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ADDENDUM # 1: Eagles Landing Golf Course Kitchen Remodel

Date of Addendum: 6/10/24

NOTICE TO ALL BIDDERS AND PLANHOLDERS

The Bid Documents for the above-referenced Project are modified as set forth in this Addendum. The original Bid Documents and any previously issued addenda remain in full force and effect, except as modified by this Addendum, which is hereby made part of the Bid Documents. Vendors will take this Addendum into consideration when preparing and submitting a bid, and will acknowledge receipt of this Addendum in the space provided in the Bid Documents.

BID SUBMITTAL DEADLINE

The bid submittal time has not been changed.

1.0 – QUESTIONS AND ANSWERS

The following questions and answers are provided as a matter of information to clarify issues raised about the Bid Documents.

Item	Questions and Answers
1.1	The Town has decided to extend the Last Day for Questions until Friday, June 28, 2024 at 3pm.
1.2	Please clarify where the responsibility of the GC's plumber begins concerning the propane piping installation. The propane supplier will install the new underground gas tank, run all new gas lines to building, furnace, and kitchen appliances.
1.3	Can the town please consider extending the bid date from being due Monday July 8th? This day follows a long holiday weekend and many contractors, manufacturing plants and sales reps will not be available the week prior leading up to this day and may also not be working this Monday. Please let us know ASAP so we can determine our ability to bid this and other projects you have scheduled. No there will not be an extension. The Town as allotted plenty of time for the bid responses to be submitted.
1.4	Drawing 3/A101 – does not show the columns called out for in drawing 2/S101. They will be in the middle of the new bar. Please provide details for column finishes. The pipe columns are detailed in wall. See S101 detail #2 & 4. Columns will be roughly 1ft. from exterior bar countertop wrapped in gypsum board. Refer to revised outline specifications.
1.5	Drawing 2/S101 – there are no details for connecting the existing framing to the W12x45 steel beam. Please provide connection details. Refer to sheet A701 detail #3 & 16. On sheet S002, it states “any connection not specifically detailed on the structural drawings shall be designed and detailed by the structural steel fabricator. See the typical beam connection details on the drawings”.

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1.6	Drawing 1/S101 – calls for demolition of existing floor to confirm footing size. Please confirm the floor is required to be demolished. Refer to sheet AD101 legend comment #7. In order to size the existing footing, the contractor will have to cut out some sections to verify existing footing size and replace.
1.7	Drawing 3/A301 – bar countertop at the drink rail will only be 1” thick, a concern from countertop suppliers. Keep same. Stick with current design.
1.8	Is a door hardware schedule forthcoming? See attached revised outline specifications.
1.9	Please see the following pages for specification revisions: <ol style="list-style-type: none"> 1. Section 057313 – Stainless Steel Foot Railings 2. Section 087100 – Door Hardware 3. Section 092910 – Gypsum Board Assemblies 4. Section 096513 – Resilient Base and Accessories 5. Section 099113 – Exterior Painting 6. Section 099123 – Interior Painting
2.0	Specifications 075423, 076200, 077200, 078413, 078425, 079200, 081113, 081416, 087100, 092910, 096513, 099113, 099123, 101400, 102800, 104413, 104416 are listed in the table of contents but not included. Please provide specifications or confirm not applicable. We could also not locate a specification for CMU, aluminum doors/frames, glazing, FRP doors/frames, bituminous dampproofing, or metal footrail. The revised outline specifications are attached. The sections that were added to the outline spec are as follows: <ol style="list-style-type: none"> 1. Section 057313 – Stainless Steel Foot Railings 2. Section 075423 – TPO 3. Section 076200 – Flashing & Sheet Metal 4. Section 077200 – Roof Accessories 5. Section 078413 – Fire Protection, HVAC & Plumbing Penetration Firestopping 6. Section 078425 – Splash Blocks 7. Section 079200 – Joint Sealants 8. Section 081113 – Hollow Metal Doors & Frames 9. Section 081416 – Flush Wood Doors 10. Section 087100 – Door Hardware 11. Section 092910 – Gypsum Board Assemblies 12. Section 096513 – Resilient Base and Accessories 13. Section 099113 – Exterior Painting 14. Section 099123 – Interior Painting 15. Section 101400 – Signage 16. Section 102113.19 – Plastic Toilet Compartments 17. Section 102800 – Toilet & Bath Accessories 18. Section 104413 – Fire Extinguisher Cabs 19. Section 104416 – Fire Extinguishers
2.1	Finish Schedule A601 notes quarry tile base in Kitchen 106, A701 indicates resinous cove base; please confirm quarry tile is to be provided. Quarry tile and quarry cove base to be installed in kitchen.
2.2	There appears to be a urinal screen shown in Mens 110, but it is not tagged as such; please confirm one should be provided (and provide specification if so). Solid plastic urinal screen to be provided. See outline specification section 102113.19 – Plastic Toilet Compartments for details.

END OF ADDENDUM

OUTLINE SPECIFICATIONS
100% Construction Documents
Eagle Landing Clubhouse
Berlin, Maryland



ARCHITECTURE
ENGINEERING

Becker Morgan Group, Inc.
312 West Main Street, Suite 300
Salisbury, Maryland 21801

2022120.01
Revised - June 6, 2024

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NOT USED

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NOT USED

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Work covered by the Contract Documents.
 - 2. Type of the Contract.
 - 3. Owner-furnished products.
 - 4. Use of premises.
 - 5. Owner's occupancy requirements.
 - 6. Work restrictions.
 - 7. Specification formats and conventions.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Eagles Landing Clubhouse

- 1. Project Location: Berlin, Maryland

- B. Owner: Town of Ocean City

- 1. Owner's Representative and Primary Contact:

Taylor Hershey, Project Manager, Ocean City-Public Works-Engineering Division
214 65th Street, Room B, Ocean City, MD 21842
Phone: 443.664.8490(o) 717.419.5053 (m)
Email: THershey@oceancitymd.gov

- 2. Architect's Representative:

William E. Sieg, AIA, Senior Associate
Becker Morgan Group, Inc., 312 West Main Street, Suite 300, Salisbury, Maryland,
21801
Phone: 410.546.9100
Email: wsieg@beckermorgan.com.

C. General Contractor/Construction Manager: TBD

D. The Work consists of the following:

The Work consists of +/- 400 sqft addition to the existing Eagles Landing clubhouse as well as interior renovations to the kitchen & grille, bathrooms and dining/bar area. Minor modifications to adjacent exterior courtyards, decks and circulation paths is also included. Further breakdown of major project components is as follows:

- a. Interior – expansion of both mens and womens bathrooms (all new fixtures and finishes both spaces), expansion of existing kitchen and grille with all new equipment provided with exception of existing exhaust hood. New walk in frig/freezer to be provided. Upgraded finishes to all other spaces in the clubhouse with the exception of the office and pro shop.
- b. Exterior – stick built wood construction (walls and roof) of addition area with minor demolition and patch and repair to adjacent construction. Aesthetic of materials to match existing. Provide new roofing and roof repairs associated with new roof top mechanical units and vents.
- c. See Clark Retail equipment drawings for specifics related to new kitchen equipment.

2. The following trades and contracts will be associated with the work: interior and exterior doors and windows, hollow metal frames & doors, interior & exterior paint, wood trusses, structural steel; gypsum drywall, solid core wood doors; signage, acoustic panel ceilings; carpentry & casework, masonry, concrete, exterior siding and stone veneer,. Also included is mechanical, electrical and plumbing work associated with the spaces noted in the project area as well as site work and site utilities as shown on the civil engineering documents.

1.4 TYPE OF CONTRACT

- A. Project will be constructed under a single prime contract.
- B. A separate contract for work in the adjacent areas is also anticipated, see Use of Premises section.

1.5 OWNER-FURNISHED PRODUCTS AND/OR SERVICES

- A. Owner-Furnished Products and/or Services:

On all Owner-Furnished Products and/or Services General Contractor will coordinate with owner-hired vendor(s) to grant access and accommodate said vendor(s) ability to perform work. General Contractor will be responsible for damage to any owner-hired vendor(s) products once installed.

1. Owner will hire access control contractor with budget amount as specified in allowance section of specifications and/as indicated on the contract documents.

2. Owner will hire security contractor as required. Will provide coordination information to GC

1.6 USE OF PREMISES

- A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Limits: Confine constructions operations to area as designated on Drawings.
 2. Driveways and Entrances: Keep driveways 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.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract. Note: Same criteria that was listed in section 011000-1.5 applies to concurrent work

1.7 COORDINATION WITH OCCUPANTS

- A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
 1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
 3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.8 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, (in season), Saturday work allowable in off season and/or as agreed upon by the Owner.

- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two (2) days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's Owner's written permission.
- C. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor air intakes.
- D. Site Access: Contractor must maintain access to all parts of the site at all times during construction to facilitate Owner's operations and other construction activities.
 - 1. Provide an unobstructed travelway to the public alley that is to the south of the construction/project area
 - 2. Coordinate with other Contractors as required for special requirements (i.e. oversize load deliveries, collaboration of tie-ins, etc).
 - 3. Travelway shall consist of a stable surface properly graded to drain away from surface. Standing water is not permitted.
 - 4. Provide a minimum 6" of compacted aggregate or other material approved by Engineer.
 - 5. Maintain travelway to keep it free of large ruts, potholes or other deficiencies which may prohibit reasonable use.
 - 6. Surfaces which will remain in place as part of final work will require inspection and acceptance prior to being covered. Mud, debris and other objectionable material must be removed and base checked for proper compaction and grade.

1.9 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI/CSC's "MasterFormat" numbering system.
 - 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 - 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- B. 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. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for

clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

- a. 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for products selected under an allowance.
 - 2. Section 012300 "Alternates" for products selected under an alternate.
 - 3. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
 - 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 to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form acceptable to Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section.

Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within **seven** days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within **15** days of receipt of request, or **seven** days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

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

1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than **15** days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed for face brick (section 042000) Others shall be considered based on criteria below.
- C. Substitutions for Convenience: Architect will consider requests for substitution if received within **60** days after **the Notice to Proceed**. Requests received after that time may be considered or rejected at discretion of Architect.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.

- i. Requested substitution provides specified warranty.
- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Division 01 Section "Unit Prices" for administrative requirements for using unit prices.
 - 2. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
1. Include installation costs in purchase amount only where indicated as part of the allowance.
 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within twenty-one (21) days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than twenty-one (21) days after such authorization.
1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701-2017.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Division 01 Section "Unit Prices" for administrative requirements governing use of unit prices.
 - 3. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual Table of Contents as a guide to establish line items for the Schedule of Values. Provide at least one (1) line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:

- a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
2. Submit draft of AIA Document G703-1992 Continuation Sheets.
 3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total one hundred (100) percent.
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
 7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 8. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
 10. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702-1992 and AIA Document G703-1992 Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within twenty-four (24) hours. One (1) copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
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 final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by 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 waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.

3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.
 16. Initial settlement survey and damage report if required.
- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing one hundred (100) percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707-1994, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Coordination Drawings.
 - 2. Administrative and supervisory personnel.
 - 3. Project meetings.
 - 4. Requests for Interpretation (RFIs).
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.
- C. Related Sections include the following:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
 - 2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.
 - 4. Division 01 Section "Submittal Procedures" for coordinating Submittals.

1.3 DEFINITIONS

- A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.

4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
 9. 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.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate required installation sequences.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
3. Number of Copies: Submit two (2) opaque copies of each submittal. Architect will return one (1) copy.
 - a. Submit five (5) copies where Coordination Drawings are required for operation and maintenance manuals. Architect will retain two (2) copies; remainder will be returned. Mark up and retain one (1) returned copy as a Project Record Drawing.
4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

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

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than fifteen (15) days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

- a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Preparation of Record Documents.
 - l. Use of the premises.
 - m. Work restrictions.
 - n. Owner's occupancy requirements.
 - o. Responsibility for temporary facilities and controls.
 - p. Construction waste management and recycling.
 - q. Parking availability.
 - r. Office, work, and storage areas.
 - s. Equipment deliveries and priorities.
 - t. First aid.
 - u. Security.
 - v. Progress cleaning.
 - w. Working hours.
3. Minutes: 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. Advise Architect of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The 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 problems.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written recommendations.
 - n. Warranty requirements.
 - o. Compatibility of materials.

- p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at appropriate intervals but not less than monthly. Coordinate dates of meetings with preparation of payment requests.
- 1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference 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. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.

- 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) 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.
3. Minutes: Record the meeting minutes.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.8 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 1. Project name.
 2. Date.
 3. Name of Contractor.
 4. Name of Architect.
 5. RFI number, numbered sequentially.
 6. Specification Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 10. Contractor's signature.
 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

- C. Software-Generated RFIs: Software-generated form from project website.
 - 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow ten (10) working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following day.
 - 1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Incomplete RFIs or RFIs with numerous errors.
 - 2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
 - 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within ten (10) days of receipt of the RFI response.
- E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. 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 dropped and not submitted.
 - 5. RFI description.
 - 6. Date the RFI was submitted.
 - 7. Date Architect's response was received.

1.9 PROJECT WEBSITE

- A. Use Architect's Project Website for purposes of hosting and managing project communication and documentation until Final Completion. Project Website shall include the following functions:
 - 1. Project directory.
 - 2. RFI forms and logs.

3. Task and issue management.
4. Submittals forms and logs.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Preliminary Construction Schedule.
2. Contractor's Construction Schedule.
3. Submittals Schedule.
4. Daily construction reports.
5. Material location reports.
6. Field condition reports.
7. Special reports.

- B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
4. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of subcontractor.
5. Description of the Work covered.
6. Scheduled date for Architect's final release or approval.

- B. Preliminary Construction Schedule: Submit two (2) opaque copies.

1. Approval of cost-loaded preliminary construction schedule will not constitute approval of Schedule of Values for cost-loaded activities.

- C. Contractor's Construction Schedule: Submit two (2) opaque copies of initial schedule, large enough to show entire schedule for entire construction period.

- D. Daily Construction Reports: Submit two (2) copies at monthly intervals.
- E. Material Location Reports: Submit two (2) copies at monthly intervals.
- F. Field Condition Reports: Submit two (2) copies at time of discovery of differing conditions.
- G. Special Reports: Submit two (2) copies at time of unusual event.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 - 2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first sixty (60) days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
 - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for commencement of the Work to dates of Substantial and 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.
- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than twenty (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 sixty (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 Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. Startup and Testing Time: Include not less than fourteen 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.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One (1) Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.

- e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Startup and placement into final use and operation.
 8. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of electrical installation.
 - e. Substantial Completion.
 - E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
 - F. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
 1. Refer to Division 01 Section "Payment Procedures" for cost reporting and payment procedures.
- 2.3 PRELIMINARY CONSTRUCTION SCHEDULE
- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven days of date established for commencement of the Work.
 - B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first sixty (60) days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- 2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)
- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within thirty (30) days of date established for commencement of the Work. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
 - B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 1. For construction activities that require three (3) months or longer to complete, indicate an estimated completion percentage in ten (10) percent increments within time bar.

2.5 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events (refer to special reports).
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.
 14. Change Orders received and implemented.
 15. Construction Change Directives received and implemented.
 16. Services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial Completions and occupancies.
 19. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one (1) day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

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 each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Actual 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.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections:
 - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Division 01 Section "Project Management and Coordination".
 - 3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 5. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- E. Project Website: Internet website, requiring user name and password for log in, used for the controlled transmission and exchange of project-related information and data including

Requests for Information, Submittals, Field Bulletins, etc., between Owner, Contractor, Architect, and other authorized parties.

- F. Large-format Submittal: Submittal with page size in excess of 11" x 17".
- G. Complex Submittal: Submittal containing dense diagrams, schedules, tables, or other information difficult to review in electronic format. Examples include door schedule, mechanical equipment schedules, ATC diagrams, electrical panel schedules, etc.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first sixty (60) days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 1) Revisions shall be provided to Architect and Owner not less than once per month during the submittal process.
 - 2) Contractor may suspend revision of submittal schedule upon completion of required construction-phase submittals, but shall resume revisions at Architect's direction for close-out submittals.
 - 4. Format: Arrange the following information in a tabular format. Contractor shall use Microsoft Excel template file provided by Architect.
 - a. Submittal number.
 - b. Specification Section number
 - c. Specification Section title.
 - d. Scheduled date for first submittal.
 - e. Scheduled date for Architect's final release or approval.
 - f. Description of the Work covered.
 - g. Name of subcontractor.
 - h. Submittal category: Action, informational.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will be made available by Architect for Contractor's use in preparing submittals, upon specific request of the Contractor.
1. Architect will furnish Contractor one (1) set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.
 - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. Digital Drawing Software Program: The Contract Drawings are available in native Microstation V8 XM edition DGN files or converted to AutoCAD 2000 DWG.
 - c. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.
 - d. Charges for digital data files shall be as described in the data licensing agreement, and shall be the responsibility of the Contractor.
 - e. Contractor shall follow the prescribed Digital Data File request procedure.
 - 1) Contractor shall inform Architect that digital data files will be requested, including information required for Architect to complete data licensing agreement.
 - a) Name of Contractor.
 - b) Name and title of Contractor's agent who will sign form.
 - c) Email address and name of person to receive digital data files.
 - d) File format: DGN, DWG.
 - e) List of drawings for which digital data files are being requested.
 - 2) Architect will provide data licensing agreement to Contractor and indicate charges.
 - 3) Contractor shall sign data licensing agreement and return to Architect along with payment for charges.
 - 4) Upon receipt of signed agreement and payment for charges, Architect will convert files and send to Contractor through project website.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow fifteen (15) days average for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow fifteen (15) days average for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow twenty-one (21) days average for initial review of each submittal.
 - a. All submittals pertaining to work by: Civil, Structural, Fire Protection, Plumbing, Mechanical, and Electrical.
- D. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Name of subcontractor.
 - f. Name of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a dash and then a sequential number (e.g., 061000-01). Resubmittals shall include an alphabetic suffix (e.g., 061000-01A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- E. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.

- a. File name shall use project identifier and Specification Section number followed by a dash and then a sequential number (e.g., SCCSC-061000-01.pdf). Resubmittals shall include an alphabetic suffix (e.g., SCCSC-061000-01A.pdf).
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Include the following information on an inserted cover sheet:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Name of firm or entity that prepared submittal.
 - f. Name of subcontractor.
 - g. Name of supplier.
 - h. Name of manufacturer.
 - i. Submittal number, including revision identifier.
 - j. Number and title of appropriate Specification Section.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Related physical samples submitted directly.
 - 1) Submittal number and name.
 - n. Other necessary identification.
5. Include the following information as keywords in the electronic file metadata:
 - a. Project name.
 - b. Number and title of appropriate Specification Section.
 - c. Manufacturer name.
 - d. Product name.
- F. Options: Identify options requiring selection by the Architect.
- G. Deviations: Identify deviations from the Contract Documents on submittals.
 1. Deviations not explicitly noted on submittal and not explicitly approved by Architect shall be considered disapproved regardless of whatever action is indicated for submittal.
- H. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- I. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
 1. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.

- b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Indication of full or partial submittal.
 - j. Drawing number and detail references, as appropriate.
 - k. Transmittal number.
 - l. Submittal and transmittal distribution record.
 - m. Remarks.
 - n. Signature of transmitter.
2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- L. Use for Construction: Use only final submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Post electronic submittals as PDF electronic files directly to Project Web site specifically established for Project.
 - a. Architect will return annotated file.
 - b. Annotate and retain one (1) copy of file as an electronic Project record document file.

- c. At conclusion of project, provide one (1) hard copy of annotated electronic Project record document files to Owner.
 - 1) Assemble into three ring, D-ring style binders.
 - 2) Collate by specification section and submittal number.
 - 3) Provide tab dividers and label (number only) for each Specification Section.
 - 4) Within each specification section, pages may be printed single or double sided, up to two (2) submittal pages per side of 8 1/2" x 11" printed sheet.
 2. Large-format and Complex Action Submittals: In addition to PDF electronic files, which shall be the Project record documents, submit two (2) paper copies of each submittal for Architect's use, unless otherwise indicated. Architect will not return copies.
 3. Large-format and Complex Informational Submittals: In addition to PDF electronic files, which shall be the Project record documents, submit two (2) paper copies of each submittal for Architect's use, unless otherwise indicated. Architect will not return copies.
 4. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
 5. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
 6. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.

- d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. PDF electronic file.
 - b. Large-format and Complex Submittals: In addition to the PDF electronic files, two paper copies of Product Data, unless otherwise indicated. Architect will not return copies.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based upon Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 42 inches (750 by 1067 mm).
 3. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
 - b. Large-format and Complex Submittals: In addition to PDF electronic file, two (2) opaque (bond) copies of each submittal. Architect will not return copies.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Designation used in Contract Drawings and Specifications, if applicable.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one (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 not return samples.
 - b. In addition to Samples, submit transmittal form, submittal identification and information sheet, and other relevant information in PDF electronic file. Architect will indicate selection through electronic submittal.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three (3) sets of Samples. Architect will retain one (1) Sample set; remainder will be returned. Mark up and retain one (1) returned Sample set as a Project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.
 - 3) In addition to Samples, submit transmittal form, submittal identification and information sheet, and other relevant information in PDF electronic file. Architect will indicate selection through electronic submittal.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product indicated in the Contract Documents.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.

4. Location within room or space.
5. Submit product schedule in the following format:
 - a. PDF electronic file.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- G. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- H. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A or equivalent. Include the following information in tabular form:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
 4. Submit subcontract list in the following format:
 - a. PDF electronic file.
 - b. Number of Copies: In addition to PDF electronic file, one (1) paper copy of subcontractor list, unless otherwise indicated. Architect will not return copies.
- J. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- K. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- L. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.
- M. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- N. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- O. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

- P. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- R. Product Test Reports: Submit written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- S. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- T. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."
- U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- W. Field Test Reports: Submit reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- X. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- Y. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally-signed PDF electronic file and three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:
 - 1. Approved: No further action on submittal is required.
 - 2. Approved as Noted: Incorporate corrections noted in Work and indicate in record drawings. If notes cannot be incorporated into Work, resubmit the submittal with explanation of why notes cannot be complied with and indicate proposed response to address intent of notes.
 - 3. Received for Record/Not Reviewed: Submittal provided to satisfy record submittal requirement from previous submittal notes or Contract Documents, or submittal not

required and not reviewed. Any notes provided are for Contractor reference and use, but do not imply standard level of review by Architect.

4. Revise and Resubmit: Incorporate corrections noted in Work and resubmit revised submittal for review.
 5. Disapproved: Submittal does not meet intent of Contract Documents. Correct deficiencies noted and resubmit for review.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300



ARCHITECTURE
ENGINEERING

Eagles Landing Clubhouse

Berlin, Maryland
2022120.01

Release for use of Digital Media

In connection with the Agreement between the Owner and Architect dated <insert DATE>, Architect will provide the <insert Owner's name> with certain Instruments of Services in electronic format.

Pursuant to your request, the digital media being provided is forwarded in accordance with the following terms.

Definitions:

- a. Digital Information: the information stored on Digital Media or sent via electronic exchange (email and FTP) known as the Work of the contracted design professional, Becker Morgan Group, Inc. and their consultants, herein after referred to as the Firm.
- b. Digital Media: the electronic, electromagnetic and/or optical storage media, (i.e. disk drives, tapes, compact or DVD discs, etc.) on which the Work is stored.
- c. The Work: the instrument of professional services of the Firm including but not limited to the design drawings, sketches, renderings, photographs, models, specifications.

Terms:

1. In accepting and utilizing Digital Information on any form of Digital Media or email generated and provided by the Firm, the Undersigned covenants and agrees that all such Digital Information are instruments of service of the Firm prepared solely for use in connection with the single project for which they were prepared, who shall be deemed the author of the Digital Information, and shall retain all common law, statutory law and other rights, including copyrights.
2. The Digital Documents are provided as a convenience to the Recipient for informational purposes only in connection with the Recipient's performance of its responsibilities and obligations relating to the Project. The Digital Documents are not Contract Documents and do not replace or supplement the paper copies of the Drawings and Specifications that are, and remain, the Contract Documents for the Project.
3. The Digital Information is provided only as a design record prior to construction and for reference to the Undersigned. The information in no way shall be used for "as-built" or record purposes.
4. The Undersigned agrees not to use this Digital Information, in whole or in part for any purpose or project other than the specific project for which the Undersigned and the Firm have a prior Professional Services Agreement. It is further understood and agreed that only printed copies of the Instruments of Services shall be signed and sealed by Architect or its subconsultants in accordance with the laws of the state in which the project is built.

5. The Work cannot be distributed, altered, reused, sold, leased, printed, plotted, or duplicated without the expressed written consent of the Firm.
6. For Shop Drawings - Where the Recipient has received specific permission to use the Digital Documents in connection with Recipient's obligation to prepare certain documents for the Project, Recipient shall, in addition to the other obligations set forth herein, be obligated to remove Architect's or Architect's Consultant's title block from the copy of the Digital Documents used by Recipient. It is understood and agreed that the Digital Documents are not to be used by any contractor or any of its subcontractors of any tier or any material supplier or vendor as a shop drawing or any other type of submittal or as the basis for preparing such shop drawing or submittal. The sole exception to this prohibition shall be that the Recipient may use the Digital Documents as backgrounds upon which to prepare its shop drawing or other submittal when it is specifically permitted in technical section of project specification. When these digital documents are used as backgrounds in the preparation of shop drawings or other submittals, the Recipient agrees to confirm the accuracy of the digital documents before using them, Recipient agrees to accept all responsibility for any errors or inaccuracies and to release the Architect and its subconsultants from any liability or claims for recovery of damages or expenses arising as the result of such errors or inaccuracies.
7. Under no circumstances shall transfer of the Digital Information for use by the Undersigned be deemed a sale by the Firm. The parties agree that the Digital Documents are not, nor shall they be construed to be, a product. The Firm makes no warranties, either express or implied, of the Digital Media or the Digital Information as to merchantability or fitness for any particular purpose the Undersigned may need.
8. The Digital Information submitted by the Firm to the Undersigned is submitted for an acceptance period of sixty days. Any defects the Undersigned discovers during this period shall be reported to the Firm and may be corrected as part of the Firm's Basic Scope of Services. Correction of defects detected and reported after the acceptance period will be compensated for as Additional Services.
9. The Digital Information is not guaranteed as to accuracy and completeness of all dimensions and details. Information contained in the signed and sealed printed documents should be deemed to be correct and superior to digital information.
10. The Digital Information is not guaranteed as to compatibility, in so far as incompatibilities may be present now or in the future in the Undersigned's computers, storage devices, software, and output systems.
11. The Digital Media on which the Digital Information is provided cannot be guaranteed as to its durability, completeness or usability, in so far as instabilities may be present in the Digital Media, and in the transferring, archiving, recording or translating systems now and in the future. The Firm is not liable in any way for the perpetuation of this Digital Information on released digital media or on digital media retained by the Firm for its archives. Recipient agrees to accept all responsibility for any errors or inaccuracies and to release Architect and its subconsultants from any liability or claims for recovery of damages or expenses arising as the result of such errors or inaccuracies.
12. Provision of the Information to the Undersigned in no way limits the Firm to the further use of the Digital Information for the Firm's benefit.
13. Recipient agrees to waive any and all claims and liability against Architect and its subconsultants resulting in any way from any failure by Recipient to comply with the requirements of this Agreement for the Delivery of Documents in Digital Format. The Undersigned agrees, to the fullest extent permitted by law, to indemnify and hold the Firm harmless from any damage, liability or cost, including reasonable attorney's fees and costs of defense, arising from any changes made by anyone other than the Firm or from any reuse of the Digital Information without the prior written consent of the Firm. Recipient further agrees to indemnify and save harmless the Owner, Architect and its subconsultants and each of their partners, officers, shareholders, directors and employees from any and all claims, judgments, suits, liabilities, damages, costs or expenses (including reasonable defense and attorneys fees) arising as the result of either: 1)

Recipient's failure to comply with any of the requirements of this Agreement for the Delivery of Documents in Digital Format; or 2) a defect, error or omission in the Digital Documents or the information contained therein, which defect, error or omission was not contained in the Contract Documents as defined in Paragraph 2 or where the use of such Contract Documents would have prevented the claim, judgment, suit, liability, damage, cost or expense.

14. Check one:

- The Undersigned agrees to \$200 charge per digital file created payable to this office prior to release of any Digital Information. Note: it may be assumed that one printed drawing sheet is equivalent to one digital file.
- Charges are not applicable as provision of Digital Information is part of the Basic Scope Services.

Please sign below and return one (1) copy of this form to our office.

Media/Information Received:

sign here>

Accepted – signature

Date

Name / Title – printed

Company

BMG Principal – signature

Date

BMG Principal – printed

Prepared by – printed

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 2. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing,

or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.

- D. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.
- J. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

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

1.5 SUBMITTALS

- A. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications 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. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. 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 548; 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.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of

manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architects seven (7) days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven (7) days for initial review and each re-review of each mockup.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. 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.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 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 Division 01 Section "Submittal Procedures."
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. 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.

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

1.8 SPECIAL TESTS AND INSPECTIONS

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. 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 modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 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. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
- 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 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICBO	International Conference of Building Officials (See ICC)	
ICBO ES	ICBO Evaluation Service, Inc. (See ICC-ES)	
ICC	International Code Council www.iccsafe.org	(888) 422-7233 (703) 931-4533
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543

- C. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections include the following:
 - 1. Division 01 Section "Summary" for limitations on utility interruptions and other work restrictions.
 - 2. Division 01 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 3. Division 01 Section "Execution" for progress cleaning requirements.
 - 4. Divisions 02 through 49 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.
 - 5. Division 31 Section "Termite Control" for pest control.

1.3 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.
- C. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.
- D. Water Service: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete bases for supporting posts.
- B. Lumber and Plywood: Comply with requirements in Division 06 Section "Rough Carpentry."
- C. Paint: Comply with requirements in Division 09 painting Sections.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 1. Install electric power service overhead, unless otherwise indicated.
 2. Connect temporary service to Owner's existing power source, as directed by Owner.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one (1) telephone line for each field office.
1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.
 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Architect's office.
 - e. Engineers' offices.
 - f. Owner's office.
 - g. Principal subcontractors' field and home offices.
 3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- I. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
 2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
 3. Recondition base after temporary use, including removing contaminated material, regrading, proof rolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course

pavement before installation of final course according to Division 32 Section "Asphalt Paving."

- C. Parking: Provide temporary parking areas for construction personnel.
- D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- E. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.
 - 1. Provide one (1) ground mounted project sign on painted plywood, 4 feet by 8 feet, that includes the following information:
 - a. Project: Eagles Landing Clubhouse
 - b. Owner: Town of Ocean City
 - c. Architect: Becker Morgan Group, Inc.
 - d. Civil Engineer: Becker Morgan Group, Inc.
 - e. Mechanical, Electrical, Allen & Shariff Engineering
 - f. Structural Engineer: Becker Morgan Group, Inc.
 - g. General Contractor: TBD
 - h. Subcontractors: TBD, list each major trade / vendor
 - 2. Submit project sign artwork for confirmation of spelling, titles, colors and fonts, to Architect for approval prior to execution.
 - 3. Provide temporary, directional signs for construction personnel and visitors.
 - 4. Maintain and touchup signs so they are legible at all times.
- F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.
- G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Division 01 Section "Summary."

- B. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Division 31 Section "Site Clearing."
- C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- E. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.
- F. Site Enclosure Fence: When excavation begins, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one (1) set of keys.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other

substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This 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; product substitutions; and comparable products.
- B. Related Sections include the following:
 - 1. Division 01 Section "Alternates" for products selected under an alternate.
 - 2. Division 01 Section "References" for applicable industry standards for products specified.
 - 3. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
 - 4. Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service

performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

- A. Substitution Requests: Submit PDF through Project Website of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

- B. Comparable Product Requests: Submit PDF through Project Website of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. 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 fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: Architect will indicate approved substitution requests in Addenda to the Bid Documents.
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

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

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Store cementitious products and materials on elevated platforms.
 - 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

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

7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
3. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. 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 Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or

texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within sixty (60) days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution does not require extensive revisions to the Contract Documents.
 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 4. Substitution request is fully documented and properly submitted.
 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 7. Requested substitution is compatible with other portions of the Work.
 8. Requested substitution has been coordinated with other portions of the Work.
 9. Requested substitution provides specified warranty.

2.3 COMPARABLE PRODUCTS

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

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Sections include the following:
 - 1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 01 Section "Submittal Procedures" for submitting surveys.
 - 3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit two (2) copies signed by land surveyor.
- E. Final Property Survey: Submit two (2) copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: 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 and other construction affecting the Work.
1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: 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. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

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

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 3. Inform installers of lines and levels to which they must comply.
 4. Check the location, level and plumb, of every major element as the Work progresses.
 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- D. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 - 2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. 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.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
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.
- H. 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.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend

preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. 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 materials more than seven (7) days during normal weather or three (3) 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.
- 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: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- 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.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- 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 Division 01 Section "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "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 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Disposing of non-hazardous construction waste.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for environmental-protection measures during construction.
 - 2. Division 31 Section "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Disposal: Removal off-site of construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

1.4 PERFORMANCE GOALS

- A. General: Develop waste management plan that results in end-of-Project rates for salvage/recycling of 50 percent by weight of total waste generated by the Work.

1.5 SUBMITTALS

- A. Waste Management Plan: Submit three (3) copies of plan within thirty (30) days of date established for commencement of the Work.
- B. 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.
- C. 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.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

1.7 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, and waste reduction work plan. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by Owner. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally recycle or dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

- B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
2. Division 01 Section "Execution" for progress cleaning of Project site.
3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
5. Divisions 03 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. 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. Reinspection: 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.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three (3) copies 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.

1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch 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.
- C. 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: Provide 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 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. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to unusual operating conditions.

- o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - s. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Maintenance manuals for the care and maintenance of products, materials, finishes, systems and equipment.

- B. Related Sections include the following:

1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
4. Divisions 03 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

- A. Initial Submittal: Submit two (2) draft copies of each manual at least fifteen (15) days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one (1) copy of draft and mark whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit one (1) copy of each manual in final form at least fifteen (15) days before final inspection. Architect will return copy with comments within fifteen (15) days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit three (3) copies of each corrected manual within fifteen (15) days of receipt of Architect's comments.

1.5 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.

4. Date of submittal.
 5. Name, address, and telephone number of Contractor.
 6. Name and address of Architect.
 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one (1) volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two (2) or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions.
 2. Performance and design criteria if Contractor is delegated design responsibility.

3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name, and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name, and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.

6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- C. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data includes more than one (1) item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- D. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."
- E. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
- B. Related Sections include the following:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Divisions 03 through 33 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one (1) set of marked-up Record Prints.
- B. Record Specifications: Submit one (1) copy of Project's Specifications, including addenda and contract modifications.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one (1) set of black-line white prints of the Contract Drawings and Shop Drawings.
 - 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 prepare the 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 understandable drawing technique.

- c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 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 below first floor.
 - 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 or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 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. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

2.2 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 and Record Drawings where applicable.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one (1) copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples 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 017839

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of building and/or structure as indicated on plans
 - 2. Demolition and removal of selected site elements.- sidewalks, ground mounted mechanical units, adjacent decks and stairs as indicated on the architectural and MEP plans
- B. Related Sections include the following:
 - 1. Refer to adjacent work in existing building envelope marked N.I.C. Coordinate as required with General Contractor that is responsible for work in N.I.C. areas.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
- B. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property in addition to items described in Paragraph 1.4-A., demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

1.5 SUBMITTALS

- A. Pre-demolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.
- B. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.
- D. Predemolition Conference: Conduct conference at Project with Construction Manager/General Contractor. Review methods and procedures related to selective demolition including, but not limited to, the following:
 - 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.

1.7 PROJECT CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Construction Manager and Owner. Owner will remove hazardous materials under a separate contract.
- C. Storage or sale of removed items or materials on-site is not permitted.

- D. 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.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

1.9 COORDINATION

- A. It is the intent of this specification in conjunction with the demolition drawings to show the majority of the demolition but may not show all incidental items required to accommodate the new work. It is the responsibility of the Demolition Contractor to become familiar with the new work and fully coordinate demolition efforts with the new work required.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 - 1. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 2. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate, and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
 - 1. 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.

- F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
 - 1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."
- B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
 - a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

- A. Temporary Facilities: 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.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling.
- B. Temporary Shoring: 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.

3.4 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, to minimize disturbance of adjacent surfaces. 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 fire watch and 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.
- B. 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.
- C. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 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.
- D. 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.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 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 Division 01.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 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 024119

SECTION 055000 – METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following metal fabrications:
 - 1. Rough hardware.
 - 2. Ladders.
 - 3. Loose bearing and leveling plates.
 - 4. Loose steel lintels.
 - 5. Miscellaneous framing and supports not specified in other sections.
 - 6. Shelf and relieving angles.
 - 7. Miscellaneous steel trim including steel angle corner guards, steel edgings and loading area edge angles.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 5 Section "Structural Steel Framing" for structural steel framing system components.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
- C. Samples representative of materials and finished products as may be requested by Architect.
- D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include a list of completed projects with project name, addresses, names of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in service performance, and with sufficient production capacity to produce required units without delaying the Work.

- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code Steel," AWS D1.2 "Structural Welding Code Aluminum," and AWS D1.3 "Structural Welding Code Sheet Steel."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

1.6 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. 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.

PART 2 - PRODUCTS

2.1 FERROUS METALS

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: Product type (manufacturing method) and as follows:
 - 1. Cold Formed Steel Tubing: ASTM A 500.
 - 2. Hot Formed Steel Tubing: ASTM A 501.
 - a. For exterior installations and where indicated, provide tubing with hot dip galvanized coating per ASTM A 53.
- D. Steel Pipe: ASTM A 53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.
 - 1. Black finish, unless otherwise indicated.

- E. Cast in Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 (ASTM A 47M) malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as required, hot dip galvanized per ASTM A 153.
- F. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.

2.2 PAINT

- A. Shop Primer for Ferrous Metal: Fast curing, lead and chromate free, universal modified alkyd primer complying with performance requirements of 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.
- B. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD P 21035 or SSPC Paint 20.
- C. Bituminous Paint: Cold applied asphalt mastic complying with SSPC Paint 12, except containing no asbestos fibers.

2.3 FASTENERS

- A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon head bolts, ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), with hex nuts, ASTM A 563 (ASTM A 563M), and, where indicated, flat washers.
- C. Machine Screws: ANSI B18.6.3.
- D. Lag Bolts: ANSI B18.2.1 (ANSI B18.2.3.8M).
- E. Wood Screws: Flat head, carbon steel, ANSI B18.6.1.
- F. Plain Washers: Round, carbon steel, ANSI B18.22.1 (ANSI B18.22M).
- G. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
 - 1. Material: Carbon steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2. Material: Group 1 alloy 304 or 316 stainless steel bolts and nuts complying with ASTM F 593 (ASTM F 738M) and ASTM F 594 (ASTM F 836M).

