PROJECT MANUAL

UNC ITS Manning
Raleigh, North Carolina

November 04 , 2024 **Bid Set Documents**

Owner
University of North Carolina

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Interior Architects Project Number: **26UNCC.0004.000**

END OF DOCUMENT

DOCUMENT 00 01 07 - PROFESSIONAL SEALS PAGE

The specification sections listed below were prepared by or under the direct supervision of the Architect:

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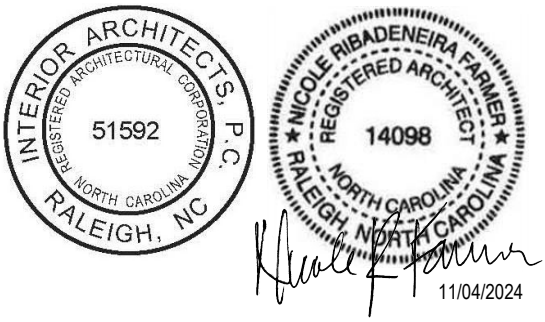

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08 12 13 Hollow Metal Frames
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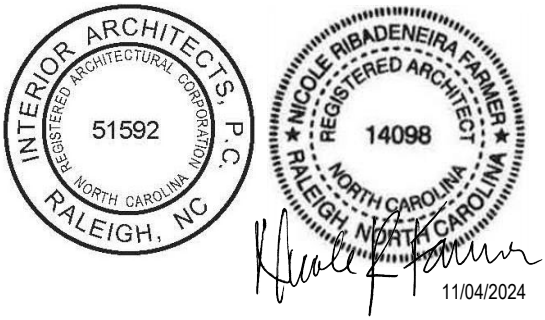

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SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Project requirements.
2. Type of Contract.
3. Work covered by Contract Documents.
4. Other work.
5. Permits
6. Access to site.
7. Coordination with occupants.
8. Occupancy requirements.
9. Work restrictions.
10. Specification and drawing conventions.

1.2 PROJECT REQUIREMENTS

A. Dimensions: Verify dimensions indicated on drawings with field dimensions before fabrication or ordering of materials. Do not scale drawings. When a dimension is required, request information from Architect.

B. Existing Conditions: Notify Architect of existing conditions differing from those indicated on the drawings.

1.3 PROJECT INFORMATION

A. Project Identification: UNC ITS Manning, Project No. 26UNCC.0004.000.
1. Project Location: 211 Manning Drive, Chapel Hill, North Carolina 27599.

B. Owner: University of North Carolina.

C. Architect: IA Interior Architects.
1. Architect's Representative: Nicole Farmer, 919-719-0512, n.farmer@interiorarchitects.com.

1.4 TYPE OF CONTRACT

A. Type of Contract: Project will be constructed under a single prime contract.

1.5 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work consists of interior construction, including but not limited to:
1. New architectural work - partitions, doors, ceilings, finishes, electrical, mechanical, plumbing, and fire protection for office spaces.

1.6 OTHER WORK

A. Separate Contract: Owner will award separate contracts for performance of certain construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract. These contracts will include the following:
1. Security systems (Contractor to furnish and install empty conduits with a junction box where indicated on the Contract Documents).
2. Information Technology, Data and Communication System (Contractor to furnish and install empty conduits with a junction box where indicated on the Contract Documents).

3. Fixtures, furnishings, and equipment to the extent not identified in the Contract Documents. A separate Contract will be awarded by Tenant.
4. Furniture: A separate Contract will be awarded by Tenant for the supply and installation of workstations, office furniture, loose furniture, and conference room tables. Other furniture to be determined.
5. Audio Visual systems (Contractor to furnish and install empty conduits with a junction box where indicated on the AV Contract Documents). A separate Contract will be awarded by Tenant for remainder of system.
6. Graphics and Signage Work. A separate Contract will be awarded by Tenant for this work.

B. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, and without interfering with or delaying work under this Contract.

1.7 PERMITS

A. Contractor shall secure and pay for all permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required.

B. If required by governmental authority, Owner will make application for permits and licenses using forms obtained and prepared by Contractor and with all costs paid by Contractor.

1.8 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Access: At all times, provide Architect and Owner's representatives, easy and safe access to the Work wherever it is in preparation and progress. Provide such access so Architect may perform its functions.

C. Landlord's or Property Manager's Rules: Conform at all times to Landlord's and Property Manager's requirements for protection of plant, materials, equipment, and noise levels. A copy of Landlord's or Property Manager's rules (tenant work letter or lease requirements) will be furnished upon written request from Owner.

D. Use of Site: Confine operations at the site to areas permitted by law, ordinances, permits, and the Contract Documents and do not unreasonably encumber the Site with materials or equipment.
1. Driveways, Walkways and Entrances: Keep driveways parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
   a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
   b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

E. Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.9 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy site and existing buildings during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.

B. Schedule use of premises for Work and coordinate construction operations with the Owner to allow for Owner occupancy.
   1. Schedule use of premises for Work and coordinate construction operations with the Owner to allow for use of site and premises by the public.
   2. Perform the Work during normal business hours only upon approval of the Owner.
   3. Perform demolition work after business hours or at such times as approved by Owner Demolition work includes, but is not limited to, sprinkler work, concrete saw cutting, spray painting, hammering, nailing, and similar work, which may cause noise, dust, or odors, thereby disturbing occupants.
   4. Keep premises orderly, clean and with a minimum of obstruction and inconvenience to the tenants and the public.
   5. Limit use of site to areas designated unless otherwise allowed by Owner in writing.
   6. Relocate stored products that interfere with public access, operations of the Owner or separate contractor. If necessary, obtain and pay for additional storage or work areas needed for operations.
   7. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
   8. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.10 OCCUPANCY REQUIREMENTS

A. Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
   1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
   2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

1.11 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. Contractor’s Conduct on Premises: The Contractor and their employees shall behave in a respectful, courteous, and safe manner. Abusive, harassing, and lewd behavior is prohibited. Music playing is prohibited. Alcohol, tobacco, and drug use is prohibited.
   1. Comply with Owner’s security requirements.

C. On-Site Work Hours: Limit work in the existing building to normal business working hours of Monday through Friday, unless otherwise indicated.

D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others.

E. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
   1. Notify Owner not less than two days in advance of proposed disruptive operations.

F. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

G. Employee Identification: Owner will provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

1.12 SPECIFICATION AND DRAWING CONVENTIONS

A. These specifications are a specialized form of technical writing edited from master specifications and contain deviations from traditional writing formats. Capitalization, underlining, and bold print is only used to assist reader in finding information and no other meaning is implied.

B. Except where specifically indicated otherwise, the subject of all imperative statements is the Contractor.

C. Sections are generally numbered in conformance with Construction Specifications Institute Masterformat System. Numbering sequence is not consecutive. Refer to the Table of Contents for names and numbers of sections included in this Project.

D. Pages are numbered separately for each section. Each section is noted with "End of Section" to indicate the last page of a section.

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

F. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
   1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
   2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and as scheduled on Drawings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 10 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

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

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
   1. Include as part of each alternate, costs of related coordination, revisions, and adjustments.
   2. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. As indicated on drawings.

END OF SECTION 01 23 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

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

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit searchable pdf file with documentation and attachments for each substitution request. Provide 3 copies of samples and, where necessary, 3 copies of range samples per requirements in Section 01 33 00 “Submittal Procedures.”
   1. Substitution Request Form: Use facsimile of form provided in Project Manual.
   2. Documentation: Provide documentation as specified herein with each request.

1.4 QUALITY ASSURANCE

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

1.5 COORDINATION WITH OTHER WORK

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

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. General: Any proposed substitution must maintain the quality standards established by the Contract Documents for the specified product without any detrimental effect to Owner.
   1. Substitutions require prior review and acceptance by Architect per process specified herein. Substitutions shall be submitted per procedures specified herein and shall not be submitted as part of a submittal.
      a. Substitutions submitted as a submittal prior to acceptance shall be rejected and returned to Contractor without action.
   2. In instances of dispute as to whether any substitution proposed by Contractor is acceptable, the judgment of Architect shall govern. The burden of proof rests solely with Contractor to show compliance and acceptability of proposed substitutions.
      a. Submit complete documentation for substitution as specified herein. Incomplete substitution requests will be returned to Contractor without action.

3. If substitution is accepted by Architect, Contractor shall submit required submittals for that portion of the Work per submittal procedures in Section 01 33 00 “Submittal Procedures.”
4. Contractor shall address impact on Submittal Schedule and Contractor’s Construction Schedule and shall accept schedule changes without change in time or cost to Owner.
5. Acceptable substitutions shall comply with all requirements in the Contract Documents including those within individual specification sections and in Section 01 60 00 “Product Requirements,” except where deviations have been accepted in writing by Architect. Deviations not pointed out by Contractor are not accepted.

B. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
   1. Conditions: Architect will consider Contractor's request for substitution for cause only when the following conditions are satisfied and will return requests without action, except to record noncompliance if the following conditions are not satisfied.
      a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
      b. Requested substitution does not require revisions to the Contract Documents that are extensive, change design intent or are unacceptable to Architect.
      c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
      d. Substitution request is fully documented and properly submitted.
      e. Requested substitution will not unnecessarily adversely affect Contractor's Construction Schedule.
      f. Requested substitution has received necessary approvals of authorities having jurisdiction.
      g. Requested substitution is compatible with other portions of the Work.
      h. Requested substitution has been coordinated with other portions of the Work.
      i. Requested substitution provides specified warranty.
      j. If requested substitution involves other work, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to providers of other work.

C. Substitutions for Convenience: Not allowed.

D. Change in Project Condition as Justification for Request - Extenuating circumstances as follows:
   1. Product is no longer manufactured.
   2. Product is not available due to a strike, lockout, or bankruptcy.
   3. Product is not available due to an Act of God.
   4. Specified product is identified as incompatible or inappropriate for Project.
   5. Specified item fails to comply with building code requirements.
   6. Manufacturer or fabricator declares a specified product to be unsuitable for use intended and refuses to warrant its installation.
   7. Requested substitution will provide Owner with a cost savings without affecting desired effect of specified product.

2.2 SUBSTITUTION REQUEST PROCEDURES

A. Substitution Request Procedures: If substitution request is justified per preceding article, submit each substitution request per the following substitution procedures:
   1. Limit each request to one proposed substitution.
   2. Substitution Request Form: Use Form attached at end of section. Complete all lines. If a line is not applicable, indicate “N/A.” Identify product to be replaced and product to be substituted. Include Specification Section number, title and paragraph and Drawing numbers and titles.
   3. 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 product specified. Include annotated copy of applicable Specification Section addressing each item in section in left hand margin stating whether proposed substitution complies with requirement or deviates. Specifically indicate deviations and impact on Work.
         1) Significant qualities may include attributes such as performance, weight, deflection, tolerances, size, durability, visual effect, warranties, and specific features and requirements indicated.
      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      e. Samples showing full range of colors including submission for specific finish to match Architect’s control sample or selected product.
         1) Where color or finish does not match Architect’s control sample or selected product, provide custom color or finish.
         2) When, due to the nature of the material, the material is available in a range of colors, i.e., natural stone, brick, and tile, Contractor shall submit the full available range of colors for that material for Architect’s review.
         3) When material is available with varying characteristics, Contractor shall submit a range sample depicting the applicable range proposed for this project as specified in Section 01 33 00 “Submittal Procedures.”
         4) Provide photographs of quarried materials showing proposed selection.
      f. Certificates and qualification data, where applicable or requested.
      g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
      h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
      i. Research/evaluation reports from model code organization acceptable to authorities having jurisdiction showing compliance with building code in effect for Project.
      j. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on overall Contract Time. If specified product or method of construction cannot be provided within Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
      k. Cost information, including proposal of change, if any, to Contract Sum.
      l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
n. Other information as necessary to assist evaluation.

B. Architect Review:
1. Architect will review Contractor's written request for substitution when the conditions noted previously under “Substitution for Cause” are satisfied.
2. If those conditions are not satisfied, Architect will return request to Contractor, without recommendation to Owner, except to record noncompliance with those requirements:
3. If necessary, Architect will request additional documentation for evaluation within 5 days of receipt of a substitution request.

C. Architect will notify Contractor of acceptance or rejection of proposed substitution within 10 days of receipt of request, or 5 days of receipt of additional documentation, whichever is later. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

D. Contractor shall issue a Proposed Change Order documenting acceptance of substitution.

E. Contractor may proceed with using substitution in lieu of the product specified if Architect does not issue a decision on use of a proposed substitution within time allocated. Contractor shall proceed with submitting Shop Drawings, Samples and Product Data for the proposed product for review by Architect.

F. Submission of a Shop Drawing, Sample or Product Data indicating proposed variance from Contract Documents is not a proper submission and does not constitute a Substitution Request. Approval of a Shop Drawing, Sample or Product Data indicating a proposed variance from the Contract Documents does not constitute approval of a Substitution.

END OF SECTION 01 25 00

Owner: _____ Project Name: _____

_____ Location: _____

_____ Date: _____

Attn: _____ Substitution No: _____

From:

_____

_____

Contractor requests for substitutions will be considered upon receipt of this completed substitution request form and all required supporting documentation. Substitutions made without completion of this form and the Architect's approval will be considered non-compliant work. The Contractor proposes the following substitution in accordance with the requirements of the Contract Documents.

Substitution Form

Specified Product / Material / Equipment:
Substitution Description:
IA Drawing References:
IA Specification References:

Deduct $ from Base Bid if Substitution is selected.
Add $ to Base Bid if substitution is selected.
Deduct days calendar
Add days to base bid if substitution is selected.

Performance Evaluation

☐ New Product
☐ 2 – 5 Years old
☐ 5 – 10 years old
☐ More than 10 years old
☐ Product / Material Performance & Test Data Attached
☐ Project(s) where last used (Include date(s)

Differences between proposed and specified Product/Material:

Certification
The undersigned certifies that:

1. Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product or material.
2. Same warranty will be furnished for the proposed substitution as for the specified product or material.
3. Same maintenance service and source of replacement parts, as applicable, are available.
4. Proposed substitution will have no adverse affect on other trades and will not affect or delay progress schedule.
5. Cost data as stated above is complete. Claims for additional cost related to accepted substitution which may subsequently became apparent, are to be waived.
6. Proposed substitution does not affect dimensions and functional clearances.
7. Coordination, installation, and changes in the work as necessary for accepted substitution will be complete in all respects.
8. Proposed substitution change will not lengthen contract time.

Submitted by
Signed by
Date
Firm
Phone
Address
Email
Attachments

A/E's Review and Recommendation

☐ Substitution approved. Prepare submittals per Spec Section 01 33 00 after award
☐ Substitution Rejected - Resubmit with additional information requested
☐ Substitution Rejected - Use specified materials
☐ Substitution Rejected - Received too late- Use specified materials

Signature

Typed Name of Signer:
Typed Title of Signer:
Date:

Owner's Review and Action

☐ Substitution Approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Process. Prepare Change Order.
☐ Substitution Approved as Noted – Make submittals in accordance with Specification Section 01 25 00 Substitution Process. Prepare Change Order.
☐ Substitution Rejected - Use specified materials

Signature

Typed Name of Signer:
Typed Title of Signer:
Date:

Additional Comments: ☐ Contractor ☐ Subcontractor
☐ Supplier / Manufacturer ☐ Building Management ☐ Architect

Attachments:

Distribution:

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 CLARIFICATIONS AND MINOR CHANGES IN THE WORK

A. Architectural Supplemental Instructions (ASI): Architect may issue supplemental instructions clarifying the Work or describing minor changes in the Work, not involving adjustment to Contract Sum or Contract Time.
   1. Architect will use AIA Document G710, "Architect's Supplemental Instructions" when issuing supplemental instructions.
   2. Architect has no authority to order changes in the Work that involve changes to Contract Sum or Contract Time. In the event Contractor believes ASI involves such a change, Contractor shall notify Architect and Owner promptly and in any event within the time frames stated in the Agreement.

1.3 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. Construction Change Directive contains a complete description of change in the Work and designates method to determine change in Contract Sum or Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
   1. After completion of change, submit supporting documentation required in this Section to substantiate cost and time adjustments to the Contract.

1.4 REQUEST FOR PROPOSAL

A. Owner-Initiated Request for Proposal: If Owner contemplates making a change that will affect the Contract Sum or Contract Time, Architect will issue a Request for Proposal (RFP) with a detailed description of proposed changes in the Work. If necessary, description will include supplemental or revised Drawings and Specifications.
   1. RFP issued by Architect is not instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in RFP or 20 days after receipt of RFP, when not otherwise specified, Contractor shall submit a Proposed Change Order (PCO) to Owner and Architect estimating adjustments to the Contract Sum and Contract Time necessary to execute the change, including supporting documentation required in this Section.
   3. Owner will review and respond to Contractor’s PCO within 10 working days after its receipt.
   4. If RFP requires Contractor to proceed with work that will be submitted in the future as a Change Order, Contractor shall expeditiously proceed with the work described in the RFP. Contractor shall submit documentation for inclusion in a Change Order once the work covered by the RFP is completed or as soon as final cost/time is determined.

1.5 CONTRACTOR PROPOSED CHANGE ORDERS

A. Contractor-Initiated Proposed Change Orders:
   1. If Contractor discovers a discrepancy in the Contract Documents that was not previously noted, or determines upon receipt of an Architect's Supplemental Instructions (ASI), that the work described therein will necessitate a change in Contract Sum or Contract Time, Contractor shall notify Architect and Owner, in writing, within 5 days of such discovery or determination that Contractor intends to submit a Proposed Change Order (PCO) for the work involved.
   2. Within 10 working days of such notice, Contractor shall submit a PCO to Owner and Architect; the PCO shall state:
      a. Proposed change in Contract Sum and/or Contract Time.
      b. Description of other changes in the work required by the proposed change, or desirable therewith, if any.
      c. Substantiation of costs or time involved, including supporting documentation required in this Section.
      d. Reference the ASI related to the PCO.
   3. Contractor is not authorized to proceed with work that changes either the Contract Sum, or Contract Time without receiving written authorization, or approval from Owner.

1.6 SUPPORTING DOCUMENTATION

A. Whether initiated by Owner or Contractor, a Proposed Change Order (PCO) shall be submitted by Contractor to Owner and Architect for review, accompanied by all applicable supporting documentation.

B. Form of Proposed Change Order (PCO) shall be as agreed upon mutually by Owner and Contractor and shall include, at the minimum, the following breakdown and supporting documents:
   1. Cover Letter.
   2. Statement outlining reasons for the change and the effect of the change on the Work.
   3. Summary Cost Estimate.
   4. Detailed Breakdown (Labor and Materials), by Subcontractor, Supplier, etc. related to the Schedule of Values included in the Application and Certificate for Payment.
      a. Subcontractor proposals.
      b. Equipment supplier proposals, invoices, etc.
      c. Detailed Breakdown of General Conditions costs.
      d. Detailed explanation of Contractor's fee basis.
      e. Applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      f. Credits for work not performed and no longer required by the proposed changes.
   5. An updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
   6. If proposed change requires substitution of product or system for product or system specified, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions.

1.7 AUTHORIZATION

A. Owner will review Proposed Change Order with input from Architect and will determine whether additional information is required or if changes in Contract Sum and/or Contract Time are acceptable.

B. If questions remain, Owner or Architect will request either further information or a meeting to discuss Proposed Change Order particulars.

C. Upon agreement between the Owner and Contractor on proposed changes, Contractor shall produce a Change Order on AIA Document G701 with authorized changes as agreed upon by the parties with signatures for Owner, Contractor and Architect, with all supporting documentation attached.

1.8 DISPUTES

A. Should Contractor and Owner disagree about the value of proposed change in Contract Sum or Contract Time, Contractor shall notify Owner, in writing, stating reason for disagreement.
   1. Disagreement about value of a Change Order does not relieve Contractor of responsibility to proceed with the change, as ordered, and to seek settlement of dispute under pertinent provisions of the Contract Documents.

1.9 COORDINATION

A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum as shown in the Change Order.

B. Promptly revise Progress Schedule to reflect any change in Contract Time; revise schedules to adjust times for other items of work affected by the change and resubmit.

1.10 WORK ON CHANGES

A. Work on proposed changes that affect the Contract Sum shall not be started until an approved Change Order has been received by Contractor, unless otherwise directed by Owner in writing.

B. In all cases, Contractor shall maintain an accurate account of all labor and materials involved in the change.

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Schedule of Values: Statement furnished by Contractor allocating portions of Contract Sum to various portions of the Work for use as basis for reviewing Applications for Payment.

1.3 SCHEDULE OF VALUES

A. Coordination:
   1. Coordinate preparation of schedule of values with preparation of Contractor's Construction Schedule.
   2. Coordinate line items in Schedule of Values with other required administrative forms and schedules, including the following:
      a. Application for Payment forms with continuation sheets.
      b. Submittal Schedule.
   3. Submit Schedule of Values to Architect at earliest possible date, but no later than 7 days before date scheduled for submittal of initial Applications for Payment.
   4. Architect will review and return draft version with any changes or questions for Contractor to provide additional information or follow-up.

B. Format and Content: Provide electronic pdf to Architect and Owner. Use Project Manual table of contents as a guide to establish line items for Schedule of Values. Provide at least one line item for each Specification Section. Forms filled out by hand are unacceptable.
   1. Identification: Include the following Project identification on Schedule of Values:
      a. Project name and location.
      b. Name of Architect.
      c. Architect's project number.
      d. Contractor's name and address.
      e. Date of submittal.
   2. Arrange Schedule of Values consistent with format of AIA Document G703.
   3. Provide breakdown of Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of 5 percent of Contract Sum.
      a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling 5 percent of Contract Sum and subcontract amount.
   4. Round amounts to nearest whole dollar; total shall equal Contract Sum.
   5. Provide separate line item in Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
      a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
   6. Provide separate line items in Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Each item in Schedule of Values and Applications for Payment shall be complete, with total cost and proportionate share of general overhead and profit for each item.
    a. Other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in Schedule of Values or distributed as general overhead expense, at Contractor's option.
8. Update and resubmit Schedule of Values before next Applications for Payment when Owner and Architect accepted contract modifications result in a change in Contract Sum.
    a. Add approved change orders as separate line item. When change involves multiple trades or is determined by Architect to require further breakdown, add approved change order as separate sheet.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following initial Application for Payment shall be consistent with previous applications and payments as executed by Architect and paid for by Owner.
    1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
    1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
    2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
    3. Provide summary documentation for stored materials indicating the following:
        a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
        b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
        c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
    4. Materials stored on-site, which is not readily available for review, must be identified and listed in stored materials column.
    5. Payment will not be made for materials and equipment stored off site, except at Owner’s discretion and prior approval.
        a. When Application for Payment includes material or equipment stored off-site, Application shall be accompanied by a statement certifying:
            1) Description of Item(s) being stored.
            2) Location of bonded warehouse(s) where materials or equipment is being stored.
            3) Affidavit of Storage.
            4) Certificate of Insurance.
            5) Bill of sale made to Owner stating there will be no additional cost for transportation and delivery of item(s) being stored.
            6) Statement certifying that item or any part thereof will not be installed in any construction other than work under this Contract.

C. Payment Application Times: Provide Contractor notarized Application for Payment on date indicated in the Agreement between Owner and Contractor. If no date is indicated, then the 1st of the month will be considered the agreed upon date. The period of construction work covered by each Application for Payment is one month unless other period is indicated in the Agreement.
   1. Submit draft copy of Application for Payment to Architect by the 25th of the month. Include work to be performed through the end of the month.
   2. Review draft copy with Architect and Owner at progress meeting near the date of issuance for Contractor notarized Application for Payment but prior to due date for Architect executed Application for Payment with sufficient time to make accepted changes made to draft copy.
      a. Supply Owner and Architect with supporting evidence for stored materials and percentages complete.
      b. When Architect requires substantiating information, submit data justifying dollar amounts in question.
      c. In taking action on Contractor's Application and Certificate for Payment, Architect shall rely on the accuracy and completeness of the information furnished by Contractor and shall not be deemed to represent that he has made audits of the supporting data.
   3. Make revisions to draft Application for Payment as acceptable to Owner and Architect to correspond to agreed upon percentages complete.
   4. Issue and transmit revised Contractor certified /notarized Application for Payment to Architect.

D. Application for Payment Forms: Use AIA Documents G702 and G703 as form for Applications for Payment. For each item, provide a column for listing each of the following:
   1. Item Number.
   2. Description of work.
   3. Scheduled Values.
   4. Previous Applications.
   5. Work in Place and Stored Materials under this Application.
   6. Authorized Change Orders.
   7. Total Completed and Stored to Date of Application.
   8. Percentage of Completion.
   9. Balance to Finish.
   10. Retainage.

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
   1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
   2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
   3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
   4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

F. Waivers of Mechanic's Lien: With each Application for Payment, submit Waivers of Mechanic's Lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
   1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
   2. When an application shows completion of an item, submit conditional final or full waivers.
   3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

4. Submit final Application for Payment with or proceeded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

G. Transmittal: Submit number of originals required by the Contract, but not less than 3, signed and notarized, to Architect by method ensuring receipt within 24 hours with Waivers of Mechanic's Lien and required attachments.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of initial Application for Payment include the following:
1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).
4. Submittal Schedule (preliminary if not final).
5. Initial progress report.
6. Report of preconstruction conference.
7. Certificates of insurance and insurance policies.
8. Performance and payment bonds.
9. Data needed to acquire Owner's insurance.

I. Provide the following with Application for Payment as Project progresses:
1. Updated Contractor's Construction Schedule.
2. Stored materials documentation.
3. Waiver of Liens.
4. Progress reports.

J. Application for Payment at Substantial Completion: After Architect issues Certificate of Substantial Completion, submit Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Prior to submitting request for final payment, forward to Architect for transmittal to Owner bonds, written warranties required for particular items of work, and the following:
1. Properly executed releases of waivers of lien on AIA Documents G706, "Contractor's Affidavit of Payment of Debts and Claims" and G706A, "Contractor's Affidavit of Release of Liens."
    a. Submit to Architect in duplicate prior to final payment.
    b. If Contractor cannot furnish a waiver of liens or releases satisfactory to Owner, Owner may require a surety bond as a condition precedent to final payment.
2. A properly executed "Consent of Surety Company to Final Payment," AIA Document G707.
3. Evidence that claims have been settled.
4. Certification of satisfaction/release of all Permits.
5. Occupancy permits and similar approvals or certifications by governing authorities and franchised services, assuring Owner's full access and use of completed work.

