



PROJECT MANUAL

VOLUME #2 of 2

**Daviess County Judicial Center
Family Courtroom and Office Renovation**

January 2, 2019



**PROJECT MANUAL VOLUME 2 INDEX
FOR
DAVISS COUNTY JUDICIAL CENTER
FAMILY COURTROOM AND OFFICE RENOVATION
SCB PROJECT NO. 1659.1**

GENERAL SPECIFICATION NOTES:

1. Unless noted otherwise, the following shall apply to all manufacturers listed throughout the construction documents: Subject to compliance with Contract Documents, manufacturers listed are approved as a manufacturer only. This does not imply that specific products supplied by such manufacturers have been reviewed and comply with requirements. It shall be the manufacturer's / contractor's responsibility to ensure that all requirements of the Contract Documents are met, including but not limited to the requirements for matching of specific finishes. "Standard" products that do not meet all requirements of the contract documents will not be accepted. As required to meet the requirements of the contract documents, custom products may be required from certain manufacturers. Unless noted otherwise by the Architect or Construction Manager for specific substitutions, the contractor supplying any substituted products shall be responsible for any additional costs associated with the use of such substitutions regardless of the trade or bid package affected.
2. As clarification, substitution requests are not required for product manufacturers that are not listed but that otherwise meet or exceed all requirements of the contract documents, expressed or implied, unless the specifications clearly indicate that only certain manufacturers shall be accepted as clarified below. Refer also to the Preface to the Volumes 2 and 3 Specification Indexes.
 - a. Many sections, after stating "Available Manufacturers" or "Available Products" or similar introduction, include the statement "but not limited to". Although specific manufacturers are listed, it is understood that not all products offered by available manufacturers may meet these requirements. Therefore, products not meeting all requirements will not be accepted. It is intended that other manufacturers shall be accepted provided they meet or exceed all requirements of the contract documents.
 - b. The above also applies to specifications that indicate a "Basis-of-Design" product. In such cases, every requirement may not be listed in the specification. It shall be the responsibility of other manufacturers to verify the basis-of-design manufacturer requirements to determine whether their product meets or exceeds all requirements of the basis-of-design product.
 - c. Some sections state simply "Available Manufacturers" or "Available Products" or similar introduction, after which specific manufacturers are listed. In such cases, only those manufacturers may be supplied without a formal substitution request.
3. The Architect shall not review individual submittal items for the same or related products separately. All submittals for the same product shall be submitted simultaneously as a single package.

DIVISION 2 – EXISTING CONDITIONS

024119 SELECTIVE DEMOLITION

DIVISION 3 – CONCRETE

NONE

DIVISION 4 – MASONRY

NONE

DIVISION 5 – METALS

055000 METAL FABRICATIONS

DIVISION 6 – WOOD AND PLASTICS

061053 MISCELLANEOUS ROUGH CARPENTRY
064023 INTERIOR ARCHITECTURAL WOODWORK

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

078413 PENETRATION FIRESTOPPING
078446 FIRE-RESISTIVE JOINT SYSTEMS
079200 JOINT SEALANTS

DIVISION 8 – DOORS AND WINDOWS

081113 HOLLOW METAL FRAMES
081416 FLUSH WOOD DOORS
081433 STILE AND RAIL WOOD DOORS
083113 ACCESS DOORS AND FRAMES
087100 DOOR HARDWARE
088000 GLAZING
088300 MIRRORS

DIVISION 9 – FINISHES

092900 GYPSUM BOARD
093000 TILING
095113 ACOUSTICAL PANEL CEILINGS
096513 RESILIENT BASE AND ACCESSORIES
096519 RESILIENT TILE FLOORING
096816 SHEET CARPETING
099123 PAINTING

DIVISION 10 – SPECIALTIES

101400 SIGNAGE
102800 TOILET ACCESSORIES
104400 FIRE PROTECTION SPECIALTIES

DIVISION 11 – EQUIPMENT

115213 PROJECTION SCREENS

DIVISION 12 – FURNISHINGS

126101 FIXED AUDIENCE SEATING

DIVISION 13 – SPECIAL CONSTRUCTION

NONE

DIVISION 14 – CONVEYING SYSTEMS

NONE

REFER TO SEPARATE MEP SPECIFICATIONS BY MEP ENGINEER UNDER SEPARATE CONTRACT WITH OWNER

END OF INDEX

SECTION 024119 - SELECTIVE DEMOLITION

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. Demolition and removal of selected portions of building or structure.
 - 2. Cutting, patching and repair.
 - 3. Salvage of existing items to be reused or recycled.

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: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled. Protect construction indicated to remain against damage and soiling during selective demolition.
- E. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- F. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 MATERIALS OWNERSHIP

- A. Except for items or materials that are indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain on the Owner's property, demolition waste becomes property of Contractor.

1.5 PREINSTALLATION MEETINGS

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

1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- D. Predemolition Photographs or Video: Submit before Work begins.
- E. Landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- F. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.7 QUALITY ASSURANCE

- A. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety including but not limited to:
- B. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
- C. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations and event schedule will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Owner assumes no responsibility for actual condition of the portion to be selectively demolished.
 - 1. Owner will maintain conditions existing at time of inspection for bidding purpose as far as practical.
 - 2. Before selective demolition, Owner will remove items indicated on Drawings or as observed during pre-bid conference.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 WARRANTY

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

2.2 REPAIR MATERIALS

- A. Use repair materials identical to existing materials and finishes.
 - 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. Based on prior approval of Architect.
 - 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 before starting selective demolition operations.
- B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

- 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. Examine condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Do not interrupt existing utilities serving the facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
 - a. Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.

- c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- B. 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 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, including areas and paths in existing building utilized for access.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
- C. 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.
- D. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

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.
 10. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 11. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
- B. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- C. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, using methods least likely to damage elements retained or adjoining construction.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Proceed with patching after construction operations requiring cutting are complete.
 5. All cutting shall produce smooth even surfaces.
- D. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing. Where patching cannot produce acceptable results as determined by the Architect, finishes shall be replaced as required.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
- E. 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 on-site as designated by Owner.
 5. Protect items from damage during transport and storage.
- F. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- G. 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. Concrete: Demolish in small sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

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.
- 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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 2. Anti-ballistic steel armor.
- B. Related Sections:
 - 1. Division 06 Section "Interior Architectural Woodwork" for millwork associated with anti-ballistic steel armor.

1.3 SUBMITTALS

- A. The Architect shall not review individual submittal items separately. All submittals shall be submitted simultaneously as a single package.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
 - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.5 PROJECT CONDITIONS

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

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. 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 METALS, GENERAL

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

2.2 FERROUS METALS

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- D. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- E. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.
- F. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: 1-5/8 by 1-5/8 inches (41 by 41 mm) as indicated.
- G. Anti-Ballistic Steel Armor: 3/8" AR500 steel.

2.3 FASTENERS

- A. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- B. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

- C. Eyebolts: ASTM A 489.
- D. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- E. Lag Screws: ASME B18.2.1 (ASME B18.2.3.8M).
- F. Wood Screws: Flat head, ASME B18.6.1.
- G. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).
- H. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).
- I. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- J. Post-Installed Anchors:
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
- K. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- F. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.
- G. 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.

- H. Concrete: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

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

- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D. Galvanize miscellaneous framing and supports where indicated.

2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.8 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer.
- C. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.9 ANTI-BALLISTIC STEEL ARMOR

- A. Provide 3/8" AR-500 steel.
- B. Fabricate to conform to indicated details, including required radii.
- C. Butt joints shall be tight-fitting, hairline joints.
- D. Weld to supports as required.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 painting Sections.

- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

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. Minor framing with dimension lumber.
 - 2. Wood blocking, cants, and nailers.
 - 3. Wood furring and grounds.
 - 4. Wood sleepers.
 - 5. Plywood backing panels.
- B. Related Sections include the following:
 - 1. Division 06 Section "Interior Architectural Woodwork" for nonstructural carpentry items exposed to view and not specified in another Section.

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NHLA: National Hardwood Lumber Association.
 - 3. NLGA: National Lumber Grades Authority.
 - 4. SPIB: The Southern Pine Inspection Bureau.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

3. For fire-retardant treatments specified to be High-Temperature (HT) type include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Powder-actuated fasteners.
5. Expansion anchors.
6. Metal framing anchors.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.
- B. Deliver interior wood materials that are to be exposed to view only after building is enclosed and weatherproof, wet work other than painting is dry, and HVAC system is operating and maintaining temperature and humidity at occupancy levels.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or if grade stamp is omitted, provide certificates of grade compliance issued by grading agency prior to delivery on site.
 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 4. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or if marking is omitted, provide certificates of treatment compliance issued by inspection agency prior to delivery on site.
- D. Application: Treat items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawl spaces or unexcavated areas.
 5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).
1. Use treatment that does not promote corrosion of metal fasteners.
 2. Use Exterior type for exterior locations and where indicated.
 3. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
 4. Use Interior Type A, unless otherwise indicated.
- B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or if marking is omitted, provide certificates of treatment compliance issued by inspection agency prior to delivery on site.
- C. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- D. Application: Treat items indicated on Drawings, and the following:
1. Framing for raised platforms.
 2. Concealed blocking.
 3. Roof construction.

4. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

- A. Maximum Moisture Content: 19 percent.

2.5 MISCELLANEOUS LUMBER

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

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.

- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content. Species at Contractor's option.

- C. For exposed boards, refer to "Interior Architectural Woodwork" Section 06.

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

1. Mixed southern pine, No. 2 grade; SPIB.
2. Spruce-pine-fir (south) or spruce-pine-fir, Construction or 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
3. Eastern softwoods, No. 2 Common grade; NELMA.

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

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

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

2.6 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

2.7 FASTENERS

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

in this Article for material and manufacturer.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- 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 assemblies 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 and inspecting agency.
 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.8 METAL FRAMING ANCHORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Cleveland Steel Specialty Co.
 2. Harlen Metal Products, Inc.
 3. KC Metals Products, Inc.
 4. Simpson Strong-Tie Co., Inc.
 5. Southeastern Metals Manufacturing Co., Inc.
 6. USP Structural Connectors.
- B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 1. Use for interior locations where stainless steel is not indicated.

2.9 MISCELLANEOUS MATERIALS

- A. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate and install furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction whether specifically indicated or not. The contractor shall coordinate with the architectural woodwork and manufactured wood casework or other equipment fabricators/installers to ensure adequate blocking is provided and accepted prior to concealment.
- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction". Refer to drawings for specific details.
- C. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
- D. Do not splice structural members between supports, unless otherwise indicated.
- E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.
- F. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches (2438 mm) o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches (2438 mm) o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- (38-mm actual-) thickness.
 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. (9.3 sq. m) and to solidly fill space below partitions.
 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet (6 m) o.c.
- G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

- I. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the 2007 Kentucky Building Code.
- J. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring horizontally and vertically at 24 inches (610 mm) o.c., or as indicated on drawings.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 16 inches (406 mm) o.c.

3.4 PROTECTION

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

END OF SECTION 061053

SECTION 064023 - 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.
2. Interior frames, jambs and transoms.
3. Stair handrails.
4. Flush wood paneling and wainscots.
5. Interior ornamental work.
6. Courtroom furnishings and wood cabinets.
7. Pre-manufactured Lecterns.
8. Shop finishing.

- B. Related Sections include the following:

1. Division 05 Section "Metal Fabrications" for anti-ballistic steel reinforcement.
2. Division 06 Section "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
3. Division 08 Sections "Flush Wood Doors" and "Stile and Rail Wood Doors" for matching millwork and finish requirements.
4. Division 12 Section "Manufactured Casework".
5. Division 12 Section "Fixed Audience Seating".

1.3 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.
- B. Rough carriages for stairs are a part of interior architectural woodwork. Platform framing, headers, partition framing, and other rough framing associated with stairwork are specified in Division 06 Section "Miscellaneous Rough Carpentry."

1.4 PERFORMANCE REQUIREMENTS

- A. General:

1. Provide woodwork systems, including anchorage, capable of withstanding, without failure, the effects of the following:
 - a. Structural loads.
 - b. Movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - c. Dimensional tolerances of building frame and other adjacent construction.
2. Failure includes the following:
 - a. Deflection exceeding specified limits.
 - b. Loosening or weakening of fasteners, attachments, and other components.

1.5 SUBMITTALS

- A. Product Data: For each type panel products, wood trim and cabinet products, high-pressure decorative laminate, adhesive for bonding plastic laminate, solid-surfacing material, fire-retardant-treated materials, cabinet hardware and accessories, brackets and finishing materials and processes.
 1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 1. Show details full size.
 2. Show required locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement required by architectural woodwork fabricator/installer but specified and/or provided in other Sections.
 3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.
 4. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
 5. Provide coordination drawings where anti-ballistic steel, security and electronics are incorporated into courtroom fabrications.
 6. Apply AWI-certified compliance label to each page of Shop Drawings.
- C. Samples for Initial Selection:
 1. Shop-applied transparent finishes.
 2. Plastic laminates.
 3. Trim Profiles.
 4. Sections of handrail and guardrail caps.
- D. Samples for Verification:
 1. Lumber with transparent finish, not less than 6 inches wide by 24 inches (600 mm) long, for each species and cut, finished on 1 side and 1 edge.
 2. Veneer leaves representative of and selected from flitches to be used for transparent-finished woodwork.
 3. Veneer-faced panel products with or for transparent finish, four (4) sets of three (3) bound sets of 12 by 24 inches (300 by 600 mm), showing full range of cut, color and grain for

- each species. Label back of each panel with the flitch number, cut, color, grain, and figure indicate specified finishing process, stain (if applicable) and sheen. Include at least one face-veneer seam and finish as specified.
4. Plastic laminates, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge.
 5. Corner pieces as follows:
 - a. Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches (450 mm) high by 18 inches (450 mm) wide by 6 inches (150 mm) deep.
 - b. Miter joints for standing trim.
 6. Exposed cabinet hardware and accessories, one unit for each type and finish.
 7. 12" long sections of finished handrails.
- E. Mock-ups: Shop fabricated mockups of actual millwork components shall be assembled and finished to the maximum extent possible for inspection by the Architect at the project site. The Architect shall be informed a minimum of seven days before the requested time of review. Approved assemblies may be disassembled and installed at the project site. Separate mockups shall be constructed of the following:
1. Judges Bench
 2. Wood Door Casing (with expanded header)
- F. Product Certificates: For each type of product, signed by product manufacturer, certifying that products furnished comply with requirements.
- G. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.
- H. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
1. Compliance required AWI finish system.
 2. Fire Retardant Treated Materials.
 3. AWI Quality Certification Program labels and certificates indicating that woodwork, including installation, complies with requirements of grades specified.
- I. Schedules and Reports:
1. Submit:
 - a. Fabrication and installation schedule indicating AWI-QCP inspections during fabrication and construction.
 2. Inspection Reports:
 - a. AWI-QCP Inspection Reports indicating compliance with the specified grade(s) of work and finishes and shall be inspected under the Quality Control Program with the additional following requirements:
 - 1) During fabrication and installation, project may have multiple inspections in the fabricator's shop and at project location for compliance of AWS standards and the project's specifications prior to fabrication of materials and will be inspected during and after installation in the field for compliance of AWS standards and compliance with the project's specifications.

- 2) Immediately after each inspection, AWI-QCP to send reports co-signed by the fabricator indicating compliance with contract requirements and acceptability of findings.
- 3) Each report shall accompany the current Application for Payment by the fabricator through the contractor.

1.6 SOURCE QUALITY CONTROL

- A. Contractor will engage AWI-QCP as an independent inspecting agency to perform shop inspections under the Quality Control Program with the following requirements:
 1. Certification stipulating compliance with the specified grade(s) of work and section(s) of the current edition of the AWS and the project requirements.
 2. Project has been inspected in the fabricator's shop prior to delivery or installation of materials.
 3. After each inspection, AWI-QCP sends copy of each inspection report with a letter signed by the fabricator indicating acceptance of report, correction of deficiencies (if any), and requesting partial contractual payment for Work completed.
- B. Receipt of the certification by AWI is a Condition Precedent for payments to the Contractor.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance and has completed a minimum of two successful AWI/QCP projects.
- B. Installer Qualifications: Certified participant in AWI's Quality Certification Program who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance and has completed a minimum of two successful AWI/QCP projects.
- C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers and wood doors with face veneers that are sequence matched with woodwork and transparent-finished wood doors that are required to be of same species as woodwork.
- D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Standards" latest edition for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
 1. Provide AWI compliance labels and certificates indicating that woodwork, including installation, complies with requirements of grades specified. This project has been registered as AWI/QCP Project Number 17.0582.
 2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.
 3. Self-labeling shall not preclude the successful bidder from AWI/QCP shop fabrication product inspections.

4. At a minimum, AWI/QCP inspections shall be performed at least twice during fabrication and three times during installation. The Architect shall be included in determining the schedule for such inspections.
 5. If quality issues require, the Architect reserves the right to request additional AWI/QCP inspections
 6. All AWI/QCP inspections shall be provided at the fabricator's/installer's expense.
- E. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- G. Preinstallation Conference: Prior to installation on the project site, conduct conference at Project site to comply with requirements in Division 01 Sections.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Division 01 Sections".

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.10 COORDINATION

- A. The Contractor shall: Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.
- B. Hardware Coordination: Acquire copies of approved hardware schedule specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Species and Cut for Transparent Finish:
 - 1. Standing and Running Trim, Interior Ornamental Work, Courtroom Furnishings, Trim and Cabinets: AWI Premium Grade American Cherry.
 - 2. Wainscot and Paneling (including veneer wood panels associated with Courtroom Furnishings and Wood Transoms and cabinet door faces): AWI Premium Grade American Cherry.
- C. Interior Woodwork for Opaque Finish
 - 1. Interior woodwork for opaque finish includes the following:
 - a. Chair Rail.
 - 2. Grade: Custom
 - 3. Wood Species: Eastern white pine, sugar pine, or western white pine.
 - 4. Match dimension and profile of existing trim.
- D. 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-Exterior Glue.
 - 4. Softwood Plywood: DOC PS 1, Medium Density Overlay.
 - 5. Veneer-Faced Panel Products (Hardwood Plywood or MDF): HPVA HP-1.
 - 6. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches (76 mm) wide. Wood Moisture Content: 5 to 10 percent.
- E. Other Products:

1. Adhesives for Bonding Plastic Laminates
- F. 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, products that may be incorporated into the work include but are not limited to one of the following:
 - a. Formica Corporation
 - b. Lamin-Art, Inc.
 - c. Nevamar Company, LLC; Decorative Products Div.
 - d. Wilsonart International; Div. of Premark International, Inc.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this Article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified.
1. Do not use treated materials that do not comply with requirements of referenced woodworking standard or that are warped, discolored, or otherwise defective.
 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 3. Identify fire-retardant-treated materials with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use the following treatment type:
1. Exterior Type: Organic-resin-based formulation thermally set in wood by kiln drying.
 2. Interior Type A: Low-hygroscopic formulation.
 3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking plant certified by testing and inspecting agency.
 4. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.
 5. Kiln-dry materials before and after treatment to levels required for untreated materials.
- C. Fire-Retardant Particleboard: Panels complying with the following requirements, made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.
1. For panels 3/4 inch (19 mm) thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi (11 MPa); modulus of elasticity, 300,000 psi (2070 MPa); internal bond, 80 psi (550 kPa); and screw-holding capacity on face and edge, 250 and 225 lbf (1100 and 1000 N),

- respectively.
2. For panels 13/16 to 1-1/4 inches (20 to 32 mm) thick, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, 1300 psi (9 MPa); modulus of elasticity, 250,000 psi (1720 MPa); linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 and 175 lbf (1100 and 780 N), respectively.
 3. Product: Subject to compliance with requirements, provide "Duraflake FR" by Weyerhaeuser.
- D. Fire-Retardant Fiberboard: Medium-density fiberboard panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.
1. Product: Subject to compliance with requirements, provide "Medite FR" by SierraPine Ltd.; Medite Div.

2.3 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 (Scheduled by Describing Products)."
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening.
- C. Back-Mounted Pulls: BHMA A156.9, B02011.
- D. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter. *EXPOSED HARDWARE SHALL MATCH BRONZE FINISH SPECIFIED IN SECTION 08 "DOOR HARDWARE".
- E. Catches: Roller catches, BHMA A156.9, B03071.
- F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04102; with shelf brackets, B04112.
- G. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.
- H. Drawer Slides: BHMA A156.9, B05091.
 1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-overtravel-extension type; zinc-plated steel ball-bearing slides.
- I. Door Locks: BHMA A156.11, E07121.
- J. Drawer Locks: BHMA A156.11, E07041.
- K. Spectator Gates Pivots / Closers: Basis-of-Design Bommer Model 7122.
- L. Grommets for Cable Passage through Countertops: 2-inch x 3-inch oblong, molded-plastic

grommets and matching plastic caps with slot for wire passage. Selected from the manufacturer's full range of colors.