I. Toggle Bolts: FS FF B 588, tumble wing type, class and style as required.

2.4 GROUT

- A. Nonshrink, Metallic Grout: Factory packaged, ferrous aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy duty loading applications.
- B. Nonshrink, Nonmetallic Grout: Factory packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

1. Nonshrink, Metallic Grouts:

- a. Embeco 885 and 636; Master Builders Technologies, Inc.
- b. Ferrolith G Redi Mix and G NC; Sonneborn Building Products ChemRex, Inc.
- c. Hi Mod Grout; Euclid Chemical Co.
- d. Met ox; The Spray Cure Company.
- e. Supreme Plus; Cormix Construction Chemicals.

2. Nonshrink, Nonmetallic Grouts:

- a. B 6 Construction Grout; W. R. Bonsal Co.
- b. Crystex; L & M Construction Chemicals, Inc.
- c. Diamond Crete Grout; Concrete Service Materials Co.
- d. Euco N S Grout; Euclid Chemical Co.
- e. Five Star Grout; Five Star Products.
- f. Kemset; The Spray Cure Company.
- g. Masterflow 928 and 713; Master Builders Technologies, Inc.
- h. Sealtight 588 Grout; W. R. Meadows, Inc.
- i. SonogROUT 14; Sonneborn Building Products ChemRex, Inc.
- j. Supreme; Cormix Construction Chemicals.
- k. Sure grip High Performance Grout; Dayton Superior Corp.
- l. Vibropruf #11; Lambert Corp.

2.5 CONCRETE FILL

- A. Concrete Materials and Properties: Comply with requirements of Division 3 Section "Cast in Place Concrete" for normal weight, air entrained, ready mix concrete with a minimum 28 day compressive strength of 3000 psi, unless higher strengths are indicated.

2.6 FABRICATION, GENERAL

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Allow for thermal movement resulting from a 100 deg F change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
- E. Shear and punch metals cleanly and accurately. Remove burrs.
- F. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- G. Remove sharp or rough areas on exposed traffic surfaces.
- H. 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 that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- I. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat head (countersunk) screws or bolts. Locate joints where least conspicuous.
- J. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- K. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. 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.
- L. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- M. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.7 ROUGH HARDWARE

- A. Furnish bent, or otherwise custom fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for

anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.

- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.8 STEEL LADDERS (**Provide in areas indicated on contract drawings**)

- A. General: Fabricate Interior Fixed Vertical Ladder & Cage in areas indicated on floor plans and elevations, with dimensions, spacings, details, and anchorages as indicated. Comply with requirements of ANSI A14.3.
- B. Basis of design product: EGA Vertical Wall Mounted Ladder (VMS-10 Series) as manuf. by EGA Products Inc., 4275 N. 127th street, Brookfield, WI 53005, phone 800.937.3427, info@agaproducts.com or approved equivalent.
- C. Siderails: Continuous, steel, ½ by 2 1/2 inch flat bars, with eased edges, spaced 18 inches apart.
- D. Bar Rungs: ¾ inch diameter steel bars, spaced 12 inches o.c.
- E. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
- F. Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet o.c. with welded or bolted steel brackets.
 - 1. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches.
 - 2. Extend side rails 42 inches above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose neck the extended rails back to the structure to provide secure ladder access.
- G. Provide nonslip surfaces on top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resin adhesive, or by using a type of manufactured rung that is filled with aluminum oxide grout.
- H. Provide OSHA approved safety cages as indicated or as required by code.

2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of the required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.10 LOOSE STEEL LINTELS

- A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.

- C. Size loose lintels for equal bearing of 1 inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated.
- D. Galvanize loose steel lintels located in exterior walls.

2.11 MISCELLANEOUS STEEL TRIM

- A. Fabricate metal protection wrap at overhead exterior doors where indicated on drawings from steel plates of .250" thick hot-rolled diamond plate steel per ASTM A786. Fabricate 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.
- C. Galvanize exterior diamond plate steel.

2.12 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the Work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - a. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1 1/4 inches wide by 1/4 inch thick by 8 inches long.

2.13 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designing finishes.
- B. Finish metal fabrications after assembly.

2.14 STEEL AND IRON FINISHES

- A. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot dip process complying with the following requirements:
 - 1. ASTM A153 for galvanizing iron and steel hardware.
 - 2. ASTM A123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick or thicker.

- B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC SP 6 "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC SP 3 "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete, sprayed on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC PA 1 "Paint Application Specification No. 1" for shop painting.
- D. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA a "Paint Application Specification No. 1" for shop painting. Paint embedded steel on exposed portions and initial 2" of embedded areas only.
 - 1. Do not paint contact surfaces which are to be welded or high-strength bolted.
 - 2. Apply a minimum of two (2) coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- E. Application: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a uniform minimum dry film thickness of 2.0 mils for steel prepared per SP-1 and SP-3; and 3.0 mils for steel prepared per SP-6. Use painting methods which will result in full coverage of joints, corners, edges, and all exposed surfaces.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION, GENERAL

- A. Fastening to In Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

- D. 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 the surfaces of exterior units that have been hot dip galvanized after fabrication and are intended for bolted or screwed field connections.
- E. 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 that no roughness shows after finishing and contour of welded surface matches those adjacent

3.3 SETTING LOOSE PLATES

- A. Clean concrete and masonry bearing surfaces of bond reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
- B. Set loose leveling and bearing plates on wedges or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
 - 1. Use nonshrink, metallic grout in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC PA 1 requirements for touching up shop painted surfaces.
 - 1. Apply by brush or spray to provide a 2.0 mil minimum dry film thickness.
- B. For galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A780.

END OF SECTION 055000

SECTION 057313 – STAINLESS STEEL FOOT RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior bracket supported bar foot rail system.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Stainless steel foot railings assembled from standard components.
2. Fasteners
3. Color & finish options.

B. Shop Drawings: Include plans, elevations, sections, and attachment details.

C. Samples: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member
2. Fittings and brackets.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide **2” Round OD Tubing bar foot rail system by KEGWORKS,1460 Military Road, Buffalo, NY 14217 1.866.249.2337, KEGWORKS.COM.** Foot rail system to include all required brackets, end caps and mounting accessories or a comparable product by an equivalent manufacturer. List to include but not limited to the following:

1. Bar foot rail tubing for 2” OD Bar rail bracket system
2. 90 degree bracket for 2” OD Bar rail bracket system
3. Adjustable, flush 90, flush 45 and/or curved flush elbows for 2” OD Bar rail bracket system
4. 4” wall flanges for 2” OD Bar rail bracket system
5. Domed end caps for 2” OD Bar rail bracket system
 - a. Finish/color for all railings and components to be selected by owner/architect from manufacturer’s full range of standard available finishes. All railings and components to be the same finish/color.

- B. Product Options: Information on Drawings and in the Specifications establishes requirements for railing system's aesthetic effects and performance characteristics.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Railings, including attachment to building construction, are to withstand the effects of gravity loads.

2.3 METALS, GENERAL

- A. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.4 COPPER ALLOYS

- A. Stainless Steel Alloys, General: Provide alloys indicated and with temper to suit application and forming methods, but with strength and stiffness.
- B. Seamless Tube, Brass: ASTM B135/B135M Alloy UNS C26000 (cartridge brass, 70 percent copper).
- C. Plate, Sheet, Strip, and Bars; Brass: ASTM B36/B36M, Alloy UNS C26000 (cartridge brass, 70 percent copper).

2.5 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
 1. Aluminum Components: Type 304 stainless steel fasteners.
 2. Stainless Steel Components: Type 304 stainless steel fasteners.
 3. Copper-Alloy (Brass) Components: Silicon bronze (Alloy 651 or Alloy 655) fasteners where concealed; brass (Alloy 260 or Alloy 360) fasteners where exposed.
 4. Dissimilar Metals: Type 304 stainless steel fasteners.

2.6 MISCELLANEOUS MATERIALS

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.7 FABRICATION OF METAL RAILINGS

- A. Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

- B. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- C. Close exposed ends of hollow railing members with prefabricated end fittings.
- D. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work where indicated.

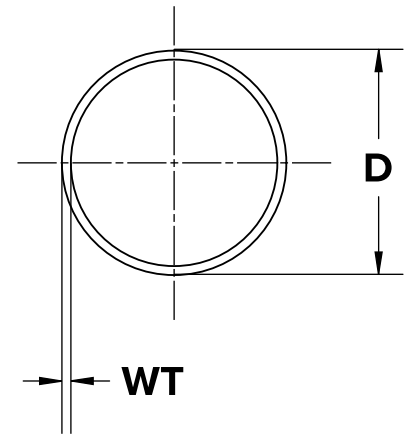
PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with Drawings and manufacturer's written instructions for installing glazed decorative metal railings, accessories, and other components.
- B. Perform cutting, drilling, and fitting required for installing metal railings.
 - 1. Fit exposed connections together to form tight, hairline joints.
 - 2. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
 - 3. Set posts plumb within a tolerance of **1/16 inch in 3 feet (2 mm in 1 m)**.
 - 4. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed **1/4 inch in 12 feet (5 mm in 3 m)**.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals. Retain one of first two paragraphs below or delete both if no posts in concrete. Coordinate with products specified in Part 2.
- D. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted in sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

END OF SECTION 057313

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AVAILABLE FINISHES



BRUSHED
STAINLESS



POLISHED
STAINLESS



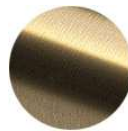
GUNMETAL
GREY



BRUSHED
BRASS



POLISHED
BRASS



ANTIQUE
BRASS



SUNSET
COPPER



OIL RUBBED
BRONZE



MATTE
BLACK

CUSTOM COLORS ARE AVAILABLE BY REQUEST

DIMENSIONS

(D) DIAMETER	2.00"
(WT) WALL THICKNESS	0.05"

Tubing is available in 2', 4', 6', 8', and 12' sections. Radius work and custom cuts available upon request.

INSTALLATION

1. Cut tubing to the correct length for your bar. To cut **Brass Tubing**, use either a hacksaw or a powered radial arm saw. To cut **Stainless Steel Tubing**, use a powered radial arm saw with a carbide tip blade.
2. Loosely assemble the tubing with the brackets.
3. If you have multiple tubes, use splicing sleeves to join them together.
4. Secure the loose tubing to the brackets with set screws.

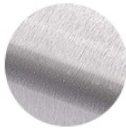
For full instructions, visit our blog post: **Planning & Installing Bar Foot Rails**

Care and maintenance of bar foot rail varies by finish. Given the nature of the product, typical wear and tear may be noticed with your bar rail over time, such as scuffs, scratches, and dirt. Visit kegworks.com/bar-rail-care to read our guide on how to properly prep, clean & maintain all bar rail finishes.



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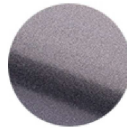
AVAILABLE FINISHES



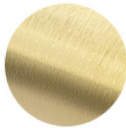
BRUSHED
STAINLESS



POLISHED
STAINLESS



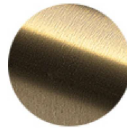
GUNMETAL
GREY



BRUSHED
BRASS



POLISHED
BRASS



ANTIQUE
BRASS



SUNSET
COPPER

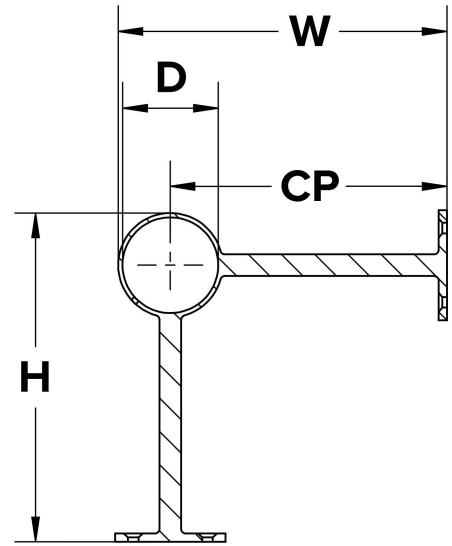


OIL RUBBED
BRONZE



MATTE
BLACK

CUSTOM COLORS ARE AVAILABLE BY REQUEST



DIMENSIONS

(W) WIDTH	7.00"
(H) HEIGHT	7.00"
(D) DIAMETER	2.01"
(CP) CENTER POINT	5.89"

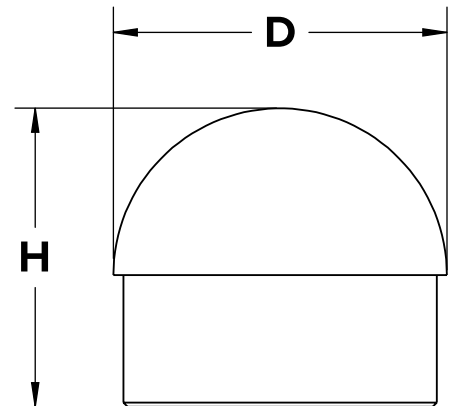
INCLUDED HARDWARE

- 8 x #10 1-1/2" Mounting Screws
- 1 x #8 3/4" Self-Drilling Set Screw

INSTALLATION

1. Measure & mark holes for mounting screws.
2. Attach brackets to the face of the bar and floor with the 8 mounting screws.
3. Secure tubing to bracket by fastening set screws through hole in the bottom of bracket.

Care and maintenance of bar foot rail varies by finish. Given the nature of the product, typical wear and tear may be noticed with your bar rail over time, such as scuffs, scratches, and dirt. Visit kegworks.com/bar-rail-care to read our guide on how to properly prep, clean & maintain all bar rail finishes.



AVAILABLE FINISHES



BRUSHED
STAINLESS



POLISHED
STAINLESS



GUNMETAL
GREY



BRUSHED
BRASS



POLISHED
BRASS



ANTIQUE
BRASS



SUNSET
COPPER



OIL RUBBED
BRONZE



MATTE
BLACK

CUSTOM COLORS ARE AVAILABLE BY REQUEST

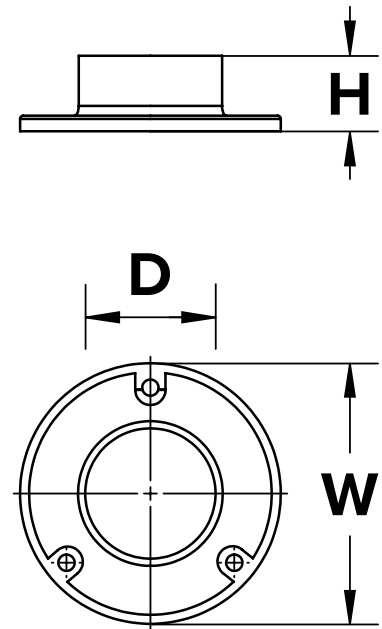
DIMENSIONS

(H) HEIGHT	1.79"
(D) DIAMETER	2.00"

INSTALLATION

1. Secure bar rail tubing to bar face.
2. Insert end cap into the end of bar rail tubing.
3. End cap will fit loosely into the tubing. Use adhesive for more a secure, permanent fit.

Care and maintenance of bar foot rail varies by finish. Given the nature of the product, typical wear and tear may be noticed with your bar rail over time, such as scuffs, scratches, and dirt. Visit kegworks.com/bar-rail-care to read our guide on how to properly prep, clean & maintain all bar rail finishes.



AVAILABLE FINISHES



BRUSHED
STAINLESS



POLISHED
STAINLESS



GUNMETAL
GREY



BRUSHED
BRASS



POLISHED
BRASS



ANTIQUE
BRASS



SUNSET
COPPER



OIL RUBBED
BRONZE



MATTE
BLACK

CUSTOM COLORS ARE AVAILABLE BY REQUEST

DIMENSIONS

(H) HEIGHT	1.16"
(W) WIDTH	4.00"
(D) DIAMETER	2.01"

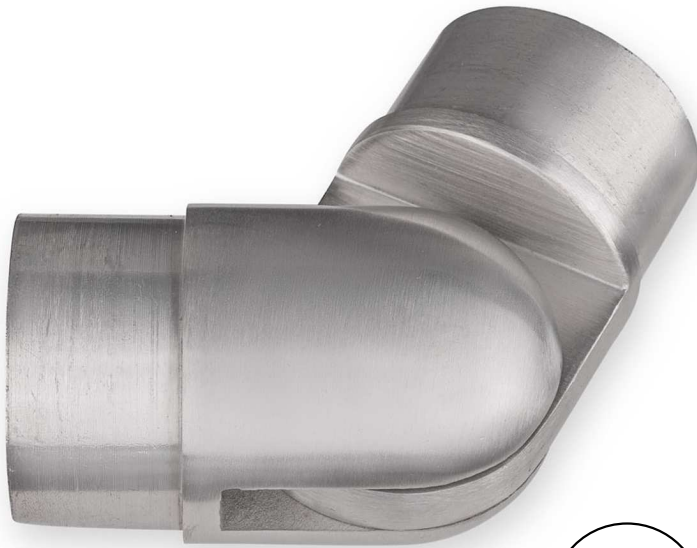
INCLUDED HARDWARE

- 3 x #10 1-1/2" Mounting Screws
- 1 x #8 3/4" Self-Drilling Set Screw

INSTALLATION

1. Measure & mark holes on wall for mounting screws.
2. Secure flange to wall with the 3 mounting screws.
3. Insert end of tubing into wall flange.
4. Secure tubing to bar face or floor with brackets.

Care and maintenance of bar foot rail varies by finish. Given the nature of the product, typical wear and tear may be noticed with your bar rail over time, such as scuffs, scratches, and dirt. Visit kegworks.com/bar-rail-care to read our guide on how to properly prep, clean & maintain all bar rail finishes.



**KEGWORKS
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AVAILABLE FINISHES



BRUSHED
STAINLESS



POLISHED
STAINLESS



GUNMETAL
GREY



BRUSHED
BRASS



POLISHED
BRASS



ANTIQUE
BRASS



SUNSET
COPPER

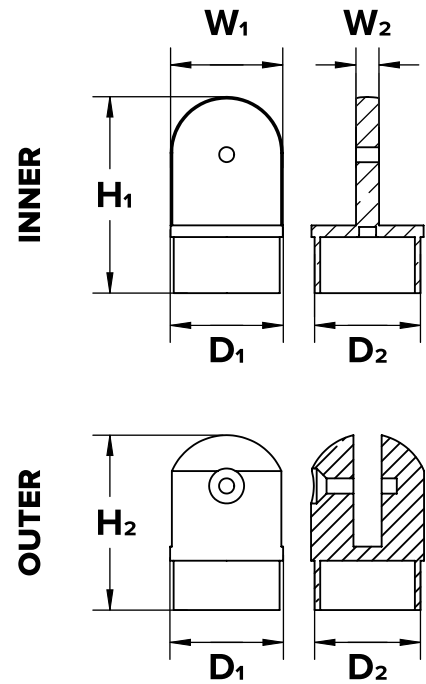


OIL RUBBED
BRONZE



MATTE
BLACK

CUSTOM COLORS ARE AVAILABLE BY REQUEST



DIMENSIONS

(W ₁)	WIDTH 1	2.00"
(W ₂)	WIDTH 2	0.41"
(H ₁)	HEIGHT 1	3.50"
(H ₂)	HEIGHT 2	3.10"
(D ₁)	DIAMETER 1	2.00"
(D ₂)	DIAMETER 2	1.89"

INSTALLATION

1. Completely secure the first section of bar rail tubing to the bar face or wall.
2. Insert elbow fitting into the end of the secured section of tubing.
3. Adjust elbow fitting to the desired angle.
4. Connect the second piece of tubing to the elbow fitting.
5. Secure the second section of bar rail tubing to bar face

Care and maintenance of bar foot rail varies by finish. Given the nature of the product, typical wear and tear may be noticed with your bar rail over time, such as scuffs, scratches, and dirt. Visit kegworks.com/bar-rail-care to read our guide on how to properly prep, clean & maintain all bar rail finishes.

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The General Conditions, any Supplementary General Conditions and Division 1, General Requirements, are hereby made a part of this Section as fully as if repeated herein.

1.2 SUMMARY

- A. Blocking and nailers; plates, sills and curbs
- B. Blocking and nailers for LCD brackets, projection systems and screens, and other Section 27 equipment
- C. Blocking for Owner-furnished –lockers –to cover reused lockers from salvage
- D. Wood grounds
- E. Mounting panels
- F. Interior Partition Framing including bulkheads and soffits
- G. Ceiling, and Roof Framing
- H. Roof sheathing of softwood plywood

1.3 RELATED WORK

- A. Section 033000, Cast-In-Place Concrete
- B. Section 064023, Interior Architectural Woodwork
- C. Division 23, Mechanical
- D. Division 26, Electrical

1.4 QUALITY ASSURANCE

- A. Lumber Grading Rules and Wood Species: Agencies, Bureaus and Lumber Associations certified by Board of Review, American Lumber Standards Committee or Canadian Lumber Standards Administrative Board.
- B. Grade Marks: Identify lumber and plywood by official grade mark.
- C. Optional Framing: Certain requirements of bracing, notching, lapping or nailing may be waived in lieu of engineered connectors. Code approval and performance of connectors must be submitted to the engineer for approval.

- D. Manufacturer of Sheathing: Member of American Plywood Association (APA).

1.5 REFERENCES

A. American Plywood Association (APA)

1. APA PS-1, Construction and Industrial Plywood (ANSI A199.1)
2. APA E30A, Design/Construction Guide - Residential and Commercial

B. American Forest and Paper Association

1. AFPA T03: Span Tables for Joists and Rafters
2. AFPA T05: Wood Structural Design Data
3. AFPA T11: Manual for Wood Frame Construction
4. AFPA T901: National Design Specifications for Wood Construction

C. National Bureau of Standards (NBS): NBS PS-20 American Softwood Lumber Standard

D. Wood Associations:

1. Southern Pine Inspection Bureau (SPIB)
2. Western Wood Products Association (WWPA)
3. West Coast Lumber Inspection Bureau (WCLIB)
4. National Lumber Grades Authority (NLGA)
5. Northeastern Lumber Manufacturers Association (NELMA)
6. Redwood Inspection Service (RIS)

E. American Wood Preservers Association

1. AWWA U1: Use Category System
2. AWWA C9-85: Pressure Treatment - Plywood
3. AWWA P5-86: Water Borne Preservative
4. AWWA C1-86: Pressure Treatment (General Requirements)

1.6 SUBMITTALS

- A. Material Lists: Indicate selected wood species, stress ratings, grades and locations in the work.
- B. Manufacturers Literature: Types of rough hardware indicating size and material.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect materials from weather, humidity and moisture.
- B. Store materials 6-inches above ground on framework or blocking.
- C. Cover with waterproof covering, providing adequate air circulation.
- D. Protect sheet materials from broken and damaged surfaces and edges.

PART 2 - PRODUCTS

2.1 MATERIALS - SOFTWOOD LUMBER

- A. Lumber dimensions indicated are nominal, actual dimensions per PS20.
- B. Surface four sizes (S4S), unless specified otherwise.
- C. Provide dry lumber with 19% maximum moisture content at time of dressing for 2" nominal thickness or less, unless otherwise indicated.

2.2 MATERIALS - SOFTWOOD BOARD LUMBER: PS-20, 1" to 1-1/2" thick; 2" to 12" wide

- A. Specie/Grade: WWPA, No. 4 Common; IWP, Utility; SPIB, No. 4; S-Dry or MC-15
 - 1. Locations: Concealed blocking and nailers; wood furring; wood grounds.

2.3 MATERIALS - SOFTWOOD DIMENSION LUMBER: PS-20

- A. Structural Joists and Studs: S-Dry or MC-15
 - 1. Specie Group
 - a. Specie Group - Hem-Fir (WWPA, WCLIB); Grade, No. 2 KD
 - i. Design Values - (psi) Fb=850; E=1,300,000 modulus; Fc = 1300 parallel to grain
 - b. Specie Group - Spruce-Pine-Fir (NLGA); Grade, No.1/No.2 KD
 - i. Design Values - (psi) Fb=875; E=1400,000 modulus; Fc = 1150 parallel to grain

2.4 MATERIALS - SOFTWOOD DIMENSION LUMBER: MISCELLANEOUS

- A. Specie/Grade: Any commercial softwood; Construction or No. 3 grade; S-Dry or MC-15.
 - 1. Locations: Miscellaneous framing; blocking and nailers; plates; sills and curbs.

2.5 ACCESSORIES - FASTENERS - ROUGH CARPENTRY

- A. Material and Size: Where rough carpentry is exposed to the weather, in ground contact or in areas of high relative humidity, all connection plates, angles, hangers, bolts, lag screws, nails, etc. shall be one of the following:
 - 1. Domestic steel shall be zinc plated or galvanized per ASTM A 153 or A653, class G185.
 - 2. Stainless steel shall conform to AISI Type 304.
- B. Case Hardened Cut Nails: Size 8d for 1-inch thick wood; 10d for 2-inch thick wood; toe nailing increase by two sizes.
 - 1. Locations: Attachment of non-exposed wood to block masonry walls.

- C. Common Nails: 8d for 1-inch thick wood; 12d for 2-inch thick; 40d for 3-inch thick; toe nailing increase by two sizes.
 - 1. Locations: Attachment of wood to wood.
- D. Expansion Shields: "Exp. Bolts" size minimum 1/2" bolt, shield length minimum 2-1/2".
 - 1. Locations: Attachment into masonry or cement products and materials with density in excess of 40 pcf.
- E. Lag Bolts/Screws: Minimum 1/2" diameter, with length 2 times material passed through.
 - 1. Locations: Attachment of assembled units to wood framing.
- F. Wood Screws: 6" long TimberLok self-drilling screws by FastenMaster or approved equal.
 - 1. Locations: Attachment of assembled units to wood framing
- G. Nuts and bolts: 3/4", #20 thread, hex head, 1" longer than material penetrated. Use carriage bolts (square neck or finned) where head is later inaccessible or in hazardous location.
 - 1. Locations: Attachment of structural members to each other or substrate.
- H. Anchor bolts: 3/4" minimum 12" long with 2" hook end and 4" of thread.
 - 1. Locations: Embedment in masonry and concrete for blocking.
- I. Plate Washers: Size to accommodate fastener, minimum 3/4" outside diameter.
 - 1. Locations: Bolts and nuts (all types), penetrating wood or fiber board products.

2.6 ACCESSORIES – SHIMS

- A. Material: Cedar shingles, slate, lead, galvanized steel or plastic.

2.7 ACCESSORIES - METAL FRAMING ANCHORS

- A. General: Provide galvanized steel framing anchors of structural capacity, type, and size required for installation of framing. Provide joist hangers, nail plates, post caps and base, metal cross bridging, framing anchors, L-straps, T-straps, header braces, plywood clips, etc., as indicated on drawings and as follows:
 - 1. Research or Evaluation Reports: Provide products for which model code research or evaluation reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with building code in effect for Project.
 - 2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that 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.

- B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 (ASTM A 653M, Z180) coating designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated. For sheet steel fastened to preservative treated lumber, provide G185 coating.

PART 3 - EXECUTION

3.1 PREPARATION - GENERAL CARPENTRY

- A. Verify dimensions and details before proceeding with the work.
- B. Coordinate locations of supports so that attached work will be secure and stable to support design loads of applicable wood specie.
- C. Verify location and use of treated lumber. Coat all cut surfaces of treated lumber with an approved preservative.

3.2 PREPARATION – FRAMING

- A. Advise installers of other work of the required limitations on notching and boring holes through wood frame members.
- B. Notches: Do not notch in end quarter or middle quarter of joists or rafters, and do not exceed 1/6 of depth of member for depth of notches in top or bottom of joists. Limit length of notches to 1/3 of depth of member.
- C. Holes: Do not bore holes closer than 2" from top or bottom of joists or rafters, and limit diameter to 1/3 of depth of member.

3.3 INSTALLATION - GENERAL CARPENTRY

- A. Utilize materials of longest practical lengths to prevent splicing.
- B. Do not use materials with warp, twist or bow in excess.
- C. Cut, scribe and cope for accurate fit.
- D. Set work accurately to required lines with members level, plumb and true with intersections to required angles.
- E. Shim to lines and levels with full-bearing.

3.4 INSTALLATION - ANCHORING AND FASTENING

- A. Securely attach wood products, to each other and to other materials, as indicated and as recommended by published standards.
- B. Make tight connections between members.

- C. Do not allow nails and screws to penetrate opposite sides which will be exposed to view or will receive finish.
- D. Install fasteners without splitting of wood; pre-drill pilot holes for sizes larger than 1/8".
- E. Do not hammer threaded fasteners; tighten without lubrication.
- F. Install load carrying components with appropriate devices.
- G. Set fasteners flush with surface; counter bore screws, nuts and bolts.
- H. Nail or screw plywood in accord with APA publication E30A.

3.5 INSTALLATION - BLOCKING AND NAILERS, PLATES, SILLS AND CURBS

- A. Softwood lumber or plywood in appropriate strength and size for use. No piece less than 6' long, unless indicated by dimensions. Anchor: Board lumber 2' on center, dimension lumber 4' on center, not less than 2 bolts.
 - 1. Locations: Roof blocking for perimeters and penetrations. Also for secure fastening, stiffening, anchoring, hanging and attainment of various other profiles.

3.6 INSTALLATION - WOOD GROUNDS

- A. Softwood lumber or plywood, minimum 3/4" thick x 6" wide; attached between studs.
 - 1. Locations: Wall mounting in habited spaces (e.g., door stops, cabinets, shelving, rails, handicapped grab bars, toilet accessories, specialties and equipment furnished under other sections.)

3.7 INSTALLATION - WOOD FRAMING

- A. Set accurately, plumb, level, and rigidly secured. Frame openings and comply with the NFPA Manual for House Framing. Cut, join and tightly fit framing around other work. Do not splice structural members between supports unless otherwise detailed.
- B. Anchor and nails in accord with the following Publications except where modified by other portions of this specification.
 - 1. National Evaluation Report No. NER-272 for pneumatic or mechanical driven staples, P-Nails, and allied fasteners.
 - 2. Published requirements of manufacturer of metal framing anchors.
 - 3. Table 1 - Recommended Nailing Schedule of NFPA Manual for House Framing.
 - 4. "Table 2304.9.1 - Fastening Schedule" of the 2003 International Building Code.
- C. Firestop in concealed spaces: Use wood blocking in concealed spaces of nominal 2-inch thickness, unless blocked by other framing members.
 - 1. Stud walls (exterior or interior): Provide firestopping at each floor level and at top story ceiling level.
 - 2. Floor and ceiling framing: Provide firestopping at ends of joists and over supports for full

depth of joists.

- D. Sill Plates: Provide where wood framing is supported by concrete or masonry walls or piers. Anchor to embedded bolts as shown.

3.8 INSTALLATION - STUD FRAMING:

A. Studs:

1. Layout partition or wall on level deck.
2. Set wide face of stud perpendicular to face of wall or partition.
3. End nail studs through bottom and top plate.
4. Erect walls complete with headers and jamb studs.

- B. Plates: Provide plates 2-inches thick and of same width as studs.

- C. Bottom Plates: Fasten bottom plate to deck near each end of partition or wall and at not more than 4' on center between ends. Anchor to wood with nails or lag bolts, to masonry and concrete with anchor bolts, expansion sleeves, or power driven fasteners.

- D. Single Top Plate: Permitted for non-loadbearing interior partitions.

- E. Double-Top Plates: Face nail upper top plate to lower top plate, over lap top plates at corners and intersections, stagger joints between plates.

- F. Corners and Intersection: Construct with minimum 3 studs 2-inches thick, providing bearing surface for wall finishes.

- G. Ends of Partitions Abutting Other Walls: Secure with fasteners located near each end of stud and maximum 4-feet on center.

- H. Openings: Frame with addition of jack studs (plus additional stud for openings wider than 6-feet) and double header members of thickness equal to width of studs. Set headers on edge and support on jack studs.

1. Openings in Exterior and Bearing Walls: Minimum header depth as required by AFPA T11 and the contract drawings.
2. Non-bearing partitions: Minimum header depth of 4-inches for openings 3-feet and less in width and 6-inches deep for wider openings.

- I. Blocking and Struts: Provide minimum continuous horizontal row at mid-height of single story partitions over 8 feet high, and at midpoint between floors of multi-story partitions, using 2" thick members as the same width of studs.

- J. Grounds: Provide blocking and framing of same width as studs for support of facing materials, fixtures, specialty items including grab bars in all tub/shower units and trim.

- K. Gables: Frame gable end walls with studs cut to fit and toe nail to top plates of wall framing.

3.9 INSTALLATION - PROTECTION OF FRAMING – BRACING

- A. Temporarily brace framing to maintain alignment, sustain winds and construction loads.
- B. Leave bracing in place until lateral stability is achieved with other design elements.
- C. Remove temporarily bracing when no longer required.

3.10 INSTALLATION - ROUGH CARPENTRY HARDWARE

- A. Where edges of the roof plywood abut one another, use plywood sheathing clips at 16" on center.
- B. Where wood joists frame into beams, use 16 gauge standard joist hangers and 10d nails.
- C. All roof trusses with overhangs and all other horizontal surfaces exposed to wind uplift shall be secured to the building framing with 16 gauge hurricane anchors and 8 nails.

3.11 INSPECTION

- A. The Owner shall employ and pay for the services of an independent Inspection Agency, acceptable to the Structural Engineer, to perform a field review of the installation of the structural wood framing.
- B. Field inspection shall include but is not limited to the following:
 - 1. Size, species and spacing of all stud bearing walls and roof rafters.
 - 2. Installation of all headers, jambs, lintels and other framing at openings.
 - 3. Bridging and blocking installation between trusses, rafters and stud members.
 - 4. All connections between individual framing members including beam to beam, joist to beam, beam to column and truss to beam/wall. These connections include nailing of plywood to framing members as well as installation of hurricane anchors, steel plate connections and other framing details.
- C. Final Report: The Inspection Agency shall prepare a written report that summarizes the work inspected during the course of the project. A discussion of all deviations from the contract documents and specifications, with their related impact on the final construction, shall be described in detail. The engineer of record shall review this final report, and recommend corrective measures (as deemed necessary) that must be made prior to final acceptance of the work. Prior to final payment, a written report certifying that the work meets the requirements of the contract documents, specifications, and all governing agencies shall be prepared, submitted, and approved by the Architect.
- D. See spec section 061700 for additional requirements.

END OF SECTION 061000

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Wall sheathing.
 - 2. Weather-resistive barriers.
 - 3. Flexible flashing at openings in sheathing.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for plywood backing panels.

1.3 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. For building wrap, include data on air-/moisture-infiltration protection based on testing according to referenced standards.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WALL SHEATHING

- A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.
 - 1. Product: Subject to compliance with requirements, provide "Dens-Glass Gold" by G-P Gypsum Corporation.
 - 2. Type and Thickness: Regular, 1/2 inch thick.
 - 3. Size: Use largest sheet size available and appropriate for vertical installation.

2.2 FASTENERS

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

- B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
 - 1. For steel framing less than 0.0329 inch thick, attach sheathing to comply with ASTM C 1002.
 - 2. For steel framing from 0.033 to 0.112 inch thick, attach sheathing to comply with ASTM C 954.
- C. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. DuPont; Tyvek.
 - b. Ludlow Coated Products; Barricade Building Wrap
 - c. Reemay, Inc.; Typar HouseWrap.
 - 2. Allowable UV Exposure Time: Not less than three (3) months.
- D. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.3 FLEXIBLE FLASHING

- A. Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.025 inch.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
 - b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Vycor Plus Self-Adhered Flashing.
 - c. MFM Building Products Corp.; Window Wrap.
 - d. Polyguard Products, Inc.; Polyguard 300.
 - e. Protecto Wrap Company; BT-25 XL.
- B. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
- D. Use appropriate fasteners. 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.
- E. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
- B. Apply fasteners so heads bear tightly against face of sheathing boards but do not cut into facing.
- C. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.
 - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

3.3 BUILDING WRAP INSTALLATION

- A. Comply with manufacturer's written instructions.
 - 1. Seal seams, edges, fasteners, and penetrations with tape.
 - 2. Extend into jambs of openings and seal corners with tape.

3.4 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.

1. Prime substrates as recommended by flashing manufacturer.
2. Lap seams and junctures with other materials at least 4 inches, except that at flashing flanges of other construction, laps need not exceed flange width.
3. Lap flashing over weather-resistant building paper at bottom and sides of openings.
4. Lap weather-resistant building paper over flashing at heads of openings.
5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

END OF SECTION 061600

SECTION 064113 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior standing and running trim associated with casework.
 - 2. Shop fabricated wood cabinets.
 - 3. Shop fabricated plastic laminate casework
 - 4. Solid surface countertops.
 - 5. Solid-surfacing at storefront sills.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
 - 2. Division 09 Section "Resilient Base and Accessories" for interior base molding.

1.3 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
- B. Samples for Initial Selection:
 - 1. Shop applied finishes.
 - 2. Plastic laminates.
 - 3. PVC edge material.
 - 4. Thermoset decorative panels.
 - 5. Solid-surfacing materials.
- C. Samples for Verification:
 - 1. For each product, 12 inches length for running trim.
 - 2. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish.
 - 3. Thermoset decorative-panels, 8 by 10 inches, for each type, color, pattern, and surface finish, with edge banding on 1 edge.
 - 4. Corner pieces as follows:
 - a. Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
 - 5. Exposed cabinet hardware and accessories, one unit for each type and finish.

6. Solid-surfacing materials, 6 inches square.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials against weather and contact with damp or wet surfaces.
- B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1.6 COORDINATION

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

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Wood Species and Cut for Transparent Finish: White oak, rift sawn or cut.
- B. Wood Products: Comply with the following:
 1. Hardboard: AHA A135.4.
 2. Medium-Density Fiberboard: ANSI A208.2, Grade MD.
 3. Particleboard: ANSI A208.1, Grade M-2.
 4. Particleboard: Straw-based particleboard complying with requirements in ANSI A208.1, Grade M-2, except for density.
 5. Softwood Plywood: DOC PS 1 Medium Density Overlay.
 6. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.
- C. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
 1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semi-exposed edges.
- D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated into the Work include, but are not limited to, the following:
 - a. Formica Corporation.
 - b. Nevamar Company, LLC; Decorative Products Div.
 - c. Wilsonart International; Div. of Premark International, Inc.
 2. Colors and Patterns: Basis of design for laminate areas noted on drawings and schedules as PL-1 to be "Wilson Art" – color to be determined from manufacturer's entire range of colors / patterns (all price levels.)
- E. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
1. 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:
 - a. Meganite.
 - b. Avonite, Inc.
 - c. E. I. du Pont de Nemours and Company.
 - d. Formica Corporation.
 - e. Wilsonart International; Div. of Premark International, Inc.
 2. Type: Standard type, unless Special Purpose type is indicated.
 3. Colors and Patterns:
 - a. Basis of design for solid surface areas noted on drawings and schedules as S-1 (casework) to be "Meganite - color to be determined from manufacturer's entire range of colors (all price levels).
 - b. Basis of design for solid surface areas as noted on drawings and schedules (at window sills, vanities, misc.) to be Meganite (color as selected from manufacturer's full color range – (all price levels).