6. Test/adjust/balance records, maintenance instructions, meter readings, start-up performance reports, and similar commissioning information germane to Owner's occupancy, use, operation, and maintenance of completed work.
7. Final cleaning of the Work.
8. Advice to Owner on coordination of shifting insurance coverage(s), including proof of extended coverage(s) as required.
9. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
10. Completion of project close-out requirements including transmittal of Project Record Documents, warranties, operations and maintenance manuals and attic stock to Owner.
11. Completion of items specified for completion beyond time of Substantial Completion.
12. Transmittal of required project construction records to Owner.
13. Proof, satisfactory to Owner, that taxes, fees, and similar obligations of Contractor have been paid.
14. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
15. Conversion of door locks and other Contractor's access provisions to Owner's property.

L. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
   1. Updated final statement, accounting for final changes to Contract Sum.
   2. Certificate of Final Completion.

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. Administrative and supervisory personnel.
   2. Digital project management.
   3. Documentation from Architect
   4. Project coordination.
   5. Requests for Information (RFIs).
   6. Project meetings.
   7. Project tracking.
   8. Project reports.

1.2 INFORMATIONAL SUBMITTALS

A. Subcontract List: Provide a directory 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. Use CSI Form 1.5A. Include the following information:
   1. Name, address, and telephone number of subcontractor and suppliers.
   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 10 working days of starting construction operations, submit a list of key personnel assignments, including superintendent and personnel in attendance at site. Identify individuals and their duties and responsibilities; list addresses and home, office, and cell phone numbers and e-mail addresses. Provide same information for individuals assigned as alternates assigned to Project.
   1. Post copies of list in project meeting room and in temporary field office. Maintain copy on DPM as defined in this Section. Keep list current at all times.

1.3 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. Provide administrative and supervisory personnel as required for proper performance of the Work including a project manager and project superintendent with experience in the administration and supervision of construction similar to this Project. Contractor's project staff shall be experienced in the following as a minimum:
   1. Scheduling and sequencing of Work.
   2. Coordination of the Work.
   3. Temporary services and facilities.
   4. Submittal review.
   5. Selections for compatibility
   6. Installation of the Work.
   7. Protection of the Work
   8. Cutting and patching.
   9. Inspection and tests.

1.4 DIGITAL PROJECT MANAGEMENT

A. Digital Project Management (DPM): Provide, administer, and use an Internet-based Project Management site acceptable to Owner and Architect for hosting, managing, and archiving of Project communication and documentation until Final Completion. Contractor shall include cost of DPM in Contract Sum.
   1. As a minimum, use DPM for the following Project procedures:
      a. Project Directory: Compilation of Project personnel, including companies, names and contact information for Contractor, Owner, Architect, Consultants, subcontractors, and other entities involved in Project.
      b. Project Communications including creation, logging, tracking, and notification for RFIs, Submittals, Proposed Change Orders, and final Change Orders.
      c. Creation and distribution of agendas and meeting minutes.
      d. Distribution of Project Documentation including Contractor's Construction Schedules, Schedule of Values, Submittal Schedule, and draft Applications for Payment.
      e. Contract Document Management: Maintain locked pdf of issued documents including Drawings, Specifications, Modifications and Architectural Supplemental Instructions (ASIs).
      f. Punch list items and status.
   2. DPM shall allow for the following:
      a. Access control for each entity to limit entity's digital rights to create, modify, view, and print documents.
      b. Tracking of status of each Project Communication in real time, including log time and date when information is transmitted to DPM.
      c. Notifying addressees via email that documents are available on DPM.
      d. Securing items on DPM from changes once submitted to DPM.
   3. DPM Users: Contractor and Architect are required to use DPM service. Subcontractors, suppliers, and Architect's consultants shall be permitted to use DPM service at no extra charge.
      a. Users of DPM service are required to have an email address, Internet access, and PDF review software able to mark up and apply electronic stamps to documents (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless this capability is provided by DPM service.
      b. Provide 7 user licenses for use of Owner, Architect, and Owner's and Architect's consultants.
      c. Provide 8 hours of training on DPM at Architect's office for Owner and Architect.

B. Provide Project required submittals and documentation to Owner and Architect in electronic, searchable pdf utilizing DPM.
   1. Upload, transmit, log and store Project submittals and documentation on DPM in separate directories.
   2. Notify Owner, Architect and other concerned parties via email using DPM capabilities when submittals and documentation has been uploaded.
   3. Maintain submittals and documentation on DPM. Do not delete or modify documentation at any time. Name new documents by type of document and date of issuance so each has a separate unique title. Do not archive documentation until end of Project after transferring copy to Owner and Architect.

4. Transmit documents used for construction contract administration only through DPM. Do not use email or hard copies. If hard copies are required for meetings or at site, provide pdf of document on DPM.
    a. Emailed and hard copies of documents intended to use DPM service will not be reviewed.
        1) When hard copies are required, an electronic pdf file shall be posted to DPM in addition to hard copy being transmitted.
5. At Project Closeout, Architect will determine when to terminate DPM services in conjunction with Contractor and Owner.
6. Prior to terminating DPM, provide Owner and Architect with complete copy of files on DPM, in locked format to prevent further changes, on portable drive.
7. Acceptable DPM Services: One of the following Internet-based Project software packages under their current published licensing agreements:
    a. Autodesk; Buzzsaw or Constructware.
    b. Meridian Systems; Prolog.
    c. Procore Technologies, Inc.
    d. If not listed, one submittal for approval by owner and architect.
8. Contractor can propose their own standard service provided it meets the requirements herein for the DPM service and is acceptable to Architect and Owner.

C. Digital Project Documentation: Documents transmitted to Architect and Owner shall be in pdf files that are fully searchable. Scanned pdf documents are not acceptable.

1.5 DOCUMENTATION FROM ARCHITECT

A. The Contract Documents in pdf format will be provided to Contractor for the Project. Modifications will be provided in pdf format electronically when issued.
    1. Architect makes no representations as to the accuracy or completeness of pdf files as they relate to the Contract Drawings. Notify Architect of any errors or deficiencies.
    2. Maintain archived unmarked "locked" pdf of Contract Documents on DPM.
    3. When modifications are issued, add modifications and other issued documentation to maintain complete sets of Contract Documents.
    4. Contract Documents in pdf format are not to be used to determine dimensions, construction or existing conditions, or any other purpose then to provide an electronic document record of the Contract Documents.
        a. Do not use pdf files to determine dimensions by scaling. Where dimensioning information is required but not apparent, notify Architect and request additional information.

B. Markup of Contract Document Documentation:
    1. Maintain copy of Contract Documents at Project site complete with all modifications and request for information attached. Slip sheet documents so that all versions of issued documents are maintained with latest version on top.
    2. Utilize separate electronic pdf reference copy of Contract Documents on DPM with original content locked for reference but allowing mark-up electronically at site.

C. Architect will provide digital drawing files for Contractor's use in preparing Shop Drawings and Coordination Drawings.
    1. Prior to Architect transferring files, Contractor shall execute and return to Architect an Electronic File Transmittal Agreement (EFTA), on form available from Architect, signed and dated by responsible person representing Contractor.

2. Architect will transfer files by method to be determined by Architect.
3. Prior to Contractor transferring files to others, Contractor shall require entity to which Architect's digital drawing files are conveyed to abide by the terms and conditions of the EFTA, and only to use these files for this Project.
    a. Contractor shall not furnish copies of Architect's digital drawing files to any party that is not directly providing services for this Project.

D. Limitations of Usage of Architect's Files:
1. Using Architect's digital drawing files does not relieved Contractor of the duty to fully comply with the Contract Documents, including and without limitation:
    a. Coordination of the Work with the Contract Documents, field conditions, and other work required by the Contract Documents.
    b. Preparation, coordination, checking, and detailing of shop drawings and/or other submittals, including measurements, dimensions, and quantities of the Work.
2. When modifying Architect's digital drawings for project-related services, Contractor and/or third party using Architect's digital drawing files shall add its company name, address, telephone number, and contact information to the title block of each sheet, and all references to Architect shall be removed from the digital drawing.
    a. Contractor shall be responsible for removing information not normally provided on Shop Drawings, including Architect's title block and any references to the Contract Documents from Architect's digital drawing files.
        1) Shop Drawings and other type submittals submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
    b. Contractor shall make changes to Architect's digital drawing files as necessary to coordinate with the Work, existing conditions, changes in the Contract Documents and as necessary to accurately depict the Work.
3. Architect makes no representations as to the accuracy or completeness of digital drawing files as they relate to the Contract Drawings.
    a. Contractor shall be solely responsible for verifying the accuracy of all results created with the use of Architect's digital drawing files.
4. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, the Contract Documents shall govern.
    a. Contractor is responsible for determining if any conflict exists.
    b. Promptly notify Architect of any discrepancy in digital drawing files.

E. Digital Drawing Files Available from Architect:
1. Digital drawing files of floor plans and reflected ceiling plans will be provided as dwg files in AutoCAD version to be determined by Architect.
2. At Contractor's written request, electronic copies of Project Building Information Model (BIM) Digital Data Files will be provided by Architect in Revit version to be determined by Architect.
3. Architect's digital drawing files will be provided by Architect once during the Project and will not be updated or maintained. Digital drawing files with modifications will not be issued.
4. At Contractor's written request, digital drawing files for engineering systems will be provided to Contractor for use in connection with this Project, per conditions indicated in Engineering specification sections, including signing required release form by Contractor and other entities provided the files. Engineering digital drawing files will be made available in software to be determined by engineer.

1.6 PROJECT COORDINATION

A. Coordinate construction operations included in the various sections of the Specifications to provide for proper installation, connection, and operation of the Work where portions depend on each other and to provide an efficient and orderly installation of each part of the Work.
   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, testing, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to parties involved, outlining special procedures required for coordination, including required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities 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 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. Startup and adjustment of systems.
   8. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
   1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.7 COORDINATION OF THE WORK

A. Layout of the Work:
   1. Layout partitions for Architect's review and confirmation at the Project Site. Taking care to include furred walls, additional layers of gypsum board and materials with thickness and support, including wood paneling, stone paneling and stretched fabric wall systems.
   2. Mark locations of devices, including switches, outlets, and data devices.
   3. Mark panelized areas to indicate jointing and equal panel sizes to coordinate between the device placement and panel construction.
   4. Mark overhead items including lights and diffusers, access panels and ductwork. Where multiple systems intersect or overlap, provide coordination drawings.
   5. Architect will review and address any issues with dimensions.

B. Coordination drawings:
   1. Contractor shall prepare coordination drawings where careful coordination is needed for installation of Work fabricated by separate entities, or where limited space availability necessitates maximum utilization of space for efficient installation of different components.
      a. Where more than one trade is involved, provide Coordination Drawings that are drawn as a single file with each trade item or assembly on a separate layer.
      b. Provide coordination drawings per requirements in individual Sections and per requirements in Section 01 33 00 "Submittal Procedures."
      c. Refer to Drawings for specific coordination drawing requirements for mechanical and electrical installations.
         1) Provide coordination drawings for Work in mechanical and electrical rooms and spaces where two or more entities provide the Work and separate shop drawings are insufficient to show coordination.
   2. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
      a. Use Drawings as basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
      b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
      c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
      d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
      e. Indicate required installation sequences.
      f. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
   3. Separate layers shall be prepared for the following areas of work.
      a. Ductwork, diffuser locations, mechanical piping, mechanical equipment, plumbing and automatic temperature control.
      b. Sprinkler System.
      c. Electrical, lighting layouts, speaker layout, sound masking system, emergency lighting and exit signs.
      d. Reflected ceiling plans.
   4. Utilize graphic symbols as indicated on Contract Drawings.
   5. Prepare final Coordination Drawings using uniform drawing size, no larger than original Contract Document drawing size.
   6. Key and cross-reference Coordination Drawings to the Contract Drawings.
   7. Detail complex areas of building systems at larger scales than that used for the typical floor plans to provide a clear representation of the work being described.
   8. Submit Coordination Drawings on a composite floor-by-floor or area-by-area basis and include representations of the work of all trades for the particular floor or area being submitted.
   9. Coordination Drawings shall bear the signed approval stamp of each trade and subcontractor to indicate that the final composite drawings accurately represent their work in coordination with other trades.

10. Processing Time: Refer to Section 01 33 00 "Submittal Procedures."
    a. Relocations of Work installed or modified prior to review of Coordination Drawings, shall be made without additional expense to Owner.
11. Organize coordination drawings as follows:
    a. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
    b. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
    c. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
    d. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
        1) Show openings and sleeve locations required in slabs, walls, beams and other structural elements, including openings necessary but not shown on structural drawings, and deviations in the location of holes shown on structural drawings.
        2) Specifically note or indicate relocated openings and new openings.
    e. Mechanical and Plumbing Work: Show the following:
        1) Sizes and bottom elevations of rectangular ductwork.
        2) Sizes and centerline elevations of round ductwork, piping and conduit runs.
        3) Acoustical lining in ductwork, flange dimensions, reinforcement, and insulation for ductwork, as well as flange dimensions and insulation for all pipes and ducts.
        4) Sizes and bottom elevations of ductwork and piping support systems.
        5) Identify low-, medium-, and high-pressure ductwork
        6) Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts, and electrical distribution equipment.
        7) Orientation of equipment requiring electrical connections and indicate, where required, location of architectural access panels as may be required by code or to facilitate maintenance.
        8) Fire-rated enclosures around ductwork.
        9) Show double lines for ductwork and pipes 6 inches and larger. Ductwork shall be drawn with allowance for sound lining, insulation, connection flanges and reinforcing. Show single lines for electrical work, conduit runs and lines below sizes noted above. Draw busways to scale.
    f. Electrical Work: Show the following:
        1) Vertical and horizontal conduit runs, 1-1/4 inches in diameter and larger.
        2) Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
        3) Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
        4) Location of pull boxes and junction boxes, dimensioned from column center lines.
        5) Dimension the location of all major components from column centerlines and indicate, where required, code required clearances by cross-hatching.
        6) Location of access panels to comply with code, or facilitate maintenance.
    g. Fire-Protection System: Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

12. Architect will review coordination drawings to confirm that the Work is being coordinated, but not for details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

C. Coordination Drawings Submittal:
1. Provide Coordination Drawings in searchable pdf format at a scale of not less than 1/4"= 1'-0".
2. Represent each trade by a unique layer and color. Files shall contain a color key.
3. Submit Coordination Drawings via DPM to Architect per submittal requirements in Section 01 33 00 "Submittal Procedures."
4. Contractor's Review:
   a. Review Coordination Drawings and check for compliance with the Contract Documents. Note corrections and field dimensions.
      1) Highlight and encircle deviations from the Contract Documents. Note reason for deviation adjacent to each item.
   b. Mark Coordination Drawing submittal with Contractor's approval stamp before submitting to Architect.
      1) Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
5. Architect's Action:
   a. Architect will review Coordination Drawing submittal as an Action Submittal per Section 01 33 00 "Submittal Procedures."
   b. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

D. Record Drawings:
1. Maintain at project site an orderly file of Coordination Drawings available for reference during regular working hours to Owner, Architect, and their representatives.
2. Keep Coordination Drawings up-to-date with revisions which reflect the actual construction. Owner reserves the right to check that Coordination Drawings have been updated at every Progress Meeting.
3. Submit Coordination Drawings to Architect for Owner at the completion of all work, corrected by Contractor, if so required, and returned to Architect prior to final payment to Contractor.

1.8 REQUESTS FOR INFORMATION (RFIS)

A. During bidding process or progress of the Work, Contractor may submit a request for interpretation of the Contract Documents, for clarification of a portion of the Contract Documents, to secure additional information regarding the Work due to site or unforeseen conditions, or to address discrepancies.
1. Submit RFIs in a prompt manner to avoid delays in the Work.

B. Requests for Information (RFI) shall meet the following requirements:
1. RFIs shall be originated by Contractor.
   a. RFI's from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by Contractor prior to submittal to Architect.
      1) Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.

2. The number of RFIs shall be kept to a minimum by Contractor.
    a. Contractor shall carefully study Contract Documents to assure that requested information is not available therein.
        1) RFI's which request information available in Contract Documents will be deemed either improper or frivolous, and may be returned unanswered when the information is clear in the Contract Documents.
3. RFIs shall be fully documented by Contractor including references to the Contract Documents with digital photos of plans and site conditions.
4. RFIs shall clearly state reason for clarification or request including discrepancies and site conditions.
5. RFIs issued to request clarification of layout shall include the full layout of the Work and Contractor suggested solution using drawings to scale to be submitted with RFI.
    a. RFI's that fail to include a suggested solution will be returned unanswered with a requirement that Contractor submit a complete request.
6. RFIs shall not be used for purposes as follows:
    a. To request approval of submittals.
    b. To request approval of substitutions.
    c. To request changes which entail additional cost or credit.
    d. To request different methods of performing work than those drawn and specified.

C. Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI per the following:
1. Content of RFI: Include a detailed, legible description of item needing information or interpretation and the following:
    a. Project name.
    b. Project number.
    c. Date.
    d. Name of Contractor.
    e. Name of Architect.
    f. RFI number, numbered sequentially.
    g. RFI subject.
    h. Specification Section number and title and related paragraphs, as appropriate.
    i. Drawing number and detail references, as appropriate.
    j. Field dimensions and conditions, as appropriate.
    k. Contractor's suggested resolution. If Contractor's suggested resolution impacts Contract Time or Contract Sum, Contractor shall state impact in the RFI.
    l. Contractor's signature.
    m. Attachments: Include sketches, notations, measurements, photos, Product Data, Shop Drawings, Coordination Drawings, and other information necessary to fully describe items needing clarification or interpretation.
        1) Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on sketches.
        2) Include digital photographs of conditions.
2. Use software-generated form on DPM with substantially the same content indicated above. Submit RFI as searchable pdf file including attachments.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow 7 working days for Architect's response for each RFI. RFIs received by Architect after 2:00 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 Contract Time or 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 of additional information.
   3. Architect's response to RFI may result in a change to Contract Time or Contract Sum and may be eligible for Contractor to submit a PCO according to Section 01 26 00 "Contract Modification Procedures."
      a. If Contractor believes RFI response warrants change in Contract Time or Contract Sum, notify Architect in writing within 10 days of receipt of RFI response.

E. RFI Log: Prepare and maintain a RFI log on DPM. Submit log with agenda for progress meetings. Update and submit at progress meetings. Log to include the following:
   1. Project name.
   2. Name and address of Contractor.
   3. Name and address of Architect.
   4. RFI number including RFIs that were returned without action or withdrawn.
   5. RFI description.
   6. Date the RFI was submitted.
   7. Date Architect's response was received.

F. On receipt of Architect's response, immediately post response on DPM, update RFI log and notify affected parties. Notify Architect within 7 days if Contractor disagrees with response.

1.9 PROJECT CONFERENCES AND MEETINGS

A. Schedule and conduct conferences and meetings 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.
   2. Agenda: Prepare meeting agenda. Distribute agenda to invited attendees.
   3. Minutes: Record significant discussions and agreements achieved. Within 3 days of meeting, post proposed meeting minutes to DPM and notify concerned parties, including Owner and Architect.
      a. Minute Action Items:
         1) Number each item in minutes by discernable number.
         2) Note date of meeting when first discussed.
         3) Annotate the party responsible for resolving the item.
         4) Update item at each meeting with progress. Change responsible parties when item passes to new party to resolve.
         5) Maintain minute items on official minutes for minimum one meeting after item is resolved and parties agree to strike item in meeting.
      b. Notification: Inform participants including Owner and Architect 3 days prior to meetings that are not regularly scheduled.

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

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires 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.
   2. Provide 2 work days' written notice to Architect and Owner Project Manager of all pre-installation conferences. They may attend as appropriate.
   3. 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.
y. Agreements, and disagreements.
z. Required corrective measures and actions.

4. Minutes: Contractor shall record and distribute meeting minutes.
5. Do not proceed with installation if 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. Progress Meetings: Conduct progress meetings at biweekly intervals with dates of meetings coordinated with preparation of payment requests.
1. 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. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. 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. Review present and future needs of each entity present, including the following:
1) Interface requirements.
2) Sequence of operations.
3) Resolution of conflicts.
4) Status of submittals.
5) Deliveries.
6) Off-site fabrication.
7) Access.
8) Site utilization.
9) Management of outages.
10) Temporary facilities and controls.
11) Progress cleaning.

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

b. Contractor's Construction Schedule:
1) Review progress since last meeting.
2) Review 2 week look ahead.
a) Items impacting Building Management including after hour work, noise, utility shutdowns, etc.
3) Determine whether each activity is on time, ahead of schedule, or behind schedule.
4) Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
5) Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within Contract Time.

c. Site Walk-through of in-progress Work including site review of issues discussed during progress meeting; attended by, at a minimum: Contractor's Superintendent and Project Manager, Architect and Owner.

3. Minutes: Contractor shall record and distribute meeting.
a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with minutes of each meeting.

E. Coordination Meetings: Conduct project coordination meetings at regular intervals, to verify detailed coordination procedures for the upcoming construction operations in order to avoid potential problems and misunderstandings.
1. Attendees: In addition to Contractor's and Owner's representatives, each subcontractor, supplier, or other entity involved in coordination or planning construction activities shall be represented. All participants shall be authorized to conclude matters relating to the Work.
2. Agenda: Review plans and requirements of each entity present, including but not limited to subjects listed for Progress Meetings.
3. Contractor shall record and distribute minutes of meeting.

F. Special Meetings:
1. Call special meetings when warranted and of frequency deemed necessary, place and time as mutually agreed to by Architect and Owner.
2. Key review meetings: During the course of the work, Contractor shall meet with Owner and Architect to review work done to date. These key meetings shall be held at commencement of the appropriate construction phases:
a. Start-up meeting: Review project procedures, establish communication channels, issue Contract Documents "Issued for Construction" and review questions regarding the project.
b. Layout review: Review layout of partitions, doors, jambs, ceiling and soffits, ceiling tile start point, and electrical, data, telecommunications and audio-visual outlets marked on the floor for review prior to start of construction.

c. Above ceiling review: Review work above the ceiling including mechanical systems, light fixtures, cable trays, conduit, sprinkler lines, plumbing and plenum barriers.
d. Drywall completion: Review drywall installation prior to finish materials application.

G. Other Meetings: In addition to meetings previously listed, Architect and Owner reserves the right to call additional meetings on topics including demonstration and training, or on any subject Architect or Owner deems necessary to discuss.

H. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to scheduled date of Substantial Completion to review requirements and responsibilities related to Project closeout.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties. Participants at meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. 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. Submittal of written warranties.
d. Requirements for preparing operations and maintenance data.
e. Requirements for delivery of material samples, attic stock, and spare parts.
f. Requirements for demonstration and training.
g. Preparation of Contractor's punch list.
h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
i. Submittal procedures.
j. Owner's partial occupancy requirements.
k. Installation of Owner's furniture, fixtures, and equipment.
l. Responsibility for removing temporary facilities and controls.
3. Minutes: Entity conducting meeting will record and distribute meeting minutes.

1.10 PROJECT TRACKING

A. Maintain Project Log for the following:
1. Requests for Information.
2. Submittals.
3. Inspections.
4. Change Orders.

B. Include the following in each as a minimum: Date of Issuance, Date of Return and Status.

C. Attach Logs to Progress Meeting Minutes.

1.11 PROJECT REPORTS

A. Submit to Owner, Architect and Project Manager weekly written progress reports, including the following:
1. Percentage of work completed by phase and trade.
2. Statement as to expected completion and occupancy date.
3. Changes introduced into the work.
4. General remarks on items that could affect project.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Submittals Schedule.
   2. Contractor's Construction Schedule.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a Construction Schedule consume time and resources.
   1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
   2. Predecessor Activity: An activity that precedes another activity in the network.
   3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

1.3 INFORMATIONAL SUBMITTALS

A. Submit required submittals in the following format:
   1. Electronic copy of file.
   2. Searchable pdf file.

B. Submittals Schedule: Submit Submittal Schedule as required in Section 01 33 00 "Submittal Procedures" in conjunction with initial Contractor's Construction Schedule.

C. Contractor's Construction Schedule: Submit electronic copy of schedule. Include type of schedule (initial or updated) and date on label.

D. CPM Reports: Concurrent with CPM Construction Schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
   1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
   2. Logic Report: List of preceding and succeeding activities for activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
   3. Total Float Report: List of all activities sorted in ascending order of total float.

1.4 QUALITY ASSURANCE

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

1.5 COORDINATION

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

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Provide a Submittals Schedule per requirements in Section 01 33 00 "Submittal Procedures" in accordance with the Contract and General Conditions to Architect for review. Submittals Schedule shall be consistent with information in overall project schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend from date established for Notice to Proceed to date of final completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
   1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
   2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
   3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
   4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.

5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents, and as follows, in schedule. Show how the sequence of the Work is affected.
1. Include a separate activity for each portion of the Work performed by Owner.
2. Work Restrictions: Show the effect of the following items on the schedule:
a. Coordination with existing construction.
b. Limitations of continued occupancies.
c. Uninterruptible services.
d. Partial occupancy before Substantial Completion.
e. Use of premises restrictions.
f. Provisions for future construction.
g. Seasonal variations.
h. Environmental control.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, Notice to Proceed, Substantial Completion, and final completion.

E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Outline the following in critical path format using a software program similar to MS Project.
1. Overlapping trades and intersections created between subs.
2. Durations of activities expressed by a bar line.
3. Procurement Schedule outlining off-site manufacture, submittals, and submittal review periods.
4. Clearly identified long-lead materials or any expedited submittal reviews that are required to meet the date of substantial completion.

C. CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for commencement of the Work.
a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
3. Use "one workday" as unit of time for individual activities. Indicate nonworking days and holidays incorporated into schedule in order to coordinate with Contract Time.

