SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Division 01 Section "Summary" for use of premises, and phasing, and Owner-occupancy requirements.
2. Division 01 Section "Execution" for cutting and patching procedures.
3. Division 01 Section "Photographic Documentation" for preconstruction photographs taken before selective demolition operations.
4. Division 01 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
5. Division 01 Section "Cutting and Patching" for cutting and patching procedures.
6. Division 31 Section "Site Clearing" for site clearing and removal of above- and below-grade improvements.

1.2 DEFINITIONS

A. Relocate: Detach items from existing construction, move to new location on site or within building, reset equipment in new location in accordance with equipment manufacturer’s recommendations and tolerance.
1. When manufacturer data is not available from Owner, comply with best practices and traditional standards for such installation.

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

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

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

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

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

1.3 MATERIALS OWNERSHIP

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

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

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

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

D. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's 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 if applicable.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
6. Means of protection for items to remain and items in path of waste removal from building.

E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Division 01 Section "Photographic Documentation." Submit before Work begins.

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

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

H. Landfill Records: Indicating receipt and acceptance of hazardous waste by a landfill facility licensed to accept hazardous waste if applicable to demolished items.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

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

1.7 FIELD CONDITIONS

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

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

1. Before selective demolition, Owner will remove the following items:

a. Loose furnishings not built into existing construction.

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

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

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

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

1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

1. Existing roof warranty.

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.

1.9 COORDINATION

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

2.2 MATERIALS

A. General: Provide new materials or undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

B. Lumber and Plywood: Comply with requirements in Division 06 Section "Rough Carpentry."

C. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

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

C. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

1. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

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

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

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

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

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

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
   3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
   4. Cover and protect furniture, furnishings, and equipment that have not been removed.
   5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

   1. Strengthen or add new supports when required during progress of selective demolition.

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

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least two hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly.

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

C. Removed and Salvaged Items:

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

D. Salvaged Items:
1. Fire Extinguishers.
2. AED equipment and cabinet.
3. Metal Graphic Panel.
4. Exterior furniture in area of addition.

E. 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.

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

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

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

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and 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."

E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. Refer to Division 07 Section “Modified Membrane Roofing” for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.
3. Remove existing roofing system down to base ply where patching to new is required.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.8 CLEANING

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

END OF SECTION 024119

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

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 specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Interior and exterior slabs on grade.
   2. Elevated slabs.
   3. Utilities.
   4. Concrete rehabilitation (patching)

B. Related Sections include the following:
   1. Division 31 Section “Earth Moving” for stone subbase below slabs on grade.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

B. Defective Slab: A slab not meeting any of the following requirements:
   1. Specified thickness, flatness, levelness or variation from elevation.
   2. Specifications for maximum moisture content in flooring finish sections.
   3. A floor slab rejected by installers of flooring finishes to be applied to slabs for non-compliance with manufacturer's requirements for floor finish and moisture content.
   4. Free of excessive cracking.
   5. Free of individual cracks greater than 1/16 inch thick.
   6. Specified compressive strength.

1.4 SUBMITTALS

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

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mixing water to be withheld for later addition at Project site such that specified water to cement ration is not exceeded.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. Provide shop drawings in advance of concrete construction and prior to delivery of reinforcing steel to the site such that all of engineer’s review comments can be addressed prior to fabrication and delivery of reinforcing steel.

D. Qualification Data: For manufacturer and testing agency.

E. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

F. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Steel reinforcement and accessories.
   4. Curing compounds.
   5. Vapor retarders/barriers.

G. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

H. Field quality-control test and inspection reports.

I. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for concrete and source of aggregates.
   1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
   2. Manufacturer shall be PennDOT approved.

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Owner will engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.
      c. Ready-mix concrete manufacturer.
      d. Cast-in-place concrete subcontractor
      e. Review concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction joints, forms and form-removal limitations, reinforcement accessory installation, concrete repair procedures, and protection of cast-in-place concrete.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other approved panel materials.
   2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      a. High-density overlay, Class 1 or better.
      b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
      c. Structural 1, B-B or better; mill oiled and edge sealed.
      d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

C. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
   2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

D. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

E. Forms and templates which are worn, bent, warped, or broken shall not be used. The forms shall be accurately set to line and grade in a manner to prevent settlement or displacement.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Welded Wire Fabric Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire woven into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, ASTM A 775/A 775M epoxy coated.

C. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.

D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
   1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 WATERSTOPS

A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
   1. Products: Product shall be compatible and approved by waterproofing membrane supplier. Subject to compliance with requirements, provide one of the following:
      a. Carlisle Coatings & Waterproofing, Inc.; MiraSTOP.
      b. CETCO; Volclay Waterstop-RX.
      c. Concrete Sealants Inc.; Conseal CS-231.
      d. Greenstreak; Swellstop.
      e. Henry Company, Sealants Division; Hydro-Flex.
      f. JP Specialties, Inc.; Earth Shield Type 20.

2.5 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
   1. Portland Cement: ASTM C 150, Type I gray. Contractor's option to supplement with the following:
      a. Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.
   1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
   2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   3. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

2.7 VAPOR RETARDERS

A. Plastic Vapor Retarder:
   1. Description: ASTM E 1745, Class A. Not less than 15 mils thick, unless noted otherwise.
   2. Include manufacturer's recommended adhesive or pressure-sensitive tape.
   3. Performance: Physical properties not less than the following when tested according to ASTM E 96:
      a. Water Vapor Permeance: 0.012 perms.
      b. Water Vapor Transmission Rate: 0.006 g/sf/hr or lower.
   4. Products: Subject to Compliance with requirements, provide one of the following:
      a. Fortifiber Corporation; Moistop Ultra 15.
      b. Raven Industries Inc.; Vapor Block 15.
      c. Reef Industries,; Gryffolyn T-105.
      d. Stego Industries, LLC; Stego Wrap, 15 mils.
      e. W. R. Meadows; Perminator 15 mils.
      f. Viper VaporCheck II, 15 MIL

2.8 CURING MATERIALS

A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

B. Water: Potable.

C. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
   1. Locations: Apply to exposed interior concrete floors not indicated for another finish
   2. Products: Subject to compliance with requirements, provide one of the following.
      a. Burke by Edoco; Cureseal 1315 WB.
      b. ChemMasters; Polyseal WB.
      c. Lambert Corporation; UV Safe Seal.
      d. L&M Construction Chemicals, Inc.; Lumiseal FX.
      e. Meadows, W. R., Inc.; Vocomp-30.

2.9 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips:
   1. Exterior Applications: ASTM D 1751, asphalt-saturated cellulosic fiber
   2. Interior Applications: Closed cell isomeric polymer foam.
      a. Product: Subject to compliance with requirements, provide "Ceramar"; W.R Meadows or approved equivalent.

B. Key Joints for Slabs-on-Grade: Provide joint forming units with removable cap to create void for joint sealant.

1. Product: Key-Loc Joint System; Form-A-Key Products Div., Cardinal Manufacturing Company, Inc.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion, PVA or styrene butadiene.

2.10 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Application: Repair of new non-compliant floors indicated to receive another finish other than paint.
2. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
3. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
4. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
5. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Application: Repair of new non-compliant floors indicated to receive no finish other than paint.
2. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
3. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
4. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
5. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.
6. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
a. "Levelayer III" by Dayton Superior.
b. "Levelex HS" by L&M Construction.
c. "Certi-Vex SLU TC" by Vexcon.

2.11 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 25 percent.
2. Do not use fly ash in exterior concrete slabs or pavements.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement for exterior applications of concrete and to 1.00 percent by weight of cement for interior applications.

D. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing or high-range water-reducing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

E. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.12 CONCRETE MIXTURES FOR BUILDING AND SITE ELEMENTS

A. Slab-on-Grade Ramps, Curbs and Steps: Proportion normal-weight concrete mix as follows:
   1. Compressive Strength (28 Days): 4000 psi.
   2. Maximum Slump: 4 inches.
      a. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches after admixture is added to concrete with 2- to 4-inch slump.
   3. Maximum Water-Cement Ratio: 0.45.
   4. Air entrain as specified below for exterior elements.

B. Suspended Slabs: Proportion normal-weight concrete mix as follows:
   1. Minimum Compressive Strength (28 Days): 4000 psi.
   2. Maximum Slump: 4 inches plus or minus 1 inch.
   3. Maximum Water-Cement Ratio: 0.45.

C. Air Content for Exterior Concrete Elements Subject to Freezing: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:
   1. Air Content: 6 percent plus or minus one percent for 3/4-inch-nominal maximum aggregate size.
   2. Do not air entrain concrete for interior floors.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

2.13 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.14 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
   1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Patching and Repair Products: Mix in accordance with manufacturer’s written instructions.

PART 3 - EXECUTION

3.1 PREPARATION FOR CONCRETE REHABILITATION

A. Areas to be repaired must be clean, sound, and free of contaminants. All loose and deteriorated concrete shall be removed by mechanical means. Mechanically prepare the concrete substrate

to obtain a surface profile of +/- 1/16" (CSP 5 or greater as per ICRI Guidelines) with a new exposed aggregate surface. Area to be patched shall not be less than 1/2" in depth.

B. Where reinforcing steel with active corrosion is encountered, sandblast the steel to a white metal finish to remove all contaminants and rust. Where corrosion has occurred due to the presence of chlorides, the steel shall be high pressure washed after mechanical cleaning. Prime steel in accordance with patching manufacturer's requirements.

3.2 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
1. Class A, 1/8 inch for smooth-formed finished surfaces.
2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Footings: Form exterior side of footings to accept waterproofing.

E. Construct forms tight enough to prevent loss of concrete mortar.

F. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

I. Chamfer exterior corners and edges of permanently exposed concrete ¾" unless noted otherwise.

J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

K. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.3 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.4 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 48 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
   1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength, as determined by compression testing of field cured concrete cylinders.
   2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.5 VAPOR RETARDERS/BARRIERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
   1. Lap joints 6 inches and seal with manufacturer's recommended tape. Turn barrier up wall and terminate per manufacturer's requirements.

3.6 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset

laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
   2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
   3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
   1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when concrete has hardened sufficiently such that cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
   2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

F. New to Existing Joints: Bush hammer sawn surfaces of existing to create mechanical bond, do not damage top edge of face where exposed to view in finished work. Drill for dowels, set with grout. Apply bonding compound to concrete interface in accordance with manufacturer’s recommendations. Place new concrete in accordance with these specifications.

3.8 WATERSTOPS

A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.9 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect and only if allowed for in approved mix design.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
   1. Deposit concrete in horizontal layers of depth in a manner to avoid inclined construction joints.
   2. Deposit and consolidate concrete for walls in a continuous operation, within limits of construction joints, until placement of a panel or section is complete, without introducing horizontal construction joints.
   3. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
   4. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   2. Maintain reinforcement in position on chairs during concrete placement.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 305.1 and 301 and as follows:
   1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.10 FINISHING FORMED SURFACES

A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces to receive a rubbed finish, and surfaces to be covered with a coating or covering material applied directly to concrete.

B. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where concrete is exposed to view:
   1. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method and where epoxy flooring is to be applied. While concrete is still plastic, slightly scarify surface with a fine broom.
   1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

C. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
   1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
   1. Apply light broom finish to concrete indicated to be covered with Underlayment or Topping.
   2. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
   3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/8 inch

E. Pour concrete slabs level such that slab thickness will increase due to deflected shape of supporting steel beams. Assume that steel beams will deflect a minimum of L/240 and the steel deck will deflect at least ½” under the weight of wet concrete. No change orders will be approved for additional concrete quanities due to the deflected shape of supporting structural elements.

3.12 EXTERIOR SLABS ON GRADE, STEPS AND APRONS

A. General: Concrete walks and aprons shall be constructed as shown on the plans. They shall be constructed with welded wire mesh as noted. Sidewalks shall be minimum four inches (4”) thick. Driveway aprons shall be minimum six inches (6”) thick unless noted otherwise on plans.