1. Product: Subject to compliance with requirements.

M. Exposed Hardware Finishes shall match exposed finishes specified in Section "08" door Hardware. For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated. Finish samples to be provided for exposed and semi-exposed components and will be selected from the manufacturer's full range available in the types listed below:

1. Dark, Oxidized, Satin Bronze, Oil Rubbed: BHMA 613 for bronze base; BHMA 640 for steel base; match Architect's sample.

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

2.4 MISCELLANEOUS INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content or fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content (where code requires).

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

C. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

D. Adhesive for Bonding Plastic Laminate:

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive recommended by the manufacturer.

2.5 PRE-MANUFACTURED LECTERNS:

A. Basis-of-Design Product: DA-LITE – "Providence Lectern".

1. 32" Model with oversized reading surface and a storage shelf below.

2. Provide unit with Casters and Electric Height Adjustment.

3. Provide unit with high-intensity reading light and LED digital clock / timer countdown capability.

4. Provide AWI Premium Grade American Cherry veneer stained to match other millwork and architectural woodwork described in this section. Submit samples for matching/selection.

2.6 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Unless otherwise indicated, provide Premium-grade interior woodwork complying with referenced quality standard.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Fabricate woodwork to dimensions, profiles, and details indicated. This shall include custom profiles and radiused members. Ease edges to radius indicated for the following unless otherwise noted in details:
 - 1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch (19 mm) Thick or Less: 1/16 inch (1.5 mm).
 - 2. Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch (3 mm).
 - 3. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch (1.5 mm).
- D. Complete shop fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting. Unnecessary construction of site-built components shall not be allowed.
 - 1. Notify Architect 10 (ten) days in advance of the dates and times woodwork fabrication will be complete.
 - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
 - 3. Preassembled work shall be inspected by the Architect at his discretion prior to breakdown for shipment.
- E. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 - 1. Seal edges of openings in countertops with a coat of varnish.

2.7 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

- A. Grade: Premium.
- B. Wood Species and Cut: Refer to Paragraph 2.1, B. Custom profiles as indicated in drawings.
- C. For trim items wider than available lumber, use veneered construction. Do not glue for width.
- D. For rails wider or thicker than available lumber, use veneered construction. Do not glue for

width or thickness.

- E. 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.
- F. Assemble casings in plant except where limitations of access to place of installation require field assembly.
- G. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.

2.8 INTERIOR FRAME AND JAMB CLADDING FOR TRANSPARENT FINISH

- A. Grade: Premium.
- B. Wood Species and Cut: Refer to Paragraph 2.1, B. Custom profiles as indicated in drawings.

2.9 FLUSH WOOD PANELING AND WAINSCOTS

- A. Grade: Premium.
- B. Wood Species and Cut: Refer to Paragraph 2.1, B.
 - 1. Lumber Trim and Edges: At fabricator's option, trim and edges indicated as solid wood (except moldings) may be either lumber or veneered construction compatible with grain and color of veneered panels.
- C. Matching of Adjacent Veneer Leaves: Book match.
- D. Veneer Matching within Panel Face: Center balance match.
- E. Panel-Matching Method: No matching between panels is required. Select and arrange panels for similarity of grain pattern and color between adjacent panels.
- F. Vertical Panel-Matching Method: Continuous match; veneer leaves of upper panels are continuation of veneer leaves of lower panels.

2.10 INTERIOR ORNAMENTAL WORK FOR TRANSPARENT FINISH

- A. Interior ornamental work for transparent finish includes the following:
 - 1. Special items as indicated on drawing.
 - 2. Pediment heads and plinths.
 - 3. Pilasters.
 - 4. Furnishings
- B. Grade: Premium.
- C. Wood Species and Cut: Refer to Paragraph 2.1, B.

- D. Profiles and Shapes: Refer to drawings.

2.11 WOOD CABINETS FOR TRANSPARENT FINISH

- A. Grade: Premium.
- A. AWI Type of Cabinet Construction: As detailed in the Drawings.
- B. Wood Species and Cut for Exposed Surfaces: Refer to Paragraph 2.1, B
 1. Grain Direction: Vertically for drawer fronts, doors, and fixed panels.
 2. Matching of Veneer Leaves: Slip match.
 3. Vertical Matching of Veneer Leaves: End match.
 4. Veneer Matching within Panel Face: Balance match.
 5. Veneer Matching within Room: Provide cabinet veneers in each room or other space from a single flitch with doors, drawer fronts, and other surfaces matched in a sequenced set with continuous match where veneers are interrupted perpendicular to the grain.
 6. Comply with veneer and other matching requirements indicated for blueprint-matched paneling.
- C. Semiexposed Surfaces: Provide surface materials indicated below:
 1. Surfaces Other Than Drawer Bodies: Compatible species to that indicated for exposed surfaces, stained to match.
 2. Drawer Sides and Backs: Solid-hardwood lumber, stained to match species indicated for exposed surfaces.
 3. Drawer Bottoms: Hardwood plywood.
- D. Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.12 PLASTIC-LAMINATE COUNTERTOPS

- A. All nominal 1" thick laminate clad countertops shown on drawings shall be constructed with 1" particleboard core laminated top face with GP50 (.050) high pressure decorative laminate, with BK20 backer underside. Provide tight joint fasteners where needed.

2.13 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. General: Shop finish all transparent-finished interior architectural woodwork at fabrication shop as specified in this Section. Refer to Division 09 painting Sections for finishing opaque-finished architectural woodwork.
- D. General: Drawings indicate items that are required to be shop finished. Finish such items at

fabrication shop as specified in this Section. Refer to Division 09 painting Sections for finishing architectural woodwork not indicated to be shop finished.

- E. 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.
- F. 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.
- G. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523.
 - 1. Grade: Premium.
 - 2. AWI Finish System: TR-1: Standard lacquer. (Typical)
 - 3. AWI Finish System: TR-2: Catalyzed lacquer. (Attorney tables and fixed audience seating.)
 - 4. Staining: Match approved sample for color.
 - 5. Wash Coat for Stained Finish: Apply a vinyl wash coat to woodwork made from closed-grain wood before staining and finishing.
 - 6. Open Finish for Open-Grain Woods at Vertical Surfaces: Do not apply filler to open-grain woods.
 - 7. Filled Finish for Open-Grain Woods at Horizontal Surfaces: After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
 - a. Apply vinyl wash-coat sealer after staining and before filling.
 - 8. Sheen: Semigloss, 55-75 gloss units.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.
- C. The casework contractor shall coordinate with miscellaneous rough carpentry contractor to

ensure adequate blocking and/or reinforcement is provided and accepted prior to concealment.

3.2 INSTALLATION

- A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.
- B. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
- C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- D. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with recommendations of chemical treatment manufacturer, including those for adhesives used to install woodwork.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches (1500 mm) long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
 - 1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.
 - 2. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches (3 mm in 2400 mm).
- G. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Maintain veneer sequence matching of cabinets with transparent finish.
 - 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for 1-inch (25-mm) penetration into wood framing, blocking, or hanging strips.
- H. Paneling: Anchor paneling to supporting substrate with finish nails, set and filled to match finish.
 - 1. Install flush paneling with no more than 1/16 inch in 96-inch (1.5 mm in 2400-mm) vertical cup or bow and 1/8 inch in 96-inch (3 mm in 2400-mm) horizontal variation from a true plane.
- I. Complete the finishing work specified in this Section to the greatest extent in the shop.

Finishing not completed at shop or before installation of woodwork may be completed in the field. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces or where only sealer/prime coats were applied in shop. Joints shall be tight-fitting without use of filler.

- J. All electrical and data services shall be routed through concealed conduits or wireways. Refer to electrical for requirements on concealed conduits.

3.3 FIELD QUALITY CONTROL

A. Testing Agency:

1. Contractor has engaged AWI-QCC-QCP to perform inspections during installation.
 - a. Payment for these services authorized by the Architect and will be made by the Contractor.
2. After installation inspection, AWI-QCC-QCP will provide a certificate to the fabricator stipulating compliance with the specifications standards.
3. The fabricator shall present this certificate to the Contractor for final payment minus contractual limitations.
4. Receipt of the certification by AWI-QCC-QCP is a Condition Precedent for payments to the Contractor.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064023

SECTION 078413 – PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes firestopping for the following:
 - 1. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 - 2. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
 - 3. Sealant joints in fire-resistance-rated construction.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 07 Section "Joint Sealants" for non-fire-resistive-rated joint sealants.
 - 2. Mechanical Sections specifying ducts and piping penetrations.
 - 3. Electrical Sections specifying cable and conduit penetrations.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.
- B. F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.
- C. T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T-rated assemblies are required where the following conditions exist:
 - 1. Where firestop systems protect penetrations located outside of wall cavities.
 - 2. Where firestop systems protect penetrations located outside fire-resistive shaft enclosures.
 - 3. Where firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.
 - 4. Where firestop systems protect penetrating items larger than a 4 inch (100 mm) diameter nominal pipe or 16 sq. in. (100 sq. cm) in overall cross-sectional area.
- D. Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, as determined per ASTM E 119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.
- E. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
2. For floor penetrations with annular spaces exceeding 4 inches (100 mm) or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

F. For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of product specified.

1. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

C. Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.

1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.

D. Product certificates signed by manufacturers of firestopping products certifying that their products comply with specified requirements.

E. Product test reports from, and based on tests performed by, a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on comprehensive testing of current products.

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, and other information specified.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide firestopping that complies with the following requirements and those specified under the "System Performance Requirements" article:

1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems that is acceptable to authorities having jurisdiction.
2. Through-penetration firestop systems are identical to those tested per ASTM E 814 under conditions where positive furnace pressure differential of at least 0.01 inch of water (2.5 Pa) is maintained at a distance of 0.78 inch (20 mm) below the fill materials surrounding

the penetrating items in the test assembly. Provide rated systems complying with the following requirements:

- a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by UL in their "Fire Resistance Directory," by Warnock Hersey, or by another qualified testing and inspecting agency.
3. Fire-resistive joint sealant systems are identical to those tested for fire-response characteristics per ASTM E 119 under conditions where the positive furnace pressure differential is at least 0.01 inch of water (2.5 Pa), as measured 0.78 inch (20 mm) from the face exposed to furnace fire. Provide systems complying with the following requirements:
- a. Fire-Resistance Ratings of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory" or by another qualified testing and inspecting agency.
 - b. Joint sealants, including backing materials, bear classification marking of qualified testing and inspection agency.
- B. Information on drawings referring to specific design designations of through-penetration firestop systems is intended to establish requirements for performance based on conditions that are expected to exist during installation. Any changes in conditions and designated systems require the Architect's prior approval. Submit documentation showing that the performance of proposed substitutions equals or exceeds that of the systems they would replace and are acceptable to authorities having jurisdiction.
- C. Installer Qualifications: Engage an experienced/certified Installer who has completed firestopping that is similar in material, design, and extent to that indicated for Project and that has performed successfully. Installer shall be certified by authorities having jurisdiction.
- D. Single-Source Responsibility: Obtain through-penetration firestop systems for each kind of penetration and construction condition indicated from a single manufacturer.
- E. Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."
- F. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
- B. Store and handle firestopping materials to prevent their deterioration or damage due to

moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.
- C. Do not cover up those firestopping installations that will become concealed behind other construction until authorities having jurisdiction, if required, have examined each installation.

PART 2 - PRODUCTS

2.1 FIRESTOPPING, GENERAL

- A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
- B. Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories may include but are not limited to the following items:
 - 1. Permanent forming/damming/backing materials including the following:
 - a. Semirefractory fiber (mineral wool) insulation.
 - b. Ceramic fiber.
 - c. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
 - d. Fire-rated formboard.
 - e. Joint fillers for joint sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.
- C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

2.2 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

- A. Ceramic-Fiber and Mastic Coating: Ceramic fibers in bulk form formulated for use with mastic coating, and ceramic fiber manufacturer's mastic coating.
- B. Ceramic-Fiber Sealant: Single-component formulation of ceramic fibers and inorganic binders.
- C. Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation.

- D. Intumescent, Latex Sealant: Single-component, intumescent, latex formulation.
- E. Intumescent Putty: Nonhardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.
- F. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum foil on one side.
- G. Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce a paintable compound, passing ASTM E 136, with flame-spread and smoke-developed ratings of zero per ASTM E 84.
- H. Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogenous mortar.
- I. Pillows/Bags: Re-usable, heat-expanding pillows/bags composed of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- J. Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping/ gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
- L. Solvent-Release-Curing Intumescent Sealant: Solvent-release-curing, single-component, synthetic-polymer-based sealant of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping/ gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
 - 2. Grade for Horizontal Surfaces: Pourable (self-leveling) grade for openings in floors and other horizontal surfaces.
 - 3. Grade for Vertical Surfaces: Nonsag grade for openings in vertical and other surfaces.
- M. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Ceramic-Fiber and Mastic Coating:
 - a. FireMaster Bulk and FireMaster Mastic, Thermal Ceramics.
 - 2. Ceramic-Fiber Sealant:
 - a. Metacaulk 525, The RectorSeal Corporation.
 - 3. Endothermic, Latex Sealant:
 - a. Fyre-Shield, Tremco Inc.

4. Endothermic, Latex Compounds:
 - a. Flame-Safe FS500/600 Series, International Protective Coatings Corp.
 - b. Flame-Safe FS900/FST900 Series, International Protective Coatings Corp.

5. Intumescent Latex Sealant:
 - a. Metacaulk 950, The RectorSeal Corporation.
 - b. Fire Barrier CP 25WB Caulk, 3M Fire Protection Products.
 - c. Series SSS Intumescent Sealant, Specified Technologies, Inc.

6. Intumescent Putty:
 - a. Pensil 500 Intumescent Putty, General Electric Co.
 - b. Flame-Safe FSP1000 Putty, International Protective Coatings Corp.
 - c. Fire Barrier Moldable Putty, 3M Fire Protection Products.

7. Intumescent Wrap Strips:
 - a. Dow Corning Fire Stop Intumescent Wrap Strip 2002, Dow Corning Corp.
 - b. CS2420 Intumescent Wrap, Hilti Construction Chemicals, Inc.
 - c. Fire Barrier FS-195 Wrap/Strip, 3M Fire Protection Products.
 - d. Series Blu and Series Red Intumescent Strips, Specified Technology, Inc.

8. Job-Mixed Vinyl Compound:
 - a. USG Firecode Compound, United States Gypsum Co.

9. Mortar:
 - a. K-2 Firestop Mortar, Bio Fireshield, Inc.
 - b. Novasit K-10 Firestop Mortar, Bio Fireshield, Inc.
 - c. KBS-Mortar Seal, International Protective Coatings Corp.
 - d. Series SSM Fire-Rated Mortar, Specified Technology, Inc.

10. Pillows/Bags:
 - a. Firestop Pillows, Bio Fireshield, Inc.
 - b. KBS Sealbags, International Protective Coatings Corp.
 - c. Series SSP Putty and Putty Bags. Specified Technology, Inc.

11. Silicone Foams:
 - a. Dow Corning Fire Stop Foam 2001, Dow Corning Corp.
 - b. Pensil 200 Foam, General Electric Co.

12. Silicone Sealants:
 - a. Dow Corning Firestop Sealant 2000, Dow Corning Corp.
 - b. Dow Corning Firestop Sealant SL 2003, Dow Corning Corp.
 - c. Pensil 100 Firestop Sealant, General Electric Co.
 - d. CS240 Firestop Sealant, Hilti Construction Chemicals, Inc.
 - e. Metacaulk 835, The RectorSeal Corporation.
 - f. Metacaulk 880, The RectorSeal Corporation.
 - g. Fyre-Sil, Tremco Inc.

h. Fyre-Sil S/L, Tremco Inc.

13. Solvent-Release-Curing Intumescent Sealants:

- a. Biostop 500 Intumescent Firestop Caulk, Bio Fireshield, Inc.
- b. Fire Barrier CP 25N/S Caulk, 3M Fire Protection Products.
- c. Fire Barrier CP 25S/L Caulk, 3M Fire Protection Products.

2.3 FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.
- B. Sealant 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.
- C. Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.
 - 1. Additional Movement Capability: Provide sealant with the capability to withstand the following percentage changes in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated:
 - a. 100 percent movement in extension and 50 percent movement in compression for a total of 150 percent movement.
- D. Single-Component, Nonsag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.
- E. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Single-Component, Neutral-Curing, Silicone Sealant:
 - a. Dow Corning 790, Dow Corning Corp.
 - b. Dow Corning 795, Dow Corning Corp.
 - c. Silpruf, General Electric Co.
 - d. Ultraglaze, General Electric Co.
 - e. 864, Pecora Corp.
 - f. Pen 300 and 300 SL, General Electric
 - 2. Single-Component, Nonsag, Urethane Sealant:
 - a. Isoflex 880 GB, Harry S. Peterson Co., Inc.
 - b. Isoflex 881, Harry S. Peterson Co., Inc.
 - c. Vulkem 921, Mameco International Inc.
 - d. Sikaflex--15LM, Sika Corp.

2.4 MIXING

- A. For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment,

selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
 - 1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
 - 2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form release agents from concrete.
- B. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

3.3 INSTALLING THROUGH-PENETRATION FIRESTOPS

- A. General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated or required as permanent components of firestop systems.
- C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:
 - 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce

smooth, uniform surfaces that are flush with adjoining finishes.

3.4 INSTALLING FIRE-RESISTIVE JOINT SEALANTS

- A. General: Comply with the "System Performance Requirements" article in Part 1, with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install joint fillers 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 and develop fire-resistance rating required.
- C. 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 width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- D. Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.5 FIELD QUALITY CONTROL

- A. Inspecting agency will report observations promptly and in writing to Contractor and Architect.
- B. Do not proceed to enclose firestopping with other construction until reports of examinations by agency inspectors are issued and corrections are made such that firestopping complies with requirements.
- C. Where deficiencies are found, repair or replace firestopping so that it complies with requirements.

3.6 CLEANING

- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.
- B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they 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 firestopping immediately and install new materials to produce firestopping complying with specified requirements.

END OF SECTION 078413

SECTION 078446 - FIRE-RESISTIVE JOINT SYSTEMS

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 fire-resistive joint systems for the following:
 - 1. Head-of-wall joints.
 - 2. Wall-to-wall joints.
- B. Related Sections include the following:
 - 1. Division 07 Section "Penetration Firestopping" for systems installed in openings in walls and floors with and without penetrating items.
 - 2. Division 07 Section "Joint Sealants" for non-fire-resistive joint sealants.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For joints in the following constructions, provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed:
 - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 - 3. Fire-resistance-rated floor assemblies.
 - 4. Exterior curtain-wall assemblies and fire-resistance-rated floor assemblies.
- B. Fire Resistance of Joint Systems: Assembly ratings indicated, but with assembly ratings not less than that equaling or exceeding fire-resistance rating of constructions in which joints are located, as determined by UL 2079.
- C. Fire Resistance of Perimeter Fire-Containment Systems: Integrity and insulation ratings indicated as determined by the Kentucky Building Code and UL 2079.

1.4 SUBMITTALS

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

- B. Shop Drawings: For each fire-resistive joint system, show each kind of construction condition in which joints are installed and relationships to adjoining construction. Include fire-resistive joint system design designation of testing and inspecting agency acceptable to authorities having jurisdiction that demonstrates compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.
- C. Product Certificates: For each type of fire-resistive joint system, signed by product manufacturer.
- D. Qualification Data: For Installer.
- E. Compatibility and Adhesion Test Reports: From fire-resistive joint system manufacturer indicating the following:
 - 1. Materials forming joint substrates have been tested for compatibility and adhesion with fill materials.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- F. Evaluation Reports: Evidence of fire-resistive joint systems' compliance with ICBO ES AC30, from the ICBO Evaluation Service.
- G. Research/Evaluation Reports: For each type of fire-resistive joint system to meet the requirements of the Kentucky Building Code.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain fire-resistive joint systems for each kind of joint and construction condition indicated through one source from a single manufacturer.
- B. Preconstruction Compatibility and Adhesion Testing: Submit to fire-resistive joint system manufacturers, for testing indicated below, samples of materials that will contact or affect fill materials.
 - 1. Use manufacturer's standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of fill materials to joint substrates.
 - 2. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 3. For materials failing tests, obtain fire-resistive joint system manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
- C. Fire-Test-Response Characteristics: Provide fire-resistive joint systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for fire-resistive joint systems acceptable to authorities having jurisdiction.
 - 2. Fire-resistive joint systems are identical to those tested per ICBO ES AC30 and are qualified for types of joints and joint movement capabilities indicated in a current

Evaluation Report by the ICBO Evaluation Service.