2.2 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware."
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.
- C. Back-Mounted Pulls: BHMA A156.9, B02011.
- D. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.
- E. Catches: Magnetic catches, BHMA A156.9, B03141.

- F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- G. Shelf Rests: BHMA A156.9, B04013; metal.
- H. Drawer Slides: BHMA A156.9, B05091.
 - 1. Standard Duty (Grade 1, Grade 2, and Grade 3): Side mounted; full-extension type; zinc-plated steel with polymer rollers.
 - 2. Box Drawer Slides: Grade 1; for drawers not more than 6 inches high and 24 inches wide.
- I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
- J. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.3 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Grade: Custom.
- B. For trim items wider than available lumber, use veneered construction. Do not glue for width or thickness.
- C. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- D. Assemble casings and moldings in shop except where limitations of access to place of installation require field assembly. Miter corners in shop and prepare for field assembly with bolted fittings designed to pull connections together.

2.4 WOOD CABINETS FOR TRANSPARENT FINISH

- A. Grade: Custom.
- B. AWI Type of Cabinet Construction: Reveal overlay on face frame.
- C. Wood Species and Cut for Exposed Surfaces: White oak, plain sawn or sliced.
 - 1. Grain Direction: Horizontally for drawer fronts, doors, and fixed panels.
 - 2. Matching of Veneer Leaves: Book match.
 - 3. Vertical Matching of Veneer Leaves: End match.
 - 4. Veneer Matching within Panel Face: Running match.
- D. Semiexposed Surfaces: Provide surface materials indicated below:
 - 1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
 - 2. Drawer Sides and Backs: Solid-hardwood lumber, same species indicated for exposed surfaces.
 - 3. Drawer Bottoms: Hardwood plywood.

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

2.5 PLASTIC-LAMINATE CABINETS

A. AWI Type of Cabinet Construction:

- 1. Flush overlay - typical
- 2. Flush with exposed face frame

B. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

- 1. Horizontal Surfaces Other Than Tops: Grade HGL.
- 2. Postformed Surfaces: Grade HGP.
- 3. Vertical Surfaces: Grade VGS.
- 4. Edges: Grade HGS.

C. Materials for Semi-exposed Surfaces:

- 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade VGS.
 - a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch thick, matching laminate in color, pattern, and finish.
 - b. For semi-exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS.
- 2. Drawer Sides and Backs: Thermoset decorative panels.
- 3. Drawer Bottoms: Thermoset decorative panels.

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

E. 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 selected by Architect from laminate manufacturer's full range in the following categories:
 - a. Solid colors, matte finish.
 - b. Wood grains, matte finish.
 - c. Patterns, matte finish.

2.6 CABINET FABRICATION

A. Plastic-Laminate-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:

- 1. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch particleboard, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semiexposed surfaces.

2. Shelves: 3/4-inch plywood, plastic-laminate faced.
3. Backs of Cabinets: 1/2-inch particleboard, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semiexposed surfaces.
4. Drawer Fronts: 3/4-inch particleboard, plastic-laminate faced.
5. Drawer Sides and Backs: 1/2-inch solid-wood or veneer-core hardwood plywood, with glued dovetail or multiple-dowel joints.
6. Drawer Bottoms: 1/4-inch hardwood plywood, thermoset decorative panels glued, and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 24 inches wide.
7. Doors: 3/4-inch particleboard or MDF, plastic-laminate faced.

- B. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.

2.7 CASEWORK HARDWARE AND ACCESSORIES

- A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.

1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.

- B. Butt Hinges: Stainless-steel, semi-concealed, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 hinges for doors less than 48 inches high and 3 hinges for doors more than 48 inches high.

- C. Pulls: Solid stainless-steel wire pulls, fastened from back with two screws. For sliding doors, provide recessed stainless-steel flush pulls. Provide 2 pulls for drawers more than 24 inches wide.

- D. Drawer Slides: BHMA A156.9, Type B05091.

1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated, steel ball-bearing slides.
2. Box Drawer Slides: Grade 1, for drawers not more than 6 inches high and 24 inches wide.
3. File Drawer Slides: Grade 1, for drawers more than 6 inches high or 24 inches wide.
4. Pencil Drawer Slides: Grade 1, for drawers not more than 3 inches high and 24 inches wide.
5. Keyboard Slides: Grade 1, for computer keyboard shelves.

- E. Drawer and Hinged Door Locks: Cylindrical (cam) type, 5-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.

1. Provide a minimum of two (2) keys per lock and six (6) master keys.
2. Provide locks on all doors and drawers.

- F. Sliding-Door Hardware Sets: Manufacturer's standard, to suit type and size of sliding-door units.

- G. Adjustable Shelf Supports: 2-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.

- H. Adjustable Shelf Supports: Mortise-type, zinc-plated steel standards and shelf rests complying with BHMA A156.9, Types B04071 and B04091.
- I. Grommets for Cable Passage through Countertops: 1-1/4-inch OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.

2.8 SOLID-SURFACING-MATERIAL COUNTERTOPS AND SILLS

- A. Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
 - 1. Fabricate tops with shop-applied edges of materials and configuration indicated.
 - 2. Fabricate tops with loose backsplashes for field application.
- B. Integral Sink Bowls: Comply with ISSFA-2 and ANSI Z124.3, Type 5 or Type 6, without a precoated finish.-do we have these coordinate w/SPA & IOTT
- C. Solid-Surfacing-Material Thickness: 3/4 inch.
- D. Coordinate installation at sills at storefronts with substrate available.

2.9 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Adhesives: As recommended for indicated use by adhesive manufacturer for specified product.

2.10 SHOP FINISHING

- A. Grade: Provide finishes of same grades as items to be finished.
- B. General: Finish architectural woodwork at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
- C. Shop Priming: Shop apply the prime coat including backpriming, if any, for transparent-finished items specified to be field finished. Refer to Division 09 painting Sections for material and application requirements.
- D. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.
- E. Transparent Finish:

1. Grade: Custom.
2. AWI Finish System: Catalyzed polyurethane.
3. Staining: Match approved sample for color.
4. Wash Coat for Stained Finish: Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
5. Sheen: Gloss, 61-100 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 COORDINATION

- A. If concealed blocking is required, coordinate with trades to provide same, and ensure timely installation and location of blocking within the appropriate sequence of construction.

3.2 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.

3.4 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 2. Countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.5 CASEWORK INSTALLATION

- A. Install level, plumb, and true; shim as required, using concealed shims. Where manufactured wood casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Fasten cabinets to masonry or framing, wood blocking, or reinforcements in walls and partitions with fasteners spaced 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
 - 1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 16 inches o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than two fasteners.
- C. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten to hanging strips, masonry, or framing, blocking, or reinforcements in walls or partitions. Align similar adjoining doors to a tolerance of 1/16 inch.
 - 1. Fasten through back, near top and bottom, at ends, and not more than 16 inches o.c.
 - 2. Use toggle bolts at hollow masonry.
 - 3. Use expansion anchors at solid masonry.
 - 4. Use No. 10 wafer-head screws sized for 1-inch penetration at wood hanging strips.
 - 5. Use No. 10 wafer-head screws sized for 1-inch penetration into wood framing or blocking at wood-framed partitions.
 - 6. Use No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish at metal-framed partitions.
- D. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- E. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.6 INSTALLATION OF TOPS

- A. Field Jointing: Where possible make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
 - 1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- B. Secure tops to cabinets with Z- or L-type fasteners or equivalent, using two (2) or more fasteners at each front, end, and back.
- C. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.

- D. Secure backsplashes and end splashes to tops with concealed metal brackets at 16 inches o.c. and walls with adhesive.
- E. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.7 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.8 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.9 PROTECTION

- A. Protect installed products from damage from weather and other causes during remainder of the construction period.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 064023

100% Construction Document Specifications

066000-CELLULAR PVC FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cellular PVC fabrications including the following:
 - 1. Trim.
 - 2. Mouldings.

1.2 RELATED SECTIONS

- A. Section 061000 - Rough Carpentry.
- B. Section 062000 - Finish Carpentry.

1.3 REFERENCES

- A. ASTM International (ASTM): ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013000 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Verification Samples: For each finish product specified, two (2) samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with requirements of authorities having jurisdiction and applicable codes at the location of the project.
- B. Manufacturer Qualifications: Minimum 5 years experience manufacturing similar products.
- C. Installer Qualifications: Minimum 2 years experience installing similar products.
- D. Mock-Ups: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Construct area designated by Architect.
 - 2. Do not proceed with remaining work until workmanship is accepted by Architect.
 - 3. Remodel mock-up area as required to produce acceptable work.

100% Construction Document Specifications

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Comply with manufacturer's recommendations. Handle materials to avoid damage.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

- A. Provide manufacturer's standard limited warranty for products, stating that components will be free from defects in material that occur as a direct result of the manufacturing process, occur under normal use and service, occur during the warranty period and result in blistering, peeling, flaking, cracking, splitting, cupping, rotting or structural defects from termites or fungal decay.

- 1. Trim Warranty Period: 25 years.
- 2. Moulding Warranty Period: 25 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Azek Building Products, Inc., 801 Corey St.; Moosic, PA 18507; Toll Free Tel: 877-ASK-AZEK; Tel: 570-346-8797; Fax: 570-346-5080; Web: www.azek.com.
 - 2. HB & G
- B. Substitutions: As approved by Architect / Owner

2.2 TRIM

- A. Fire Performance Characteristics: Provide products complying with the following:
 - 1. Flame Spread Index: Less than 25, ASTM E 84.
- B. PVC Trim: Material shall have the following characteristics:
 - 1. Material: Solid Cellular PVC.
 - 2. Style: As selected by the Architect.
 - 3. Trim Size: As noted on the drawings.
- C. PVC Cornerboards: Material shall have the following characteristics:

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1. Material: Solid Cellular PVC.
 2. Style: As selected by the Architect
- D. PVC Sheet: Material shall have the following characteristics:
1. Material: Solid Cellular PVC.
 2. Style: As selected by the Architect
 3. Sheet Size: As noted on drawings from the following:
 - a. 3/8 inches x 4 feet x 8 feet actual dimension.
 - b. 1/2 inches x 4 feet x 8 feet actual dimension.
 - c. 5/8 inches x 4 feet x 8 feet actual dimension.
 - d. 3/4 inches x 4 feet x 8 feet actual dimension.
 - e. 1 inches x 4 feet x 8 feet actual dimension.
- E. PVC Skirt Board: Two-piece skirt board including universal siding interface. Material shall have the following characteristics:
1. Material: Solid Cellular PVC.
 2. Style: As selected by Architect
 3. Skirt Board Trimboard Size: As noted on drawings from the following:

- a. 5/4 x 6 x 18 feet nominal, 1 inches x 5-1/2 inches by 18 feet actual dimension.
 - b. 5/4 x 8 x 18 feet nominal, 1 inches x 7-1/4 inches by 18 feet actual dimension.
 - c. 5/4 x 10 x 18 feet nominal, 1 inches x 9-1/4 inches by 18 feet actual dimension.
 4. Nailing Flange Length: 1-1/2 inches.
 5. Drip Edge Overhang: 1/4 inches.
- F. Integrated Drip Edge Board: Two-piece skirt board including drip edge. Material shall have the following characteristics:
1. Material: Solid Cellular PVC.
 2. Style: As selected by Architect
 3. Skirt Board Trimboard Size: As noted on drawings from the following:

- a. 5/4 x 4 x 18 feet nominal, 1 inches x 3-1/2 inches by 18 feet actual dimension.
 - b. 5/4 x 6 x 18 feet nominal, 1 inches x 5-1/2 inches by 18 feet actual dimension.
 4. Nailing Flange Length: 1-1/4 inches.
 5. Drip Edge Overhang: 1/8 inches.
- G. Finish Grade Trim: Two-piece, hidden fastener trim system with base plate for fastening and cover trim with nailing flange. Material shall have the following characteristics:
1. Material: Solid Cellular PVC.
 2. Style: As selected by Architect
 3. Finish Grade Trim Size: As noted on drawings from the following:

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- a. 6/4 inches x 4 inches by 18 feet actual dimension.
- b. 6/4 inches x 6 inches by 18 feet actual dimension.
4. Miter Corner Reinforcement: 3" x 3".

2.3 MOULDINGS

A. Crown Profiles: Material shall have the following characteristics:

1. Material: Solid Cellular PVC.
2. Crown Moulding Profile: As selected by Architect/Owner from below:

- a. 3" Crown Moulding: 9/16 inches x 2-3/4 inches x 16 feet, AZM-52.
- b. 4 inches Crown Moulding: 9/16 inches x 3 5/8 inches x 16 feet, AZM-49.
- c. 5" Crown Moulding: 11/16 inches x 4 5/8 inches x 16 feet, AZM-47.
- d. 6 inches Crown Moulding: 11/16 inches x 5-1/4 inches x 16 feet, AZM-45.
- e. 8 inches Crown Moulding: 7-1/2 inches x 1 inches, AZM-43.
- f. 3-1/2 inches Bed Moulding: 13/16 inches x 3-1/2 inches x 16 feet, AZM-28.
- g. Bed Moulding: 9/16 inches x 1-3/4 inches x 16 feet, AZM-75.
- h. Cove Moulding: 9/16 inches x 2-3/4 inches x 16 feet, AZM-52.
- i. Imperial Rake Crown: 1 3/8 inches x 2-3/4 inches x 16 feet, AZM-6937.
- j. Rams Crown: 1 13/32" x 2 1/16 inches x 16 feet, AZM-6934.

B. Detail Profiles: Material shall have the following characteristics:

1. Material: Solid Cellular PVC.
2. Detail Profile:

- a. Historic Sill: 1-3/4 inches x 2 1/32" x 16 feet, AZM-6930.
- b. Sub Sill Nose: 1 17/32" x 1-1/2 inches x 16 feet, AZM-6933.
- c. Water Table: 2-3/4 inches x 2" x 18 feet, AZM-6935.
- d. Quarter Round: -3/4 inches x-3/4 inches x 16 feet, AZM-105.
- e. Scotia: -3/4 inches x-3/4 inches x 16 inches, AZM-93.
- f. Drip Cap: 1 5/8 inches x 11/16 inches, AZM-197.

C. Casing Profiles: Material shall have the following characteristics:

1. Material: Solid Cellular PVC.
2. Casing Profile:

- a. Adams Casing: 1 1/16 inches x 3-1/2 inches x 16 feet, AZM-97.
- b. Back Band: 1 11/32" x 1 3/16 inches x 16 feet, AZM-6931.
- c. Back Moulding: 11/16 inches x 1 5/8 inches x 16 feet, AZM-217.
- d. Base Cap: 11/16 inches x 1 1/8 inches x 16 feet, AZM-164.
- e. Brick Mould: 1-1/4 inches x 2" x 17', AZM-180.
- f. Brick Mould: 1-1/4 inches x 2" x 18 feet, AZM-180.
- g. Colonial Base Cap: -3/4 inches x 5-1/4 inches x 16 feet, AZM-163.
- h. Crosshead Pediment: 2 13/32" x 7 1/8 inches x 18 feet, AZM-6216.
- i. Rake Moulding: 1 1/16 inches x 2" x 16 feet, AZM-287.

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- j. Shingle Mould: 11/16 inches x 1 5/8 inches x 16 feet, AZM-210.
- k. Square Profile Moulding: 1-1/2 inches x 1-1/2 inches x 12 feet, AZM-236.
- l. Wainscot Cap: 1 inches x 2-1/4 inches x 16 inches, AZM-284.
- m. Fluted/Reeded: 5-1/4 inches x 15/16 inches, AZM-606.
- n. Garage Door Thermostop: 2" x 3/8 inches, AZM-6936.

2.4 ACCESSORIES

- A. Fasteners: Stainless steel or hot-dip galvanized, with thin shank, blunt point, full round head as recommended by the manufacturer.
- B. Adhesives: Azek Adhesive, a non-toxic, odorless, UV stable, water-based PVC cement.
- C. Sealants: Urethane, polyurethane or acrylic based sealants without silicone.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions that may be detrimental to proper or timely completion.
- B. For decking and porch flooring installations, ensure surfaces are suitable for installation of decking and that adequate structural support has been provided.
 - 1. Standard Installation: Confirm that joists are spaced at 16 inches on center maximum, and are sloped at a minimum of 1/4 inch per foot away from the building.
 - 2. Forty-five Degree Angle Installation: Confirm that joists are spaced at 12 inches on center maximum, and are sloped at a minimum of 1/4 inch per foot away from the building.
- C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install products in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
 - 1. Use manufacturer's recommended fasteners, not more than 2 inches from ends.
 - 2. Glue joints to eliminate joint separation.
 - 3. Allow for expansion and contraction at ends of the runs.
- B. Decking and Porch Flooring Installation:
 - 1. Install with grain side up for the walking surface.
 - 2. Fasten tight to joists. Provide shims if there are variations in framing.
 - 3. Countersink fasteners slightly to provide necessary clearance when installing the next board.
 - 4. Cut final boards as required for proper appearance.

3.3 CLEANING AND PROTECTION

- A. Protect from damage during construction operations. Promptly repair any damaged surfaces.

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Remove and replace work which cannot be satisfactorily repaired.

- B. Clean products, prior to Substantial Completion, using materials recommended by the manufacturer to remove stains, dirt and debris prior to final acceptance.

END OF SECTION 066000

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. Perimeter insulation under slabs-on-grade.
2. Cavity-wall insulation.
3. Concealed building insulation.
4. Exposed building insulation.
5. Formed-in-place insulation.
6. Radiant barriers.
7. Vapor retarders.

- B. Related Sections include the following:

1. Division 04 Section "Unit Masonry" for insulation installed in cavity walls and masonry cells.
2. Division 07 Section "Self-Adhering Sheet Waterproofing" for insulation and insulated drainage panels installed with waterproofing.
3. Division 09 Section "Gypsum Board Assemblies" for installation in metal-framed assemblies of insulation specified by referencing this Section.
4. Division 09 Section "Gypsum Board Assemblies."
5. Division 13 Section "Special Construction"
6. Division 21 Section "Fire-Suppression."
7. Division 22 Section "Piping Plumbing Insulation."
8. Division 23 Section "HVAC Piping Insulation."

1.3 DEFINITIONS

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

1.4 PERFORMANCE REQUIREMENTS

- A. Plenum Rating: Provide fiber insulation where indicated in ceiling plenums whose test performance is rated as follows for use in plenums as determined by testing identical products per "Erosion Test" and "Mold Growth and Humidity Test" described in UL 181, or on comparable tests from another standard acceptable to authorities having jurisdiction.

1. Erosion Test Results: Insulation shows no visible evidence of cracking, flaking, peeling, or delamination of interior surface of duct assembly, after testing for 4 hours at 2500-fpm (13-m/s) air velocity.
2. Mold Growth and Humidity Test Results: Insulation shows no evidence of mold growth, delamination, or other deterioration due to the effects of high humidity, after inoculation with *Chaetomium globosum* on all surfaces and storing for 60 days at 100 percent relative humidity in the dark.

1.5 SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 1. Surface-Burning Characteristics: ASTM E 84.
 2. Fire-Resistance Ratings: ASTM E 119.
 3. Combustion Characteristics: ASTM E 136.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

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

2.2 BOARD INSULATION

- A. Board Insulation bonded to plywood: Hunter panels Xci Ply; high thermal resistive rigid insulation panel composed of a closed cell polyisocyanurate foam core bonded on one side to a coated glass facer and on the other side to fire treated plywood:
1. **Manufacturers:** Basis of Design is Hunter Panels Xci Ply as manufactured by Hunter Panels 15 Franklin St., Portland, ME 04101, (888-746-1114) www.hunterpanels.com. Other manufacturer's may be submitted for approval prior to bid:
 2. Type: ASTM C 1289, Type V:
 - a. Grade 3 (25 psi).
 3. Fire Resistant Plywood Thickness: 5/8 inch.
 4. Panel Size: 4 feet by 8 feet).
 5. Thickness/ R Value: Long term thermal resistance values based on ASTM C 1289 with a 15-year time weighted average:
 - a. 2.6 inches (66mm) / R Value 12.90
 6. Dimensional Stability: ASTM D 2126, 2 percent change linear change (7 days).
 7. Moisture Vapor Permeance: ASTM E 96, less than 1 perm (57.5ng/ (Pasm2)).
 8. Water Absorption: ASTM C 209, less than 0.1 percent by volume.
 9. Resistance to Mold: ASTM D 3273 Passed (10).

2.3 GLASS-FIBER BOARD INSULATION

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
1. [CertainTeed Corporation](#).
 2. [Johns Manville](#).
 3. [Knauf Insulation](#).
 4. [Owens Corning](#).
- B. Foil-Faced, Flexible Glass-Fiber Board Insulation: ASTM C 612, Type IA or ASTM C 553, Types I, II, and III; faced on one side with foil-scrim-kraft vapor retarder; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84.
1. Nominal density of 1.0 lb/cu. ft. (16 kg/cu. m), thermal resistivity of 3.7 deg F x h x sq. ft./Btu x in. at 75 deg F (25.7 K x m/W at 24 deg C).

2. Nominal density of not less than 1.5 lb/cu. ft. (24 kg/cu. m) or more than 1.7 lb/cu. ft. (27 kg/cu. m), thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F (27.7 K x m/W at 24 deg C).
- C. Foil-Faced, Glass-Fiber Board Insulation: ASTM C 612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84.
1. Nominal density of 2.25 lb/cu. ft. (36 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
 2. Nominal density of 3 lb/cu. ft. (48 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
 3. Nominal density of 4.25 lb/cu. ft. (68 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
 4. Nominal density of 6 lb/cu. ft. (96 kg/cu. m), thermal resistivity of not less than 4.34 deg F x h x sq. ft./Btu x in. at 75 deg F (30.1 K x m/W at 24 deg C).
- D. Sustainability Requirements: Provide glass-fiber board insulation as follows:
1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
 2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

2.4 GLASS-FIBER BLANKET INSULATION

- A. Available Manufacturers:
1. CertainTeed Corporation.
 2. Guardian Fiberglass, Inc.
 3. Johns Manville.
 4. Knauf Fiber Glass.
 5. Owens Corning.
- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- C. Where glass-fiber blanket insulation is indicated by the following thicknesses, provide blankets in batt or roll form with thermal resistances indicated:
1. 3-1/2 inches (89 mm) thick with a thermal resistance of 11 deg F x h x sq. ft./Btu at 75 deg F (1.9 K x sq. m/W at 24 deg C).
 2. 3-5/8 inches (92 mm) thick with a thermal resistance of 11 deg F x h x sq. ft./Btu at 75 deg F (1.9 K x sq. m/W at 24 deg C).
 3. 5-1/2 inches (140 mm) thick with a thermal resistance of 19 deg F x h x sq. ft./Btu at 75 deg F (3.3 K x sq. m/W at 24 deg C).
 4. 6-1/2 inches (165 mm) thick with a thermal resistance of 21 deg F x h x sq. ft./Btu at 75 deg F (3.7 K x sq. m/W at 24 deg C).

2.5 FOAMED-IN-PLACE INSULATION (for use to insulate exterior tube column sections and other areas as required.)

A. (Basis of design): HFC-blown type Closed Cell Foam: CertainTeed CertaSpray Closed Cell Foam, medium-density, MDI-based polyurethane thermoset rigid foam. CertaSpray A-side closed cell is mixed with CertaSpray B-side closed cell under pressure in a 1:1 volumetric ratio, will react and expand into a medium-density closed cell foam with an in-place core density of 1.9- 2.2 pcf:

1. Or approved equal by the following:

- a. Icynene, Inc.
- b. Polymaster, Inc.
- c. UCSC.

B. Physical and Mechanical Properties:

- a. Core Density: 1.9-2.4 pcf when tested in accordance with ASTM D 1622.
- b. Thermal Resistance (aged): 5.8 less than or equal to 2-1/2 inches / 6.4 when greater than 2-1/2 inches when tested in accordance with ASTM C 518 at 75 degrees F, (h-ft²- degrees F)/Btu.
- c. Thermal Resistance (initial): 6.4 when tested in accordance with ASTM C 518 at 75 degrees F, (h-ft²- degrees F)/Btu.
- d. Closed Cell Content: 88-95 percent when tested in accordance with ASTM D 2842.
- e. Compressive Strength: Greater than 25 psi when tested in accordance with ASTM D 1621.
- f. Tensile Strength: 23 psi when tested in accordance with ASTM D 1623.
- g. Water Absorption: Less than 2 percent by volume when tested in accordance with ASTM D 2842.
- h. Dimensional Stability: Less than 9 percent by volume when tested in accordance with ASTM D 2126 at 75 degrees F/95 percent RH, 28 Day.
- i. Water Vapor Transmission: 1.3 perm/inch when tested in accordance with ASTM E 96.
- j. Air Permeability: 0.013 when tested in accordance with ASTM E 283 at 1 inch thickness, L/s/m².
- k. Fungi Resistance: Pass, with no growth when tested in accordance with ASTM C 1338.

2. Fire Performance

- a. Flame Spread: Less than 25 when tested in accordance with ASTM E 84.
- b. Smoke: Less than 450 when tested in accordance with ASTM E 84.

3. Thermal Performance (aged): Tested in accordance with ASTM C 518 and/or ASTM C 177 at 75 degrees F (24 degrees C) mean temperature.

- a. Thickness 2-1/2 inches (64 mm), R-Value 16.0 (h-ft²-degreesF)/Btu (2.8 (m²-degreesC)/W).

- b. Thickness 3-1/2 inches (89 mm), R-Value 22.4 (h-ft²-degreesF)/Btu (3.9 (m²-degreesC)/W).

2.6 RADIANT BARRIERS

- A. Interior Radiation Control Coating: ASTM C 1321. Silver-colored, not thickness-dependent, low-emissivity solvent water-based coating, formulated for adherence to substrates indicated and with a surface emittance value of 0.25 or less as measured per ASTM C 1371.

1. Available Products:

- a. SOLEC Corporation; LO/MIT-I.
- b. SOLEC Corporation; LO/MIT-II.

- B. Sheet Radiant Barriers: ASTM C 1313 and as follows:

1. Available Products:

- a. Innovative Energy, Inc.; R+Heatshield Commercial Solid.
- b. Innovative Insulation, Inc.; Super R Premium (Commercial).

2. Sheet Construction: Foil on both sides of substrate.
3. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 5 and 10, respectively.
4. Water-Vapor Transmission: 1 perm, maximum.
5. Sheet Width: 48 inches.

2.7 VAPOR RETARDERS

- A. Polyethylene Vapor Retarders: ASTM D 4397, 6 mils (0.15 mm) thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).

- B. Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft. (12 kg/100 sq. m), with maximum permeance rating of 0.0507 perm (2.9 ng/Pa x s x sq. m).

1. Available Products:

- a. Raven Industries Inc.; DURA-SKRIM 6WW.
- b. Reef Industries, Inc.; Griffolyn T-65.

- C. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nonwoven grid of nylon cord or polyester scrim and weighing not less than 22 lb/1000 sq. ft. (10 kg/100 sq. m), with maximum permeance rating of 0.1317 perm (7.56 ng/Pa x s x sq. m) and with flame-spread and smoke-developed indexes of not more than 5 and 60, respectively.

1. Available Products:

- a. Raven Industries Inc.; DURA-SKRIM 2FR.
- b. Reef Industries, Inc.; Griffolyn T-55 FR.

- D. Foil-Polyester-Film Vapor Retarders: 2 layers of 0.5-mil- (0.013-mm-) thick polyester film laminated to an inner layer of 1-mil- (0.025-mm-) thick aluminum foil, with maximum water-vapor transmission rate in flat condition of 0.0 g/h x sq. m and with maximum flame-spread and smoke-developed indexes of 5.
 - 1. Product: Subject to compliance with requirements, provide "Zero Perm" by Alumiseal Corporation.
- E. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- F. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.
- G. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.
- H. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and with demonstrated capability to bond vapor retarders securely to substrates indicated.

2.8 AUXILIARY INSULATING MATERIALS

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.
- B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
- C. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

2.9 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
 - 1. Available Products:
 - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
 - b. Eckel Industries of Canada; Stic-Klip Type N Fasteners.
 - c. Gemco; Spindle Type.
 - 2. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
 - 3. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:

1. Available Products:
 - a. Gemco; 90-Degree Insulation Hangers.
 2. Angle: Formed from 0.030-inch- (0.762-mm-) thick, perforated, galvanized carbon-steel sheet with each leg 2 inches (50 mm) square.
 3. Spindle: Copper-coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
1. Available Products:
 - a. AGM Industries, Inc.; RC150.
 - b. AGM Industries, Inc.; SC150.
 - c. Gemco; Dome-Cap.
 - d. Gemco; R-150.
 - e. Gemco; S-150.
 2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Ceiling plenums.
 - b. Attic spaces.
 - c. Where indicated.
- D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 1 inch (25 mm) between face of insulation and substrate to which anchor is attached.
1. Available Products:
 - a. Gemco; Clutch Clip.
- E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
1. Available Products:
 - a. AGM Industries, Inc.; TACTOO Adhesive.
 - b. Eckel Industries of Canada; Stic-Klip Type S Adhesive.
 - c. Gemco; Tuff Bond Hanger Adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF UNDER-SLAB INSULATION

- A. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
- B. Protect top surface of horizontal insulation from damage during concrete work by applying protection course with joints butted.

3.5 INSTALLATION OF CAVITY-WALL INSULATION

- A. On units of foam-plastic board insulation, install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face, and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates indicated.
 - 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Division 04 Section "Unit Masonry."

3.6 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Set vapor-retarder-faced units with vapor retarder in location indicated of construction, unless otherwise indicated.
 - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- D. Install mineral-fiber insulation in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures.
 - 4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 - 5. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 - 6. For wood-framed construction, install mineral-fiber blankets according to ASTM C 1320 and as follows:
- E. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
 - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
 - 2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
 - 3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
 - 4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- F. Install board insulation in curtain-wall construction where indicated on Drawings according to curtain-wall manufacturer's written instructions.
 - 1. Retain insulation in place by metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold

insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated between insulation and glass.

2. Install insulation where it contacts perimeter fire-containment system to prevent insulation from bowing under pressure from perimeter fire-containment system.

- G. Apply self-supported, spray-applied cellulosic insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make it flush with face of studs by using method recommended by insulation manufacturer.

3.7 INSTALLATION OF RADIANT BARRIERS

- A. Install interior radiation control coating system according to ASTM C 1321.
- B. Install sheet radiant barriers in locations indicated according to ASTM C 1158.

3.8 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Before installing vapor retarder, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
- C. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.
- D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.9 PROTECTION

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

END OF SECTION 072100

SECTION 072110 – INSULATING AIR BARRIER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Materials and installation methods for a spray polyurethane foam building insulation and air/vapor barrier system located in the non-accessible part of the wall.
2. SRAB (sheet rubberized-asphalt barrier) self-adhered air/vapor barrier membrane in roof assemblies.
3. Materials and installation to bridge and seal the following air leakage pathways and gaps:
 - a. Connections of the walls to the roof air barrier.
 - b. Connections of the walls to the foundations.
 - c. Seismic and expansion joints.
 - d. Openings and penetrations of window frames, store front, curtain wall.
 - e. Barrier precast concrete and other envelope systems.
 - f. Door frames.
 - g. Piping, conduit, duct and similar penetrations
 - h. Masonry ties, screws, bolts and similar penetrations.
 - i. All other air leakage pathways in the building envelope.
4. Materials to act as flashings and counter flashings.

B. RELATED SECTIONS

1. Section 03300 - Cast-In-Place Concretes for Concrete back-up walls and underslab vapor retarder.
2. Section 04200 - Unit Masonry for backup walls and Masonry veneer cavity walls.
3. Section 07131 - Self-Adhering Sheet Waterproofing: Below grade waterproofing.
4. Section 07160 - Bituminous Dampproofing: Below grade dampproofing.
5. Section 07210 - Building Insulation: Insulation with integral vapor retarder facing.
6. Section 07620 - Sheet Metal Flashing and Trim: Sheet metal flashings.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide air/vapor barrier system constructed to perform as a continuous air/vapor barrier system, as building thermal insulation, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. System shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.

1.3 SUBMITTALS

- A. Provide submittals in accordance with Section 01330.
1. At bid submission, provide evidence to the Architect of licensing and certification under the Air Barrier Association of America's (ABAA's) Quality Assurance Program.
 2. Submit shop drawings showing locations and extent of air/vapor barrier and details of all typical conditions, intersections with other envelope systems and materials, membrane flashings and counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated and how miscellaneous penetrations such as conduits, pipes electric boxes and the like are sealed.
 3. Submit manufacturer's product data sheets for each type of material, including manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties.
 4. Submit manufacturer's installation instructions.
 5. Provide evidence of testing by an accredited laboratory confirming material has been tested and conforms to the requirements of ASTM E2178, Standard for Air Barrier Materials.
 6. Certification by air/vapor barrier manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
 7. Certification of compatibility by air/vapor barrier manufacturer, listing all materials on the project that it connects to or that come in contact with it.
 8. Submit two samples, 12 by 12 inch (300 by 300 mm) minimum size, of each air/vapor barrier material required for Project.
 9. Submit test results of air permeability testing of primary air barrier material (ASTM E 2178-01)
 10. Submit test results of assembly in accordance with ABAA test protocol.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
1. The air barrier contractor shall be, during the bidding period as well as for the duration of the installation, officially recognized as a Licensed Contractor by the Air Barrier Association of America (ABAA). The contractor shall carry liability insurance and bonding.
 2. Each worker who is installing air barriers must be either a Certified Applicator or an installer who is registered with ABAA
 3. Air/vapor barrier installers must be trained and certified by ABAA/NECA (National Energy Conservation Association) and PSDI (Professional Skills Development Institute for energy conservation) in accordance with the training requirements outlined in the ULC S705.2-02 Installation Standard. Installers shall have their photo-identification certification cards in their possession and available on the project site, for inspection upon request.
- B. Single-Source Responsibility: Obtain air/vapor barrier materials from a single manufacturer regularly engaged in manufacturing the product.

- C. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).
 - D. Preconstruction Meeting: Convene week prior to commencing Work of this section, in accordance with Section - Project Meetings.
 - E. Field-Constructed Mock-Ups: Prior to installation of air/vapor barrier, apply air/vapor barrier as follows to verify details under shop drawing submittals and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as qualities of materials and execution:
 - 1. Apply air/vapor barrier in field-constructed mock-ups of assemblies specified in Section 04200 and Section 09253.
 - 2. Apply air/vapor barrier in field-constructed mock-ups of assemblies specified in Section 01452, "Mock-Ups".
 - 3. Construct typical exterior wall panel, 8 feet long by 8 feet wide, incorporating back-up wall, partial cladding, window and doorframe and sill, insulation, flashing, building corner condition, junction with roof system foundation wall and typical penetrations and gaps; illustrating materials interface and seals. All transition membranes and seals shall be installed per the manufacturer's system requirements.
 - F. Test mock-up for air and water infiltration to conform with Section 01400 - Quality Control, in accordance with ASTM E 783 and ASTM E1105.
 - G. Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed air and vapor barrier unless it has been inspected, tested and approved.
 - H. Protect people and materials from over-spray and contact with chemicals and gases.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacture, expiration date, and directions for storage.
 - B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air/vapor barrier manufacturer. Protect stored materials from direct sunlight.
 - C. Avoid spillage. Immediately notify Owner, if spillage occurs and start clean up procedures.
 - D. Clean spills and leave area as it was prior to spill.
 - E. Separate and recycle waste materials in accordance with Section 01355 - Waste Management and Disposal, and with the Waste Reduction Workplan.
 - F. Place materials defined as hazardous or toxic waste in designated containers.

- G. Ensure emptied containers are sealed and stored safely for disposal away from children.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Apply air/vapor barrier within range of ambient and substrate temperatures recommended by air/vapor barrier manufacturer. Do not apply air/vapor barrier to a damp or wet substrate, unless the manufacturer specifically permits that for the product.
 - 1. Do not apply air/vapor barrier in snow, rain, fog, or mist.
 - 2. Do not apply air/vapor barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer.
 - 3. The product shall not be installed after the expiry date printed on the label of each container. The product has a shelf life of 6 months from the date of manufacture.

1.7 WARRANTY

- A. For sealant and membrane materials provide a twenty-four (24) month warranty period.
- B. Material Warranty: Provide the manufacturer's three (3) year air/vapor barrier material warranty under provisions of Section.
- C. System Warranty: Provide the manufacturer's three (3) year system warranty, including the primary air/vapor barrier and installed accessory sealant and membrane materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.1 MATERIALS & MANUFACTURERS

- A. Sprayed polyurethane foam air barrier wall systems are manufactured on the jobsite by trained, certified contractor manufacturers. The Contractor, Manufacturer must be certified by the Air Barrier Association of America (ABAA) and provide trained certified mechanics with a demonstrated ability to manufacture air barrier system on project of similar size, scope and complexity.

Bob McFadden
Bel Air Foamed Insulation, Inc.
2133 N. Fountain Green Road
Bel Air, MD 21015
(410)838-5900
FAX (410)879-0287

Landon Royals
Royals Insulation
212-A Najoles Road
Millersville, MD 21108
(410) 729-0405
Fax (410) 729-0825

Temple Chappell
Procoat Applicators
PO Box 4366
Annapolis, MD 21403
(410)626-1546
Fax (410)295-6576
spfspec@aol.com

Bonnie Strickler
PUFF Inc.
1851 Gleco Mills Lane
Charlottesville, VA 22903
(434)977-0427
(434)977-0428
suzie@puffinc.com

1. Sprayed polyurethane foam material, when tested, shall meet the requirements of ULC S705.1-01 Standard for Thermal Insulation-Spray Applied Rigid Polyurethane Foam, Medium Density, Material- Specification.
2. A copy of an Evaluation Report (such as the CCMC Evaluation Report) or copies of the test reports from an accredited testing laboratory, for each physical property, indicating that the product meets the requirements of ULC S705.1-01 shall be made available upon request. A copy of either the evaluation report or the test reports shall be on file at the ABAA office.
3. Material containers shall be labeled with the Evaluation Report number of the evaluation agency.
4. Design R value as indicated in test report; minimum R6/inch.
5. Density as indicated in test report: 1.9 pounds per cubic foot.
6. Smoke development as indicated in test report ASTM E84-04; Flame spread index 25, Smoke Developed 400 or less tested at 3" thickness
7. Products that meet the preceding requirements:
 - a. BASF Walltite® performance properties are used as the design standard or equal

B. AUXILIARY MATERIALS

1. Furnish auxiliary materials recommended by air/vapor barrier manufacturer for intended use and compatible with the air/vapor barrier.
2. Self-adhering modified asphalt/polyethylene flashing to counterflash metal flashings:
 - a. Bakor Blueskin® TWF.
3. Primer: Water based liquid primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates;
 - a. Aquatac® as manufactured by Bakor Inc.