B. Contractor will replace any work exceeding these parameters at no additional expense to the Owner.

C. Sub-grade shall be prepared and stone base installed and compacted prior to installing forms. Work shall include removal and disposal of old concrete. Engineer shall be called to inspect sub-grade, forming, and reinforcing prior to pouring concrete.

D. Grade Adjustments and Utility Cover Extensions:
1. Grade adjustments of existing manholes, utility and signal boxes, and all other existing structures shall be made prior to the start of any paving or ramp work. This includes any grade adjustment for a revised vertical height and slope to match proposed slopes. Adjustment shall include rebuilding existing structure where required.
2. Manhole and inlet extensions shall meet PennDOT standards and be approved by the engineer prior to use.
3. Before placing paving or ramp material, set adjustable extension units in the existing inlet or manhole frame with the section resting on the flange. Secure the unit in place in accordance with the manufacturer's instructions.
4. Relocation of signal boxes shall include moving the box, relocating wiring as required and adjusting the box elevation to match the required grade.
5. Relocation of PECO boxes shall be coordinated with PECO. Contractor's work to include removal of concrete and preparation of sub-grade as required for PECO to re-locate the box. Contractor is responsible for scheduling PECO around other work at the intersection.
6. When required by project notes on drawings, Contractor shall supply detailed drawings in accordance with RC-67M for approval by the Owner and local authorities prior to construction.

E. All forms shall be set true to line and grade and held rigidly in position. They shall be either of metal or of acceptable planned and mated lumber, and of such construction that there will be no interference to inspection grade and alignment and that a smooth surface will be provided.

F. ADA Compliant Curb Ramps and Driveway Aprons
1. Where shown on the plans, ADA ramps shall be installed utilizing all applicable provisions found in sections 7.1 and 7.2 plus the following:
2. All elements of construction must meet or exceed the dimensional requirements found in RC-67M and the Penn DOT District 6-0 guidelines dated October 5, 2010
3. Elements should be installed to the plan elevations with the flattest slopes possible. All slopes and dimensions must meet or exceed the requirements of RC-67M. Maximum slope of any part of the handicap entrance ramp or curb ramps shall be 8.2% and maximum cross slope shall be 2.0%. Landings shall have a maximum slope of 2.0% in any direction. Contractor will replace any work exceeding these parameters at no additional expense to the owner.
4. All slopes are measured with respect to a level plane. A digital level should be available on site at all times to verify formwork and installed elements
5. Depressed curb for ramps must be flush with the adjacent roadway but be sloped up from the road at a grade matching the ramp slope. Edge of road must be set and flow line shall be graded to maintain a minimum grade of 0.5% and prevent ponding in front of the ramp.
6. Provide a slip resistant texture on curb ramp by coarse brooming transverse to the slope of the ramp. Extend texture the full width and length of the curb ramp including the flared side ramps.
7. All ADA compliant Ramps and curb shall be constructed monolithically.

G. Sidewalks:
1. Proposed sidewalk shall have a slope of 5% maximum along the direction of travel and a cross slope of at least 1% and no more than 1.8%. Proposed sidewalk must match and

be flush with the existing walk at the limit of work. If the cross slope adjustment is 0.5” or less, the adjustment to the new walk may be made in the first block. If greater than 0.5”, the adjustment should be made over two blocks.

H. Sidewalk step sections where shown on the plans shall be adjusted to accommodate the actual finish grades meeting the minimum requirements of 7” maximum rise and 11” minimum run.

I. After the concrete has been placed, floated and screeded, the final finishing shall be delayed sufficiently to prevent the finishing operations from working an excess of fine materials to the surface. The surface shall receive a course broom finish to provide a slip resistant surface in all weather conditions.

J. The sidewalks shall be scored in blocks of the same lengths as the width of the walk, and the edges of the sidewalk and the transverse joints shall be finished with a one-quarter inch (1/4”) edging tool. One-half inch (1/2”) pre-molded expansion joint material shall be placed between the back of the curb and the sidewalk, and at all points where the walk or steps abut the buildings or permanent structures or existing walks, and at the transverse expansion joints placed every twenty feet (20’)

K. Longitudinal contraction joints shall be placed in cases where the width of the sidewalk exceeds five feet (5’) as shown on the drawings or as directed by the Engineer.

L. Expansion joints shall also be placed where a change in thickness occurs, i.e., at both sides of a driveway entrance.

M. The forms shall be left in place at least twenty-four (24) hours or until the concrete has set sufficiently so that, in the opinion of the Engineer, they can be removed without damage to the walk.

3.13 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

E. Exterior Curbs:
1. Excavation shall be made to required depth, and the material upon which the curb is to be constructed shall be compacted to a firm, even surface. Engineer shall be called to inspect sub-grade and forming prior to pouring concrete
2. The concrete shall be placed in the forms in horizontal layers not to exceed five inches (5”), and spaded sufficiently to eliminate all voids. An approved vibrator may be used when permitted by the Engineer.

3. Where indicated or directed, drainage openings shall be made through the curb at the elevation and of the size required. The curb shall be the depressed as indicated or directed. The top surface of the curb shall be finished true to line and grade in a smooth, neat and even manner by means of wood float, and the edges of the face and back shall be rounded to a radius of not more than three-quarters (3/4) of and inch and one quarter (1/4) of an inch respectively, while the concrete is still plastic. The finished curb surface shall be free from voids and honeycomb. Any additional surface finishing required shall be performed immediately.
4. The curb shall be constructed in uniform lengths or sections of ten feet (10'), except where shorter lengths are necessary for closures or curves, but no section shall be less than four feet (4'). Premolded expansion joint filler three-quarters (3/4) of an inch in thickness and cut to conform to the cross-section of the curb, shall be placed at the ends of sections of curved curb and at intervals of not more than 93 feet. Intermediate joints between sections shall be formed of 2 thickness of 1-ply bituminous paper, cut neatly to the cross-section of handling the work is such that the templates cannot be removed satisfactorily, the curb shall be constructed in alternate sections.
5. The forms shall not be removed within 12 hours after the concrete has been placed. No rubbing to correct irregularities will be permitted until the full curing period has elapsed. Any irregular surface shall be corrected by rubbing with a Carborundum stone.
6. Brush finishing or plastering will not be permitted and all rejected curb shall be promptly removed and replaced at no expense to the owner. I. All joints in the curb shall be opened from top to bottom immediately after the forms are removed, and the edges adjacent to the joints shall be sharp and clean-cut. After the forms are removed, minor defects shall be filled with mortar composted of 1 part of cement and 2 parts of fine aggregate.
7. Curing: The curb shall be cured and protected as specified in PennDOT Specifications Form # 408. After finishing, spray with curing agent.
8. After the concrete has attained the required strength, the spaces in front and back of the curb shall be backfilled with approved material in layers of not more than four inches (4") in depth, which shall be thoroughly compacted mechanically to the required elevation and cross-section.

3.14 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    a. Water.
    b. Continuous water-fog spray.

c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
d. Alternative vapor retarder spray applied product.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
   b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
3. Curing and Sealing Compound: Apply uniformly to interior floors and slabs indicated to receive no other finish in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.
   a. Apply final coat immediately before substantial completion.
   b. Do not seal concrete floors scheduled for painting, topping, underlayment or locations with applied finishes.

3.15 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.16 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.
   3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
   4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's

written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

D. Moisture Content: Where moisture content of floor slab is not within requirements for applied flooring materials when tested 3 weeks before planned application of floor finishes, perform corrective work as follows:
1. Shot-blast entire floor surface, expose shot blasted floor to humidity- and temperature-controlled air environment for 7 days, then repair as specified above for correction of other low areas scheduled to receive floor coverings. Provide temperature and humidity control according to requirements in Division 01 Section "Temporary Facilities and Controls.

E. Perform structural repairs and rehabilitation of concrete using patching mortar in accordance with manufacturer’s recommendations.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.17 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
1. Retesting required as a result of failure to comply with specifications shall be by Contractor.

B. Inspections:
1. Steel reinforcement placement.
2. Headed bolts and studs.
3. Verification of use of required design mixture.
4. Concrete placement, including conveying and depositing.
5. Curing procedures and maintenance of curing temperature.
6. Verification of concrete strength before removal of shores and forms from beams and slabs.
7. See structural drawings for additional concrete inspection requirements.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture up to 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   b. Concrete Test Cylinders are required for curb and sidewalk: Provide strength tests of concrete with a minimum of one sample (4 cylinders) per truck delivery, and one sample (1) per mix design. Provide 7 day and 28 day break results in accordance with ACI 318 and ASTM C39. (Addendum 2)
3. Maintain accurate records identifying concrete placed that is associated with each batch of samples tested, such that concrete found to be in non-compliance can easily be identified in the field.
4. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
5. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
7. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
8. Compression Test Specimens: ASTM C 31/C 31M.
   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
   b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
   c. Cast and laboratory cure one standard cylinder for each composite sample.
9. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
   c. Hold one laboratory cured cylinder for testing at 56 days at the discretion of the Architect.
10. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
11. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
12. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
13. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

14. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
15. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
16. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.

END OF SECTION 03 30 00

SECTION 035416 HYDRAULIC CEMENT UNDERLAYMENT

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. Medium strength self-leveling cementitious underlayment for use below interior floor coverings.
   2. Skimcoat Patch & Finishing Underlayment.
   3. Concrete Sub-floor Crack Repair products and procedures (as required or referenced on drawings).

B. Related Sections:
   1. Division 09 Sections: Reference for related floor finish products

1.3 SUBMITTALS

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

B. Shop Drawings: Plans indicating substrates, locations, and average depths of underlayment and topping based on survey of substrate conditions.

C. Manufacturer Certificates: Signed by manufacturers of both underlayment and floor covering system certifying that products are compatible.

D. Qualification Data: For Installer.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment and topping products required for this Project.

B. Manufacturer’s Representative: Experienced with manufacturer’s systems and project conditions.

C. Product Compatibility: Manufacturers of both underlayment and floor covering system certify in writing that products are compatible.

D. Mockups: Apply hydraulic-cement-based underlayment and topping mockups to demonstrate surface finish, bonding, texture, tolerances, and standard of workmanship.
   1. Apply mockups approximately 100 sq. ft. in area in location indicated or, if not indicated, as directed by Architect. Provide one mockup each for underlayment and topping.
   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature and humidity, ventilation, and other conditions affecting underlayment performance.
   1. Conduct crack repairs and place hydraulic-cement-based underlayments and toppings only when ambient temperature and temperature of substrates are between 50 and 80 deg. F.

1.7 COORDINATION

A. Coordinate application of underlayment with requirements of floor covering products, including adhesives, specified in Division 09 Sections, to ensure compatibility of products.

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. Products: Subject to compliance with requirements, provide one of the products specified.
   2. Basis of Design Product: Provide product specified. Comply with Division 01 requirements for substitutions of basis of design products.