3. Fire-resistive joint systems are identical to those tested per UL 2079 Perimeter fire-containment systems are identical to those tested per both the Kentucky Building Code and UL 2079. Provide rated systems complying with the following requirements:
 - a. Fire-resistive joint system products bear classification marking of qualified testing and inspecting agency.
 - b. Fire-resistive joint systems correspond to those indicated by referencing system designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fire-resistive joint system products to Project site in original, unopened containers or packages with qualified testing and inspecting agency's classification marking applicable to Project and with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for fire-resistive joint systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate fire-resistive joint systems per manufacturer's written instructions by natural means or, if this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- B. Coordinate sizing of joints to accommodate fire-resistive joint systems.
- C. Do not cover up fire-resistive joint system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following

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requirements apply for product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
 - a. Fire-Resistive Joint Systems:
 - 1) DAP Inc.
 - 2) Hilti, Inc.
 - 3) 3M Fire Protection Products.
 - 4) Tremco, Inc.
 - 5) United States Gypsum Company.

2.2 FIRE-RESISTIVE JOINT SYSTEMS, GENERAL

- A. Compatibility: Provide fire-resistive joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.
- B. Accessories: Provide components of fire-resistive joint systems, including forming materials, that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.

2.3 FIRE-RESISTIVE JOINT SYSTEMS

- A. Where UL-classified fire-resistive joint systems are indicated, they refer to alphanumeric designations listed in UL's "Fire Resistance Directory" under product Category XHBN.
- B. Head-of-Wall, Fire-Resistive Joint System:
 1. UL-Classified Products:
 2. Assembly Rating: 1 hour, 2 hours.
 3. Nominal Joint Width: As indicated.
 4. Movement Capabilities: Class I.
- C. Wall-to-Wall, Fire-Resistive Joint System:
 1. UL-Classified Products:
 2. Assembly Rating: 1 hour, 2 hours.
 3. Nominal Joint Width: As indicated.
 4. Movement Capabilities: Class I.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance.

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

3.2 PREPARATION

- A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from fire-resistive joint system materials. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with Part 1 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.
- B. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
- C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.
 2. Apply fill materials so they contact and adhere to substrates formed by joints.
 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. If deficiencies are found, repair or replace fire-resistive joint systems so they comply with requirements.

3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to joints as Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

END OF SECTION 078446

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes joint sealants for the following locations:

- 1. 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. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors.
 - e. Perimeter joints of toilet fixtures.
 - f. Perimeter joints of countertops, backsplashes and other interior woodwork and millwork components.

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

- 1. Division 07 Section "Penetration Firestopping" for through-penetration firestopping systems.
- 2. Division 09 Section "Gypsum Board" for sealing concealed perimeter joints of gypsum board partitions to reduce sound transmission.
- 3. Division 09 Section "Tile" for sealing tile joints.

1.3 SYSTEM 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. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.
- C. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.

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. Preconstruction Compatibility and Adhesion Testing: Submit to joint sealant manufacturers samples of materials that will contact or affect joint sealants for compatibility and adhesion testing as indicated below:
 - 0. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - f. Perform tests under normal environmental conditions that will exist during actual installation.
 - 1. Submit not less than 9 pieces of each type of material, including joint substrates, shims, joint sealant backings, secondary seals, and miscellaneous materials.
 - 2. Schedule sufficient time for testing and analysis of results to prevent delay in the progress of the Work.
 - 3. Investigate materials failing compatibility or adhesion tests and obtain joint sealant manufacturer's written recommendations for corrective measures, including use of specially formulated primers.
 - 4. Testing will not be required when joint sealant manufacturer is able to submit joint preparation data required above that are acceptable to Architect and are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- D. Product Testing: Provide comprehensive test data for each type of joint sealant based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal of test results to Architect.
 - 1. Test elastomeric sealants for compliance with requirements specified by reference to ASTM C 920. Include test results for hardness, stain resistance, adhesion and cohesion under cyclic movement (per ASTM C 719), low-temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging, and effects of accelerated weathering.
 - 2. Include test results performed on joint sealants after they have cured for 1 year.

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 period for use, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F (4 deg C).
 - 2. When joint substrates are wet.
- B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.
- C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.8 SEQUENCING AND SCHEDULING

- A. Sequence installation of joint sealants to occur not less than 21 nor more than 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.

2.2 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated on each Elastomeric Joint Sealant Data Sheet at end of this Section, including those requirements referencing ASTM C 920 classifications for Type, Grade, Class, and Uses.
- B. Products: Subject to compliance with requirements, provide one of the products specified in each Elastomeric Joint Sealant Data Sheet.
- C. Installation Locations: Refer to sealant data sheet for applicable substrates. Sealant to be installed at all applicable exterior joints, interior control joints, interior face of joints in exterior walls and other interior working joints.

2.3 LATEX JOINT SEALANTS

- 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

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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 50 percent.
- D. Available Products: Subject to compliance with requirements, provide one of the following, or approved equal:
 - 1. Acrylic-Emulsion Sealant:
 - f. "AC-20," Pecora Corp.
 - g. "Sonolac," Sonneborn Building Products Div., ChemRex, Inc.
 - h. "Tremco Acrylic Latex 834," Tremco, Inc.
 - 2. Silicone-Emulsion Sealant:
 - a. "Trade Mate Paintable Glazing Sealant," Dow Corning Corp.
- E. Installation Locations: Sealant to be installed at interior non-working joints, for example, joint between door frame and wall, interior wood trim joints, other joints requiring sealant prior to application of finishes.

2.4 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. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.
- 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 as 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.

2.5 MISCELLANEOUS MATERIALS

JOINT SEALANTS

- 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 in any way joint substrates and adjacent nonporous surfaces, 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 recommendations of joint sealant manufacturer 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: Where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. 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. 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.
- D. 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.
 - a. Do not leave gaps between ends of joint fillers.
 - b. Do not stretch, twist, puncture, or tear joint fillers.
 - c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
 - 2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
- E. 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.
- F. 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 C 1193, of recess depth and at locations indicated.

3.4 CLEANING

- A. Clean off excess sealants or 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.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration, dirt stains discoloration 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 that and installations with repaired areas are indistinguishable from original work.

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PRODUCT DATA SHEET 1 - ELASTOMERIC JOINT SEALANT

- A. Elastomeric Joint Sealant Designation: ES1
- B. Base Polymer: Urethane.
- C. Type: S (single component).
- D. Grade: NS (nonsag).
- E. Class: 25.
- F. Use[s] Related to Exposure: T (traffic) and NT (nontraffic).
- G. Uses Related to Joint Substrates: M, G, A and, as applicable to joint substrates indicated, O.
 - 1. Use M Substrate: Mortar joints.
 - 2. Use G Substrate: Glass joints.
 - 3. Use A Substrate: Aluminum joints.
 - 4. Use O Joint Substrates: Coated glass, color anodized aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, limestone, marble, ceramic tile, and wood.
- H. Available Products:
 - 1. Bostik Inc.
 - 2. Mameco International, Inc.
 - 3. Pecoraa Corporation.
 - 4. Products Research & Chemical Corporation.
 - 5. Sika Corporation.
 - 6. Sonneborn Building Products Division ChemRex, Inc.
 - 7. Tremco, Inc.
 - 8. W.R. Meadows, Inc.

END OF SECTION 079200

SECTION 081113 – HOLLOW METAL 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 hollow metal frames.
- B. Related section include the following:
 - 1. Division 08 Section “Flush Wood Doors”.
 - 2. Division 08 Section “Stile and Rail Wood Doors”.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each frame design.
 - 2. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 3. Locations of reinforcement and preparations for hardware.
 - 4. Details of anchorages, joints, field splices, and connections.
 - 5. Details of accessories.
 - 6. Details of moldings, removable stops, and glazing.
 - 7. Details of conduit and preparations for power, signal, and control systems.
- C. Other Action Submittals:
 - 1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.5 QUALITY ASSURANCE

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

1.6 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 nonvented plastic.
 - 1. Provide additional protection to prevent damage to finish of factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal 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.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, products by one of the following may include but are not limited to:
 - 1. Ceco Door Products; an Assa Abloy Group company.
 - 2. Curries Company; an Assa Abloy Group company.
 - 3. Steelcraft; an Ingersoll-Rand company.
 - 4. Metal Products, Inc., Corbin, KY
 - 5. Megamet Industries, Inc.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B; suitable for exposed applications.

- B. Frame Anchors: ASTM A 591, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008 or ASTM A 1011, hot-dip galvanized according to ASTM A 153, Class B.
- C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153.
- D. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
- E. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143.
- F. Glazing: Comply with requirements in Division 08 Section "Glazing."

2.3 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Interior Frames: Fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames as full profile welded unless otherwise indicated.
 - 3. Frames for Wood Doors: 16 gauge steel sheet. (14 gauge at Janitor and Storage Room Doors.)
 - 4. Frames for Lights: 16 gauge steel sheet.
- C. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.4 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 - 2. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
 - 3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.5 STOPS AND MOLDINGS

- A. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
- B. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

2.6 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- wide steel.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch 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. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/NAAMM-HMMA 861.
- C. Hollow Metal Frames: 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.
 - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 - 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. 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 anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
 - b. Compression Type: Not less than two anchors in each jamb.
 - c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

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

- D. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

- E. Hardware Preparation: Factory prepare hollow metal work to receive templated 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/NAAMM-HMMA 861.
 2. Reinforce frames to receive nontemplated, 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 16 Sections.

- F. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 2. Provide fixed frame moldings on secure side of interior frames.
 3. Provide loose stops and moldings on inside of hollow metal work.
 4. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.8 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
 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; compatible with substrate and field-applied coatings despite prolonged exposure.

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. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

- C. For record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. 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 to the following tolerances:
 - 1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - 4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap frames to receive nontemplated, 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.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

- a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
4. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
5. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
7. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

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 Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid-core doors wood-veneer faces.
2. Solid core doors with plastic laminate faces.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Sections:

1. Division 06 Section "Interior Architectural Woodwork" for requirements for matching finishes for both flush wood doors and wood millwork.
2. Division 08 Section "Hollow Metal Frames".

1.3 SUBMITTALS

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

- B. 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 fire-protection ratings for fire-rated doors.

C. Samples for Verification:

1. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
 - a. Provide samples for each species of veneer and solid lumber required.
 - b. Plastic laminate, 6 inches (150 mm) square, for each color, texture and pattern selected.

- D. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.
- C. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Standards," latest edition, unless more stringent requirements are specified.
 - 1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified. This project has been registered as AWI/QCP Project Number 11.0124.
 - 2. Provide WI-Certified Compliance Certificate indicating that doors comply with requirements of grades specified.
 - 3. Provide WI-Certified Compliance Certificate for installation.
- D. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated.
- E. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during 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 (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Algoma Hardwoods, Inc.
 2. Ampco, Inc.
 3. Buell Door Company Inc.
 4. Chappell Door Co.
 5. Eagle Plywood & Door Manufacturing, Inc.
 6. Eggers Industries.
 7. Graham; an Assa Abloy Group company.
 8. Haley Brothers, Inc.
 9. Ideal Architectural Doors & Plywood.
 10. Ipik Door Company.
 11. Lambton Doors.
 12. Marlite.
 13. Marshfield Door Systems, Inc.
 14. Mohawk Flush Doors, Inc.; a Masonite company.
 15. Oshkosh Architectural Door Company.
 16. Poncraft Door Company.
 17. Vancouver Door Company.
 18. VT Industries Inc.

2.2 DOOR CONSTRUCTION, GENERAL

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- B. WDMA I.S.1-A Performance Grade: As indicated.
- C. Particleboard-Core Doors:
1. Particleboard: ANSI A208.1, Grade LD-1.
 2. Particleboard: Straw-based particleboard complying with ANSI A208.1, Grade LD-2 or M-2, except for density.
 3. Blocking: 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) bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 - c. 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.
 4. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- D. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.

- a. Screw Withdrawal, Face: 700 lbf (3100 N).
 - b. Screw Withdrawal, Edge: 400 lbf (1780 N).

- E. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 - 1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. 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. Comply with specified requirements for exposed edges.

- F. Mineral-Core Doors:
 - 1. Core: Noncombustible 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 follows:
 - a. 5-inch (125-mm) top-rail blocking.
 - b. 5-inch (125-mm) bottom-rail blocking, in doors indicated to have protection plates.
 - c. 5-inch (125-mm) midrail blocking, in doors indicated to have armor plates.
 - d. 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.
 - 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.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

- A. Solid-Core Doors:
 - 1. Grade: AWI Premium Grade American Cherry.
 - 2. Match between Veneer Leaves: Book match.
 - 3. Assembly of Veneer Leaves on Door Faces: Balance match.
 - 4. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
 - 5. 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 20 feet (6 m) or more.
 - 6. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
 - 7. Exposed Vertical Edges: Same species as faces.
 - 8. Core: Either glued wood stave or structural composite lumber.
 - 9. Construction: Seven plies, either bonded or nonbonded construction.
 - 10. WDMA I.S.1-A Performance Grade: Standard Duty or as indicated.
 - 11. Applied wood face trim as indicated on Drawings.
 - a. AWI Premium Grade American Cherry.
 - 12. Stain and Finish: Shop finish to match millwork specified in Division 06 Section "Interior Architectural Woodwork".

2.4 PLASTIC-LAMINATE-FACED DOORS

A. Interior Solid-Core Doors

1. Grade: Premium.
2. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HSH.
3. Colors, Patterns, and Finishes: As selected by Architect from laminate manufacturer's full range of solid-color products.
4. Core: Particleboard.
5. Construction: Three plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before faces are applied. Faces are bonded to core using a hot press.
6. SDMA I.S.1-A Performance Grade: Heavy Duty.

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. Locate hardware to comply with DHI-WDHS-3. 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.

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 08 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. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
 - a. Comply with NFPA 80 for fire-rated doors.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or 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 081433 - STILE AND RAIL WOOD DOORS

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 stile and rail wood doors.
- B. Related Sections include the following:
 - 1. Division 06 Section "Interior Architectural Woodwork" for requirements for veneers from the same flitches and matching finishes for both architectural woodwork and stile and rail wood doors.
 - 2. Division 08 Section "Door Hardware".
 - 3. Division 08 Section "Flush Wood Doors".
 - 4. Division 08 Section "Hollow Metal Frames".

1.3 SUBMITTALS

- A. Product Data: For each type of door. Include details of construction.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data, including those for stiles, rails, panels, and moldings (sticking); and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate requirements for veneer matching.
- C. Samples for Verification: Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edgings representing typical range of color and grain for each species of veneer and solid lumber required.
- D. Product Certificates: Signed by door manufacturers.
- E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain stile and rail wood doors through one source from a single manufacturer.

- B. Source Limitations: Obtain stile and rail wood doors of special design and construction from same fabricator as work in Division 06 Section "Interior Architectural Woodwork."
- C. Quality Standard for Doors of Stock Design and Construction: Comply with WDMA I.S.6, "Industry Standard for Wood Stile and Rail Doors," unless more stringent requirements are specified.
 - 1. Mark, label, or otherwise identify stile and rail wood doors as complying with WDMA I.S.6, and include panel design number if applicable.
- D. Quality Standard for Doors of Special Design and Construction: Comply with AWI's "Architectural Woodwork Standards", latest edition, unless more stringent requirements are specified.
 - 1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified. This project has been registered as AWI/QCP Project Number 11.0124.
- E. Fire-Rated Wood Doors: Doors and frames 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.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in opaque plastic bags or cardboard cartons.
- C. Mark each door on top and bottom edge with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

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

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, and have warped (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 2. Warranty shall be in effect during the following period of time from date of Substantial Completion:
 - a. Interior Doors: Five years.

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.

2.2 MATERIALS

- A. General: Use only materials that comply with referenced quality standards unless more stringent requirements are specified.
1. Assemble interior doors, frames, and sidelites, including components, with either dry-use or wet-use adhesives complying with ASTM D 5572 for finger joints and ASTM D 5751 for joints other than finger joints.
- B. Low-Emitting Materials:
1. Provide doors made with adhesives and composite wood products that do not contain urea-formaldehyde resins.
- C. Panel Products: Any of the following:
1. Particleboard made from wood particles, with binder containing no urea-formaldehyde resin, complying with ANSI A208.1, Grade M-2.
 2. Medium-density fiberboard made from wood fiber, with binder containing no urea-formaldehyde resin, complying with ANSI A208.2, Grade MD.
 3. Hardboard, complying with AHA A135.4.
 4. Veneer core plywood.

2.3 STILE AND RAIL DOORS

- A. Available Manufacturers:
1. Artistic Doors and Windows, Inc.
 2. Eggers Industries; Architectural Door Division.
 3. International Door and Latch.
 4. JELD-WEN, Inc.
 5. Maywood, Inc.
 6. McPhillips Manufacturing.
 7. QSM Doors, Inc.
 8. Simpson Door Company.
 9. VT Industries.
 10. Algoma Hardwoods
 11. TruStile
- B. Interior Doors:
1. Grade for Transparent Finish: Select or Better (no knots).

2. Wood Species for Transparent Finish: AWI Premium Grade American Cherry.
3. Raised-Panel Thickness: As indicated in Drawings.
4. Flat-Panel Thickness: As indicated in Drawings.
5. Glazed Panels: As indicated on Drawings.
6. Interior Door Types: As indicated in Drawings.
7. Stain and Finish: Shop finish to match wood millwork specified in Division 06 Section "Interior Architectural Millwork".

C. Construction, General:

1. Panel Designs: Drawings indicate panel designs. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

D. Door Construction for Transparent Finish:

1. Stile and Rail Construction: Clear lumber; may be edge glued for width. Select lumber for similarity of grain and color, and arrange for optimum match between adjacent pieces.
2. Raised-Panel Construction: Edge-glued, clear lumber, glued to both sides of a wood-based panel product. Select lumber for similarity of grain and color, and arrange for optimum match between adjacent pieces.
3. Flat-Panel Construction: Veneered, wood-based panel product.

2.4 FABRICATION

A. Fabricate stile and rail wood doors in sizes indicated for Project-site fitting.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W Series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and substrates, with Installer present, for suitable conditions where wood stile and rail doors and fire-rated wood door frames will be installed.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
2. Reject doors with defects.

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

3.2 INSTALLATION

A. Install fire-rated wood door frames level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

1. Countersink fasteners, fill surface flush, and sand smooth.
- B. Hardware: For installation, see Division 08 Section "Door Hardware."
- C. Install wood doors to comply with manufacturer's written instructions and with referenced quality standard, and as indicated.
 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- D. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
 1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold.
 - a. Comply with NFPA 80 for fire-rated doors.
 2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
 3. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.

3.3 ADJUSTING AND PROTECTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or 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 081433

SECTION 083113 - ACCESS 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. This Section includes the following:
 - 1. Access doors and frames for walls and ceilings.
- B. Related Sections include the following:
 - 1. Division 09 Section "Acoustical Panel Ceilings" for suspended acoustical tile ceilings.

1.3 SUBMITTALS

- A. Product Data: For each type of access door and frame indicated. Include construction details, fire ratings, materials, individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each door face material, at least 3 by 5 inches (75 by 125 mm) in size, in specified finish.
- D. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.
- E. Ceiling Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of access door(s) and frame(s) through one source from a single manufacturer.
- B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction, complying with 2006 International Building Code including 2007 Kentucky Amendments:

1. NFPA 252 or UL 10B for vertical access doors and frames.
2. ASTM E 119 or UL 263 for horizontal access doors and frames.

C. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

1. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

1. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

C. Steel Sheet: electrolytic zinc-coated, ASTM A 591/A 591M with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

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

1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."

2. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.

E. Drywall Beads: Edge trim formed from 0.0299-inch (0.76-mm) zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

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. Acudor Products, Inc.
2. Babcock-Davis; A Cierra Products Co.
3. Bar-Co, Inc. Div.; Alfab, Inc.
4. Cendrex Inc.
5. Dur-Red Products.

6. Elmdor/Stoneman; Div. of Acorn Engineering Co.
7. Jensen Industries.
8. J. L. Industries, Inc.
9. Karp Associates, Inc.
10. Larsen's Manufacturing Company.
11. MIFAB, Inc.
12. Milcor Inc.
13. Nystrom, Inc.
14. Williams Bros. Corporation of America (The).

B. Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.

1. Locations: Wall and ceiling surfaces.
2. Door: Minimum 0.060-inch- (1.5-mm-) thick sheet metal, set flush with exposed face flange of frame.
3. Frame: Minimum 0.060-inch- (1.5-mm-) thick sheet metal with 1-1/4-inch- (32-mm-) wide, surface-mounted trim.
4. Hinges: Continuous piano.
5. Lock: Manufacturer's standard.

C. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.

1. Locations: Wall and ceiling surfaces.
2. Fire-Resistance Rating: Not less than that indicated in the Drawings for the location of installation.
3. Temperature Rise Rating: 250 deg F (139 deg C) at the end of 30 minutes.
4. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch (0.9 mm).
5. Frame: Minimum 0.060-inch- (1.5-mm-) thick sheet metal with 1-inch- (25-mm-) wide, surface-mounted trim.
6. Hinges: Concealed-pin type.
7. Automatic Closer: Spring type.
8. Latch: Self-latching device.
9. Lock: Manufacturer's standard.

2.3 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

1. Exposed Flanges: As indicated.
2. Provide mounting holes in frames for attachment of units to metal or wood framing.
3. Provide mounting holes in frame for attachment of masonry anchors. Furnish adjustable metal masonry anchors.

- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 - 1. For cylinder lock, furnish two keys per lock and key all locks alike.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Commercial door hardware for the following swinging doors:
 - a. Flush wood.
- B. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. KENTUCKY BUILDING CODE.
- C. Related Sections include the following:
 - 1. Division 08 Section "Hollow Metal Doors and Frames" for astragals provided as part of fire-rated labeled assemblies and for door silencers provided as part of hollow-metal frames.
 - 2. Division 08 Section "Flush Wood Doors" for astragals provided as part of fire-rated labeled assemblies.

1.3 SUBMITTALS

- A. **Number of Submittals: All items listed in this section are to be included in one submittal prepared by one Supplier.**
- B. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- C. Samples for Initial Selection: For each finish, color, and texture required for each type of door hardware as requested by Architect.
- D. Qualification Data:
 - 1. Finish Hardware Installers

- a. Finish hardware, including electrified hardware, for wood, hollow metal, and aluminum doors to be installed by personnel trained and certified by the manufacturer of the product furnished.
 - b. Provide manufacturer's certificates for installer as part of Contractor's bid information. Failure to supply certificates may result in rejection of bid.
 - 2. Hardware Supplier
 - a. Established contract hardware firm which maintains and operates an office, display, and stock in project area and which is a factory authorized distributor of the lock being furnished.
 - b. Hardware scheduled and furnished by or under direct supervision an Architectural Hardware Consultant.
 - c. All schedules submitted to the Architect for approval and job use must carry the signature and certified seal of this Architectural Hardware Consultant.
 - 3. Architectural Hardware Consultant
 - a. Currently certified by the Door and Hardware Institute.
 - b. Full-time employee of the Hardware Supplier or an individual having no contractual ties to any supplier/manufacturer entity.
 - c. Available at reasonable times to Architect, Owner, and Contractor during course of work.
- E. Maintenance Data: For each type of door hardware. Include final hardware schedule, keying schedule, riser diagrams, and point-to-point wiring diagrams in 3-ring binder, labeled on spine with project name and "Door Hardware".
- F. Warranty: Special warranty specified in this Section.
- G. Other Action Submittals:
- 1. Door Hardware Sets: Prepared by or under the supervision of a DHI certified Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. **Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule"; other formats will be rejected without review. Double space entries, and number and date each page.**
 - b. **Numerical Sequence of Sets and Headings: Submittal headings shall be in exact order as hardware sets in specification: one heading only per set. Submittal set numbers shall relate to specification set numbers, ie. if three headings are required for Set 12 due to door width differences, then the heading numbers should be 12.1, 12.2, and 12.3 or employing similar linking logic.**
 - c. **Door Numbers: Identical to those used in the contract documents.**
 - d. Number of Copies: (5).
 - e. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, and material of each door and frame.
 - 2) Type, style, function, size, quantity, and finish of each door hardware item.
 - 3) Complete designations of every item required for each door or opening including name and manufacturer.
 - 4) Degree of opening for closer and overhead stop and holder installation.
 - 5) Keying information.
 - 6) Fastenings and other pertinent information.

- 7) Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - 8) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 9) Mounting locations for door hardware.
 - 10) Notes included with specification hardware sets transcribed verbatim into submittal hardware sets.**
 - 11) Door and frame sizes and materials.
 - 12) List of related door devices specified in other Sections for each door and frame.
- f. Submittal Sequence: Submit the final door hardware sets at earliest possible date, particularly where approval of the door hardware sets must precede fabrication of other work that is critical in Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the door hardware sets.
2. Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

1.4 QUALITY ASSURANCE

- A. Furnish proper hardware types and quantities for door function, hardware mounting and clearances, and to meet applicable codes. Bring discrepancies to the attention of the Architect a minimum of (10) days prior to bid date so that an addendum may be issued. No additional compensation will be allowed after bidding for hardware changes required for proper function, hardware mounting or clearances, or to meet codes.**
- B. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- C. Source Limitations: **All items listed in hardware sets are to be furnished by one supplier.** Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- D. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:
1. NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 2. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:
 - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

- b. Door Closers: Comply with the following maximum opening-force requirements indicated:
 - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
 - 2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
 - 3. NFPA 101: Comply with the following for means of egress doors:
 - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - b. Thresholds: Not more than 1/2 inch high.
 - 4. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40" above sill) or UL-10C.
 - a. Test Pressure: Positive pressure labeling.
- E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Conference is to include representatives of the Owner, Architect, Contractor, CM if applicable, Hardware Supplier, and Manufacturer of Key Cylinders. Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to Owner by registered mail or overnight package service. Obtain Owner's contact name and address from Architect.

1.6 COORDINATION

- A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Distribute templates in a timely manner so as not to delay suppliers. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Ten years for mortise locks and latches.
 - 2. Five years for exit hardware.
 - 3. Ten years for manual door closers.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide (6) months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this and door hardware sets indicated in Part 3 "Door Hardware Sets" Article.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
- B. Designations: Requirements for design, grade, function, material, finish, size and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
 2. References to BHMA Standards: In addition to other requirements in this section, provide products complying with or exceeding these standards and requirements for description, quality, and function.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electrified access control door hardware, in compliance with specifications, must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01 "Substitution Procedures". Approval of requests is at the discretion of the architect, owner, and their designated consultants.
- D. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include manufacturers specified.

2.2 BUTT HINGES, GENERAL

- A. Quantity: Provide the following, unless otherwise indicated:
1. Two Hinges: For doors with heights up to 60 inches (1524 mm).
 2. Three Hinges: For doors with heights 61 to 90 inches (1549 to 2286 mm).
 3. Four Hinges: For doors with heights 91 to 120 inches (2311 to 3048 mm).
 4. For doors with heights more than 120 inches (3048 mm), provide 4 hinges, plus 1 hinge for every 30 inches (750 mm) of door height greater than 120 inches (3048 mm).
- B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- C. Hinge Height, Width, and Weight: Unless otherwise indicated, provide the following:
1. Doors with Exit Devices or 3'6" or more in width: 5" high, heavy-weight hinges.
 2. Doors less than 3'6" in width: 4-1/2" high, standard-weight hinges.
 3. Width: 4-1/2" heavy-weight, 4-1/2" standard-weight, unless proper clearance requires a different width.
 4. Doors with Closers: Antifriction-bearing hinges.
- D. Hinge Base Metal: Unless otherwise indicated, provide the following:
1. Exterior and in-swinging restroom door hinges: Stainless steel, with stainless-steel pin.
 2. Balance of hinges: Steel, with steel pin.
- E. Hinge Options: Provide the following:
1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for reverse bevel lockable doors.
 2. Corners: Square.
 3. Number of knuckles: Five.
- F. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat-head. Finish screw heads to match surface of hinges.

G. Template Hinge Dimensions: BHMA A156.7.

H. Available Manufacturers:

1. Bommer Industries, Inc. (BI).
2. Hager Companies (HAG).
3. McKinney Products Company; an ASSA ABLOY Group company (MCK).
4. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
5. PBB, Inc. (PBB)

2.3 LOCKS AND LATCHES, GENERAL

A. Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).

B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

C. Lock Trim:

1. Levers: Cast.
 - a. Schlage 03 tubular model with full smooth return.
2. Escutcheons: Forged.
 - a. Schlage N model.
3. Lockset Designs: Provide design indicated in hardware sets, or, if sets are provided by another manufacturer, provide designs that match those designated.

D. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.

E. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

F. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.

2.4 MECHANICAL LOCKS AND LATCHES

A. Lock Types: Provide mortise or bored locks as indicated by model number in the Hardware Schedule.

- B. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
 - 1. Mortise Locks: BHMA A156.13.
- C. Mortise Locks: Stamped steel case with steel or brass parts; BHMA A156.13 Grade 1.
 - 1. Available Manufacturers:
 - a. Best Access Systems; Div. of The Stanley Works (BAS).
 - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
 - d. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
 - e. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).
- D. Compatibility with Key Cylinders: fully warranted for use with key cylinder furnished.

2.5 DOOR BOLTS

- A. Bolt Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Mortise Flush Bolts: Minimum 3/4-inch (19-mm) throw.
- B. Automatic Flush Bolts: BHMA A156.3, Grade 1; **designed for mortising into door edge without mortising out the corner of the door.**
 - 1. Available Manufacturers:
 - a. Door Controls International (DCI).
 - b. Hager Companies (HAG).
 - c. Rockwood Manufacturing Company (RM).

2.6 EXIT DEVICES

- A. Exit Devices: BHMA A156.3, Grade 1.
- B. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).
- C. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

- E. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- F. Outside Trim: As specified in hardware sets; material and finish to match locksets, unless otherwise indicated.
 - 1. Match design for locksets and latchsets, unless otherwise indicated.
- G. Fasteners. Manufacturer's standard, except furnish sex bolts for attachments to doors.
- H. Shims: Provide shims if needed for clearance.
- I. Available Manufacturers:
 - 1. Detex, Inc. (DTX)
 - 2. Precision Hardware, Inc. (PH).
 - 3. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
 - 4. Von Duprin; an Ingersoll-Rand Company (VD).

2.7 KEY CYLINDERS

- A. Standard Lock Cylinders: BHMA A156.5, Grade 1.
- B. Cylinders: Provide cylinders for all devices requiring key cylinders to properly function: constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 - 1. Number of Pins: Six or seven as directed by Owner.
 - 2. Keyway: Patented or non-patented as directed by Owner.
 - 3. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
 - 4. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 5. Bored-Lock Type: Cylinders with tailpieces to suit locks.
- C. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
 - 1. Small-format Interchangeable Cores: Core insert, removable by use of a special key; usable with other manufacturers' cylinders.
 - 2. Extra Cores: Provide Owner with (5) extra permanent cores for job. Key extra cores as directed by Owner.
 - 3. Ship permanent cores directly from factory to Owner. Obtain Owner's contact information from Architect.
- D. Construction Keying: Comply with the following:
 - 1. Construction Cores: Provide keyed brass construction cores that are replaceable by permanent cores for all locking devices. Provide 6 construction master keys.
 - a. Replace construction cores with permanent cores as directed by Owner.
- E. Supplemental Items: Provide cylinder spacers, collars, and correct cams as needed for proper function of locking devices.

- F. Available Manufacturers:
 - 1. Best Access Systems; Div. of The Stanley Works (BAS).

2.8 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference, and as follows:
 - 1. Great-Grand Master Key System: Cylinders are operated by a change key, a master key, a grand master key, and a great-grand master key.
 - 2. Existing System: Master key or grand master key locks to Owner's existing system.
- B. Keys: Nickel silver.
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."
 - 2. Quantity: Provide the following:
 - a. Cylinder Change Keys: Three per cylinder.
 - b. Master Keys: Six per master.
 - c. Grand Master Keys: Six per grand master.
 - 3. Ship keys directly from factory to Owner. Obtain Owner's contact information from Architect.

2.9 OPERATING TRIM

- A. Materials: Fabricate from stainless steel, unless otherwise indicated.
- B. Dimensions: All dimensions, shapes, fasteners, and other properties identical to models specified in hardware sets.
- C. Available Manufacturers:
 - 1. Hager Companies (HAG).
 - 2. Hiawatha (HIW).
 - 3. Burns (BRN).
 - 4. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - 5. Rockwood Manufacturing Company (RM).
 - 6. Trimco (TBM).

2.10 ACCESSORIES FOR PAIRS OF DOORS

- A. Coordinators: BHMA A156.3.
 - 1. Available Manufacturers:
 - a. Door Controls International (DCI).
 - b. Hager Companies (HAG).
 - c. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - d. Rockwood Manufacturing Company (RM).
 - e. Trimco (TBM).

2.11 SURFACE CLOSERS

- A. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
 - 1. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
- C. Fasteners: Manufacturer's standard for arms, shoes and brackets. Sex bolts for fastening closers to doors.
- D. Mounting Accessories: Provide shoes, brackets, drop plates, spacers, etc., as needed for proper mounting of closers and arms to door and frame.
- E. Spring Size of Units: Provide field-sizable closers, adjustable for spring sizes 1-6, plus 50% extra spring power at spring size 6, to meet field conditions and requirements for opening force.
- F. Cylinders: 1-1/2" minimum diameter; cast iron or high-silicon alloy aluminum.
- G. Mounting Configuration: Unless otherwise indicated by model number in the hardware sets:
 - 1. Do not furnish closers capable of being mounted on the corridor side of doors.
 - 2. Do not furnish regular arm closers in areas accessible to students.
 - 3. If tri-pack closers are furnished for regular arm applications, remove parallel arm shoe from closer box before delivering to job.
 - 4. Parallel Arm closers are to be manufacturer's double forged rigid models.
- H. Available Manufacturers and Series for Rack and Pinion Surface Closers:
 - 1. LCN Closers; an Ingersoll-Rand Company (LCN): 4040XP series.
 - 2. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT): 281 or 351 series.
 - 3. Stanley Commercial Hardware; Div. of The Stanley Works (STH): D4550 series.
 - 4. Corbin-Russwin: DC8000 series.

2.12 PROTECTIVE TRIM UNITS

- A. Size:
 - 1. Width
 - a. Singles, and pairs with removable mullions or surface applied astragals: 2 inches (38 mm) less than door width on push side and 1 inch (13 mm) less than door width on pull side
 - b. Other pairs: 1 inch (13 mm) less than door width
 - 2. Height: as specified in door hardware sets; or, if constrained by door bottom rail height, 1" less bottom rail height.

- B. Fasteners: Manufacturer's machine or self-tapping countersunk screws.
- C. Metal Protective Trim Units: BHMA A156.6; beveled 4 sides; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel.
- D. Available Manufacturers:
 - 1. Hager Companies (HAG).
 - 2. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - 3. Hiawatha (HIW).
 - 4. Burns (BRN).
 - 5. Rockwood Manufacturing Company (RM).
 - 6. Trimco (TBM).

2.13 MECHANICAL WALL STOPS

- A. Stops and Bumpers: BHMA A156.16, Grade 1.
 - 1. Provide wall stops for doors unless floor, overhead, or other type stops are scheduled or indicated. Where floor or wall stops are not appropriate, provide overhead holders.
 - 2. Properties. Cast construction with fastener suitable for wall or floor condition.
 - 3. Available Manufacturers:
 - a. Hager Companies (HAG).
 - b. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - c. Hiawatha (HIW).
 - d. Burns (BRN).
 - e. Rockwood Manufacturing Company (RM).
 - f. Trimco (TBM).

2.14 OVERHEAD STOPS AND HOLDERS

- A. BHMA A156.8, Grade 1. Template for maximum degree of opening before encountering obstruction.
- B. Available Manufacturers:
 - 1. Architectural Builders Hardware Mfg., Inc. (ABH).
 - 2. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 - 3. Hager (HAG).
 - 4. Rixson Specialty Door Controls; an ASSA ABLOY Group company (RIX).
 - 5. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).

2.15 SILENCERS

- A. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.
- B. Available Manufacturers:
 - 1. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 - 2. Hager Companies (HAG).
 - 3. IVES Hardware; an Ingersoll-Rand Company (IVS).

4. McKinney Products Company; an ASSA ABLOY Group company (MCK).
5. Rockwood Manufacturing Company (RM).
6. Trimco (TBM).

2.16 DOOR GASKETING

- A. General: Provide continuous weather-strip gasketing on exterior hollow metal doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners as indicated by models in hardware sets.
 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. If hardware is to be attached to the frame and would interfere with the gasketing, then provide hardware compatible gasketing that does not need to be cut for the mounting of hardware.
 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 3. Sweeps: Apply to bottom of in-swinging exterior hollow metal doors, or as required for sound attenuation, forming seal with threshold or floor when door is closed.
- B. Requirements per type of rated door provided (these requirements supersede models indicated in hardware sets):
 1. Category A wood doors: provide models indicated in hardware sets.
 2. Category B wood doors: provide Category G&H seals at jambs and meeting edges. If Category H seals are indicated in hardware sets, provide Cat G seals in addition to the Category H seals.
 3. Category A and B hollow metal doors: provide models indicated in hardware sets.
- C. Air Leakage: Not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Jamb Gasketing Materials:
 1. Adhesive Seals. As specified in hardware sets or approved equal.
 2. Intumescents: As required.
 3. Screwed-on weatherstrip and sweeps. Neoprene.
- G. Available Manufacturers for Jamb Gaskets (provided they provide items with neoprene inserts):
 1. Hager Companies (HAG).
 2. National Guard Products (NGP).
 3. Pemko Manufacturing Co. (PEM).
 4. Reese Enterprises (REE).
 5. Zero International (ZER).
 6. Door Hardware Systems, Inc. (DHS).

2.17 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
 - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

2.18 FINISHES

- A. Standard: BHMA A156.18, as indicated in door hardware sets.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 Series.
 - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.
- B. Wood Doors: Comply with DHI A115-W Series.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.
1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 3. Pulls: locate pulls as directed by Architect.
- B. Mounting Locations:
1. Wall Stops: Locate so that lockset spindle and wall stop share horizontal and vertical centerlines.
 2. **Closers and Overhead Stop/holders: Template and mount closers and overhead stops for maximum degree of opening before door encounters obstruction or so as to interface with specified wall stops and holders. When used with closers, template and locate overhead stops so that closer arm does not fully extend and bottom out. These functionality requirements override any degree of opening information in the specifications or submittals.**
- C. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- D. **Weatherstrip and Gasketing with Metal Retainers: Fit up as needed for neat appearance with no gaps between retainers or bulbs.**

3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
- B. Overhead Stops/Holders: Set adjustable stops for maximum degree of opening before door encounters obstruction. Adjust friction to control door.
- C. Door Closers:
1. Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
 2. Adjust latch period so that door does not slam nor injure fingers.
 3. Adjust spring power so that door properly latches.

4. Adjust backcheck to slow door down before hitting stop point so as to prevent damage to closer, arm, door, frame, and fasteners.

D. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DOOR HARDWARE SCHEDULE (followed by Door-Set Index)

Note 1: See Part 2 Door Gasketing for requirements regarding Category G and Category H seals per type of rated door provided.

HW SET: E01A

EACH TO HAVE:

3	EA	BUTT HINGES	5BB1 4.5 X 4.5	641	IVE
1	EA	STOREROOM LOCK	L9080HD-03N	613	SCH
1	EA	SFIC CYLINDER CORE		613	BES
1	EA	ELECTRIC STRIKE	4100	613	TRN
1	EA	CLOSER, REGULAR ARM 1461 REG X FC		695	LCN
1	EA	ALL STOP, CONVEX	1270CX	613	TRI
2	EA	CAT H ADHESIVE JAMB SEAL SET	2525B	BRN	NGP
NOTE: APPLY DOUBLE-ROW FOR SOUND SEALING.					
1	EA	SOUND DOOR BOTTOM SWEEP	SSDB3	313	DHS
1	EA	DOOR CONTACT, POP-IN, DPDT	MSS100-4Y	BRN	FLR

NOTE 1: PROVIDE CONDUIT STUB-UP WITH PULL STRING FROM ELECTRIC STRIKE IN STRIKE JAMB AND DOOR CONTACT IN TOP JAMB. PROVIDE CARD READER, LOW VOLTAGE POWER, AND CONTROL ELECTRONICS TIED INTO EXISTING ACCESS CONTROL SYSTEM.