D. CPM Schedule Preparation: Prepare a list of activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
   1. Activities: Indicate estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
      a. Preparation and processing of submittals.
      b. Mobilization and demobilization.
      c. Purchase of materials.
      d. Delivery.
      e. Fabrication.
      f. Utility interruptions.
      g. Installation.
      h. Work by Owner that may affect or be affected by Contractor's activities.
      i. Testing.
      j. Punch list and final completion.
      k. Activities occurring following final completion.
   2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
   3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
   4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
      a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of proposed change on overall project schedule.

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
   1. Contractor or subcontractor and the Work or activity.
   2. Description of activity.
   3. Main events of activity.
   4. Immediate preceding and succeeding activities.
   5. Early and late start dates.
   6. Early and late finish dates.
   7. Activity duration in workdays.
   8. Total float or slack time.

G. Schedule Updating: At request of Owner or Architect, when making revisions to Construction Schedule, prepare tabulated reports showing the following:
   1. Identification of activities that have changed.
   2. Changes in early and late start dates.
   3. Changes in early and late finish dates.
   4. Changes in activity durations in workdays.
   5. Changes in the critical path.
   6. Changes in total float or slack time.
   7. Changes in the Contract Time.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before regularly scheduled progress meeting preceding issuance of paper copy of application for payment.
   1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
   2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
   3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

END OF SECTION 01 32 00

SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for construction photographs.

1.2 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within 7 days of taking photographs.
   1. Digital Camera: Minimum sensor resolution of 8 megapixels. Cell phone camera providing required resolution is acceptable.
   2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
      a. Documentation using PlanGrid software is acceptable.

1.3 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - EXECUTION

2.1 CONSTRUCTION PHOTOGRAPHS

A. Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
   1. Maintain key plan with each set of photographs identifying location.
   2. Field Office Images: Maintain one set of images accessible in field office, available at all times for reference. Identify images in the same manner as those submitted to Architect.

B. Views:
   1. Take photographs from a sufficient number of different exterior views and from a sufficient number of interior views to show construction progress. Consult with Architect for recommendations on views.
   2. Photograph from locations to factually illustrate condition of construction and state of progress.
   3. To the extent practicable, take successive monthly photographs from same overall view as preceding monthly photographs.

C. Do not sell or display photographs in publications without permission of Owner.

D. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction. In particular, take photographs of any existing damage or deficiencies in existing conditions, including conditions adjacent to the project site, prior to commencement of work.
   1. Flag construction limits before taking construction photographs.
   2. Take 20 photographs to show existing conditions adjacent to property before starting the Work from different vantage points.

3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

E. Periodic Construction Photographs: Take 20 photographs monthly, coinciding with cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

F. Digital Images: Submit a complete set of digital image electronic files as a Project Record Document.
1. Submit images exactly as originally recorded in digital camera without alteration, manipulation, editing or modification.
2. Provide images in uncompressed TIFF format, produced by a digital camera with minimum sensor size of 4.0 megapixels and with an image resolution of not less than 1600 x 1200 pixels.
3. Images shall have same aspect ratio as the sensor, uncropped.
4. Provide following information:
    a. Date and Time: Include date and time in filename, if photograph is not accurately date stamped by camera.
    b. Orientation of view including description of vantage point, in terms of location, direction viewed (by compass point), and elevation or story of construction,
    c. Unique sequential identifier.

END OF SECTION 01 32 33

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

B. Action Submittals: Indicated as such in individual Specification Sections, including written and graphic information and samples that require Architect's responsive action.

C. Informational Submittals: Indicated as such in individual Specification Sections, including written and graphic information that do not require Architect's responsive action, but which may be rejected for not complying with requirements.

D. Coordination Drawings: Drawings prepared per Section 01 33 00 “Project Management and Coordination” showing relationship and integration of different construction requiring coordination of fabrication or installation to fit in space provided or function as intended.

E. Field Samples: Full-size physical examples erected on-site to illustrate construction, or finish materials, and to establish standard by which the Work will be judged.

F. Range Samples: Set of multiple samples of materials whether natural or man-made exhibiting the variations in color, finish, and other characteristics apparent in the material.

G. Digital Project Management (DPM) per Section 01 31 00 “Project Management and Coordination.”

H. MSDS: Material Safety Data Sheets.

1.2 ACTION SUBMITTALS

A. Submittal Schedule: Submit Submittal Schedule with Contractor’s Construction Schedule per Section 01 32 00 “Construction Progress Documentation” as active spreadsheet in Microsoft Excel and as searchable pdf file.

1. Format: Include the following information in tabular format.
    a. Specification Section number and title.
    b. Submittal Name and Number.
    c. Submittal category: Action, Informational, Closeout, etc.
    d. Submittal Type: Product Data, Shop Drawing, Sample, Product Certification, etc.
    e. Name of entity responsible including subcontractor, supplier, manufacturer, etc.
    f. Description of the Work covered.
    g. Proposed date for first submittal.
    h. Days for Architect’s review.
    i. Proposed date for Architect's approval.
2. List proposed submittals required in each specification section of the Contract Documents and as necessary to verify compliance with Project requirements such as Range Samples. Include information required under format, for each submittal.
    a. Coordinate submittals so that submittals from each specification section are sent at same time.
        1) When approvals for some submittals are required prior to submitting other submittals, such as Samples for Initial Selection, indicate submittals to be sent later and highlight in Submittal Schedule.
3. Make submittals of all items required in any specification section at the same time.

4. Make submittals of related work items in logical groupings to facilitate inter- relation of associated items, i.e. doors, frames, and hardware submittals made at same time.
5. Indicate proposed dates coordinated with Contractor's Construction Schedule.
    a. Coordinate sequencing of submittals with requirements of the Work and submittals from other specification sections.
    b. Include time required for review (as detailed herein), allowing sufficient time for ordering, manufacturing, fabrication, and delivery when establishing dates.
    c. Indicate dates and days of review for all recipients for each submittal, with sufficient days for sequential review.
    d. Allow time for resubmittals including addressing Architect's comments and for handling and reviewing submittals required by those corrections.
    e. Coordinate Submittal Schedule with list of subcontracts, Schedule of Values, and Contractor's Construction Schedule.
    f. Highlight items that differ from Contract Documents including differences in days allowed for review or packaging of submittals.
    g. Revise Submittal Schedule per Architect's comments until Submittal Schedule is acceptable to Architect and Contractor. Architect will return Submittal Schedule as accepted by Architect, to be considered final Submittal Schedule.
        1) Review proposed revisions to Submittal Schedule at Progress Meetings. Revisions shall be acceptable to Architect and Contractor.
            a) Revisions may result in additional time required for review.
            b) Updated Submittal Logs shall include acknowledgement of resubmissions and any impact on Construction Schedule.
        2) Architect's review time will not be finalized until Submittal Schedule has been accepted by Architect and Contractor.
    h. Upon acceptance of Submittal Schedule by Architect, provide revised version in pdf format and utilize final Submittal Schedule as basis for Submittal Log.
6. Submit Submittal Log representing Architect accepted Submittal Schedule prior to submitting submittals to Architect by DPM. Do not make any changes from final Submittal Schedule days and dates.
    a. Submittals sent to Architect prior to final Submittal Schedule and Submittal Log acceptance will be returned without action.
7. Preliminary Submittal Schedule: Preliminary Submittal Schedule is acceptable when schedule is complex or long lead items need approval prior to full development of Construction Schedule, notify Architect. Submit Preliminary Submittal Schedule concurrently with start-up construction schedule to cover submittals required in first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required due to long lead time for manufacture or fabrication.
8. Updated Submittal Logs: Submit with agenda for Progress Meetings to reflect changes in current status and timing for submittals with additional update at Progress Meeting.
    a. Highlight any revisions to Submittal Log when dates of submittal are delayed.
    b. Indicate resubmissions and pending dates of posting to DPM.
    c. Do not include changes not approved by Architect.

1.3 SUBMITTAL PROCEDURES

A. Utilize Architect's digital drawing files per requirements in Section 01 31 00 "Project Management and Coordination" for preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Submit all Action and Informational submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
      a. Exception: Where samples for initial selection and samples for verification are both required, submit samples for verification after initial selection has been returned by Architect.
   3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
   4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
      a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals. Time for review shall commence on Architect's receipt of submittal. Submittals received after 3 p.m. will be considered as being delivered the following working day.
   1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination. Delaying submittals to facilitate coordination between submittals shall not constitute a delay of the Work nor shall it be the basis for an extension of time.
   2. If intermediate submittal is necessary, process it in same manner as initial submittal.
   3. Resubmittal Review: Allow 10 days for review of each resubmittal.
   4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated or where noted in the review of the Submittal Schedule, allow 15 days for initial review of each submittal.
   5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 12 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
      a. Direct Transmittal to Consultant: Where Contract Documents indicate that submittals may be transmitted directly to Architect's consultants, provide duplicate copy of transmittal to Architect. Submittal will be returned to Architect before being returned to Contractor.

D. Post Submittals to DPM per agreed upon, final Submittal Schedule. Notify Architect, Owner and concerned parties when submittals are posted to DPM.
   1. Do not post submittals to DPM prior to date agreed upon in final Submittal Schedule.
   2. Remove items not posted in accordance with final Submittal Schedule.
   3. Hold incomplete submittals until all required items in technical sections can be posted at same time.

E. Prepare submittals required by specification to show compliance with Contract Documents.
   1. Make submittals in the English language and in the English system of measurement.
   2. When specifications require more than one item of submittal, submit required submittals at the same time.
   3. Separate submittal into separate submittals to facilitate review and approval of submittals without requiring resubmittal of all items from a specification section.

4. Identify each submittal per identification requirements.
5. Make submittals of related work items in logical groupings to facilitate interrelation and coordination of associated items.
6. Use Architect's numbering and references when referring to materials and items such as doors, hardware, and finishes.
7. Mark all items that differ from the Contract Documents.
8. Indicate items that require Architect's review.
9. Furnish copies of final submittals to authorities having jurisdiction as required.
10. Distribute final submittals as necessary for coordination of the Work.

F. Transmit submittals electronically where possible. Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
2. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
3. Provide PDF files that are fully searchable and to scale for all original documentation created for this Project, such as Shop Drawings.
4. Scanned Copies: Legible scanned PDF files of printed paper originals are acceptable for Product Data, if published PDF file is not available. Scanned submittals that are not legible will be rejected.
5. Sheet Orientation: Orient PDF sheets to a "Ready-to-Read" orientation with majority of text horizontal to the sheet with no additional adjustments or formatting required by the viewer.
6. File Security: Do not set any permissions on the file. Protected documents will not be accepted.
7. Metadata: Include the following information in the electronic submittal file metadata:
    a. Title: Project title
    b. Author: Contractor's name.
    c. Subject: Submittal type (product data, shop drawing, report, etc.)
    d. Keywords: Number and title of appropriate Specification Section; manufacturer name; product name/model number.
8. File Size: Limit file size of each submittal as follows. Break larger PDF files into multiple packages where necessary to meet delivery restrictions. Identify split packages as "1 of #" and "2 of #" in the subject line.
    a. Email Delivery: 10 Megabytes.
    b. FTP Delivery: 100 Megabytes.

G. Maintain Submittal Log on DPM in agreed upon format, with the following information included for each submittal as a minimum:
1. Submittal number using specification section number where item is specified.
2. Subcontractor, Supplier and Manufacturer names.
3. Category of submittal as defined in this Section.
4. Number of days for review.
5. Dates, including time:
    a. Date for required submission to Architect from final Submittal Schedule.
    b. Date of actual submission to Architect.
    c. Date of return to Contractor.
6. Action on Architect's Stamp on returned submittal.
7. Highlight or otherwise indicate submittals requiring resubmission.

H. Submittal Documentation:
1. Provide a coversheet with the following on each submittal. Bind coversheet to electronic submittal.
a. Project name and Architect's Project Number.
b. Date of submission to Architect. Other dates regarding drawing completion date or transmission between entities can be included.
c. Name and address of Architect.
d. Name and address of Contractor.
e. Name and address of subcontractor, supplier, and manufacturer as applicable.
f. Name and address of entity that prepared submittal.
g. Submittal Number: Number with specification section number followed by decimal point and a sequential number (e.g., 061000.01). Add alphabetic suffix after another decimal point (e.g., 061000.01.A) for resubmittals.
h. Drawing number and detail references, as appropriate.
i. Location(s) where product is to be installed, as appropriate.
j. Other necessary identification.
k. Category of Submittal: Action or Informational.
l. Indicate on submittal, as appropriate, if submittal is Delegated Design.
m. Provide space 6 inches by 8 inches on coversheet for Architect's Stamp.
2. Provide Contractor's Stamp on each submittal with signature of Contractor's responsible party approving submittal and date approved, with statement that submittal complies with requirements of the Contract Documents.
a. Format submittals so documents are 8-1/2 inch by 11 inch, but no larger than 30 inch by 42 inch.
b. Provide electronic submittals with a digital signature of Contractor's responsible party. Digital signature shall be of type acceptable to Architect and Owner.
3. List, highlight, encircle, and identify deviations from Contract Documents on submittals, including minor variations and limitations, with reason for deviation.
4. Note options requiring selection by Architect.
5. Indicate compliance with Contract Documents, relationship to other work, and other information as specified, including:
a. Identification of product or materials
b. Field dimensions, clearly identified as such
c. Mark submittals for pertinent information to this Project.
1) Where printed materials describe more than one product or model, clearly identify which is submitted for review.
a) Architect will return submittal REJECTED if submittal has multiple products without identification by Contractor to complete proper checking of submittal.
6. Comply with other requirements in specifications.
7. Provide revised submittals per specified requirements in this Section.

1.4 RESUBMISSION REQUIREMENTS

A. Resubmit submittals stamped REVISE AND RESUBMIT AS NOTED or REJECTED.
1. Do not resubmit submittals that are not required by Architect to be resubmitted.
2. Make resubmittals in same form as previous submittal. Note date and bubble content changed from any previous submittal.

B. Resubmittal procedure shall follow the same procedures as the initial submittal.
   1. Review time for resubmissions to be the same as planned for initial submissions.
   2. Resubmission to contain same information as first submission except that submission numbers to be adjusted per identification requirements.
   3. Highlight items that are changed from previous submission.
      a. Architect's review is restricted to review of revisions to previous submittal.
      b. Architect will return resubmissions REJECTED that include new or revised information or drawings that are not clearly marked.
      c. If resubmittal must include new information or changes other than those requested by Architect, include reason and location of such changes.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by other specification sections.
   1. Make any corrections required by Architect's comments.
   2. Resubmit corrected Action Submittals until Action Submittals are stamped "NO EXCEPTIONS TAKEN" or "PROVIDE AS NOTED." Final Architect approved submittals must bear one of these stamps.
      a. Notify Architect in writing if comments cannot be met or if additional revisions other than those requested are required. Resubmit these modified submittals even if resubmittal is not required by Architect's Stamp.

B. Action Submittals include the following as well as other noted submittals in other specification sections:
   1. Comparable Product Request.
   2. Product Data.
   3. Shop Drawings.
   4. Samples.

C. Comparable Product Request: Comply with Section 01 60 00 "Product Requirements. Provide Comparable product requests with submittal detailing compliance with specification requirements, showing how product is comparable to Basis of Design product or is "equal" to the stated product when specified as "approved equal."

D. Product Data:
   1. Provide manufacturer's printed information indicating compliance with requirements, including recognized trade association and testing agency standards, tolerances in construction or materials, dimensions and clearances of operation and maintenance. Include data sheets, catalogue cut sheets, assembly documentation, and other data as required to show compliance.
      a. Submit Product Data indicating tolerances, options and construction information affecting performance or appearance in the final installation and information from standards when standards are cited in specification section.
         1) Clearly identify where submitted item is not compliant or cannot meet tolerances, including joint sizes. Note deviation from compliance in Product Data and include same information on Shop Drawings.
      b. If submittal must be specially prepared because standard published data is not suitable for use, submit as Shop Drawing, not as Product Data.
      c. The following are not acceptable Product Data and will be returned REJECTED:
         1) Citing catalog numbers without providing catalogue cut sheets.
         2) Unedited or partially edited standard manufacturer's 3 part specification.

2. For equipment, include the following, as applicable:
    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction.
3. Mark submittal to indicate products and options as applicable. Clearly identify selections meeting Contract Document requirements by highlighting items.
    a. Cross out information which is not applicable to the Project.
    b. Supplement standard information to provide information applicable to the Work.
    c. Show dimensions and clearances required.
    d. Show performance characteristics and capacities.

E. Shop Drawings: Submit Project-specific drawings, diagrams, schedules, and other data specially prepared for the work.
1. Fully illustrate requirements of Contract Documents, include the following:
    a. Identification of products and thicknesses.
    b. Assembly of components, including fabrication and installation requirements.
    c. Joint locations and sizes, identifying joint variances expected in installed work.
    d. Corner conditions and treatments.
    e. Transitions between materials.
    f. Direction of materials exhibiting graining or texture.
    g. Supports and attachments.
    h. Coordination with adjacent work, including field conditions and new work.
    i. Coordination with Work supplied by other trades for inclusion in the work in the Shop Drawing, such as, hardware at doors, frames, and architectural woodwork.
    j. Dimensions established for the work and adjacent construction.
    k. Dimensions established by field measurement or that require field verification.
    l. Coordination as required for proper and complete installation of the Work.
2. Provide plans, elevations, and details at sufficient scale to show materials, dimensions, thicknesses, assembly, attachments, adjoining work, and other pertinent information.
    a. Minimum Scale: 1/4” = 1’-0” for plans and elevations; 1-1/2” = 1’-0” for details, unless otherwise required by specification section. Provide plans, elevations and details at larger scale when required by specification section or necessary to show relationships and assembly.
    b. Provide Shop Drawings that are legible and drawn accurately to scale. Freehand drawings are not acceptable.
    c. Graphics shall be original, drawn for this Project and not a reproduction of the Contract Documents or standard printed data.
        1) Use Architect’s digital drawing files only for background scope of new and existing construction modified as necessary to represent the Work.
    d. Identify details by reference to sheet and detail number on Contract Drawings.
    e. Use product and finish identifications indicated in the Contract Documents.
3. Coordinate with submittals of other work for proper relationships, installation, component and assembly dimensions and characteristics.
4. Indicate material tolerances allowed by standards or manufacturer.
5. Provide the following as Shop Drawings when required by specification sections.
    a. Setting diagrams.
    b. Schedules.
    c. Patterns.

d. Templates.
e. Seaming diagrams.
f. Wiring diagrams.
g. Controls.
h. Signage.

6. Provide Coordinated Shop Drawings that include work of more than one trade, showing adjacent Work in a complete manner, for the following:
   a. Doors, frames, and hardware.
   b. Samples of interior finish materials.
   c. Restoration work including integration with new work.
   d. Sprinkler, mechanical, plumbing, and piping.
   e. Lighting and HVAC.
   f. Decorative metal, architectural woodwork, and metal fabrications.
   g. Architectural woodwork doors and door hardware.
   h. Decorative metal railings, stairs, and finish components of stairs.
7. Indicate deviations from Contract Documents or where final appearance may vary in dimension or relationship.

F. Samples: Physical samples which illustrate materials, finishes, and workmanship, and establish visual standards by which the Work shall be judged. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and materials showing color, texture, and pattern. Samples will be reviewed for color and appearance only. Compliance with all other requirements shall be the exclusive responsibility of Contractor.
   1. Approval of samples will not preclude rejection of completed Work, if completed Work deviates from sample or does not otherwise comply with Contract requirements.
   2. Samples shall show anticipated range of color and/or texture. Architect may require additional submissions if the range or consistency is not satisfactory.
      a. Architect's determination of Samples and whether installed Work matches Samples in appearance is final.
         1) Where a perceivable range is accepted by Architect, materials installed that are abutting or within 6 inches of each other in the final construction shall not vary by more than one-half the accepted range.
         2) Final Architect approved Samples will be compared with actual material and finish delivered and installed in the Work.
   3. Identification: Unidentified samples will be returned to Contractor without review. Attach label on back side of samples with the following:
      a. Submittal Number.
      b. Number and title of applicable specification section and paragraph number.
      c. Project designation for material/finish from Contract Documents.
      d. Generic description of Sample.
      e. Product name and name of manufacturer.
      f. Sample source.
      g. Contact information for manufacturer and manufacturer's representative.
      h. Indicate if product is custom and composition/control number.
      i. Provide separate coversheet for Samples for Initial Selection with the required identification information.
   4. Submit digital photos of front and back of samples with electronic submittal.

5. Submit Range Samples showing differences that occur in natural or man-made materials, even if not specifically required by specification section, to indicate color differences, or characteristics representative of materials to be used in Work.
6. Sequence sample submissions when specification requires unfinished samples or veneers to be approved prior to submitting finish sample.
7. Submit samples of materials which are generally furnished in containers bearing manufacturer's descriptive labels and printed application instructions.
8. Date of submittal of sample is when delivered to Architect, and when posted to DPM.
9. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
10. Disposition: Maintain approved Samples at site, available for comparisons throughout the course of the Work, to determine final acceptability of construction and finish. Submit Samples to Owner as part of Project Record Documents.
11. Samples for Initial Selection: Where specifically required in other specification sections or where selection is required by Architect, submit manufacturer's full range of available colors and finishes in the form of color charts, chain sets, or small samples showing the full range of colors, textures, and patterns available. When requested, submit Samples for Initial Selection on actual substrates.
    a. Number of Samples: Submit 1 full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will retain submittal. When Contractor desires a Sample for their records, submit 2 full sets.
12. Samples for Verification: Submit minimum of 5 samples of actual material, prepared from same material to be used for the Work. Architect reserves the right to require submission of any materials whether or not specifically indicated in specifications.
    a. Submit Samples physically identical with material or product proposed for use:
        1) Show full range of color and texture variations expected.
        2) Submit from actual production run or natural material to be used for Project, with all applied treatments, cured and finished. Generic samples are not acceptable.
            a) When materials will be from multiple production runs or of natural materials, submit Range Sample showing differences expected.
        3) Apply paint, coating, or other applied finish to actual substrate and not a paper sample. When same finish will be in different gloss levels, provide samples for each gloss level. When finish and gloss will be on different substrates, provide samples for each substrate in each gloss level.
    b. Submit samples that are 8"x10", unless otherwise specified:
        1) Full size for equipment or device less than 8"x10".
        2) 10" in length for linear devices or materials.
        3) 1 pint for non-solid materials.
        4) 4"x4" for color selection samples.
    c. Architect will retain 2 Samples, return 1 to Owner and 2 to Contractor. Samples to be retained at site and shall not be incorporated into the Work. Maintain 1 Sample as Project Record.

13. Range Samples: Submit 5 sets of minimum 5 samples 8”x10” minimum, but not less than required to show size and full range of characteristics expected in actual material to be used for Project. Identify characteristics and their size, quantities and extent expected in the material on back of Range Sample or on separate sheet with submittal identification. Submit electronically photos of front and back of Range Samples. Submit photos of characteristics when extensive.
    a. Where size of characteristic varies from those in sample, provide additional samples and photographic documentation showing variability of characteristics, including sizes, quantities, and scope.
    b. Provide narrative with Range Sample certifying statements regarding expected color and characteristics expected in material to be used for Project.
    c. Range Samples shall show characteristics evident in material.
        1) Characteristics not evident in samples are deemed unacceptable.
        2) Lack of a Range Sample or lack of clear identification of size, quantity and scope of characteristics in Range Sample for a material does not imply any approval of characteristics not clearly identified and approved.
        3) Materials that exhibit characteristics not in final Architect approved Range Samples are not acceptable and will be rejected for replacement at no additional cost to Owner.
14. Fabrication Sample: Submit full-size, fully fabricated Samples identical with the material and arrangement proposed, with edges, corners, and reveals as required in Contract Documents, demonstrating assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics. Include stepped finishes and examples of shop and field work where required in specification.
    a. Submit a single Fabrication Sample unless otherwise required by specification. Architect will retain Fabrication Sample.
    b. Size Fabrication Sample as indicated in specification, allowing for portability to Project site.
15. Field Samples: Provide where required by specification. Use first installations or mock-ups on site to illustrate finishes, textures, and the standard by which the Contract Work will be judged. Provide field samples in sizes prescribed or as required by Architect. Comply with requirements in Section 01 40 00 “Quality Requirements.”

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other specification sections. Informational Submittals are submitted for information only. Architect will review and return with or without comments. Architect will return as REJECTED or REVISE AND RESUBMIT if Informational Submittal is not in compliance with Contract Documents.
    1. Make any corrections required by Architect’s comments.
    2. Resubmit corrected Informational Submittal until Informational Submittal is stamped FOR INFORMATION ONLY – NO COMMENTS or FOR INFORMATION ONLY – COMMENTS AS NOTED.
        a. Notify Architect in writing to revisions other than the corrections requested even when resubmittal is not required by Architect’s Stamp.

B. Informational Submittals include the following as well as other noted submittals in other specification sections:
    1. Coordination drawings or other coordination information.
    2. Administrative Submittals from Division 01 Sections.
    3. Qualification data.
    4. Certifications.
    5. Statements.

6. Test reports.
7. Manufacturer's Instructions.
8. Closeout Submittals.
9. Sustainable Design Submittals.
10. Delegated Design Submittals.

C. Coordination Drawing Submittals: Comply with requirements in Section 01 31 00 "Project Management and Coordination."
   1. Submit Coordination Drawings in PDF format. If required by Architect, submit Coordination Drawings as active drawing file.
      a. Prepare Coordination Drawings of involved trades in a scale of not less than 1/4 inch = 1 foot or larger, as required by Architect.
      b. Show sequences and relationships of separate components.
      c. Work installed prior to review of Coordination Drawings is at Contractor's risk. Subsequent relocations shall be made at no additional cost to Owner.

D. Administrative Submittals: Submittals as required by Division 01 Sections. Comply with requirements in other specification sections. Administrative submittals are considered informational submittals and will be reviewed as such by Architect. Architect will not stamp and return administrative submittals unless Architect has specific comments on the submittals, including requirements for additional information or revisions.

E. Qualification Data: Submit information that demonstrates capabilities and experience of entity, including lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified. Comply with requirements for qualifications in specification and Section 01 40 00 "Quality Requirements."