2.2 HYDRAULIC-CEMENT-BASED UNDERLAYMENTS (Self-Leveling)

A. Hydraulic-cement-based, polymer-modified, self-leveling product that can be applied in minimum uniform thicknesses of 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
   1. Basis-of-Design Products - Subject to compliance with requirements, provide one of the following:
      a. Ardex; V-1200
      b. MAPEI Corporation; Ultraplan 1.
      c. UZIN; NC 150
   2. Performance and Physical Properties: Meet or exceed the following values for material cured at 73° F+/-3°F (23° C+/-3°C) and 50% +/-5% relative humidity:
      a. Application: Barrel Mix or Pump
      b. Flow Time: 10 minutes
      c. Final Set: Approx. 90 minutes
      d. Compressive Strength: 4500 psi (315 kg/cm2) at 28 days, ASTM C109M.
      e. Flexural Strength: 1000 psi (70 kg/cm2) at 28 days, ASTM C348.
      f. VOC: 0

B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch; or coarse sand as recommended by underlayment manufacturer.
   1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

C. Water: Potable and at a temperature of not more than 70 deg F.

D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

2.3 SKIMCOAT PATCH AND FINISHING UNDERLAYMENT

A. General: Quick drying, patching and smoothing compound that can be troweled from a true featheredge up to 1/2" in a single application. For use over interior concrete, wood, moisture-insensitive tile and stone, cutback and other non-water soluble adhesive residues on concrete.
   1. Product to be used for subfloor preparation according to floor finish manufacturer's recommendations. Applications include, but are not limited to:
      a. Flash patching subfloor over concrete to minimize flooring finish transitions
      b. Plywood underlayment seam filler

B. Basis-of-Design Products - Subject to compliance with requirements, provide one of the following:
   1. Ardex Feather Finish- Self Drying Cement Based Underlayment
   2. Uzin 866 - Skim & Repair Compound

2.4 CRACK REPAIR COMPONENTS (Concrete Subfloor)

A. Basis-of-Design Products: Provide products listed below as manufactured by Sika Corp, or provide equivalent products as supplied by Conproco, Mapei or Ardex.
   1. Repair Mortar: Sikacrete 211, Product 557-500.
   2. Epoxy Mortar: One to one mix of Sikadur 32, Hi-Mod. Product 770 and oven dried silica sand.
   3. Crack Filler: Sikadur 52, Product 396.
   4. Gel Type Crack Filler: Sikadur 31, High Mod Gel, Product 390.
   5. Low Viscosity Rigid Polyurethane Crack and Joint Repair: ARDEX ARDIFIX™; Manufactured by ARDEX Americas: 400 Ardex Park Drive, Aliquippa, PA, 15001, USA, (724) 203-5000, www.ardexamericas.com

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.5 STITCH CRACK REPAIR COMPONENTS

A. Basis of Design Products: Provide products listed below as manufactured by Sika Corp, or provide equivalent products as supplied by Conproco or Mapei.
   1. Epoxy Mortar: One to one mix of Sikadur 32, Hi-Mod. Product 770 and oven dried silica sand.
   2. Crack Filler: Sikadur 52, Product 396.
   3. Gel Type Crack Filler: Sikadur 31, High Mod Gel, Product 390.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
   1. Proceed with application only after unsatisfactory conditions have been corrected.

B. Conduct no less than 1 moisture vapor transmission rate tests per 1000 square feet.

3.2 PREPARATION

A. General: Prepare and clean substrate according to manufacturer's written instructions.
   1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment and topping.
   2. Fill substrate voids to prevent underlayment and topping from leaking.
   3. Comply with manufacturer’s recommendations for scrubbing topping materials into surface and other preparations for topping.

B. Crack Repair: Chip away loose material at surface. Cracks shall be v-routed to a 1/2 inch depth and blown free of dust and debris with oil free compressed air. Gravity feed cracks with epoxy. Pour epoxy into joint until completely filled.

C. Stitch Crack Repair: Cut channel into concrete flooring and cracks to minimum width and depth indicated or as recommended by manufacturer for product specified. Blow out to remove dust and particles. Fill slot with epoxy mortar to top of slab. Between slots, prepare and fill crack as indicated above for Crack Repair. Reference Detail 3/A1.1a.

D. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
   1. Remove sufficient concrete adjacent to clean outs and floor drains to permit installation of topping or underlayment and floor finishes flush with clean out and floor drains.
   2. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

E. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment and topping according to manufacturer's written instructions.

3.3 APPLICATION

A. General: Mix and apply underlayment and topping components according to manufacturer's written instructions.
   1. Close areas to traffic during underlayment and topping application and for time period after application recommended in writing by manufacturer.
   2. Coordinate application of components to provide optimum underlayment and topping-to-substrate and intercoat adhesion.
   3. At substrate expansion, isolation, and other moving joints, provide crack isolation membrane as recommended by manufacturer.

B. Crack Repair Materials: Comply with manufacturer’s recommendations.

C. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

D. Apply underlayment and topping to produce uniform, level surface, typically.
   1. Apply a final layer without aggregate to produce smooth surface.
   2. Feather edges to match adjacent floor elevations.

E. Apply trowel grade topping and wear course materials to areas indicated to receive a sloped finish.

F. Cure underlayment and topping according to manufacturer's written instructions. Prevent contamination during application and curing processes.

G. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

H. Remove and replace underlayment and topping areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

B. Protect topping from concentrated and rolling loads for 28 days.

C. Apply no less than 2 coats of sealer at topped floors with no other finish.

END OF SECTION

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Brick.
3. Mortar and grout materials.
4. Reinforcement.
5. Ties and anchors.
6. Embedded flashing.
7. Accessories.
8. Mortar and grout mixes.

B. Products Installed but not Furnished under This Section:
1. Steel lintels in unit masonry.
2. Steel shelf angles for supporting unit masonry.
3. Cavity wall insulation adhered to masonry backup.

C. Related Requirements:
1. Division 07 Section "Thermal Insulation" for cavity wall insulation.
2. Division 07 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
3. Division 07 Section "Fire-Resistive Joint Systems” for fire-resistive joint system at heads of masonry walls.
4. Division 07 Section “Joint Sealants” for sealing control joints in unit masonry.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

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

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Indicate sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Indicate bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315R. Indicate elevations of reinforced walls.

3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
4. Provide shop drawings in advance of concrete construction and prior to delivery of reinforcing steel to the site such that all of engineer's review comments can be addressed prior to fabrication and delivery of reinforcing steel.

C. Samples for Initial Selection:
1. Clay face brick, in the form of straps of five or more bricks.
2. Colored mortar.
3. Weep/cavity vents.

D. Samples for Verification: For each type and color of the following:
1. Clay face brick.
2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.
3. Weep/cavity vents.
4. Cavity drainage material.
5. Accessories embedded in masonry.

1.5 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

B. Material Certificates: For each type of the following:

1. Masonry units.

a. Include material test reports substantiating compliance with requirements.
b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
c. For exposed brick, include test report for efflorescence in accordance with ASTM C67/C67M.
d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Reinforcing bars.
7. Joint reinforcement.
8. Anchors, ties, and metal accessories.

C. Qualification Statements: For testing agency.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined in accordance with TMS 602.

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

1.6 QUALITY ASSURANCE

A. Qualifications:
1. Testing Agency Qualifications: Qualified in accordance with ASTM C1093 for testing indicated.

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

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

D. Mason Qualifications: Employ the highest skilled masonry craftsperson for laying feature walls. Mason shall have no less than 10 years experience in laying exposed masonry.

1.7 MOCKUPS

A. Sample Panel Mockups: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 01 Section "Quality Requirements" for mockups.

1. Build sample panels for typical exterior wall in sizes approximately 60 inches (1524 mm) long by 48 inches (1219 mm) high by full thickness.
2. Build sample panels facing south.
3. Where masonry is to match existing, build panels adjacent and parallel to existing surface.
4. Clean one-half of exposed faces of panels with masonry cleaner indicated.
5. Protect approved sample panels from the elements with weather-resistant membrane.
6. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.

    a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.

B. Wall Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for materials and execution.

1. Build mockup as indicated on Drawings or if not indicated as outlined below and directed by architect.
2. Build mockups for typical exterior wall] in sizes approximately 60 inches (1524 mm long by 60 inches (1524 mm) high by full thickness, including face and backup wythes and accessories.

    a. Include a sealant-filled joint at least 16 inches (406 mm) long in exterior wall mockup.
    b. Include lower corner of window opening, with stone trim, at upper corner of exterior wall mockup. Make opening approximately 12 inches (305 mm) wide by 16 inches (406 mm) high.
    c. Include through-wall flashing installed for a 24-inch (610-mm) length in corner of exterior wall mockup approximately 16 inches (406 mm) down from top of mockup, with a 12-inch (305-mm) length of flashing left exposed to view (omit masonry above half of flashing).
    d. Include metal studs, sheathing, water-resistive barrier, sheathing joint-and-penetration treatment, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.

3. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
4. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
5. Protect accepted mockups from the elements with weather-resistant membrane.
6. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations by Change Order.

1.8 DELIVERY, STORAGE, AND HANDLING

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

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

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

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

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

1.9 FIELD CONDITIONS

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

1. Extend cover a minimum of 24 inches (610 mm) down both sides of walls, and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (610 mm) down face next to unconstructed wythe, and hold cover in place.

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

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

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

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

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

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Masonry to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

B. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) in accordance with TMS 602.

2.2 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

1. Where fire-resistance-rated construction is indicated, use the equivalent thickness method for masonry units in accordance with ACI 216.1.

2.3 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide square-edged units for outside corners unless indicated to be bull nose by plan designation “BN”.

B. CMUs: ASTM C90, normal weight, unless otherwise indicated.
1. Size (Width): Manufactured to dimensions 3/8 inch (10 mm) less than nominal dimensions.
2. Exposed Faces: Smooth cast, no scores.

2.4 LINTELS (Allowed where not exposed to view)

A. Solid Concrete Masonry Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength of not less than that of CMUs**.**

B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

C. Offset Angle Supports: Steel plate brackets anchored to structure, allowing continuous insulation behind shelf angle supporting veneer. Component and anchor size and spacing engineered by manufacturer.
1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304.

2.5 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels, requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing, and where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Clay Face Brick: Facing brick complying with ASTM C216, Grade SW.
1. Basis-of-Design Products: The following product shall be incorporated into the work upon approval of initial selection sample panel by Architect.
   a. Manufacturer/ Color/ Pattern: Taylor Clay Normans, 50/50 mingle #309 and #392. 2-1/4” x 11-5/8” in size.
2. approval of initial selection sample panel by Architect
3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3350 psi (23.10 MPa).
4. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested in accordance with ASTM C67/C67M.
5. Efflorescence: Provide brick that has been tested in accordance with ASTM C67/C67M and is rated "not effloresced."
6. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 8 inches (203 mm) long.
7. Application: Use where brick is exposed unless otherwise indicated.

2.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6.4 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

E. Aggregate for Grout: ASTM C404.

F. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. BASF Corporation – Construction Chemicals
   b. Euclid Chemical Company
   c. GCP Applied Technologies Inc.

G. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

H. Water: Potable.

2.7 REINFORCEMENT

A. Refer to Structural Drawings for details. If not indicated, confirm with Architect based off the following:

B. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60 (Grade 420).

C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Hohmann & Barnard, Inc.; #RB or RB-Twin Rebar Positioner or a comparable product by one of the following:
   a. Heckmann Building Products, Inc.
   b. Lock Rite.
   c. Wire-Bond.

D. Masonry-Joint Reinforcement, General: ASTM A951/A951M.

1. Interior Walls: Hot-dip galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.
3. Wire Size for Side Rods: W1.7 or 0.148-inch (3.77-mm) diameter.
4. Wire Size for Cross Rods: W1.7 or 0.148-inch (3.77-mm) diameter.
5. Wire Size for Veneer Ties: W1.7 or 0.148-inch (3.77-mm) diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (406 mm) o.c.
7. Provide in lengths of not less than 10 ft. (3 m).

E. Masonry-Joint Reinforcement for Single-Wythe Masonry: Truss type with single pair of side rods.

F. Masonry-Joint Reinforcement for Multiwythe Masonry:
1. Adjustable (two-piece) type, truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch (1.6 mm) and maximum vertical adjustment of 1-1/4 inches (32 mm). Size ties to extend at least halfway through facing wythe but with at least 5/8-inch (16-mm) cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.

G. Masonry-Joint Reinforcement for Non-Aligned Cavity Wall and Multiwythe Masonry:

1. Adjustable (three-piece) type for random or nonaligned courses, truss design, with one side rod at each face shell of backing wythe, with a triangular tie with restraint bar welded at 16" o.c. Triangular tie part of truss shall extend through insulation and be tied with an additional side rod, at cavity walls. Triangular part of truss shall only extend through face shell of back-up CMU for multi-wythe construction. Provide a 3/8" J-Bar for insertion into slots of the ties protruding from block back-up wall, and individual ties for engagment around the J-Bar and into the veneer. Ties extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.
2. Products:
   a. Dur-O-Wal, DA 3300 “Dur-O-Tab with Restraint Bar”.
   b. b. Hohman and Barnard: Tie HVR-190 and 195.
3. Contractor’s Option: Provide single-wythe wall reinforcing for CMU back up course and separately attached wall ties as specified below.