HW SET: 01

EACH TO HAVE:

3	EA	BUTT HINGES	5BB1 4.5 X 4.5	641	IVE
1	EA	ENTRANCE LOCK	L9050HD-03N	613	SCH
1	EA	SFIC CYLINDER CORE		613	BES
1	EA	CLOSER, REGULAR ARM 1461 REG X FC		695	LCN
1	EA	WALL STOP, CONCAVE	1270CV	613	TRI
2	EA	CAT H ADHESIVE JAMB SEAL SET	2525B	BRN	NGP
NOTE: APPLY DOUBLE-ROW FOR SOUND SEALING.					
1	EA	SOUND DOOR BOTTOM SWEEP	SSDB3	313	DHS

HW SET: 01A

EACH TO HAVE:

3	EA	BUTT HINGES	5BB1 4.5 X 4.5	641	IVE
1	EA	ENTRANCE LOCK	L9050HD-03N	613	SCH
1	EA	SFIC CYLINDER CORE		613	BES
1	EA	OVERHEAD STOP, HD, CONCEALED	100S X ADJ	613	GLY
1	EA	CAT H JAMB SEAL SET	172NDKB	313	NGP
1	EA	SOUND DOOR BOTTOM SWEEP	SSDB3	313	DHS

HW SET: 01B

EACH TO HAVE:

3	EA	BUTT HINGES	5BB1 4.5 X 4.5	641	IVE
1	EA	ENTRANCE LOCK	L9050HD-03N	613	SCH
1	EA	SFIC CYLINDER CORE		613	BES
1	EA	OVERHEAD STOP, MD, SURFACE	450S	613	GLY

HW SET: 02

EACH TO HAVE:

6	EA	HINGE	5BB1HW 5 X 4.5	641	IVE
1	EA	PANIC HARDWARE	CD9927EO X LBR	313	VON
1	EA	PANIC HARDWARE	CD9927NL-OP X LBR	313	VON
3	EA	PERMANENT CORE	PATENTED	613	BES
2	EA	MORTISE CYLINDER	80-132 XQ11-948 (DOGGING) SFIC W/CC	613	SCH
1	EA	RIM CYLINDER	80-159 SFIC W/CC	613	SCH
2	EA	OFFSET PULL	RM3114 X 11" CTC X TYPE 12-HD	613	ROC
2	EA	SURFACE CLOSER	4040XP SCUSH	695	LCN
2	EA	KICK PLATE	K1050 X 8 X 1LDW X B4E X CSK	613	ROC
2	EA	VIEWER	976	613	TRI
1	EA	MORTISED ASTRAGAL	136N	DKB	NGP

HW SET: 02A

EACH TO HAVE:

6	EA	HINGE	5BB1HW 5 X 4.5	641	IVE
1	EA	PANIC HARDWARE	CD9927EO X LBR	313	VON
1	EA	PANIC HARDWARE	CD9927NL-OP X LBR	313	VON
3	EA	PERMANENT CORE	PATENTED	613	BES
2	EA	MORTISE CYLINDER	80-132 XQ11-948 (DOGGING) SFIC W/CC	613	SCH
1	EA	RIM CYLINDER	80-159 SFIC W/CC	613	SCH
2	EA	OFFSET PULL	RM3114 X 11" CTC X TYPE 12-HD	613	ROC
2	EA	SURFACE CLOSER	4040XP SCUSH	695	LCN
2	EA	KICK PLATE	K1050 X 8 X 1LDW X B4E X CSK	613	ROC
2	EA	VIEWER	976	613	TRI
1	EA	MORTISED ASTRAGAL	136N	DKB	NGP
2	SET	JAMB SEALS	797B	BLK	REE

APPLY DOUBLE-ROW OF 797B FOR SOUND SEAL.

HW SET: 03

EACH TO HAVE:

3	EA	HINGE	5BB1HW 5 X 4.5	641	IVE
1	EA	PANIC HARDWARE	CD99L 996L-07 425-SNB	313	VON
2	EA	PERMANENT CORE	PATENTED	613	BES
1	EA	MORTISE CYLINDER	80-132 XQ11-948 (DOGGING) SFIC W/CC	613	SCH
1	EA	RIM CYLINDER	80-159 SFIC W/CC	613	SCH
1	EA	SURFACE CLOSER	1461 FC	695	LCN

HW SET: 04

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	641	IVE
1	EA	CLASSROOM LOCK	L9070HD 03N	613	SCH
1	EA	PERMANENT CORE	PATENTED	613	BES
1	EA	WALL STOP	1278CX	613	TRI
1	EA	SOUND SWEEP	SSDB3	313	DHS
2	SET	JAMB SEALS	797B	BLK	REE

APPLY DOUBLE-ROW OF 797B FOR SOUND SEAL.

HW SET: 06

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	641	IVE
1	EA	INSTITUTION LOCK	LV9082HD 03N	613	SCH
2	EA	PERMANENT CORE	PATENTED	613	BES
1	EA	SURFACE CLOSER	1461 REG FC	695	LCN
1	EA	KICK PLATE	K1050 X 8 X 2LDW X B4E X CSK	613	ROC
2	EA	VIEWER	976	613	TRI
1	EA	SOUND SWEEP	SSDB3	313	DHS
1	EA	WALL STOP	1278CX	613	TRI
2	SET	JAMB SEALS	797B	BLK	REE

APPLY DOUBLE-ROW OF 797B FOR SOUND SEAL.

HW SET: 07

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	641	IVE
1	EA	PRIVACY SET	L9040 03N	613	SCH
1	EA	WALL STOP	1278CV	626	TRI

HW SET: 07A

EACH TO HAVE:

3	EA	BUTT HINGES	5BB1 4.5 X 4.5	641	IVE
1	EA	PRIVACY SET	L9040-03N	613	SCH
1	EA	WALL STOP, CONVEX	1270CX	613	TRI

Door	HW Set
341.1	06
347	07A
348	07A
349	05

350.1	02A
350.2	03
350A	02
350B	04
350C	04

355	01A
356	E01A
356A	01B
356B	07A
357.1	01

357.2	01A
357A	01

END OF SECTION

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Windows.
 - 2. Doors.
- B. Related Sections include the following:
 - 1. Division 08 Section "Mirrors."

1.3 DEFINITIONS

- A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the minimum glass thicknesses to comply with ASTM E 1300.

1.5 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.

- B. Samples: For the following products, in the form of 12-inch- (300-mm-) square Samples for glass.
 - 1. One-way mirrored vision glass.
 - 2. Fire-resistive glazing products.
- C. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Source Limitations for Glass: Obtain each glass type through one source from a single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.
- D. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.
 - 1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- E. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.
 - 1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
 - 2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
- F. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and 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 252.
- G. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.
 - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency or manufacturer acceptable to authorities having jurisdiction.
 - 2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. (0.84 sq. m) in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. (0.84 sq. m) or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

H. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

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.

2.2 GLASS PRODUCTS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
- B. One Way Mirrored Vision Glass.
 1. Basis-of-Design Product: ¼" Pilkington Mirropane TM Transparent mirror glass with reflective surface installed on "subject" side.
 2. Or equal.
- C. Tempered Glass: ASTM C 1048, Kind FT (fully tempered), Type II, Class 1 (clear); and of quality and finish specified.

2.3 FIRE-RATED GLAZING PRODUCTS

- A. Monolithic Ceramic Glazing Material: Proprietary product in the form of clear flat sheets of 3/16-inch (5-mm) nominal thickness weighing 2.5 lb/sq. ft. (12.2 kg/sq. m), and as follows:
 - 1. Fire-Protection Rating: As indicated for the fire window in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - a. Specially Tempered Monolithic Glass: Proprietary Category II safety glazing product in the form of a specially tempered 1/4-inch- (6.4-mm-) thick monolithic lite, and as follows:

2.4 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
 - 1. Neoprene, ASTM C 864.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
 - 1. Neoprene.
 - 2. EPDM.
 - 3. Silicone.
 - 4. Thermoplastic polyolefin rubber.
 - 5. Any material indicated above, as compatible with other products used.
- C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.5 GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
 - 1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

2.6 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
 - 1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 - 2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
 - 1. Type 1, for glazing applications in which tape acts as the primary sealant.
 - 2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.8 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

- B. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
 - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - 2. Minimum required face or edge clearances.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm) as follows:
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of

openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

- D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 LOCK-STRIP GASKET GLAZING

- A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system, unless otherwise indicated.

3.8 CLEANING AND PROTECTION

- A. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.
- B. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- C. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- D. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

SECTION 088300 - MIRRORS

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 types of silvered flat glass mirrors.
 - 1. Annealed monolithic glass mirrors adhered to toilet room walls.

1.3 DEFINITIONS

- A. Deterioration of Mirrors: Defects developed from normal use that are attributable to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning mirrors contrary to mirror manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide mirrors that will not fail under normal usage. Failure includes glass breakage and deterioration attributable to defective manufacture, fabrication, and installation.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
 - 2. Mirror mastic.
 - 3. Mirror hardware.
- B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.
- C. Samples: For each type of mirror product required, in the form indicated below:
 - 1. Mirrors, 12 inches (300 mm) square, including edge treatment on 2 adjoining edges.

- D. Product Certificates: For each type of mirror and mirror mastic, signed by product manufacturer.
- E. Qualification Data: For Installer.
- F. Mirror Mastic Compatibility Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.
- G. Warranty: Special warranty specified in this Section.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed mirror glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in mirror installations with a record of successful in-service performance.
- B. Source Limitations for Mirrors: Obtain mirrors from one source for each type of mirror indicated.
- C. Source Limitations for Mirror Glazing Accessories: Obtain mirror glazing accessories from one source for each type of accessory indicated.
- D. Glazing Publications: Comply with the following published recommendations:
 - 1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
 - 2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- E. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing and substrates on which mirrors are installed.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors, protected from moisture including condensation.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form, made out to Owner and signed by mirror manufacturer agreeing to replace mirrors that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below:
1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering mirrors that may be incorporated into the Work include, but are not limited to, the following:
1. Arch Aluminum & Glass Co., Inc.
 2. Gardner Glass Products.
 3. Gilded Mirrors, Inc.
 4. Guardian Industries Corp.
 5. Independent Mirror Industries, Inc.
 6. Lenoir Mirror Company.
 7. Messer Industries, Inc.
 8. Stroupe Mirror Co., Inc.
 9. Sunshine Mirror.
 10. Virginia Mirror Company, Inc.
 11. VVP America, Inc.; Binswanger Mirror Products.
 12. Walker Glass Co., Ltd.

2.2 SILVERED FLAT GLASS MIRROR MATERIALS

- A. Annealed Float Glass for Inner Lite of Laminated Mirrors: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; Class 1 (clear).

2.3 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Type A Shore durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- C. Mirror Mastic: An adhesive setting compound, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
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. Gunther Mirror Mastics.
- b. Palmer Products Corporation.

2.4 FABRICATION

- A. Mirror Sizes: To suit Project conditions, cut mirrors to final sizes and shapes.
- B. Mirror Edge Treatment: Rounded polished edge.
 - 1. Seal edges of mirrors after edge treatment to prevent chemical or atmospheric penetration of glass coating.
 - 2. Require mirror manufacturer to perform edge treatment in factory immediately after cutting to final sizes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance.
 - 1. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
 - 2. Proceed with mirror installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating surfaces with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
 - 1. Install mastic as follows:
 - a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
 - b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.

3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

END OF SECTION 088300

SECTION 092900 - GYPSUM BOARD

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. Non-load-bearing steel framing members for gypsum board assemblies.
- 2. Gypsum board assemblies attached to steel framing.

- a. Interior gypsum and metal stud partitions.
 - b. Suspended gypsum ceilings.
- c. Interior gypsum soffits.
- d. Tile backing panels.

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

- 1. Division 07 Section "Firestopping" for firestopping systems and fire-resistive-rated joint sealants.

1.3 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms related to gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 ASSEMBLY PERFORMANCE REQUIREMENTS

- A. Sound Transmission Characteristics: For gypsum board assemblies indicated to have STC ratings, provide materials and construction identical to those of assemblies whose STC ratings were determined per ASTM E 90 and classified per ASTM E 413 by a qualified independent testing agency.

- B. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

1.5 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

- B. Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

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1.6 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Where fire-rated gypsum board assemblies are indicated, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- 1. Fire Resistance Ratings: As indicated by reference to GA File Numbers in GA-600 "Fire Resistance Design Manual" or to design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer.
- C. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- D. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.
- C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
- B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.
- C. Ventilation: Ventilate building spaces, as required, for drying joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, products to be incorporated in the work may include but are not limited to the following:

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1. Steel Framing and Furring:
 - a. Clark Steel Framing.
 - b. Consolidated Systems, Inc.
 - c. Dale Industries, Inc.
 - d. Dietrich Industries, Inc.
 - e. Marino Industries Corp.
 - f. Gold Bond Building Products Div., National Gypsum Co.
 - g. Unimast Inc.
 - h. Clark Western Building Systems, Inc.
2. Grid Suspension Assemblies:
 - a. Chicago Metallic Corp.
 - b. National Rolling Mills Co.
 - c. USG Interiors, Inc.
3. Gypsum Board and Related Products:
 - a. Domtar Gypsum.
 - b. Georgia-Pacific Corp.
 - c. Gold Bond Building Products Div., National Gypsum Co.
 - d. United States Gypsum Co.

2.2 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

- A. General: Provide components of sizes indicated but not less than that required to comply with ASTM C 754 for conditions indicated.
- B. Cast-In-Place and Post-installed Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attaching hanger wires, and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined from testing per ASTM E 488 conducted by a qualified independent testing agency.
 1. Expansion anchor.
- C. Wire for Hangers and Ties: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper.
- D. Hanger Rods: Mild steel and zinc-coated or protected with rust-inhibitive paint.
- E. Flat Hangers: Mild steel and zinc-coated or protected with rust-inhibitive paint.
- F. Angle-Type Hangers: Angles with legs not less than 7/8 inch (22 mm) wide, formed from 0.0635-inch- (1.6-mm-) thick galvanized steel sheet complying with ASTM A 446, G90 (ASTM A 446M, Z180) Coating Designation, with bolted connections and 5/16-inch- (8-mm-) diameter bolts.
- G. Channels: Cold-rolled steel, 0.0598-inch- (1.5-mm-) minimum thickness of base (uncoated) metal and 7/16-inch- (11-mm-) wide flanges, and as follows:
- H. Steel Studs for Furring Channels: ASTM C 645, with flange edges bent back 90 deg and doubled over to form 3/16-inch- (5-mm-) minimum lip (return), minimum thickness of base (uncoated) metal and minimum depth as follows:

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1. Thickness: 0.0179 inch (26 ga.), unless otherwise indicated.
 2. Depth: As indicated.

- I. Steel Rigid Furring Channels: ASTM C 645, hat-shaped, depth of 7/8 inch (22 mm), and minimum thickness of base (uncoated) metal as follows:
 1. Thickness: 0.0179 inch (26 ga.), unless otherwise indicated.

- J. Steel Resilient Furring Channels: Manufacturer's standard product designed to reduce sound transmission, fabricated from steel sheet complying with ASTM A 525 (ASTM A 525M) or ASTM A 568 (ASTM A 568M) to form 1/2-inch- (12.7-mm-) deep channel of the following configuration:
 1. Single-Leg Configuration: Asymmetric-shaped channel with face connected to a single flange by a single slotted leg (web).
 2. Double-Leg Configuration: Hat-shaped channel, with 1-1/2-inch- (38.1-mm-) wide face connected to flanges by double slotted or expanded metal legs (webs).
 3. Configuration: Either configuration indicated above.

- K. Grid Suspension System for Ceilings / Soffits: ASTM C 645, manufacturer's standard direct-hung grid suspension system composed of main beams and cross furring members that interlock to form a modular supporting network.

2.3 STEEL FRAMING FOR WALLS AND PARTITIONS

- A. General: Provide steel framing members complying with the following requirements:
 1. 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. Interior Studs: Maximum Deflection: L/240 at 5 lbf per sq. ft. (240 Pa).
 2. Protective Coating: Manufacturers standard corrosion-resistant coating.

- B. Interior Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 deg and doubled over to form 3/16-inch- (5-mm-) wide minimum lip (return) and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:
 1. Thickness: 20 ga. Minimum or as otherwise specifically indicated in partition types or details.
 2. Depth: As indicated.
 3. GA listed is minimum allowed, provide gauge as required for height limitations as defined by MFR.

- C. Steel Rigid Furring Channels: ASTM C 645, hat-shaped, depth and minimum thickness of base (uncoated) metal as follows:
 1. Depth: 7/8 inch (22.2 mm), unless otherwise indicated.
 2. Thickness: 0.0179 inch (26 ga.), unless otherwise 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 (0.84 mm), designed for screw attachment to steel studs and steel rigid furring channels used for furring.

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- E. 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.
- F. Slip-Type Head Joints: Where indicated, provide the following:
 - 1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing, resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- G. Opening Framing Option
 - 1. Allow for alternative valued engineered opening framing systems (Red Header RO System) manufactured by Clark Western Building Systems.
 - a. Subject to requirements of code evaluation of reports and/or shop drawings with engineering calculations signed and sealed by a registered PE (Professional Engineer).
 - b. Minimum Material Thickness: As required by design.
 - c. Minimum Flange Width: As required by design.

2.4 GYPSUM BOARD PRODUCTS

- A. General: Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end butt joints.
 - 1. Thickness: Provide gypsum board thicknesses to comply with ASTM C 840 for application system and support spacing indicated.
 - 2. Widths: Provide gypsum board in widths of 48 inches (1219 mm).
- B. Gypsum Wallboard: ASTM C 36 and as follows:
 - 1. Type: Regular for vertical surfaces, unless otherwise indicated.
 - 2. Type: Type X where required for fire-resistive-rated assemblies.
 - 3. Edges: Tapered.
 - 4. Thickness: 5/8" vertical applications, unless noted otherwise. 1/2" horizontal applications unless noted otherwise.
 - 5. Products: Subject to compliance with requirements, provide one of the following products where proprietary gypsum wallboard is indicated:
 - a. Gyprock Fireguard C Gypsum Board, Domtar Gypsum.
 - b. Firestop Type C, Georgia-Pacific Corp.
 - c. Fire-Shield G, Gold Bond Building Products Div., National Gypsum Co.
 - d. SHEETROCK Brand Gypsum Panels, FIRECODE C Core, United States Gypsum Co.
 - e. SHEETROCK Brand Gypsum Panels, ULTRACODE Core, United States Gypsum Co.
 - f. Centex American Gypsum Company.
 - 7. Type: Sag resistant for horizontal surface applications such as soffits, ceilings, etc.
 - 8. Flexible Type: Manufactured to bend to fit radii and to be more flexible than standard regular type gypsum board of same thickness. Built up in layers as required to achieve indicated finished thickness.

- C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
 - 1. Thickness: 5/8 inch.
 - 2. Long Edges: Tapered.
- D. Gypsum Backing Board for Multilayer Applications: ASTM C 442 or, where backing board is not available from manufacturer, gypsum wallboard, ASTM C 36 and as follows:
 - 1. Type: Regular for vertical surfaces, unless otherwise indicated.
 - 2. Type: Type X where indicated or required for fire-resistive-rated assemblies.
 - 3. Edges: Manufacturer's standard.
 - 3. Thickness: 5/8 inch (16 mm), unless noted otherwise.

2.5 WATER RESISTANT GYPSUM BOARD

- A. 1. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. 2. Application: Gypsum board assemblies at toilet areas.
- C.
 - a. a. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. Core: 5/8 inch (15.9 mm), Type X.

1.2 2.6 TILE BACKING PANELS

- A. A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a.
 - b. National Gypsum Company, Permabase Cement Board.
 - c. USG Corporation; DUROCK Cement Board.
 - 2. Thickness: 5/8 inch (15.9 mm).
 - 3. Mold Resistance: ASTM D 3273, score of 10.

2.7 TRIM ACCESSORIES

- A. Accessories for Interior Installation: Corner beads, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:
 - 3. Material: Formed metal, complying with the following requirement:
 - a. Sheet steel zinc-coated by hot-dip process.
 - 4. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047:
 - a. Cornerbead on outside corners, unless otherwise indicated.
 - b. LC-bead with both face and back flanges; face flange formed to receive joint

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- compound. Use LC-beads for edge trim unless otherwise indicated.
- c. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.
 - d. One-piece control joint formed with V-shaped slot, with removable strip covering slot opening.