F. Certifications: Submit notarized Certificate on entity's letterhead certifying compliance with requirements in the Contract Documents, signed and dated by individual authorized to sign documents on behalf of the entity responsible for preparing certification. Provide Certificate types as required from specification. Date must be after date of award of Project.
   1. Certifications, General:
      a. Provide on each certificate Project name and location, name and address of Contractor, and reference to specification section. List specific requirements that Certificate is intended to address.
      b. When a laboratory test report is submitted with Certificates, include name and address of qualified inspection and testing agency and dates of tests.
      c. Contractor shall review Certificates of Compliance before submission to Architect, to ensure that the affidavit is properly worded, dated, and signed.
      d. Certification does not relieve Contractor from furnishing satisfactory material. Owner reserves the right to further test installed materials and require removal of material is found not to meet the specific requirements.
   2. Installer Certificates: Affidavit by Installer that Installer complies with requirements in the Contract Documents and, where required, is authorized by product manufacturer to install specified product for this specific Project. Include evidence of installation experience where Qualifications are specified in specification section.
   3. Manufacturer Certificates: Affidavit by manufacturer that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where Qualifications are specified in specification section, and authorization of Installer to install specified product for this specific Project when required by specification section.

4. Product Certificates: Affidavit on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
5. Material Certificates: Affidavit on supplier's letterhead certifying that material complies with requirements in the Contract Documents.
6. Welding Certificates: Written certification that welding procedures and personnel comply with requirements in the Contract Documents. Include record of Welding Procedure Specification and Procedure Qualification Record on AWS forms, and names of firms and personnel certified.
7. Statement of Manufacturer's Review: Submit fully executed Statements of Manufacturer's Review on the form bound herein.

G. Test Reports: Comply with requirements in Section 01 40 00 "Quality Requirements" and specification sections. Include a statement on an attached coversheet that states compliance with Contract Documents or if compliance is not met.
   1. Include test procedures and results carried out by required qualified entity to verify that materials and equipment used in the work comply with the Contract Documents.
      a. Testing reports are required to be performed and reported on specifically for Project, unless otherwise indicated. Non-Project specific testing and inspection are indicated in specification and set limitations on age and other requirements.
      b. Only test reports made by qualified agencies operating in the United States, Canada, Japan or United Kingdom for testing not done specifically for this Project.
      c. Submit reports written by a qualified entity, on qualified entity's standard form or letterhead, indicating and interpreting test results for compliance with requirements in the Contract Documents.
      d. Qualified agency shall be per Section 01 40 00 "Quality Requirements."
   2. Material Test Reports: Showing compliance with ASTM or other requirements in the Contract Documents.
   3. Product Test Reports: 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.
   4. Research Reports: Report, from a model code organization acceptable to authorities having jurisdiction, that product complies with code in effect for Project. Include:
      a. Name of evaluation organization.
      b. Date of evaluation.
      c. Time period when report is in effect.
      d. Product and manufacturers' names.
      e. Description of product.
      f. Test procedures and results.
      g. Limitations of use.
   5. Preconstruction Test Reports: Reports indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
   6. Compatibility Test Reports: Reports indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
   7. Field Test Reports: Reports indicating and interpreting results of field tests performed either during installation of product or after product are installed in its final location, for compliance with requirements in the Contract Documents.

8. Manufacturer's Field Reports: Reports by manufacturer's authorized representative on manufacturer's letterhead indicating testing, inspections and observations of installation and procedures. Include the following, as applicable:
    a. Name, address, and telephone number of manufacturer's authorized representative making report.
    b. Statement on condition of substrates and their acceptability for installation of product.
    c. Statement that products at Project site comply with requirements.
    d. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
    e. Results of operational and other tests and a statement of whether observed performance complies with requirements.
    f. Statement whether conditions, products, and installation will affect warranty.
    g. Other required items indicated in specification sections.

H. Manufacturer's Instructions: Submit written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

I. Closeout Submittals: Prepare and submit Closeout Submittals required by other specification sections. Comply with requirements in other specification sections.

J. Prepare and submit Sustainable Design Submittals per requirements in other specification sections.

K. Delegated Design Submittals: Comply with requirements in Section 01 40 00 "Quality Requirements" - Delegated Design Requirements and specification sections. Submit Delegated Design Submittals including Shop Drawings, Design Data, Certifications and Calculations for permanent or temporary construction structural components as required by specification sections.
1. Prepare Delegated Design Submittals with written and graphic information, as required to show compliance with Delegated Design requirements.
2. Delegated Design Submittals shall clearly state:
    a. Project.
    b. Professional engineer responsible for the design of the system or component.
    c. Specification section.
    d. Drawing references.
    e. Design data, including performance and design criteria, and list of applicable codes and regulations.
    f. List of any assumptions.
    g. Date completed.
    h. Other pertinent information which will allow a complete review.
    i. Name and version of software, if any, used for calculations.
    j. Page numbers and page totals on each sheet as Page _ of _.
3. Provide calculations including load diagrams if applicable.

4. Submit scanned pdf and 3 paper copies, signed, and sealed by the responsible professional engineer, for each product and system, with statement that design complies with performance and design criteria in the Contract Documents.
5. Architect and Engineer will only review calculations, performance and design data which are for permanent parts of the Work.
6. Architect and Engineer will only review for compliance with stipulated design criteria.
    a. Architect's and Engineer's review and/or any comments do not constitute any liability for the actual design when delegated by the Contract Documents.
    b. Delegated Design Professional Engineer remains responsible for actual design.

PART 3 - EXECUTION

3.1 SUBMISSION REQUIREMENTS

A. Submit submittals to Architect for review and approval prior to commencing work requiring submittal. Make revisions and resubmit as required by comments on submittal. Use only final Architect approved submittals stating "proceed without further input from Architect" including required revisions for fabrication and installation of Work. Retain copies at site.
    1. Architect will return submittals that are non-compliant as defined herein.
    2. No portion of the Work shall commence until all related submittals are reviewed and approved by Architect. Work prior to Architect review is done at Contractor's risk.
    3. Work shall conform to approved submittals. Removal of work deviating from approved submittals and its replacement shall be performed at no additional cost to Owner.
    4. Submittals shall be complete for each portion of the work.
        a. Architect will hold submittals dependent on other submittals until they are available and coordinated and sufficient information is available to permit proper evaluation.

B. Architect will not review submittals that are non-compliant and will return as REJECTED. The following are considered non-compliant submittals:
    1. Submittals without all required information, including Contractor's Stamp, Contractor's review comments and clear identification of deviations from the Contract Documents.
    2. Submittal with numerous errors, or that appear checked superficially by Contractor.
    3. Scanned pdf or image files in lieu of searchable pdf, unless specifically required.
    4. Submittal from source other than Contractor.
    5. Submittal not required by Contract Documents.
    6. Delegated Design submittals that are not signed and sealed.
        a. Architect will review unsigned copies as a draft but will not return Delegated Design Submittals without requiring resubmission that are signed and sealed.
    7. Incomplete submittals without all required items from same specification section.
        a. Partial submittals prepared for a portion of the Work will be reviewed only when partial submittals were accepted by Architect in final Submittal Schedule.
    8. Submittals with MSDS: Architect will not review submittal containing MSDS.
        a. Architect will return submittal with MSDS as REJECTED.
        b. Contractor shall remove MSDS from submittal and resubmit to Architect.
        c. Retain MSDS and include in Operations and Maintenance Manuals.
    9. Submittals with substitutions not previously approved per Section 01 25 00 "Substitution Procedures."
        a. Substitution items will be returned to Contractor requesting submission as substitution.
    10. Submittals with disclaimers, ownership statements, or extraneous information.

11. Submittals using reproduction of Contract Documents or that were not created specifically for this Project.
12. Drawings that are not to scale, illegible, non-Project specific, or hand drawn.
13. Product Data without identification of specific products for Project.
14. Resubmitted submittals without revisions clearly indicated.

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Coordinate preparation and processing of submittals with construction activities, providing submittals sufficiently in advance of the Work to avoid delay. Coordinate submittals with the Contract Documents including:
   1. Fabrication, purchasing, testing, delivery, other submittals, and related activities.
   2. The Work including other work where indicated, verifying fit and applicability with related trades and furnishing items for installation in work of another trade.

B. Submit required submittals per final Submittal Schedule.
   1. Submit submittals as separate items to allow approval of a submittal without requiring resubmission for all submittals in a specification section.
   2. Coordinate submission of submittals for related parts of the Work to allow concurrent review, coordination, and color selection.
      a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Make submittals in accordance with final Submittal Schedule and Construction Schedule allowing sufficient time for Architect's review, including time for resubmittals.
   1. No extension of Contract Time will be authorized for failure to transmit submittals to allow required processing and review.
      a. Contractor shall be responsible for any additional time required for review when submissions vary from final Submittal Schedule in dates or submittal items.
      b. Additional time required for reviewing submittals shall in no way relieve Contractor from performing the Work on schedule.

D. Checking and Approving:
   1. Contractor shall review submittals to confirm compliance with the Contract Documents; to determine and verify materials, field measurements, and field construction criteria, or will do so; and to check and coordinate information within submittals and with previous and concurrent submittals of related work with requirements of the Work. When submittal is a resubmittal, Contractor shall review revisions to verify compliance with previous comments and that revisions have been identified. Contractor shall note their comments required for revision and identify dimensions that have been or will be field verified.
      a. Contractor shall distribute submittals to other parties prior to reviewing and submitting to Architect for input regarding coordination and applicability of components and assemblies.
         1) Provide Certifications to Architect as required in specification sections regarding coordination and acceptability of other and adjacent work.
   2. Provide with each submittal either on the submittal or on Contractor's coversheet a list of any deviations from the Contract Documents and reason for such deviation.
   3. Affix Contractor's Stamp with signature of responsible party for Contractor and date of Contractor's review and approval to each submittal.
      a. Contractor's Stamp shall include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

4. Upon return of submittal to Contractor, review Architect's comments and make corrections or changes indicated. Resubmit when required by Architect's Stamp.
    a. Highlight revisions. Annotate drawing revision number and date in title block.
        1) Make only revisions required by Architect's review.
        2) If additional revisions are made, specifically highlight, noting reason for change.
5. When Contractor considers comments to be a change to the Contract Documents, notify Architect immediately in writing.
    a. Architect will provide basis for comments citing Contract Documents or issue a contract modification per Section 01 26 00 "Contract Modification Procedures."
    b. Failure to notify Architect implies acceptance of comments as applicable to Contract Documents.

E. Distribute final Architect approved submittals to concerned parties as necessary for performance of construction activities.

F. Maintain submittals as Project Record Documents and transmit to Owner at Project Closeout per requirements in Section 01 78 39 "Project Record Documents."

3.3 ARCHITECT'S RESPONSIBILITIES

A. Architect's review of submittals is conducted for the limited purpose of checking for conformance with information and design intent in the Contract Documents and is not a complete check.
1. Architect's review is not for the purpose of confirming or approving:
    a. Deviations from the Contract Documents, including materials, quantities, location, quality, dimension, or orientation.
    b. Substitutions.
    c. Means, methods, sequences, or techniques of construction.
    d. Safety of Contractor's work, workplan, procedures, workers or of the site.
    e. Any clarification of information in the Contract Documents.
    f. Changes in Contract Cost or Contract Time.
    g. Changes not made according to Architect's comments.
        1) Items revised on resubmittal shall be highlighted to be considered reviewed by Architect.
    h. Dimensions and quantities.
    i. Instructions for installation or performance of equipment or systems.
    j. An assembly of which an item is a component.
2. Architect's review of samples is only for visual characteristics.
3. Architect's approval of submittals shall not relieve Contractor of responsibility for:
    a. Compliance with the Contract Documents unless specifically pointed out to the Architect and Owner per requirements in the General Conditions. Architect's comments on submittals cannot change, nor do they permit any departure from the Contract Documents.
    b. Submittal errors or omissions that are not clearly identified.
    c. Adequate connections, erection techniques, bracing, or deficiencies in strength.
    d. Satisfactory performance of work and coordination with the work of all trades.
    e. Proper fitting of the work as performed.
    f. Confirming and correlating quantities and dimensions.
    g. Selecting fabrication processes and techniques of construction.
    h. Coordination of the Work including translating comments to parts and pieces on Shop Drawings, field dimensions and existing conditions.

i. Performing the work in a safe and satisfactory manner.
j. Compliance with the construction schedule.

4. Architect will return submittals with reasonable promptness while allowing sufficient time in Architect's professional judgment to permit adequate review.

B. Action Submittals: Architect will review and indicate revisions required, stamp with Architect's Stamp with mark to indicate further action and return to Contractor.
1. Items on stamp are as follows:
a. NO EXCEPTIONS TAKEN: Proceed without further input from Architect.
b. PROVIDE AS NOTED: Proceed without further input from Architect provided that comments are incorporated in the Work. If comments can't be complied with, make revisions and resubmit to Architect.
c. REVISE AND RESUBMIT: Submittal does not comply with Contract Documents' design intent. Additional review by Architect required.
1) Do not use, or allow others to use, on Project.
2) Revise per comments and highlight revisions. Resubmit without delay.
d. REJECTED: Submittal does not comply with Contract Documents' design intent. Additional review by Architect required.
1) Do not use, or allow others to use, on Project.
2) Revise to comply with Contract Documents'. Resubmit without delay.
e. NO ACTION: Submittal not reviewed by Architect.

C. Informational Submittals: Architect will review and indicate revisions required, stamp with Architect's Stamp marked to indicate any further action and return to Contractor.
1. Items on stamp are as follows: FOR INFORMATION.
2. When comments are noted on submittal, address comments and incorporate into the Work.
3. Resubmit Informational Submittal when comment requires resubmission.

END OF SECTION 01 33 00

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance, quality control and testing and inspection services to be performed.
   1. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
      a. 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.
      b. 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.
      c. 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.
      d. Specific test and inspection requirements are not specified in this Section.

1.2 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. 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.

D. 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.

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

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

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

H. 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.
   1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of 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.

1.3 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 Quality Levels: The quality level indicated or specified shall be the minimum level to be provided or performed. The actual installation may comply exactly with the minimum 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.

C. Comply completely with manufacturer’s instructions. Should manufacturer’s instructions conflict with Contract Documents, request clarification from Architect.

1.4 DELEGATED DESIGN

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.

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on systems indicated and where required by AHJ.

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

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

F. Reports: Prepare and submit certified written reports as required herein.

G. Quality Control Testing and Inspection Agencies shall submit testing and inspection reports, including Agencies' analysis of results and recommendations, immediately following completion of the test or inspection.
   1. Each report shall include complete detailed information pertaining to the test or inspection, including information required in each related technical specification section.
   2. Reports shall bear the name of qualified individual performing the inspection or test.
   3. Distribution: Submit copies of reports directly to the following:
      a. Architect.
      b. Structural Engineer.
      c. Owner.
      d. Contractor.
      e. Inspectors.

H. Delegated-Design Submittal: Submit Shop Drawings, Calculations, and other required submittals per specification section. In addition, submit a statement, signed and sealed by responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that products and systems are in compliance with performance and design criteria indicated. Include list of Codes, loads, and other factors used in performing these services.

1.6 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 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than 5 days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

C. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
   1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
   2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections" required the State of Maryland.
   3. Owner-performed tests and inspections indicated in the Contract Documents.

D. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups and first installations.

E. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 QUALITY ASSURANCE

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

B. Manufacturer Qualifications: 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: Firm experienced in producing products similar to those indicated for this Project and with a minimum of three years record of successful in-service performance, as well as sufficient production capacity to produce required units. Additional years of experience as indicated in technical sections.

D. Factory-Authorized Service Representative Qualifications: 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.

E. Installer Qualifications: 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 minimum of three years record of successful in-service performance. Additional years of experience as indicated in technical sections.

F. Professional Engineer Qualifications: Professional engineer who is legally qualified to practice in the State of Maryland 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.

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

H. Testing Agency Qualifications: An NRTL, an NVLAP, or an 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.

I. Manufacturer's Technical Representative Qualifications: 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.

J. Factory-Authorized Service Representative Qualifications: 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.

1.9 QUALITY CONTROL

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

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
   1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not, even if no permit is required for that work.
   2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
   3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
   4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
   5. 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 01 33 00 "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 was revised or replaced Work that failed to comply with the Contract Documents. Architect retains the right to require the use of a different testing agency for retesting and reinspecting.

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
   5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
   6. Do not perform any duties of Contractor.
   7. Attend Project progress meetings as requested by Architect.

G. 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 testing and inspecting equipment at Project site.

H. Coordination: 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.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 TESTING AND INSPECTION

A. Owner reserves the right to engage independent Testing and Inspection Agencies to verify the adequacy of Contractor’s quality control program. The scope and extent of the Quality Control Testing and Inspection is as specified in the technical specification sections.

B. Quality Control Testing and Inspection services are intended to verify compliance of work performed by Contractor with specified requirements. Quality Control Testing and Inspection services do not relieve Contractor of the responsibility for compliance with, or general fulfillment of, the requirements of the Contract Documents. Specified Quality Control Testing and Inspection are not intended to limit or supplant Contractor’s own quality control program.

C. Quality Control Testing and Inspection Agencies engaged by Contractor shall be acceptable to Owner and Architect.

D. Quality Control Testing and Inspection Agencies engaged by Contractor shall be fully independent of Contractor and shall perform all functions and responsibilities as if under contract with Owner.

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 DEFICIENT WORK

A. General: If any materials or equipment selected for testing fails to meet the requirements of the Contract Documents, such materials or equipment may be subject to removal and replacement. At the discretion of Owner, the installed defective materials and equipment may be permitted to remain in place subject to a proper adjustment of the Contract Sum.

B. If tests or inspections reveal failure of materials to comply with the requirements of the Contract Documents, the costs of additional tests by Owner, and compensation for Owner's and Architect's additional services, made necessary by such failure, shall be charged to Contractor by Change Order.

3.3 REPAIR AND PROTECTION

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

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

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

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

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

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

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

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1. Architect may require that copies of certain reference specifications be kept at the job site.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

END OF SECTION 01 42 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as “specialties,” “systems,” “structure,” “finishes,” “accessories,” and similar terms. Such terms are self-explanatory and have well recognized meanings in the construction industry.

B. 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. Comply with specifications and referenced standards as minimum requirements.

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. Materials: Products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
3. Equipment: A product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.
4. New Products: New Products are items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
5. Basis-of-Design Product Specification: Specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, color, finish, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
6. Comparable Product: A product proposed by Contractor from a list of manufacturers listed in the individual product specification that allows for comparable products or includes the terms “or approved equal” or “or equal” in lieu of “Basis of Design”, proprietary or semi-proprietary product.
    a. Comply with procedure for submission of “comparable products” as required in this Section.
    b. Contractor shall provide information to demonstrate through submittal process, that product submitted 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.
    c. In instances of dispute as to whether any product proposed by Contractor is an acceptable “comparable product”, the judgment of Architect shall govern.
    d. The burden of proof rests solely with Contractor.

7. Match existing: Where indicated on drawings to “match existing,” the Contractor is responsible to field verify the existing condition and present for the Architect’s approval the existing product assembly and/or finish to match.
    a. If accepted, the installation will follow the assembly manufacturer’s current recommendations and standards meeting all applicable codes and testing.
    b. The accepted assembly must also meet all building owner standards if they are more stringent than the manufacturers.
    c. All requirements and procedures in Division 01 sections will apply.
    d. If accepted assembly matches attic stock available from owner, Architect can choose to have attack stock installed in new work.
8. Substitution: A product proposed by Contractor which is different from that which is required by the Contract Documents and is not a listed product or by a listed manufacturer allowing for “comparable products” in an individual product specification.
    a. Comply with procedure for substitutions as defined in Section 01 25 00 “Substitution Procedures.” Do not submit as “comparable product” or as part of submittal review process. Submit as substitution with required documentation.
    b. In instances of dispute as to whether any substitution proposed by Contractor is acceptable, the judgement of Architect shall govern.
    c. The burden of proof rests solely with Contractor.

1.3 ACTION SUBMITTALS

A. Product Submittals: Comply with requirements in Section 01 33 00 "Submittal Procedures" and individual specification sections showing compliance with requirements.
    1. Comparable Product Requests: Submit sufficient information for consideration of each comparable product, identifying product to be replaced, compliance with requirements and indicating qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product. Include Specification Section number and title and Drawing numbers and titles.
        a. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
        b. Submit in conjunction with other submittals required in technical specification section. Do not submit substitutions as comparable products. Items that are a substitution will be returned “Rejected” for proper submission as substitution.
        c. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
            1) Form of Approval: Per Section 01 33 00 "Submittal Procedures."
            2) Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
    2. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
B. Compatibility of Options: If Contractor is given an 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.

C. Whenever the Contract Documents require that a product complies with Federal Specifications, ASTM Designations, ANSI Specifications or other association standard, Contractor shall present an affidavit from the manufacturer certifying that the product complies therewith. Where requested or specified, submit supporting test data to substantiate compliance.

D. Nameplates and labels: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
   1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
   2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
      a. Name of product and manufacturer.
      b. Model and serial number.
      c. Capacity.
      d. Speed.
      e. Ratings.

E. Workmanship:
   1. Comply with industry standards, except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
   2. Perform work by persons qualified to produce workmanship of specified quality.
   3. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

F. Manufacturer’s Instructions:
   1. When work is specified to comply with manufacturer’s instructions, submit copies as specified in Section 01 33 00 “Submittal Procedures”, distribute copies to persons involved, and maintain one set in field office.
   2. Perform work in accordance with details of instructions and specified requirements.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions. More detailed requirements for transportation and handling are specified under the technical Sections.
   1. Transport products by methods to avoid product damage. Provide appropriate equipment and qualified personnel to move products on-site without damage.
   2. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
   3. 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.
   4. 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.
   5. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
   6. Store products to allow for inspection and measurement of quantity or counting of units as well as inspection or review for compliance with requirements of the Contract Documents.

7. Store materials in a manner that will not endanger Project structure.
8. Provide suitable temporary weathertight storage facilities as may be required for materials to protect them from damage in storage, maintaining environmental conditions, including temperature, ventilation, and humidity, conforming to manufacturer's requirements, warranty requirements, and as necessary to protect the stored material from damage. Do not use damaged material in the Work.
    a. Available storage space at the job site is limited. Any additional off-site space required is the responsibility of Contractor.
    b. Allocate storage areas and coordinate their use by the trades on Project. Maintain current layout of storage facilities. Secure and control access to storage to protect stored materials from theft, vandalism, or other damage.

1.6 PRODUCT WARRANTIES

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

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
    1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
    2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
    3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Provide full warranty period to Owner for any equipment used by contractor for temporary construction purposes.

D. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. Products: Provide products as specified in the different specification sections meeting descriptive and performance requirements indicated. Provide proprietary products indicated unless comparable products or "approved equals" are indicated. Provide substitutions only where allowed or meeting the requirements in Section 01 25 00 "Substitution Procedures."
    1. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered, unless otherwise indicated.
    2. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

3. In case of conflict between differing specifications for a product, the most stringent specification (or the most stringent combination of specifications) shall apply. Contact Architect regarding interpretation of specifications as required.
4. Materials specified on Contract Documents by reference to title, symbol, or number of a Commercial or Industry Standard, Federal Specification, ASTM designation, ANSI designation, Manufacturer's data, or other similar reference standard are identified hereby as the minimum requirement for the quality of materials required hereunder. References are to latest editions of same, except as indicated otherwise. If not in contradiction to the building code or regulations of other governmental agencies as may have jurisdiction, such reference documents shall be considered as an integral part of these specifications as if repeated word for word herein.

B. Manufacturers: Provide products by listed manufacturers meeting project requirements. Consideration of other manufacturers where allowed by the specifications or meeting specific requirements for substitutions are dependent on meeting specified requirements including proven expertise, experience and similar project experience as listed under Quality Assurance in technical specification sections.
1. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered, unless otherwise indicated.
2. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
3. 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.

2.2 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Comply with specifications and referenced standards as minimum 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. Products required to be supplied in quantity within a Specification Section shall be of the same manufacture, shall be interchangeable, and shall be the same with regard to function, texture, pattern and color. To the greatest extent possible, provide products from a single source.
3. 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.
4. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:
1. Proprietary Specification Requirements: Where only a single product is named, provide the product indicated. Comparable products or substitutions for Contractor's convenience will not be considered, unless otherwise indicated.
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. 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, colors, finishes and other characteristics that are based on the product named.
    b. Comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed by one of the other named manufacturers.
4. Semi-Proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products specified. Comparable products or substitutions for Contractor's convenience will not be considered.
5. Where products or manufacturers are specified by name, accompanied by the term “or equal,” or “or approved equal” comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
6. Non-Proprietary Specifications: Where Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict Contractor to use of these products only, Contractor may propose any available product that complies with Contract requirements.
7. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
8. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application shown or specified. General overall performance of a product is implied where the product is specified for a specific application.
    a. Manufacturer’s recommendations may be contained in published product literature, or by the manufacturer’s certification of performance.
9. Compliance with Standards, Codes and Regulations: Where Specifications only require compliance with an imposed code, standard or regulation, provide a product that complies with the standards, codes or regulations specified.
    a. Provide an affidavit from the manufacturer certifying that the product complies with standards, codes, or regulations and submit supporting test data to substantiate compliance, if requested by Owner.
10. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Section 01 25 00 “Substitution Procedures" for consideration of an unnamed product or system.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches satisfactorily.
    1. Where multiple items are to match same Architect’s sample, finish and color shall be controlled by single entity so that finish is applied by the same finisher or finishing materials from the same production lot shall be used at multiple finishers. Final finish of each item or system shall match.
    2. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for selection of a matching product in another product category, or for noncompliance with specified requirements.