2.8 TIES AND ANCHORS

A. General: Ties and anchors extend at least 1-1/2 inches (38 mm) into veneer but with at least a 5/8-inch (16-mm) cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
   1. Galvanized-Steel Sheet: ASTM A653/A653M, Commercial Steel, G60 (Z180) zinc coating.
   2. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.

   1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches (51 mm) long for masonry constructed from solid units.
   2. Where wythes do not align or are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches (32 mm).
   3. Wire: Fabricate from 3/16-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.

D. Anchors for Connecting to Structural Steel: As specified on structural drawings.

E. Partition Top Anchors: 0.105-inch- (2.66-mm-) thick metal plate with a 3/8-inch- (10-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
   1. Where clearances do not permit use of a plate and tube, provide two angles, secured to deck or structure above, one on each side of wall. Angles shall be 4 by 4 by ¼ inch.

F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.4 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.

   1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M.

G. Adjustable Masonry-Veneer Anchors:

   1. General: Provide anchors that allow vertical adjustment but resist a 100 lbf (445 N) load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch (1.6 mm).

2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.0785-inch- (1.99-mm-) thick steel sheet, galvanized after fabrication.
3. Fabricate wire ties from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized-steel wire unless otherwise indicated.

4. Masonry-Veneer Anchors; Slotted Plate: Sheet metal anchor section, with screw holes at top and bottom; and raised rib-stiffened strap, stamped into center to provide a slot between strap and base for wire tie.

    a. Basis-of-Design Product: Hohmann & Barnard, Inc., HB-213 for steel studs.

    b. Alternate: Hohmann & Barnard, Inc., HB-5213 for CMU back-up walls.

5. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 (4.83 mm) diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours in accordance with ASTM B117.
6. Post-installed Anchors: Provide chemical or torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
    a. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).

2.9 EMBEDDED FLASHING

A. Metal Flashing: Through wall flashing, custom formed concealed stainless steel flashing, reglets and counterflashing as specified in Division 07 Section “Sheet Metal Flashing and Trim”.

B. Flexible Flashing: For flashing partly exposed to the exterior or in masonry courses immediately above cast stone, use metal flashing specified above. For flashing not exposed to the exterior, use the following:

1. Stainless Steel Fabric Flashing: Composite, flashing product consisting of 2-mil (0.05-mm) of Type 304 stainless steel sheet, bonded to a layer of polymeric fabric, to produce an overall thickness of 40-mil (1.0-mm).

    a. Products: Subject to compliance with requirements, provide one of the following or an equal product approved by the architect:
        1) York Manufacturing, Inc.: Multi-Flash SS
        2) Hohmann & Barnard, Inc.: Mighty-Flash Stainless Steel Composite

C. Solder and Sealants for Sheet Metal Flashings:

1. Solder for Stainless Steel: ASTM B32, Grade Sn60, with acid flux of type recommended by stainless steel sheet manufacturer.
2. Elastomeric Sealant: ASTM C920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.

D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

E. Termination Bars for Flexible Flashing: Provide flexible flashing manufacturer's recommended termination bars fabricated from Stainless steel.

2.10 ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

D. Weep/Cavity Vents: Use the following unless otherwise indicated:
   1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3.2 mm) less than depth of outer wythe, in color selected from manufacturer's standard.

      a. Products:
         1) Advanced Building Products Inc.; Mortar Maze weep vent.
         2) Heckmann Building Products Inc.; No. 85 Cell Vent.
         3) Hohmann & Barnard, Inc.; Quadro-Vent.
         4) Wire-Bond; Cell Vent.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

   1. Mortar Deflector: Strips, full depth of cavity and 10 inches (254 mm) high, with dovetail-shaped notches that prevent clogging with mortar droppings.

      a. Basis-of-Design Product: Mortar Net USA, Ltd.; Mortar Net with Insect Barrier

F. Proprietary Acidic Masonry Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

   1. Basis-of-Design Product: Prosoco, Sure Klean 600, New masonry cleaner.

2.11 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

   1. Do not use calcium chloride in mortar or grout.

2. Use portland cement-lime, masonry cement, or mortar cement mortar unless otherwise indicated.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use Type M.
2. For reinforced masonry, use Type S.
3. For mortar parge coats, use Type N.
4. For exterior, above-grade, load-bearing, nonload-bearing walls, and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
5. For interior nonload-bearing partitions, Type O may be used instead of Type N.

D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. For mineral-oxide pigments do not exceed 10 percent of portland cement by weight.
2. For Carbon-black pigments do not exceed 5 percent of masonry cement or mortar cement by weight.
3. Application: Use pigmented mortar for exposed mortar joints with the following units:
   a. Face brick.

E. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) as measured in accordance with ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

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

3.2 INSTALLATION, GENERAL

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

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

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

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

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested in accordance with ASTM C67/C67M. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (13 mm) or minus 1/4 inch (6.4 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (13 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6.4 mm) in a story height or 1/2 inch (13 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), or 1/2-inch (13-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 ft. (3.2 mm in 3 m), 1/4 inch in 20 ft. (6.4 mm in 6 m), or 1/2-inch (13-mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), 3/8 inch in 20 ft. (10 mm in 6 m), or 1/2-inch (13-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 ft. (3.2 mm in 3 m), 1/4 inch in 20 ft. (6.4 mm in 6 m), or 1/2-inch (13-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), 3/8 inch in 20 ft. (10 mm in 6 m), or 1/2-inch (13-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), or 1/2-inch (13-mm) maximum.

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.6 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

3.4 LAYING MASONRY WALLS

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

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (102-mm) horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches (102 mm). Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (102-mm) horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches (610 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors, and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1219 mm) o.c. unless otherwise indicated.
3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078443 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

1. For glazed masonry units, use a nonmetallic jointer 3/4 inch (19 mm) or more in width.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

E. Cut joints flush where indicated to receive waterproofing, cavity wall insulation, or air barriers unless otherwise indicated.

3.6 COMPOSITE MASONRY

A. Bond wythes of composite masonry together as follows:

1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
b. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement.

B. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.

1. Provide continuity with masonry-joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.

C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are indicated at juncture, bond walls together as follows:

1. Provide individual metal ties not more than 8 inches (203 mm) o.c.
2. Provide continuity with masonry-joint reinforcement by using prefabricated T-shaped units.
3. Provide rigid metal anchors not more than 24 inches (610 mm) o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

3.7 CAVITY WALLS

A. Bond wythes of cavity walls together as follows:

1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

   a. Where bed joints of both wythes align, use tab-type reinforcement.
   b. Where one wythe is of clay masonry and the other of concrete masonry and do not align, use adjustable (three-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align or separate wall anchors with single wythe reinforcing.
   c. When three-piece type reinforcing is employed, do not pierce wall flashing with vertical rod. Where rod is discontinued above the through wall flashing, bend rod at bottom end so that rod cannot pierce flashing.

B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

C. Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches (305 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as indicated.

1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.8 ANCHORED MASONRY VENEERS

A. Anchor masonry veneers to wall framing and or concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Embed tie sections in masonry joints.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and horizontally. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around perimeter.

B. Provide not less than 2 inches (51 mm) of airspace between back of masonry veneer and face of insulation.

1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.9 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (152 mm).

1. Space reinforcement not more than 16 inches (406 mm) o.c.
2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.10 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
1. Install masonry control joints at 24 feet on center maximum in exterior walls, and 30 feet on center maximum in interior walls when joints are not indicated on plans.
2. Utilize existing control joint locations where they occur.

B. Form control joints in concrete masonry as follows:
1. Install preformed control-joint gaskets designed to fit standard sash block.

C. Form expansion joints in brick as follows:
1. Build in compressible joint fillers where indicated.
2. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch (10 mm) for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch (10 mm).

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

3.11 LINTELS

A. Install steel lintels where indicated.

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

C. Provide minimum bearing of 8 inches (203 mm) at each jamb unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, AND CAVITY VENTS

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

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 4 inches (102 mm), and 1-1/2 inches (38 mm) into the inner wythe.
3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches (203 mm); with upper edge tucked under water-resistive barrier, lapping at least 4 inches (102 mm). Fasten upper edge of flexible flashing to sheathing through termination bar**.**
4. At lintels and shelf angles, extend flashing 6 inches (152 mm) minimum at each end. At heads and sills, extend flashing 6 inches (152 mm) minimum and turn ends up not less than 2 inches (51 mm) to form end dams.
5. Interlock end joints of sawtooth sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
6. Install metal drip edges with sawtooth sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
7. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

D. Install reglets and nailers for flashing and other related construction where they are indicated to be built into masonry.
1. At existing Masonry: Grind mortar out of head joint of course shown. Insert reglet, wedge in place with lead or plastic shims and pack in grout of same color and type as existing. Tool joint to match existing.

E. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep/cavity vent products to form weep holes.
2. Space weep holes 24 inches (610 mm) o.c. unless otherwise indicated.

F. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Accessories" Article.

3.13 REINFORCED UNIT MASONRY

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches (1524 mm).

3.14 PATCHING MASONRY

A. Where existing brick or concrete masonry is indicated to be patched, remove full damaged units to next mortar joint. Remove full units.

B. Use salvaged brick when patching existing brick masonry. Match mortar color and bed thickness.

C. Where demolition exposes damaged or cut units, tooth in new CMU to provide full undamaged or cut units.

D. Use same mortar as specified for new construction. Modify mortar mix to match existing masonry mortar appearance. Point mortar to match existing to eliminate evidence of repair.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements will be at Contractor's expense.

B. Inspections: Special inspections in accordance with Level 2 in TMS 402 unless designated as an essential facility.
1. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

C. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.

D. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140/C140M for compressive strength.

E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.

F. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.

G. See structural drawings for additional inspection requirements.

3.16 PARGING

A. Parge exterior faces of:
   1. Below-grade masonry walls to receive waterproofing.
   2. Above grade masonry to receive air barrier membrane.
   3. Above grade to receive ceramic tile.

B. Parge interior faces of masonry to receive laminate gypsum wall board, backer board or cement board.

C. Parge masonry in 2 uniform coats to a total thickness of 3/4 inch. Dampen wall before applying first coat and scarify first coat to ensure full bond to subsequent coat.
   1. Parge masonry to receive ceramic tile in 1 uniform coat of 3/8 inch unless filling or leveling of the wall is required in which case provide necessary coats and thickness to level wall.

D. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot (3.2 mm per 305 mm). Form a wash at top of parging and a cove at bottom.

E. Damp-cure parging for at least 24 hours and protect parging until cured.

F. For masonry to receive waterproofing form a wash at top of parging and a cove at bottom.
   1. Damp- cure parging for at least 24 hours and protect parging until cured.

3.17 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
7. Clean masonry with a proprietary acidic masonry cleaner applied according to manufacturer's written instructions.

3.18 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood blocking, and nailers.
   2. Plywood backing panels.

1.2 ACTION SUBMITTALS

A. Product Data:

   1. For each type of process and factory-fabricated product.
   2. For preservative-treated wood products.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates:

   1. For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
   2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.

B. Evaluation Reports: For the following, from ICC-ES:

   1. Wood-preservative-treated wood.
   2. Fire-retardant-treated wood.
   3. Power-driven fasteners.
   4. Post-installed anchors.
   5. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

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

   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.

3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content:

1. Boards: 19 percent.
2. Dimension Lumber: 19 percent unless otherwise indicated.

2.2 PRESERVATIVE TREATMENT

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

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

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

D. 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 crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATMENT

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

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Exterior Type: Treated materials are to comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.

C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.

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

E. Application: Treat items indicated on Drawings, and the following:
   1. Concealed blocking.
   2. Framing for non-load-bearing partitions.
   3. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

A. 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. Dimension Lumber Items: Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.