2.8 JOINT TREATMENT MATERIALS

- A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
- B. Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.
- C. Setting-Type Joint Compounds for Gypsum Board: Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
 - 1. Where setting-type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
 - 2. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer for this purpose.
 - 3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by the gypsum board manufacturer for this purpose.
 - 4. For topping compound, use sandable formulation.
- D. Drying-Type Joint Compounds for Gypsum Board: Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.
 - 1. Ready-Mixed Formulation: Factory-mixed product.
 - 2. Taping compound formulated for embedding tape and for first coat over fasteners and face flanges of trim accessories.
 - 3. Topping compound formulated for fill (second) and finish (third) coats.
 - 4. All-purpose compound formulated for both taping and topping compounds.
- E. Joint Compound for Cementitious Backer Unit: Material recommended by cementitious backer unit manufacturer.

2.9 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following requirements:
 - 1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies 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 transmission of airborne sound.

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

1. Acoustical Sealant:

- a. AC-20 FTR Acoustical and Insulation Sealant, Pecora Corp.
- b. SHEETROCK Acoustical Sealant, United States Gypsum Co.

2. Acoustical Sealant for Concealed Joints:

- a. BA-98, Pecora Corp.
- b. Tremco Acoustical Sealant, Tremco, Inc.

2.10 MISCELLANEOUS MATERIALS

A. General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.

B. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum panels.

C. Spot Grout: ASTM C 475, setting-type joint compound recommended for spot grouting hollow metal door frames.

D. Fastening Adhesive for Metal: Special adhesive recommended for laminating gypsum panels to steel framing.

E. Steel drill screws complying with ASTM C 1002 for the following applications:

- 1. Fastening gypsum board to steel members less than 0.03 inch (0.84 mm) thick.
- 2. Fastening gypsum board to gypsum board.

F. Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

G. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.

H. Sound Attenuation Blankets: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing):

- 1. Mineral-Fiber Type: Thermafiber mineral wool or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

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- A. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.
- 1. Furnish concrete inserts and other devices indicated to other trades for installation well in advance of time needed for coordination with other construction.
 - B. Coordination with Sprayed Fire-Resistive Materials:
 - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (600 mm) o.c.
 - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLING STEEL FRAMING, GENERAL

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
- B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with "Gypsum Construction Handbook" published by United States Gypsum Co.
- C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.
 - 1. Where building structure abuts ceiling perimeter or penetrates ceiling.
 - 2. Where partition framing and wall furring abut structure except at floor.
- D. Do not bridge building expansion and control joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.

3.4 INSTALLING STEEL FRAMING FOR SUSPENDED GYPSUM CEILINGS AND SOFFIT FRAMING

- A. Suspend ceiling hangers from building structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling

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- 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 due to age, corrosion, or elevated temperatures.
 4. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 5. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 6. Do not attach hangers to steel deck tabs.
 7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 8. Do not connect or suspend steel framing from ducts, pipes or conduit.
- B. Sway-brace suspended steel framing with hangers used for support and provide diagonal x-bracing.
- C. Install suspended steel framing components in sizes and at spacings indicated but not less than that required by the referenced steel framing installation standard.
1. Wire Hangers: 0.1620-inch (4.1-mm) diameter, 48 inches (1219 mm) o.c.
 2. Carrying Channels (Main Runners): 1-1/2 inch (38.1 mm), 48 inches (1219 mm) o.c.
 3. Rigid Furring Channels (Furring Members): 16 inches (406 mm) o.c.
- D. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring members or grid suspension members are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) as measured both lengthwise on each member and transversely between parallel members.
- E. Wire-tie or clip furring members to main runners and to other structural supports as indicated.
- 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.
- G. For interior soffits, install cross-bracing and additional framing to resist uplift as required.

3.5 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

- A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.
- B. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Cut studs 1/2 inch (13 mm) short of full height. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
 1. Install vertical deflection clips to building structure.

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2. For STC-rated and fire-resistive-rated partitions requiring partitions to extend to the underside of floor/roof slabs and decks or other continuous solid structural surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed, to support gypsum board closures needed to make partitions continuous from floor to underside of solid structure.
- D. Install steel studs and furring in sizes and at spacings indicated but not less than that required by the referenced steel framing installation standard to comply with maximum deflection and minimum loading requirements specified:
 1. Single-Layer Construction: Space studs at 16 inches (406 mm) o.c. unless noted otherwise.
- E. Install steel studs so that flanges point in the same direction and so that leading edges or ends of each gypsum board can be attached to open (unsupported) edges of stud flanges first.
- F. Frame door openings to comply with details indicated, with GA-219, and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 1. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- G. Frame openings other than door openings in same manner as required for door openings. Install framing below sills of openings to match framing required above door heads.
- H. Install sound attenuation blankets as follows:
 1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c. unless noted otherwise.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (600 mm) o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with standard width insulation panel and continue in regular manner. At interior corners, space second member no more than 12 inches (300 mm) from corner and cut insulation to fit.
 4. Until gypsum board is installed, hold insulation in place with 10-inch (250-mm) staples fabricated from 0.0625-inch- (1.6-mm-) diameter tie wire and inserted through slot in web of member.

3.6 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.
- B. Install sound attenuation blankets where indicated prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

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- D. Install wall/partition board panels to minimize the number of abutting end joints or avoid them entirely. Stagger abutting end joints not less than one framing member in alternate courses of board. At stairwells and other high walls, install panels horizontally with end abutting joints over studs and staggered.
- E. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- F. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position adjoining panels so that tapered edges abut tapered edges, and field-cut edges abut field-cut edges and ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions. Avoid joints at corners of framed openings where possible.
- G. Attach gypsum panels to steel studs so that the leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- H. Attach gypsum panels to framing provided at openings and cutouts.
- I. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors, and doors over 32 inches (800 mm) wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.
- J. Form control joints and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels. If not indicated, space and locate as recommended by USG Gypsum Construction Handbook. Verify joint locations w/Architect prior to installation.
- K. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
- 1. Fit gypsum panels around ducts, pipes, and conduits.
 - 2. Refer to partition types general notes on drawings for exceptions.
- L. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4-to-1/2-inch- (6-to-13-mm-) wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- M. Where STC-rated gypsum board assemblies are indicated, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of the partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
- N. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.7 GYPSUM BOARD APPLICATION METHODS

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- A. Single-Layer Application: Install gypsum wallboard panels as follows:
 - 1. On ceilings, apply gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated, and provide panel lengths that will minimize end joints.

C. Direct-Bonding to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members or base layer of gypsum board), comply with gypsum board manufacturer's recommendations, and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.8 INSTALLING TRIM ACCESSORIES

- A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.
- B. Install corner beads at external corners.
- C. Install edge trim where edge of gypsum panels would otherwise be exposed or semiexposed. Provide edge trim type with face flange formed to receive joint compound except where other types are indicated.
 - 1. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
 - 2. Install L-bead where edge trims can only be installed after gypsum panels are installed.
- D. Install control joints at locations indicated, and where not indicated according to ASTM C 840, and in locations approved by Architect for visual effect.

3.9 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration and levels of gypsum board finish indicated.
- B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.
- C. Apply joint tape over gypsum board joints except those with trim accessories having concealed face flanges not requiring taping to prevent cracks from developing in joint treatment at flange edges.
- D. Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.
 - 1. Level 1 for ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistive-rated assemblies and sound-rated assemblies.
 - 2. Level 3 for gypsum board surfaces where indicated. (None Required)
 - 3. Level 4 for gypsum board surfaces receiving wallcoverings. (None Required).
 - 4. Level 4 for gypsum board surfaces receiving paint.

- E. For level 4 gypsum board finish, embed tape in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration. Use one of the following joint compound combinations:
 - 1. Embedding and First Coat: Setting-type joint compound.
 - 2. Fill (Second) Coat: Setting-type joint compound.
 - 3. Finish (Third) Coat: Ready-mixed, drying-type, all-purpose or topping compound.
 - 4. Embedding and First Coat: Ready-mixed, drying-type, all-purpose or taping compound.
 - 5. Fill (Second) Coat: Ready-mixed, drying-type, all-purpose or topping compound.
 - 6. Finish (Third) Coat: Ready-mixed, drying-type, all-purpose or topping compound.
- F. Where level 1 gypsum board finish is indicated, apply joint compound specified for embedding coat.

3.10 CLEANING AND PROTECTION

- A. Promptly remove any residual joint compound from adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner suitable to Installer that ensures gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.

END OF SECTION 092900

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 mosaic tile.
 - 2. Through-body porcelain tile; floor and wall.
 - 3. Mosaic marble/glass tile.
 - 4. Metal joint strips installed as part of tile installations.
 - 5. Stone thresholds.
- B. Related Sections include the following:
 - 1. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 2. Division 09 Section "Gypsum Board" for cementitious backer units.

1.3 DEFINITIONS

- A. **Module Size:** Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

1.4 PERFORMANCE REQUIREMENTS

- A. **Static Coefficient of Friction:** For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. **Level Surfaces:** Minimum 0.6.

1.5 SUBMITTALS

- A. **Product Data:** For each type of product indicated.
- B. **Shop Drawings:** Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. **Samples for Initial Selection:** For each type of tile and grout indicated. Include Samples of accessories involving color selection.

- D. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required.
 - 2. Full-size units of each type of trim and accessory for each color and finish required.
 - 3. Stone thresholds in 6-inch (150-mm) lengths.
- E. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- F. Product Certificates: For each type of product, signed by product manufacturer.
- G. Qualification Data: For Installer.
- H. Material Test Reports: For each tile-setting and -grouting product.

1.6 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.
 - 1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
 - 1. Stone thresholds, stools, wall base and trim.
 - 2. Metal joint strips.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - 1. Basis-of-Design Product: The design for each tile type is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
 - 2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.
- 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. Match Architect's samples.
- D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.3 TILE PRODUCTS

A. Available Manufacturers:

1. American Marazzi Tile, Inc.
 2. *American Olean; Div. of Dal-Tile International Corp.
 3. *Crossville Ceramics Company, L.P.
 4. *Daltile; Div. of Dal-Tile International Inc.
 5. Florida Tile Industries, Inc.
 6. Interceramic.
 7. Laufen USA.
 8. Metropolitan Ceramics.
 9. Porcelanite, Inc.
 10. Rango
 11. United States Ceramic Tile Company.
- *Denotes Basis-of-Design Manufacturer.

B. Unglazed Colorbody Porcelain Mosaic Tile: Factory-mounted flat tile as follows:

1. Composition: Impervious natural clay or porcelain.
2. Surface: Slip-resistant.
3. Module Size: 2 by 2 inches (50.8 by 50.8 mm).
4. Nominal Thickness: 1/4 inch (6.35 mm).
5. Face: Pattern of design indicated, with cushion edges.
6. Basis-of-Design Product: American Olean Commercial Mosaic Tile, Unglazed Colorbody Porcelain Mosaics, Group 1 and group 2

C. Glazed Porcelain Color Body Floor and Wall Tile (2 colors): Flat tile as follows:

1. Composition: Porcelain
2. Facial Dimensions: 12 x 12 (cut where indicated)
3. Thickness: 3/8".
4. Face: Color/Pattern of design indicated.
5. For latex-portland cement-mortared and grouted paver tile, precoat with temporary protective coating.
6. Basis-of-Design Product: As indicated on A9.7 and drawings A7.9 and A9.8 (Designation P1 and P2).

D. Mosaic Marble/Glass Tile: Floor and Wall Accent: Factory-mounted flat tile as follows:

1. Composition: Marble and glass.
2. Module Size: 5/8" x 5/8" inches (50.8 by 50.8 mm), and 5/8" x Random
3. Thickness: 3/8 inch.

2.4 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes. Refer to Threshold details on Drawing Sheet A9.2.

1. Bevel edges at 2:1 slope (MAX), aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch (12.7 mm) or less, and finish bevel to match face of threshold.
- B. Marble Thresholds: ASTM C 503 with a minimum abrasion resistance of 12 per ASTM C 1353 or ASTM C 241 and with honed finish.
1. Description: Uniform, Carrera, Botticino, or Crema Marfil.

2.5 SETTING AND GROUTING MATERIALS

A. Available Manufacturers:

1. Atlas Minerals & Chemicals, Inc.
2. Boiardi Products Corporation.
3. Bonsal, W. R., Company.
4. Bostik.
5. C-Cure.
6. Custom Building Products.
7. DAP, Inc.
8. Jamo Inc.
9. LATICRETE International Inc.
10. MAPEI Corporation.
11. Southern Grouts & Mortars, Inc.
12. Summitville Tiles, Inc.
13. TEC Specialty Products Inc.

B. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

1. For wall applications, provide nonsagging mortar that complies with Paragraph C-4.6.1 in addition to the other requirements in ANSI A118.1.

C. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:

1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
2. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.
 - a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.

D. Water-Cleanable, Tile-Setting Epoxy Adhesive: ANSI A118.3.

E. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color as selected by Architect.

F. Standard Sanded Cement Grout: ANSI A118.6, color as selected by Architect.

G. Standard Unsanded Cement Grout: ANSI A118.6, color as indicated.

H. Polymer-Modified Tile Grout: ANSI A118.7, color as indicated.

2.6 ELASTOMERIC SEALANTS

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 07 Section "Joint Sealants."
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Joint Strips: Height to match tile and setting-bed thickness, metallic, designed specifically for flooring applications, white zinc alloy or stainless steel exposed-edge material.
- C. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
 - 1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F (49 to 60 deg C) per ASTM D 87.
 - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Grout Sealer: Manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.
 - 1. Available Products:
 - a. Bonsal, W. R., Company; Grout Sealer.
 - b. Bostik; CeramaSeal Grout Sealer.
 - c. C-Cure; Penetrating Sealer 978.
 - d. Custom Building Products.
 - e. Jamo Inc.
 - f. MAPEI Corporation; KER
 - g. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
 - h. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
 - i. TEC Specialty Products Inc.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.

- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Provide concrete substrates for tile floors installed with adhesives or thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
 - 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
 - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
 - 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Grout tile to comply with requirements of the following tile installation standards:
 - 1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.
- I. Where indicated, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.4 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.
 - 1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
 - a. Tile floors in wet areas.
 - b. Tile floors composed of tiles 12 by 12 inches.
 - c. Tile floors composed of rib-backed tiles.
- B. Joint Widths: Install tile on floors with the following joint widths:
 - 1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).

2. Porcelain Tile: 1/8 inch (3.17 mm).
 3. Ceramic Wall Tile: 1/16 inch (1.6 mm).
- C. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.
- D. Metal Joint Strips: Install as required to meet industry standards related to joint placement. Verify locations with Architect.
- E. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.
- F. Mosaic (5/8" x 5/8"): Back-butter so medallion installs at height equal to the adjacent floor porcelain.

3.5 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Joint Widths: Install tile on walls with the following joint widths:
1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
 2. Glazed Wall Tile: 1/16 inch (1.6 mm).
- C. Mosaic (5/8" x Random) Accent (4" high) Wall Band (A2): Back-butter so wall band accent installs at height equal to the adjacent wall porcelain

3.6 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.7 FLOOR TILE INSTALLATION SCHEDULE – Locations indicated on Drawings and Finish Schedule.

- A. Tile Installation: Interior floor installation on concrete; thin-set mortar; TCA F113 and ANSI A108.5.
 - 1. Tile Type: Unglazed ceramic mosaic and unglazed paver tile.
 - 2. Thin-Set Mortar: Latex portland cement mortar.
 - 3. Grout: Sand-portland cement grout.

3.8 WALL TILE INSTALLATION SCHEDULE

- A. Tile Installation: Interior wall installation over cementitious backing panels, thin-set mortar; TCA W243 and ANSI A108.5.
 - 1. Tile Type: Glazed wall or Porcelain tile.
 - 2. Thin-Set Mortar: Latex portland cement mortar.
 - 3. Grout: Sand-portland cement, Standard sanded cement or Standard unsanded cement grout.

END OF SECTION 093000

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

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 acoustical panels and exposed suspension systems for ceilings.

1.3 DEFINITIONS

- A. AC: Articulation Class.
- B. CAC: Ceiling Attenuation Class.
- C. LR: Light Reflectance coefficient.
- D. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For components with factory-applied color finishes.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Panel: Set of full-size 6-inch- (150-mm-) square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- (300-mm-) long Samples of each type, finish, and color.
- D. Qualification Data: For testing agency.
- E. Field quality-control test reports.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- G. Research/Evaluation Reports: For each acoustical panel ceiling and components and anchor and fastener type.
- H. Maintenance Data: For finishes to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory, with the experience and capability to conduct the testing indicated. NVLAP-accredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the test methods specified.
- B. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
 - 1. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
 - a. Smoke-Developed Index: 450 or less.
- D. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following: 2006 International Building Code, including 2007 Kentucky Amendments.
- E. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use. Request an Above Ceiling Inspection prior to installing panels in grid.

1.8 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity of each type installed.
 - 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.
 - 3. Hold-Down Clips: Equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

- A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
 - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.
- B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
 - 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
- C. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING as indicated in "Reflected Ceiling" plans and designated by "Reflected Ceiling General Symbols" on the Drawings.

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. *Armstrong World Industries, Inc.
 - 2. BPB USA.
 - 3. Chicago Metallic Corporation.
 - 4. Ecophon CertainTeed, Inc.
 - 5. USG Interiors, Inc.*Denotes Basis-of-Design Product Manufacturer
- B. Basis-of-Design Products: Subject to compliance with requirements, provide the following:

- 1. Cirrus, square lay-in, medium texture, or equal.
- C. Color: White.
- D. NRC: Varies, as indicated by Ceiling Type indicated.
- E. Edge/Joint Detail: As indicated by Ceiling Type indicated.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
 - 1. Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Postinstalled, non-corrosive anchors.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
- E. Hanger Rods or Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- F. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.
- G. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- H. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
- I. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place.
- J. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.
- K. Impact Clips: Where indicated, provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. *Armstrong World Industries, Inc.
 2. BPB USA.
 3. Chicago Metallic Corporation.
 4. Ecophon CertainTeed, Inc.
 5. USG Interiors, Inc.
*Denotes Basis-of-Design Products indicated in "Reflected Ceiling General Symbols" on plans.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation, with prefinished wide metal caps on flanges, as designated on drawings.
1. Prelude 15/16" grid, or equal.
 2. Cap Finish: Painted white.
- C. METAL EDGE MOLDINGS AND TRIM
- C. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Armstrong World Industries, Inc.
 2. BPB USA.
 3. Chicago Metallic Corporation.
 4. Fry Reglet Corporation.
 5. Gordon, Inc.
 6. USG Interiors, Inc.
- D. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.
1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.

2.5 ACOUSTICAL SEALANT

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
1. Acoustical Sealant for Exposed and Concealed Joints:
 - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - b. USG Corporation; SHEETROCK Acoustical Sealant.
 2. Acoustical Sealant for Concealed Joints:

- a. OSI Sealants, Inc.; Pro-Series SC-175 Rubber Base Sound Sealant.
- b. Pecora Corporation; BA-98.
- c. Tremco, Inc.; Tremco Acoustical Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 8. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 9. Do not attach hangers to steel deck tabs.
 10. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 11. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
 12. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Where mechanical units occur above acoustical ceilings, install tees in segments as required to allow future removal of the unit so that complete removal of the ceiling is not required. Any such joints in tees shall produce clean, tight butt joints in the exposed tees surfaces. Coordinate with the mechanical contractor.
- G. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
 3. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.
 5. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

6. Edge treatment of cut tegular edge panels shall require tegular edges to be neatly cut to match factory edges with matching surface finish applied along cut edges.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections and prepare reports:
 1. Suspended ceiling system.
 2. Hangers, anchors and fasteners.
- B. Tests and Inspections: Testing and inspecting of completed installations of acoustical panel ceiling hangers and anchors and fasteners shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
 1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
 - a. Within each test area, testing agency will select 1 of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select one of every 2 postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
 - b. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- C. Remove and replace acoustical panel ceiling hangers and anchors and fasteners that do not pass tests and inspections and retest as specified above.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient base.
 - 2. Resilient molding accessories.
- B. Related Sections:
 - 1. Division 09 Section "Resilient Tile Flooring" for resilient floor material.
 - 2. Division 09 Section "Sheet Carpeting" for sheet carpeting.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.
- D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: 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.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.7 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 12 linear feet of base, 12 full size treads and risers, 12 lineal feet of all other profiles used on the project.

PART 2 - PRODUCTS

2.1 RESILIENT BASE in Locations Indicated on Drawings:

- A. Resilient Base:
 - 1. Available Manufacturers: Subject to compliance with requirements, products that may be included in the Work, include, but are not limited to the following:
 - a. Armstrong World Industries, Inc.
 - b. Flexco, Inc.
 - c. Johnsonite.
 - d. Mondo Rubber International, Inc.
 - e. Musson, R. C. Rubber Co.
 - f. Nora Rubber Flooring; Freudenberg Building Systems, 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) or Group II (layered).
 - 3. Style: Cove (base with toe).
- C. Minimum Thickness: 0.125 inch (3.2 mm).
- D. Height: As indicated on Drawings.