D. Visual Selection Specification:
   1. Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, submit product that complies with all specified requirements to Architect with finish samples from manufacturer's complete product line that includes both standard and premium items for Architect's selection of finish including color, gloss, pattern, density, and texture.
      a. Include manufacturer's name and pertinent data which will facilitate completion of color schedule until submittals and required samples have been submitted to and reviewed by Architect.
      b. Include items which may come in only one or a limited number of colors.
      c. Include items which are specified without any reference to color, but which come in a color, and require selection by Architect.
      d. In no case shall a color for materials, products or equipment for which colors are available be selected or submitted without first consulting Architect.
   2. The sentence "Custom color selected by Architect.", "Match existing color." or "Match Architect's approved sample." shall mean that color, texture, or pattern has been selected or that it will be selected by Architect and that Contractor shall provide color, texture or pattern conforming to that selection.
   3. When, due to the nature of the material, the material is available in a range of colors, i.e., natural stone, brick, and tile, Contractor shall submit the full available range of colors for that material for Architect's review. When material is available with varying characteristics, Contractor shall submit a multiple set of samples depicting the applicable range proposed for this project. Materials not conforming to the approved color range will be rejected and Contractor shall remove nonconforming materials from the site and replace them with materials in the approved color range at Contractor's expense.

E. Custom: Where Specifications require "custom", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches. Custom items shall not be restricted by manufacturer's standard finishes or colors.

2.3 COMPARABLE PRODUCTS

A. General: Any proposed Comparable Product Request must maintain the quality standards established by the Contract Documents for the specified product without any detrimental effect to Owner. Comparable products shall be in compliance with Contract Document requirements. Deviation in compliance shall be expressly noted. Contractor shall be required to provide all documentation and information necessary to prove that the Comparable Product is "equal" to the listed product.

B. If Contractor submits a product other than the product specified as the "Basis of Design", and the submitted alternate manufacturer is named in the relevant specification Section, that submittal shall be processed in accordance with requirements in Section 01 33 00 "Submittal Procedures."
   1. Contractor shall submit all required evidence to show alternate product's compliance with technical requirements and equivalency with the "Basis of Design" product. Contractor is responsible for providing documentation that proves that product of manufacturer meets the requirements of the Contract Documents.
   2. If changes are required in the related work, Contractor shall note such in submittal.
   3. Architect may directly approve or disapprove this product as reviewed in the submittal.
   4. Finish and color or alternate manufacturer or product shall match Architect's control sample or scheduled "Basis of Design" product.
      a. Where finish or color does not match as determined by Architect, provide custom color and finish to match Basis of Design product scheduled.

C. 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.
      a. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Include annotated copy of applicable Specification Section addressing each item in section in left hand margin stating whether proposed substitution complies with requirement or deviates. Specifically indicate deviations and impact on Work.
         1) Significant qualities may include attributes such as performance, weight, deflection, tolerances, size, durability, visual effect, warranties, and specific features and requirements indicated.
   2. Evidence that proposed product provides specified warranty.
   3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
   4. Samples showing full range of colors including submission for specific finish to match Architect's control sample or selected product.
      a. Where color or finish does not match Architect's control sample or selected product, provide custom color or finish.
      b. Submit range samples for materials available in a range of colors.
      c. Submit a multiple set of samples depicting the applicable range proposed for this project.
      d. Provide photographs of quarried materials showing proposed selection.
   5. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
   6. Research/evaluation reports evidencing compliance with building code in effect for Project, from model code organization acceptable to authorities having jurisdiction.
   7. Contractor's certification that proposed Comparable Product complies with requirements in Contract Documents, is compatible with related materials, appropriate for applications indicated, and has no impact on Construction Cost or Schedule.
   8. Other information as necessary to assist evaluation.

D. Architect will review submittals for comparable products as part of the submittal process per Section 01 33 00 "Submittal Procedures." Architect will review information provided and whether the following conditions are satisfied.
   1. Comparable Product does not require unacceptable revisions to Contract Documents.
   2. Comparable Product is consistent with Contract Documents and will produce desired results.
   3. Comparable Product is fully documented and properly submitted.
   4. Comparable Product will not unnecessarily adversely affect Contractor's Construction Schedule.
   5. Comparable Product has received necessary approvals of authorities having jurisdiction.
   6. Comparable Product has been coordinated, and is compatible, with other portions of the Work.
   7. Comparable Product provides specified warranty.
   8. If Comparable Product involves more than one contractor, Comparable Product 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.

E. Architect will return submittals with action noted. If necessary, Architect will request additional information or documentation for evaluation with returned submittal.

2.4 PROOF OF COMPLIANCE

A. Materials specified on the Contract Documents by reference to title, symbol, or number of a Commercial or Industry Standard, Federal Specification, ASTM designation, ANSI designation, Manufacturer's data, or other similar reference standard are identified hereby as the minimum requirement for the quality of materials required hereunder.
   1. References are to the latest editions of same, except as indicated otherwise.
   2. If not in contradiction to the building code or regulations of other governmental agencies as may have jurisdiction, such reference documents shall be considered as an integral part of these specifications as if repeated word for word herein.

B. Whenever the Contract Documents require that a product complies with Federal Specifications, ASTM Designations, ANSI Specifications or other association standard, Contractor shall present an affidavit from the manufacturer certifying that the product complies therewith. Where requested or specified, submit supporting test data to substantiate compliance.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

A. Products shall be applied, installed, connected, erected, used, adjusted, cleaned, and conditioned in accordance with respective manufacturer’s instructions and recommendations unless more stringent requirements are specified.
   1. In case of any differences or conflicts between requirements of a manufacturer’s written instructions and the technical sections of the specifications, the instructions of specifications having the more detailed and precise requirements which are specifically applicable to the Work in question, as determined by Architect shall govern.

B. Verify and coordinate clearances, dimensions and installation of adjoining construction, equipment, piping, ducts, conduits, or other mechanical or electrical items or apparatus.

C. Prior to fabrication, field measure actual existing conditions as applicable to ensure proper fit.

D. Inspect each item of material or equipment immediately prior to installation. Reject damaged and defective items.

E. Recheck measurements and dimensions of Work, as an integral step of starting each installation. Whenever stock manufactured products are specified, verify actual space requirements for setting or placing into allotted space.

F. Anchor each product securely in place with positive anchorage devices designed and sized to withstand expected loads. Anchors shall be accurately located and aligned with other Work.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

H. Allow for expansion of materials and building movement.

I. Damaged products shall be not installed as part of the Work. At Owner’s sole discretion, Owner may approve the use of repaired items in the Work. Contractor shall bear all costs related to replacing or repairing and refurbishing damaged products.

3.2 PROTECTION OF INSTALLED WORK

A. Clean, protect, adjust, and perform maintenance on installed Work as necessary to ensure freedom from damage and deterioration at time of Substantial Completion. Remove protective devices when no longer needed.
   1. Provide special protection where specified in individual Specification Sections.
   2. Provide temporary and removable materials for protection of installed products. Control activity in immediate work area to minimize damage.
   3. Protect finished Work from damage, defacements, stains, scratches, and wear.
   4. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
   5. Protect finished floors, stairs, and other surfaces from traffic dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 INFORMATIONAL SUBMITTALS

A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
   1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
   2. Procedures: Specifically describe how cutting and patching will be performed.
   3. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
   4. Products: List products to be used for patching and firms or entities that will perform patching work.
   5. Trades: Indicate the firms or entities that will perform the cutting and patching.
   6. Dates: Indicate when cutting and patching will be performed.
   7. Structural Elements: Where cutting and patching involve modifying structural elements, including precast concrete, submit details and engineering calculations, generated by a professional engineer licensed to practice in the jurisdiction where the project is located, indicating structural integrity of proposed modification.
   8. Effect on weatherproof integrity of the Work.
   9. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted. Indicate utilities that will need to be relocated.
      a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
   10. Cost proposal when applicable.
   11. Architect's Approval: Obtain Architect's approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.
   12. Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void or diminish required or existing warranties.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
   1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
   2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
      a. Primary operational systems and equipment.
      b. Fire separation assemblies.
      c. Air or smoke barriers.
      d. Fire-suppression systems.
      e. Mechanical systems piping and ducts.
      f. Control systems.
      g. Communication systems.
      h. Fire-detection and -alarm systems.
      i. Conveying systems.
      j. Electrical wiring systems.
      k. Operating systems of special construction.
   3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
      a. Water, moisture, or vapor barriers.
      b. Membranes and flashings.
      c. Exterior curtain-wall construction.
      d. Sprayed fire-resistive material.
      e. Equipment supports.
      f. Piping, ductwork, vessels, and equipment.
      g. Noise- and vibration-control elements and systems.
   4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
   5. Fire-Rated Assemblies: At penetrations of fire-rated assemblies, completely seal penetration with firestop in accordance with Division 7 Sections.

B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
   1. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
   1. Description of the Work.
   2. List of detrimental conditions, including substrates.
   3. List of unacceptable installation tolerances.
   4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Require compliance with manufacturer's printed installation instructions, including each step in sequence. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 INSTALLATION

A. Refer to Section 01 60 00 "Product Requirements" for product Installation requirements.

B. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
   4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

C. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

F. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

G. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

H. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

I. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

J. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

K. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
   1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
   2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

B. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

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

D. Temporary Support: Provide temporary support of work to be cut.

E. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill. Do not damage or cut any steel reinforcing unless specifically allowed by the approved cutting and patching proposal.
   4. Structure: Do not damage or cut any structural framing unless specifically allowed by the approved cutting and patching proposal
   5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
   6. Proceed with patching after construction operations requiring cutting are complete.

G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
   1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
   2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
      a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
      b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Maintain exterior enclosure in a weathertight condition and ensures thermal and moisture integrity of building enclosure.

H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

I. Painting: Where patching occurs in previously painted surface, provide appropriate prime coat followed by first finish coat of paint. Provide final finish coat over entire area containing patch; for continuous surface extend to nearest vertical break or intersection, for an assembly refinish entire unit. Except where indicated otherwise, finish in sheen and color to match existing.

3.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    a. Use containers intended for holding waste materials of type to be stored.
4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

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

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field assembled components and equipment installation, comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Refer to Section 01 60 00 “Product Requirements” for product protection requirements.

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

C. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements for "Cutting and Patching."
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

1.4 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.

1.5 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Forms approved by Architect. Include the following information:
   1. Material category.
   2. Generation point of waste.
   3. Total quantity of waste in tons (tonnes).
   4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
   5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
   6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
   7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Qualification Data: For waste management coordinator and refrigerant recovery technician.

H. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

I. Refrigerant Recovery: Comply with requirements in Section 02 41 19 "Selective Demolition" for refrigerant recovery submittals.

1.6 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.

B. Refrigerant Recovery Technician Qualifications: Comply with requirements in Section 02 41 19 "Selective Demolition."

C. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

D. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
   1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
   2. Review requirements for documenting quantities of each type of waste and its disposition.
   3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
   4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
   5. Review waste management requirements for each trade.

1.7 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Use Forms approved by Architect. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Forms approved by Architect. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
   1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work in compliance with Section 02 41 19 "Selective Demolition."
   2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
   3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
   4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
   5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
   6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there were no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Use Forms approved by Architect. Include the following:
   1. Total quantity of waste.
   2. Estimated cost of disposal (cost per unit). Include transportation and tipping fees and cost of collection containers and handling for each type of waste.
   3. Total cost of disposal (with no waste management).
   4. Revenue from salvaged materials.
   5. Revenue from recycled materials.
   6. Savings in transportation and tipping fees by donating materials.
   7. Savings in transportation and tipping fees that are avoided.
   8. Handling and transportation costs. Include cost of collection containers for each type of waste.
   9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:
   1. Demolition Waste:
      a. Concrete.
      b. Concrete reinforcing steel.
      c. Wood studs.
      d. Wood joists.
      e. Plywood and oriented strand board.
      f. Wood trim.
      g. Structural and miscellaneous steel.
      h. Rough hardware.

i. Roofing.
j. Insulation.
k. Doors and frames.
l. Door hardware.
m. Windows.
n. Glazing.
o. Metal studs.
p. Gypsum board.
q. Acoustical tile and panels.
r. Carpet.
s. Carpet pad.
t. Equipment.
u. Cabinets.
v. Plumbing fixtures.
w. Piping.
x. Supports and hangers.
y. Valves.
z. Sprinklers.
aa. Mechanical equipment.
bb. Refrigerants.
cc. Electrical conduit.
dd. Copper wiring.
ee. Lighting fixtures.
ff. Lamps.
gg. Ballasts.
hh. Electrical devices.
ii. Switchgear and panelboards.
jj. Transformers.

2. Construction Waste:
   a. Masonry and CMU.
   b. Lumber.
   c. Wood sheet materials.
   d. Wood trim.
   e. Metals.
   f. Roofing.
   g. Insulation.
   h. Gypsum board.
   i. Piping.
   j. Electrical conduit.
   k. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
      1) Paper.
      2) Cardboard.
      3) Boxes.
      4) Plastic sheet and film.
      5) Polystyrene packaging.

6) Wood crates.
7) Wood pallets.
8) Plastic pails.

l. Construction Office Waste: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following construction office waste materials:
1) Paper.
2) Aluminum cans.
3) Glass containers.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Comply with requirements in Section 02 41 19 "Selective Demolition" for salvaging demolition waste.

B. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

C. Salvaged Items for Sale and Donation: Not permitted on Project site.

D. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.

4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

E. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

F. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

G. Plumbing Fixtures: Separate by type and size.

H. Lighting Fixtures: Separate lamps by type and protect from breakage.

I. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
   a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.4 RECYCLING DEMOLITION WASTE

A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
1. Pulverize concrete to maximum 1-1/2-inch (38-mm) size.

B. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
1. Pulverize masonry to maximum 1-1/2-inch (38-mm) size.
2. Clean and stack undamaged, whole masonry units on wood pallets.

C. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

D. Metals: Separate metals by type.
1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

E. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

F. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

G. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.

H. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.

I. Conduit: Reduce conduit to straight lengths and store by material and size.

J. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

3.5 RECYCLING CONSTRUCTION WASTE

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

B. Wood Materials:
   1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
   2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
   1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

D. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner’s property.

B. Burning: Do not burn waste materials.

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.
   5. Repair of the Work.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at final completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
   3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
5. Submit testing, adjusting, and balancing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Advise Owner of changeover in utility services.
6. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
8. Complete final cleaning requirements.
9. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit final completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
   1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
   1. Organize list of spaces in sequential order.
   2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
   3. Include the following information at the top of each page:
      a. Project name.
      b. Date.
      c. Name of Architect.
      d. Name of Contractor.
      e. Page number.
   4. Submit list of incomplete items in the following format:
      a. MS Excel electronic file. Architect will return annotated file.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
   1. Submit on digital media acceptable to Architect.

E. Warranties in Paper Form:
   1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

F. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

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

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Remove tools, construction equipment, machinery, and surplus material from Project site.
    c. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    d. Sweep concrete floors broom clean in unoccupied spaces.
    e. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    f. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    g. Remove labels that are not permanent.
    h. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    i. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    j. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    k. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
        1) Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.
    l. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
    m. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
   1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
   2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
      a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
   3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
   4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit copies of record Drawings as follows:
      a. Initial Submittal:
         1) Submit PDF electronic files of scanned record prints and one of file prints.
         2) Submit record digital data files and one set(s) of plots.
         3) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
      b. Final Submittal:
         1) Submit record digital data files and three set(s) of record digital data file plots.
         2) Plot each drawing file, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
   1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

1.3 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
   1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
      a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
      b. Accurately record information in an acceptable drawing technique.
      c. Record data as soon as possible after obtaining it.
      d. Record and check the markup before enclosing concealed installations.
      e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:
    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Construction Change Directive.
    k. Changes made following Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.
4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
    a. See Section 01 31 00 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
    b. Architect will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Format: Annotated PDF electronic file with comment function enabled.
2. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
3. Identification: As follows:
    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect.
    e. Name of Contractor.

1.4 RECORD SPECIFICATIONS

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

B. Format: Submit record Specifications as annotated PDF electronic file.

1.5 RECORD PRODUCT DATA

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

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
   3. Note related Change Orders, record Specifications, and record Drawings where applicable.

C. Format: Submit record Product Data as annotated PDF electronic file.
   1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.6 MAINTENANCE OF RECORD DOCUMENTS

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

END OF SECTION 01 78 39

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Demolition and removal of selected portions of building or structure.
   2. Salvage of existing items to be reused or recycled

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
   5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Engineering Survey: Submit engineering survey of condition of building.

C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control, and for noise control. Indicate proposed locations and construction of barriers.

D. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's and other tenants' on-site operations are uninterrupted.

2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.

F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

G. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 WARRANTY

A. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.10 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
   1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

D. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
   1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
   2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off utilities with utility companies.
   2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
    1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
    2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
    3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
    4. Cover and protect furniture, furnishings, and equipment that have not been removed.

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
    1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
    1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
    2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
    3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:
1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 74 19 "Construction Waste Management and Disposal."
1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Miscellaneous steel framing and supports.
   2. Loose bearing and leveling plates for applications where they are not specified in other Sections.

1.2 COORDINATION

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

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

1.3 ACTION SUBMITTALS

A. Product Data: For each item.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.5 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304.

D. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304.

E. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.

F. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

G. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

2.2 FASTENERS

A. General: Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with hex nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.

C. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593 (ASTM F738M); with hex nuts, ASTM F594 (ASTM F836M); and, where indicated, flat washers; Alloy Group 1 (A1).

D. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.
   1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

E. Post-Installed Anchors: Torque-controlled expansion anchors.
   1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

2.4 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
   1. Furnish inserts for units installed after concrete is placed.

2.6 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
   1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

2.7 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.8 STEEL AND IRON FINISHES

A. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
   1. Interior Items (SSPC Zone 1A): SSPC-SP 7, "Brush Off Blast Cleaning."

B. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 REPAIRS

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

END OF SECTION 05 50 00

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Framing with engineered wood products.
   2. Wood blocking and cants.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
   2. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
   3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:
   1. Fire-retardant-treated wood.
   2. Power-driven fasteners.
   3. Post-installed anchors.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
1. Treatment shall not promote corrosion of metal fasteners.
2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
3. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664 and design value adjustment factors shall be calculated according to ASTM D6841.

C. 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. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

2.3 MISCELLANEOUS LUMBER

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

B. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

C. For blocking used for attachment of other construction, select, and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

D. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.5 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
   1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F1667.

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

D. Post-Installed Anchors: 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.
   1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.
   2. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2 (ASTM F738M and ASTM F836M, Grade A1 or A4).

2.6 MISCELLANEOUS MATERIALS

A. Adhesive, Including Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

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

D. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated.

E. 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.

F. 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.

G. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

H. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
   1. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3.2 INSTALLATION OF WOOD BLOCKING

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 INSTALLATION OF WOOD FURRING

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring horizontally and vertically at 24 inches (610 mm) o.c.

3.4 PROTECTION

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

END OF SECTION 06 10 00

SECTION 06 41 16 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Plastic-laminate-clad architectural cabinets.
   2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.2 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:
   1. Include plans, elevations, sections, and attachment details.
   2. Show large-scale details.
   3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
   4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
   5. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples: For each exposed product and for each color and texture specified, in manufacturer's or manufacturer's standard size.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Product Certificates: For each type of product.
   1. Composite wood and products.
   2. Thermoset decorative panels.
   3. High-pressure decorative laminate.
   4. Adhesives.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
   1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.

B. Installer Qualifications: Manufacturer of products Licensed participant in AWI's Quality Certification Program.

C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Build mockups of typical architectural cabinets as shown on Drawings.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 43 and 70 percent during the remainder of the construction period.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
   1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

B. Architectural Woodwork Standards Grade: Custom.

C. Type of Construction: As indicated.

D. Door and Drawer-Front Style: As indicated .

E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
   1. Acceptable Products: As scheduled.

F. Laminate Cladding for Exposed Surfaces:
   1. Horizontal Surfaces: Grade HGS.
   2. Postformed Surfaces: Grade HGP.
   3. Vertical Surfaces: Grade VGS.
   4. Edges: Grade HGS.
   5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.

G. Materials for Semiexposed Surfaces:
   1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
      a. Edges of Plastic-Laminate Shelves: PVC tape, 0.018-inch (0.460-mm) minimum thickness, matching laminate in color, pattern, and finish.
      b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
      c. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
   2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
   3. Drawer Bottoms: Thermoset decorative panels.

H. Dust Panels: 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers unless located directly under tops.

I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

J. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
   1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.

K. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. As scheduled.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
   1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
   1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
   2. Thermoset Decorative Panels: MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 71 00 "Door Hardware."

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100 degrees of opening, self-closing.

C. Wire Pulls: Back mounted, solid metal, 5 inches (127 mm) long, 2-1/2 inches (63.5 mm) deep, and 5/16 inch (8 mm) in diameter.

D. Decorative Pulls: As scheduled.

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

F. Shelf Rests: BHMA A156.9, B04013; metal.

G. Drawer Slides: BHMA A156.9.
   1. Grade 1 and Grade 2: Side mounted.
      a. Type: Full extension.
      b. Material: Epoxy-coated steel with polymer rollers.

H. Door Locks: BHMA A156.11, E07121.

I. Drawer Locks: BHMA A156.11, E07041.

J. Door and Drawer Silencers: BHMA A156.16, L03011.

K. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
   1. Satin Stainless Steel: BHMA 630 unless otherwise noted.

L. 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 metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
   1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.

B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.

B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.

C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.

D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) using concealed shims.
   1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c..

3.3 FIELD QUALITY CONTROL

A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.
   1. Inspection entity shall prepare and submit report of inspection.

3.4 ADJUSTING AND CLEANING

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

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 06 41 16

SECTION 07 84 13 - THROUGH PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Through-penetration firestopping of penetrations through fire-resistance-rated assemblies including both empty openings and openings containing penetrating items.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

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

B. Product Certificates:
   1. Certifying the non-metallic plumbing piping system and the fire sprinkler piping system manufacturers evaluated and approved the firestopping products for installation with or near its piping system.
   2. Certifying the firestopping products comply with NFPA 13 requirements for material compatibility with non-metallic pipe and tubing.

C. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
   1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by qualified testing agency, for penetration firestopping.

1.5 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

A. Single Subcontract Responsibility: Engage a single Subcontractor to coordinate, furnish and install firestopping to maintain fire resistance ratings in the Work.

B. Installer Qualifications: A firm experienced in installing through-penetration fire stop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction of a minimum of five projects with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Evidence of FMG 4991 approval is acceptable for installer qualifications, but not mandatory.

C. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials in manufacturer’s original packaging labeled to show name, brand, type, and grade. Store materials in protected dry location off ground in accordance with manufacturer’s instructions. Do not open packaging nor remove labels until time for installation.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

D. Do not cover up penetration firestopping system installations that will become concealed behind other construction until each installation has been examined by Owner's inspecting agency and building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:
   1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
   2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
      a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
         1) UL in its "Fire Resistance Directory."
         2) Intertek Group in its "Directory of Listed Building Products."
         3) FM Approval in its "Approval Guide."

B. Provide through-penetration firestopping that is 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.
   1. Evaluate each opening condition and select appropriate firestopping materials to maintain fire resistance ratings and designate appropriate UL assembly.
      a. Include resistance to smoke at penetrations, connections to adjacent materials and other construction gaps.

b. Consider exposure of opening to water, movement, vibration and temperature variation in determining appropriate material selection for opening.
c. Where more than four inches of floor is open and subject to traffic or loading, install firestopping materials capable of supporting same loading as floor.

2. Provide firestopped openings with rating equivalent to surrounding construction with design designation in UL "Fire Resistance Directory" for fire-resistance-rated assemblies, tested in accordance ASTM E814 (UL 1479) for time and temperature rise rating and ASTM E84 (UL 723) for flame spread rating.
3. Submit UL tested and listed assembly sheet identical to each field condition. Install through-penetration firestopping identical to tested assemblies.
4. Provide through-penetration firestop materials which are non-toxic, non-hazardous, do not contain asbestos fibers or dust particles nor other substance prohibited by law, and do not require hazardous waste disposal of used containers.

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 floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

D. Building Movement: Provide through-penetration firestopping suitable to withstand building movements, including thermal movements, loading deflections, shrinkage, creep and similar movements, when tested in accordance with specified standards.

E. Water Resistance: Provide through-penetration firestopping resistant to degradation from moisture during normal service before exposure to heat and fire. Through-penetration firestopping used in exterior wall, roof, plaza, and other locations that penetrate exterior envelope shall also function as watertight seal preventing passage of water.

F. Compatibility: Provide firestop systems that are compatible with one another; with substrates forming openings; and with the items, if any, penetrating firestop systems, under conditions of service and application, as demonstrated by firestop system manufacturer based on testing and field experience.

G. For through-penetration firestopping exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide through-penetration firestopping complying with systems indicated in Schedule at end of Part 3 of this Section.

2.3 THROUGH PENETRATION FIRESTOPPING

A. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E814 or UL 1479, based on testing at positive pressure differential of 0.01-inch wg.
1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls, and fire partitions.
2. F-Rating: Not less than fire-resistance rating of constructions penetrated.

B. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E814 or UL 1479, based on testing at positive pressure differential of 0.01-inch wg.
   1. Horizontal assemblies include floors and horizontal duct enclosures.
   2. F-Rating: At least 1 hour, but not less than fire-resistance rating of constructions penetrated.
   3. T-Rating: At least 1 hour, but not less than fire-resistance rating of constructions penetrated except for floor penetrations within cavity of a wall.
   4. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.

C. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at 0.30-inch wg at both ambient and elevated temperatures.
   1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.

D. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.

E. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Sealants: 250 g/L.
   2. Sealant Primers for Nonporous Substrates: 250 g/L.
   3. Sealant Primers for Porous Substrates: 775 g/L.

F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
   1. Permanent forming/damming/backing materials, including the following:
      a. Slag-wool-fiber or 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.

2.4 FILL MATERIALS

A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

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. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

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 sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.5 MIXING

A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with 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 penetration firestopping.
   2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by 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 penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
   1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

C. Install fill materials for firestopping 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 the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
   1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
   2. Contractor's name, address, and phone number.
   3. Designation of applicable testing and inspecting agency.
   4. Date of installation.
   5. Manufacturer's name.
   6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Manufacturer’s Field Service: At start of installation, periodically as the Work progresses, and after completion, furnish services of firestopping material manufacturers’ technical representative at job site as necessary to advise on every phase of the Work. As a minimum, furnish representative’s attendance during first day of installation for each major type of firestopping material, and furnish technical assistance to Installer as may be required.

B. Inspecting Agency: Owner will engage a qualified independent testing and inspection agency to perform tests and inspections, and prepare reports.