2.5 PLYWOOD BACKING PANELS

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

2.6 FASTENERS

A. General: Fasteners are to be of size and type indicated and comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.

   1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

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

C. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58 ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

2.7 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

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

PART 3 - EXECUTION

3.1 INSTALLATION

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

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

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

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

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

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

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

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. ICC-ES evaluation report for fastener.

END OF SECTION 061000

SECTION 06 41 16

PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Plastic-laminate countertops
4. Laboratory countertops
5. Laboratory sinks

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.

1.2 COORDINATION

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

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.

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

D. Samples for Initial Selection: For each type of exposed finish.

E. Samples for Verification: For the following:

1. Plastic Laminates (High Pressure Laminate (HPL)): 8 by 10 inches for each type, color, pattern, and surface finish required.

a. Provide one sample applied to core material with specified edge material applied to one edge – 3mm Solid PVC Edgebanding

2. Thermally Fused Laminate (TFL) Panels: 8 by 10 inches for each color, pattern, and surface finish.

3. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Certificates: For each type of product.

1. Composite wood products.
2. Thermally fused laminate panels.
3. High-pressure decorative laminate.
4. Adhesives.

1.5 QUALITY ASSURANCE

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

1. Manufacture is required to be in the AWI's Quality Certification Program, however project is not required to be certified.

B. Installer Qualifications: Manufacturer of products

C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups of typical architectural cabinets as shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 FIELD CONDITIONS

A. Environmental Limitations without Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CABINET MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. ACS – Advanced Cabinet Systems
2. AMC - American Millwork & Cabinetry, Inc.
3. Mastercraft Woodworking Company, Inc.

2.2 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.

B. Architectural Woodwork Standards Grade: Custom

C. Type of Construction: Frameless.

D. Door and Drawer-Front Style: Flush overlay.

E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
1. If specific product is not listed in drawings, then products to be selected from “Standard HPL” full range of product options from the following manuf.:
   a. Wilsonart
   b. Formica
   c. Arborite

F. Laminate Cladding for Exposed Surfaces:
1. Horizontal Surfaces: Grade HGS
2. Postformed Surfaces: Grade HGP.
3. Vertical Surfaces: Grade HGS
4. Edges: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish
5. Pattern Direction: Vertically for doors and fixed panels, horizontally for drawer fronts

G. Materials for Semiexposed Surfaces:
1. Surfaces Other Than Drawer Bodies: Thermally fused laminate panels.

a. Edges of Thermally Fused Laminate Panel Shelves: PVC or polyester edge banding.
2. Drawer Sides and Backs: Solid-hardwood lumber
3. Drawer Bottoms: Hardwood plywood

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

I. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with [glued rabbeted joints supplemented by mechanical fasteners] [or] [glued dovetail joints].

J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. Refer to Interior Finish Legend & Room Schedule in drawings.
2. If not indicated in drawings, material to be selected by Architect from laminate manufacturer's full range in the following categories:
a. Standard HPL Finish

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

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

2.4 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products in accordance with test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials 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 qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
2. Mill lumber before treatment and implement 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 architectural cabinets.

2.5 CABINET HARDWARE AND ACCESSORIES

A. Hardware, General: Provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware complying with requirements indicated.
1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.

B. Finish:
1. Exposed Hardware:
a. Stainless Steel, Type 304, Directional Satin, No. 4
2. Interior Hardware (slides, catches and adjustable shelves): Brushed Aluminum
a. Provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

C. Hinges:
1. Standard hinges for wall cabinets, base cabinets and tall cabinet doors shall be of the heavy-duty, wrap around, institutional type with five knuckles, non-removable pin and rounded ends.
a. Hinges for overlay door construction shall be 2-¾” high by .095” thick and hinges for lipped radius construction shall be 2-½” high by .072 thick.
b. Hinge swing shall be 270 degrees.
c. Hinges shall be finished in colors selected from the manufacturer’s standard colors.
d. Hinge screws shall be concealed when door is closed.
2. The number of hinges shall vary according to the door height as follows:
a. 10-½” – 34-½” door height: 2 hinges,
b. over 34-½” – 52-½” door height: 3 hinges,
c. over 52-½” – 70-½”: 4 hinges,
d. over 70-½”: 5 hinges.

D. Pulls:
1. Wire Pull: 4 inch center-to-center Stainless Steel Pull, Back-Mounted, Solid Metal, Brushed Finish

E. Catches: Magnetic catches, ANSI/BHMA A156.9, B03141

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

G. Shelf Rests: ANSI/BHMA A156.9, B04013; metal

H. Drawer Slides: ANSI/BHMA A156.9.
   1. Heavy-Duty (Grade 1HD-100 and Grade 1HD-200): Side mount
      a. Type: Full extension.
      b. Material: Epoxy-coated polymer slides.
      c. Motion Feature: Soft close dampener
   2. General-purpose drawers more than 3 inches high, but not more than 6 inches high and not more than 18 inches wide, provide 100 lb load capacity.
   3. General-purpose drawers more than 6 inches high and more than 18 inches but not more than 30 inches wide, provide 150 lb load capacity.
      a. Basis of Design: Accuride – 3932EC (Easy-Close)
   4. Lateral file drawers more than 6 inches high and more than 30 inches wide but not more than 36 inches, provide 200 lb load capacity.
      a. Basis of Design: Accuride – 3600EC (Easy-Close), up to 36 inches wide

I. Cabinet Door and Drawer Locks: Cylindrical (cam) type, 5-pin tumbler, brass with chrome-plated finish or 6-tumbler diecast body with dead bolt engagement, complying with BHMA A156.11, Grade 1.
   1. Provide a minimum of two keys per lock and six master keys.
   2. Provide locks for all doors and drawers unless noted otherwise on drawings.
   3. Key locks in each room alike; masterkey locks for entire building to operate from a single master key.

J. Door Locks: ANSI/BHMA A156.11, E07121.

K. Drawer Locks: ANSI/BHMA A156.11, E07041.

L. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.

M. Clothes Rods: 1-5/16-inch-diameter, chrome-plated steel tubes.
   1. Rod Flanges: Aluminum.

N. Grommets for Cable Passage: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
   1. Color: (Standard color, coordinate with countertop finish.)

O. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.
   1. Satin Stainless Steel: ANSI/BHMA 630.

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

Q. Ceiling Mount Double Hooks: Dual steel hook with bulb safety ends, matte nickel finish, welded construction. Provide Stevens Advantage Hooks Gallery Collection Model SA-364MN. Product shall be attached to cabinet body with two number 10 screws with combined pullout strength of at least 400 pounds.

R. Wall Mount Hook: Dual steel hook with bulb safety ends, matte nickel finish, welded construction formed for coat and hat hooks. Provide Stevens Advantage Hooks Gallery Collection Model SA-363MN. Product shall be attached to cabinet body with two number 10 screws with combined pullout strength of at least 400 pounds.

S. Glass for Glazed Doors: Clear tempered glass complying with ASTM C 1048, Kind FT, Condition A, Type 1, Quality-Q3; not less than 5.0 mm think.

2.6 COUNTERTOPS

A. Countertops, General:
1. Provide smooth, clean exposed tops and edges in uniform plane free of defects.
2. Provide front and end overhang of 1 inch over base cabinets.

B. Plastic-Laminate Tops:
1. Horizontal Surfaces: Grade HGS
2. Typical Countertop Thickness: 1 ¼”
3. Edges: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish

C. Plastic-Laminate Back & Side Splashes:
1. 4” high, unless noted otherwise
2. Match laminate of adjacent countertop, provide finish on exposed faces & edges of splash unit.

D. Countertop Support Brackets: L-shaped bracket formed from mitered and welded steel tubes punched for attachment holes for securing to wall and to countertop. Miter and close exposed end with steel plate, welded and ground smooth. Finish with powder coat paint system in white.
1. Tubes shall be 1-1/2 inch by 2-1/2 inch.
2. Surface mounted for concrete masonry walls, partially recessed mounted for steel stud construction.
3. Maximum countertop span: 42 inches between supports.

2.7 SHELVING

A. Plastic-Laminate Shelving: Plastic-laminate sheet, Type HGS or HGP, shop bonded with waterproof glue to both sides of particleboard. Sand surfaces to which plastic laminate is to be bonded.
1. Typical Shelf Thickness: 7/8 inch.
2. Edges: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish

B. Adjustable Shelf Supports: Powder-coated steel standards and shelf brackets, complying with BHMA A156.9, Types B04102 and B04112, surface mounted.

2.8 COUNTERTOP, TABLE TOP, SINK, AND SINK COVER MATERIALS

A. Epoxy: Factory-molded, modified epoxy-resin formulation with smooth, nonspecular finish.

1. Basis of Design Product Subject to compliance with requirements, provide countertops and related components as manufactured by Durcon, Inc., or comparable products by one of the following:
a. Epoxyn Products.
b. Kewaunee.

2. Physical Properties:
a. Flexural Strength: Not less than 10,000 psi.
b. Modulus of Elasticity: Not less than 2,000,000 psi.
c. Hardness (Rockwell M): Not less than 100.
d. Water Absorption (24 Hours): Not more than 0.02 percent.
e. Heat Distortion Point: Not less than 260 deg F.

3. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol,

ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.

b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent)

4. Color: As selected by Architect from epoxy manufacturer's full range.

2.9 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesive for Bonding Plastic Laminate: Urea formaldehyde

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.10 FABRICATION

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

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

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

D. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual."

1. For glass in frames, secure glass with removable stops.
2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of institutional casework.

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

3.3 INSTALLATION

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

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

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

D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
   1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
   2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
   3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c.
      a. Toggle bolts through cells of concrete masonry;
      b. Or No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips;
      c. Or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.
      d. Hanging strips may only be used when fully concealed at sides of cabinets.

3.4 INSTALLATION OF COUNTERTOPS

A. Field Jointing: Where possible make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
   1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

B. Secure tops to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each front, end, and back.

C. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection.

D. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and walls with adhesive.

E. Seal junctures of top, splash, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.5 INSTALLATION OF SHELVES

A. Securely fasten adjustable shelf supports to partition framing, wood blocking, or reinforcements in partitions.

B. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.

3.6 ADJUSTING AND CLEANING

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

B. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

C. Clean, lubricate, and adjust hardware.

D. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 064116

SECTION 072410 – CLEANING FOR EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

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.

B. Section 072412 Repair of EIFS for repair requirements

1.2 SUMMARY

A. Provide cleaning of existing wall surface in preparation for resurfacing and/or recoating.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each product.

B. Written procedural and coordination plan.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
   1. A list of minimum three job references.

1.6 REFERENCES

A. ASTM D 4258 Standard Practice for Surface Cleaning of Concrete for Coating

B. SSPC-SP 13/NACE 6 Surface Preparation of Concrete

C. ICRI No. 03732 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to perform maintenance and cleaning of manufacturer's system using trained workers.

B. Mockups: provide mockup area of cleaning to verify product effectiveness, to demonstrate aesthetic effects, to set quality standards for procedures and execution, and finish effect.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.

B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.

1.9 FIELD CONDITIONS

A. Weather Limitations: Maintain ambient temperatures above 40 deg F for a minimum of 24 hours before, during, and after cleaning operations. Do not perform cleaning during rainfall. Proceed with operation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit according to manufacturers' written instructions.

B. Apply materials only when surface and ambient temperatures are above 40 degrees F and are expected to remain above 40 degrees F for 24 hours after application.

C. Provide protection of surrounding areas and adjacent surfaces from spillage, splatter, overspray or other unintended contact with the materials that are being applied.

1.10 COORDINATION AND SCHEDULING

A. Schedule cleaning operations to permit inspections.

B. Schedule cleaning operations prior to and allow time for repair and resurfacing operations to follow.

C. Coordinate with all trades involved to schedule work to result in the proper sequencing of materials within the repair (proper lapping of water resistive system components and flashing).