- E. Lengths: Cut lengths 48 inches (1219 mm) long or coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Inside Corners: Preformed.
- H. Colors: As selected by Architect from full range of industry colors.

2.2 RESILIENT MOLDING ACCESSORY

- A. Resilient Molding Accessory:
 - 1. Available Manufacturers: Subject to compliance with requirements, products that may be included in the Work, include, but are not limited to the following:
 - a. Flexco, Inc.
 - b. Johnsonite.
 - c. R.C.A. Rubber Company (The).
 - d. Roppe Corporation, USA.
 - e. VPI, LLC; Floor Products Division.
- B. Descriptions: May include any of the following as required for a finished installation. Cap for cove carpet, Cap for cove resilient floor covering, Carpet bar for tackless installations, Carpet edge for glue-down applications, Nosing for carpet, Nosing for resilient floor covering, Reducer strip for resilient floor covering, Joiner for tile and carpet, Transition strips.
- C. Material: Vinyl or Rubber at Contractor's option. Colors must match other vinyl and rubber accessories.
- D. Profile and Dimensions: As indicated on drawings.
- E. Colors and Patterns: As selected by Architect from full range of industry 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 manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Cove Base Adhesives: Not more than 50 g/L.
 - b. Rubber Floor Adhesives: Not more than 60 g/L.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
 - 4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent, or as recommended by the manufacturer, relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.

- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.

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 or 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. 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. Vinyl composition floor tile.

- B. Related Sections:

- 1. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

1.3 SUBMITTALS

- A. The Architect shall not review individual submittal items for the same or related products separately. All submittals for the same product shall be submitted simultaneously as a single package.
- B. Product Data: For each type of product indicated.
- C. Samples for Initial Selection: For each type of floor tile indicated.
- D. Qualification Data: For qualified Installer.
- E. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.4 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 indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.
- B. Fire-Test-Response Characteristics: 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.

1.5 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.

1.6 PROJECT 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. 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 flooring installation.
- D. Close spaces to traffic for 48 hours after flooring installation.
- E. Install flooring after other finishing operations, including painting, have been completed.

1.7 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. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 - PRODUCTS

2.1 VINYL COMPOSITION FLOOR TILE

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Congoleum Corporation;
 - 3. Mannington Mills, Inc
- B. Tile Standard: ASTM F 1066, Class 2, through-pattern tile.
- C. Wearing Surface: Smooth.
- D. Thickness: 0.125 inch (3.2 mm).
- E. Size: 12 by 12 inches (305 by 305 mm).

- F. Colors and Patterns: As selected by Architect from full range of industry colors.

2.2 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 floor product and substrate conditions indicated.
 - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Rubber Floor Tile Adhesives: Not more than 60 g/L.
 - b. VCT Adhesives: Not more than 50 g/L.
- C. Floor Polish: Provide protective liquid floor polish products only as recommended by 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 floor tile.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

- a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until they are same temperature as space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 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.
- 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 running in alternating checkerboard with pattern of colors and sizes indicated.
- 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 flooring into toe spaces, door reveals, closets, and similar openings. Extend flooring to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on flooring as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- G. Install flooring on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere 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.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of flooring.
- 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 flooring 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 floor tile surfaces before applying liquid floor polish only if recommended by Manufacturer.
- E. Joint Sealant: Apply sealant at the joints around columns, at door frames, and at other joints and penetrations.
- F. Cover finish flooring until Substantial Completion.
- G. Apply floor polish per manufacturer's recommendations.

END OF SECTION 096519

SECTION 096816 - SHEET CARPETING

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. Woven carpet.
- B. Related Sections include the following:
 - 1. Division 09 Section "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.

1.3 SUBMITTALS

- A. Product Data: For the following, including installation recommendations for each type of substrate:
 - 1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
- B. Shop Drawings: Show the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
 - 2. Carpet type, color, and dye lot.
 - 3. Locations where dye lot changes occur.
 - 4. Seam locations, types, and methods.
 - 5. Type of subfloor.
 - 6. Type of installation.
 - 7. Pattern type, repeat size, location, direction, and starting point.
 - 8. Pile direction.
 - 9. Type, color, and location of insets and borders.
 - 10. Type, color, and location of edge, transition, and other accessory strips.
 - 11. Transition details to other flooring materials.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet: 12-inch- (300-mm-) square Sample.
 - 2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch- (300-mm-) long Samples.

3. Carpet Seam: 6-inch (150-mm) Sample.
4. Mitered Carpet Border Seam: 12-inch- (300-mm-) square Sample. Show carpet pattern alignment.

- D. Product Schedule: For carpet: Use same designations indicated on Drawings.
- E. Qualification Data: For Installer.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.
- G. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet.
- H. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer that excels in commercial installation with a minimum of five years experience. Lead mechanic must be certified by the Certified Floor Covering Installers Association prior to bid and hold a Commercial-2 classification. An installer with C-2 certification must be present at all times that floor covering is being installed. The installer's name and certification number must be submitted prior to bid and shall be verified by the Construction Manager or General Contractor. Information regarding C.F.I. and a listing of certified installers is available online at www.cfiinstallers.com.
- B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to carpet installation including, but not limited to, the following:
1. Review delivery, storage, and handling procedures.
 2. Review ambient conditions and ventilation procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104, Section 5, "Storage and Handling."

1.6 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."
- B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other equipment items are indicated for installation on top of carpet, install carpet before installing these items.

1.7 WARRANTY

- A. Special Warranty for Carpet: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, excess static discharge.
 - 3. Warranty Period: To be equal to or greater than stated in the products/Basis-of-Design years from date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

PART 2 - PRODUCTS

2.1 WOVEN CARPET::

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Basis-of-Design:
 - 1. Karastan Contract – “Adirondack II”
 - a. Color: As selected by Architect from manufacturer's full range.
 - b. Source: The Mohawk Group
- C. Nylon Type: Ultron Nylon.
- D. Surface Appearance: Textured Pattern Cut and Loop.
- E. Construction: Woven
- F. Pattern Repeat: 1”(L) x 1” (W)

- G. Pitch: 216 (315 ends per meter)
- H. Pile Weight: 36 oz./sq. yd.
- I. Weight Density: 204,624
- J. Dye Method: Skein Dyed
- K. Backing: Manufacturers standard. As follows:
 - 1. Interlaced into Pile.
- L. Applied Protective Treatment: Sentry Plus.
- M. Performance Characteristics: As follows:
 - 1. Warranty: Lifetime for the following:
 - a. Texture Retention
 - b. High Tuft Bind
 - c. Dimensional Stability
 - d. Against Edge Ravel
 - e. Delamination
 - f. Against Pilling and Fuzzing
 - 2. Smoke Density: ASTM E 662 Less than 450
 - 3. Static Propensity: AATCC 134 Under 3.5 KV
 - 4. Retention Rating: "Severe Traffic"
 - 5. Flammability ASTM E 648 Class 1

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet/cushion manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
 - 1. VOC Limits: Provide adhesives that comply with the following limits for VOC content when tested according to ASTM D 5116:
 - a. Total VOCs: 10.00 mg/sq. m x h.
 - b. Formaldehyde: 0.05 mg/sq. m x h.
 - c. 2-Ethyl-1-Hexanol: 3.00 mg/sq. m x h.
- C. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet/cushion manufacturer.
 - 2. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. For wood subfloors, verify the following:
 - 1. Underlayment over subfloor complies with requirements specified in Division 06 Section "Rough Carpentry."
 - 2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm), unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet/cushion manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.3 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
 - 1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
 - 2. Double-Glue-Down Installation: Comply with CRI 104, Section 10, "Double Glue-Down Installation."

- B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Do not bridge building expansion joints with carpet.
- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.

3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 - 2. Remove yarns that protrude from carpet surface.
 - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protection of Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet adhesive manufacturer.

END OF SECTION 096816

SECTION 099123 - PAINTING

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 surface preparation, painting, and finishing of exposed interior and exterior items and surfaces.

- 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.

- B. Paint exposed surfaces whether or not colors or finish are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.

- 1. Painting includes all interior work, exposed surfaces, gyp. board soffits, exposed metal, piping, plywood mounting boards, etc.

- C. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels.

- 1. Prefinished items not to be painted include the following factory-finished components:

- a. Acoustic materials.
 - b. Manufactured wood casework.
 - c. Finished mechanical and electrical equipment except painting of electrical panels in finished areas at the discretion of the Architect.
 - d. Light fixtures.
 - e. Switchgear
 - f. Distribution cabinets (except electrical panel covers at direction of Architect.)

- 2. Concealed surfaces not to be painted include wall or ceiling surfaces in the following generally inaccessible areas:

- a. Furred areas.
 - b. Pipe spaces and plumbing chase.
 - c. Duct shafts.

- 3. Finished metal surfaces not to be painted include:

- a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper.
 - e. Bronze.
 - f. Brass.

4. Operating parts not to be painted include moving parts of operating equipment, such as the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
5. Labels: Do not paint over Underwriters Laboratories, Factory Mutual or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

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

1. Division 06 Section "Interior Architectural Woodwork" for finishing of priming interior architectural woodwork.
2. Division 08 Sections "Hollow Metal Frames" for shop-priming steel doors and frames.
3. Painting mechanical and electrical work is specified in mechanical and electrical sections, respectively.

E. Maintenance Stock:

1. Maintenance Stock:
 - a. At time of completing application, deliver stock of maintenance material to the Owner. Furnish not less than two properly labeled and sealed one gallon cans of each type of finish coat of each color, taken from lots furnished for the work.
 - b. Provide at typed listing of all color codes for the Owner's use.

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each paint system specified, including block fillers and primers.
 1. Provide the manufacturer's technical information including label analysis and instructions for handling, storage, and application of each material proposed for use.
 2. List each material and cross-reference the specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification.
 3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- C. Samples for initial color selection in the form of manufacturer's color charts.
 1. After color selection, the Architect will furnish color chips for surfaces to be coated.
- D. Samples for Verification Purposes: Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.
 1. Provide stepped samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.

2. Provide a list of material and application for each coat of each sample. Label each sample as to location and application.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to those indicated for the Project that have resulted in a construction record of successful in-service performance.
- B. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
 1. Product name or title of material.
 2. Product description (generic classification or binder type).
 3. Manufacturer's stock number and date of manufacture.
 4. Contents by volume, for pigment and vehicle constituents.
 5. Thinning instructions.
 6. Application instructions.
 7. Color name and number.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.6 JOB CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 deg F (7 deg C) and 95 deg F (35 deg C).
- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, provide products of one of the following or an approved equal:
 1. The Glidden Company (ICI/Glidden). - Basis of Design
 2. Devoe and Reynolds Co. (Devoe).
 3. Benjamin Moore and Co. (Moore).

4. PPG Industries, Pittsburgh Paints (PPG).
5. The Sherwin-Williams Company (S-W).
6. Sonneborn Building Products (Concrete Sealers).

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.
- B. Material Quality: Provide the manufacturer's best-quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.
 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish the manufacturer's material data and certificates of performance for proposed substitutions.
- C. Colors: Provide color selections made by the Architect from the manufacturer's full range of colors.

2.3 PRIMERS

- A. Primers: Provide the manufacturer's recommended factory-formulated primers that are compatible with the substrate and finish coats indicated.
- B. Refer to Interior Paint Schedule at the end of this Section.

2.5 INTERIOR FINISH PAINT MATERIAL

- A. Finish Paint: Provide the manufacturer's recommended factory-formulated finish-coat materials that are compatible with the substrate and undercoats indicated.
- B. Refer to Interior Paint Schedule at the end of this Section.

2.6 MISCELLANEOUS WOOD-FINISHING MATERIALS – Refer to Division 06 “Interior Architectural Woodwork”

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which painting will be performed for compliance with paint application requirements. Surfaces receiving paint must be thoroughly dry before paint is applied.
 1. Do not begin to apply paint until unsatisfactory conditions have been corrected.
 2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to the manufacturer's instructions for each particular substrate condition and as specified.
 - 1. Provide barrier coats over incompatible primers or remove and reprime. Notify Architect in writing about anticipated problems using the specified finish-coat material with substrates primed by others.
 - 2. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. Prime, stain, or seal wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
 - 3. Ferrous Metals: Clean ungalvanized ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC).
 - a. Blast steel surfaces clean as recommended by the paint system manufacturer and according to requirements of SSPC specification SSPC-SP 10.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.

- D. Materials Preparation: Carefully mix and prepare paint materials according to manufacturer's directions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
 3. Use only thinners approved by the paint manufacturer and only within recommended limits.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
1. Paint colors, surface treatments, and finishes are indicated in the schedules.
 2. Provide finish coats that are compatible with primers used.
 3. The number of coats and the film thickness required are the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce a smooth even surface according to the manufacturer's directions.
 4. Apply additional coats if undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
 5. The term exposed surfaces includes areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
 6. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 7. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, nonspecular black paint.
 8. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 9. Sand lightly between each succeeding enamel or varnish coat.
 10. Omit primer on metal surfaces that have been shop-primed and touch-up painted.
- C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
- D. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to the manufacturer's directions.

1. Brushes: Use brushes best suited for the material applied.
 2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
- E. Minimum Coating Thickness: Apply materials no thinner than the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
- F. Mechanical and Electrical Work: Painting mechanical and electrical work is limited to items exposed in mechanical equipment rooms and in occupied spaces as directed by Architect.
- G. Mechanical and electrical items to be painted are included in mechanical and electrical sections.
1. Exposed Mechanical and Electrical ductwork and piping paint colors are specified in mechanical and electrical sections, respectively.
- H. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime-coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- I. Pigmented (Opaque) Finishes: Completely cover to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with specified requirements.

3.4 CLEANING

- A. Cleanup: At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.5 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings.
1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates, as indicated.
- B. Gypsum Drywall Systems:
 - 1. Latex, Egg-shell for gypsum board wall surfaces: Two coats over primer with total dry film thickness not less than 3.3 mil.
 - a. Prime coat, Gypsum Drywall Primer: (Glidden) 1000-1200 Prep & Prime Hi-Hide Primer Sealer
 - b. First and Second Coat, Acrylic Egg-shell: 1412V Glidden Ultra-Hide Egg-shell Wall & Ceiling Enamel.
 - 2. Latex, Flat for gypsum board ceilings and soffits: Two coats over primer with total dry film thickness not less than 3.3 mil.
 - a. Prime coat, Gypsum Drywall Primer: (Glidden) 1000-1200 Prep & Prime Hi-Hide Primer Sealer
 - b. First and Second Coat, Acrylic Flat: 1210V Glidden Ultra-Hide Flat Wall & Ceiling Paint.
- C. Ferrous Metals:
 - 1. Semigloss Enamel Finish: Two coats over primer with total dry film thickness not less than 2.5 mils, excluding primer. (For interior doors and door frames, stair components, ect.)
 - a. Prime Coat, Ferrous metal primer: (Glidden) 4030 Tru-Glaze WB Waterborne Epoxy Primer.
 - c. Intermediate Coat: Same as topcoat.
 - d. Finish Coat, Interior, semigloss, alkyd enamel:

END OF SECTION 099123

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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Plaques.
2. Panel signs.
3. Dimensional Letters.
4. Bronze plaques

- B. Related Sections include the following:

1. Division 06 Section "Interior Architectural Woodwork" for wood frames for signage.
2. Plumbing Sections for labels, tags, and nameplates for plumbing systems and equipment.
3. HVAC Sections for labels, tags, and nameplates for HVAC systems and equipment.
4. Electrical Sections for "Identification for Electrical Systems" for labels, tags, and nameplates for electrical equipment.
5. Electrical Sections "Interior Lighting" for illuminated Exit signs.

1.3 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.4 SUBMITTALS

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

- B. Shop Drawings: Show fabrication and installation details for signs.

1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
3. Submit dimensional letter layout drawings indicating proposed character spacing relative to surrounding construction.
4. Submit complete layout of bronze plaque with logo.

- C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:
 - 1. Aluminum.
 - 2. Acrylic sheet.
 - 3. Polycarbonate sheet.
 - 4. Fiberglass sheet.
 - 5. Die-cut vinyl characters and graphic symbols. Include representative samples of available typestyles and graphic symbols.
 - 6. Fabric Swatches for selection.
 - 7. Header Panel Section for selection.
 - 8. Samples of trim in profiles indicated.

- D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:
 - 1. Dimensional Characters: Full-size Samples of each type of dimensional character (letter, number, and graphic element).
 - 2. Aluminum: For each form, finish, and color, on 6-inch- (150-mm-) long sections of extrusions and squares of sheet at least 4 by 4 inches (100 by 100 mm).
 - 3. Acrylic Sheet: 8 by 10 inches (200 by 250 mm) for each color required.
 - 4. Fiberglass Sheet: 8 by 10 inches (200 by 250 mm) for each color required.
 - 5. Panel Signs: Not less than 12 inches (305 mm) square including border and sample characters.
 - 6. Trim/Frame: 6-inch- (152-mm-) long sections of each profile.
 - 7. Accessories: Manufacturer's full-size unit.

- E. Sign Schedule: Use same designations indicated on Drawings.

- F. Qualification Data: For Installer and fabricator.

- G. Maintenance Data: For signs to include in maintenance manuals.

- H. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

- B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

- C. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

- D. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and the 2007 Kentucky Building Code including 2007 Amendments.

1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 COORDINATION

- A. Coordinate placement of anchorage devices with templates for installing signs.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors and sign lamination.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.
- B. Aluminum Sheet and Plate: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 5005-H32.
- C. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 6063-T5.
- D. Bronze Castings: ASTM B 584, Alloy UNS No. C86500 (No. 1 manganese bronze).
- E. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).
- F. 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.

G. Applied Vinyl: Die-cut characters from vinyl film of nominal thickness of 3 mils (0.076 mm) with pressure-sensitive adhesive backing, suitable for exterior applications.

2.2 PLAQUES

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. Advance Corporation; Braille-Tac Division.
2. A. R. K. Ramos.
3. Gemini Incorporated.
4. Matthews International Corporation; Bronze Division.
5. Metal Arts; Div. of L&H Mfg. Co.
6. Mills Manufacturing Company.
7. Nelson-Harkins Industries.
8. Southwell Company (The).

B. Cast Plaques: Provide castings free of pits, scale, sand holes, and other defects, as follows:

1. Plaque Material: Bronze.
2. Background Texture: Manufacturer's standard pebble texture.
3. Border Style: Projected bevel.
4. Mounting: Rosettes and fasteners matching plaque finish for substrates encountered.

C. Plaque and AOC Logo Schedule:

1. Plaque Type:
 - a. Plaque Size: As indicated on Drawings.
 - b. AOC Logo Size: As indicated on Drawings.
 - c. Character Size: As indicated on Drawings.
 - d. Character Finish/Color: As selected by Architect.
 - e. Text/Message: As indicated on Drawings.
 - f. Location: As indicated on Drawings.

2.3 PANEL SIGNS

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. 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)

B. 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. Acrylic Sheet: 0.080 inch (2.03 mm) thick.
2. Edge Condition: Square cut.
3. Corner Condition: Rounded to radius where indicated.
4. Mounting: As indicated in Drawings by sign type.
 - a. Wall mounted with two-face tape and adhesive.
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.

C. Wood Panel Sign Frames: American Cherry-finished to match Architectural Woodwork.

1. Perimeter Frame Profile: Refer to Drawings.
2. Perimeter Frame Corners: Square.
3. Provide where indicated.

D. Changeable Message Inserts: Fabricate signs to allow insertion of changeable messages in the form of slide-in inserts.

1. Furnish insert material and software for creating text and symbols for PC-Windows computers for Owner production of paper inserts.
2. Furnish insert material cut-to-size for changeable message insert.

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. 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.

G. Panel Sign Schedule: Refer to Drawings for Schedule and Locations on plan.

2.4 DIMENSIONAL LETTERS

- A. Fabricated Channel Characters: Form exposed faces and sides of characters to produce surfaces free from warp and distortion. Include internal bracing for stability and attachment of mounting accessories. Comply with the following requirements:
1. Cast Aluminum: Not less than 0.090 inch (2.29 mm) thick.
 - a. Finish: Painted.
 - b. Color: As selected by Architect from manufacturer's full range.
 - c. Produce characters with smooth flat faces, sharp corners, and precisely formed lines and profiles, free of pits, scale, sand holes, and other defects. Cast lugs into back of characters and tap to receive threaded mounting studs. Alloy and temper recommended by sign manufacturer for casting process used and for finish indicated. Basis-of-Design character style shall be Times Bold by Gemini, Inc.
 2. Provide manufacturer's hardware for projection mounting channel characters at one-half inch distance from wall surface.
 3. Character Size: 3" high.
 4. Text/Message: As indicated.
 5. Location: Interior and exterior.