4. Primer: Solvent based, VOC compliant primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates;
 - a. Blueskin® Primer by Bakor, Inc.
5. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes by SRAB air/vapor barrier manufacturer.
6. Stainless-Steel Sheet Flashing: ASTM A167, Type 304, soft annealed, with No. 2D finish; minimum, 0.0156 inch (0.4 mm) thick.
7. Transition Strip: Self-adhering, smooth surfaced SBS modified bitumen membrane, nominal 40 mil thickness, width as required.
 - a. Blueskin® SA as manufactured by Bakor Inc
8. Transition Strip Primer:
 - a. Blueskin® Primer as manufactured by Bakor Inc.
9. Sheet Membrane Transition Strip Termination Sealant:
 - a. Polybitume 570-05 by Bakor Inc.
10. Sheet Membrane Air Barrier Perimeter Seal to Windows, Doors, Curtainwall and Storefront systems: Non-reinforced, cured chloroprene polymer sheet (neoprene) complying with ASTM D2000 Designation 2BC415 to 3BC620, 50 to 65 mils (1.3 to 1.6 mm) thick.
 - a. Adhesive: Typical contact-type adhesive used for fully-adhered membranes.
 - b. Lap Sealant: Typical urethane or silicone lap and termination sealant used for membrane edges recommended by manufacturer.
 - c. Termination bars and fasteners:
 - 1) Stainless steel, Aluminum bars, and stainless fasteners Galvanized steel.
11. Sheet Membrane Sheet Membrane Air Barrier Perimeter Seal to Windows, Doors, Curtainwall and Storefront systems: Low modulus silicone sheet; provide manufacturer's standard system consisting of precured low-modulus silicone extrusion, in sizes to fit widths indicated, combined with a neutral-curing low modulus silicone sealant for bonding extrusions to substrates.
 1. Pecora Sil-Span.
 2. Dow 1-2-3 or equal.
12. Provide sealants in accordance with Section 07900 - Joint Sealers. Comply with ASTM C920 and ASTM C920 classifications for type, grade, class, and uses

- a. Silicone Sealant Type A: natural cure, low modulus, to seal sheet membrane flashing to polyethylene face of sheet rubberized-asphalt barrier and to seal between and to non-bituminous sheet systems.
 - 1) Acceptable materials:
 - a) Dow 790
 - b) Pecora 864
 - 2) SPF (Sprayed Polyurethane Foam) Sealant: Provide one- or two-component, foamed-in-place, polyurethane foam sealant with the following characteristics:
 - a) Density: 1.5 to 2.0 PCF.
 - b) Flame Spread (ASTM E162): 25 or less.
 - c) Initial R-Value (at 1 inch): Not less than 7. Acceptable materials:
 - Zerodraft Foam Sealant.
 - Zerodraft Insulating Air SealantZerodraft (Division of Canam Building Envelope Specialists Inc.), 125 Traders Blvd. E., Unit # 4, Mississauga, ON, L4Z 2H3 Tel. 1-877-272-2626
 3. Substrate Cleaner: Non-corrosive type recommended by sealant manufacturer compatible with adjacent materials.

C. EQUIPMENT

1. The equipment used to spray the polyurethane foam material shall be in accordance with ULC S705.2-02 and the equipment manufacturer's recommendations for specific type of application.
2. Equipment settings are to be recorded on the Daily Work Record as required by the ULC S705.2-02 Installation standard.
3. Each proportioner unit to supply only one spray gun.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which air/vapor barrier systems will be applied, with Installer present, for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
 1. Do not proceed with installation until after minimum concrete curing period recommended by air/vapor barrier manufacturer.
 2. Ensure that:

- a. surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants
 - b. concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
 - c. masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.
3. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
 4. Notify Architect in writing of anticipated problems using air/vapor barrier over substrate.

3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air/vapor barrier application.
- B. Prime masonry, concrete substrates with conditioning primer when installing modified asphalt membrane transition membranes.
- C. Prime glass-fiber surfaced gypsum sheathing an adequate number of coats to achieve required bond to transition membranes, with adequate drying time between coats.
- D. Prime wood, metal, and painted substrates with primer recommended by membrane manufacturer.
- E. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air/vapor barrier and at protrusions according to air/vapor barrier manufacturer's written instructions and approved tested system in accordance with ABAA air barrier testing protocol.
 1. Verify that surfaces and conditions are suitable to accept work as outlined in this section.
 2. Prior to commencement of work report in writing to the architect, consultant, any defects in surfaces or conditions that may adversely affect the performance of products installed under this section.
 3. Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.
 4. Examine joints before sealing to ensure configurations, surfaces and widths are suitable for spray polyurethane foam. Report in writing all defects stating the locations of joints deemed unacceptable for the application of the spray polyurethane foam.

3.3 PREPARATION

- A. Protection:
 1. Mask and cover adjacent areas to protect from over spray.

2. Ensure any required foam stop or back up material are in place to prevent over spray and achieve complete seal.
3. Seal off existing ventilation equipment. Install temporary ducting and fans to ensure exhaust fumes. Provide for make-up air.
4. Erect barriers, isolate area and post warning signs to advise non-protected personnel to avoid the spray area.

B. Surface Preparation

1. Surfaces to receive foam insulation shall be clean, dry and properly fastened to ensure adhesion of the polyurethane foam to the substrate.
2. Ensure that all work by other trades that may penetrate through the air barrier system is in place and complete.
3. Ensure that surface preparation and any primers required conform to the manufacturer's instructions.
4. Prepare surfaces by brushing, scrubbing, scraping, or grinding to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion and integrity of the spray polyurethane foam. Wipe down metal surfaces to remove release agents or other non-compatible coatings, using clean sponges or rags soaked in a solvent compatible with the spray polyurethane foam. Ensure surfaces are dry before proceeding.
5. Install transition membranes to all applicable surfaces and ensure proper adhesion of the transition membranes to the substrate, capable of having spray polyurethane foam insulation.
6. Install counter-flashings
 - a. Metal: Mechanically fasten metal counter-flashings with screws at 8" (200 mm) o.c.
 - b. Membrane: Cut into and uncover only 3" of siliconized release paper along one edge of the counter-flashing membrane. Adhere membrane flashing to the pre-primed substrate a minimum of 3" and roll firmly in place.
7. Ensure veneer anchors are in place.

C. APPLICATION:

1. Spray-application of polyurethane foam shall be installed in accordance with ULC S705.2-02 and the manufacturer's instructions.
2. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer and the ULC S705.2 Installation standard.
3. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings. Passes shall be not less than 1/2 inch and not greater than 2 inches.
4. Do not install spray polyurethane foam within 3 inches of heat emitting devices such as light fixtures and chimneys.
5. Finished surface of foam insulation to be free of voids and embedded foreign objects.
6. Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.

7. Trim, as required, any excess thickness that would interfere with the application of cladding/covering system by other trades.
8. Clean and restore surfaces soiled or damaged by work of the section. Consult with section of work soiled before cleaning to ensure methods used will not damage the work.
9. Do not permit adjacent work to be damaged by work of this section. Damage to work of this section caused by other sections shall be repaired by this section at the expense of the subcontractor causing the damage.
10. Complete connections to other components or repair any gaps, holes or other damage using material which conforms to ULC S710.1 Polyurethane Sealant Foam – One Component – Material or ULC S711.1 Polyurethane Sealant Foam – Two Components – Material and shall be installed in accordance with ULC S710.2 Polyurethane Sealant Foam – One component – Installation or ULC S711.2 Polyurethane Sealant Foam – Two Component – Installation, whichever is appropriate.

D. FIELD QUALITY CONTROL

1. Site Tests
 - a. The Licensed Installer shall conduct daily visual inspection, adhesion/cohesion testing and density measurements as outlined by the ULC S705.2-02 Installation standard.
 - b. The Licensed Installer shall complete the Daily Work Record and record all information required including the results of the testing. The Daily Work Record shall be kept on site for routine inspection. Copies of the Daily Work Record shall be forwarded to the owner or owner's representative upon request. Copies of the Daily Work Record or monthly summaries shall be sent to the ABAA office on a monthly basis as required by the Quality Assurance Program.
 - c. Transition membranes shall be pull tested in accordance with the ABAA Quality Assurance Program requirements before installing the spray polyurethane air barrier material.
 - d. The costs incurred for daily testing and inspection by the Licensed Installer and the completion of the Daily Work Record shall be borne by the Licensed Contractor.
2. Inspection
 - a. Arrange for site inspections by ABAA. The cost of inspections shall be included in the bid provided by the Licensed Contractor.
 - b. The ABAA site-inspections shall verify conformance with the manufacturer's instructions, the standard ULC S705.2-02 Installation standard, the ABAA Quality Assurance Program, and this section of the project specification.
 - c. Inspections and testing shall be carried out at 5%, 50% and 95% of completion. A written inspection report shall be forwarded to the architect, the owner's representative, the Contractor, and the ABAA-licensed installer within 3 working days of the inspection and test being performed. In the case of any deficiencies, the ABAA-licensed inspector may verbally advise the licensed installer at the time of the inspection.

- d. If the inspection reveals any defects, the Licensed Contractor shall immediately rectify all such defects at his cost.

E. TOLERANCES

1. Maximum variation from indicated thickness: minus (-) ¼ inch; plus (+) ½ inch.

F. PROTECTION

1. Protect the spray polyurethane foam from ultraviolet radiation when installed on the exterior of a building.
2. Cover the spray polyurethane foam with a thermal barrier when installed on the interior of the building.

END OF SECTION 072110

SECTION 072119 - FOAMED-IN-PLACE INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Closed-cell spray polyurethane foam.
- 2. Open-cell spray polyurethane foam.

- B. Related Requirements:

- 1. Section 072100 "Thermal Insulation" for foam-plastic board insulation.
- 2. Section 075700 "Coated Foamed Roofing" for spray polyurethane foam insulation used for roofing applications.

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Evaluation Reports: For spray-applied polyurethane foam-plastic insulation, from ICC-ES.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 CLOSED-CELL SPRAY POLYURETHANE FOAM

- A. Closed-Cell Spray Polyurethane Foam: ASTM C 1029, Type II, minimum density of 1.5 lb/cu. ft. and minimum aged R-value at 1-inch (25.4-mm) thickness of 6.2 deg F x h x sq. ft./Btu at 75 deg F
1. Manufacturers: Subject to compliance with requirements, provide basis of design product “Demilec – Heatlok-XT with Blazelok TBX (intumescent paint)” or approved equivalent by one of the following:
 - a. BASF Corp. - Construction Chemicals.
 - b. CertainTeed Corporation.
 - c. Dow Chemical Company (The).
 - d. Gaco Western LLC.
 - e. Henry Company.
 - f. Icynene Inc.
 - g. Johns Manville; a Berkshire Hathaway company.
 - h. NCFI Polyurethanes; a division of Barnhardt Manufacturing Company.
 - i. SWD Urethane Company.
 - j. Volatile Free, Inc.
 2. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 or less.
 3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.2 OPEN-CELL SPRAY POLYURETHANE FOAM

- A. Open-Cell Spray Polyurethane Foam: Spray-applied polyurethane foam using water as a blowing agent. Minimum density of [0.4 lb/cu. ft. (6.4 kg/cu. m)] and minimum aged R-value at 1-inch (25.4-mm) thickness of 3.4 deg F x h x sq. ft./Btu at 75 deg F (24 K x sq. m/W at 24 deg C).
1. Manufacturers: Subject to compliance with requirements, provide basis of design products by “Demilec 3315 E. Division Street, Arlington, TX 76011, ph (817) 633-2000, www.demilec.com – or approved equivalent by one of the following:
 - a. BASF Corp. - Construction Chemicals.
 - b. CertainTeed Corporation.
 - c. Dow Chemical Company (The).
 - d. Gaco Western LLC.
 - e. Henry Company.
 - f. Icynene Inc.

- g. Johns Manville; a Berkshire Hathaway company.
 - h. NCFI Polyurethanes; a division of Barnhardt Manufacturing Company.
 - i. SWD Urethane Company.
 - j. Volatile Free, Inc.
2. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 or less.
3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.3 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by insulation manufacturer where required for adhesion of insulation to substrates.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify that substrates are clean, dry, and free of substances that are harmful to insulation.
- B. Priming: Prime substrates where recommended by insulation manufacturer. Apply primer to comply with insulation manufacturer's written instructions. Confine primers to areas to be insulated; do not allow spillage or migration onto adjoining surfaces.

3.2 INSTALLATION

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Spray insulation to envelop entire area to be insulated and fill voids.
- C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.
- D. Framed Construction: Install into cavities formed by framing members to achieve thickness indicated on Drawings.
- E. Cavity Walls: Install into cavities to fully fill void.
- F. Miscellaneous Voids: Apply according to manufacturer's written instructions.

3.3 PROTECTION

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

END OF SECTION 072119

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Building paper.
2. Building wrap.
3. Flexible flashing.
4. Drainage material.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.
- B. Shop Drawings: Show details of building **[paper]** **[wrap]** at terminations, openings, and penetrations. Show details of flexible flashing applications.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For **[water-resistive barrier]** **[and]** **[flexible flashing]**, from ICC-ES.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIER

- A. Building Paper: ASTM D 226, Type 1 (No. 15 asphalt-saturated organic felt), unperforated.
- B. Building Paper: Water-vapor-permeable, asphalt-saturated kraft building paper that complies with ICC-ES AC38, Grade D[; **except with water-resistance rating not less than 1 hour**].
- C. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Dorken Systems Inc.](#)
 - b. [Dow Chemical Company \(The\).](#)
 - c. [DuPont Safety & Construction.](#)
 - d. [Kingspan Insulation Limited.](#)
 - e. [Ludlow Coated Products.](#)
 - f. [Raven Industries, Inc.](#)
 - g. [Reemay, Inc.](#)
2. Water-Vapor Permeance: Not less than [**75 perms (4300 ng/Pa x s x sq. m)**] [**20 perms (1150 ng/Pa x s x sq. m)**] [**8 perms (460 ng/Pa x s x sq. m)**] <Insert value> per ASTM E 96/E 96M, Desiccant Method (Procedure A).
3. Air Permeance: Not more than **0.004 cfm/sq. ft. at 0.3-inch wg (0.02 L/s x sq. m at 75 Pa)** when tested according to ASTM E 2178.
4. Allowable UV Exposure Time: Not less than three months.
5. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

- D. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.2 FLEXIBLE FLASHING

- A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than [**0.025 inch (0.6 mm)**] [**0.030 inch (0.8 mm)**] [**0.040 inch (1.0 mm)**].

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [DuPont Safety & Construction.](#)
 - b. [GCP Applied Technologies Inc.](#)
 - c. [Protecto Wrap Company.](#)
 - d. [Raven Industries, Inc.](#)
2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

- B. Rubberized-Asphalt Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than [**0.025 inch (0.6 mm)**] [**0.030 inch (0.8 mm)**] [**0.040 inch (1.0 mm)**].

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Advanced Building Products Inc.](#)

- b. [Carlisle Coatings & Waterproofing Inc.](#)
- c. [Fiberweb, Clark Hammerbeam Corp.](#)
- d. [Fortifiber Building Systems Group.](#)
- e. [GCP Applied Technologies Inc.](#)
- f. [MFM Building Products Corp.](#)
- g. [Polyguard Products, Inc.](#)
- h. [Wire-Bond.](#)

2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

C. Primer for Flexible Flashing: Product recommended in writing by flexible flashing manufacturer for substrate.

D. Nails and Staples: Product recommended in writing by flexible flashing manufacturer and complying with ASTM F 1667.

2.3 DRAINAGE MATERIAL

A. Drainage Material: Product shall maintain a continuous open space between water-resistive barrier and exterior cladding to create a drainage plane and shall be used under [**siding**] [**portland cement plaster**] [**adhered masonry veneer**].

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

- a. [CavClear/Archovations, Inc.](#)
- b. [DuPont Safety & Construction.](#)
- c. [Insulfoam - a division of Carlisle Construction Materials Inc.](#)
- d. [Keene Building Products.](#)
- e. [Stuc-O-Flex International, Inc.](#)

2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.

B. Cover sheathing with water-resistive barrier as follows:

1. Cut back barrier **1/2 inch (13 mm)** on each side of the break in supporting members at expansion- or control-joint locations.
2. Apply barrier to cover vertical flashing with a minimum **4-inch (100-mm)** overlap unless otherwise indicated.

- C. Building Paper: Apply horizontally with a 2-inch (50-mm) overlap and a 6-inch (150-mm) end lap; fasten to sheathing with galvanized staples or roofing nails.
- D. Building Wrap: Comply with manufacturer's written instructions and warranty requirements.
 - 1. Seal seams, edges, fasteners, and penetrations with tape.
 - 2. Extend into jambs of openings and seal corners with tape.

3.2 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
 - 1. Prime substrates as recommended by flashing manufacturer.
 - 2. Lap seams and junctures with other materials at least 4 inches (100 mm) except that at flashing flanges of other construction, laps need not exceed flange width.
 - 3. Lap flashing over water-resistive barrier at bottom and sides of openings.
 - 4. Lap water-resistive barrier over flashing at heads of openings.
 - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

3.3 DRAINAGE MATERIAL INSTALLATION

- A. Install drainage material over building wrap and flashing to comply with manufacturer's written instructions.

END OF SECTION 072500

SECTION 073113 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Asphalt shingles.
- 2. Underlayment.

- B. Related Sections:

- 1. Section 061000 "Rough Carpentry" for wood framing.
- 2. Section 061600 "Sheathing" for roof sheathing.
- 3. Section 076200 "Sheet Metal Flashing and Trim" for metal roof penetration flashings, counterflashings and flashings.

1.3 DEFINITION

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 ACTION SUBMITTALS

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

- B. Samples for Initial Selection: For each type of asphalt shingle, ridge and hip cap shingles, ridge vent and exposed valley lining indicated.

- 1. Include similar Samples of trim and accessories involving color selection.

- C. Samples for Verification: For the following products, of sizes indicated, to verify color selected:

- 1. Asphalt Shingle: Full size.
- 2. Ridge and Hip Cap Shingles: Full size.
- 3. Ridge Vent: 12-inch- (300-mm-) long Sample.
- 4. Exposed Valley Lining: 12 inches (300 mm) square.
- 5. Self-Adhering Underlayment: 12 inches (300 mm) square.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for asphalt shingles.
- C. Research/Evaluation Reports: For each type of asphalt shingle required, from the ICC.
- D. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of asphalt shingle to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Asphalt Shingles: 100 sq. ft (9.3 sq. m) of each type, in unbroken bundles.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain ridge and hip cap shingles, ridge vents, felt underlayment and self-adhering sheet underlayment from single source from single manufacturer.
- C. Fire-Resistance Characteristics: Where indicated, provide asphalt shingles and related roofing materials identical to those of assemblies tested for fire resistance per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
 - 1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.
- D. 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 mockups for asphalt shingles including related roofing materials.
 - a. Size: 48 inches (1200 mm) long by 48 inches (1200 mm) wide.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated, weathertight location according to asphalt shingle manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install asphalt shingles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.11 WARRANTY

A. Special Warranty: Standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials within specified warranty period.

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

- a. Manufacturing defects.
- b. Structural failures including failure of asphalt shingles to self-seal after a reasonable time.

2. Material Warranty Period: 25 years from date of Substantial Completion, prorated, with first three years nonprorated.

3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds up to 130 mph for first 15 years from date of Substantial Completion.

4. Algae-Discoloration Warranty Period: Asphalt shingles will not discolor 10 years from date of Substantial Completion.

B. Special Project Warranty: Roofing Installer's Warranty signed by roofing Installer, covering the Work of this Section, in which roofing Installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Laminated-Strip Asphalt Shingles: ASTM D 3462, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide GAF Materials Corporation. Timberline UHDZ or comparable product by one of the following:
 - b. Owens Corning
 - c. Certainteed.
 2. Strip Size: Manufacturer's standard.
 3. Algae Resistance: Granules treated to resist algae discoloration.
 4. Color and Blends: Color: As selected by Architect from manufacture's complete range.
 5. Standards/Qualifications: ASTM D228, ASTM D3018 (Type 1), ASTM D3161 (Class F Wind Resistance), ASTM D3462, ASTM D7158 (Class H Wind Resistance), ASTM E108/UL790 (Class A Fire Resistance), Miami-Dade County Product Approval (12-0309.01).
- B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.2 UNDERLAYMENT MATERIALS

- A. Self-Adhering Sheet Underlayment, High Temperature: Minimum of 30- to 40-mil- (0.76- to 1.0-mm-) thick, slip-resisting, polyethylene-film-reinforced top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release paper backing; cold applied.
 1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
 2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
 3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle Coatings & Waterproofing, Inc.
 - b. Grace, W. R. & Co. - Conn.
 - c. Henry Company.

2.3 RIDGE VENTS

- A. Rigid Ridge Vent: Manufacturer's standard, rigid section high-density polypropylene or other UV-stabilized plastic ridge vent for use under ridge shingles.

2.4 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.

- B. Roofing Nails: ASTM F 1667; aluminum, stainless-steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum **0.120-inch- (3-mm-)** diameter, barbed shank, sharp-pointed, with a minimum **3/8-inch- (9.5-mm-)** diameter flat head and of sufficient length to penetrate **3/4 inch (19 mm)** into solid wood decking or extend at least **1/8 inch (3 mm)** through OSB or plywood sheathing.
 - 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.
- C. Felt Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, **1-inch (25-mm)** minimum diameter.

2.5 METAL FLASHING AND TRIM

- A. General: Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
 - 1. Sheet Metal: Stainless steel, Aluminum, mill finished.
- B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item.
 - 1. Apron Flashings: Fabricate with lower flange a minimum of 4 inches (100 mm) over and 4 inches (100 mm) beyond each side of downslope asphalt shingles and 6 inches (150 mm) up the vertical surface.
 - 2. Step Flashings: Fabricate with a headlap of 2 inches (50 mm) and a minimum extension of 4 inches (100 mm) over the underlying asphalt shingle and up the vertical surface.
 - 3. Cricket Flashings: Fabricate with concealed flange extending a minimum of 18 inches (450 mm) beneath upslope asphalt shingles and 6 inches (150 mm) beyond each side of chimney and 6 inches (150 mm) above the roof plane.
 - 4. Open-Valley Flashings: Fabricate in lengths not exceeding 10 feet (3 m) with 1-inch- (25-mm-) high, inverted-V profile at center of valley and equal flange widths of 10 inches (250 mm).
 - 5. Drip Edges: Fabricate in lengths not exceeding 10 feet (3 m) with 2-inch (50-mm) roof-deck flange and 1-1/2-inch (38-mm) fascia flange with 3/8-inch (9.6-mm) drip at lower edge.
- C. Vent Pipe Flashings: ASTM B 749, Type L51121, at least **1/16 inch (1.6 mm)** thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof, and extending at least **4 inches (100 mm)** from pipe onto roof.

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.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through asphalt shingles.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated below and/or on Drawings, lapped in direction to shed water. Lap sides not less than **3-1/2 inches (89 mm)**. Lap ends not less than **6 inches (150 mm)** staggered **24 inches (600 mm)** between courses. Roll laps with roller. Cover underlayment within seven days.
1. Eaves: Extend from edges of eaves **24 inches (600 mm)** beyond interior face of exterior wall.
 2. Rakes: Extend from edges of rake **24 inches (600 mm)** beyond interior face of exterior wall.
 3. Valleys: Extend from lowest to highest point **18 inches (450 mm)** on each side.
 4. Hips: Extend **18 inches (450 mm)** on each side.
 5. Ridges: Extend **36 inches (914 mm)** on each side without obstructing continuous ridge vent slot.
 6. Sidewalls: Extend beyond sidewall **18 inches (450 mm)**, and return vertically against sidewall not less than **4 inches (100 mm)**.
 7. Dormers, Chimneys, Skylights, and Other Roof-Penetrating Elements: Extend beyond penetrating element **18 inches (450 mm)**, and return vertically against penetrating element not less than **4 inches (100 mm)**.
 8. Roof Slope Transitions: Extend **18 inches (450 mm)** on each roof slope.
- C. Concealed, Valley Lining: Comply with NRCA's recommendations. Install a **36-inch- (914-mm-)** wide felt underlayment centered in valley. Fasten to roof deck with roofing nails.
1. Lap roof-deck felt underlayment over valley felt underlayment at least **6 inches (150 mm)**.
 2. Install a **36-inch- (914-mm-)** wide strip of granular-surfaced valley lining centered in valley, with granular-surface face up. Lap ends of strips at least **12 inches (300 mm)** in direction to shed water, and seal with asphalt roofing cement. Fasten to roof deck with roofing nails.
- D. Metal-Flushed, Open-Valley Underlayment: Install two layers of **36-inch- (914-mm-)** wide felt underlayment centered in valley. Stagger end laps between layers at least **72 inches (1830 mm)**. Lap ends of each layer at least **12 inches (300 mm)** in direction to shed water, and seal with asphalt roofing cement. Fasten each layer to roof deck with roofing nails.

1. Lap roof-deck felt underlayment over first layer of valley felt underlayment at least **6 inches (150 mm)**.

3.3 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
 1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.
- C. Step Flashings: Install with a headlap of **2 inches (50 mm)** and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.
- D. Cricket Flashings: Install against the roof-penetrating element extending concealed flange beneath upslope asphalt shingles and beyond each side.
- E. Open-Valley Flashings: Install centered in valleys, lapping ends at least **8 inches (200 mm)** in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.
 1. Secure hemmed flange edges into metal cleats spaced **12 inches (300 mm)** apart and fastened to roof deck.
 2. Adhere **9-inch- (225-mm-)** wide strip of self-adhering sheet to metal flanges and to self-adhering sheet underlayment.
- F. Rake Drip Edges: Install rake drip edge flashings over underlayment and fasten to roof deck.
- G. Eave Drip Edges: Install eave drip edge flashings below underlayment and fasten to roof sheathing.
- H. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.4 ASPHALT SHINGLE INSTALLATION

- A. General: Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip at least **7 inches (175 mm)** wide with self-sealing strip face up at roof edge.
 1. Extend asphalt shingles **3/4 inch (19 mm)** over fascia at eaves and rakes.
 2. Install starter strip along rake edge.

- C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- D. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- E. Install asphalt shingles by single-strip column or racking method, maintaining uniform exposure. Install full-length first course followed by cut second course, repeating alternating pattern in succeeding courses.
- F. Fasten asphalt shingle strips with a minimum of six roofing nails located according to manufacturer's written instructions.
 - 1. Where roof slope exceeds 20:12, seal asphalt shingles with asphalt roofing cement spots after fastening with additional roofing nails.
 - 2. Where roof slope is less than 4:12, seal asphalt shingles with asphalt roofing cement spots.
 - 3. When ambient temperature during installation is below 50 deg F (10 deg C), seal asphalt shingles with asphalt roofing cement spots.
- G. Woven Valleys: Extend succeeding asphalt shingle courses from both sides of valley 12 inches (300 mm) beyond center of valley, weaving intersecting shingle-strip courses over each other. Use one-piece shingle strips without joints in valley.
 - 1. Do not nail asphalt shingles within 6 inches (150 mm) of valley center.
- H. Closed-Cut Valleys: Extend asphalt shingle strips from one side of valley 12 inches (300 mm) beyond center of valley. Use one-piece shingle strips without joints in valley. Fasten with extra nail in upper end of shingle. Install asphalt shingle courses from other side of valley and cut back to a straight line 2 inches (50 mm) short of valley centerline. Trim upper concealed corners of cut-back shingle strips.
 - 1. Do not nail asphalt shingles within 6 inches (150 mm) of valley center.
 - 2. Set trimmed, concealed-corner asphalt shingles in a 3-inch- (75-mm-) wide bed of asphalt roofing cement.
- I. Open Valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips. Maintain uniform width of exposed open valley 1/8 inch in 12 inches (1:96) from highest to lowest point.
 - 1. Set valley edge of asphalt shingles in a 3-inch- (75-mm-) wide bed of asphalt roofing cement.
 - 2. Do not nail asphalt shingles to metal open-valley flashings.
- J. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.

- K. Ridge and Hip Cap Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.
 - 1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

END OF SECTION 073113

SECTION 074643.13 - ENGINEERED WOOD SIDING
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PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Engineered wood siding.
 - a. Panel and lap siding.
 - b. Trim and fascia.
 - c. Soffit.
2. Accessories.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood stud substrate support framing.
2. Section 061600 "Sheathing" for wall sheathing substrates.
3. Section 072100 "Thermal Insulation" for continuous insulation behind exterior cladding.
4. Section 072500 "Weather Barriers" for water-resistive barriers.
5. Section 079200 "Joint Sealants" for sealants at edges and transitions between composite composition siding system and exterior cladding.

1.2 DEFINITIONS

- A. Treated Engineered Wood: Engineered wood products manufactured for exterior use treated with manufacturer's proprietary process to resist fungal decay and termite damage.

1.3 COORDINATION

- A. Coordinate engineered wood siding installation with flashings, trim, and construction of other adjoining work to ensure proper sequencing, construction progress, and to provide a leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

- A. Coordinate with Section 013100 "Project Management and Coordination."

- B. Preinstallation Conference: Conduct conference at Project site.

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, to attend the meeting. Advise Architect of scheduled meeting dates and times a minimum of 14 days prior to meeting.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Schedule.
 - b. Responsibilities
 - c. Critical path items.
 - d. Submittals.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product and component included in engineered wood siding system. Include the following:
 1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product and accessory included in siding system.
 2. Installation methods, including nailing patterns.
 3. Siding manufacturer's requirements for products to be installed by others.
 4. Maintenance and periodic inspection recommendations.
- B. Shop Drawings: For engineered wood siding.
 1. Include plans, elevations, sections, and attachment details.
 2. Detail expansion joints, material joints, angle changes, flashings, and abutment to adjacent Work.
- C. Samples for Initial Selection: For engineered wood siding, including related accessories.
- D. Samples for Verification: For each type, color, texture, and pattern required.
 1. ~~6-inch-~~ (152-mm-) long Sample of engineered wood siding and trim.
- E. Sustainable Design Submittals:
 1. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.
 2. Environmental Product Declaration (EPD): For each product.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualifications: For Installer.
- B. Product Test Reports: For each product, APA tests performed by a qualified testing agency.
- C. Evaluation Reports: For engineered wood siding system, from ICC-ES in compliance with AC321.
- D. Sample warranties.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Installers trained by siding manufacturer.
- A. Panel to comply with HUD-UM-40c - HUD Building Product Standards and Certification Program for Plywood and Other Performance Rated Wood-Based Structural-Use Panels.

1.9 MOCKUPS

- A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall area as requested by architect/owner.
 - 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.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components and other manufactured items so as not to be damaged or deformed. Package components for protection during transportation and handling with manufacturer's name and identification of products.
- B. Unload, store, and erect components in a manner to prevent bending, warping, twisting, and surface damage. Maintain slip sheet until piece is being prepared for installation.
- C. Store components on flat surfaces clear of the ground. Store under roof or covered with suitable weathertight and ventilated covering, and in accordance with manufacturers' written instructions.

1.11 WARRANTY

- A. Manufacturer's Trim and Siding Limited Warranty: Manufacturer agrees to repair or replace components of engineered wood siding against substrate damage within specified warranty period.
 - 1. Substrate damage is defined as deterioration, buckling, and overlay issues caused by manufacturing defects or termite damage.
 - 2. Hail damage is defined as a crack or chip in the surface overlay, or product substrate dents exceeding **3/8 inch (10 mm)** in length or diameter and is caused by hail.

3. Limited Warranty Period: 50 years from date of installation and written to Owner on date of Substantial Completion.
- B. Manufacturer's Trim and Siding Prefinish Limited Warranty: Manufacturer agrees to repair or replace components of prefinished engineered wood siding against finish and substrate damage within specified warranty period.
1. Substrate damage is defined as deterioration, buckling, or overlay issues caused by manufacturing defects or termite damage.
 2. Hail damage is defined as cracks or chips in the surface overlay or dent in the substrate of the product that exceeds **3/8 inch (10 mm)** in length or diameter, and is caused by hail.
 3. Finish damage is defined as, under normal conditions and use, discoloring due to chalking, peeling, blisters, cracks; erosion to the extent of exposing the substrate; or yellowing or color fade change from light exposure not to exceed 5 Delta E CMC (2:1).
 4. Limited Warranty Period for Substrate: 50 years from date of installation and communicated to Owner on date of Substantial Completion.
 5. Limited Warranty Period for Finish: 15 years from date of installation and communicated to Owner on date of Substantial Completion.
- C. Manufacturer's Accessories and Non-Standard Applications Limited Warranty: Manufacturer agrees to repair or replace components of manufacturer's accessories and when used in approved non-standard applications against substrate and finish damage within specified warranty period.
1. Substrate damage is defined as deterioration, buckling, or overlay issues caused by manufacturing defects or termite damage.
 2. Hail damage is defined as cracks or chips in the surface overlay or dent in the substrate of the product that exceeds **3/8 inch (10 mm)** in length or diameter, and is caused by hail.
 3. Finish damage is defined as, under normal conditions and use, discoloring due to chalking, peeling, blisters, cracks; erosion to the extent of exposing the substrate; or yellowing or color fade change from light exposure not to exceed 5 Delta E CMC (2:1).
 4. Limited Warranty Period for Substrate and Finish: 10 years from date of installation and communicated to Owner on date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Provide components and materials specified in this Section from single manufacturer for a complete and compatible assembly.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide engineered wood siding system tested to APA PS2 and PRP 108, in compliance with **IBC Section 2308.9.3, Table 2308.9.3(5)**, and certified to be without permanent deformation or failure of structural members in accordance with design wind velocities for Project geographic location and probability of occurrence based on data from

wind velocity maps provided in ASCE 7 and as approved by authorities having jurisdiction (AHJ).

- B. Fire-Resistance Performance: Comply with ASTM E119 for testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency acceptable to AHJ.
 - 1. Surface-Burning Characteristics: Provide engineered wood siding system with a Class C flame-spread index of 76 to 200 or less and a smoke-developed index of 0 to 450 or less when tested in accordance with ASTM E84 and UL 723.
- C. Thermal Movement Performance: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.
- D. Certified Wood: Wood products to be labeled in accordance with the AF&PA's Sustainable Forestry Initiative, or be certified and labeled in accordance with the standards of the Programme for Endorsement of Forest Certification.
- E. Certified Wood: Wood products to be certified in accordance with the American Tree Farm System's "AFF Standard," the AF&PA's Sustainable Forestry Initiative, or the standards of the Programme for Endorsement of Forest Certification.
- F. Composite Wood Products: Products to be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or made with no added formaldehyde.
- G. Composite Wood Products: Products to be made without added urea formaldehyde.

2.3 ENGINEERED WOOD SIDING

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Trim & Siding or comparable product by one of the following:
 - 1. Allura.
 - 2. James Hardie.
- B. Treated Engineered Wood Lap Siding: Exterior-grade, resin-saturated, paper overlay laminated to EPA-registered zinc-borate-treated engineered wood siding. Exposed edges sealed for moisture resistance. Manufacturer's acrylic finish.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Lap Siding or comparable product.
 - 2. Thickness: to match existing/adjacent
 - 3. Width: to match existing/adjacent
 - 4. Length: 12 ft.
 - 5. Color: As selected by Architect from manufacturer's full range
 - 6. Texture: Cedar texture.

- C. Treated Engineered Wood Soffit: Exterior-grade, resin-saturated, paper overlay laminated to EPA-registered zinc-borate-treated engineered wood siding. Exposed edges beveled and sealed for moisture resistance. Manufacturer's acrylic finish.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Soffit or comparable product.
 2. Thickness: to match existing/adjacent
 3. Width: to match existing/adjacent
 4. Length: 8 ft.
 5. Edges: Square.
 6. Color: As selected by Architect from manufacturer's full range
 7. Texture: to match existing/adjacent
- D. Treated Engineered Wood Trim and Fascia: Provide manufacturer's standard trim,[fascia board,] angles, and similar components at corners, transitions, and rough openings meeting the performance requirements.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Trim & Fascia or comparable product.
 1. Thickness: to match existing/adjacent
 2. Width: to match existing/adjacent
 3. Length: 16 ft. (4.9 m).
 4. Edges: Square.
 5. Color: As selected by Architect from manufacturer's full range
 6. Texture: to match existing/adjacent
- E. Treated Engineered Wood Outside Corners: Exterior-grade, resin-saturated, paper overlay laminated to EPA-registered zinc-borate-treated engineered wood siding. Exposed edges sealed for moisture resistance. Manufacturer's acrylic primer finish.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Louisiana-Pacific Corporation; LP SmartSide Outside Corners or comparable product.
 2. Thickness: to match existing/adjacent
 3. Width: to match existing/adjacent
 4. Length: 10 ft. (3.0 m).
 5. Edges: Square.
 6. Color: As selected by Architect from manufacturer's full range
 7. Texture: to match existing/adjacent

2.4 ACCESSORIES

- A. Fasteners: Hot-dipped galvanized nails, with 0.092-inch (2.3-mm) diameter shank, in length required to penetrate [wood structural panels and]structural framing a minimum of 1-1/2 inches (38 mm), as recommended in writing by composite siding system manufacturer suitable for and compatible with system materials. Larger diameter fasteners may be required depending on wind pressure, wind speed, and wind exposure category limitations for structures in product approvals PR-N124 or ESR-1301.
- B. Sealant: ASTM C920, minimum Class 25 sealant.

- C. Water-Resistive Barrier: ASTM D226 or other approved water-resistive barrier.
- D. Air Barrier: ASTM E1677.
 - 1. Seam Tape: Air barrier manufacturer's standard product.
- E. Non-Compressible Drainable Housewrap:
 - 1. Non-compressible type with a minimum 40-mil (1-mm) drainage gap not reduced by force of fastening during siding installation.
 - 2. Drainable housewrap type that removes bulk water by creating a minimum 40-mil (1-mm) drainage gap (air gap) at individual measurement points between housewrap and back of siding.
- F. Flashing:
 - 1. Provide flashing at window and door heads and where indicated on Drawings. Refer to Division 07 for sheet metal flashing.
 - 2. Material: Aluminum.
 - a. Finish: Siliconized polyester coating.
 - b. Finish: High-performance organic finish.
 - c. Finish: Factory-prime coating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, engineered wood siding system supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that support members and anchorage have been installed within alignment tolerances required by engineered wood siding manufacturer.
 - 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by engineered wood siding manufacturer.
 - a. Verify that air and moisture barrier has been installed over sheathing substrate to prevent air infiltration and water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install engineered wood siding in accordance with manufacturer's written instructions in orientation, sizes, and locations indicated. Anchor engineered wood siding and other components of the Work securely in place.