PART 2 - PRODUCTS

2.1 MATERIALS – CLEANING SOLUTIONS

A. General
   1. Mix and use commercially available cleaning solutions in accordance with the cleaning product manufacturer’s instructions.
   2. Refer technical questions about specific commercial cleaning products to the cleaning product manufacturer.
   3. Use and dispose of cleaning solutions and rinse water in accordance with applicable local regulations.
   4. DO NOT USE solvent based cleaners (acetone, gasoline, ketones, mineral oils, or turpentine) Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with EIFS components.

2.2 MILD DETERGENT WASH

A. Solution of 1 – 2 cups tri-sodium-phosphate (TSP) or TSP substitute per gallon of warm water

B. General Purpose Cleaner by Wind-lock Corp., www.wind-lock.com

C. Wash Down™ by Demand Products, www.demandproducts.com

D. EIFS Clean 'N Prep by PROSOCO, www.prosoco.com

E. Other commercial general cleaners as recommended by the cleaning material manufacturer for the surface to be cleaned.

2.3 EFFLORESCENCE REMOVAL

A. Efflorescence and Scale Remover, by Demand Products

B. Sentry Efflorescence and Scale Remover, by Wind-lock Corp.

C. Other commercial efflorescence cleaners as recommended by the cleaning material manufacturer for the surface to be cleaned.

2.4 ALGAE AND MILDEW REMOVAL

A. Solution of ½ to 1 quart household bleach to 1 gallon of water (may be added to TSP detergent solution for general cleaning)

B. Miracle Mildew Remover by Wind-lock Corp.

C. Other commercial algae and mildew cleaners as recommended by the cleaning material manufacturer for the surface to be cleaned.

NOTE: Bleach is not required if algae or mildew are not present, but existing algae or mildew will recur if bleach solution is not used.

PART 3 - EXECUTION

3.1 GENERAL

A. The techniques described in this section may be used on painted or coated concrete, stucco or EIFS surfaces. All techniques are not necessarily appropriate for all substrates.

B. Test method and material in an inconspicuous area to verify techniques and materials to be used.

C. Use the least aggressive means that produces effective results.

D. Use methods in compliance with applicable local regulations.

E. Follow applicable regulations for personal protective equipment when performing cleaning.

3.2 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from cleaning and restoration work.

B. Protect video device and sensors attached to masonry. Wrap both in heavy polyethylene sheeting and securely tape in place. Remove protections when elastomeric finish is complete. Coordinate with Owner when sensors are to be compromised. Relocate temporarily if necessary.

C. Keep wall wet below area being cleaned to prevent streaking from runoff.

3.3 APPLICATION OF CLEANING SOLUTIONS

A. Commercial cleaning products:
1. Select the appropriate cleaning solution and apply in accordance with the cleaning solution manufacturers recommendations.
2. Rinse thoroughly with clean water to remove all residue and surface contaminants.

B. Generic mild detergent wash:
1. Apply mild detergent solution to the wall area to be cleaned.
2. Rinse thoroughly with clean water to remove all residue and surface contaminants.

C. Generic algae and mildew removal:
1. Apply algae and mildew removal solution and allow to soak for minimum 15 minutes. (Reapplication may be necessary for severe growth).
2. Use hand-scrubbing technique to remove streaking or other localized growth.
3. Rinse thoroughly using clean water to remove all residue and surface contaminants.

3.4 HAND-SCRUBBING

A. Use hand scrubbing technique for localized stubborn stains that are resistant to low pressure washing techniques or otherwise require special treatment.

B. Use soft to medium bristled brush

C. Avoid overly aggressive scrubbing which could damage the existing coatings.
NOTE: DO NOT USE stiff-bristled or wire brushes.

3.5 PRESSURE WASHING (as means of cleaning existing coating)

A. Use cool or warm water. DO NOT USE steam or high temperature methods when existing coatings are to remain in-place

B. Use minimum 30 degree fan tip

C. Determine distance from wall and pressure required to provide satisfactory results without damage to existing coatings or substrates based on test area.
1. Use pressure in the range of 2500 psi to 3000 psi for coatings applied to solid substrates (concrete, masonry, and stucco), unless undesirable effects are produced. If damage to existing coating occurs, adjust pressure, distance of tip from wall, or fan tip angle to achieve satisfactory results.

NOTE: DO NOT USE high pressure on EIFS claddings. Limit pressure to 500 psi, maximum, when EIFS is the substrate.

2. Determine if architectural features are foam shapes to protect against accidental damage in cases where they are attached to solid substrates such as stucco, masonry or concrete. Limit pressure to 500 psi, maximum, for foam trim features.

3.6 PRESSURE WASHING (as a means of removing existing coating layers)

A. Determine pressure, fan tip angle and tip distance from wall as required to remove loose coatings or excess coating applications on solid substrates.

B. Verify that the technique does not produce damage to the substrate and adjust as necessary. C. Dispose of rinse-water and waste in accordance with appropriate local regulations.

NOTE: A chemical paint stripper may be an option to improve efficiency in combination with pressure washing when existing coatings are to be removed. Consult with the paint stripper manufacturer for proper use and disposal of rinse-water and waste. Remove and replace EIFS in areas requiring localized repair as indicated on the project drawings.

END OF SECTION 07 24 10

SECTION 072412 – REPAIR FOR EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

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.

B. Section 072410 Cleaning of EIFS for cleaning requirements

1.2 SUMMARY

A. Repair distress and construction deficiencies of exterior insulation and finish system (EIFS) cladding.

B. Repair nonstructural EIFS base coat and finish. (Note: the combination of EIFS base coat, reinforcing mesh and finish may be referred to as “EIFS lamina” and, for purposes of this specification, treated as a single construction element.)

C. Repair flashing and waterproofing deficiencies at EIF system terminations.

D. Resurface wall to provide uniform appearance in accordance with owner’s requirements.

1.3 DEFINITIONS

A. Definitions in ASTM E 2110 apply to Work of this Section.

B. EIFS: Exterior insulation and finish system(s).

C. IBC: International Building Code.

D. Restore Level 0 – Clean and Recoat

E. Restore Level 1 – Clean and Recoat with Repair

F. Restore Level 2 – Repair and Refinish

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site. At minimum discuss:
   1. Full scope of repairs
   2. Repair locations as noted on project drawings,
   3. Coordination and location of repairs that specifically require coordination between trades to set the proper sequence of installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each EIFS component, trim, and accessory, including water-resistive coatings.

B. EIFS, repair materials, and coating manufacturers' specifications, details, installation instructions and product data.

C. Samples: For each exposed product and for each color and texture specified, 8 inches square in size.

D. Samples for Initial Selection: For each type of finish-coat color and texture indicated.
   1. Include similar Samples of exposed accessories involving color selection.

E. Samples for Verification: 24-inch-square panels for each type of finish-coat color and texture indicated, prepared using same tools and techniques intended for actual work including custom trim, each profile, and an aesthetic reveal.
   1. Include exposed trim and accessory Samples to verify color selected.
   2. Include a typical control joint filled with sealant of color selected, as specified in Section 079200 "Joint Sealants."

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
   1. A list of minimum three job references.

B. Manufacturer Certificates: Signed by EIFS manufacturer certifying the following:
   1. EIFS complies with requirements.
   2. Substrates to which EIFS is indicated to be attached are acceptable to EIFS manufacturer.
   3. Accessory products installed with EIFS, including joint sealants, flashing, water-resistive coatings, trim, whether or not furnished by EIFS manufacturer and whether or not specified in this Section, are acceptable to EIFS manufacturer.

C. Product Certificates: For cementitious materials and aggregates and joint sealant, from manufacturer.

D. Product Test Reports: For each EIFS assembly and component, and for water-resistive coatings, for tests performed by a qualified testing agency.

E. Field quality-control reports and special inspection reports.

F. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For EIFS to include in maintenance manuals.

1.8 REFERENCES

A. ASTM Standards
   1. ASTM C 920, Specification for Elastomeric Joint Sealants

2. ASTM C 1382, Specification for Sealants for EIFS
3. ASTM E 2430, Specification for EIFS Reinforcing Mesh
4. ASTM E 2568, Specification for EIFS
5. ASTM E 2570, Specification for Water-resistive Barrier Coatings

B. Other References
1. StoTherm EIFS Reference Guide: Repair and Maintenance
2. Sto reStore Cleaning Specification
3. Sto Specification A100G, StoTherm Classic NExT Guide Specification
4. ICC-ES ESR-1748 StoTherm NExT Evaluation Report

1.9 DESIGN REQUIREMENTS

A. Determine repair scope and detail design requirements based on inspection of the field conditions.

B. Provide crack repair detail for cracks not wider than 1/16-inch nominal width.

C. Provide crack repair detail for cracks wider than 1/16-inch but not wider than 1/8-inch.

D. Provide flashing installation, repair and/or replacement details for applicable conditions and indicate locations of each repair on project drawings. Flashing remediation shall be based on standard flashing requirements listed below and indications of distress or leakage observed during inspection.
1. Provide head flashing above all window and door openings.
2. Provide flashing at the bottom of the EIF system.
3. Terminate EIFS minimum 2-inches above paved grade and roofing materials.
4. Terminate EIFS minimum 4-inches above soil and landscaped finished grades. (Note: verify local code requirements and comply with them for minimum distance above grade for EIFS termination.)
5. Provide metal cap flashing for parapets. Cap flashing shall be sloped to drain water onto the roof system.
6. Provide metal flashing for non-vertical or low slope projections to drain water away from the wall exterior.

E. Integrate all flashing repair and replacement with the water-resistive barrier system to provide direct and continuous drainage to the exterior of the wall.

F. Install backer rod and sealant joint at perimeters of window, doors and mechanical penetrations.

G. Provide detail drawings consistent with Manufacturers guideline details and product installation instructions.

1.10 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to install manufacturer's system using trained workers.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.

C. Manufacturer’s requirements

1. EIFS material manufacturer shall be experienced provider of cementitious and polymer-based materials for use in EIFS construction and repair for minimum 25 years.
2. EIFS manufacturer shall have a manufacturing quality control system that is certified to comply with ISO 9001-2008 and an environmental quality management system certified to comply with ISO 14001-2004.
3. EIFS manufacturer shall have current valid code evaluation reports which list the EIFS materials to be used.

D. Contractor requirements
1. Contractor shall be licensed and insured and shall have been engaged in EIFS and EIFS repair construction for minimum three years.
2. Contractor shall be knowledgeable in the proper handling, use and installation of materials.
3. Contractor shall employ skilled mechanics who are experienced and knowledgeable in the repair procedures and requirements of the specified project.
4. Contractor shall have completed minimum three projects of similar size, scope and complexity to the project being specified.
5. Contractor shall provide the proper equipment, manpower and supervision on the job site to perform the repair procedures in accordance with Manufacture's published repair specifications, applicable Manufacture details and the contract documents.

E. Inspection requirements
1. Quality control inspections shall be provided for by the owner or owner's representative.
2. Inspectors shall be qualified by experience to evaluate field conditions before and during the repair process and shall be familiar with the specified repair procedures prior to commencement of work.
3. Inspections shall be provided at key intervals during each repair.
4. Inspect locations of flashing repair and other locations where existing EIFS must be removed after demolition of the EIFS is completed and before any existing flashing is removed. Verify that the proposed repair is constructible and will function in the manner intended based on the visible conditions. Resolve any visible construction detail conflicts with the repair designer before allowing the contractor to proceed with the repair.
5. Inspect the condition of the water-resistive barrier and transition elements for visible evidence of material integrity and continuity of the system.
6. Inspect the conditions of newly installed or replaced flashing and water-resistive barrier components before installing the replacements. Verify that flashing and water-resistive barrier installation is in accordance with the repair detail design. Verify visible continuity of the water-resistive barrier system to direct water to the exterior of the wall via the flashing.
7. Inspect the final appearance of each repair location to verify compliance with owner requirements.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.