2.5 ACCESSORIES

- A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.6 FABRICATION

- A. General: Provide manufacturer's standard signs of configurations indicated.
1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
 2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
 3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
 4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.7 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.

2.8 ALUMINUM FINISHES

- A. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating; as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - 1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm), medium glass. ACRYLIC SHEET FINISHES

2.10 ACRYLIC SHEET FINISHES

- A. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

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 work.
- B. Verify that items, including anchor inserts, are sized and located to accommodate signs.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.
 - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches (75 mm) of sign without encountering protruding objects or standing within swing of door.

- B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
 - 1. Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
 - 2. Silicone-Adhesive Mounting: Attach signs to irregular, porous, or vinyl-covered surfaces.
 - 3. Shim Plate Mounting: Provide 1/8-inch- (3-mm-) thick, concealed aluminum shim plates with predrilled and countersunk holes, at locations indicated, and where other mounting methods are not practicable. Attach plate with fasteners and anchors suitable for secure attachment to substrate. Attach panel signs to plate using method specified above.
 - 4. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.
 - 5. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to conceal mounting materials.

- C. Cast-Metal Plaques: Mount plaques using standard fastening methods to comply with manufacturer's written instructions for type of wall surface indicated.
 - 1. Face Mounting: Mount plaques using exposed fasteners with rosettes attached through face of plaque into wall surface.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101400

SECTION 102800 - TOILET 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.
- B. Refer to Plumbing specifications for detention grade toilet accessories integral with detention grade toilet fixtures.

1.2 SUMMARY

- A. This Section includes toilet accessory items including detention grade accessories as scheduled on drawings.

1.3 REFERENCES

- A. Americans with Disabilities Act Accessibility Guidelines.
- B. ASTM A 240/A 240M - Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Steel Plate, Sheet, and Strip for Pressure Vessels.
- C. ASTM A 554 - Standard Specification for Welded Stainless Steel Mechanical Tubing.
- D. ASTM C 1036 - Standard Specification for Flat Glass.
- E. ASTM F 446 - Standard Consumer Safety Specification for Grab bars and Accessories Installed In the Bathing Area.

1.4 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specifications Sections.
- B. Product data for each toilet accessory item specified, including construction details relative to materials, dimensions, gages, profiles, mounting method, specified options, and finishes.
- C. Maintenance instructions including replaceable parts and service recommendations.
- D. Shop Drawings:
 - 1. Plans: Locate each specified unit in project.
 - 2. Elevations: Indicate mounting height of each product.
 - 3. Details: Indicate anchoring and fastening details, required locations and types of anchors and reinforcement and materials required for installation of specified product.
- E. Closeout submittals: Warranty issued and executed by manufacturer and countersigned by the Contractor.

1.5 QUALITY ASSURANCE

- A. Inserts and Anchorages: Furnish accessory manufacturers' standard inserts and anchoring devices that must be set in concrete or built into masonry. Coordinate delivery with other work

to avoid delay.

- B. Single-Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect.
- C. Manufacturer Qualifications: Minimum of five years documented experience producing product specified.

1.6 PROJECT CONDITIONS

- A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.
- B. Unacceptable conditions: Any condition deemed unacceptable by the Architect shall be corrected before installation begins.

1.7 WARRANTY

- A. Warranty: Submit a written warranty executed by mirror manufacturer, agreeing to replace any mirrors that develop visible silver spoilage defects within warranty period.
- B. Warranty Period: 15 years from date of Substantial Completion.
- C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- D. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of detention toilet accessories that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1) Structural failures including deflection exceeding 1/4 inch (6 mm).
 - 2) Faulty operation of hardware.
 - 3) Deterioration of metals, metal finishes, and other materials beyond normal detention use.
 - 4) Warranty Period: Two years from date of Substantial Completion.

1.8 MAINTENANCE TOOLS

- A. Tool Kits: Provide two sets of tools for use with security fasteners, each packaged in a compartmented kit configured for easy handling and storage.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Security Fasteners: Furnish not less than 1 box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide toilet accessories by one of the following:
1. A & J Washroom Accessories.
 2. American Specialties, Inc.
 3. **Bobrick Washroom Equipment, Inc. (**)**
 4. Bradley Corporation.
 5. General Accessory Manufacturing Co.
 6. McKinney/Parker.
 7. World Dryer (Hand Dryers).
 8. Frost Products Limited

**** Denotes manufacturer upon which products and model numbers are listed on Toilet Accessories Schedule and the level of quality required.**

2.2 MATERIALS, GENERAL

- A. Stainless Steel: ASTM A 240/A 240M, Type 304, with polished No. 4 finish, 0.034 inch (0.9 mm) minimum thickness.
- B. Baked Enamel Finish: Factory-applied, baked acrylic enamel coating.
- C. Mirror Glass: Nominal 6.0 mm thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electro- plated copper coating, and protective organic coating complying with FS DD-M-411.
- D. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.
- G. Security Fasteners: Operable only by tools produced for use on specific type of fastener by fastener manufacturer or other licensed fabricator. Manufacturer's standard drive system type, head style, material, and protective coating as required for assembly, installation, and strength.
- H. Refer to Drawings for specific accessory model numbers and locations. Model numbers are based upon American Specialties, Inc. and represent configuration and level of quality required.

2.3 FABRICATION

- A. General: No names or labels are permitted on exposed faces of toilet and bath accessory units. On either interior surface not exposed to view or on back surface, provide identification of each accessory item either by a printed, waterproof label or a stamped nameplate indicating manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate

units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

- C. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors or access panels with full-length, stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.
- D. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, re-supply, etc. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls with concealed heavy duty construction adhesive. Set units plumb, level, and square at locations indicated, according to manufacturer's instructions for type of substrate involved.
- C. Security Fasteners: Install detention toilet accessories using security fasteners with head style appropriate for installation requirements, strength, and finish of adjacent materials, except that a maximum of two different sets of tools shall be required to operate security fasteners for Project. Provide stainless-steel security fasteners in stainless-steel materials.
- D. Install grab bars to withstand a downward load of at least 250 lbf (1100 N), complying with ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

3.3 SCHEDULE

- A. See schedule on drawing A1.1.

END OF SECTION 102800

SECTION 104400 - FIRE PROTECTION SPECIALTIES

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 are in contract for the following:
 - a. Portable fire extinguishers.
 - 2. Fire extinguishers.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Portable Fire Extinguishers: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher.
 - a. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function.[]
 - 2. Cabinets: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
 - a. 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.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Initial Selection: For each type of fire protection cabinet indicated.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Size: 6 by 6 inches (150 by 150 mm) square.
- E. Operation and Maintenance Data:

1. For fire protection cabinets to include in maintenance manuals.
2. For fire extinguishers to include in maintenance manuals.

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. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- C. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
 1. Provide fire extinguishers approved, listed, and labeled by FMG.

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.

1.6 SEQUENCING

- A. Apply decals and vinyl lettering on field-painted, fire protection cabinets after painting is complete.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- 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: Suitable for fire extinguisher.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. J. L. Industries, Inc., a division of Activar Construction Products Group;
 - 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.;
- B. Cabinet Construction: Fire-rated at all rated wall locations.
 - 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: 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: Match cabinet body and door material.
- F. Door Material: 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.
 - 2. Provide concealed 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. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.

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 glazing.
 - 2) Application Process: Pressure-sensitive vinyl letters.
 - 3) Lettering Color: To be selected by Architect.
 - 4) Orientation: Vertical.

K. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:
 - a. Exterior of cabinet door, trim and all exposed surfaces except for those surfaces indicated to receive another finish.
 - b. Interior of cabinet and door.
2. Steel: Baked enamel or powder coat.
3. Color: To be selected by the Architect.

2.3 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Ansul Incorporated; Tyco International Ltd.
 - c. Badger Fire Protection; a Kidde company.
 - d. Buckeye Fire Equipment Company.
 - e. Fire End & Croker Corporation.
 - f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
 - g. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
 - h. Larsen's Manufacturing Company.
 - i. Moon-American.
 - j. Pem All Fire Extinguisher Corp.; a division of PEM Systems, Inc.
 - k. Potter Roemer LLC.
 - l. Pyro-Chem; Tyco Safety Products.
 2. Valves: Manufacturer's standard.
 3. Handles and Levers: Manufacturer's standard.
 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb (4.5-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.4 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. Fabricate door frames of one-piece construction with edges flanged.
 - 3. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 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.

2.6 STEEL FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel.
- B. Factory Prime Finish: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
- C. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

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. 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 and fire extinguishers in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
 - 1. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
 - a. Seal through penetrations with firestopping sealant as specified in Division 07 Section "Penetration Firestopping."
- C. Identification: Apply vinyl lettering at locations selected by Architect.

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 104400

SECTION 115213 - PROJECTION SCREENS

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. Front-projection screens, for suspended acoustical ceiling systems and gypsum board ceiling systems.
- B. Related Sections include the following:
 - 1. Division 6 Section "Miscellaneous Rough Carpentry" for wood backing for recessed screen installation.
 - 2. Electrical Sections for electrical service and connections including metal device boxes for switches and conduit, where required, for low-voltage control wiring.

1.3 DEFINITIONS

- A. Gain of Front-Projection Screens: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.
- B. Half-Gain Angle: The angle, measured from the axis of the screen surface, to the most central position on a perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

1.4 SUBMITTALS

- A. Product Data: For each type of screen indicated.
- B. Shop Drawings: Show layouts and types of projection screens. Include the following:
 - 1. Location of screen centerline relative to ends of screen case.
 - 2. Location of wiring connections.
 - 3. Location of seams in viewing surfaces.
 - 4. Drop length.
 - 5. Connections to supporting structure for pendant- and recess-mounted screens.
 - 6. Anchorage details.
 - 7. Details of juncture of exposed surfaces with adjacent finishes.
 - 8. Frame details.
 - 9. Accessories.
 - 10. Wiring Diagrams: For electrically operated units.

- C. Samples for Initial Selection: For finishes of surface-mounted screen cases.
- D. Maintenance Data: For projection screens to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain projection screens through one source from a single manufacturer. Obtain each screen as a complete unit, including necessary mounting hardware and accessories.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver projection screens until building is enclosed and other construction within spaces where screens will be installed is substantially complete and ready for screen installation.
- B. Store rear-projection screens in manufacturer's protective packaging and according to manufacturer's written instructions.

1.7 COORDINATION

- A. Coordinate layout and installation of projection screens with adjacent construction, including ceiling framing, light fixtures, HVAC equipment, fire-suppression system, and partitions.

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.
- B. Recessed, Electrically Operated Screens with Automatic Ceiling Closure: Motor in roller units designed and fabricated for recessed installation in ceiling; with bottom of case composed of two panels fully enclosing screen, motor, and wiring, one panel hinged and designed to open and close automatically when screen is lowered and fully raised, the other removable or openable for access to interior of case.
 - 1. Available Products: ** Indicates Units used as a basis of design comparison.
 - a. Da-Lite Screen Co., Inc.; **Advantage Deluxe Electrol (**)**
 - b. Draper Inc.
 - c. Stewart Filmscreen Corporation.

2. Provide metal or metal-lined wiring compartment on units with motor in roller.
 3. Screen Case: Made from metal, factory Finish.
 4. Provide screen case constructed to be installed with underside flush with ceiling at gypsum board ceiling assemblies.
 5. Provide screen case constructed to be installed with flange to receive ceiling at suspended acoustical ceiling tile assemblies.
 6. Color: As selected by Architect from manufacturers full range of available colors.
- C. Wide-Angle Reflective Viewing Surface: Peak gain of 1.5, and half-gain angle of at least 35 degrees.
1. Available Products:
 - a. Da-Lite Screen Co., Inc.; Video Spectra 1.5
 - b. Draper Inc.; F1500.
- D. Protective Coating: Provide formulation designed by screen manufacturer as a permanent topcoat over optical coatings to protect against normal abrasion before, during, and after installation.
- E. Size of Viewing Surface: 8'x8'.
- F. Factory Frames: Screen manufacturer's standard frames of profile indicated, fabricated to sizes required to fit screens from aluminum extrusions complying with ASTM B 221 (ASTM B 221M) for 6063-T5 alloy and temper.
1. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
- G. Glazing Accessories for Factory Frames: Provide gaskets and setting blocks with proven record of compatibility with screen and frame surfaces, of sizes and shapes to accommodate thickness of screen indicated and to fit glazing channel provided.
- H. Glazing Accessories for Field-Framed Screens: Provide materials compatible with screen and frame surfaces while complying with applicable requirements of Division 8 Section "Glazing."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install projection screens at locations indicated to comply with screen manufacturer's written instructions.
- B. Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.
 1. Install low-voltage controls according to NFPA 70 and manufacturer's written instructions.
 - a. Wiring Method: Install wiring in raceway except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use UL-

listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.

2. Test electrically operated units to verify that screen controls, limit switches, closure, and other operating components are in optimum functioning condition.

3.2 PROTECTING AND CLEANING

- A. After installation, protect projection screens from damage during construction. If damage occurs despite such protection, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.
 1. Provide temporary covering of rear-projection screens until time of Substantial Completion. Use type of covering approved by screen manufacturer that will effectively protect screen from abrasion, breakage, or other damage.
- B. Clean projection screens on both faces immediately before date scheduled for inspection intended to establish date of Substantial Completion. Use methods and cleaning materials recommended by screen manufacturer, taking care not to scratch or damage optical coatings or screen substrates.

END OF SECTION 115213

SECTION 126101 - FIXED AUDIENCE SEATING

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 fixed pew seating with the following:
 - 1. Wood ends, seat and back.
 - 2. Not upholstered.
- B. Related Sections:
 - 1. Division 06 "Interior Architectural Woodwork".

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 fixed pew seating.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Seating Layout: Show seating layout, aisle widths, spacing between each row, accessibility provisions and attachments to other work.
 - 2. Show accessories, if any.
- C. Samples for Initial Selection: For each type of exposed finish, color, texture, and pattern indicated.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Wood Materials and Finishes: Manufacturer's standard-size unit, not less than 3 inches (75 mm) square.
 - 2. Exposed Fasteners: Full-size units of each type.
- E. Product Certificates: Verifying finish and construction quality.
- F. Field quality-control reports.
- G. Maintenance Data: For fixed pew seating to include in maintenance manuals. Include the following:

1. Methods for maintaining wood finish.
2. Precautions for cleaning materials and methods that could be detrimental to finishes and performance.

H. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain pews, including accessories and mounting components, from single source from single manufacturer.
- B. Preinstallation Conference: Conduct conference at Project site.
- C. Manufacturer Qualification: Manufacturer shall have been regularly engaged in the manufacture of similar items for a minimum of fifteen (15) years, and shall have a history of successful production acceptable to the architect.
- D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Standards" latest edition, for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
 1. Provide AWI compliance labels and certificates indicating that woodwork, including installation, complies with requirements of grades specified. This project has been registered as AWI/QCP Project Number 17.0582.
 2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install pews until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary or permanent HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Verify actual dimensions of pew layout and construction contiguous with seating by field measurements BEFORE fabrication.

1.6 COORDINATION

- A. Coordinate layout and installation to avoid conflicts with items adjacent, including but not limited to the following components:
 1. Power and lighting components.
 2. Millwork and casework items.
 3. HVAC diffusers and components.
 4. Flooring products and components.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of pews that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures including standards, beams, pedestals, and ends.
 - b. Deterioration of wood finishes, and other materials beyond normal wear and use.
 2. Warranty Period: 25 years from date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials from the same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. (2) Pew ends – (1) right hand and (1) left hand.
 2. 5 percent quantity of mounting hardware/brackets.

PART 2 - PRODUCTS

A. BASIS-OF-DESIGN: Ratigan-Schottler.

1. End Panel: OE-20, wood stained to match millwork.
2. Seat and Backs: Solid wood Pew Body PB-95, wood stained to match millwork in Courtroom, stained to match adjacent pews in waiting.
3. Caps: To match end panel OE-20.
4. All components shall be solid wood:
 - a. AWI Premium American Cherry.

B. SUBSTITUTIONS:

1. Substitutions will be reviewed if submitted prior to bidding. Refer to the proper procedures for substitutions in Division 01 of the Project Manual.
2. Manufacturers must provide complete product information regarding quality, construction methods, products, installations and references for (5) projects of a similar size and complexity, completed in the last 2 years.

C. MANUFACTURERS: Provide products equal to or exceeding the requirements indicated.

1. Ratigan Schottler
2. Imperial Woodworks, Inc.
3. Covenant Inc. – Springfield, MO.
4. Sauder Corporation

D. SOLID WOOD SUPPORTS

All supports are 1¼" minimum thickness. All supports shall be solid wood. The front and rear

edges of supports shall be solid wood, shaped for a rounded appearance.

Supports shall be full height of the pew back to the underside of the solid wood caprail. Intermediate supports shall be constructed with excess length. Supports shall be scribed at the job site to meet the individual floor conditions and to produce a true, level installation.

Distribution of the supports is provided to insure a rigid, trouble free installation. The maximum unsupported span of a pew shall not exceed 4'-6". The maximum possible unsupported span shall not exceed 4'-6". The maximum unsupported span may be increased up to 6'-0" where the manufacturer can demonstrate engineering criteria establishing that their products have been designed for this spacing.

Each support is attached to the pew back with two 2" #10 screws. They are countersunk, and each is covered with a wood button. The support is fastened to the pew seat with the use of three (3) chair braces.

End supports are inset 16" from the outside face of the pew to the outside face of the support. End supports are anchored to the floor with the use of two (2) concealed floor anchors at each end of the pew. Intermediate supports are anchored as needed at the discretion of the factory.

E. TRUSS SUPPORTS

Note: Not all manufacturers may use the term "Truss Support", in which case construction shall be similar to "Solid Wood Supports" in Paragraph "D" above.

Supports are to be 1¼" thick x 18" wide x full height to the underside of the solid wood back caprail. Width is tapered to 16½" at the floor. Method of seat attachment to truss supports may vary from that specified if the manufacturing can demonstrate that their method is equivalent or better.

The truss support is constructed with the use of Solid Wood rails on both the front and rear edges joined together with 5/8" Solid Wood. The Solid Wood members on the front and rear are 3¼" wide x 1¼" thick. The Solid Wood joining them is mortised into both Solid Wood rails, and glued and nailed together to insure a bond engineered to be stronger than the parts being assembled.

The middle supports shall be constructed with excess length. Supports shall be scribed at the job site to meet the individual floor conditions and to produce a true, level installation.

The outside supports utilize two (2) concealed floor anchors, with the intermediate supports anchored as needed.

The supports are fastened to the bottom of the pew seat with the use of 3 chair braces using 6 screws. There shall be no toe-nailing of the screws through the support into the bottom of the pew seat.

F. WOOD PORTIONS OF PEWS

1. Flat or contoured Wood backs
2. Contoured Wood Seats
3. Wood Ends
4. Wood Supports

wood material.

Stain and finish to match interior architectural woodwork specified in Section 064023.

Pew backs and seats are made in one section.

G. ALL WOOD BACKS

Constructed of 3/4" solid wood; grain shall be longitudinal. The back tops (back caprail) shall be a 1 3/4" minimum heavy molded solid wood rail, secured to the top of the pew back by a tongue and groove joint, glued and blind nailed. Standard 32" back height.

H. ALL WOOD CONTOURED SEATS

Constructed of 3/4" solid wood, grain shall be longitudinal, with continuous balance sheet on bottom face. Front edge shall be heavy molded solid wood rail. Standard 16" seat depth.

I. FINISH

Shop stain and finish all pews (no paint) in conformance with requirements of Division 06 Section "Interior Architectural Woodwork".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine floors, risers, and other adjacent work and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Examine locations of HVAC supply ducts.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install seating in locations indicated and fastened securely to substrates according to manufacturer's written installation instructions.
 - 1. Use installation methods and fasteners that produce an evenly distributed load.
 - 2. Install supports, pedestals and ends plumb.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations.

3.4 ADJUSTING

- A. Adjust pew ends so that they are aligned with each other in straight rows or as indicated in plan layout.
- B. Verify that all components are anchored.
- C. Repair minor abrasions and imperfections in finishes to match factory-applied finish.

END OF SECTION 126101