C. Provide on-site inspections for firestops in accordance with ASTM E2174, and on-site inspections for firestopping systems and perimeter fire barriers in accordance with ASTM E2393 as work progresses.
   1. Verify that firestopping systems have been constructed in compliance with submitted designs for fire rating required by the Contract Documents and are acceptable to Authorities having jurisdiction.
   2. Visual inspection of substrates before installation of firestopping to ascertain that preparation has been performed in accordance with the Contract Documents.
   3. Visual inspection of completed work including removal of damming materials if used to ensure an adequate and complete fire and smoke seal.

4. Final inspection after other trades have completed Work in contact with firestopping material, but before firestopping material is covered.
5. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
6. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.7 THROUGH PENETRATION FIRESTOPPING SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Firestop Systems with No Penetrating Items FS-1:
   1. Available UL-Classified Systems: C-AJ- 0001-0999.
   2. Type of Fill Materials: One or more of the following:
      a. Latex sealant.
      b. Silicone sealant.
      c. Intumescent putty.
      d. Mortar.

C. Firestop Systems for Metallic Pipes, Conduit, or Tubing FS-2:
   1. Available UL-Classified Systems: C-AJ- 1001-1999.
   2. Type of Fill Materials: One or more of the following:
      a. Latex sealant.
      b. Silicone sealant.
      c. Intumescent putty.
      d. Mortar.

D. Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing FS-3:
   1. Available UL-Classified Systems: C-AJ- 2001-2999.
   2. Type of Fill Materials: One or more of the following:
      a. Latex sealant.
      b. Silicone sealant.
      c. Intumescent putty.
      d. Intumescent wrap strips.
      e. Firestop device.

E. Firestop Systems for Electrical Cables FS-4:
   1. Available UL-Classified Systems: C-AJ- 3001-3999.
   2. Type of Fill Materials: One or more of the following:
      a. Latex sealant.
      b. Silicone sealant.

c. Intumescent putty.
d. Silicone foam.
e. Pillows/bags.

F. Firestop Systems for Cable Trays FS-5:
1. Available UL-Classified Systems: C-AJ- 4001-4999.
2. Type of Fill Materials: One or more of the following:
a. Latex sealant.
b. Intumescent putty.
c. Silicone foam.
d. Pillows/bags.
e. Mortar.

G. Firestop Systems for Insulated Pipes FS-6:
1. Available UL-Classified Systems: C-AJ- 5001-5999.
2. Type of Fill Materials: One or more of the following:
a. Latex sealant.
b. Intumescent putty.
c. Silicone foam.
d. Intumescent wrap strips.

H. Firestop Systems for Miscellaneous Electrical Penetrants FS-7:
1. Available UL-Classified Systems: C-AJ- 6001-6999.
2. Type of Fill Materials: One or more of the following:
a. Latex sealant.
b. Intumescent putty.
c. Mortar.

I. Firestop Systems for Miscellaneous Mechanical Penetrants FS-8:
1. Available UL-Classified Systems: C-AJ- 7001-7999.
2. Type of Fill Materials: One or both of the following:
a. Latex sealant.
b. Mortar.

J. Firestop Systems for Groupings of Penetrants FS-9:
1. Available UL-Classified Systems: C-AJ- 8001-8999.
2. Type of Fill Materials: One or more of the following:
a. Latex sealant.
b. Mortar.
c. Intumescent wrap strips.
d. Firestop device.
e. Intumescent composite sheet.

END OF SECTION 07 84 13

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Joint sealants.

1.2 ACTION SUBMITTALS

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

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

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers. Store and handle materials in compliance with manufacturer's written instructions.

1.4 COORDINATION

A. Ensure joint sealant products are coordinated and compatible with the non-metallic plumbing piping system and the fire sprinkler piping system.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

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

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 JOINT SEALANTS

A. Butt Glazing Sealant: Silicone, Nonstaining, S, NS, Class 100/50**,** T, NT: Single-component, nonsag, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Uses T and NT.

1. Products and Manufacturers: Subject to compliance with requirements, provide one of the following:
   a. DOWSIL 795; Dow Chemical Company.
   b. Spectrem 2; Tremco, an RPM Co.
   c. Silpruf SCS 2000; Momentive.
   d. Sika, Sikasil WS 295.
2. Joint Locations: Between glass, and between glass and adjacent substrates.

B. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 50, Uses T and NT.

1. Products and Manufacturers: Subject to compliance with requirements, provide one of the following:
   a. Pecora Corporation; Urexpan NR-200.

b. Tremco, an RPM Co.; Vulkem, 445SSL.
c. Sika; Sikaflex 1c SL.

2. Joint Locations: Tile control and expansion joints.

C. Sealants for Contact with Food: Comply with 21 CFR 177.2600, NSF Standard 51, and ASTM C 920 for Type S, Grade NS, Class 25, Use NT.
1. Dow Chemical Company; 786 Silicone Sealant.

D. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
1. Products and Manufacturers: Subject to compliance with requirements, provide one of the following:
a. Dow Chemical Company; 786 Silicone Sealant.
b. Momentive; Sanitary SCS 1700.
c. Pecora Corporation; 898 Silicone Sanitary Sealant.
d. Tremco, an RPM Co.; Tremsil 200 Sanitary.
2. Joint Locations:
a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints where indicated.
c. Other joints as indicated on Drawings.

E. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
1. Products and Manufacturers: Subject to compliance with requirements, provide one of the following:
a. Pecora Corporation; AC-20 + Silicone.
b. DAP Products Inc.; Alex Plus Acrylic Latex Caulk Plus Silicone.
c. BASF; MasterSeal NP 520.
d. Tremco, an RPM Co.; Tremflex 834.
2. Joint Locations:
a. Control joints on exposed interior surfaces of exterior walls.
b. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
c. Other joints as indicated on Drawings.

2.3 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C1330, Type B (bicellular material with a surface skin) or other type, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

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

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

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

3.2 PREPARATION

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

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

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

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

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

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

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

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   1. Remove excess sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.
   4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C1193.
   5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C1193.
      a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

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

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 92 00

SECTION 08 12 13 - HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Interior hollow-metal frames.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803.

1.3 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:
   1. Elevations of each frame type.
   2. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   3. Locations of reinforcement and preparations for hardware.
   4. Details of each different wall opening condition.
   5. Details of preparation for electrified hardware, access control and security systems.
   6. Details of anchorages, joints, field splices, and connections.
   7. Details of accessories.
   8. Details of moldings, removable stops, and glazing.

C. Product Schedule: For hollow-metal frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of fire-rated hollow-metal frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
   1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal frames vertically under cover at Project site with head up. Place on minimum 4-inch-(102-mm-) high wood blocking.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. ASSA ABLOY.
2. de LaFontaine.
3. Mesker Door Inc.
4. Pioneer Industries, Inc.
5. Republic Builders Products Company.
6. Steelcraft; an Allegion (formerly Ingersoll-Rand) company.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 HOLLOW METAL WORK

A. Construct hollow-metal frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Interior Frames: NAAMM-HHMA 861. Comply with HMMA 803 for materials and construction requirements, providing custom shapes as required for profiles and configurations indicated.
1. Materials: Cold-rolled, uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm) for openings up to 48 inches (1219 mm) wide, and 0.067 inch (1.7 mm) for frames 48 inches (1219 mm) and wider.
2. Exposed Finish: Prime.
3. Machine mitered, full (continuous) profile welded, unless otherwise indicated.
4. Welding:
   a. Perimeter face joints (flush or indented): Continuously welded internally or externally with flush face joints finished smooth with seamless faces. Continuously weld internally the rabbets and soffits.
   b. Internal flush face joints: Continuously welded and finished smooth with seamless faces.
   c. Members at internal indented intersections: Securely welded to concealed reinforcements, and have hairline face seams.
5. Slip-On Frames: Provide slip-on frames at existing partitions to remain.
   a. Furnish components unassembled.
   b. Factory prepare flush corner joints with steel reinforcing gussets not less than 0.032 in. (0.8 mm) thick, and/or with integral tabs and slots which securely interlock upon assembly.
   c. Design corner joint to assure component profile alignment and frame performance, when field assembled by others, in accordance with the manufacturer's installation instructions.

6. Stop Height: 0.625 inch (15.8 mm) minimum.
7. Corner Joint:
    a. Fabricate with all contact edges closed tight.
        1) Where the two joining members faces are equal; provide faces mitered, and with stops mitered or butted.
        2) Where the two joining members faces are unequal; faces may be mitered or butted at manufacturers option.
    b. Reinforce corner joints.

C. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

D. Jamb Anchors: Provide frame product with anchorage appropriate to frame and wall construction.
1. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
    a. Three anchors per jamb up to 60 inches high.
    b. Four anchors per jamb from 60 to 90 inches high.
    c. Five anchors per jamb from 90 to 96 inches high.
    d. Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
2. Compression Type: Not less than two anchors in each frame.

E. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.

F. Floor Anchors: Provide frame product with anchorage appropriate to frame and wall construction.
1. Provide floor anchors for each jamb and mullion that extends to floor.
2. Weld floor anchors inside jambs.
3. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at top of underlayment.
4. For applications that do not permit the use of a floor anchor, substitute an additional jamb anchor at a location not to exceed 8 in. (204 mm) from the base of the jamb.
5. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
6. Thickness of floor anchor; same as frame, minimum.

G. Vertical Bracing:
1. For frames supported on steel studs, if studs at jamb do not extend to structure above, provide vertical steel struts, 3/8 inch x 2 inches, extended from top of frame at each jamb to supporting construction above.
2. Bend top of struts at right angle and attach to supporting construction by bolting, welding, or other suitable anchorage.

H. Shipping Spreaders: For all door openings in welded frame product provide a temporary steel spreader welded to the base of the jambs or mullions to serve as bracing during shipping, and handling. Spreaders are not to be used for installation.

2.3 MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.

D. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

E. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

F. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

2.4 FABRICATION

A. Fabricate all finished work neat in appearance, square, and free of defects, warps and buckles. Pressed steel members shall be straight and of uniform profile throughout their lengths.
   1. Mark frame product with an identification number as shown on the approved submittal.
   2. Provide frames formed to profiles indicated, matching existing frames where applicable.
   3. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

B. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
   1. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   2. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

C. Hardware Preparation: Factory prepare hollow-metal frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames," HMMA 831 "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames,", the Door Hardware Schedule, and templates provided by hardware supplier.
   1. Reinforce frames to receive nontemplated, mortised, and surface-mounted door hardware. Offset reinforcement so that faces of mortised hardware items are flush with surface of the frame.
      a. Secure reinforcement by spot welding. Comply with applicable requirements of ANSI/BHMA A156.115 and A156.115W specifications for door and frame preparation for hardware.
      b. Factory drill and tap for surface-applied hardware, except at push-plates and kickplates provide reinforcing only.
   2. Comply with BHMA A156.115 for preparing hollow-metal frames for hardware.
      a. Hinges and Pivots: 7 gage thick by 1-1/4 inches wide by 10 inches.
      b. Strike, Surface Mounted Hold Open Arms, and Flushbolt Reinforcements: 12 gage thick by size as required by hardware manufacturer.
      c. Closer Reinforcements: 12 gage thick one piece channel by size as required by hardware manufacturer.
      d. Other Hardware Reinforcements: As required for adequate strength and anchorage.
      e. Electrical Requirements: Make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replaced.

1) Provide all cutouts and reinforcements required for hollow metal frames to accept security system components.
2) Frames with Electric Hinges and Pivots: Provide welded on UL listed back boxes with metal conduit or raceway to permit wiring from electric hinge or pivot to other electric door hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated.
1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

2.5 STEEL FINISHES

A. After fabrication, fill and sand all tool marks and surface imperfections as required to make face sheets, continuously welded vertical door edges and weld joints free from irregularities and dressed smooth.

B. Factory Priming for Field-Painted Finish: Apply shop primer immediately after surface preparation and pretreatment. Apply a sufficient number of coats, baked on, to obtain uniformly smooth exposed surfaces. Touchup surfaces having runs, smears, or bare spots.
1. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
a. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
b. Refer to Section 09 91 23 “Interior Painting” for field-applied coating.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. Install hollow-metal frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with NAAMM-HHMA 840.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
    a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    b. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    c. Install frames with removable stops located on secure side of opening.
2. Floor Anchors: Secure with postinstalled expansion anchors.
    a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Solidly pack insulation inside frames.
4. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
    a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 08 12 13

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Flush wood veneer-faced doors for transparent finish.
2. Flush wood doors for opaque finish.
3. Factory finishing flush wood doors.
4. Factory fitting flush wood doors to frames and factory machining for hardware.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:
1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door trim for openings.
5. Door frame construction.
6. Factory-machining criteria.
7. Factory-priming and finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
1. Door schedule indicating door location, type, size, and swing.
2. Door elevations, dimension, and locations of hardware, lite cutouts, and glazing thicknesses.
3. Details of frame for each frame type, including dimensions and profile.
4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.
8. Requirements for veneer matching.
9. Doors to be factory primed or finished and application requirements.

C. Samples for Verification:
1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
2. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Special warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.8 FIELD 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 temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Delamination of veneer.
      b. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
      c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
   2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
   3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. ASSA ABLOY Wood Doors and Frames; Graham.
   2. Eggers Industries.
   3. Masonite Architectural; Aspiro Series (formerly Algoma and Marshfield).
   4. VT Industries Inc.; Artistry and Heritage collections.

B. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.

B. Adhesives: Do not use adhesives that contain urea formaldehyde.

C. Composite Wood Products: Products shall be made without urea formaldehyde.

D. Low-Emitting Materials:
   1. Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.
   2. Fabricate doors with adhesives and composite wood products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 SOLID-CORE FLUSH WOOD DOORS

A. Interior Doors:
   1. Performance Grade:
      a. ANSI/WDMA I.S. 1A Heavy Duty unless otherwise indicated.
      b. ANSI/WDMA I.S. 1A Extra Heavy Duty: Public toilets and janitor's closets.
      c. ANSI/WDMA I.S. 1A Grade: Premium.
   2. Faces for Transparent Finish: Single-ply wood veneer not less than 1/50 inch (0.508 mm) thick.
      a. Species and Cut: As indicated on Drawings.
      b. Match between Veneer Leaves: Book match.
      c. Assembly of Veneer Leaves on Door Faces: Center-balance match.
      d. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
      e. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
      f. Transom Match: Continuous match.
      g. Exposed Vertical and Top Edges: Same species as faces or a compatible species - Architectural Woodwork Standards edge Type A.
   3. Faces for Opaque Finish: Either medium-density overlay (MDO) or high-density fiberboard.
      a. Apply MDO directly to high-density hardboard crossbands.
      b. Exposed Vertical and Top Edges: Any closed-grain hardwood.
   4. Edge Construction:
      a. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
         1) Screw-Holding Capability: 550 lbf (2440 N) in accordance with WDMA T.M. 10.
   5. Core for Non-Fire-Rated Doors:
      a. ANSI A208.1, Grade 1-LD-2 particleboard.
         1) 1-3/8 inch wide minimum prior to fitting, 2 ply laminated wood construction consisting of a single piece hardwood outer band, without fingerjoints, and an inner band of SCL. Trim non-rated door width equally on both jamb edges.
         2) Compatible - Similar in overall color, grain characteristics as the face veneer. Outer stile minimum widths after factory trim to be 1/2-inch
         3) Vertical Edges can be one piece or laminated hardwood lumber, but visible portion must be same species as face veneer or recognized compatible species. Matching or outer layer of lumber to be a minimum of 1/2-inch or thicker after trim.
         4) Crossbands: Hardwood veneer with a minimum thickness of 1/8-inch. Laminate crossbands and face veneers to the core with Type 1 waterproof glue. Extend crossbands full width of door and have grain direction at 90° to face of door. Minimum properties include internal bond minimum of 220 psi. Synthetic crossbands of either fiberwood or particleboard are not permitted unless they meet minimum internal bond of 220 psi.
         5) Rails (Horizontal Edges): Solid lumber - hardwood or softwood, with grain running perpendicular to stiles.

6) Construction: AWI Section 1300, PC-5 CE. Stiles, rails, and blocking bonded to core then entire unit abrasive planed before veneering. Cross banding materials shall extend full width of door with grain running horizontally, tapeless spliced without voids or show through (telegraphing), and directly glued to core and blocking. Sand cross banding before application of face veneer. Face veneer shall extend full height of door with grain running vertically, tapeless spliced without voids or show through (telegraphing), and directly glued to cross band. Glue lines between face veneer, cross banding, and blocking shall be of a type to comply with the specified warranty using the hot plate process.

b. WDMA I.S. 10 structural composite lumber, Timberstrand LSL. Provide doors with structural composite lumber cores instead of particleboard cores at locations where exit devices are indicated or where light or louver cutouts exceed 40% of the door area.
   1) Screw Withdrawal, Door Face: 700 lbf.
   2) Screw Withdrawal, Vertical Door Edge: 550 lbf.

6. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before faces are applied.

B. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors and as needed to eliminate through-bolting hardware.
   1. Blocking consisting of minimum 1/2 wide single length SCL outer band and single length SCL inner band fabricated of same materials as vertical edges.
      a. Provide 5-1/2-inch wide minimum blocking at top-rail blocking in doors indicated to have closers.
      b. Provide 5-1/2-inch wide minimum blocking at bottom rail at doors indicated to have kick, mop, or armor plates.
      c. Provide 5-1/2-inch wide minimum blocking at mid-rail blocking in doors indicated to have exit devices.
      d. Provide either two 4-1/2 inch by 18 inch minimum sized lock blocks on each door stile or a single 10 inch high continuous lock rail located on lockcase body centerlines

2.4 LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
   1. Wood Species: Same species as door faces.
   2. Profile: Manufacturer's standard shape.
   3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.
   1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

B. Factory machine doors for hardware that is not surface applied.
   1. Locate hardware to comply with DHI-WDHS-3.
   2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
   3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.

4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Factory cut and trim openings through doors.
1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.6 FINISHING

A. Finish doors at factory that are indicated to receive shop applied transparent and shop applied opaque finishes.

B. Use only paints and coatings that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.7 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.
1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
4. Stains and fillers may be omitted on top edges, unless top of door is viewable from above.

B. Transparent Finish:
1. ANSI/WDMA I.S. 1A Grade: Premium.
2. Finish: ANSI/WDMA I.S. 1A TR-6 Catalyzed Polyurethane.
3. Staining: As selected by Architect from manufacturer's full range.
4. Sheen: Satin, unless otherwise indicated.

C. Opaque Finish:
1. ANSI/WDMA I.S. 1A Grade: Premium.
2. Finish: ANSI/WDMA I.S. 1A OP-6 Catalyzed Polyurethane.
3. Color: As selected by Architect from manufacturer's full range.
4. Sheen: Satin, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.
1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

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

3.2 INSTALLATION

A. Hardware: Apply hardware to doors in accordance with hardware manufacturer's instructions and Section 08 71 00 "Door Hardware." For particleboard core doors drill pilot holes of proper size for installing hinge screws. Adjust hardware items just prior to final inspection. Leave work in complete and proper operating condition.
   1. Factory wrapping shall be maintained on new doors during construction period, and all hardware shall be installed by cutting the factory wrapping at the mounting location of the hardware item.

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Install frames level, plumb, true, and straight.
   1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3.2 mm in 2400 mm).
   2. Anchor frames to anchors or blocking built in or directly attached to substrates.
      a. Secure with countersunk, concealed fasteners and blind nailing.
      b. Use fine finishing nails or finishing screws for exposed fastening, countersunk, and filled flush with woodwork.
         1) For factory-finished items, use filler matching finish of items being installed.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge, matching clearances specified for factory prefitting, and to contact stops uniformly. Field cutting, fitting, or trimming, if required, shall be executed in a workmanlike manner.
   1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Protect wood doors to ensure that the wood door work will be without damage or deterioration at the time of Substantial Completion.

C. Refinish or replace wood doors damaged during installation. Replace doors that are damaged or that do not comply with requirements, including those that are warped, twisted, demonstrate core show through, are not true in plane, or cannot be refinished to satisfaction of Architect. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing as acceptable to Architect.

END OF SECTION 08 14 16

SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Access doors and frames for walls and ceilings, including access panels for mechanical, plumbing and electrical Work located behind or above finished walls or ceilings which require access, whether or not such panels are indicated on Drawings.

1.2 ALLOWANCES

A. Access doors and frames are part of an access door and frame allowance.

1.3 ACTION SUBMITTALS

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

B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items with concealed framing, suspension systems, piping, ductwork, and other construction. Show the following:
   1. Method of attaching door frames to surrounding construction.
   2. Ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim.

C. Access Door Schedule: Submit, for Architect's information, complete access door and panel schedule, including types, ratings, general locations, sizes, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.

1.4 COORDINATION

A. Verification: Obtain specific locations and sizes for required access doors and panels from trades requiring access to concealed equipment, and indicate on access door schedule submittal.

B. Layout access panels on concrete slabs for Architect's review. Architect will confirm acceptability or adjust locations. Provide approved layout on reflected ceiling plans for record.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Steel Access Door Manufacturers: Subject to compliance with requirements, provide access doors and frames as indicated by Nystrom, Inc. or comparable products by one of the following:
   1. Acudor Products, Inc.
   2. Babcock-Davis.
   3. Bauco Access Panel Solutions, Inc.
   4. Karp Associates, Inc.
   5. Milcor, Inc.

B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

2.2 STEEL ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:
   1. Description: Face of door flush with frame, with exposed flange and concealed hinge.
   2. Locations: Wall access doors in toilet and shower rooms.
   3. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch (1.63 mm), 16 gage factory primed.
   4. Stainless Steel Sheet for Door: Nominal 0.062 inch (1.59 mm), 16 gage, ASTM A480/A480M No. 4 finish.
   5. Frame Material: Same material, thickness, and finish as door.
   6. Latch and Lock: Cam latch, screwdriver operated.
   7. Basis of Design Product: Nystrom, Inc.; NT Series.

B. Flush Access Doors with Concealed Flanges:
   1. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
   2. Locations: Wall access doors at wetstacks. Uncoated steel unless otherwise indicated. Metallic coated steel where access door assembly is subject to water or moisture.
   3. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage, factory primed.
   4. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch (1.63 mm), 16 gage factory primed.
   5. Frame Material: Same material and thickness as door.
   6. Latch and Lock: Cam latch, screwdriver operated.
   7. Basis of Design Product: Nystrom, Inc.; NW Series.

C. Recessed Access Doors with Concealed Flanges for Gypsum Board Infill:
   1. Description: Door face recessed 1/2 inch (13 mm) for gypsum board infill; with concealed flange for gypsum board installation and concealed hinge.
   2. Locations: Wall and ceiling.
   3. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage, factory finished.
   4. Frame Material: Same material and thickness as door.
   5. Latch and Lock: Cam latch, screwdriver operated.
   6. Basis of Design Product: Nystrom, Inc.; RW Series.

D. Flush Access Doors with Concealed Flanges/Tile Ready:
   1. Description: Face of door flush with frame, with concealed flange and concealed hinge ready for tile application.
   2. Locations: Wall access doors in fire rated construction in wet areas including toilet and shower rooms.
   3. Stainless Steel Sheet for Door: Nominal 0.062 inch (1.59 mm), 16 gage, ASTM A480/A480M No. 4 finish.
   4. Frame Material: Same material, thickness, and finish as door.
   5. Latch and Lock: Self-latching with cylinder lock, key operated.
   6. Basis of Design Product: Nystrom, Inc.; RUW Series.

2.3 MATERIALS

A. Metal Surfaces, General: For fabrication of access door and panel metal work which will be exposed to view in the finished work, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and applying surface finishes.

B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.

D. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

E. Stainless Steel Plate, Sheet, and Strip: ASTM A240/A240M or ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.

F. Stainless Steel Flat Bars: ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.

G. Frame Anchors: Same material as door face.

H. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329. Stainless steel fasteners for stainless steel items.

I. Drywall Beads: Edge trim formed from 0.0299-inch (0.76-mm) zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.4 PAINT

A. Shop Primers: Provide primers that comply with Division 09 Section "Painting."

B. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

C. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

2.5 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Steel Access Doors and Frames:

1. Forming: Form exposed surfaces free from warp, wave and buckle, with corners square, unless otherwise shown. Form molded members straight and true, with welded joints coped or mitered, well formed, and in true alignment. Dress welded joints on exposed surfaces smooth so they are invisible after finishing and flush with adjacent surfaces. Provide attachment devices and fasteners of type required to secure access doors and frames to contiguous support construction.
2. Reinforcing: Reinforce members and joints with structural shapes and plates in concealed locations, as necessary for adequate strength and rigidity. Provide concealed fastenings unless otherwise shown. Locate necessary exposed fastenings in an orderly pattern, in accordance with reviewed shop drawings. Separate dissimilar metals with dielectric separator to prevent galvanic action. Do not extend coatings onto exposed surfaces
3. Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
    a. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
    b. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.
    c. Frames: Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame for steel frames.

C. Latch Hardware:
   1. Quantity: Furnish number of latches required to hold doors tightly closed.
   2. For recessed panel doors, provide access sleeves for each latching device. Furnish plastic grommets and install in holes cut through finish.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

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

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
   1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
   2. Factory Finished: Apply manufacturer's standard baked-enamel or powder-coat finish immediately after cleaning and pretreating, with minimum dry-film thickness of 1 mil (0.025 mm) for topcoat.
      a. Color: As selected by Architect from full range of industry colors.

E. Stainless Steel Finishes:
   1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
   2. Polished Finish: ASTM A480/A480M No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.
      a. Run grain of directional finishes with long dimension of each piece.
      b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
   3. Provide stainless steel access doors in shower rooms, locker rooms, food service back-of-house rooms, restrooms, and other walls scheduled to receive ceramic tile finish, epoxy paint, or FRP panels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Verify dimensions of openings by field measurements so that access doors and related items will be accurately designed, fabricated, and fitted to the substrate.

B. Coordinate access doors and panels with the work of other Sections and provide items to be placed during the installation of other work. Coordinate delivery of such items to the project site. Deliver items which are to be built into the work of other Sections in time so as not to delay the progress of the Work.