B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.
1. Protect liquid products (pails) from freezing and temperatures greater than 90 degrees F. Do not store in direct sunlight.
2. Protect portland cement based materials (bag products) from moisture and humidity. Store under cover and off of the ground in a dry location.

3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.12 FIELD CONDITIONS

A. Weather Limitations:
   1. Apply materials only when surface and ambient temperatures are above 40 degrees F and are expected to remain above 40 degrees F for 24 hours after application.
   2. Do not apply EIFS adhesives or coatings during rainfall.
   3. Provide supplementary heat for installation in temperatures less than 40 degrees F.
   4. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

B. Provide protection of surrounding areas and adjacent surfaces from spillage, splatter, overspray or other unintended contact with the materials that are being applied.

1.13 COORDINATION AND SCHEDULING

A. Schedule repairs to permit inspections where specified in Section 1.10.E.

B. Do not start repairs in an area unless sufficient work can be completed such that the area is weather-tight at the end of the work shift. Alternatively allow sufficient time before the end of the work shift to provide temporary weather protection until work can resume.

C. Coordinate with all trades involved to schedule work to result in the proper sequencing of materials within the repair including proper lapping of water resistive system components and flashing.

D. Schedule finish and coating application to large areas such that each day’s application will end at an architectural break.

1.14 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of EIFS-clad drainage-wall assemblies that fail in materials or workmanship within specified warranty period.

   1. Failures include, but are not limited to, the following:
      a. Bond integrity and weathertightness.
      b. Deterioration of EIFS finishes and other EIFS materials beyond normal weathering.

   2. Warranty coverage includes the following components of EIFS-clad drainage-wall assemblies:
      a. EIFS finish, including base coats, finish coats, and reinforcing mesh.
      b. Insulation installed as part of EIFS including foam build-outs.
      c. Insulation adhesive and mechanical fasteners.
      d. EIFS accessories, including trim components and flashing.
      e. Water-resistive coatings.
      f. EIFS drainage components.

3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Sto Corporation; StoTherm ci Essence system, or comparable product by one of the following:
   1. BASF Wall Systems.
   2. Dryvit Systems, Inc.
   3. Parex USA, Inc.

B. Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with EIFS components.

2.2 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with ASTM E 2568 and with the following:

   1. Weathertightness: Resistant to uncontrolled water penetration from exterior, with a means to drain water entering EIFS to the exterior.
   2. System Fire Performance: Fire-resistance rating of wall assembly.
   3. Structural Performance: EIFS assembly and components shall comply with ICC-ES AC219 when tested according to ASTM E 2568.
   4. Impact Performance: ASTM E 2568, Medium impact resistance unless otherwise indicated.
   5. Bond Integrity: Free from bond failure within EIFS components or between EIFS and substrates, resulting from exposure to fire, wind loads, weather, or other in-service conditions.
   6. Abrasion Resistance of Finish Coat: Sample consisting of 1-inch-thick EIFS mounted on 1/2-inch-thick gypsum board; cured for a minimum of 28 days and shows no cracking, checking, or loss of film integrity after exposure to 528 quarts of sand when tested according to ASTM D 968, Method A.
   7. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch clean glass substrate; cured for 28 days and shows no growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274.

2.3 BASE COAT

A. Cementitious Base Coats
   1. Sto BTS Xtra
   2. Sto Primer-Adhesive-B

B. Acrylic Base Coat
   1. Sto RFP acrylic .

2.4 GLASS FIBER MESH REINFORCEMENT

A. Provide alkali resistant, open weave glass fiber mesh reinforcing for surface leveling and waterproof base coat.
   1. Products:
      a. Sto Mesh – alkali-resistant, glass-fiber reinforcing mesh for use with Sto base coat products to provide crack resistance.

b. Sto Detail Mesh – alkali-resistant, glass-fiber reinforcing mesh for use with Sto base coats to provide crack resistance and at system terminations.
c. StoGuard Mesh – self-adhesive mesh for use with Sto Gold Fill water resistive barrier joint and transition treatment.
d. Sto Armor Mat – high impact resistant, 15 oz. per sq.yd. alkali resistant, glass-fiber reinforcing mesh.
e. Sto Armor Mat XX – ultra-high impact resistant, 20 oz. per sq.yd. alkali resistant glass-fiber reinforcing mesh.

2.5 PRIMER
A. Provide acrylic primer
1. Sto Primer Sand

2.6 POLYMERIC FINISH
A. Provide polymeric acrylic EIFS finish. Color and texture to be determined based on mockup.
1. Acrylic Finish Products
a. Stolit – Acrylic textured finish.

2.7 ACRYLIC CRACK FILLER
A. Provide acrylic crack filler.
1. Products:
a. Sto Flexible Crack Filler – acrylic-based crack filler packaged in sealant tube for use (unreinforced) in repair of cracks not wider than 1/16-inch and up to 1/8-inch wide with mesh reinforcement.

2.8 PORTLAND CEMENT
A. Provide ASTM C 150 Type I, Type II, or Type I-II cement for mixing with Sto Primer/Adhesive and/or Sto Flexyl.

2.9 SEALANT

A. Sealant shall be low-modulus, comply with ASTM C 920, ASTM C 1382 and be recommended for use with EIFS by the sealant manufacturer.

2.10 MIXING

A. Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix materials in clean containers. Use materials within time period specified by EIFS manufacturer or discard.

B. Mix cementitious products with clean, potable water.

PART 3 - EXECUTION

3.1 EIFS INSTALLATION, GENERAL

A. Comply with ASTM C 1397, ASTM E 2511, and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

3.2 EIFS LEVELS OF REPAIR

A. Level 0 Repair:
   1. Prepare surface to receive finish coating in accordance with EIFS Cleaning specification 072410
   2. Provide finish coat with color and texture selected by Architect from manufacturer's standard finishes. New finish coat to maintain the integrity of any existing design elements.
   3. Retain and protect all existing expansion joints, control joints, building trim, coping and flashing materials.

B. Level 1 Repair:
   1. Level 1 repair includes all requirements of Level 0 repair in addition to:
      a. Repairing puncture damage
      b. Repairing crack damage if required
      c. Flashing repair if required

C. Level 2 Repair:
   1. Level 2 repair includes all requirements of Level 0 and Level 1 repair in addition to:
      a. Repairing surface with new mesh, base coat, and finish coat.

3.3 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 roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.

C. Inspect locations identified on the project drawings for repair.

D. Establish clear understanding of the repair scope and process with the mechanics that will perform the work for each individual location.

E. Proceed with installation only after unsatisfactory conditions have been corrected.
   1. Begin coating application only after surfaces are dry.
   2. Application of coating indicates acceptance of surfaces and conditions.

3.4 PREPARATION

A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind drainage plane of EIFS and deterioration of substrates.

C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.

3.5 SELECTIVE DEMOLITION

A. Remove and replace EIFS in areas requiring localized repair as indicated on the project drawings.

B. Use hearing, eye, ear and respiratory personal protective equipment when performing demolition.

C. Provide adequate protection to persons and property from potential falling debris from demolition and repair construction.

D. Comply with local environmental regulations with regard to handling and disposal of construction waste produced by selective EIFS demolition.

E. Comply with Manufacturer’s EIFS Repair and Maintenance Guide.

F. Limit the depth of cuts through the EIFS lamina into the insulation board to prevent damage of the substrate.

G. Remove damaged insulation board by hand or in a manner which minimizes damage to the substrate.

H. Remove and replace damaged substrate as required by conditions that may become evident as a result of the demolition process.

3.6 SUBSTRATE PROTECTION APPLICATION

A. Primer/Sealer: Apply over substrates and where required by EIFS manufacturer for improving adhesion of insulation to substrate.

B. Water-Resistive Coating: Apply over sheathing to provide a water-resistive barrier.

C. Tape and seal joints, exposed edges, terminations, and inside and outside corners of sheathing unless otherwise indicated by EIFS manufacturer's written instructions.

D. Flexible-Membrane Flashing: Install over weather-resistive barrier, applied and lapped to shed water; seal at openings, penetrations, terminations, and where required by EIFS manufacturer. Prime substrates if required and install flashing to comply with EIFS manufacturer's written instructions and details.

3.7 FLASHING REPLACEMENT

A. Repair flashing and/or correct conditions in locations indicated on the project drawings and as described in section 1.9 of this specification.

B. Remove EIFS in accordance with section 3.4 of this specification.

C. Remove enough area to permit proper installation of flashing as detailed in Sto Corp. guideline details for water-resistive barrier and EIFS construction.

D. Inspect the condition of the water-resistive barrier membrane and transition materials.

E. Repair or replace damaged water resistive barrier system components.

F. Install replacement components in a sequence and manner to provide shingle-laps and provide a continuous path for moisture drainage to the exterior of the wall via the flashing.

G. Install new flashing components such that the completed repair will comply with Sto Corp. guideline details for EIFS construction.

H. Mix and apply EIFS materials in accordance with printed instructions for the products being used.

3.8 EIFS DAMAGE REPAIR

A. Perform repairs in accordance with EIFS Manufactures Reference Guide for Repair and Maintenance.
   1. Repair impact damage to EIFS including damaged substrate, insulation, base coat reinforcing mesh and finish in locations indicated on the project drawings.
      a. Determine the exact scope of individual repairs based on inspection at the time of selective demolition.
   2. Repair cracks in EIFS finish and lamina where indicated on project drawings.

B. Procedure: Puncture Damage Repair.
   1. Clean the area around the damage. Apply a water-based gel type paint remover with a stiff brush to the finish in the immediate area surrounding the damage (Fig. 1A). Exercise care with the paint remover to avoid getting it onto surfaces that are not being repaired. Alternatively, a hand held grinder can be used to remove the surface of the adjacent finish, taking care not to grind or deteriorate the mesh layer. Use a scraper to remove at least 5 inches around the puncture damage and to leave a sharp finished edge. Use coarse sand paper to remove the top layer of base coat to the mesh surface.
   2. 2. Cut the mesh at the damaged area so at least 2-1/2 inches of intact base coat and reinforcing mesh exist between the puncture damage and the finished edge. Cut EPS slightly larger than the damaged EPS and temporarily “pin” it in place with a nail. Use a sharp knife to cut through the EPS. Cut at least 1 inch away from the mesh cut. Cut with a slight angle so that the new EPS will be slightly larger than the hole to be plugged with it.
   3. Make a clean cut to the substrate and remove the old EPS. Dry fit the new EPS to check for fit. Adjust size or re-cut new EPS if fit is not snug. “Butter” the sheathing side of the new EPS with Sto base coat along the perimeter and in the middle, then press into place (Fig. 3B). Make sure the new EPS is flush with or higher than the surface of the adjacent EPS. Allow the adhesive to dry, then rasp or sand the surface flush with the adjacent EPS and brush clean.
   4. Cut Mesh to overlap existing mesh at least 1 inch. Apply masking tape up to the finished edge surrounding the repair area. Apply Sto base coat and embed the mesh patch in the wet base coat and level the base coat to match the surface profile of the original base coat. Allow the base coat to dry and check the surface profile to make sure it matches the original. Apply additional base coat if necessary and allow to dry.
   5. If Primer was used in the original installation apply Sto Primer and allow to dry.
   6. Apply Sto finish (matched to existing texture and color) with a stainless steel trowel and remove the aggregate in the finish from the masking tape. Scrape the finish tight against the wall to match the adjacent finished surface. Repeat if necessary. Then float the finish with a plastic float to match the adjacent texture.
   7. Remove masking tape and use a brush to “stipple” the wet edge into the adjacent finish. Alternate between brush and float to achieve the texture match.