1. Shim or otherwise plumb substrates receiving engineered wood siding system.
 2. Flash engineered wood siding at perimeter of all openings.
 3. Locate and space fastenings in uniform vertical and horizontal alignment.
 4. Seal engineered wood substrates exposed to weather to prevent moisture intrusion and water buildup.
 - a. Seal around penetrations.
 - b. Seal each exposed cut of siding and trim. It is not recommended to field spray-applied coatings on cuts.
 - c. Seal each butt joint from weather by covering with joint moldings, sealant, or factory prefinished ends.
 5. Install flashing and trim as engineered wood siding work proceeds.
 6. Align bottoms of engineered wood siding.
 7. Provide weathertight escutcheons for pipe- and conduit-penetrating engineered wood siding system.
- B. Metal Protection: Where dissimilar metal flashings contact each other or corrosive substrates, protect against galvanic action as recommended in writing by siding manufacturer.
- C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to achieve waterproof performance.
- E. Replace engineered wood siding components that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074643

SECTION 075423 - THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adhered thermoplastic polyolefin (TPO) roofing system.
2. Substrate board.
3. Roof insulation.
4. Cover board.
5. Walkways.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood framing, nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 061600 "Sheathing" for wood-based, structural-use roof deck panels.
3. Section 072100 "Thermal Insulation" for insulation beneath the roof deck.
4. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counter-flashings.
5. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.2 PREINSTALLATION MEETINGS

- ##### A. Preinstallation Conference: Conduct conference at Project site

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For insulation and roof system component fasteners, include copy of FM Approvals RoofNav listing.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane termination details.
3. Flashing details at penetrations.

C. Samples: For the following products:

1. Roof membrane and flashings, of color required.

D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Submit evidence of compliance with performance requirements.
2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

B. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

C. Research reports.

D. Field Test Reports:

1. Concrete internal relative humidity test reports.
2. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

E. Field quality-control reports.

F. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
- B. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
 - 1. Fire / Windstorm Classification: Class 1A-120
 - 2. Hail-Resistance Rating: SH.
- E. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.
 - 1. Wind Uplift Load Capacity: 120 psf.
- F. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low slope roof products.
- G. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class C; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- H. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- A. TPO Sheet: ASTM D6878/D6878M, internally fabric- or scrim-reinforced TPO sheet.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Tremco
 - b. GAF
 - c. Firestone Building Products
 - d. Carlisle SynTec Incorporated
 - 2. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.
 - 3. Thickness: 60 mils (1.5 mm) nominal.

4. Exposed Face Color: White.

2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
 1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as TPO sheet.
- C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- D. Bonding Adhesive: Manufacturer's standard.
- E. Slip Sheet: ASTM D2178/D2178M, Type IV; glass fiber; asphalt-impregnated felt.
- F. Slip Sheet: Manufacturer's standard, of thickness required for application.
- G. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- H. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 SUBSTRATE BOARDS

- A. Substrate Board: ASTM C1396/C1396M, Type X gypsum board.
 1. Thickness: 5/8 inch (16 mm).
- B. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M fiber-reinforced gypsum board.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [CertainTeed Corporation.](#)
 - b. [Georgia-Pacific Gypsum LLC.](#)
 - c. [National Gypsum Company.](#)
 - d. [USG Corporation.](#)
 2. Thickness: 1/4 inch (6 mm).
 3. Surface Finish: Factory primed.

Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.5 ROOF INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 2, Grade 2 or Grade 3, felt or glass-fiber mat facer on both major surfaces.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [Atlas Roofing Corp.](#)
 - b. [Firestone Building products](#)
 - c. [Insulfoam, Carlisle Construction](#)
 - d. [Johns Manville](#)
 2. Size: **48 by 48 inches** (1219 by 1219 mm)
 3. Thickness:
 - a. Base Layer: **1-1/2 inches** (38 mm)
 - b. Upper Layer: as indicated on drawings and details
- B. Tapered Insulation: Provide factory-tapered insulation boards.
1. Material: Match roof insulation
 2. Minimum Thickness: **1/4 inch** (6.35 mm).
 3. Slope:
 - a. Roof Field: **1/4 inch per foot** (1:48) unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: **1/2 inch per foot** (1:24) unless otherwise indicated on Drawings.

2.6 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M fiber-reinforced gypsum board.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [CertainTeed Corporation.](#)
 - b. [Georgia-Pacific Gypsum LLC.](#)
 - c. [National Gypsum Company.](#)
 - d. [USG Corporation.](#)
 2. Thickness: **1/4 inch** (6 mm).
 3. Surface Finish: Factory primed.

2.7 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch (5 mm) thick and acceptable to roofing system manufacturer.
 - 1. Size: Approximately 36 by 60 inches (914 by 1524 mm).
 - 2. Color: Contrasting with roof membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Perform fastener-pullout tests according to roof system manufacturer's written instructions.
 - 1. Submit test result within 24 hours after performing tests.
 - a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.
- D. Install sound-absorbing insulation strips according to acoustical roof deck manufacturer's written instructions.

3.3 INSTALLATION OF ROOFING, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.

3.4 INSTALLATION OF COVER BOARDS

- A. Install cover boards over existing membrane roofing with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of **6 inches (150 mm)** in each direction.
 - 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - 2. Cut and fit cover board tight to nailers, projections, and penetrations.
 - 3. Fasten cover board to resist specified uplift pressure at corners, perimeter, and field of roof.

3.5 INSTALLATION OF INSULATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Metal Decking:
 - 1. Install base layer of insulation with joints staggered not less than **24 inches (610 mm)**
 - a. Locate end joints over crests of decking.
 - b. Where installing composite and noncomposite insulation in two (2) or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than **1/4 inch (6 mm)** in width.
 - e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus **24 inches (610 mm)**.
 - 1) Trim insulation so that water flow is unrestricted.
 - f. Fill gaps exceeding **1/4 inch (6 mm)** with insulation.
 - g. Cut and fit insulation within **1/4 inch (6 mm)** of nailers, projections, and penetrations.
 - h. Loosely lay base layer of insulation units over substrate.
 - i. Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
 - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
 - 2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than **12 inches (305 mm)** from previous layer of insulation.
 - a. Staggered end joints within each layer not less than **24 inches (610 mm)** in adjacent rows.
 - b. Install with long joints continuous and with end joints staggered not less than **12 inches (305 mm)** in adjacent rows.

- c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
- d. Make joints between adjacent insulation boards not more than **1/4 inch (6 mm)** in width.
- e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus **24 inches (610 mm)**.
 - 1) Trim insulation so that water flow is unrestricted.
- f. Fill gaps exceeding **1/4 inch (6 mm)** with insulation.
- g. Cut and fit insulation within **1/4 inch (6 mm)** of nailers, projections, and penetrations.
- h. Loosely lay each layer of insulation units over substrate.
- i. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - 1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus **25 deg F (14 deg C)** of equiviscous temperature.
 - 2) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 3) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF ADHERED ROOF MEMBRANE

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. Start installation of roofing in presence of roofing system manufacturer's technical personnel and Owner's testing and inspection agency.
- D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- F. Hot Roofing Asphalt: Apply a solid mopping of hot roofing asphalt to substrate at temperature and rate required by manufacturer, and install fabric-backed roof membrane. Do not apply to splice area of roof membrane.
- G. Fabric-Backed Roof Membrane Adhesive: Apply to substrate at rate required by manufacturer, and install fabric-backed roof membrane.
- H. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.
- I. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- J. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- K. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.7 INSTALLATION OF BASE FLASHING

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.8 INSTALLATION OF WALKWAYS

- A. Flexible Walkways:
 1. Install flexible walkways at the following locations:
 - a. Perimeter of each rooftop unit.
 - b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 - c. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - d. Top and bottom of each roof access ladder.
 - e. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
 - f. Locations indicated on Drawings.
 - g. As required by roof membrane manufacturer's warranty requirements.
 2. Provide **6-inch (76-mm)** clearance between adjoining pads.
 3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Perform the following tests:

1. Electrical Capacitance/Impedance Testing: Testing agency shall survey entire roof area for entrapped water within roof assembly according to ASTM D 7954/D 7954M.
 - a. Perform tests before overlying construction is placed.
 - b. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - c. Testing agency shall prepare survey report indicating locations of entrapped moisture, if any.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

SECTION 076200 - FLASHING AND SHEET METAL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide all labor, equipment, and materials fabricate and install the following.

1. Fascia, scuppers, and trim.
2. Counterflashings over bituminous base flashing.
3. Counterflashings for roof accessories.
4. Counterflashings at roof mounted equipment and vent stacks.
5. Base flashing coverings.
6. Coping cap at parapets.
7. Gutters, scuppers and down spouts.
8. Counterflashings at walls and penetrations.
9. Lead flashing for bituminous membranes.
10. Other components.

- B. RELATED SECTIONS

1. Section 061000 - Rough Carpentry
2. Section 074113 – Metal Roof Panels
3. Section 077200 - Roof Accessories
4. Section 079200 - Joint Sealants

1.3 REFERENCES

ASTM A-446	Specification for steel sheet
ASTM B-209	Specification for aluminum sheet
ASTM B-221	Specification for aluminum extruded shape
FS QQ-L-201	Specification for Lead Sheet
ASTM A792	Steel Sheet, Aluminum-Zinc Alloy-Coated, by the Hot-Dip Process
ASTM B32	Solder Metal
ASTM B209	Aluminum and Alloy Sheet and Plate
ASTM B486	Paste Solder
ASTM D226	Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D486	Asphalt Roof Cement, Asbestos-free
FS O-F-506	Flux, Soldering, Paste and Liquid
WH	Warnock Hersey International, Inc. Middleton, WI.
FM	Loss Prevention Data Sheet
NRCA	National Roofing Contractors Association - Roofing Manual
SMACNA	Architectural Sheet Metal Manual

1.4 SUBMITTALS

- A. Submit under provisions of all technical performance criteria set forth in the specifications.
- B. Product Data: Provide manufacturer's specification data sheets for each product.
- C. Samples for Verification: For each type of exposed finish.
 - 1. Sheet Metal Flashing: 12 inches long by actual unit width, including finishes seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
 - 2. Scuppers, Downspouts, Coping caps, Unit-Type Accessories and Miscellaneous Materials: Full size sample in required finish.
- D. Shop Drawings
 - 1. For manufactured and shop fabricated gravel stops, fascia, scuppers, and all other sheet metal fabrications.
 - 2. Shop drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashing, termination's, and installation details.
 - 3. Indicate type, gauge and finish of metal.
- E. Certification
 - 1. Submit roof manufacturer's certification that metal fasteners furnished are acceptable to roof manufacturer.
 - 2. Submit roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.
 - 3. Submit certification that metal and fastening system furnished is Tested and Approved by Factory Mutual for I-90 Wind Up-Lift Requirements.
- F. Manufacturer's Product Data
 - 1. Metal material characteristics and installation recommendations.
 - 2. Submit color chart prior to material ordering and/or fabrication so that equivalent colors to those specified can be approved.
 - 3. Provide approval letters from metal manufacturer for use of their metal within this particular roofing system type.

1.5 QUALITY CONTROL

- A. Reference Standards
 - 1. Comply with details and recommendations of SMACNA for methods of joining, anchorage, provisions for expansion, etc.
 - 2. FM Approvals Listing: Copings and roof edge flashings as listed in FM Approval's "Roof Nav" and approved for windstorm classification Class 1-120.

B. Manufacturer's Warranty

1. Pre-finished metal material shall require a written 30-year non-prorated warranty covering fade, chalking and film integrity. The material shall not show a color change greater than 5 NBS color units per ASTM D-2244 or chalking excess of 8 units per ASTM D-659. If either occurs material shall be replaced per warranty, at no cost to the Owner.

C. Contractor's Warranty

1. The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of two years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.

1.6 QUALIFICATIONS

- A. Fabricator and Installer: Company specializing in sheet metal flashing work with five (5) years experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials which may cause discoloration or staining.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Metal system is to be comprised of minimum Aluminum or Galvalume steel, coated on both sides with an epoxy primer and on the weathering surface with a polyvinylidene fluoride or siliconized polyester baked organic coated finish.

1. Materials

- a. Aluminum-Zinc alloy Coated Steel

Aluminum-zinc alloy (galvalume) coated steel, ASTM A792, coating designation AZ-50, 16 gauge or .050 Aluminum; 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.

*Standard Kynar 500 finish coating is only accepted.

b. Colors shall be custom to match metal roof color.

B. Miscellaneous Metals and Flashings:

1. Zinc-Coated Steel Sheet: ASTM A526, 0.20% copper, 26 gage (0.0179"); designation G90 hot-dip galvanized, mill phosphatized.
2. Stainless Steel Sheet: Type 302/304, ASTM A167, 28 gage, (0.015"), annealed except dead soft where fully concealed by other work, 2D (dull) finish.
3. Copper Sheet: ASTM B370, 16 oz. (0.0216), temper H00 (cold-rolled).
4. Lead-Coated Copper Sheet: ASTM B101. Type I, Class A (12-15 1 lb. of lead coating per 100 sq. ft.), 17.1 oz. (0.022").
5. Zinc Alloy Sheet: Zinc with 0.6% copper and 0.14% titanium; 0.27" thick (21 gauge); standard (soft) temper, mil finish.

2.2 RELATED MATERIALS

A. Metal Primer: Zinc chromate type.

B. Plastic Cement: ASTM D 4586

C. Sealant: Specified in Section 07900 or on drawings.

D. Lead: Meets Federal Specification QQ-L-201, Grade B, four pounds per square foot.

E. Solder: ANSI/ASTM B32; 95/05 type.

F. Flux: FS O-F-506.

G. Underlayment: Self-Adhering, High Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene or polypropylene-film top surface laminated to a layer of butyl or SBS modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Acceptable Manufacturerers include:

1. Carlisle Construction materials
2. W.R. Grace & Co.
3. Henry Company
4. Owens Corning

H. Slip Sheet: Rosin sized building paper.

I. Fasteners:

1. Corrosion resistant screw fastener as recommended by metal manufacturer. Finish exposed fasteners same as flashing metal.
2. Fastening shall conform to Factory Mutual I-90 requirements or as stated on section details, whichever is more stringent.

J. Termination Bars:

1. Shall be aluminum unless otherwise recommended by membrane manufacturers.
2. Material shall be .125" x 1" (minimum) aluminum conforming to ASTM B-221, mill finish. Bar shall have caulk cup as required.

K. Gutter and Downspout Anchorage Devices: Type recommended by fabricator.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect contact areas of dissimilar metals with heavy asphalt or other approved coating, specifically made to stop electrolytic action.

3.2 GENERAL

- A. Install work watertight, without waves, warps, buckles, fastening stress, or distortion, allowing for expansion and contraction.
- B. Fastening of metal to walls and wood blocking shall comply with SMACNA Architectural Sheet Metal Manual, Factory Mutual I-90 wind uplift specifications and/or manufacturer's recommendations whichever is of the highest standard.
- C. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.
- D. Metal fascia and copings shall be secured to wood nailers at the bottom edge with a continuous cleat. Cleats shall be at least one gauge heavier than the metal it secures.

3.3 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets are in place, and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed, and secure.
- C. Beginning of installation means acceptance of existing conditions.
- D. Field measure site conditions prior to fabricating work.

3.4 MANUFACTURED SHEET METAL SYSTEMS

- A. Installing Contractor shall be responsible for determining if the sheet metal systems are in general conformance with roof manufacturer's recommendations.
- B. Furnish and install manufactured sheet metal systems in strict accordance with manufacturer's printed instructions.
- C. Provide all factory-fabricated accessories including, but not limited to, fascia extenders, miters, scuppers, joint covers, etc.

3.5 SHOP FABRICATED SHEET METAL

- A. Installing Contractor shall be responsible for determining if the sheet metal systems are in general conformance with roof manufacturer's recommendations.
- B. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.
- C. Hem exposed edges.
- D. Angle bottom edges of exposed vertical surfaces to form drip.
- E. All corners for sheet metal shall be lapped with adjoining pieces fastened and set in sealant.
- F. Joints for gravel stop fascia system, cap flashing, and surface-mount counterflashing shall be formed with a 1/4" opening between sections. The opening shall be covered by a cover plate or backed by an internal drainage plate formed to the profile of fascia piece. The cover plate shall be embedded in mastic, fastened through the opening between the sections and loose locked to the drip edges.
- G. Install sheet metal to comply with Architectural Sheet Metal manual, Sheet Metal and Air Conditioning Contractor's National Associations, Inc.

3.6 FLASHING MEMBRANE INSTALLATION

A. COPING CAP

- 1. Copings shall be provided with factory fabricated welded watertight coping accessories such as miters, transitions, end caps, etc. and finished to match coping system. No exposed fasteners will be accepted throughout the entire project.
- 2. Accessories: Joint covers, corners, supports, strip flashing at joinings, fastening, and other accessories shall be included.
- 3. Install continuous cleat fasten 6" O.C.
- 4. Install new coping cap hooked to continuous cleat.

B. SURFACE MOUNTED COUNTERFLASHING / COPING CAP

- 1. Copings shall be provided with factory fabricated welded watertight coping accessories such as miters, transitions, end caps, etc. and finished to match coping system. No exposed fasteners will be accepted throughout the entire project.
- 2. Accessories: Joint covers, corners, supports, strip flashing at joinings, fastening, and other accessories shall be included.
- 3. Install continuous cleat fasten 6" O.C.
- 4. Install new coping cap hooked to continuous cleat.

C. SURFACE MOUNTED COUNTERFLASHING

1. Counterflashing shall be provided with watertight accessories such as miters, transitions, end caps, etc. and finished to match counterflashing.
2. Accessories: Joint covers, corners, fasteners, strip flashing at joinings, fastening, and other accessories shall be included.
3. Apply butyl tape to wall behind flashing. Secure termination bar through flashing butyl tape and into wall.
4. Secure new counterflashing set on a butyl tape above flashing 8" O.C., caulk top of counterflashing.

D. REGLET MOUNTED COUNTERFLASHING

1. Reglet shall be provided with watertight accessories such as miters, transitions, end caps, etc. and finished to match.
2. Accessories: Joint covers, corners, fasteners, strip flashing at joinings, fastening, and other accessories shall be included.
3. Cut reglet in masonry one joint above flashing.
4. Apply butyl tape to wall behind flashing. Secure termination bar through flashing butyl tape and into wall.
5. Secure reglet counterflashing with expansion fasteners and caulk reglet opening.

E. ROOF DRAIN

1. Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.
2. Set lead/copper flashing (30" square minimum) in a 1/4" bed of mastic.
3. Install clamping ring and strainer assure all plies are under the clamping ring.

F. PLUMBING STACK

1. Prime flange and sleeve at a rate of 100 square feet per gallon and allow to dry.
2. Install properly sized sleeves in a 1/4" bed of elastomeric sealant.
3. Turn sleeve a minimum of 1" down inside of stack.
4. Caulk intersection of the membrane and flange with elastomeric sealant.

END OF SECTION 076200

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

- 1. Roof curbs.

- B. Related Sections include the following:

- 1. Division 5 Section "Metal Fabrications" for ladders and miscellaneous metal framing and supports.
- 2. Division 6 Section "Rough Carpentry" for roof sheathing, wood cants, and wood nailers.
- 3. Division 7 Section "Flashing and Sheet Metal" for shop- and field-fabricated metal flashing and counterflashing, scuppers, gutters and downspouts, fasciae, roof expansion-joint covers, valleys, and miscellaneous sheet metal trim and accessories.
- 4. Division 7 Sections for roofing accessories included as part of roofing Work.
- 5. Division 9 Sections for shop primers and field painting.
- 6. Division 13 Section "Metal Building Systems".
- 7. Division 23 Section "Power Ventilators" for power roof-mounted ventilators.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, materials, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other Work.
- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for roof accessories with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples in manufacturer's standard sizes, and of same thickness and material indicated for the Work. If finishes involve normal color or shade variations, include sample sets showing the full range of variations expected.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with the following:

1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

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. Roof Curbs and Equipment Supports:
 - a. Custom Curb, Inc.
 - b. Roof Products & Systems Corp.
 - c. ThyCurb, Inc.

2.2 MATERIALS, GENERAL

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M) for alclad alloy 3005H25 or alloy and temper required to suit forming operations, with mill finish, unless otherwise indicated.
- B. Extruded Aluminum: ASTM B 221 (ASTM B 221M) alloy 6063-T52 or alloy and temper required to suit structural and finish requirements, with mill finish, unless otherwise indicated.
- C. Galvanized Steel Sheet: ASTM A 653/A 653M with G90 (Z275) coating designation; commercial quality, unless otherwise indicated.
 1. Structural Quality: Grade 40 (Grade 275), where indicated or as required for strength.
- D. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M with Class AZ-50 (AZ-150) coating, structural quality, Grade 40 (Grade 275), or as required for strength.
- E. Insulation: Manufacturer's standard rigid or semirigid glass-fiber board of thickness indicated.
- F. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWWA C2; not less than 1-1/2 inches (38 mm) thick.
- G. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
 1. Where removing exterior exposed fasteners affords access to building, provide nonremovable fastener heads.
- H. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
- I. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coating.

- J. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- K. Elastomeric Sealant: Generic type recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25, and Uses NT, G, A, and, as applicable to joint substrates indicated, O.
- L. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.3 ROOF CURBS

- A. General: Provide roof curbs capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
- B. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.0747-inch- (1.9-mm-) thick, structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.

2.4 ROOF HATCHES

- A. General: Fabricate units to withstand 40-lbf/sq. ft. (1.9- kPa) external and 20-lbf/sq. ft. (0.95- kPa) internal loading pressure. Frame with minimum 9-inch- (225-mm-) high, integral-curb, double-wall construction with 1-1/2-inch (38- mm) insulation, formed cants and cap flashing (roofing counterflashing), with welded or sealed mechanical corner joints. Provide double-wall cover (lid) construction with 1- inch- (25-mm-) thick insulation core. Provide gasketing and equip with corrosion-resistant or hot-dip galvanized hardware including pintle hinges, hold-open devices, interior padlock hasps, and both interior and exterior latch handles.
- B. Type: Single-leaf personnel access.
 - 1. For Attic Access from stair tower: 36 by 36 inches equivalent to Bilco Model #E-20.
- C. Material: Galvanized steel sheet curbs and aluminum covers (lids).
- D. Sloping Roofs: Where slope or roof deck exceeds 1/4 inch per foot (1:48), fabricate hatch curbs with height tapered to match slope to level tops of units.
- E. Hatch Railing System: Fixed railing system meeting OSHA fall protection regulations.
 - 1. Equivalent to Bil-Guard Model #RL-L by Bilco.
 - 2. Locate at all hatches.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 GALVANIZED STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 - 1. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.
- B. High-Performance Organic Finish: Cleaned and primed with inhibitive primer and organic coating as specified below. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Fluoropolymer Three-Coat System: Manufacturer's standard three-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 621 for coil-coated sheets.
 - a. Color and Gloss: As selected by Architect from manufacturer's standard of colors.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written instructions. Coordinate installation of roof accessories with installation of roof deck, roof insulation, flashing, roofing membranes, penetrations, equipment, and other construction involving roof accessories to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.
- B. Install roof accessory items according to construction details of NRCA's "Roofing and Waterproofing Manual," unless otherwise indicated,
- C. Separation: Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
- D. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.

- E. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counterflashing). Seal overlap with thick bead of mastic sealant.
- F. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.
- G. Heat-and-Smoke Vents: Locate, install, and test according to NFPA 204M.

3.2 CLEANING AND PROTECTION

- A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION 077200

SECTION 078413 - FIRE PROTECTION, HVAC & PLUMBING PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section includes:
 - 1. Through-penetration firestopping in fire rated construction.
 - 2. Through-penetration smoke-stopping in smoke partitions.

1.2 REFERENCES

- A. Underwriters Laboratories
 - 1. UL Fire Resistance Directory
 - a. Through-penetration firestop devices (XHCR)
 - b. Fire resistance rating (BXUV)
 - c. Through-penetration firestop systems (XHEZ)
 - d. Fill, void, or cavity material (XHHW)
- B. American Society for Testing and Materials Standards:
 - 1. ASTM E 814-88: Standard Test Method for Fire Tests of Through-Penetration Firestops.

1.3 DEFINITIONS

- A. Assembly: Particular arrangement of materials specific to given type of construction described or detailed in referenced documents.
- B. Barriers: Time-rated fire walls, smoke barrier walls, time-rated ceiling/floor assemblies and structural floors.
- C. Firestopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire, gasses and smoke.
- D. Penetration: Opening or foreign material passing through or into barrier or structural floor such that full thickness of rated materials is not obtained.
- E. System: Specific products and applications, classified and numbered by Underwriters Laboratories, Inc. to close specific barrier penetrations.
- F. Sleeve: Metal fabrication or pipe section extended through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in other sections and may or may not be required.

1.4 SYSTEM DESCRIPTION

- A. Design Requirements
 - 1. Fire-rated construction: Maintain barrier and structural floor fire resistance ratings including resistance to cold smoke at all penetrations.
 - 2. Smoke barrier construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations.

1.5 SUBMITTALS

- A. Submit in accordance with Division 01 Section *Submittal Procedures*, unless otherwise indicated.
- B. Product data: Manufacturer's specifications and technical data including the following:
 - 1. Detailed specification of construction and fabrication.
 - 2. Manufacturer's installation instructions.
- C. Shop drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.
 - 1. Details of each proposed assembly identifying intended products and applicable UL system number, or UL classified devices.
 - 2. Manufacturer or manufacturer's representative shall provide qualified engineering judgment and drawings relating to non-standard applications as needed.
- D. Quality control submittals:
 - 1. Statement of qualifications.
- E. Applicators' qualifications statement:
 - 1. List past projects indicating required experience.

1.6 QUALITY ASSURANCE

- A. Installer's qualifications: Fire experienced in installation or application of systems similar in complexity to those required for this project, plus the following:
 - 1. Acceptable to or licensed by manufacturer, State or local authority where applicable.
 - 2. At least two (2) years experience with systems.
 - 3. Successfully completed at least five (5) comparable scale projects using this system.
- B. Local and State regulatory requirements: Submit forms or acceptance for proposed assemblies not conforming to specific UL Firestop System numbers, or UL classified

devices.

- C. Materials shall have been tested to provide fire rating at least equal to that of the construction.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping:

1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Coordinate delivery with scheduled installation date, allow minimum storage at site.

- B. Storage and protection: Store materials in a clean, dry, ventilated location. Protect from soiling, abuse, moisture and freezing when required. Follow manufacturer's instructions.

1.8 PROJECT CONDITIONS

A. Existing condition:

1. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
2. Proceed with installation only after penetrations of the substrate and supporting brackets have been installed.

B. Environmental requirements:

1. Furnish adequate ventilation if using solvent.
2. Furnish forced air ventilation during installation if required by manufacturer.
3. Keep flammable materials away from sparks or flame.
4. Provide masking and drop cloths to prevent contamination of adjacent surfaces by firestopping materials.

1.9 WARRANTY

- A. Submit copies of written warranty agreeing to repair or replace joint sealers which fail in joint adhesion, extrusion resistance, migration resistance, or general durability or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated. The warranty period shall be two (2) years from date of substantial completion unless otherwise noted.

PART 2 - PRODUCTS

2.1 THROUGH-PENETRATION FIRESTOPPING OF FIRE-RATED CONSTRUCTION

- A. Systems of devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall applications. Systems or devices must be asbestos-free.

1. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the UL system or device, and designed to perform this function.
2. Acceptable manufacturers and products.
 - a. Those listed in the UL Fire Resistance directory for the UL System involved and as further defined in the System and Applications Schedule in Part 3.6 of this section.
3. All firestopping products must be from a single manufacturer. All trades shall use products from the same manufacturer unless otherwise noted.

2.2 SMOKE-STOPPING AT SMOKE PARTITIONS

- A. Through-penetration smoke-stopping: Any system complying with the requirements for through-penetration firestopping in fire-rated construction, as specified in The Systems and Applications Schedule in Part 3.6 of this section, is acceptable, provided that the system includes the specified smoke seal or will provide a smoke seal. The length of time of the fire resistance may be disregarded.

2.3 ACCESSORIES

- A. Fill, void or cavity materials: As classified under category XHHW in the UL Fire Resistance Directory.
- B. Forming materials: As classified under category XHKU in the UL Fire Resistance Directory.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 1. Verify barrier penetrations are properly sized and in suitable condition for application of materials.
 2. Do not proceed until unsatisfactory conditions have been corrected.
- B. Coordinate an inspection of all Mechanical Firestopping systems with the Fire Marshal prior to installation of ceilings, walls, etc.

3.2 PREPARATION

- A. Clean surfaces to be in contact with penetration seal materials of dirt, grease, oil, loose materials, rust, or other substances that may affect proper fitting, adhesion, or the required fire resistance.

3.3 INSTALLATION

- A. Install penetration seal materials in accordance with printed instructions of the UL Fire Resistance Directory and in accordance with manufacturer's instruction.
- B. Seal holes or voids made by penetrations to ensure an effective smoke barrier.
- C. Protect materials from damage on surfaces subject to traffic.
- D. When large openings are created in walls or floors to permit installation of pipes, ducts, or other items, close unused portions of opening with firestopping materials tested for the application. See UL Fire Resistance Directory or Section 3.6 of this document.
- E. Install smoke stopping as specified for firestopping.

3.4 FIELD QUALITY CONTROL

- A. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Perform under this section patching and repairing of firestopping caused by cutting or penetration by other trades.

3.5 ADJUSTING AND CLEANING

- A. Clean up spills of liquid components.
- B. Neatly cut and trim materials as required.
- C. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

3.6 SYSTEMS AND APPLICATION SCHEDULES*

PENETRATING ITEM	CONCRETE	GYPSUM	WOOD FLOOR/CEILING
Metal Pipe	CAJ1001 CP25S/L, CP25N/S	WL1001 CP 25	FC1002 CP 25
	CAJ1006 CS-195+, FS-195+	WL1002 FS-195+	FC1003
	CAJ1007 FS-195+, 1-inch& 2-inch Wide	WL1003 CP 25WB+,CP 25N/S	2000,2000+,20003
	CAJ1009 2000, 2000+, 2003	WL1008 2000+	FC1006 CP 25WB+
	CAJ1010 2000, 2000+, 2003	WL1009 2000+	
	CAJ1012 2000, 2000+, 2003	WL1010 2000+	
	CAJ1013 2000, 2000+, 2003	WL1016 CP 25WB+	
	CAJ1014 2000, 2000+, 2003	WL1017 CP 25WB+,CP	
	CAJ1015 2000, 2000+, 2003	25N/S	
	CAJ1017 FD 150	WL1032 CP 25WB+,CP	
	CAJ1021 FD 150	25N/S	
	CAJ1027 MPS-2+	WL1036 FD 150	
	CAJ1044 CP 25WB+	WL1037 CS-195+,FS-	
	CAJ1052 CP 25S/L, CP	195+	
	25N/S	WL1067 CP 25N/S	
	CAJ1058 2000, 2000+, 2003	WL1073 CP 25WB+	
	CAJ1060 2000, 2000+, 2003	WL1080 MPS2+	
	CAJ1063 2000, 2000+, 2003	WL1082 2000+	
	CAJ1066 CP 25N/S,CP		
	25S/L, CP 25WB+		
	CAJ1091 CP 25N/S,CP		
	25S/L, CP 25WB+		
	CAJ1092 CP 25WB+		
	CAJ1112 FS-195+		
	CAJ1160 CP 25S/L, CP		
	25N/S		
	CAJ1175 CP 25WB+		
	CAJ1176 CP 25WB+		
	CAJ1188 2000+		
	CBJ1020 CS-195+, FS-195+		
	CBJ1021 CS-195+, MPS-2+		
	CBJ1031 2001		
CBJ1032 2001			
FA1002 CP 25WB+			
WJ1010 CP25WB+			
WJ1023 2001			

Non-Metallic	CAJ2001 FS-195+, 1-inch & 2-inch WIDE, PPD'S CAJ2002 FS-195+ CAJ2003 CS-195+, FS- 195+ CAJ2005 FS-195 CAJ2006 FS-195+ CAJ2013 FS-195+ CAJ2019 2000, 2000+, 2003 CAJ2027 FS-195+, CP 25N/S, CP 25S/L, CP 25WB+ CAJ2028 FS-195, MPS-2+ CAJ2029 FS-195+, PPD'S CAJ2030 CS-195+, FS- 195+ CAJ2040 FS-195+, CP 25WB+ CAJ2044 FS-195+, CP 25N/S, CP 25S/L CP 25 WB+ CAJ2090 FS-195+ CAJ2177 FS-195+, PPD'S FA2001 FS-195+, PPD'S FS2002 CS-195+, FS-195+, MPS-2+, PPD'S FA2011 FS-195+ WJ2012 FS-195+ 1-inch WIDE	WL2002 FS-195+, PPD'S WL2003 FS-195+ WL2004 FS-195+ WL2005 FS-195+ 4' WIDE WL2006 FS-195+ WL2013 FS-195+ WL2031 CS-195+, FS- 195+ WL2032 CS-195+, FS- 195+ WL2033 FS-195+ WL2073 FS-195+ 1- inch WIDE	FC2002 FS-195+, PPD'S FC2007 FS-195+, PPD'S FC2008 FS-195+ FC2009 FS-195+, PPD'S FC2024 FS-195 FC2026 FS-195+ FC2028 FS-195, 1' & 2-inch WIDE, PPD'S
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<p>Insulated Metallic Pipe</p>	<p>CAJ5001 CP 25N/S, CP 25S/L, CP 25WB+ CAJ5002 FS-195+ CAJ5003 FS-195+ CAJ5005 MPS-2+ CAJ5009 2000+, 2003 CAJ5017 FS-195+, CP 25 CAJ5022 FS-195+ CAJ5024 FS-195+ CAJ5030 CS-195+, FS- 195+ CAJ5041 2000, 2000+, 2003 CAJ5060 CP 25WB+ CAJ5074 2000+ CBJ5002 CP 25 CBJ5003 FS-195+ FA5001 FS-195+, CP 25WB+</p>	<p>WL5001 FS-195+ WL5002 FS-195+ WL5009 FS-195+ WL5010 FS-195+ WL5011 CP 25WB+ WL5032 2000+ WL5038 CP 25WB+ WL5039 CP 25WB+ WL5040 CP 25WB+ WL5045 CP 25WB+ WL5053 2000+</p>	<p>FC5002 FS-195+ FC5008 FS-195+</p>
<p>Misc. Mechanical HVAC Ducts</p>	<p>CAJ7001 CP 25N/S CP 25S/L CAJ7003 CP 25WB+ CAJ7009 DUCT WRAP, BULK PUTTY</p>		<p>FC7001 CP 25S/L, CP 25N/S</p>
<p>Mixed Penetrating Items Combos</p>	<p>CAJ8001 CS-195+ FS-195 CAJ8003 2000, 2000+, 20003 CAJ8004 2000, 2000+, 20003 CAJ8006 2001 CAJ8013 FS-195+, CP 25 CBJ8004 CS-195, FS-195+ CBJ8005 CS-195+, MPS-2+ CBJ8008 2001 FA8001 FS-195+, CP 25WB+</p>	<p>WL8002 CS-195+, FS- 195+</p>	

* Underwriter's Laboratories, Inc., Fire Resistance Directory.

END OF SECTION 078413

SECTION 078425 – SPLASH BLOCKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:
 - 1. Furnishing and installation of Splash Blocks at downspouts, condensate outlets and other locations called for in Mechanical, Architectural and Civil documents.

1.3 SUBMITTALS

- A. Product Data: Submit applicable reference standards, performance data, and application recommendations and limitations.
- B. Shop Drawings: Submit product components in assembly.
- C. Quality Control Submittals:
 - 1. Manufacturer's installation instructions.
 - 2. Random freeze thaw test shall be conducted by the manufacturer. Test specimens shall retain 60 percent of its initial modulus of elasticity after 300 cycles. Furnish test results to the Owner upon request.
- D. Contract Closeout Submittals:
 - 1. Warranty.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Pack and ship to avoid damage according to manufacturer's recommendations:
- B. Do not accept or install damaged products at the site.

1.5 PROJECT CONDITIONS

- A. Environmental Requirements: Do not install until all grading work is completed.

1.6 WARRANTY

- A. Provide manufacturer's written warranty that products not in accordance with requirements of Contract Documents within five (5) years after commencement of warranties shall be corrected promptly after receipt of written notice from Owner.

PART 2 - PRODUCTS

2.1 SPLASH BLOCKS

- A. Splash Blocks: Pre-cast concrete, minimum size 8 inches by 16 inches by 2-1/2 inches with preformed directional channel.

2.2 MATERIALS

- A. Precast Concrete: Normal weight, air entrained concrete. Air content shall be 6 percent by volume within an allowable tolerance of plus or minus 1.5 percent.

- 1. Minimum Compressive Strength for Splash Blocks: 4000 psi.

- B. Bar Reinforcement: ASTM A 615, Grade 60, deformed.

2.3 FABRICATION

- A. Splash blocks shall be cast at the manufacturer's plant, not at the job site. Castings shall have plane smooth surfaces, true to line and face, free from defects and sharp arises. Overall dimensions for castings shall not vary more than 1/16 inch from those indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set splash blocks true to line and grade.

END OF SECTION 078425

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes sealants for the following locations:
 - 1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:
 - a. Control and expansion joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Perimeter joints between materials listed above and frames of doors and windows.
 - d. Joints between dissimilar materials.
 - e. Other joints as indicated.
 - f. Joints between curtain wall and storefront frame and dissimilar materials.
 - 2. Exterior joints in horizontal traffic surfaces as indicated below:
 - a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
 - b. Joints between dissimilar materials.
 - c. Other joints as indicated.
 - 3. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Tile control and expansion joints.
 - d. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
 - e. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - f. Perimeter joints of toilet fixtures.
 - g. Joints between dissimilar materials.
 - h. Joints where acoustical sealant is called for under Wall Type General Notes on drawings.
 - i. Other joints as indicated.
 - j. Joints between curtain wall frame and dissimilar materials.
 - 4. Interior joints in horizontal traffic surfaces as indicated below:
 - a. Control and expansion joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile and terrazzo flooring.
 - c. Joints between dissimilar materials.
 - d. Other joints as indicated.
 - 5. Fire Resistant Sealers

B. Related Sections include the following:

1. Division 7 Section "Flashing and Sheet Metal" for sealing joints related to flashing and sheet metal for roofing.
2. Division 7 Section "Firestopping" for through-penetration firestopping systems.
3. Division 8 "Glazing" for sealants used in glazing.
4. Division 9 Section "Tile" for sealing tile joints.