C. As work progresses and in sufficient time to incorporate changes into the layout, layout access panels on concrete slabs for Architect's review. Architect will confirm acceptability or adjust locations. Provide approved layout on reflected ceiling plans for record.

3.3 INSTALLATION

A. Coordinate installation with work of other trades. Advise installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

B. Install access doors and panels in Architect approved locations, securely fastened to supports and framing. Set frames accurately positioned, plumb, level and with plane of face panels in line with adjacent finish surfaces.

C. Comply with manufacturer's written instructions for installing access doors and frames.

D. Adjust doors and hardware, after installation, for proper operation.

E. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

3.4 SCHEDULES

A. Wall and ceiling access doors are required:
   1. Where specifically scheduled or noted on Drawings.
   2. Where service access is required by Code.
   3. Where service access is required for serviceable, operable, adjustable, or re-settable fire suppression, plumbing, mechanical, electrical, life safety, security, and communications systems items.

B. Sizes: Unless noted otherwise on Drawings. Refer to access requirements in applicable Divisions 21 through 28 Sections. Provide smallest size allowing reasonable access to items in plenum.
   1. Ceilings and Soffits:
      a. 18 inches by 18 inches to 24 inches by 24 inches for person access.
      b. 6 inches x 6 inches to 12 inches by 12 inches for hand access.
   2. Access for Plumbing Shut-offs: 12 inches by 12 inches at fixture chase wall.
   3. Wetstacks: Sized as required for access to equipment, cleanouts, and controls.
   4. Match existing sizes when existing access doors are being replaced.

END OF SECTION 08 31 13

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Commercial door hardware for the following:
      a. Swinging doors.
      b. Other doors to the extent indicated.
   2. Cylinders for doors specified in other Sections.

1.2 SUBMITTALS

A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, 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. 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. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1. Upon completion of construction and building turnover, furnish two (2) complete maintenance manuals to the owner. Manuals to include the following items:
   1. Approved hardware schedule, catalog cuts and keying schedule.
   2. Provide keying bitting list in paper and electronic format by registered mail directly to facility manager owner.
   3. Hardware installation and adjustment instructions.
   4. Manufacturer’s written warranty information.
   5. Wiring diagrams, elevation drawings and operational descriptions for all electronic openings.

1.3 QUALITY ASSURANCE

A. Door Hardware Installer Qualifications: An experienced and factory trainined Installer who has completed both standard and electrified builders hardware and integrated access control installations 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.

B. Regulatory Requirements: Comply with provisions of the following:
   1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:
      a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

b. Door Closers: Comply with the following maximum opening-force requirements indicated:
   1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
   2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.

2. NFPA 101: Comply with the following for means of egress doors:
   a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
   b. Thresholds: Not more than 1/2 inch high.
3. International Building Code.

C. Fire-Rated Door Assemblies: Provide door hardware for 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 NFPA 252 (neutral pressure at 40" above sill) or UL-10C.
   1. Test Pressure: Positive pressure labeling.

1.4 DELIVERY, STORAGE, AND HANDLING

A. One complete shipment of door hardware as detailed in approved Door Hardware Schedule Shop Drawings to be inventoried on site and upon receipt of material is secure in lock-up room provided with shelving for door hardware. Do not store electronic access control hardware, software or accessories at Project site without prior authorization and climate controlled facility, failure to do so will void electronic warranties.

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.

1.5 COORDINATION

A. Templates: Door Hardware Supplier to provide and distribute to the parties involved for templating for doors, frames, and other work specified to be factory prepared for installing standard, electrified and access control door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

1.6 WARRANTY

A. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of standard, electrified hardware and access control hardware that fails in materials or workmanship within specified warranty period. 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.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this Section and the Door Hardware Schedule at the end of Part 3.
   1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated for named products listed in Hardware Sets.
   2. Sequence of Operation: Provide electrified and access control hardware function, sequence of operation, and interface with other building control systems indicated.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Schedule at the end of Part 3. Products are identified by using door hardware designations, as follows:
   1. 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. (Source manufacturer listed in boldface).

2.2 HINGES AND PIVOTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Hinges:
      a. McKinney Products (MC).

B. Standards: BHMA Certified products complying with the following:
   1. Butts and Hinges: BHMA A156.1.

C. Quantity: Provide the following, unless otherwise indicated:

D. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

Maximum Door Size (inches)	Hinge Height (inches)	Metal Thickness (inches) Standard Weight	Heavy Weight
36-in by 86-in by 1-3/4	4-1/2	0.134	0.180
< 36-in by 120-in by 1-3/4	5	0.146	0.190

E. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
   1. Interior Doors: Heavy weight, ball bearing hinges unless Hardware Sets indicate LOCKS AND LATCHES

F. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Mechanical Bored Locks and Latches:
      a. Yale Security Group (YA) - 4600LN Series.

2.3 CYLINDERS AND KEYING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Cylinders:
      a. Yale Security Group (YA)

B. Standards: Comply with the following:
   1. Cylinders: BHMA A156.5.

C. Keying System: Key all locks alike

D. Keys: Provide nickel-silver keys complying with the following:
   1. Stamping: Permanently inscribe each key with a visual key control number and as directed by Owner.
   2. Quantity: Provide the following:
      a. Cylinder Change Keys (Per Key Set): Two.

2.4 CLOSERS

A. Manufacturers: Subject to compliance with requirements, provide products by one the following:
   1. Surface-Mounted Closers (Heavy Duty): BHMA Certified Grade 1.
      a. Yale Security Group (YA) - 4400 Series with heavy duty arms.

B. Standards: Comply with the following:
   1. Closers: BHMA A156.4.

C. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide non-handed, factory-sized closers adjustable to meet field conditions and requirements for opening force.

2.5 STOPS AND HOLDERS

A. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch fabricated for drilled-in application to frame. Provide (3) per single door and (2) per paired door frame if applied gasketing is not specified in Hardware Sets.

2.6 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.

2.7 FINISHES

A. Standard: Comply with BHMA A156.18.

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.

D. BHMA Designations: Comply with base material and finish requirements indicated by the following:
   1. BHMA 626 (US26D): Satin chromium plated over nickel, over brass or bronze base metal.
   2. BHMA 689: Aluminum painted, over any base metal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, 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. Proceed with installation only after unsatisfactory conditions have been corrected.

C. 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. Steel Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. 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. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
   3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
   1. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper finish. and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.6 DOOR AND HARDWARE REQUIRED ACCOUNT

A. Purchase all hardware from:
   1. Himmel’s Architectural Door and Hardware
   2. Contact: Dylan Vaughn
      a. Phone: 281-520-4035
      b. E-Mail: dvaughn@himmels.com

3.7 DOOR HARDWARE SETS

A. As scheduled on Drawings.

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Glass for interior work.
   2. Glazing sealants and accessories.

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass; 12 inches (300 mm) square.

C. Glazing Accessory Samples: For sealants, in 12-inch (300-mm) lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For glass.

C. Product Test Reports: For glazing sealants, for tests performed by a qualified testing agency.
   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: Furnish maintenance data for each type of glass and applied film for use during construction and for use by the Owner after acceptance of the Work.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance and who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

B. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

C. Glazing Publications: Comply with the applicable provisions of the referenced standards except as modified by governing codes and the Contract Documents. Where a recommendation or suggestion occurs in the referenced standards, such recommendation or suggestion shall be considered mandatory. In the event of conflict between referenced standards, this specification or within themselves, the more stringent standard or requirement shall govern.
   1. Glass Association of North America (GANA)
      a. "Sealant Manual."
      b. "Glazing Manual."
      c. “Fully Tempered Heavy Glass Door and Entrance Systems Design Guide.”
   2. Glass Tempering Association (GTA): "Engineering Standards Manual."
   3. American Society for Testing and Materials (ASTM):
      a. ASTM C1036, “Specification for Flat Glass.”
      b. ASTM C1048, “Specification for Heat Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.”

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
   1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
   2. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, gaskets, and glazing channel substrates.
   3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
   4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
   5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
   1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E1300.
   1. Design Loads: 5 psf for partitions.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
   1. Safety Glazing Labeling: Permanently mark safety glazing with certification label of the SGCC or another certification agency acceptable to AHJ with label indicating manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies. Provide removable labels when acceptable to AHJ. Locate permanent markings in one corner, and in the same location, of each glass light in accordance with the requirements of SGCC labeling guidelines. Markings shall have a nominal size of no greater than 1 inch in diameter, and be located with glass edge clearances, at the corner, by not more than 3/4 inch up and 3/4 inch over.

E. Glass Design: Glass thicknesses and heat treatments indicated are minimum requirements. Glazing details shown are for convenience of detailing only and are to be confirmed by the Contractor relative to cited standards and final framing details.
   1. Glazing channel dimensions indicated are intended to provide necessary minimum bite on glass, minimum edge clearances and adequate sealant and/or gasket thickness within required tolerances. Coordinate glazing systems with glazing channels to assure proper installation of systems.

F. Compatibility and Adhesion: Provide glazing sealants, gaskets, and glazing accessories which are compatible with each other and with glass and glass framing members, and which will adhere to joint surfaces.

G. Roller wave distortion: Limit roller wave distortion to 0.003 inches peak to valley or 0.008 inches peak to valley within 10.5 inches of leading or trailing edge.

2.3 GLASS PRODUCTS

A. Glass Thickness: 6 mm minimum, unless otherwise indicated. Design thicknesses per detailing as indicated or scheduled. Provide glass that complies with performance requirements and is not less than the thickness indicated.

B. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

C. Heat-Treated Glass: Heat treat glass to meet safety glazing requirements.
   1. Fabrication process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
   2. Fully tempered glass: ASTM C1048, Kind FT, meeting the requirements of ANSI Z96.1 for Condition A and CPSC 16CFR 1201 for Category II performance. Surface compression shall be equal to or greater than 10,000 psi. After tempering, heat soak 100% of all fabricated glass units to European Union Standard EN14179 to reduce the potential for inclusion related glass breakage. Statistical heat soaking shall not be permitted.
   3. Sizes and Cutting: Prior to heat treatment, cut glass to required sizes as determined by accurate measurement of openings to be glazed, making allowance for required edge clearances. Cut and process edges in accordance with glass manufacturer's recommendations. Do not cut or treat edges in the field.
      a. Maintain roller marks running horizontally in the final installation.
      b. Roller wave distortion parallel to bottom surface of glazing, in the same direction as quenching distortions, strain patterns or other distortions that may be a result of heat treating process as referenced in ASTM C1048.
      c. Tong marks are not acceptable.
   4. Flatness Tolerances:
      a. Overall Bow and Warp: Maximum 50% of bow and warp in any direction as listed in ASTM C1048 Table 2. Localized warp limited to 1/32 inch in 12 inches.
      b. Roll Ripple: Deviation from flatness at peak to valley deviation not to exceed 0.003 inches for 6 mm thick glass in glass center, with leading and trailing edge deviation not to exceed 0.008 inches for 6 mm thick glass.

2.4 GLAZING SEALANTS

A. Glazing Sealant: Neutral-curing silicone complying with ASTM C920, Type S, Grade NS, Class 50, Use NT, G and A; compounded specifically for glazing; nonhardening, nonstaining and nonbleeding. Refer to Section 07 92 00 "Joint Sealants."
   1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
   3. Field-applied sealants shall have a VOC content of not more than 250 g/L.
   4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
   5. VOC Content: Provide glazing sealants and sealant primers having not more than 100 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
   1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
   2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.6 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
   1. Color: Provide colors selected by Architect from manufacturer's standard colors.

B. Dense Compression Gaskets: ASTM C1115, continuous extruded silicone with cross sectional profile, physical properties, and tolerances as recommended by glass manufacturer for application, shape to fit glazing channel retaining slot.

C. Soft Compression Gaskets: Continuous extruded expanded silicone foam with cross sectional profile, physical properties, and tolerances as recommended by the curtain wall manufacturer, and as required, to comply with the performance requirements specified and shown all in compliance with the applicable provisions of ASTM C509, Option II, Type II.

D. Setting Blocks: ASTM C1115, silicone, 85 +/- 5 Shore A durometer hardness, 1/16 inch less than the channel width, and length based on square footage of glass unit to be supported in accordance with GANA standards and glass manufacturer recommendations.

E. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation.

F. Edge Blocks: ASTM C1115, silicone, 65 +/- 5 Shore A durometer hardness, minimum 4 inches long and sized to allow 1/8 inch clearance between edge of glass and block.

G. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

H. Glazing Felt: Treated wool felt, adhesive backed, non-wicking and non-staining.

I. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
   1. VOC Content: Provide cleaners, primers, and sealers having not more than the following VOC contents when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
      a. Cleaners and Sealers: 200 g/L.
      b. Primers: 250 g/L.

2.7 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
   1. Edge and Surface Conditions: Comply with the recommendations of AAMA "Structural Properties of Glass" for "clean-cut" edges, except comply with manufacturer's recommendations when they are at variance therewith.
   2. Edgework for Exposed Edges: Where edges of glass are to be exposed in the finish work, provide ground and polished edges with an arrised edge profile (small bevel of uniform width not exceeding 1/16 inch at an angle of approximately 45 degrees to the surface of the glass) with a polished (surface is reflective in appearance similar to the major surface of the glass) surface.

B. Cutting: Do not nip glass edges. Edges may be wheel cut or sawed and seamed at manufacturer's option. For glass to be cut at site, provide glass 2 inches larger than required in both dimensions, so as to facilitate cutting of clean cut edges without the necessity of seaming or nipping. Do not cut, seam, nip or abrade heat-treated glass.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Ensure that frame openings are plumb, level, true to line and otherwise properly installed.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.

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

3.2 PREPARATION

A. Clean glazing stops, glazing channels, and rabbets which will be in contact with the glazing materials immediately before glazing. Remove coatings which might fail in adhesion or interfere with bond of sealants. Comply with manufacturer's final wiping of surfaces immediately before application of primers. Wipe metal surfaces with IPA (isopropyl alcohol) or xylene unless otherwise required by compatibility and adhesion testing results.

B. Prime surfaces to receive glazing compounds. When priming, comply with manufacturer's recommendations both for materials and procedures.

C. Inspect each piece of glass immediately before installation. Do not install any pieces which are improperly sized or have damaged edges, scratches or abrasion or other evidence of damage.

3.3 GLAZING, GENERAL

A. Layout: Unify appearance of each series of lites by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw, and bow oriented in same direction as other pieces.

B. Use glazing channel as indicated and per final Architect approved Shop Drawings to provide necessary bite on glass, minimum edge and face clearances, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
   1. Install glass units in accordance with glass manufacturer's recommendations.

D. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
   1. For Glass Units Less Than 72 inches: Locate setting blocks at sill one- quarter of the width in from each end of the glass unless otherwise recommended by glass manufacturer.
   2. For Glass Units 72 inches or Greater: Locate setting blocks at sill one-eighth of the width in from each end of the glass, but not less than 6 inches, unless otherwise recommended by glass manufacturer.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass with uniform pattern, draw, bow, and similar characteristics, producing the greatest possible degree of uniformity in appearance on the entire wall elevation. Maintain uniform clearances between adjacent components.

J. Where safety glazing is scheduled or required, install glass after detaching removable safety glazing label unless otherwise required by authorities having jurisdiction. If local authorities require permanent labeling, install glass with permanent safety glazing label in concealed or inconspicuous locations subject to selection by Architect.

K. Glazing Materials: Do not use 2 different glazing materials in the same joint system unless the manufacturer of each material has stated in writing that his material is fully compatible with the other material.
   1. Use suitable protection to limit coverage of glazing materials to the surfaces intended for sealants.
   2. Miter-cut and seal joints of glazing gaskets to provide a continuous watertight and airtight seal at corners and other locations where joints are required. Vulcanize corner joints where compatible with installation procedure. Where wedge-shaped gaskets are driven into one side of channel to pressurize gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lights.
   3. Tool exposed surfaces of glazing materials to provide a slight wash away from the glass. Install exposed gaskets with a slight protrusion above stops in the final compressed condition.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Set glass lites centered in openings on setting blocks.

C. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

D. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a watertight and airtight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a watertight and airtight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

F. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

D. Butt glazing of single thickness glass units: Comply with sealant and glass manufacturer's recommendations for glazing.
   1. Brace glass in position for duration of glazing process
   2. Mask edges of glass at adjoining glass edges and between glass edges and framing members.
   3. Secure small diameter non-adhering foamed rod on back side of joint.
   4. Apply sealant to open side of joint in continuous operation; completely fill joint without displacing foam rod; tool sealant surface smooth to concave profile.
   5. Allow sealant to cure, then remove foam backer rod.
   6. Apply sealant to opposite side; tool sealant smooth to concave profile.
   7. Remove masking tape.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. After installation and until final acceptance, clean glass as frequently as required, but not less than once per month, to remove build-up of dirt, scum, and other substances. Comply with glass manufacturer's recommendations for cleaning.

C. Wash and polish glass on both faces not more than 4 days prior to final acceptance.

D. Comply with glass manufacturer's recommendations for final cleaning.

E. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 PROTECTION

A. Protect glass from contact with contaminating substances resulting from construction operations.
   1. If contaminating substances come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
   2. Remove and replace glass that cannot be cleaned without damage.

B. Remove and replace glass that is damaged during construction period.

3.9 GLASS SCHEDULE

A. Glass Type: Clear fully tempered float glass.
   1. Minimum Thickness: 6 mm.
   2. Safety glazing required.

END OF SECTION 08 80 00

SECTION 09 22 16 – NON STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Non-load-bearing steel framing systems for interior partitions.
   2. Suspension systems for interior ceilings and soffits.
   3. Grid suspension systems for gypsum board ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

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

B. Evaluation Reports: From ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction. For the following:
   1. Firestop tracks.
   2. Post-installed anchors.
   3. Power-actuated fasteners.

1.4 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

C. Horizontal Deflection: For gypsum board assemblies without applied rigid finishes L/240; for gypsum board assemblies with applied rigid finishes such as tile, stone, wood paneling L/360.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
   1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
   2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A653/A653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.

B. Studs and Tracks: ASTM C645.
   1. Steel Studs and Tracks:
      a. Minimum Base-Steel Thickness: Manufacturer's standard thicknesses that comply with structural performance requirements for stud depth indicated, unless otherwise indicated.
      b. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:
   1. Single Long-Leg Track System: ASTM C645 top track with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
   2. Double-Track System: ASTM C645 top outer tracks, inside track with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
   3. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
   1. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm), unless otherwise indicated.

F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
   1. Depth: 1-1/2 inches (38 mm).
   2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C645.
   1. Minimum Base-Steel Thickness: 0.0329 inch (0.836 mm).
   2. Depth: 1-1/2 inches (38 mm).

H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
   1. Configuration: Asymmetrical.

I. Isolation Strip at Exterior Walls: 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

J. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:
   1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, AC193, AC58, or AC308 as appropriate for the substrate.
      a. Uses: Securing hangers to structure.
      b. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.

C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges with depth as required for span and loading and indicated on Drawings.

E. Furring Channels (Furring Members): 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.

F. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.
   1. Performance Requirements: Ceiling support system shall support a live load of 6 psf minimum at L/240.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
   1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:
   1. Existing Sprayed Fire-resistive Materials: Remove only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754.
   1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
   1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
   2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
      a. Install two studs at each jamb unless otherwise indicated.
      b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
      c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
   3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
   4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
      a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
   5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

E. Direct Furring:
   1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
      a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior gypsum board.
   2. Tile backing panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For the following products:
   1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.3 QUALITY ASSURANCE

A. Mockups: Build mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
   1. Build mockups for the following:
      a. Each level of gypsum board finish indicated for use in exposed locations.
   2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
   3. Simulate finished lighting conditions for review of mockups.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: ASTM C1396/C1396M.
   1. Thickness: 5/8 inch (15.9 mm).
   2. Long Edges: Tapered.

B. Gypsum Board, Type X: ASTM C1396/C1396M.
   1. Thickness: 5/8 inch (15.9 mm).
   2. Long Edges: Tapered.

C. Gypsum Ceiling Board: ASTM C1396/C1396M.
   1. Thickness: 1/2 inch (12.7 mm).
   2. Long Edges: Tapered.

D. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.
   1. Core: 5/8 inch (15.9 mm), Type X.
   2. Long Edges: Tapered.
   3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.4 SPECIALTY GYPSUM BOARD

A. Gypsum Board, Type C: ASTM C1396/C1396M. Manufactured to have increased fire-resistive capability.
   1. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
   2. Long Edges: Tapered.

2.5 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.
   1. Thickness: 5/8 inch (15.9 mm).
   2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.
   1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
   2. Shapes:
      a. Cornerbead.
      b. LC-Bead: J-shaped; exposed long flange receives joint compound.

c. L-Bead: L-shaped; exposed long flange receives joint compound.
d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
e. Expansion (control) joint.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5.
2. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:
1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Tile Backing Panels:
1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

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

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
   1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
   2. Fit gypsum panels around ducts, pipes, and conduits.
   3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Single-Layer Application:
   1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
   2. On partitions/walls, apply gypsum panels to minimize end joints.
   3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Multilayer Application:
   1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
   2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
   3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

C. Laminating 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 written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:
   1. Cornerbead: Use at outside corners, unless otherwise indicated.
   2. LC-Bead: Use at exposed panel edges.
   3. L-Bead: Use where indicated.
   4. U-Bead: Use where indicated.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
   1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
   2. Level 2: Panels that are substrate for tile.
   3. Level 3: Where indicated on Drawings.
   4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
   5. Level 5: Where indicated on Drawings.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage 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, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 30 13 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Glazed wall tile.

1.2 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, ANSI A108.17, and ANSI A108.19 which are contained in its "Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Verification:
   1. Full-size units of each type and composition of tile and for each color and finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product.

D. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
   2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
   2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
   3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup of each type of wall tile installation.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

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

D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.10 WARRANTY

A. Warranty: Manufacturer agrees to repair or replace components of tile system that fail in materials or workmanship within specified warranty period, when the products are installed within their shelf life and according to governmental regulations and manufacturer’s written materials which are in effect at the time installation.
   1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
   1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
   1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
   2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 (and A137.3 for large format tiles) for types, compositions, and other characteristics indicated.
   1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
   1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

E. Dynamic Coefficient of Friction (level interior tiles that will be walked on when wet) per ANSI A137.1: DCOF (Dynamic Coefficient of Friction) of 0.42, DCOF, per DCOF AcuTestSM method.

2.3 TILE PRODUCTS

A. As Scheduled.

2.4 SETTING MATERIALS

A. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15, A118.11, and ISO 13007 C2ES1P1.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Custom Building Products; CEGLite™ 100% Solids Commercial Epoxy Grout.
      b. H.B. Fuller Construction Products Inc. / TEC; TEC® AccuColor EFX® Epoxy Special Effects Grout (TA-440).
      c. LATICRETE SUPERCAP, LLC; LATICRETE® SUPERCAP™ Moisture Vapor Control.
      d. MAPEI Corporation; Floor Tile Mortar.
   2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.

2.5 GROUT MATERIALS

A. High-Performance Tile Grout: ANSI A118.7 and ISO 13007 CG2FAW.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Custom Building Products; Prism Color Consistent Grout.
      b. H.B. Fuller Construction Products Inc. / TEC; TEC Power Grout.
      c. LATICRETE SUPERCAP, LLC; Permacolor.
      d. MAPEI Corporation; Ultracolor Plus.

2.6 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.7 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

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

3.2 PREPARATION

A. Fill cracks, holes, and depressions in substrates for tile installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
   1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
   2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
   3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
   1. Glazed Wall Tile: 1/16 inch (1.6 mm) unless scheduled otherwise.

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
   1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

3.4 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove grout residue from tile as soon as possible.
   2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.5 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Wall Installations, Wood or Metal Studs or Furring:
   1. Ceramic Tile Installation Insert designation: TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board.
      a. Ceramic Tile Type: As scheduled.
      b. Thinset Mortar: Improved modified dry-set mortar.
      c. Grout: High-performance unsanded grout.

END OF SECTION 09 30 13

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
   1. Acoustical Panels: Set of 6-inch- (150-mm-) square Samples of each type, color, pattern, and texture.
   2. Exposed Suspension-System Members, Moldings, and Trim: Set of 12-inch- (300-mm-) long Samples of each type, finish, and color.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Ceiling suspension-system members.
   2. Structural members to which suspension systems will be attached.
   3. Method of attaching hangers to building structure.
   4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
   5. Size and location of initial access modules for acoustical panels.
   6. Items penetrating finished ceiling and ceiling-mounted items including the following:
      a. Lighting fixtures.
      b. Diffusers.
      c. Grilles.
      d. Speakers.
      e. Sprinklers.
      f. Access panels.
      g. Perimeter moldings.
   7. Minimum Drawing Scale: 1/4 inch = 1 foot (1:48).

B. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.

C. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
   2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
   3. Hold-Down Clips: Equal to 2 percent of quantity installed.

1.7 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Build mockup of typical ceiling area as shown on Drawings.
   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. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: Class A according to ASTM E1264.
   2. Smoke-Developed Index: 450 or less.

2.3 ACOUSTICAL PANELS

A. Basis-of-Design Products: Refer to Drawings.

B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Color: White, unless otherwise indicated.

D. Thickness: As indicated on Drawings.

E. Modular Size: As indicated on Drawings.

F. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.4 METAL SUSPENSION SYSTEM

A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated.
   1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching 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 E1190, conducted by a qualified testing and inspecting agency.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:
   1. Stainless-Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
   2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- (2.69-mm-) diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Hold-Down Clips: Manufacturer's standard hold-down.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
   1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
   2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
   3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips.
   1. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C635/C635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

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

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C636/C636M, CISCA's "Ceiling Systems Handbook," and manufacturer's written instructions.

B. Suspend ceiling hangers from building's structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
   4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
   6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
   7. Do not attach hangers to steel deck tabs.
   8. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
   9. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as indicated on Drawings.
2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
3. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.
4. Protect lighting fixtures and air ducts according to requirements indicated.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 65 10 - RESILIENT FLOORING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Resilient wall base.
   2. Resilient molding accessories.
   3. Installation materials.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Show details of special patterns.

B. Samples for Verification:
   1. For resilient wall base and accessories, in manufacturer's standard size, but not less than 12 inches long, of each resilient product color and pattern required.