1.3 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.
- B. Provide joint sealants for interior applications that have been produced and installed to establish and maintain airtight continuous seals that are water resistant and cause no staining or deterioration of joint substrates.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data from manufacturers for each joint sealant product required.
- C. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing standard range of colors available, for each product exposed to view.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.
- B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.
- C. Field-Constructed Mock-Ups: Prior to installation of joint sealants, apply elastomeric sealants as follows to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution:
 1. Joints in field-constructed mock-ups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants specified in this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
 - 2. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F (4.4 deg C).
 - 3. When joint substrates are wet.
- B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 SEQUENCING AND SCHEDULING

- A. Sequence installation of joint sealants to occur not less than twenty-one (21) nor more than thirty (30) days after completion of waterproofing, unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors: Provide color of exposed joint sealants to comply with the following:
 - 1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated. Color selection must provide equivalent to match adjacent materials.

2.2 ELASTOMERIC JOINT SEALANTS (Interior & Exterior Vertical & Horizontal Joints)

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and including those requirements referencing ASTM C920 classifications for Type, Grade, Class and Uses.
- B. Base polymer must be silicone.
- C. Available Products: Subject to compliance with requirements, chemically curing elastomeric sealants that may be incorporated in the Work include, but are not limited to, the following:

<u>Substrate/Detail</u>	<u>Dow Corning Product</u>
Brick to Window Frame	Solvent Wipe Dow Corning 1200 primer to brick substrates Dow Corning 795
Brick to Brick	Solvent Wipe (non-alcohol type) Dow Corning 790
	OR
	Dow Corning 1200 Primer Dow Corning 795
Brick to Precast/Concrete	Solvent Wipe (non-alcohol type) Dow Corning 790
	OR
	Solvent Wipe Dow Corning 1200 Primer Dow Corning 795
Metal to Metal	As recommended by sealant manufacturer.

2.3 LATEX JOINT SEALANTS (Interior Joints in Vertical & Horizontal Surfaces)

- A. General: Provide manufacturer's standard one-part, nonsag, mildew-resistant, paintable latex sealant of formulation indicated that is recommended for exposed applications on interior and protected exterior locations and that accommodates indicated percentage change in joint width existing at time of installation without failing either adhesively or cohesively.
- B. Acrylic-Emulsion Sealant: Provide product complying with ASTM C 834 that accommodates joint movement of not more than 5 percent in both extension and compression for a total of 10 percent.
- C. Silicone Emulsion Sealant: Provide product complying with ASTM C 834 and, except for weight loss measured per ASTM C 792, with ASTM C 920 that accommodates joint movement of not more than 25 percent in both extension and compression for a total of 10 percent.
- D. Available Products: Subject to compliance with requirements, latex joint sealants that may be incorporated in the Work include, but are not limited to, the following:
 1. Acrylic-Emulsion Sealant:
 - a. "AC-20", Pecora Corp.
 - b. "Sonolac", Sonneborn Building Products Div., ChemRex, Inc.
 - c. "Tremco Acrylic Latex 834", Tremco, Inc.
 2. Silicone-Emulsion Sealant:
 - a. "Trade Mate Paintable Glazing Sealant", Dow Corning Corp.

2.4 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following requirements:
 - 1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E 90.
 - 2. Product has flame spread and smoke developed ratings of less than 25 per ASTM E 84.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.
- C. Available Products: Subject to compliance with requirements, acoustical joint sealants that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Acoustical Sealant:
 - a. "SHEETROCK Acoustical Sealant", United States Gypsum Co.
 - b. "AC-20 FTR Acoustical and Insulation Sealant", Pecora Corp.
 - 2. Acoustical Sealant for Concealed Joints:
 - a. "BA-98", Pecora Corp.
 - b. "Tremco Acoustical Sealant", Tremco, Inc.

2.5 TAPE SEALANTS

- A. Tape Sealant: Manufacturer's standard, solvent-free, butyl-based tape sealant with a solids content of 100 percent formulated to be nonstaining, paintable, and nonmigrating in contact with nonporous surfaces with or without reinforcement thread to prevent stretch and packaged on rolls with a release paper on one side.
- B. Available Products: Subject to compliance with requirements, tape sealants that may be incorporated in the Work include, but are not limited to, the following:
 - 1. "Extru-Seal Tape", Pecora Corp.
 - 2. "Shim-Seal Tape", Pecora Corp.
 - 3. "PTI 606", Protective Treatments, Inc.
 - 4. "Tremco 440 Tape", Tremco, Inc.
 - 5. "MBT-35", Tremco, Inc.

2.6 JOINT-SEALANT BACKING

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

- B. Plastic Foam Joint Fillers: Preformed compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
 - 1. Open-cell polyurethane foam.
 - 2. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.
 - 3. Proprietary, reticulated, closed-cell polymeric foam, nonoutgassing, with a density of 2.5 pcf and tensile strength of 35 psi per ASTM D 1623, and with water absorption less than 0.02 gms/cc per ASTM C 1083.
 - 4. Equivalent to Nomaco's "Sof Rod".
- C. Elastomeric Tubing Joint Fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, capable of remaining resilient at temperatures down to -26 deg F (-32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- D. 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 where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.7 FIRE RESISTANT SEALERS

- A. General: Provide manufacturer's standard fire stopping sealant with accessory materials, having fire-resistant ratings indicated as established, by the testing agency acceptable to authorities having jurisdiction.
 - 1. Fire safing insulation to be used as a sealant back-up is specified in another Division 7 section.
- B. Foamed in Place Fire Stopping Sealant: Two-part, foamed-in-place, silicone sealant formulated for use in a through penetration fire stop system for filling openings around cables, conduit, pipes, and similar penetrations through walls and floors.
- C. Products: Subject to compliance with the requirements, provide one of the following:
 - 1. Dow Corning Fire Stop Foam.
 - 2. Pensil 851, General Electric.

2.8 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 with 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 joint-sealant performance. Do not proceed with installation of joint sealants until 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 concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 3. Remove laitance and form-release agents from concrete.
 4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by 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 printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint

sealants as applicable to materials, applications, and conditions indicated.

- C. Latex Sealant Standard: Comply with recommendations of ASTM C90 for use of latex sealants.
- D. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- E. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
 - 1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 2. Do not leave gaps between ends of joint fillers.
 - 3. Do not stretch, twist, puncture, or tear joint fillers.
 - 4. Remove absorbent joint fillers that have become wet before sealant application and replace them with dry material.
 - 5. Install bond-breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
- F. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.
- G. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
 - 1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - 2. Provide flush joint configuration, per Figure 5B in ASTM C 1193, where indicated.
 - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.
 - 3. Provide recessed joint configuration, per Figure 5C in ASTM C1193, of recess depth and at locations indicated.
- H. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, and to comply with sealant manufacturer's directions for installation methods, materials, and tools that produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.

3.4 FOAMED IN PLACE FIRE STOPPING SEALANT

- A. Install continuously around piping, conduit, wiring, joists, columns, etc. at penetrations through corridor partitions and fire rated partitions, walls, floors, and ceilings.

- B. Provide fire rating required at penetrations through fire rated partitions, walls, and ceilings. Minimum fire rating shall be equal to the rating of the wall.
- C. Install around irregularly shaped component passing through partitions, walls and ceilings requiring sealants where other sealant types will not adequately fill area.

3.5 CLEANING

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

3.6 PROTECTION

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

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 08 Section "Flush Wood Doors".
3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
4. Division 08 Section "Door Hardware".
5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ANSI/BHMA A156.15 - Hardware Preparation in Steel Doors and Frames.
10. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
11. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
12. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
13. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
14. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
15. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Include the following:
 - 1. Elevations of each door design.
 - 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of anchorages, joints, field splices, and connections.
 - 6. Details of accessories.
 - 7. Details of moldings, removable stops, and glazing.
 - 8. Details of conduit and preparations for power, signal, and control systems.
- D. Samples for Verification:
 - 1. Samples are only required by request of the architect and for manufactures that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C.
 - 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
 - 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
 - 3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review

proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two (2) removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate installation of anchorages 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.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CECO Door Products.
 - 2. Curries Company.
 - 3. Amweld Building Products, LLC.
 - 4. Benchmark; a division of Therma-Tru Corporation.
 - 5. Kewanee Corporation (The).
 - 6. Mesker Openings Group; A Division of Dormakaba
 - 7. Pioneer Industries, Inc.
 - 8. Steelcraft; an Ingersoll-Rand company.
 - 9. Windsor Republic Doors.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
- B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 - 1. Design: Flush panel.
 - 2. Core Construction: Manufacturer's standard polyurethane. Where indicated, provide doors fabricated as thermal-rated assemblies with a minimum R-value 11 or better.
 - 3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.
 - 4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
 - 5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
 - 6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- C. Manufacturers Basis of Design:
 - 1. CECO Door Products Legion Series.

2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
 - 3. Frames for Steel Doors: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
 - 4. Manufacturers Basis of Design:

- a. CECO Door Products SQ/SU/SR Series.
- C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
- 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
 - 3. Frames for Wood Doors: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
 - 4. Frames for Borrowed Lights: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
 - 5. Manufacturers Basis of Design:
 - a. CECO Door Products SQ/SU/SR Series (Masonry Profile).
- D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.
- 2.5 FRAME ANCHORS
- A. Jamb Anchors:
- 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
- B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.
- C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.
- 2.6 ACCESSORIES
- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.
- 2.7 FABRICATION
- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
- 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.

2. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
3. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two (2) steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four (4) spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry 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:
 - 1) Two (2) anchors per jamb up to 60 inches high.
 - 2) Three (3) anchors per jamb from 60 to 90 inches high.
 - 3) Four (4) anchors per jamb from 90 to 120 inches high.
 - 4) Four (4) anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. 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:
 - 1) Three (3) anchors per jamb up to 60 inches high.
 - 2) Four (4) anchors per jamb from 60 to 90 inches high.
 - 3) Five (5) anchors per jamb from 90 to 96 inches high.
 - 4) Five (5) anchors per jamb plus one (1) additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two (2) anchors per head for frames above 42 inches wide and mounted in metal stud partitions.

10. Door Silencers: Except on weather-stripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.8 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. 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.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jamb and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Solid core doors with wood veneer faces.
2. Factory finishing wood doors.
3. Factory fitting wood doors to frames and factory machining for hardware.
4. Light frames and glazing installed in wood doors.

B. Related Sections:

1. Division 08 Section "Hollow Metal Doors and Frames" for wood doors in steel frames.
2. Division 08 Section "Glazing" for glass view panels in wood doors.
3. Division 08 Section "Door Hardware" for door hardware for flush wood doors and wood frames.

C. Standards and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A208.1 – Wood Particleboard.
2. Intertek Testing Service (ITS Warnock Hersey) - Certification Listings for Fire Doors.
3. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
4. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
5. UL 10C - Positive Pressure Fire Tests of Door Assemblies; UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
6. Window and Door Manufacturers Association - WDMA I.S.1-A Architectural Wood Flush Doors.

1.3 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, trim for openings, and WDMA I.S.1-A or AWS classifications. Include factory finishing specifications.

- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the wood door supplier in order to prepare the doors and frames to receive the finish hardware items.

- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.

4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire protection ratings for fire rated doors.

D. Samples for Initial Selection: For factory finished doors.

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, 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 the finished work.
2. Corner sections of doors, 8 by 10 inches, with door faces and edges representing actual materials to be used.
 - a. Provide samples for each species of veneer and solid lumber required.
 - b. Finish veneer faced door samples with same materials proposed for factory finished doors.
3. Frames for light openings, 6 inches long, for each material, type, and finish required.

E. Warranty: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is a certified participant in AWI's Quality Certification Program.
- B. Source Limitations: Obtain flush wood doors through one source from a single manufacturer to ensure uniformity in quality of appearance and construction.
- C. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, latest edition, "Industry Standard for Architectural Wood Flush Doors".
- D. Fire Rated Wood Doors: Doors 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 at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C (neutral pressure testing according to UL 10B where specified).
 1. Oversize Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies provide manufacturer's construction label, indicating compliance to independent 3rd party certification agency's procedure, except for size.
 2. Temperature Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire test exposure.
 3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - 1) Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
 4. Blocking: When through-bolts are not to be used, indicate size and location of blocking in 45, 60 and 90 minute mineral core doors.

- E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for receiving, handling, and installing flush wood doors.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package pre-finished doors individually in plastic bags or cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top rail with opening number used on Shop Drawings.
- D. Do not walk or stack other materials on top of stacked doors. Do not drag doors across one another.
- E. For all doors not factory finished – seal all four edges (stiles and rails) immediately after delivery.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in wood face veneers exceeding 0.01 inch in a 3-inch span.
 - c. Telegraphing of core construction and delaminating of face in decorative laminate-faced doors.
 - 2. Warranty includes 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 according to manufacturer's written warranty.
 - 4. Warranty not to be in effect for any field finished doors not having been sealed properly on all edges and faces.

PART 2 - PRODUCTS

2.1 DOOR CONSTRUCTION – GENERAL

- A. WDMA I.S.1-A Performance Grade: Extra Heavy Duty; Aesthetic Grade: Premium.
- B. Fire Rated Doors: Provide construction and core specified above as needed to provide fire ratings indicated.
 - 1. Category A Edge Construction: Provide 45, 60 and 90 minute fire rated doors edge construction with intumescent seals concealed by outer stile (Category A). Comply with specified requirements for exposed edges.
 - 2. Pairs: Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
 - a. Where required or specified, provide formed steel edges and astragals with intumescent seals. Finish steel edges and astragals with baked enamel.

2.2 CORE CONSTRUCTION

- A. Particleboard Core Doors:
 - 1. Particleboard: Wood fiber based materials complying with ANSI A208.1 Particleboard standard. Grade LD-2.
 - 2. Adhesive: Fully bonded construction using Polyurethane (PUR) glue.
 - 3. Blocking: When through-bolted hardware is not used, provide wood blocking in particleboard core doors as follows:
 - a. 5-inch (125-mm) top-rail blocking, in doors indicated to have closers.
 - b. 5-inch (125-mm) mid-rail blocking, in doors indicated to have exit devices.
 - 1) Optional Cores for Blocking: Provide doors with either glued-wood-stave or structural-composite-lumber core instead of particleboard core for doors indicated to receive closers and exit devices.
 - 4. Basis of Design:
 - a. Graham: PC.
- B. Mineral Core Doors:
 - 1. Core: Non-combustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire protection rating indicated.
 - 2. Blocking: Provide composite blocking with improved screw holding capability approved for use in doors of fire protection ratings indicated as needed to eliminate through-bolting hardware.
 - 3. Edge Construction: At hinge stiles, provide laminated edge construction with improved screw holding capability and split resistance. Comply with specified requirements for exposed edges.

4. Basis of Design: Graham FD.

2.3 VENEERED DOORS FOR TRANSPARENT FINISH

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

1. Eggers Industries: Premium
2. Graham: GPD

- B. Interior Solid Core Doors:

1. Grade: Premium
2. Faces: Veneer grades as noted below; veneer minimum 1/50-inch (0.5mm) thickness at moisture content of 12% or less.
 - a. Plain Sliced, Grade A faces.
 - b. Species: As selected by owner from manuf. options
3. Match between Veneer Leaves: Book match.
4. Assembly of Veneer Leaves on Door Faces:
 - a. Running Match.
5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
6. Room Match: Match door faces within each separate room or area of building. Corridor door faces do not need to match where they are separated by 10 feet or more.
7. Transom Match: Continuous match.
8. Vertical Edges: Matching same species as faces. Wood or composite material, one piece, laminated, or veneered. Minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors.
9. Horizontal Edges: Solid wood or structural composite material meeting the minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors
10. Construction: Five plies. Stiles and rails are bonded to core, then entire unit sanded before applying face veneers.
11. At doors over 40% of the face cut-out for lights and or louvers, furnish engineered composite lumber core.

2.4 LIGHT FRAMES AND GLAZING

- A. Wood Beads for Light Openings in Wood Doors up to and including 20-minute rating:

1. Wood Species: Same species as door faces.
2. Profile: Manufacturer's standard lipped profile. At wood core doors with 20-minute fire protection ratings, provide wood beads and metal glazing clips approved for such use.

- B. Metal Frames for Light Openings in Fire Rated Doors over 20-minute rating: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces, formed of 0.048-inch-thick, cold rolled steel sheet; and approved for use in doors of fire protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

- C. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with the flush wood door manufacturer's written instructions.
 - 1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.5 FABRICATION

- A. Factory fit doors to suit frame opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with requirements in NFPA 80 for fire rated doors.
- B. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.
- C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
- D. Openings: Cut and trim openings through doors in factory.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Comply with applicable requirements in Division 08 Section "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.
- E. Electrical Raceways: Provide flush wood doors receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in hardware sets in Division 08 "Door Hardware". Wire nut connections are not acceptable.

2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Transparent Finish: Provide a clear protective coating over the wood veneer allowing the natural color and grain of the selected wood species to provide the appearance specified. Stain is applied to the wood surface underneath the transparent finish to add color and design flexibility.
 - 1. Grade: Premium.
 - 2. Finish: Meet or exceed WDMA I.S. 1A TR6 Catalyzed Polyurethane finish performance requirements.

3. Staining: As selected by Architect from manufacturer's full range.
4. Effect: Filled finish.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 1. Verify that 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: For installation, see Division 8 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
 1. Install fire rated doors in corresponding fire rated frames according to NFPA 80.
- C. Factory Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Re-hang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 085413 - FIBERGLASS WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes fiberglass-framed windows (casement, awning and fixed).

1.3 REFERENCES

American Society for testing and Materials (ASTM):

E283: Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors

E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

E547: Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential

E2190: Specification for Sealed Insulating Glass Units

C1036: Standard Specification for Flat Glass

E2068: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

- a. Window and Door Manufacturer's Association (WDMA): I.S.4: Industry Standard for Water Repellent Preservative Treatment for Millwork
- b. Sealed Insulating Glass Manufacturer's Association/Insulating Glass Certification (SIGMA/IGCC)
- c. American Architectural Manufacturer's Association/Window and Door Manufacturer's Association/Canadian Specifications Association (AAMA/WDMA/CSA):
 - A. AAMA/WDMA/CSA 101/I.S.2/A440-08: Voluntary Performance Specification for Windows, Skylights, and Glass Doors
- d. Window and Door Manufacturer's Association (WDMA): Hallmark Certification Program
- e. American Architectural Manufacturer's Association (AAMA): 624-10: Voluntary Specification, Performance Requirements and Test Procedures for Organic Coatings on Fiber Reinforced Thermoset Profiles
- f. National Fenestration Rating Council (NFRC):

PART 2 - 101: Procedure for Determining Fenestration Product Thermal Properties

2.1 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 2. Review, discuss, and coordinate the interrelationship of fiberglass windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
 3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
 4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

2.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for fiberglass windows.
- B. Shop Drawings: For fiberglass windows.
 1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

- C. Samples: For each exposed product and for each color specified, 2 by 4 inches in size.
- D. Samples for Initial Selection: For units with factory-applied finishes.
 - 1. Include Samples of hardware and accessories involving color selection.
- E. Samples for Verification: For fiberglass windows and components required, prepared on Samples of size indicated below:
 - 1. Exposed Finishes: 2 by 4 inches
 - 2. Exposed Hardware: Full-size units.
- F. Product Schedule: For fiberglass windows. Use same designations indicated on Drawings.

2.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Test Reports: For each type of fiberglass window, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For manufacturer's warranties.

2.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating fiberglass windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.
- B. Installer Qualifications: An installer acceptable to fiberglass window manufacturer for installation of units required for this Project.
- 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 mockup of typical wall 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.

2.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace fiberglass windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, and air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of materials and finishes beyond normal weathering.
 - e. Failure of insulating glass.
2. Warranty Period:
 - a. Window: **10** years from date of Substantial Completion.
 - b. Glazing Units: against seal failure caused by manufacturing defects and resulting in visible obstruction through the glass for twenty (20) years from the original date of purchase. Glass is warranted against stress cracks caused by manufacturing defects from ten (10) years from date of Substantial Completion.

PART 3 - PRODUCTS

3.1 MANUFACTURERS

- A. Source Limitations: Obtain fiberglass windows from single source from single manufacturer.

3.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 1. Window Certification: WDMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 1. Minimum Performance Class: [AW] .
 2. AAMA/WDMA/CSA 101/I.S.2/A440 establishes a gateway Performance Grade for windows to qualify for each Performance Class. The gateway Performance Grade is 15 for Class R, 25 for Class LC, and 30 for Class CW. For a particular project, the minimum Performance Grade for windows is typically based on the design pressure.
 3. Minimum Performance Grade: As indicated on Drawings
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.32 Btu/sq. ft. x h x deg F (1.83 W/sq. m x K)
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of [0.40] [0.30] [0.27]
- E. Sound Transmission Class (STC): Rated for not less than **30** STC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E413.

- F. Outside-Inside Transmission Class (OITC): Rated for not less than [22] [26] [30] OITC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332.
- G. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for Wind Zone in project region for enhanced protection.
 - 1. Large-Missile Test: For glazing located within **30 feet** of grade.
 - 2. Small-Missile Test: For glazing located between **30 feet** and **60 feet** above grade.

3.3 FIBERGLASS WINDOWS

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide fiberglass S-series Windows by Viwinco windows, 851 Hemlock Road, Morgantown, PA 19543, 610.286.8884 or comparable by one of the following.
 - a. Marvin Windows
 - b. Graham Architectural products
 - c. Kolbe Windows and Doors
 - d. Pella
 - e. Andersen
- B. Operating Types: Provide the following operating types in locations indicated on Drawings:
 - 1. Casement
 - 2. Awning
 - 3. Fixed.
 - 4. Double Hung
- C. Frames and Frame Description
 - 1. Interior: clear pine exposed surfaces
 - a. Kiln-dried to moisture content no greater than twelve (12) percent at the time of fabrication
 - b. Water repellant, preservative treated in accordance with ANSI/NWWDA I.S.4.
 - 2. Exterior: Fiberglass reinforce 0.080" (2mm) thick
 - 3. Composite frame thickness: 1 5/16" (33mm). Frame depth: 4 9/16" (116mm).
- D. Sash/Panel Description
 - 1. Interior: pine
 - a. Kiln-dried to moisture content no greater than twelve (12) percent at time of fabrication
 - b. Water repellant preservative treated in accordance with ANSI/NWWDA I.S.4.
 - 2. Exterior: fiberglass reinforced 0.080" (2mm) thick
 - 3. Composite sash thickness: 1 9/16" (40mm) – standard glass; 1 31/32" (50mm) – Tri-pane.
- E. Glazing
 - 1. Select quality complying with ASTM C1036. Insulating glass SIGMA/IGCC certified to performance level CBA when tested in accordance with ASTM E2190.
 - 2. Glazing Method: 11/16 (17mm) inch insulating glass.

3. Glass Type: Low E1, E2, E3, E3/ERS air or Argon gas.
4. Glass Type Option: Rain Glass, Glue Chip, Narrow Reed, Reed, Frost, Bronze Tint, Gray Tint, Green Tint.
5. Glazing Seal: Silicone bead at interior and exterior.
6. Glazing option: STC/OITC upgrade.
7. Impact Zone 3 for windows up to 140 miles per hour. Glass is laminated insulated Low E2 or Low E3 Argon, consisting of annealed or tempered glass to the exterior and laminated glass to the interior. The laminated glass is made up of two pieces of glass with either SGP or PVB laminate layer between. The interior and exterior glazing compound is silicone, in a sandwich style glazing.
8. Tri-pane glazing option: Units are manufactured with 1 1/8" (29mm) IG with a combination coating consisting of Low E2 on surface 2 and Low E1 on surface 5 including with Air or Argon gas fill.

F. Certified Mulling

1. For Standard
2. Directional mull limits: 7 units wide by 1 unit high: Rough Opening not to exceed 113 x 71 5/8 inches (2870mm x 1819mm)
3. Directional mull limits: 1 unit wide by 5 units high; Rough Opening not to exceed 73 x 94 3/4 inches (1854mm x 2406mm)
4. Directional mull limits: 4 units by 5 units high: Rough Opening not to exceed 85 x 94 3/4 inches (2159mm x 2406mm)
5. For Impact
6. Directional mull limits 1H or 1W only. Maximum span for vertical mull is 71 1/8" (1807mm)
7. Directional mull limits for 2H or 2W only. Maximum span for horizontal mull is 72" (1829mm).

G. Finish

1. Exterior:
 - a. Pultruded Fiberglass.
 - b. Factory baked on acrylic urethane.
 - c. Meets AAMA 624-10 requirements.
 - d. Color: Stone White, Pebble Gray, Bronze, Evergreen, Cashmere, Ebony.
2. Interior:
 - a. Bare treated pine.
 - b. Optional white, clear interior, or designer black interior factory finishes.

1.1 Hardware

Coastal hardware to be provided.

- A. Lock: Multipoint locking mechanism is actuated from a single point of operation. The lock mechanism is concealed with only the actuator handle and escutcheon being visible.
- B. Hinges: Concealed stainless steel track and injection molded shoe.
- C. Handle: Die cast detachable folding handle.
- D. Roto Gear Operator: E-Gard™ coated hinge arm and housing mechanism.
- E. Snubber: Pulls the sash tight to the frame and provides positive engagement to keep the sash in place under structural loads.
- F. Color: Applies to the handle and locking hardware:

To be selected from manufacturer's standard options by owner/architect.

1.2 Weather Strip

Weather stripped at frame and sash perimeter with flexible gaskets.

Color: To be selected from manufacturer's standard options by owner/architect.

1.3 Jamb Extension

- A. Furnish jamb extension: 6 9/16 inch (167mm) or 6 13/16 inch (173mm) factory-installed
- B. Optional jamb extension: 4 11/16 inch (119mm), 4 13/16 inch (122mm), or 5 1/16 inch (129mm) – 8 9/16 inch (217mm) shipped loose.
- C. Finish: To be selected from manufacturer's standard options by owner/architect.

1.4 Insect Screen

Factory Installed

Screen mesh, 18 by 16: charcoal fiberglass.

Aluminum frame finish: To be selected from manufacturer's standard options by owner/architect.

1.5 Grilles-Between-the-Glass (GBG)

Manufactured from aluminum in a 23/32" (18mm) wide contoured profile placed between the two panes of glass. On tri-pane configurations, GBG profile is placed between exterior and center glass panes.

Colors:

SCHEDULE 1 - Interior: White, Bronze, Black.

SCHEDULE 2 - Exterior: White, Pebble Gray, Bronze, Evergreen, Cashmere, or Ebony.

Pattern:

SCHEDULE 3 - Rectangular

Not available for Impact glazed windows.

1.6 Accessories and Trim

Exterior Casing:

Non-integral to the unit – fastened to the exterior wall with barb and kerf.

2" (51mm) Brick Mould Casing available as a full surround or with sill nosing.

3 1/2" (89mm) Flat Casing as a full surround or with sill nosing; also available with 1" (25mm) ranch style header overhang.

Color: Stone White, Pebble Gray, Bronze, Evergreen, Cashmere, or Ebony.

Installation Accessories:

Factory-installed nailing fin at head, sill and side jambs.

Installation Brackets: Brackets for 4 9/16" (116mm); 6 9/16" (167mm).

Mullion kit: Mullion kit for field assembly of units – Kit includes: instructions, aluminum pins, filler blocks, wood mullion tie, sealant foam tape, interior mullion trim, mullion insulation and nailing fin connectors.

Structural mullion kit: structural mullion kit for field assembly of units. Kits includes: instructions, reinforcement member, aluminum pins, wood mullion tie, sealant foam tape, interior mullion trim, #8 x 1 3/4" screws, #7 x 1 5/8" screws, nailing fin connectors and structural brackets.

Pole operator with adapter for each sash indicated. Mill finish aluminum. Length: (five feet) (eight feet) (eleven feet six inches).

Installation clips standard with nailing fin on impact glazed windows.

- A. Sashes: Pultruded fiberglass complying with AAMA/WDMA/CSA 101/I.S.2/A440 and with exposed exterior fiberglass surfaces finished with manufacturer's standard enamel coating complying with [AAMA 613] [AAMA 623].
 - 1. Exterior Color: **As selected by Architect from manufacturer's full range**
 - 2. Interior Finish: **Wood veneer clad, maple**
- B. Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.
 - 1. Kind: Fully tempered
- C. Windborne-Debris-Impact-Resistant Laminated Glass: ASTM C1172 with two plies of float glass.
 - 1. Float Glass: **As required by performance requirements indicated.**
 - 2. Inner Ply: Clear.

3. Interlayer: **As required by performance requirements indicated**
 4. Outer Ply: **[Clear]**
 5. Low-E Coating: **Sputtered on second or third surface**
- D. Insulating-Glass Units: ASTM E2190.
1. Glass: ASTM C1036, Type 1, Class 1, q3.
 - a. Tint: **[Clear]**
 - b. Kind: Fully tempered
 2. Lites: **[Two] [Three]**.
 3. Filling: Fill space between glass lites with **[air] [argon]**.
 4. Low-E Coating: **Sputtered on second or third surface**
- E. Windborne-Debris-Impact-Resistant Insulating-Glass Units: ASTM E2190 with two lites and complying with impact-resistance requirements in "Window Performance Requirements" Article.
1. Exterior Lite: ASTM C1036, Type 1, Class 1, q3.
 - a. Tint: **[Clear]**
 - b. Kind: **[Heat strengthened] [Fully tempered]**.
 2. Interior Lite: ASTM C1172 clear laminated glass with two plies of float glass.
 - a. Float Glass: **As required by performance requirements indicated**
 - b. Interlayer Thickness: **As required by performance requirements indicated**
 3. Filling: Fill space between glass lites with **[air] [argon]**.
 4. Low-E Coating: **Sputtered on second or third surface**
- F. Glazing System: **Manufacturer's standard factory-glazing system that produces weathertight seal**

Nonmagnetic stainless steel, Series 300, or superior corrosion-resistant-coated metal hardware may be required to meet specific customer or regional needs and for protection against corrosive environments, such as in urban, coastal, or industrial areas.

- G. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock fiberglass windows, and sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: **[As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from manufacturer's full range] <Insert color and finish>**.
- H. Projected Window Hardware:

1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
 - a. Type and Style: **[Match Architect's sample] [As selected by Architect from manufacturer's full range of types and styles] <Insert type and style>**.
2. Hinges: **[Manufacturer's standard type for sash weight and size indicated] [Stainless-steel hinges with stainless-steel-reinforced, sliding nylon shoes] <Insert description>**.
3. Single-Handle Locking System: Operates positive-acting arms that pull sash into locked position. Provide one arm on sashes up to **27-1/2 inches (700 mm)** tall and two arms on taller sashes.

Retain one option in "Limit Devices" Subparagraph below if limit devices are required. They restrict sash opening for safety. Indicate locations of windows with limit devices on Drawings or in schedules, and coordinate with code requirements for windows for emergency escape and rescue.

4. Limit Devices: **[Concealed friction adjustor, adjustable stay bar] [Concealed support arms with adjustable, limited, hold-open] <Insert type>** limit devices designed to restrict sash opening.
 - a. Limit clear opening to **[4 inches (100 mm)] <Insert dimension>** for ventilation; with custodial key release.

Retain "Pole Operators" Subparagraph below if Project includes manually operated windows more than 72 inches (1800 mm) above floor. Electric operators are also available; if needed, insert requirements.

5. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than **60 inches (1500 mm)** above floor; one pole operator and pole hanger per room that has operable windows more than **72 inches (1800 mm)** above floor.
- I. Hung Window Hardware:
 1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
 2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only. **[Provide custodial locks.]**
 3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.
 - J. Horizontal-Sliding Window Hardware:
 1. Sill Cap/Track: **[Extruded-aluminum track with natural anodized finish] [Rigid PVC or other weather-resistant plastic track with manufacturer's standard integral color] [Manufacturer's standard] <Insert track material and finish>** of dimensions and profile indicated; designed to comply with performance requirements indicated and to drain to the exterior.
 2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only. **[Provide custodial locks.]**

3. Roller Assemblies: Low-friction design.
- K. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- L. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

Generally, retain "Exposed Fasteners" Subparagraph below. Revise if exposed fasteners are permitted.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

3.2 ACCESSORIES

Retain "Dividers (False Muntins)" Paragraph below if dividers are required. Indicate divider patterns on Drawings or insert requirements.

- A. Dividers (False Muntins): Provide divider grilles in designs indicated for each sash lite.
 1. Quantity and Type: [**One per sash, removable from exposed surface of interior lite**] [**Two per sash, removable from exposed surfaces of interior and permanently located at exterior lite**] [**One permanently located between insulating-glass lites**] <Insert requirements>.
 2. Material: [**Manufacturer's standard**] <Insert material>.
 3. Pattern: [**As indicated on Drawings**] <Insert pattern>.
 4. Profile: [**As selected by Architect from manufacturer's full range**] <Insert profile>.
 5. Color: [**As selected by Architect from manufacturer's full range**] <Insert color>.
- B. Jamb Extensions: [**Stain-grade Pacific Hemlock**] <Insert description>.

Insert requirements for mullion covers and trim pieces, such as brick molds, if needed.

3.3 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
 1. Type and Location: [**Full, inside for project-out**] [**Full, outside for project-in**] [**Full, outside for double-hung**] [**Half, outside for single-hung**] [**Full, outside for sliding**] [**Half, outside for sliding**] sashes.
- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
 1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
 2. Finish for Interior Screens: Baked-on organic coating in [**color selected by Architect from manufacturer's full range**] <Insert color>.

3. Finish for Exterior Screens: [**Baked-on organic coating in color selected by Architect from manufacturer's full range**] [**Matching color and finish of cladding**] <Insert finish>.

Retain "Glass-Fiber Mesh Fabric" or "Aluminum Wire Fabric" Paragraph below or insert another. Glass-fiber mesh is standard with most manufacturers. Usually, retain first option in "Glass-Fiber Mesh Fabric" Paragraph. Second option is suitable for areas plagued by small insects such as no-see-ums and is also suitable for use as a solar screen that blocks up to 65 percent of incident solar heat and glare.

- C. Glass-Fiber Mesh Fabric: [**18-by-14 (1.1-by-1.4-mm) or 18-by-16 (1.0-by-1.1-mm)**] [**20-by-20 (0.85-by-0.85-mm) or 20-by-30 (0.85-by-0.42-mm)**] <Insert type> mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.
 1. Mesh Color: [**Manufacturer's standard**] <Insert color>.
- D. Aluminum Wire Fabric: **18-by-16 (1.1-by-1.3-mm)** mesh of **0.011-inch- (0.28-mm-)** diameter, coated aluminum wire.
 1. Wire-Fabric Finish: [**Natural bright**] [**Charcoal gray**] [**Black**] <Insert finish>.

3.4 FABRICATION

- A. Fabricate fiberglass windows in sizes indicated. Include a complete system for installing and anchoring windows.
- B. Glaze fiberglass windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.

Retain "Mullions" Paragraph below if required for Project.

- D. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

Bow and bay window assemblies usually contain casement, double-hung, or fixed window units.

- E. [**Bow**] [**Bay**] Window Assemblies: Provide [**operating**] [**and**] [**fixed**] units in configuration indicated. Provide window frames, sashes, hardware, and other trim and components necessary for a complete, secure, and weathertight installation, including the following:
 1. Angled mullion posts with interior and exterior trim.
 2. Angled interior and exterior extension and trim.

Revise first subparagraph below to suit Project. Clear pine head and seat boards are optional features with most manufacturers. Unless wood species is specified, plywood will be supplied.

3. Clear [**pine**] <Insert species> head and seat boards.
4. Top and bottom plywood platforms.
5. Exterior head and sill casings and trim.

6. Support brackets.

- F. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 4 - EXECUTION

4.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

4.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

4.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.
2. Air-Infiltration Testing:
- a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.

- b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
 3. Water-Resistance Testing:
 - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.
 4. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.
 5. Test Reports: Prepared according to AAMA 502.
- C. Windows will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.
- 4.4 ADJUSTING, CLEANING, AND PROTECTION
- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
 - B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
 1. Keep protective films and coverings in place until final cleaning.
 - C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.
 - D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 085413

SECTION 087100 – DOOR HARDWARE

PART I – GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

Furnish all items of finish hardware as specified and listed in hardware sets and required by actual conditions.

B. RELATED DOCUMENTS:

Drawings and general provisions of contract found in Division 1 apply to this section.

C. RELATED SECTIONS:

1. Division 6 – Wood, Plastics and Composites sections for finish carpentry.
2. Division 8 – Openings sections for hollow metal doors and frames.
3. Division 8 – Openings sections for flush wood doors.

1.02 REFERENCES

A. ANSI A156.xx – Various Performance Standards for Finish Hardware

B. NFPA80-1999 – Fire Doors and Windows

C. UL10C – Positive Pressure Fire Tests of Door Assemblies

D. NFPA-101-2000 – Life Safety Code

E. IBC 2006 – International Building Code

F. ANSI-A117.1 – Accessible and Usable Buildings and Facilities

1.03 SUBMITTALS

A. GENERAL REQUIREMENTS:

Submit copies of finish hardware schedule in accordance with Division 1, General Requirements.

B. SCHEDULES AND PRODUCT DATA:

Submit in vertical format as recommended by the Door and Hardware Institute. Clearly show the specified hardware set number at each heading. Furnish four (4) copies of revised schedules after approval for field and file use. Note any special mounting instructions or requirements with the hardware schedule. Include the following information:

1. Handing and degree of swing of each door.
2. Door and frame sizes and materials.
3. Type, style, function, size, and finish of each hardware item.
4. Name and manufacturer of each hardware item.
5. Fastenings and other pertinent information.
6. Explanation of all abbreviations, symbols and codes contained in schedule
7. Mounting locations for hardware when varies from standard.

Submit catalog cuts and/or product data sheets for all scheduled finish hardware.

Submit separate detailed keying schedule for approval indicating clearly how the owner's final instructions on keying of locks has been fulfilled.

C. ELECTRONIC HARDWARE SYSTEMS:

1. Provide complete professionally prepared wiring diagrams for each opening requiring electronic hardware, except openings where only magnetic hold-open devices or door position switches are specified.
2. Provide complete operational descriptions of electronic components listed by opening in the hardware submittals. Detail how each electrical component functions within the opening, incorporating all conditions of ingress and egress.
3. Provide elevation drawings of electronic hardware and systems identifying locations of the system components with respect to their placement in the door opening.

D. OPERATION AND MAINTENANCE MANUALS:

Upon completion of construction and building turnover, furnish two (2) complete maintenance manuals to the owner. Include the following items:

1. Approved hardware schedule, catalog cuts and keying schedule.
2. Hardware installation and adjustment instructions.
3. Complete set of any special tools required for hardware maintenance and adjustment.
4. Manufacturer's written warranty information.
5. Wiring diagrams, elevation drawings and operational descriptions for all electronic openings.

1.04 QUALITY ASSURANCE

A. SUBSTITUTIONS:

Submit substitution requests as outlined in Division 1, General Requirements. Approval of products is at the discretion of the architect and his hardware consultant.

B. SUPPLIER QUALIFICATIONS:

1. A recognized architectural door hardware supplier who has maintained an office and has been furnishing hardware in the project's vicinity for a period of at least three (3) years.
2. Maintain an office and warehouse facilities to accommodate this project.
3. Employ at least one (1) Architectural Hardware Consultant (AHC) who is available at reasonable times during business hours for consultation about the project's hardware and requirements to the owner, architect and contractor.
4. Hardware supplier must be an authorized factory distributor of all specified products.

C. INSTALLER QUALIFICATIONS:

Firm must have three (3) years experience in installation of similar hardware to that required for this project.

1.05 FIRE-RATED OPENINGS:

1. Provide door hardware for fire-rated openings that comply with NFPA-80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed by Underwriter's Laboratories (UL) for use on types and sizes of doors indicated.

2. Project requires door assemblies and components that are compliant with positive pressure and S-label requirements. Specifications must be cross-referenced and coordinated with door manufacturers to ensure that total opening engineering is compatible with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.
 - a. Make certification(s) of compliance available upon request by the Authority Having Jurisdiction.

1.06 DELIVERY, STORAGE AND HANDLING

A. MARKING AND PACKAGING:

Supplier will package and mark items according to the approved hardware schedule, complete with necessary screws and accessories, instructions and installation templates. Contractor will check deliveries against accepted list and provide receipt for them, after which he is responsible for storage and care.

B. DELIVERY:

1. Deliver all hardware to the project site on the supplier's trucks; direct factory shipments are not allowed unless agreed upon beforehand. Inventory door hardware jointly with representatives of hardware supplier and hardware installer/contractor. Replace shortages at no cost to the owner.
2. No keys, other than construction master keys and/or temporary keys are to be packed in boxes with the locks.

C. STORAGE:

Provide secure lock-up for door hardware. Control handling and installation of hardware items so that completion of work will not be delayed by hardware losses both before and after installation.

1.07 WARRANTY:

- A. All items, except as noted below, shall be warranted in writing by the manufacturer against failure due to defective materials and workmanship for a minimum period of one (1) year commencing on the date of final completion and acceptance. In the event of product failure, promptly repair or replace item with no additional cost to the owner.
 1. Cylindrical locksets: Five (5) years
 2. Mortise locksets: Five (5) years
 3. Door closers: Ten (10) years

PART II – PRODUCTS

2.01 MANUFACTURERS

- A. Only products from manufacturers listed below will be accepted. Obtain each type of finish hardware (hinges, latch and locksets, exit devices, door closers, etc.) from a single manufacturer.

2.02 MATERIALS

A. SCREWS AND FASTENERS

Supply fasteners as required by the door and frame material and conditions. Supply through bolts for exit devices and door closers where required by code and the appropriate blocking or reinforcing is not present in the door to preclude their use.

B. HANGING DEVICES

1. HINGES

Conform to ANSA A156.1. Five knuckle design, ball bearing. Provide NRP (non-removable pin) at all exterior reverse bevel doors. Unless otherwise scheduled, supply one (1) hinge for every 30" of door height. Provide 4 1/2" x 4 1/2" hinges, except at doors exceeding 36" in width where 5" x 4 1/2" hinges shall be provided. Provide hinges with phillips flat-head screws unless specified otherwise.

- a. Specified Manufacturer: McKinney
- b. Approved Equal: Bommer, Stanley

2. PIVOTS

Conform to ANSI 156.4 Grade 1.

- a. Specified Manufacturer: Rixson
- b. Approved Equal: Ives

C. FLUSH BOLTS AND ACCESSORIES

Furnish all manual and automatic flush bolts as specified in hardware sets.

1. Specified Manufacturer: McKinney
2. Approved Equal: Ives, Rockwood, Trimco

D. CYLINDERS AND KEYING

1. CYLINDERS

Provide removable core, patented security cylinders. Furnish temporary cores for use during construction. Stamp all change keys with keyset symbol (VKC), but do not stamp with key section or biting number.

- a. Specified Manufacturer: Yale
- b. Approved Equal: None

2. KEYING

- a. Factory grand masterkey and construction key all locks and cylinders. Furnish the following key amounts:
 - 1) Three (3) change keys per lock
 - 2) Three (3) grand master keys
 - 3) Six (6) master keys per master level
 - 4) Two (2) control keys (both permanent and construction)
 - 5) One hundred (100) patented key blanks
 - 6) Fifteen (15) construction/temporary keys
- b. Prior to ordering locks and cylinders, hold a keying meeting with the owner's designated agent to determine specific keying requirements. Obtain information on the existing key system (registry number, keyway, master designations) so new cylinders can be properly integrated. Review the lock functions with the owner at this time, and advise the architect of any owner desired changes.
- c. Seal master keys and all high-security or restricted keyway blanks in tamper-proof packaged boxes when shipped from the factory. Shrink wrap and imprint the boxes to ensure the integrity of the packaging.

- d. Replace construction cores with permanent cores as directed by the owner.

3. KEY CABINET

Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Provide expansion capacity of 150% of the number of locks required for the project.

- a. Specified Manufacturer: Telkee
- b. Approved Equal: Lund

E. LOCKING DEVICES

1. MORTISE LOCKSETS

Provide locksets conforming to ANSI 156.13 Series 1000 Grade 1.

- a. Specified Manufacturer: Best 45H Series
- b. Approved Equal: None

2. CYLINDRICAL LOCKSETS

Provide locksets conforming to ANSI 156.2 Series, Grade 1 furnished with standard 2 3/4" backset.

- a. Specified Manufacturer: Best 93K Series
- b. Approved Equal: None

F. ELECTRIC STRIKES

Provide electric strikes that meet BHMA standard 501, grade 1 and that are UL Listed for Burglary Resistance, category 1034.

1. Specified Manufacturers: HES 1006 Series
2. Approved Equal: Folger Adam 600 Series

G. EXIT DEVICES

Provide exit devices which meet ANSI/BHMA A156.3 Grade 1 requirements and are listed by Underwriters Laboratories bearing the UL label for life safety in full compliance with NFPA 80 and NFPA 101. Provide rail lengths to suit door width.

1. Specified Manufacturer: Precision 2100 Series
2. Approved Equal: Corbin Russwin ED5000 Series, Yale 7100 Series

H. DOOR CLOSERS

1. SURFACE MOUNTED CLOSERS – HEAVY DUTY

All surface closers must be certified ANSI A156.4 Grade 1, and be adjustable to provide sizes 1 through 6 to comply with ADA requirements. Provide any necessary plates and brackets to suit conditions. Provide closers meeting the requirements of UBC 7-2 and UL10C.

- a. Specified Manufacturer: Stanley D-4551 Series
- b. Approved Equal: Norton 7700 Series, Yale 400 Series

2. AUTOMATIC DOOR OPERATORS

Low energy door operators must satisfy all code requirements set forth in ANSI/BHMA standard A156.19 and meet UL10C standards for use on fire doors. Units must be door closer based, and function as a typical self closing door when the units are not activated. Units must have adjustments for door closing force and backcheck, motor assist from 0 to 30 seconds, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay up to 30 seconds.

- a. Specified Manufacturer: Stanley D-4990
- b. Approved Equal: Norton 6900 Series, Besam PowerSwing

I. DOOR TRIM AND PROTECTIVE PLATES

Provide .050 gauge and two (2) inches less full width of door, or as specified. Provide push plates, pull plates, door pulls and miscellaneous door trim as shown in the hardware schedule.

1. Specified Manufacturer: McKinney
2. Approved Equal: Ives, Rockwood, Trimco

J. DOOR STOPS AND HOLDERS

1. WALL MOUNTED DOOR STOPS

Where a door is indicated on the plans to strike flush against a wall, provide wall bumpers.

- a. Specified Manufacturers: McKinney
- b. Approved Equal: Ives, Rockwood, Trimco

2. OVERHEAD STOPS / HOLDERS

Where specified, overhead stops as shown in the hardware sets are to be provided.

- a. Specified Manufacturers: Rixson 1/2/9/10 Series
- b. Approved Equal: Glynn Johnson 90/100 Series

K. GASKETING AND THRESHOLDS

1. Provide continuous weatherseal on exterior doors and smoke, light, or sound seals on interior doors where indicated or scheduled. Provide intumescent seals as required to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.
2. Provide threshold units not less than 4" wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames. All threshold units shall comply with the ANSI A117.1.

- a. Specified Manufacturers: McKinney
- b. Approved Equal: Reese, Zero

L. ELECTRONIC ACCESSORIES

1. POWER SUPPLIES

Power supplies shall furnish regulated 24VDC and shall be UL class 2 listed. LED's shall monitor zone status (voltage/no voltage) and slide switches shall be provided to connect or disconnect the load from power; 1, 4 or 8 separate output circuit breakers shall be provided to divide the load. Power supplies shall be supplied complete requiring only 120VAC to the fused input and shall be supplied in

an enclosure. Power supplies shall be provided with emergency release terminals that allow the release of all devices upon activation of the fire alarm system.

- a. Specified Manufacturer: Precision ELR150
- b. Approved Equal: As required to satisfy exit device inrush current requirements.

2.03 FINISHES

- A. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

PART III – EXECUTION

3.01 EXAMINATION

Contractor is to ensure that the building is secured and free from weather elements prior to installing interior door hardware. Examine hardware before installation to ensure it is free of defects.

3.02 INSTALLATION

- A. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with the governing regulations.
 1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute (DHI.)
 2. WDMA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."
- B. Install each hardware item in compliance with the manufacturer's instructions. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Mount closers on room side of corridor doors, inside of exterior doors, and on the stair side of stairway doors. If correct mounting location is unclear, consult the architect.

3.03 FIELD QUALITY CONTROL

- A. The hardware supplier shall do a final inspection prior to building completion to ensure that all hardware was correctly installed and is in proper working order.
- B. Prior to installation of electronic hardware, arrange a conference between the supplier, installer and related trades to review materials, procedures, and coordinate related work

3.04 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
- B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore to

proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

- C. Instruct owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes and usage of any electronic devices.
- D. Automatic door operators to be adjusted to ANSI/BHMA standard A156.19 and checked for correct operation by AAADM certified personnel. Detailed inspection report to be provided certifying completion of Field Adjust / Inspection work. Contact Besam Service Department at 800-752-8638.

3.05 PROTECTION

- A. Protect all hardware from damage or deterioration both during storage and after it has been installed. Follow the manufacturers' recommendations for storage and care.

3.06 HARDWARE SCHEDULE

- A. To be provided by the GC's subcontractor based on the above section and all applicable codes,

- B. Manufacturer's Abbreviations:

1. BE – Best Access Systems
2. HS – HES
3. MC – McKinney
4. RO – Rockwood
5. RX – Rixson
6. SN – Securitron
7. ST - Stanley

END OF SECTION 087100

SECTION 092910 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. Interior gypsum wallboard.
2. Non-load-bearing steel framing.
3. Gypsum sheathing.
4. Sound isolation clips.
5. Other auxiliary materials.

- B. Related Sections include the following:

1. Division 5 Section "Cold-Formed Metal Framing" for load-bearing steel framing.
2. Division 6 Section "Rough Carpentry" for wood framing and furring.
3. Division 7 Section "Thermal Insulation" for insulation and vapor retarders installed in gypsum board assemblies.

1.3 DEFINITIONS

- A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 SUBMITTALS

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

- B. Samples: For the following products:

1. Trim Accessories: Full-size sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from FM's "Approval Guide, Building Products" and/or UL's "Fire Resistance Directory."

- B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

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. Steel Framing and Furring:
 - a. Consolidated Systems, Inc.
 - b. Dietrich Industries, Inc.
 - c. MarinoWare; Division of Ware Ind.
 - d. National Gypsum Company.
 - e. Unimast, Inc.
 - 2. Gypsum Wallboard and Related Products:
 - a. G-P Gypsum Corp.
 - b. National Gypsum Company.
 - c. United States Gypsum Co.
 - 3. Specialty Gypsum Board:
 - a. American Gypsum.
 - b. CertainTeed Corp.
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.
 - e. USG Corporation.
 - 4. Moisture and Mold-Resistant Gypsum Wallboard.
 - a. National Gypsum Company; XP Wallboard.
 - b. United States Gypsum Co.; HUMITEK.

- c. Georgia Pacific; DensArmor Plus.
5. Impact-Resistant Gypsum Wallboard.
 - a. National Gypsum Company; Hi-Impact XP Wallboard.
 - b. United States Gypsum Co.; FIBEROCK Brand VHI Abuse-Resistant Panels.
6. Sound Batt Insulation.
 - a. Johns Manville: PolyZorb.
 - b. Knauf Fiber Glass: Crown Acoustic Floor.
 - c. Owens Corning: Quiet Zone Acoustic Batts.

2.2 STEEL SUSPENDED CEILING AND SOFFIT FRAMING

- A. Components, General: Comply with ASTM C 754 for conditions indicated.
- B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- (1.59-mm-) diameter wire, or double strand of 0.0475-inch- (1.21-mm-) diameter wire.
- C. Hanger Attachments to Concrete: As follows:
 1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching hanger wires and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by a qualified independent testing agency.
 - a. Type: Postinstalled, expansion anchor.
 2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by a qualified independent testing agency.
- D. Hangers: As follows:
 1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch (4.12-mm) diameter.
 2. Rod Hangers: ASTM A 510 (ASTM A 510M), mild carbon steel, zinc coated or protected with rust-inhibitive paint.
 3. Flat Hangers: Commercial-steel sheet, ASTM A 366/A 366M, with corrosion-resistant paint finish.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch (1.37 mm), a minimum 1/2-inch- (12.7-mm-) wide flange, with manufacturer's standard corrosion-resistant zinc coating.
- F. Furring Channels (Furring Members): Commercial-steel sheet with manufacturer's standard corrosion-resistant zinc coating.

1. Cold Rolled Channels: 0.0538-inch (1.37-mm) bare steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flange, 3/4 inch (19.1 mm) deep.
2. Steel Studs: ASTM C 645.
 - a. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
 - b. Depth: As indicated.
3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22.2 mm) deep.
4. Resilient Furring Channels: 1/2-inch- (12.7-mm-) deep members designed to reduce sound transmission.

G. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Armstrong World Industries, Inc.; Furring Systems/Drywall.
 - b. USG Interiors, Inc.; Drywall Suspension System.

2.3 STEEL FRAMING FOR WALLS AND PARTITIONS

A. General: Provide steel framing members complying with the following requirements:

1. Component Sizes and Spacings: As indicated but not less than that required to comply with ASTM C 754 under the following maximum deflection and lateral loading conditions:
 - a. Maximum Deflection: L/240 at 5 lbf per sq. ft.
2. Protective Coating: Manufacturers standard corrosion-resistant coating.

B. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 deg and doubled over to form 3/16-inch-wide minimum lip (return) and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:

1. Thickness:
 - a. Heights up to 8 feet: 25 gauge minimum.
 - b. Heights up to 12 feet: 22 gauge minimum.
2. Depth: 3-5/8 inches, unless otherwise indicated.

C. Steel Rigid Furring Channels: ASTM C 645, hat-shaped, 24 gauge minimum thickness of base (uncoated) metal with depth as indicated.

D. Furring Brackets: Serrated-arm type, adjustable, fabricated from corrosion-resistant steel sheet complying with ASTM C 645, minimum thickness of base (uncoated) metal of 0.0329 inch, designed for screw attachment to steel studs and steel rigid furring channels used for furring.

- E. Steel Resilient Furring Channels: Manufacturer's standard product designed to reduce sound transmission, fabricated from steel sheet complying with ASTM A 525 or ASTM A 568 to form 1/2-inch-deep channel of the following configuration:
 - 1. Single-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single slotted leg (web).
 - 2. Double-Leg Configuration: Hat-shaped channel, with 1-1/2-inch-wide face connected to flanges by double-slotted or expanded metal legs (webs).
 - 3. Configuration: Either configuration indicated above.
- F. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated.

2.4 INTERIOR GYPSUM WALLBOARD

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Gypsum Wallboard: ASTM C 36.
 - 1. Type X:
 - a. Thickness: 5/8 inch (15.9 mm).
 - b. Long Edges: Tapered.
 - c. Location: Vertical surfaces, unless otherwise indicated.
- C. Sag-Resistant Gypsum Wallboard: ASTM C 36, manufactured to have more sag resistance than regular-type gypsum board.
 - 1. Thickness: 1/2 inch (12.7 mm).
 - 2. Long Edges: Tapered.
 - 3. Location: Ceiling surfaces.
- D. Moisture and Mold-Resistant Gypsum Wallboard: ASTM C 36.
 - 1. Core: 5/8 inch (15.9 mm).
 - 2. Long Edges: Tapered.
 - 3. Location: Wet walls, toilet rooms and as noted on Wall Types.
- E. Impact-Resistant Gypsum Wallboard: Manufactured to produce greater resistance to surface indentation and through-penetration than standard or abuse-resistant gypsum panels.
 - 1. Core: 5/8 inch.
 - 2. Long Edges: Tapered.
 - 3. Location: As noted on Wall Types.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
2. Shapes:
 - a. Cornerbead: Use at outside corners, unless otherwise indicated.
 - 1) Basis of Design: CornerKey by Fry Reglet Corp.
 - b. LC-Bead: Use at exposed panel edges.
 - c. L-Bead: Use where indicated.
 - d. Expansion (Control) Joint: Use where indicated or as required.
 - e. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints 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.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound or drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound or drying-type, all-purpose compound.

2.8 SOUND BATT INSULATION

A. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

2.9 SOUND ISOLATION CLIPS

A. Sound Isolation Clips: Resilient Sound Isolation Clip (RSIC-1).

1. Manufacturer: PAC International, Inc., Las Vegas, NV 89128.
2. Rubber Isolator:
 - a. Natural organic rubber compound, blended with fire-inhibiting compounds.

- b. Molded to isolate ferrule from clip.
- c. Minimum of 12 micro-vibration controlling pedestals at point of contact with framing member.
- d. Manufactured to ASTM D 2000, M2 AA 510 A13, which includes:
 - 1) Hardness, ASTM D 2240, Shore A: 47.
 - 2) Modulus 300 Percent, ASTM D 412, Die C: 5.3 MPa.
 - 3) Tensile Strength, ASTM D 412, Die C: 11.2 MPa.
 - 4) Elongation at Break, ASTM D 573: 454 percent.
3. Clip: Galvanized or aluminum-zinc coated steel, 16 gauge.
4. Ferrule: Zinc-electroplated steel.
5. Projection: 1-5/8 inches from supporting structure, when 7/8-inch drywall furring channels are used.

2.10 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Fastening Adhesive:
 1. Wood: ASTM C 557.
 2. Steel: Adhesive recommended for attaching panels to steel framing.
- D. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
- E. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- F. Thermal Insulation: As specified in Division 7 Section "Thermal Insulation."
- G. Polyethylene Vapor Retarder: As specified in Division 7 Section "Thermal Insulation."
- H. Acoustical Sealant: As specified in Division 7 Section "Joint Sealants."

2.11 GLASS-MATT GYPSUM WALL SHEATHING: ASTM C 1177/1177M.

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

- a. CertainTeed Corporation; GlasRoc.
- b. G-P Gypsum Corporation; Dens-Glass Gold.
- c. National Gypsum Company; Gold Bond e(2)XP.
- d. United States Gypsum Co.; Securock.

B. Type and Thickness: Regular, 1/2 inch (13 mm) thick.

2.12 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 079200 "Joint Sealants."

B. Sheathing Tape: Self-adhering glass-fiber tape, minimum **2 inches** wide, **10 by 10 or 10 by 20 threads/inch**, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

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

3.2 PREPARATION

A. Suspended Ceilings: Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.

3.3 INSTALLING STEEL FRAMING, GENERAL

A. Installation Standards: ASTM C 754, and ASTM C 840 requirements that apply to framing installation.

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."

- C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement.
 - 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
 - 2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
 - a. Use deep-leg deflection track where indicated.
- D. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

3.4 INSTALLING STEEL SUSPENDED CEILING AND SOFFIT FRAMING

- A. Suspend ceiling 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 ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
 - 4. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, 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 support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 6. Do not attach hangers to steel deck tabs.
 - 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member and transversely between parallel members.
- C. Sway-brace suspended steel framing with hangers used for support.
- D. Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.
- E. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards.

1. Wire Hangers: 48 inches o.c.
2. Carrying Channels (Main Runners): 48 inches o.c.
3. Furring Channels (Furring Members): 16 inches o.c.

- F. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

- A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.
1. Where studs are installed directly against exterior walls, install asphalt-felt or foam-gasket isolation strip between studs and wall.
- B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.
 2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
- D. Install steel studs and furring at the following spacings:
1. Single-Layer Construction: 16 inches (406 mm) o.c., unless otherwise indicated or required to meet deflection criteria.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
- F. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
1. Install two (2) studs at each jamb, unless otherwise indicated.
 2. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- G. 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.

- H. Polyethylene Vapor Retarder: Install to comply with requirements specified in Division 7 Section "Thermal Insulation."

3.6 INSTALLING SOUND BATTS

- A. Interior Partitions and Floors for Sound Control: Sound Insulation.
 - 1. SI-1: 3 ½ inches & 5 ½ inches thick, Install at all offices, conference rooms and toilet rooms. See wall types for more information.
- B. 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 C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

3.7 APPLYING AND FINISHING PANELS, GENERAL

- A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- E. Locate 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.
- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members using resilient channels, or provide control joints to counteract wood shrinkage.
- I. Form control and expansion joints with space between edges of adjoining gypsum panels.
- J. Cover both faces of steel stud partition 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 open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- K. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- L. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion 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 C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
- M. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
- N. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

3.8 PANEL APPLICATION METHODS

- A. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
 - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
- B. Multilayer Application 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 1 framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
- C. Multilayer Application 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.

- D. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- E. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- F. 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 recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.9 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: As indicated, or if not indicated and required, install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

3.10 FINISHING GYPSUM BOARD ASSEMBLIES

- 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 those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
 - 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
 - 2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile and where indicated.
 - 3. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges where indicated.
 - 4. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.
 - 5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface where indicated.

3.11 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
1. Notify Architect seven (7) days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.
 2. Before notifying Architect, complete the following in areas to receive gypsum board ceilings:
 - a. Installation, insulation, and leak and pressure testing of water piping systems.
 - b. Installation of air-duct systems.
 - c. Installation of air devices.
 - d. Installation of mechanical system control-air tubing.
 - e. Installation of ceiling support framing.

3.12 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
1. Fasten gypsum sheathing to wood framing with screws.
 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
 3. Install boards with a **3/8-inch** gap where non-load-bearing construction abuts structural elements.
 4. Install boards with a **1/4-inch** gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.
1. Space fasteners approximately **8 inches** o.c. and set back a minimum of **3/8 inch** from edges and ends of boards.
- D. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.
- E. Seal sheathing joints according to sheathing manufacturer's written instructions.

END OF SECTION 092910

SECTION 093000 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Ceramic Tile (wall tiles in areas noted on the floor finish plan, finish schedule and interior elevations)
 - 2. Glass Mosaic Tile (wall tiles in areas noted on the floor finish plan, finish schedule and interior elevations)
 - 3. Ceramic Tile (floor tiles in areas noted on the floor finish plan, finish schedule and interior elevations)
 - 4. Quarry Tile (floor tiles in areas noted on the floor finish plan and finish schedule)

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
- C. Samples for initial selection purposes in form of manufacturer's color charts consisting of actual tiles or sections of tile showing full range of colors (minimum of 90), textures, and patterns (minimum of 50) available for each type and composition of tile indicated. Include samples of grout and accessories involving color selection. Quarry tile work will require dark custom color grout.
- D. Samples for verification purposes of each item listed below, prepared on samples of size and construction indicated, products involve color and texture variations, in sets showing full range of variations expected.
 - 1. Full size units of each type of trim and accessory for each color required.
 - 2. Slate thresholds in 6-inch lengths.
- E. Master grade certificates for each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- F. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, plus other information specified.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Single Source Responsibility for Setting and Grouting Materials: Obtain ingredients of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.
- C. Installer Qualifications: Engage an experienced Installer who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.

1.5 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

- 1. Level Surfaces: Minimum 0.6 COF.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.
- C. Handle tile with temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If despite these precautions coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
- C. Maintain temperatures at 50 deg F or more in tiled areas during installation and for seven (7) days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Standard for Ceramic Tile: Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types, compositions, and grades of tile indicated.
 - 1. Furnish tile complying with "Standard Grade" requirements unless otherwise indicated.

- B. ANSI Standard for Tile Installation Materials: Comply with ANSI standard referenced with products and materials indicated for setting and grouting.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
 - 1. Provide selections made by Architect from manufacturer's full range of standard colors, textures, and patterns for products of type indicated.
 - 2. Provide tile trim and accessories that match color and finish of adjoining flat tile.
- D. Mounting: Where factory mounted tile is required, provide back or edge mounted tile assemblies as standard with manufacturer unless another mounting method is indicated.
 - 1. Where tile is indicated for installation in wet areas, do not use back or edge mounted tile assemblies unless tile manufacturer specifies that this type of mounting is suitable for these kinds of uses and has been successfully used on other projects.

2.2 TILE PRODUCTS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products by Dal-Tile Corp (as listed below) or approved equivalent product by one of the following:
 - 1. American Olean Tile Co., Inc.
 - 2. Buchtal Corp, USA
 - 3. Summitville Tiles, Inc.
- B. Tile Type CT-P: Ceramic Tile Plank - Floor.
 - 1. Basis-of-Design Product: Dal-tile – Emerson Wood
 - 2. Size: 8” x 48”
 - 3. Description: Colorbody Porcelain floor
 - 4. Color: As selected from manufactures standard options
- C. Tile Type QT: Quarry tile - Floor
 - 1. Basis-of-Design Product: Dal-tile – Sure Step II & Paver
 - 2. Size: 6” x 6”
 - 3. Description: Fired Ceramic with textured cross treads and Quarry Guard
 - 4. Color: As selected from manufacturer’s color options – Q31, Q33 or Q37
 - 5. Texture: As selected from manufactures standard options – Q30, Q32 or Q36
- D. Tile Type QTB: Quarry Tile – floor (cove base)
 - 1. Basis-of-Design Product: Dal-tile; “P-3665”
 - 2. Size: 6” x 6” cove base
 - 3. Description: tile base
 - 4. Color: as selected from the manufacturer’s color options (in the quarry tile and quarry textures line)

5. Cove tile to be installed as indicated on finish floor plan and schedules and below frp panels (transition to floor)

E. Tile Type CWT-1: Wall tile (field)

1. Basis-of-Design Product: Dal-tile – Panoramic Porcelain Surfaces
2. Size: 15 ½” x 31” Wall Tile
3. Thickness: 6mm or 12mm
4. Color: as selected from the manufacturer’s full range of standard color options (elemental or industrial selection category)

F. Tile Type CWT-2: Mosaic wall tile. (Accent strip)

1. Basis-of-Design Product (field): Dal-tile – Color Wheel Mosaics – penny round mosaic
2. Size: 12” x 12” sheets
3. Color: as selected from the manufacturer’s full range of standard color options
4. Product Location: (provide 12” high continuous strip @ 60” a.f.f.-all walls)

2.3 SETTING MATERIALS

A. Latex Portland Cement Mortar: ANSI A118.4, composition as follows:

1. Prepackaged dry mortar mix composed of portland cement, graded aggregate, and the following dry polymer additive in the form of a re-emulsifiable powder to which only water is added at job site.
 - a. Dry Polymer Additive: Manufacturer's standard.
2. Latex additive (water emulsion) of type described below, serving as replacement for part or all of gauging water, combined at job site with prepackaged dry mortar mix supplied or specified by latex additive manufacturer.
 - a. Latex Type: Manufacturer's standard.

2.4 GROUTING MATERIALS

A. Commercial Portland Cement Grout: ANSI A118.7, color as indicated.

2.5 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

2.6 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with requirements of Division 7 Section "Joint Sealers," including ASTM C 920 as referenced by Type, Grade, Class, and Uses.

- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
- C. Multipart Pourable Urethane Sealant for Use T: Type M; Grade P; Class 25; Use T.
 - 1. Provide products by one of the following or approved equal:
 - a. Dupont : StoneTech Heavy Duty Grout Sealer
 - b. Custom Building Products : Aqua Mix Sealer's Choice Gold

2.7 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with requirements of referenced standards and manufacturers including those for accurate proportioning of materials, water, or additive content; type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and areas where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm, dry, clean, and free from oil or waxy films and curing compounds.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

3.2 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standard: Comply with parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile" that apply to type of setting and grouting materials and methods indicated.
- B. TCA Installation Guidelines: TCA "Handbook for Ceramic Tile Installation"; comply with TCA installation methods indicated, or if not otherwise indicated, as applicable to installation conditions shown.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built in items for

straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.

- E. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths unless otherwise shown.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.
- F. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw cut joints after installation of tiles.
 - 1. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."
- G. Grout tile to comply with referenced installation standards, using grout materials indicated.
 - 1. Mix and install proprietary components to comply with grout manufacturer's directions.

3.3 WALL INSTALLATION METHODS

- A. Interior Wall Installation, Tile over existing painted CMU wall:
 - 1. Tile Installation F113: Thin-set mortar; TCA F113.
 - a. Tile Type: Porcelain.
 - b. Thin-Set Mortar: Latex-portland cement mortar. : basis of design (or approved equal) –MAPEI Kerabond/Keralastic System
 - c. Grout: Polymer-modified grout.
 - d. Mortar Bed: basis of design (or approved equal) -MAPEI, Planicrete AC blended with 3:1 site mix
 - e. Mortar Bed Bond Coat (slurry): basis of design (or approved equal) –MAPEI Kerabond/Keralastic System

3.4 CLEANING AND PROTECTION

- A. Cleaning: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than fourteen (14) days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

- C. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensures that tile is without damage or deterioration at time of Substantial Completion.
 - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
 - 2. Prohibit foot and wheel traffic from tiled floors for at least seven (7) days after grouting is completed.

- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 093000

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient molding accessories.

B. Related Sections:

1. Division 09 Sections "Carpet", "Resilient Tile Flooring" & "Ceramic Tile"

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.5 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
 1. 48 hours before installation.
 2. During installation.
 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.6 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 2 percentage of total length, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

- A. Resilient Base:
 - 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. Armstrong World Industries, Inc.
 - b. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - c. Estrie Products International; American Biltrite (Canada) Ltd.
 - d. Flexco, Inc.
 - e. Johnsonite.
 - f. PRF USA, Inc.
 - g. Roppe Corporation, USA.
 - h. VPI, LLC; Floor Products Division.
- B. Resilient Base Standard: ASTM F 1861.
 - 1. Material Requirement: Type TV (vinyl, thermoplastic).
 - 2. Manufacturing Method: Group I (solid, homogeneous).
 - 3. Style: Cove (base with toe).
- C. Minimum Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: 10 feet sectional pieces in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Inside Corners: Job formed.
- H. Finish: Satin.
- I. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.2 RESILIENT MOLDING ACCESSORY

- A. Resilient Molding Accessory:

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. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - b. Flexco, Inc.
 - c. Johnsonite.
 - d. Roppe Corporation, USA.
 - e. VPI, LLC; Floor Products Division.
- B. Description: Carpet edge for glue-down applications; Nosing for carpet; Nosing for resilient floor covering; Reducer strip for resilient floor covering; Transition strips. Material: Vinyl.
- C. Profile and Dimensions: As indicated.
- D. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
- C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.
- D. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, visible adhesive and surface blemishes from resilient stair treads before applying liquid floor polish.
- E. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Solid vinyl floor tile.

- B. Related Sections:

- 1. Section 096513 "Resilient Base and Accessories" for rubber treads and tiles used at interior stairs and ramps, and resilient base, transition strips, and other accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 1. Show details of special patterns.
- C. Samples for Initial Selection: For each type of floor tile indicated.
- D. Samples for Verification: Full-size units of each color and pattern of floor tile required.
- E. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one (1) box for every fifty (50) boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F (10 deg C)** or more than **90 deg F (32 deg C)**. Store floor tiles on flat surfaces.

1.9 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 floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than **55 deg F (13 deg C)** or more than **95 deg F (35 deg C)**.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

1. Resilient Flooring, Base and Associated Accessories: Comply with RFCI FloorScore Program.
 2. Floor Sealer/ Finish applied within the building interior: VOC content not to exceed 100 g/L.
- B. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 SOLID VINYL FLOOR TILE (“LVT”)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Teknoflor Rare Plank HPD by Teknoflor, 1005 S. 60th Street, Milwaukee, WI 53214,(800.522.9166) www.teknoflor.com or comparable product by one of the following:
1. Armstrong Flooring Commercial
 2. Altro Group.
 3. Congoleum Corporation.
 4. Johnsonite; a Tarkett company.
 5. Mannington Mills, Inc.
- B. Tile Standard: ASTM F 1700. “Standard Specification for Solid Vinyl Tile”
1. Class: Class III
 2. Type: B
- C. Thickness: **0.118 inch**
- D. Size: **7.09” by 47.24” inches**
- E. Installation Method: Full-spread adhesive.
- F. Colors and Patterns: Basis of design – As selected by owner/architect from Manufacturer’s full range of colors

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 floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 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 floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile 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: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
 - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m)** in 24 hours.
 - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
- 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 floor tiles until they are the same temperature as the space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles square with room axis, or in pattern where indicated.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- H. Seamless Installation:
 - 1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to permanently fuse sections into a seamless flooring. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.
 - 2. Chemically Bonded Seams: Bond seams with chemical-bonding compound to permanently fuse sections into a seamless flooring. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.

2. Sweep and vacuum surfaces thoroughly.
 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover floor tile until Substantial Completion.

END OF SECTION 096519

SECTION 097720 – DECORATIVE FIBERGLASS REINFORCED WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Prefinished polyester glass reinforced plastic sheets and adhered to unfinished gypsum and/or cementitious wallboard.
 - 1. PVC trim.
 - 2. PVC Wall base.
- B. Products Not Furnished or Installed under This Section:
 - 1. Gypsum [Cementitious] substrate board.
 - 2. Resilient Base.

1.2 RELATED SECTIONS

- A. Section 092910 – Gypsum [Cementitious] board assemblies.
- B. Section 061000 – Rough Carpentry.
- C. Section 093000 – Tiling.
- D. Section 096513 – Resilient Base.

1.3 REFERENCES

- A. American Society for Testing and Materials: Standard Specifications (ASTM)
 - 1. ASTM D 256 - Izod Impact Strengths (ft #/in)
 - 2. ASTM D 570 - Water Absorption (%)
 - 3. ASTM D 638 - Tensile Strengths (psi) & Tensile Modulus (psi)
 - 4. ASTM D 790 - Flexural Strengths (psi) & Flexural Modulus (psi)
 - 5. ASTM D 2583- Barcol Hardness
 - 6. ASTM D 5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
 - 7. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

- A. Product Data: Submit sufficient manufacturer's data to indicate compliance with these specifications, including:

1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
- B. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.
- C. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.
- D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.
1. Submit complete with specified applied finish.
 2. For selected patterns show complete pattern repeat.
 3. Exposed Molding and Trim: Provide samples of each type, finish, and color.
- E. Manufacturers Material Safety Data Sheets (MSDS) for adhesives, sealants and other pertinent materials prior to their delivery to the site.

1.5 QUALITY ASSURANCE

- A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
1. ASTM E 84 (Method of test for surface burning characteristics of building Materials)
 - a. Wall Required Rating – Class [A] [C].
- B. Sanitary Standards: System components and finishes to comply with:
1. United States Department of Agriculture (USDA) requirements for food preparation facilities, incidental contact.
 2. Food and Drug Administration (FDA) 1999 Food Code 6-101.11.
 3. Canadian Food Inspection Agency (CFIA) requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials factory packaged on strong pallets.
- B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (range of 60 to 75°F) for 48 hours prior to installation.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70°) and ventilation consistent with good working conditions for finish work.

- B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
 - 1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

1.8 WARRANTY

- A. Furnish one (1) year guarantee against defects in material and workmanship.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. Basis of Design Product: Subject to compliance with requirements, provide Marlite Artizan FRP ;1 Marlite Drive, Dover, OH 44622. 800-377-1221 FAX (330) 343-4668 Email: info@marlite.com www.marlite.com. or approved equivalent.

2.2 PANELS

- A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.
 - 1. Coating: Multi-layer print, primer and finish coats or applied over-layer.
 - 2. Dimensions:
 - a. Thickness – 0.090 “ (2.29mm) nominal
 - b. Width - 4'-0” (1.22m) nominal
 - c. Length – [10'-0” (3.0m)][8'-0” (2.4m)][As indicated on the drawings] nominal
 - 3. Tolerance:
 - a. Length and Width: +/-1/8 “ (3.175mm)
 - b. Square - Not to exceed 1/8 “ for 8 foot (2.4m) panels or 5/32 “ (3.96mm) for 10 foot (2.4m) panels
- B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
 - 1. Flexural Strength - 1.0×10^4 psi per ASTM D 790. (7.0 kilogram-force/square millimeter)
 - 2. Flexural Modulus - 3.1×10^5 psi per ASTM D 790. (217.9 kilogram-force/square millimeter)
 - 3. Tensile Strength - 7.0×10^3 psi per ASTM D 638. (4.9 kilogram-force/square millimeter)
 - 4. Tensile Modulus - 1.6×10^5 psi per ASTM D 638. (112.5 kilogram-force/square millimeter)
 - 5. Water Absorption - 0.72% per ASTM D 570.
 - 6. Barcol Hardness (scratch resistance) of 35 55 as per ASTM D 2583.

7. Izod Impact Strength of 72 ft. lbs./in ASTM D 256

- C. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.
- D. Front Finish: In accordance with preapproved sample.
 - a. Color: As determined by the owner/architect from the following standard colors from the basis of design manufacturer:
 - 1) Marlite Artizan FRP is available in a variety of colors and patterns, including:
 - a) 148 Monticello Anigre
 - b) 310 Sierra Maple
 - c) 715 Mahogany
 - d) 5408 Monterey Sand
 - e) 5409 Townsend
 - f) 194 Cody
 - g) 209 Adara
 - h) 211 Grizel
 - i) 181-G1212 Dusk
 - j) 182-G1212 Oxide
 - k) 5415-G88 Coronado
 - l) 5416-G88 Catalina
 - m) T936-G44 Milan
 - n) T938-G44 Tuscany
 - o) T938-G88 Tuscany
 - p) T939-G44 Verona
 - q) T939-G88 Verona
 - r) T5413-G1212 Genoa

Custom patterns and colors are available. Minimum quantities may apply. Contact a Marlite representative for details.