C. Product Schedule: For resilient flooring and accessory products. Use same designations indicated on Drawings.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Resilient Base: Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Coordinate mockups in this Section with mockups specified in other Sections.
      a. Size: Minimum 100 sq. ft. (9.3 sq. m) for each type, color, and pattern in locations indicated.
   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. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 RESILIENT PRODUCTS

A. Acceptable Products: As scheduled.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
   1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare horizontal surfaces according to ASTM F710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
   4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. (304.8 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
      a. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until materials are the same temperature as space where they are to be installed.
   1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:
   1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
      a. Form without producing discoloration (whitening) at bends.
   2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
      a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:
   1. Remove adhesive and other blemishes from surfaces.
   2. Sweep and vacuum horizontal surfaces thoroughly.
   3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 65 10

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Modular carpet tile, including carpet tile for installation on access flooring.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
      a. Review delivery, storage, and handling procedures.
      b. Review ambient conditions and ventilation procedures.
      c. Review subfloor preparation procedures.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
   2. Include manufacturer's written installation recommendations for each type of substrate.

B. Shop Drawings: For carpet tile installation, plans showing the following:
   1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
   2. Carpet tile type, color, and dye lot.
   3. Type of subfloor.
   4. Type of installation.
   5. Pattern of installation.
   6. Pattern type, location, and direction.
   7. Pile direction.
   8. Type, color, and location of insets and borders.
   9. Type, color, and location of edge, transition, and other accessory strips.
   10. Transition details to other flooring materials.

C. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
   1. Carpet Tile: Full-size Sample.
   2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.

D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
   1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
   2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer with a minimum of 2 years documented experience with projects of similar size and complexity.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
   1. Build mockups at locations and in sizes as directed by Architect.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with the Carpet and Rug Institute's CRI 104.

1.9 FIELD CONDITIONS

A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.10 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
   1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
   2. Failures include, but are not limited to, the following:
      a. More than 10 percent edge raveling, snags, and runs.
      b. Dimensional instability.
      c. Excess static discharge.
      d. Loss of tuft-bind strength.
      e. Loss of face fiber.
      f. Delamination.
   3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. As scheduled.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.
   1. Refer to Finish Schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

B. Examine carpet tile for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
   1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. (304.8 sq. m) and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
      a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m).
      b. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

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

3.2 PREPARATION

A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: Glue down.

C. Maintain dye-lot integrity. Do not mix dye lots in same area.

D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.

E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:
   1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
   2. Remove yarns that protrude from carpet tile surface.
   3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 68 13

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and application of paint systems on exposed interior items and substrates.
   1. Paint exposed surfaces, except where surface or material is indicated as not to be painted. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
   2. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
      a. Prefinished items include the following factory-finished components, including but not limited to:
         1) Architectural woodwork.
         2) Finished mechanical and electrical equipment.
         3) Light fixtures.
      b. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
         1) Furred areas.
         2) Ceiling plenums.
         3) Pipe spaces.
         4) Duct shafts.
      c. Finished metal surfaces include the following:
         1) Anodized aluminum.
         2) Stainless steel.
         3) Chromium plate.
      d. Operating parts include moving parts of operating equipment and the following:
         1) Valve and damper operators.
         2) Linkages.
         3) Sensing devices.
         4) Motor and fan shafts.
      e. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.2 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
   1. Flat refers to a lusterless or matte finish with a gloss range below 5 when measured at a 60-degree meter.
   2. Eggshell refers to low-sheen finish with a gloss range between 5 and 10 when measured at a 60-degree meter.
   3. Satin refers to low sheen finish with a gloss range between 10 and 20 when measured at a 60-degree meter.

4. Semi-gloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
5. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site. Review installation procedures and coordination with other Work

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions. Include block fillers and primers.
   1. Indicate VOC content.

B. Samples for Verification: For each type of paint system, each color and gloss of topcoat, and substrate material, with texture to simulate actual conditions.
   1. Submit stepped Samples on actual substrates, 8 inches square. Paint samples on paper or hardboard are not acceptable. For paint sample on gypsum board, provide a sample of gypsum board with applied paint in required number of coats.
      a. Apply coats on Samples in steps to show each coat, including primers, required for system.
      b. Label each coat of each Sample.
      c. Label each Sample for location and application area.
      d. Resubmit until required sheen, color, and texture are achieved.
      e. Provide a list of materials and applications for each coat of each Sample

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 INFORMATIONAL SUBMITTALS

A. Certificates: Where shop prime materials are by different manufacturer than finish coat materials, submit certificate signed by both prime and finish coat manufacturers verifying compatibility.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged for storage and identified with labels describing contents.

B. Deliver one unopened 1 gallon container of paint for each top coat installed for each paint material, sheen and color.

C. Store at Project site where directed. Ensure containers are identified by manufacturer, product, sheen and color.

1.7 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator with not less than 5 years documented, successful experience who has completed painting system applications similar in material, design, and extent to those indicated for this Project, and whose work has resulted in applications with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

C. First Installation Mockups: Build first installation mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials, fabrication, installation and workmanship.
   1. Build first installation mockup of typical wall area in size and location acceptable to Architect depicting all transitions and installation components to be installed per the Contract Documents and final Architect approved Shop Drawings. Simulate finished lighting conditions for review of mockups.
      a. Materials: Provide complete installation with scheduled system materials and number of coats.
   2. Notify Architect 7 days in advance of the dates and times when first installation mockups will be constructed.
   3. Obtain Architect's approval of mockups before start of final unit of Work.
   4. Approval of first installation mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   5. Retain and maintain first installation mockups during construction in an undisturbed condition as a standard for judging the completed Work.
   6. Subject to compliance with requirements, approved first installation mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project Site in 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 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.
   8. VOC content.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.
   3. Keep storage area neat and orderly.
   4. Protect storage area surfaces from paint spillage.

1.9 FIELD CONDITIONS

A. Environmental Requirements:
   1. Apply paint to surfaces which are free of moisture.
   2. Do not apply paint in rain, snow, fog, or mist or when relative humidity exceeds 85%.
   3. During periods of inclement weather, painting may be continued if areas and surfaces to be painted are enclosed and artificial heat is supplied, provided temperature and humidity conditions prescribed are maintained.
   4. Do not start interior painting until exterior building openings are closed.

5. Where paint manufacturer's specifications or instructions differ from these environmental conditions, the more stringent requirements apply to this Work.
6. Paint fumes:
   a. Take every precaution against potential hazards of paint fumes as necessary and as required by regulations, codes, and laws.
   b. Provide additional ventilation and protective equipment if necessary.

B. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

C. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Products and Manufacturers: Subject to compliance with the requirements, provide paints as scheduled in coats and thicknesses per manufacturer's recommendations for coverage, durability and performance. Comparable products by other manufacturers listed below shall be provided as a substitution per requirements in Section 01 25 00 "Substitution Procedures" including color samples and product data.
1. Benjamin Moore & Co.
2. PPG Paints.
3. Sherwin-Williams Co.

2.2 PAINT, GENERAL

A. Material Compatibility:
1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction, and for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base:
1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Dry-Fog Coatings: 400 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Floor Coatings: 100 g/L.

9. Shellacs, Clear: 730 g/L.
10. Shellacs, Pigmented: 550 g/L.

D. Regulatory Requirements:
1. Comply with local, state, and federal codes, laws and regulations for VOC content.
2. Such codes, laws and regulations take precedence over paints specified in this Section.

E. Interface with Other Work:
1. Shop primed items: Certain items of Work are specified under other Sections to be shop primed for field painting specified in this Section. Such items include, but are not limited to, the following:
   a. Metal fabrications.
   b. Architectural woodwork (paint finish).
   c. Steel doors and frames.
   d. Access panels.
   e. Fire protection cabinets.
   f. Mechanical and electrical equipment and accessories.
2. Shop finished items: Certain items of Work are specified under other Sections to be shop finished and do not require finish painting in field. Such items include, but are not limited to, the following:
   a. Architectural woodwork (transparent finish).
   b. Metal toilet compartments.
   c. Prefabricated specialties and accessories.
   d. Equipment including mechanical and electrical equipment.

F. Colors: Provide custom colors, as indicated in Finish Schedule, of the finished paint systems to match Architect's control samples.

G. Thinners:
1. Water-thinned systems: Clean, potable water.
2. Solvent-thinned systems: Pure linseed oil, turpentine, shellac, and other materials of highest quality with identifying labels intact and seals unbroken, as recommended by paint manufacturer as suitable for each type of paint.

H. Primers and Undercoats: As recommended by paint manufacturer, suitable for substrate and compatible with finish coat requirements.

I. Galvanizing Repair Paint: High zinc-dust content paint with dry film containing not less than 94 percent zinc dust by weight, complying with SSPC Paint 20.

J. Interior Paint: Withstand washing with mild detergent solution, without loss of color, sheen or pigments.

2.3 COLOR SCHEDULE

A. Reference to a particular manufacturer's number or color name is used only as a convenience for Architect in order to establish Project color requirements. These references are not intended to describe required generic paint systems. For generic paint systems requirements, refer to “Interior Painting Schedule" as applicable to the respective conditions of use.
1. Furnish the same lots, batches, etc. within the same contiguous areas of the building (i.e. corridors on the same floors, common rooms which adjoin each other, etc.).

B. Color Schedule: The color schedule shall be considered as a guide only to color requirements; subject to Architect’s modification or acceptance.

C. Colors are indicated in the Finish Schedule on the Drawings by manufacturer and color type.

2.4 PREPARATORY COATS

A. Interior Primers: Interior latex-based primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
   1. Ferrous-Metal Substrates: Quick drying, rust-inhibitive metal primer.
   2. Zinc-Coated Metal Substrates: Galvanized metal primer.
   3. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
   4. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Comply with procedures specified in PDCA P4.
   1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
      a. Masonry: 12 percent.
      b. Gypsum Board: 12 percent.
   2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
   3. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

B. Proceed with coating application only after unsatisfactory conditions have been corrected. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

B. Do not apply final coats until other trades, whose operations would be detrimental to finish painting, have completed their Work in areas to be painted.

C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

D. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
   1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

E. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
   1. Existing Coatings to Be Painted: Provide barrier coats over existing primers and existing coatings indicated to be painted.
   2. Provide barrier coats over incompatible primers or remove and reprime.

3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, and other foreign substances in accordance with SSPC SP 1 “Solvent Cleaning”. After solvent cleaning prepare bare metal surfaces by removing all stratified rust (rust scale), all loose mill scale, all loose or non-adherent rust and detrimental welding deposits by methods specified in SSPC SP-3 "Power Tool Cleaning".
   a. Touch up bare areas, heads of bolts, welded surfaces which are unpainted, and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
   b. Surfaces requiring touch up painting shall be cleaned and primed as soon as practicable after erection and before excessive rusting or other damage occurs to such surfaces from weather or other exposure.
4. Galvanized Steel:
   a. General: Prepare surfaces of galvanized steel for painting in accordance with ASTM D6386.
   b. Clean galvanized surfaces with nonpetroleum-based solvents in accordance with SSPC SP-1 for "Solvent Cleaning", and pretreat in accordance with the recommendations of SSPC Good Painting Practice, Vol. 1, Chapter 22.
   c. Remove passivation film and grease and oil residue from galvanized steel by chemical cleaning and etching, and mechanical methods, to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.
      1) Chemically clean and etch using diluted solution of water-reducible phosphoric acid and detergent blend, and water. Dilute, apply, rinse with hot water, and force dry, in accordance with manufacturer’s written instructions.
         a) Acceptable product and manufacturer: Equivalent to Clean n Etch by Great Lakes Laboratories.
      2) Mechanically abrade surface in accordance with SSPC-SP3 “Power Tool Cleaning”.
   d. Test surfaces using one of the following methods:
      1) Copper sulfate test: Apply one drop of a 10% copper sulfate solution to the treated/rinsed/dried surface. If a black spot develops within 5 seconds of contact, the surface is ready for painting. If a black spot does not develop within 5 seconds of contact, provide additional cleaning and etching, and re-test until a black spot does so develop.
      2) Water break test: Spray water on the treated/rinsed/dried surface. If the water beads or breaks, the surface is not ready for paint; provide additional cleaning and etching, and re-test until water sheets over the surface. If the water sheets over the surface, it is a good signal that the passivation film and other oily soil has been removed, and the surface is ready for painting.
   e. After solvent cleaning, clean surfaces of rust and other insoluble contaminants in accordance with SSPC-SP2 “Hand Tool Cleaning” or SSPC-SP3 “Power Tool Cleaning”.
   f. Test surfaces by wiping a clean white cloth across cleaned surfaces. If cloth remains clean, surfaces are ready for painting. If cloth becomes dirty, do not paint; provide additional cleaning and re-test until cloth remains clean.
5. Gypsum Wallboard: Repair surface defects including cracks, depressions and holes in gypsum wallboard with wallboard joint finishing compound or spackling compound per Section 09 29 00 “Gypsum Board”. Fill out flush and sand smooth. Clean surfaces and taped joints of dust, dirt and other contaminants and be sure they are thoroughly dry before applying paint.

F. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
   1. Maintain containers used in mixing and applying 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. If necessary, remove surface film and strain material before using.
   3. Use only thinners approved by paint manufacturer and only within recommended limits.
   4. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied, and as recommended by paint manufacturer.
   1. Follow paint manufacturer's instructions; do not exceed manufacturer's recommended application rate.
   2. Do not paint over mildew, dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
   3. Use thinners only if recommended by paint manufacturer.
   4. Surfaces:
      a. Paint exposed surfaces including areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
      b. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces.
      c. Paint interior surfaces of ducts with a flat, non-specular black paint where visible through registers or grilles.
      d. Paint back sides of access panels and removable or hinged covers to match exposed surfaces. Access panels, electrical panels, air diffusing outlets, supply and exhaust grilles, louvers, exposed conduit, primed hardware items, primed outlet covers, primed wall and ceiling plates and other items in painted areas shall be painted to match the areas in which they occur unless otherwise directed by Architect.
      e. Finish doors on tops, bottoms, and side edges the same as faces.
      f. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
      g. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Painting Fireproofing, Fire Suppression, Plumbing, HVAC, Electrical, Communication, Electronic Safety and Security Work:
      a. Paint the following work where exposed in occupied spaces:
         1) Equipment, including panelboards.
         2) Uninsulated metal piping.
         3) Uninsulated plastic piping.
         4) Pipe hangers and supports.
         5) Metal conduit.
         6) Plastic conduit.

7) Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
8) Fireproofing.
9) Other items as directed by Architect.

b. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
c. Do not paint sprinkler heads or caps.
d. Do not paint detectors, sensors, or operable items.

6. Painting Mechanical and Electrical Items:
   a. When covered and uncovered pipes, conduits, hangers, and rods pass through finished room or space, paint with type of undercoat materials consistent with material to be painted and with same type and color of finish coat as used on immediately adjacent walls or ceiling surfaces, whichever surface is most appropriate to be matched, or color code as specified in Division 23.
   b. Give pumps, fans, heating, and cooling units two coats of paint unless factory finished (or unless painting is specified under other Sections).
   c. Paint interior of ducts black behind grilles or registers exposed to view or which reflect light.
   d. Do not paint name plates or polished surfaces of equipment. Leave clean and free of paint.
7. Painting Miscellaneous Items and Areas:
   a. Paint shop-primed door hinges same color as door frames to which attached unless a different color is selected. Do not paint door hardware which have plated finishes.
   b. Finish tops, bottoms, and edges of doors same as faces of doors.
   c. Finish closets same as adjoining rooms, unless otherwise specified.
   d. Finish other surfaces not specifically mentioned same as adjoining surfaces.
   e. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

B. Paint colors, surface treatments, and finishes are indicated in the paint schedules. Final colors shall match Architect approved samples.
   1. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping.
   2. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

C. 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. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that 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 ensure a finish coat with no burn-through or other defects due to insufficient sealing.
      a. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
      b. Omit primer over metal surfaces that have been shop primed and touchup painted.
   2. Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer for conditions of use.
      a. Number of coats specified are minimum number acceptable.

b. Provide finish coats that are compatible with primers used.
c. Use products of same manufacturer for succeeding coats.
    1) Where shop primed materials are field painted, or prime coat materials are by different manufacturer than finish coat materials, confirm compatibility of materials and submit required certification.
    2) If shop primer is not compatible with finish coats, apply barrier coat, as recommended by finish coat manufacturer, over incompatible shop primer.
d. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
e. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
f. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
g. Sand lightly between each succeeding enamel or varnish coat.

3. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
    a. Brushes: Use brushes best suited for type of material applied.
    b. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
    c. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
4. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque 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.
5. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
6. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING AND PROTECTION

A. Cleanup: At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
    1. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

B. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
    1. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.
   1. If stain, dirt or undercoats show through final coat of paint, correct defects and cover with additional coats until coating or paint film is of uniform finish, color, appearance and coverage.
   2. If touch-up is visible, recoat entire surface.
   3. Give special attention to edges, corners, crevices, welds, exposed fasteners, and similar items to be sure these areas receive dry film thickness equivalent to flat surfaces.

3.5 PAINTING SCHEDULE

A. Interior Paint Schedule, Typical:
   1. Interior Gypsum Wallboard and Plaster, Latex Paint Finish:
      a. One Coat, Primer:
         1) Moore Ultra Spec 500 Interior Latex Primer 534.
         2) PPG Speedhide Zero VOC Interior Primer 6-4900XI.
         3) S-W Harmony Interior Primer B11 series.
         4) S-W ProMar 200 HP Zero VOC Interior Primer.
      b. Two Coats, Flat Finish: At ceilings and elsewhere as indicated.
         1) Moore Ultra Spec 500 Interior Latex Flat 536.
         2) PPG Speedhide Zero VOC Interior Latex Flat 6-4110XI.
         3) S-W ProMar 400 HP Zero VOC Interior Flat.
      c. Two Coats, Eggshell Finish: At walls and elsewhere as indicated.
         1) Moore Ultra Spec 500 Interior Latex Low Sheen 537.
         2) PPG Speedhide Zero VOC Interior Latex Eggshell 6-4310XI.
         3) S-W ProMar 200 HP Zero VOC Interior Eg-Shel.
      d. Two Coats, Semi-Gloss Finish: At toilet rooms, other wet areas, and elsewhere as indicated.
         1) Moore Ultra Spec 500 Interior Latex Semi-Gloss 539.
         2) PPG Speedhide Zero VOC Interior Latex Semi-Gloss 6-4510XI.
         3) S-W ProMar 200 HP Zero VOC Interior Semi-Gloss.
   2. Interior Metals (Not specified to receive other coating systems/not shop finished), Acrylic Paint Finish:
      a. One Coat: Approved primer, in shop under other Sections (where specified). If not shop primed, provide primer recommended by finish coating manufacturer.
      b. Two Coats:
         1) Moore Ultra Spec 500 Interior Latex Semi-Gloss 539.
         2) PPG Speedhide Zero VOC Interior Latex Semi-Gloss 6-4510XI.
         3) S-W ProMar 200 HP Zero VOC Interior Semi-Gloss.

END OF SECTION 09 91 23

SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Toilet compartments configured as toilet enclosures and urinal screens.

B. Alternates: Work of this Section is affected by Section 01 23 00 “Alternates.”

1.2 SUBMITTALS

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

B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachments to other work.
   1. Show locations of cutouts for compartment-mounted toilet accessories.
   2. Show locations of reinforcements for compartment-mounted grab bars.
   3. Show locations of centerlines of toilet fixtures.
   4. Show overhead support or bracing locations.

1.3 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements:
   1. Comply with applicable provisions in the United States Access Board's “ADA Accessibility Guidelines (ADAAG)" for toilet compartments designated as accessible.
   2. Texas Accessibility Standards (TAS), 2012.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

1.5 WARRANTY

A. Fifteen (15) years against rust-out.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Castings: ASTM B 26.

B. Aluminum Extrusions: ASTM B 221.

C. Steel Sheet: Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.
   1. Electrolytically Zinc Coated: ASTM A 879/A 879M.
   2. Hot-Dip Galvanized: ASTM A 653, either hot-dip galvanized or galvannealed.

D. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.

E. Stainless-Steel Castings: ASTM A 743.

F. Zamac: ASTM B 86, commercial zinc-alloy die castings.

G. Particleboard: ANSI A208.1, Grade M-2 with 45-lb density, made with binder containing no urea formaldehyde.
H. Plastic Laminate: ANSI/NEMA LD 3, general-purpose HGS grade, 0.048-inch nominal thickness.

2.2 PLASTIC-LAMINATE-FACED UNITS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ampco, Inc.
2. Bobrick Washroom Equipment, Inc.
3. Bradley Corporation; Mills Partitions.
4. Metpar Corp.
5. Sanymetal; Metpar.
B. Toilet-Enclosure Style: Floor anchored.
C. Urinal-Screen Style: Wall hung.
D. Door, Pane, and Pilaster Construction: One-piece, plastic-laminate facing sheets pressure laminated to core material without splices or joints in facings or cores; with laminate applied to edges before faces to seal edges and prevent laminate from being pried loose. Seal exposed core material at cutouts to protect core from moisture.
1. Core Material: Particleboard.
2. Doors and Panels: Finished to not less than 7/8 inch thick.
3. Pilasters: Provide construction to comply with one of the following:
a. Finished to not less than 1-1/4 inches thick and with internal, nominal 0.134-inch- thick, steel-sheet reinforcement.
b. Finished to 1-1/4 inches thick and with manufacturer's standard steel-sheet core laminated to both sides of honeycomb of resin-impregnated kraft paper in lieu of particleboard core.
c. Finished to not less than 1 inch thick and with internal, nominal 0.120-inch- thick, steel-sheet reinforcement.
E. Pilaster Shoes and Sleeves (Caps): Formed from stainless-steel sheet, not less than 0.031-inch (nominal thickness and 3 inches (high, finished to match hardware.
F. Brackets (Fittings):
1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.
G. Plastic-Laminate Finish: One color and pattern in each room.
1. Color and Pattern: Refer to ID Finish Schedule/Legend.

2.3 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
1. Material: Stainless steel.
2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
3. Latch and Keeper: Manufacturer's standard latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
7. Connection Hardware: Stirrup brackets.

B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.4 FABRICATION

A. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

B. Door Size and Swings: Unless otherwise indicated, provide 24-inch wide, in-swinging doors for standard toilet compartments and 36-inch wide, out-swinging doors with a minimum 32-inch wide, clear opening for compartments designated as accessible. Accessible doors must swing out and be self-closing

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
   1. Maximum Clearances:
      a. Pilasters and Panels: 1/2 inch.
      b. Panels and Walls: 1 inch.

B. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.

C. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches (into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.

D. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact. Provide blocking or metal strapping in walls for anchorage support.

3.2 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10 21 13

SECTION 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Public-use washroom accessories.

1.2 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
   2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
   3. Include electrical characteristics.

B. Samples: Full size, for each exposed product and for each finish specified.
   1. Approved full-size Samples will be returned and may be used in the Work.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Identify locations using room designations indicated.
   2. Identify accessories using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.6 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, visible silver spoilage defects.
   2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. As scheduled.

2.3 MATERIALS

A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.

B. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.

C. Galvanized-Steel Sheet: ASTM A653/A653M, with G60 (Z180) hot-dip zinc coating.

D. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.

E. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

F. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.4 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 10 28 00

SECTION 10 44 13 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire-protection cabinets for the following:
      a. Portable fire extinguisher.

1.2 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to fire-protection cabinets, including, but not limited to, the following:
      a. Schedules and coordination requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing semirecessed-mounting method and relationships of box and trim to surrounding construction.
   2. Show location of knockouts for hose valves.

B. Shop Drawings: For fire-protection cabinets.
   1. Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Verification: For each type of exposed finish required, prepared on samples 6 by 6 inches (150 by 150 mm) square.

D. Product Schedule: For fire-protection cabinets. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.5 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers and fire hoses, hose valves, and hose racks indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. JL Industries, Inc.
   2. Larsen's Manufacturing Company.
   3. Nystrom Building Products.
   4. Potter Roemer; Div. of Smith Industries, Inc.

2.2 FIRE-PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

B. Cabinet Construction: Nonrated.

C. Cabinet Material: Cold-rolled steel sheet.
   1. Shelf: Same metal and finish as cabinet.

D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
   1. Square-Edge Trim: 1-1/4- to 1-1/2-inch (32- to 38-mm) backbend depth.

E. Cabinet Trim Material: Same material and finish as door.

F. Door Material: Steel sheet.

G. Door Style: Vertical duo panel with frame.

H. Door Glazing: Tempered float glass (clear).

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
   1. Provide manufacturer's standard.

J. Accessories:
   1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
   2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
   3. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
   4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
      a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
         1) Application Process: Decals.
         2) Lettering Color: Red.
         3) Orientation: Vertical.

K. Materials:
   1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.
      a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
      b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      c. Color: As selected by Architect from manufacturer's full range.
   2. Tempered Float Glass: ASTM C1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.3 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
   1. Weld joints and grind smooth.
   2. Miter corners and grind smooth.
   3. Provide factory-drilled mounting holes.
   4. Prepare doors and frames to receive locks.
   5. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
   1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
   2. Fabricate door frames of one-piece construction with edges flanged.
   3. Miter and weld perimeter door frames and grind smooth.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for cabinets to verify actual locations of piping connections before cabinet installation.

B. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.

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

3.2 PREPARATION

A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
   1. Provide inside latch and lock for break-glass panels.
   2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification:
   1. Apply decals at locations indicated.
   2. Apply decals on field-painted fire-protection cabinets after painting is complete.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 44 13

SECTION 10 44 16 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to fire extinguishers including, but not limited to, the following:
      a. Schedules and coordination requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher.

B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.6 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
      b. Faulty operation of valves or release levers.
   2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
   1. Provide fire extinguishers approved, listed, and labeled by FM Global.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet indicated.
   1. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
   2. Valves: Manufacturer's standard.
   3. Handles and Levers: Manufacturer's standard.
   4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.
   1. Remove and replace damaged, defective, or undercharged fire extinguishers.

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

3.2 INSTALLATION

A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

END OF SECTION 10 44 16