- b. Surface [Specifier to choose.] Marlite Standard FRP and Symmetrics are available on two standard surface textures. Pebbled (indicated by "P" designation i.e., P 100 White) and Smooth (indicated by "S" designation i.e., S 100 White). All other Marlite FRP products are smooth surface texture.
- c. Fire Rating : Marlite FRP -Class A (I) Fire Rating.
- d. Size: Specifier to choose, or as indicated on drawings.] standard sizes are;
 - 1) Marlite FRP / Artizan
 - a) 48" x 96" [1.2m x 2.4m] x .090" (3mm) nom.

2.3 BASE

- A. Marlite Base Molding for 0.090" (2.29mm) thick FRP Panels
 - 1. Color: [Black] [Quarry Red].

2. Profiles:
 - a. M 612 FRP Base Molding, 10' length
 - b. M 651 Inside Corner
 - c. M 660 Outside Corner
 - d. M 620 LH End Cap
 - e. M 625 RH End Cap

B. Marlite Cove Base Molding for .090" (2.29mm) thick FRP Panels

1. Color: [White]
2. Profile: [V65 Base Cove]

2.4 MOLDINGS

A. Aluminum Trim: Heavy weight extruded aluminum 6063-T5 alloy prefinished at the factory.

1. Profiles :
 - a. F 550 Inside Corner, 8' length
 - b. F 561 Outside Corner, 8' length
 - c. F 565 Division, 8' length
 - d. F 570 Edge, 8' length
 - e. Color: Brite Anodized

B. Aluminum Trim: Heavy weight extruded aluminum 6063-T5 alloy prefinished at the factory.

1. Profiles:
 - a. A551 Inside Corner, 8' length
 - b. A560 Outside Corner, 8' length
 - c. A565 Division, 8' length
 - d. A570 Edge, 8' length

Color: Factory Oven-Baked Finish to match spec'd panel

C. PVC Trim: Thin-wall semi-rigid extruded PVC.

1. M 350 Inside Corner, [8' length][10' length]
2. M 360 Outside Corner, [8' length][10' length]
3. M 365 Division, [8' length][10' length]
4. M 370 Edge, [8' length][10' length]
5. V 177 135° Inside Corner [8' length] [White only]
6. V 179 135° Outside Corner [8' length] [White only]
7. Color: [White][Beige][Natural Almond][Ivory][Silver][Light Grey][Black]

D. SaniSeal Trim: Co-extruded, dual-durometer polypropylene/monprene profiles with Dual-Seal Technology and high-performance pressure sensitive adhesive.

1. S650 Inside Corner, 10' length
2. S660 Outside Corner, 10' length
3. S665 Division, 8' length
4. S670 Edge, 10' length
5. Color: [White][Umber][Slate][Tan][Black][Custom, per specification]

E. Outside Corner Guard:

1. F 560SS Stainless Corner Guard, [8' length][10' length]
2. Finish: #4 brushed satin
3. M 961 PVC Outside Corner Guard
 - a. Color: [White, [8' length][10' length]][Natural Almond, [8' length][10' length]][Ivory, 10' length][Silver, 10' length][Light Grey, 10' length]

2.5 ACCESSORIES

A. Fasteners: Non-staining nylon drive rivets.

1. Match panel colors.
2. Length to suit project conditions.

B. Adhesive: Either of the following construction adhesives complying with ASTM C 557.

1. Marlite C-551 FRP Adhesive - Water- resistant, non-flammable adhesive.
2. Marlite C-915 Construction Adhesive - Flexible, water-resistant, solvent based adhesive, formulated for fast, easy application.
3. Titebond Advanced Polymer Panel Adhesive – VOC compliant, non-flammable, environmentally safe adhesive.

C. Sealant:

1. Marlite Brand MS-250 Clear Silicone Sealant.
2. Marlite Brand MS-251 White Silicone Sealant.
3. Marlite Brand - Color Match Sealant.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.

1. Verify that stud spacing does not exceed 24" (61cm) on-center.

B. Repair defects prior to installation.

1. Level wall surfaces to panel manufacturer's requirements. Remove protrusions and fill indentations.

3.2 INSTALLATION

- A. Comply with manufacturer's recommended procedures and installation sequence.
- B. Cut sheets to meet supports allowing 1/8" (3 mm) clearance for every 8 foot (2.4m) of panel.
 1. Cut and drill with carbide tipped saw blades or drill bits, or cut with shears.
 2. Pre-drill fastener holes 1/8" (3mm) oversize with high speed drill bit.
 - a. Space at 8" (200mm) maximum on center at perimeter, approximately 1" from panel edge.
 - b. Space at in field in rows 16' (40.64cm) on center, with fasteners spaced at 12" (30.48 cm) maximum on center.
- C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
 1. Install panels with manufacturer's recommended gap for panel field and corner joints.
 - a. Adhesive trowel and application method to conform to adhesive manufacturer's recommendations.
 - b. Drive fasteners for snug fit. Do not over-tighten.
- D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.
 1. All moldings must provide for a minimum 1/8 " (3mm) of panel expansion at joints and edges, to insure proper installation.
 2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

3.3 CLEANING

- A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.
- B. Refer to manufacturer's specific cleaning recommendations Do not use abrasive cleaners.

END OF SECTION 097720

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Steel.
 - 2. Galvanized metal.
 - 3. Exterior Masonry.
 - 4. Wood.
 - 5. Plastic trim fabrications.
 - 6. Exterior fiber cement trim and siding.
- B. Related Sections include the following:
 - 1. Division 5 Sections for shop priming of metal substrates with primers specified in this Section.
 - 2. Division 8 Sections for factory priming windows and doors with primers specified in this Section.
 - 3. Division 9 Section "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
 - 3. Documentation of SSPC-Paint compliance for each product category specified in Part 2.

1.4 QUALITY ASSURANCE

- A. SSPC (The Society for Protective Coatings)
 - 1. Products: Complying with SSPC Specifications where indicated.
- B. OTC (Ozone Transport Commission)
 - 1. Products: Complying with OTC Regulations regarding lower VOC limits.

C. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by Duron, Inc. or an equivalent product by one of the following:
1. Benjamin Moore & Co.
 2. Sherwin-Williams Company.
 3. M.A.B. Paints.
 4. McCormick Paints.
 5. PPG Architectural Finishes, Inc.
 6. Vista Paint.

2.2 PAINT, GENERAL

- A. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- B. Colors: As selected by Architect from manufacturer's full range, up to five (5) Color Selections.

2.3 METAL PRIMERS

- A. Universal Water Based Primer: SSPC-Paint 24.
1. Basis of Design: Zinser 1-2-3 Primer.
 2. VOC Content: E Range of E1.

2.4 EXTERIOR W.B. COATING

- A. Waterborne Pigmented Emulsion Coating (Semigloss): MPI #163 (Gloss Level 5).
 - 1. Basis of Design: Zinser 1-2-3 Primer.
 - 2. VOC Content: E Range of E1

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 work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove plates, machined surfaces, and similar items already in place that 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.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance of paint materials with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Steel and Galvanized-Metal Substrates:
 - 1. Latex Over Water-Based Primer System: MPI EXT 5.3H.
 - a. Prime Coat: Waterborne galvanized-metal primer.
 - b. Intermediate Coat: Exterior latex matching topcoat.
 - c. Topcoat: Exterior latex (semi-gloss).

- B. CMU Substrates:
 - 1. Latex over Alkali-Resistant Primer System: MPI EXT 4.2L.
 - a. Prime Coat: Alkali-resistant primer.
 - b. Intermediate Coat: Exterior latex matching topcoat.
 - c. Topcoat: Exterior latex (semi-gloss).

- C. Plastic Trim Fabrication Substrates:
 - 1. Latex System:
 - a. Prime Coat: Primer, bonding, water based, MPI #17.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.

- D. Exterior Gypsum Board Substrates:
 - 1. Latex System:
 - a. Prime Coat: Latex, exterior, matching topcoat.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.

- E. Exterior Fiber Cement Siding and Trim
 - 1. Latex System:
 - a. Prime Coat: Primer, bonding, water based, MPI #17.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following interior surface materials:
 - 1. Concrete masonry units (CMU).
 - 2. Steel.
 - 3. Galvanized metal.
 - 4. Gypsum board.
 - 5. Wood.
- B. Related Sections include the following:
 - 1. Division 5 Sections for shop priming of metal with primers specified in this Section.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
 - 3. Documentation of SSPC-Paint compliance for each product category specified in Part 2.

1.4 QUALITY ASSURANCE

- A. SSPC (The Society for Protective Coatings)
 - 1. Products: Complying with SSPC Specifications where indicated.
- B. OTC (Ozone Transport Commission)
 - 1. Products: Complying with OTC Regulations regarding lower VOC limits.
- C. MPI Standards:
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."

2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by Duron, Inc. or an equivalent product by one of the following:
 1. Benjamin Moore & Co.
 2. Columbia Paint & Coatings.
 3. Davis Paint Company.
 4. Del Technical Coatings.
 5. Sherwin-Williams Company
 6. Hallman Lindsay Quality Paints.
 7. M.A.B. Paints.
 8. McCormick Paints.
 9. PPG Architectural Finishes, Inc.
 10. Vista Paint.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 1. Provide materials for use within each paint system that are 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, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Colors: As selected by Architect from manufacturer's full range. See color schedule on drawings.

- C. Low-Emitting Requirements: Comply with Division 01 Section “Indoor Air Quality Requirements”.

2.3 BLOCK FILLERS

- A. Interior/Exterior Latex Block Filler: MPI #4.
 - 1. VOC Content: E Range of E3. Basis of Design: PrepRite Block Filler (B25W25) by Sherwin-Williams Company.

2.4 PRIMERS/SEALERS

- A. Interior Latex Primer/Sealer: MPI #50.
 - 1. VOC Content: E Range of E2.
 - 2. Basis of Design: Harmony Interior Latex Primer by Sherwin -Williams Company.
- B. Interior Latex Primer/Sealer for WOOD: MPI #50.
 - 1. VOC Content: E Range of E2.
 - 2. Basis of Design: PrepRite 200 Interior Latex Primer by Sherwin-Williams Company.

2.5 METAL PRIMERS

- A. Universal Water Based Primer: SSPC-Paint 24.
 - 1. VOC Content: E Range of E1.
 - 2. Basis of Design: Pro-Cryl (B66-310 Series) by Sherwin-Williams Company.

2.6 WATERBORNE COATING

- A. Waterborne Pigmented Emulsion Coating (Semi-gloss): MPI #163 (Gloss Level 5)
 - 1. VOC Content: E Range of E1
 - 2. Basis of Design: Duron Ultra Deluxe Semi-gloss.

2.7 LATEX PAINTS

- A. Institutional Low-Odor/VOC Latex (Semi-gloss): MPI #144 (Gloss Level 5).
 - 1. VOC Content: E Range of E3.
 - 2. Basis of Design: Harmony Low Odor Interior Latex Finish by Sherwin-Williams Company.
- B. Institutional Low-Odor/VOC Latex (Semigloss): MPI #147 (Gloss Level 5).
 - 1. VOC Content: E Range of E3.
 - 2. Basis of Design: Duron Ultra Semi-gloss.

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 work.
- B. Maximum Moisture Content of Surface Materials: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Gypsum Board: 12 percent.
- C. Verify suitability of surface materials, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of surface materials and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to surface materials indicated.
- B. Remove plates, machined surfaces, and similar items already in place that 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.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean surface materials of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime with compatible primers as required to produce paint systems indicated.
- D. Concrete: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Clay Masonry: Remove efflorescence and chalk. Do not paint surfaces if moisture content of surfaces or alkalinity of mortar joints to be painted exceed that permitted in manufacturer's written instructions.

- F. Concrete Masonry: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- G. Steel: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- H. Galvanized-Metal: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum: Remove surface oxidation.
- J. Wood:
 - 1. Scrape multiple layers of existing paint to ensure proper adhesion of new paint. Field verify existing surfaces to be painted to become familiar with the existing surfaces to be re-painted.
 - 2. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 3. Sand surfaces that will be exposed to view, and dust off.
 - 4. Prime edges, ends, faces, undersides, and backsides of wood.
 - 5. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- K. Gypsum Board: Do not begin paint application until finishing compound is dry and sanded smooth.
- L. Existing Concrete: Prepare existing surfaces with a dry diamond grinding / vacuum process. Assume 800 grit finish – five (5) step minimum process by a Concrete Refinishing System Manufacturer approved installer.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. If primers are chipped, apply additional touch-up primer until full coverage is achieved prior to application of topcoats.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

- E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 - 1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - 2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. CMU:

1. Institutional Low-Odor/VOC Latex System:

- a. Prime Coat: Interior/exterior latex block filler.
- b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
- c. Topcoat: Institutional low-odor/VOC interior latex (semigloss).

B. Steel and Galvanized-Metal:

1. Waterborne System:

- a. Prime Coat: Universal Water Based Primer.
- b. Intermediate Coat: Waterborne Coating.
- c. Topcoat: Waterborne Coating (semigloss).

C. Gypsum Board:

1. Institutional Low-Odor/VOC Latex System:

- a. Prime Coat: Interior latex primer/sealer.
- b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
- c. Topcoat: Institutional low-odor/VOC interior latex (eggshell).

D. Wood (Opaque finish):

1. Institutional Low-Odor/VOC Latex System:

- a. Prime Coat: Interior latex primer/sealer for WOOD.
- b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
- c. Topcoat: Institutional low-odor/VOC interior latex (eggshell).

E. Wood (Natural finish):

1. Institutional Low-Odor/VOC polyurethane system:

- a. Prime Coat: Interior latex primer/sealer.
- b. Filler Coat: Institutional low-odor/VOC paste wood filler.
- c. Intermediate Coat: Institutional low-odor/VOC urethane matching topcoat.
- d. Topcoat: Institutional low-odor/VOC urethane (gloss).

END OF SECTION 099123

SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes surface preparation and application of high-performance coating systems on the following substrates:

- 1. Interior Substrates:

- a. Concrete masonry units (CMU).
 - b. Gypsum board.

- B. Related Sections include the following:

- 1. Division 5 Sections for shop priming of metal substrates with primers specified in this Section.
 - 2. Division 9 painting Sections for special-use coatings and general field painting.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.

1.4 QUALITY ASSURANCE

- A. Master Painters Institute (MPI) Standards:

- 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and coating systems indicated.

- B. Mockup for final color approval: Coat mockup surfaces to comply with the following requirements, using materials and colors indicated for final unit of Work.

- 1. Locate mockups as directed by Architect.
 - 2. Include full height wall surface, from floor or wainscot to ceiling, at a minimum width of 10 feet, as part of mockups.
 - 3. Obtain final approval of colors prior to proceeding with the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. Provide products of same manufacturer for each coat in a coating system.
- B. Colors: As selected by Architect from manufacturer's full range. See color schedule on drawings.

2.2 BLOCK FILLERS

- A. Interior/Exterior Latex Block Filler: MPI#4.
 - 1. Products: Subject to compliance with requirements, provide products by Sherwin-Williams Company or the equivalent products by one of the following:
 - a. Sherwin-Williams Company (The); PrepRite, Int/Ext Block Filler, B25W25
 - b. Benjamin Moore & Co.; Moorcraft, Super Craft Latex Block Filler, 285-01.
 - c. Columbia Paint & Coatings; High Performance, Int/Ext Acrylic Latex Block Filler, 05-055-PP.
 - d. Coronado Paint; Super Kote 5000, Commercial Latex Block Filler, 946-11.
 - e. General Paint; Block Filler, 70-224.
 - f. ICI Paints; Devoe Coatings, Bloxfil Acrylic Block Filler, 4000.
 - g. Miller Paint; Ext. Block Filler, 6015.
 - h. PPG Architectural Finishes, Inc.; Interior/Exterior Latex Block Filler, 6-12.
 - i. Vista Paint; Block Kote, 040.

2.3 EPOXY COATINGS

A. Epoxy, Cold-Cured, Gloss: MPI #77.

1. Products: Subject to compliance with requirements, provide products by Sherwin-Williams Company or the equivalent products by one of the following:
 - a. Sherwin-Williams Company (The); Pro Industrial High Performance, (Basis-of-Design).
 - b. Benjamin Moore & Co.; Polyamide Epoxy Coating, CM36/CM37.
 - c. Columbia Paint & Coatings; Insl-x, Insl-Tile II, EP-5300.
 - d. Coronado Paint; Polyamide Epoxy Coating, 101 Line.
 - e. ICI Paints; Devoe/Fuller, Guardcote, DP34UXX.
 - f. Miller Paint; PPG Aquapon, Epoxy Cold Cured - Gloss, 95-1.
 - g. PPG Architectural Finishes, Inc.; Aquapon, Epoxy Cold Cured Gloss, 95-1.
 - h. Spectra-Tone; Insl-x, Insl-Tile II, EP5300 Series.
 - i. Tower Paint; Epoxy High Gloss Enamel, T8700.

B. Water-Based Epoxy (Interior and Exterior): MPI #115.

1. Products: Subject to compliance with requirements, provide products by Sherwin-Williams Company or the equivalent products by one of the following:
 - a. Sherwin-Williams Company (The); Industrial & Marine, Water Based Catalyzed Epoxy, B70W Series (Basis-of-Design).
 - b. Benjamin Moore & Co.; Acrylic Epoxy Gloss "A", Hardener "B", M43/M44.
 - c. Columbia Paint & Coatings; Dupont, Corlar Waterborne Acrylic Epoxy, 76P.
 - d. Coronado Paint; Water-Based Amine Adduct Epoxy, 142 Line.
 - e. General Paint, Ameron; Amercoat 335, 96 Line.
 - f. ICI Paints; Devoe Coatings, Tru Glaze WB Epoxy Coating, 4418.
 - g. Miller Paint; Waterborne Epoxy Gloss, 4300/4440.
 - h. PPG Architectural Finishes, Inc.; Aquapon, Waterborne Epoxy, 98-1/98-98.
 - i. Spectra-Tone; Insl-x Aqua-Tile W.B. Epoxy, ATA 100 Series.
 - j. Tower Paint, Sierra, Wall & Trim Enamel, S50.

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 work.
 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Masonry (Clay and CMU): 12 percent.
 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 3. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

4. Coating application indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
- D. Clay Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 1. Clean surfaces with pressurized water. Use pressure range of 100 to 600 psi at 6 to 12 inches.
- E. CMU Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions.
 1. Use applicators and techniques suited for coating and substrate indicated.
 2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- C. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.5 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. CMU Substrates:
 - 1. Water-Based Epoxy Coating System:
 - a. Prime Coat: Interior/exterior latex block filler, MPI #4.
 - b. Intermediate Coat: Water-based epoxy (interior and exterior), MPI #115.
 - c. Topcoat: Water-based epoxy (interior and exterior), MPI #115.

END OF SECTION 099600

SECTION 101400 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following types of signs:
 - 1. Interior ADA Room Signs.
 - 2. Symbols of Accessibility.
 - 3. Special Signs.
 - 4. Interior Building Plan Directory Signs.
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 1 Section "Temporary Facilities and Controls" for temporary project identification signs.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.
- C. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
 - 1. Provide message list for each sign required, including large-scale details of wording and layout of lettering.
 - 2. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.
 - 3. Furnish full-size spacing templates for individually mounted dimensional letters and numbers.
- D. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.
 - 1. Samples for initial selection of color, pattern, and texture:
 - a. Cast Acrylic Sheet and Plastic Laminate: Manufacturer's color charts consisting of actual sections of material including the full range of colors available for each material required.

1. Transparent Sheet: Where sheet material is indicated as "clear" provide colorless sheet in matte finish, with light transmittance of 92 percent, when tested in accordance with the requirements of ASTM D 1003.
 - b. Aluminum: Samples of each finish type and color, on 6-inch-long sections of extrusions and not less than 4-inch squares of sheet or plate, showing the full range of colors available.
2. Samples for verification of color, pattern, and texture selected, and compliance with requirements indicated:
 - a. Cast Acrylic Sheet and Plastic Laminate: Provide a sample of each type of sign. Include a sign for each color, texture, and pattern required. On each panel include a representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.
 - b. Aluminum: Samples of each finish type and color, on 6-inch-long sections of extrusions and not less than 4-inch squares of sheet or plate. Where finishes involve normal color and texture variations include sample sets showing the full range of variations expected.
 - c. Dimensional Letters: Provide one full-size representative sample of each dimensional letter type required, showing letter style, color, and material finish and method of attachment.
- E. Certification: Provide written certification from the sign manufacturer that signage meets ADA requirements.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.
- B. Design Criteria: The drawings and specifications indicate size, profiles, and dimensional requirements of signs and are based on the specific type and model indicated. Signs by other manufacturers may be considered provided that deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.
- C. Signage must comply with "Americans with Disabilities" (ADA) standards.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

2.1 MATERIALS

- A. Polycarbonate Sheet: Of thickness indicated, manufactured by extrusion process, coated on both surfaces with abrasion-resistant coating:
1. Impact Resistance: 16 ft-lbf/in. (854 J/m) per ASTM D 256, Method A.
 2. Tensile Strength: 9000 lbf/sq. in. (62 MPa) per ASTM D 638.
 3. Flexural Modulus of Elasticity: 340,000 lbf/sq. in. (2345 MPa) per ASTM D 790.
 4. Heat Deflection: 265 deg F (129 deg C) at 264 lbf/sq. in. (1.82 MPa) per ASTM D 648.
 5. Abrasion Resistance: 1.5 percent maximum haze increase for 100 revolutions of a Taber abraser with a load of 500 g per ASTM D 1044.

2.2 PANEL SIGNS

- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. ACE Sign Systems, Inc.
 2. Advance Corporation; Braille-Tac Division.
 3. Allen Industries Architectural Signage
 4. Allenite Signs; Allen Marking Products, Inc.
 5. APCO Graphics, Inc.
 6. ASI-Modulex, Inc.
 7. Best Sign Systems Inc.
 8. Bunting Graphics, Inc.
 9. Fossil Industries, Inc.
 10. Gemini Incorporated.
 11. Grimco, Inc.
 12. Innerface Sign Systems, Inc.
 13. InPro Corporation.
 14. Matthews International Corporation; Bronze Division.
 15. Mills Manufacturing Company.
 16. Mohawk Sign Systems.
 17. Nelson-Harkins Industries.
 18. Seton Identification Products.
 19. Signature Signs, Incorporated.
 20. Supersine Company (The).
- C. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner, complying with the following requirements:
1. Laminated, Polycarbonate-Faced Sheet: 0.060-inch- (1.52-mm-) thick, polycarbonate face sheet laminated to each side of 0.197-inch- (5.0-mm) thick phenolic backing.
 2. Edge Condition: Beveled.
 3. Corner Condition: Square.
 4. Mounting: Unframed.
 - a. Wall mounted with concealed anchors.
 - b. Manufacturer's standard anchors for substrates encountered.
 5. Color: As selected by Architect from manufacturer's full range.
 6. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch (0.8 mm) above surface with contrasting colors.

- D. Exterior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner, complying with the following requirements:
1. Fiberglass Sheet: 0.125-inch- (3.18-mm-) thick sheet.
 2. Edge Condition: Square cut.
 3. Corner Condition: Rounded.
 4. Mounting: Unframed.
 - a. Post mounted.
 - b. Manufacturer's standard noncorroding fasteners.
 5. Color: As required by sign type or selected by Architect.
- E. Tactile and Braille Sign: Manufacturer's standard process for producing text and symbols complying with ADA-ABA Accessibility Guidelines and with ICC/ANSI A117.1. Text shall be accompanied by Grade 2 Braille. Produce precisely formed characters with square-cut edges free from burrs and cut marks; Braille dots with domed or rounded shape.
1. Panel Material: Polycarbonate.
 2. Raised-Copy Thickness: Not less than 1/32 inch (0.8 mm).
- F. Applied Vinyl: Die-cut characters from vinyl film of nominal thickness of 3 mils (0.076 mm) with pressure-sensitive adhesive backing. Apply copy to exposed face of panel sign.
- G. Panel Sign Schedule:
1. Sign Type, Room Name:
 - a. Sign Size: As indicated.
 - b. Message Panel Material: As indicated.
 - c. Message Panel Finish/Color: Selected by Architect.
 - d. Background Finish/Color: Selected by Architect.
 - e. Character Size: As indicated.
 - f. Character Finish/Color: Selected by Architect.
 - g. Text/Message: As indicated.
 - h. Location: As indicated.
 - i. Room: As indicated.
 2. Sign Type, ADA Accessible Toilet Rooms:
 - a. Sign Size: As indicated.
 - b. Message Panel Material: As indicated.
 - c. Message Panel Finish/Color: Selected by Architect.
 - d. Background Finish/Color: Selected by Architect.
 - e. Character Size: As indicated.
 - f. Character Finish/Color: Selected by Architect.
 - g. Text/Message: As indicated.
 - h. Location: Public Toilet Rooms.
 - i. Room: MEN, WOMEN.

PART 3 - EXECUTION

3.1 INSTALLATION

SIGNAGE

- A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
 - 1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
 - 2. Attach signs with concealed theft-proof fasteners.
- B. Installation of Room Signs:
 - 1. Mount on wall or glass sidelight on the latch side of single doors and on the right side when facing double doors from corridor side, at heights indicated on the Drawings, unless specifically approved otherwise.

3.2 CLEANING AND PROTECTION

- A. At completion of the installation, clean soiled sign surfaces in accordance with the manufacturer's instructions. Repair or replace damaged signs as directed by the Architect. Protect units from damage until acceptance by Owner.

END OF SECTION 101400

SECTION 102113.19 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Solid-plastic toilet compartments configured as urinal screens.

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for blocking.
 - 2. Section 102800 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, and similar accessories mounted on toilet compartments.

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 for toilet compartments.

- B. Shop Drawings: For toilet compartments.

- 1. Include plans, elevations, sections, details, and attachment details.
 - 2. Show locations of centerlines of toilet fixtures.
 - 3. Show locations of floor drains.
 - 4. Show overhead support or bracing locations.

- C. Samples for Initial Selection: For each type of toilet compartment material indicated.

- 1. Include Samples of hardware and accessories involving material and color selection.

- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

- 1. Each type of material, color, and finish required for toilet compartments, prepared on **6-inch- (152-mm-)** square Samples of same thickness and material indicated for Work.
 - 2. Each type of hardware and accessory.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents and source.
 - 1. Door Hinges: One (1) hinge with associated fasteners.
 - 2. Latch and Keeper: One (1) latch and keeper with associated fasteners.
 - 3. Door Bumper: One (1) bumper with associated fasteners.
 - 4. Door Pull: One (1) door pull with associated fasteners.
 - 5. Fasteners: Ten (10) fasteners of each size and type.

1.7 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

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

2. [General Partitions Mfg. Corp.](#)
3. [Global Partitions; ASI Group.](#)
4. [Scranton Products.](#)
5. [Yemm & Hart Green Materials.](#)

- B. Toilet-Enclosure Style: Overhead braced.
- C. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than **1 inch (25 mm)** thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
 2. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
 3. Color and Pattern: One (1) color and pattern in each room as selected by Architect from manufacturer's full range.
- D. Pilaster Shoes: Manufacturer's standard design; stainless steel.
- E. Brackets (Fittings):
1. Full-Height (Continuous) Type: Manufacturer's standard design; extruded aluminum.

2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.
1. Material: Clear-anodized aluminum or stainless steel.
 - a. Zamac is not acceptable material. Provide heavy-duty hardware as required.
 2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
 3. Latch and Keeper: Manufacturer's standard surface-mounted 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.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match 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 compatible with related materials.

2.4 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: **ASTM B 221** (**ASTM B 221M**).
- C. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless-Steel Castings: ASTM A 743/A 743M.

2.5 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. 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.
- D. Door Size and Swings: Unless otherwise indicated, provide **24-inch- (610-mm-)** wide, in-swinging doors for standard toilet compartments and **36-inch- (914-mm-)** wide, out-swinging doors with a minimum **32-inch- (813-mm-)** wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
 - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
1. Maximum Clearances:
 - a. Pilasters and Panels: **1/2 inch (13 mm)**.
 - b. Panels and Walls: **1 inch (25 mm)**.
 2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than **1-3/4 inches (44 mm)** into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two (2) fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.
- C. Floor-Anchored Units: Set pilasters with anchors penetrating not less than **2 inches (51 mm)** 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.

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 102113.19

SECTION 102800 – TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Toilet and bath accessories.
 - 2. Electric Hand Dryers
 - 3. Underlavatory Guards
 - 4. Changing Stations
- B. Extent of each type of Toilet Accessories is indicated on drawings and schedules.
- C. Related Sections include the following:
 - 1. Division 6 Section "Miscellaneous Rough Carpentry" for blocking at end walls.
 - 2. Division 8 Section "Mirrors" for frameless mirrors.
 - 3. Division 10 Section "Toilet Compartments" for partitions and screens.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.
- B. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Toilet and Bath Accessory Schedule and room designations indicated on Drawings in product schedule.
- D. Maintenance Data: For accessories to include in maintenance manuals specified in Division 1. Provide lists of replacement parts and service recommendations.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.

- B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Toilet and Bath Accessory Schedule.
 - 1. Products of other manufacturers listed in Part 2 with equal characteristics, as judged solely by Architect, may be provided.
 - 2. Do not modify aesthetic effects, as judged solely by Architect, except with Architect's approval. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, 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. Coordinate requirements and locations for blocking as required.

1.6 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.
 - 1. Minimum Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide accessories by one of the following:
 - 1. Toilet and Bath Accessories: (Items on schedule utilize Bobrick Mfg. numbers unless otherwise indicated.)
 - a. Bobrick Washroom Equipment, Inc.
 - b. Bradley Corporation.
 - c. McKinney/Parker Washroom Accessories Corp.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Toilet and Bath Accessory Schedule on the Drawings.

- C. Electric Hand Dryers– refer to toilet accessories schedule
 - 1. Basis-of-Design Product: Dyson AB14, By Dyson Inc. 600 W. Chicago Ave., Suite 275, Chicago, IL 60654 , ph. 844.679.1647 www.dyson.com. Provide the named product or a comparable product by an equivalent manuf./product.
- D. Baby Changing Station – refer to toilet accessories schedule
 - 1. Basis-of-Design Product: Koala Kare Products KB-200. By Koala Kare Procuts, 6982 S. Quentin St., Centennial, CO 80112, ph. 888.733.3456, www.koalabear.com. Provide the named product or a comparable product by an equivalent manuf./product.
- E. Underlavatory Guard – refer to toilet accessories schedule
 - 1. Basis-of-Design Product: Truebro, Inc., Lav Shield 2018. Provide the named product or a comparable product by one of the following:
 - a. Plumberex Speciality Procuts,Inc.
 - b. TCI Products

2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.
- B. Brass: ASTM B 19, leaded and unleaded flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; ASTM B 30, castings.
- C. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch (0.9-mm) minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A 653/A 653M, G60 (Z180).
- E. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.
- F. Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.
- G. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.
- H. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- I. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.3 FABRICATION

- A. General: One, maximum 1-1/2-inch- (38-mm-) diameter, unobtrusive stamped manufacturer logo, as approved by Architect, is permitted on exposed face of accessories. On interior surface

not exposed to view or back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

- B. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.
- C. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.
- D. Recessed Toilet Accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless-steel hinge. Provide anchorage that is fully concealed when unit is closed.
- E. Framed Glass-Mirror Units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.
 - 1. Provide galvanized steel backing sheet, not less than 0.034 inch (0.85 mm) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.
- F. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:
 - 1. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
 - 2. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
- G. Keys: Provide universal keys throughout Project for internal access to accessories for servicing and resupplying. Provide minimum of twelve 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. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.
- C. Install grab bars to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.

- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 TOILET AND BATH ACCESSORY SCHEDULE

- A. See Plans for locations and types.

END OF SECTION 102800

SECTION 104413 – FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire protection cabinets for the following:
 - a. Portable fire extinguisher.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
 - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
 - 2. Show location of knockouts for hose valves.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. 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 QUALITY ASSURANCE

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. 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.

1.5 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless-Steel Sheet: ASTM A 666, Type 304.
- B. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.2 FIRE PROTECTION CABINET

- A. Cabinet Type: FEC: Suitable for fire extinguisher.
 - 1. Basis-of-Design Products: Subject to compliance with requirements, provide J.L. Industries Cosmopolitan Series No. 1036F17 at semi recessed locations, or a comparable product by one of the following: :
 - a. Fire End & Croker Corporation.
 - b. Kidde Residential and Commercial Division, Subsidiary of Kidde PLC.
 - c. Larsen's Manufacturing Company.
 - d. Modern Metal Products, Division of Technico Inc.
 - e. Moon-American.
 - f. Potter Roemer LLC.
 - g. Watrous Division, American Specialties, Inc.
 - 2. Size: 10-1/2 inches wide by 24 inches high by 6 inches deep.
- B. Cabinet Construction:
 - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- (1.1-mm-) thick, cold-rolled steel sheet lined with minimum 5/8-inch- (16-mm-) thick, fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Stainless-steel sheet.
 - 1. Shelf: Same metal and finish as cabinet.
- D. Semirecessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semirecessed cabinet installation.
 - 1. Square-Edge Trim: 1-1/4- to 1-1/2-inch (32- to 38-mm) backbend depth.
- E. Cabinet Trim Material: Stainless-steel sheet.
- F. Door Material: Stainless-steel sheet.
- G. Door Style: Fully glazed panel with frame.
- H. Door Glazing: Tempered float glass (clear).

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide manufacturer's standard hinge permitting door to open 180 degrees.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.

3. 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. Location: Applied to cabinet door.

2. Application Process: Pressure-sensitive vinyl letters.

3. Lettering Color: Red.

4. Orientation: Vertical.

K. Finishes:

1. Stainless Steel: No. 4.

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. Provide factory-drilled mounting holes.

3. Prepare doors and frames to receive locks.

4. 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 selected.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.

2. Miter and weld perimeter door frames.

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 "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 not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 3. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for hose valves and 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.
 - 1. Fire Protection Cabinets: 54 inches (1372 mm) above finished floor to top of cabinet.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Unless otherwise indicated, provide semirecessed fire protection cabinets.
 - 2. Provide inside latch and lock for break-glass panels.
 - 3. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
 - 4. Fire-Rated, Hose-Valve Cabinets:

- a. Install cabinet with not more than 1/16-inch (1.6-mm) tolerance between pipe OD and knockout OD. Center pipe within knockout.
- b. Seal through penetrations with firestopping sealant as specified in Division 07 Section "Penetration Firestopping."

C. Identification: Apply vinyl lettering at locations indicated.

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 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Sections:
 - 1. Division 10 Section "Fire Extinguisher Cabinets."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- 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 QUALITY ASSURANCE

- 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.

1.7 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.8 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.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six (6) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide J.L. Industries – Cosmic 10E or comparable product by one of the following:
 - a. Larsen's Manufacturing Company.
 - b. Potter Roemer LLC.
 - 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.
- B. Multipurpose Dry-Chemical Type in Steel Container (FE) & (FEC): UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.2 MOUNTING BRACKETS (FE):

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide J.L. Industries, Inc. – MB846C or comparable product by one of the following:
 - a. Larsen's Manufacturing Company.
 - b. Potter Roemer LLC.

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 and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Mounting Brackets: 54 inches (1372 mm) above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Sections:
 - 1. Division 10 Section "Fire Extinguisher Cabinets."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- 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 QUALITY ASSURANCE

- 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.

1.7 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.8 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.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six (6) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide J.L. Industries – Cosmic 10E or comparable product by one of the following:
 - a. Larsen's Manufacturing Company.
 - b. Potter Roemer LLC.
 - 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.
- B. Multipurpose Dry-Chemical Type in Steel Container (FE) & (FEC): UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.2 MOUNTING BRACKETS (FE):

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide J.L. Industries, Inc. – MB846C or comparable product by one of the following:
 - a. Larsen's Manufacturing Company.
 - b. Potter Roemer LLC.

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 and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Mounting Brackets: 54 inches (1372 mm) above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 104413 – FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire protection cabinets for the following:
 - a. Portable fire extinguisher.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
 - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
 - 2. Show location of knockouts for hose valves.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. 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 QUALITY ASSURANCE

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. 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.

1.5 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless-Steel Sheet: ASTM A 666, Type 304.
- B. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.2 FIRE PROTECTION CABINET

- A. Cabinet Type: FEC: Suitable for fire extinguisher.
 - 1. Basis-of-Design Products: Subject to compliance with requirements, provide J.L. Industries Cosmopolitan Series No. 1036F17 at semi recessed locations, or a comparable product by one of the following: :
 - a. Fire End & Croker Corporation.
 - b. Kidde Residential and Commercial Division, Subsidiary of Kidde PLC.
 - c. Larsen's Manufacturing Company.
 - d. Modern Metal Products, Division of Technico Inc.
 - e. Moon-American.
 - f. Potter Roemer LLC.
 - g. Watrous Division, American Specialties, Inc.
 - 2. Size: 10-1/2 inches wide by 24 inches high by 6 inches deep.
- B. Cabinet Construction:
 - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- (1.1-mm-) thick, cold-rolled steel sheet lined with minimum 5/8-inch- (16-mm-) thick, fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Stainless-steel sheet.
 - 1. Shelf: Same metal and finish as cabinet.
- D. Semirecessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semirecessed cabinet installation.
 - 1. Square-Edge Trim: 1-1/4- to 1-1/2-inch (32- to 38-mm) backbend depth.
- E. Cabinet Trim Material: Stainless-steel sheet.
- F. Door Material: Stainless-steel sheet.
- G. Door Style: Fully glazed panel with frame.
- H. Door Glazing: Tempered float glass (clear).

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide manufacturer's standard hinge permitting door to open 180 degrees.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.

3. 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. Location: Applied to cabinet door.

2. Application Process: Pressure-sensitive vinyl letters.

3. Lettering Color: Red.

4. Orientation: Vertical.

K. Finishes:

1. Stainless Steel: No. 4.

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. Provide factory-drilled mounting holes.

3. Prepare doors and frames to receive locks.

4. 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 selected.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.

2. Miter and weld perimeter door frames.

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 "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 not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 3. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for hose valves and 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.
 - 1. Fire Protection Cabinets: 54 inches (1372 mm) above finished floor to top of cabinet.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Unless otherwise indicated, provide semirecessed fire protection cabinets.
 - 2. Provide inside latch and lock for break-glass panels.
 - 3. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
 - 4. Fire-Rated, Hose-Valve Cabinets:

- a. Install cabinet with not more than 1/16-inch (1.6-mm) tolerance between pipe OD and knockout OD. Center pipe within knockout.
- b. Seal through penetrations with firestopping sealant as specified in Division 07 Section "Penetration Firestopping."

C. Identification: Apply vinyl lettering at locations indicated.

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 104413