C. Procedure: Crack Repair
   1. Mark the crack location in preparation for removal of the EIFS finish.

2. Apply a water-based gel type paint remover in the marked area to soften the finish and use a scraper to remove the finish after it has softened. Exercise care with the paint remover to avoid getting it onto surfaces that are not being repaired. Use coarse sand paper to remove the top layer of base coat to the mesh surface. Alternatively, a hand held grinder can be used to remove the finish, taking care not to grind or deteriorate the mesh layer.
3. If the cause of the crack is a gap between EPS boards, remove base coat from within the gap and fill the gap with EPS slivers or a low expanding urethane spray foam. Allow spray foam to cure. Shave or rasp flush with the surface. Then embed reinforcing mesh in Sto base coat with the mesh centered over the crack and minimum 2-1/2 inch overlap on each side of the crack. Feather the edges of the base coat.
4. If the cause of the cracks is mesh that is abutted or has insufficient overlap, embed reinforcing mesh in Sto base coat with the mesh centered over the crack and minimum 2-1/2 inch overlap on each side of the crack. Feather the edges of the base coat.
5. Apply masking tape around the area to be refinished. Then apply matching Sto finish. Scrape aggregate from the masking tape with a margin trowel. Then scrape the finish tight against the wall surface. Float with a plastic float to match the adjacent texture. Remove the masking tape and use a brush to “stipple” the wet edge of the finish into the adjacent finish. Alternate between brush and float to blend the texture.

3.9 SEALANT JOINT REPAIR

A. Remove damaged and worn sealant at joints in EIFS in accordance with Manufactures Reference Guide for Repair and Maintenance:
   1. Protect surrounding EIFS from damage during removal of existing sealant.
   2. Replace sealant with approved low-modulus material recommended by the sealant manufacturer for use with EIFS.
   3. Install sealant in accordance with sealant manufacturer’s published installation instructions for use with EIFS materials. Use sealant primer recommended by the sealant manufacturer on base coat surface if specified by the sealant manufacturer.

B. Procedure
   1. Slice along the terminating edges of the distressed sealant with a sharp scoring knife to separate it from the adjacent EIFS finish or base coat material. Take care not to slice into the EIFS materials.
   2. Pull the sealant and backer rod material from the joint. Remove the EIFS finish (if present in the joint) by grinding with a hand held grinder or by softening the finish with a water-based gel type paint remover and then scraping to remove it. Take care not to damage the EIFS finish on the face of the wall. Mask if using gel type paint remover.
   3. Remove residue of sealant in the joint by grinding with a hand held grinder, taking care not to damage the EIFS finish on the face of the wall, or to grind through the layer of base coat in the joint and damage the EIFS reinforcing mesh .
   4. Brush or blow away dust on the joint surfaces with oil-free compressed air.
   5. Apply a skim coat of Sto base coat to the prepared joint surfaces to create a smooth surface free of ridges such that it completely hides the reinforcing mesh color. Avoid heavy applications of Sto base coat. A thin coat, approximately 1/32” is sufficient. Protect Sto base coat from rain and freezing until dry.
   6. After Sto base coat is completely dry, generally 2 days under normal (70ºF, 50% RH) conditions, prepare the joint surface for new sealant.
   7. Brush or blow the joint surface clean with oil-free compressed air. Mask the adjacent EIFS finish on the face of the wall. Then prime with the sealant manufacturer’s primer (if required) and allow to dry.
   8. Install closed cell backer rod to the proper depth in the joint. Apply sealant and tool to ensure intimate or base coat material. Take care not contact with the joint surfaces.
   9. Protect sealant from rain and freezing until dry.

3.10 SURFACE REPAIR AND RECOATING

A. Surface leveling for finish texture change:
   1. Apply unreinforced skim coat to existing finish surfaces to level surface in preparation for new finish application.
      a. Sto BTS Xtra
         1) Apply Sto BTS Xtra over textured cementitious finish and pull tight to fill low areas in finish and provide flat surface to receive new textured finish.
         2) Allow Sto BTS Xtra to fully dry before applying finish.

B. Skim Coat with additional mesh to provide impact resistance:
   1. Apply glass-fiber mesh reinforced base coat in accordance with the applicable Sto Insulated Wall Cladding Specification for the products and system being used.

3.11 FINISH

A. Apply finish in accordance with Manufactures written instructions for the specified product.

B. Primer: Apply over dry base coat according to EIFS manufacturer's written instructions.

C. Finish Coat: Apply over dry primed base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

D. Sealer Coat: Apply over dry finish coat, in number of coats and thickness required by EIFS manufacturer.

3.12 COATING

A. Prepare surface to receive finish coating in accordance with EIFS Cleaning specification 072410.

B. Apply coating in accordance with Manufactures written instructions for the specified product.

3.13 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
   1. As stipulated in Ch. 17 of the IBC.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. EIFS Tests and Inspections: According to ASTM E 2359.

D. EIFS will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.14 CLEANING AND PROTECTION

A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

END OF SECTION 072412

SECTION 075000 - MEMBRANE ROOFING CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. General requirements for cutting and patching roofing membranes to accommodate changes or modifications to roof mounted equipment.

B. Related Sections:
1. Division 01 Section "Cutting and Patching" for other requirements related to cutting and patching.
2. Division 07 Section “Modified Bituminous Membrane Roofing”.
3. Division 07 Section “Roof Accessories”.

1.2 DEFINITIONS

A. OEM: Original manufacturer for installed roofing systems.

1.3 SYSTEM DESCRIPTION

A. Modified membrane patching meeting the OEM requirements for integration into existing roof system and continuance of warranty.
1. 80-mil modified bitumen base sheet and 160-mil mineral surface modified bitumen cap sheet in field
2. 40-mil modified bitumen base sheet and 160-mil mineral surface modified bitumen cap sheet at curb flashings
3. All plies fully bonded with cold-process asphalt adhesive

1.4 PERFORMANCE REQUIREMENTS

A. Weatherproof Integrity: Cutting and patching of membrane roofing for new curbs, installation of decking and new roofing after equipment removal, and other roof penetration flashings shall maintain the weather integrity of the existing roofs and shall not permit concealed or visible leaks into the building interior.
1. Comply with the current published requirements of the OEM for roof penetrations of the type necessary for the work.

1.5 SUBMITTALS

A. Product Data: For each type of product employed in the Work.

B. Shop Drawings: For roofing penetrations. Provide OEM standard details and modified details where required for the conditions of the work.

C. Manufacturer’s certificates: Signed by roofing system manufacturer certifying that the roofing system complies with requirements specified. Provide evidence of acceptance by OEM manufacturer of proposed changes to existing roof system, installation procedures for all roof membrane, and documentation that contractor is authorized by OEM to install their products.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

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

B. Manufacturer's Representative Qualifications: OEM's authorized representative who is trained and knowledgeable in the installation of units required for this Project.

C. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated, weather tight location to ensure no significant moisture pickup and maintain at a temperature exceeding roofing system manufacturer's written instructions. Store rolls of felt and other sheet materials on end on pallets or other raised surfaces. Do not double-stack rolls.
   1. Handle and store roofing materials and place equipment in a manner to avoid significant or permanent damage to deck or structural supporting members.

B. Do not leave unused felts and other sheet materials on the roof overnight or when roofing work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg F (10 deg C).

C. Deliver and store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

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

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements. Do not install roofing products on roofs that are wet.

1.9 WARRANTY

A. Where existing roof is still under OEM warranty, comply with the requirements of the OEM to maintain such warranty:

PART 2 - PRODUCTS

2.1 MATERIALS AND PRODUCTS

A. General: Provide and employ products only as approved by OEM for the type of roofing involved. Where new products are added to existing roofs, use materials of quality level at least as high as the originally installed materials.

B. Manufacturers: Provide materials by OEM manufacturer to match existing roof system.
   1. Garland Company, Inc or equal as approved by Architect.

2.2 Modified Built Up Roof System Base Sheet

A. Base Ply of Field System: Flexbase 80: SBS modified bituminous sheet (Styrene-Butadiene- Styrene) 80 mil, smooth surfaced rubber modified roofing membrane reinforced with a dual fiberglass scrim.
   1. Use: Base ply of 2-ply, modified bituminous membrane roofing system.
   2. Reinforcing: Fiberglass.
   3. Finish: smooth and sanded

B. Physical Properties: Provide SBS -modified bituminous membrane materials with the following properties when tested according to ASTM D 5147:
   1. Thickness: 80 mils minimum.
   2. Tensile Strength: 225 bf/in. at 73.4 deg F (MD). 225 lbf/in. at 73.4deg F (CMD).
   3. Elongation at Maximum Load: 7 percent minimum at 73.4 deg F in each direction.
   4. Tear Strength: 300 lbf. at 73.4 deg. F (MD). 300 lbf. at 73.4 deg. F (CMD).
   5. Low-Temperature Flexibility: Pass at minus 30 deg F.

2.3 Modified Built Up Roof System Flashing Base Sheet

A. Base Ply of Flashing System: VersiPly 40: SBS modified bituminous sheet (Styrene-Butadiene- Styrene) 40 mil, smooth surfaced rubber modified roofing membrane reinforced with a dual fiberglass mat.
   1. Use: Base ply of 2-ply, modified bituminous membrane flashing system.
   2. Reinforcing: Fiberglass.
   3. Finish: smooth

B. Physical Properties: Provide SBS -modified bituminous membrane materials with the following properties when tested according to ASTM D 5147:
   1. Thickness: 40 mils minimum.
   2. Tensile Strength: 215 bf/in. at 73.4 deg F (MD). 215 lbf/in. at 73.4deg F (CMD).
   3. Elongation at Maximum Load: 4.5 percent minimum at 73.4 deg F in each direction.
   4. Tear Strength: 275 lbf. at 73.4 deg. F (MD). 275 lbf. at 73.4 deg. F (CMD).
   5. Low-Temperature Flexibility: Pass at minus 30 deg F.

2.4 Modified Built Up Roof System Cap Sheet

A. SBS/SIS modified bituminous sheet: StressPly FR Mineral: 155 mil mineral surfaced rubber modified roofing membrane reinforced with a dual fiberglass and polyester scrim mat.
   1. Use: Roof membrane.
   2. Use: Finish ply of 2-ply, modified bituminous membrane roofing system.
   3. Reinforcing: Polyester and fiberglass.
   4. Finish: light grey mineral

B. Physical Properties: Provide SBS/SIS-modified bituminous membrane materials with the following properties when tested according to ASTM D 5147:
   1. Thickness: 155 mils minimum.
   2. Tensile Strength: 310 lbf/in. at 73.4 deg F (MD).
   3. Elongation at Maximum Load: 8.0 percent minimum at 73.4 deg F in each direction.
   4. Tear Strength: 500 lbf. at 73.4 deg. F (MD).
   5. Low-Temperature Flexibility: Pass at minus 40 deg F.

2.5 Modified Adhesives and Mastics

A. Cold Applied Membrane Adhesive and Flood Coat Adhesive: V.O.C. compliant ASTM D3019. Performance Requirements:
   1. Non-Volatile Content ASTM D4479 70%
   2. Density ASTM D1475 7.89 lbs./gal. (0.9kg/l)

3. Viscosity Stormer ASTM D562 16-20 sec.
4. Flash Point ASTM D93 100°F min. (37°C)
5. Slope: up to 3:12

B. Brush Grade Flashing Adhesive Weather-King Flashing Adhesive
1. Performance Requirements:
2. Non-Volatile Content ASTM D4479 70% min.
3. Density ASTM D1475 8.6 lbs./gal. (1kg/l)
4. Flash Point ASTM D93 100°F (37°C)

C. Silver Asphalt Roofing Mastic: V.O.C. compliant,

1. Flash Point ASTM D93 >100 °F.
2. Density @ 77°F 8.3 lbs. /gal
3. Non-Volatile 70% min.
4. Viscosity @ 77 °F mobilometer 1500g 9-11 seconds
5. Reflectivity: 60%
6. Post Industrial Recycled Content 5.19%

D. Flashing Bond Mastic: V.O.C. compliant

1. Non-Volatile Content ASTM D4479 70%
2. Density ASTM D1475 7.89 lbs./gal. (0.9kg/l)
3. Viscosity Stormer ASTM D562 16-20 sec.
4. Flash Point ASTM D93 100°F min. (37°C)
5. Slope: up to 3:12

2.6 AUXILIARY MEMBRANE MATERIALS

A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with SBS-modified bituminous roofing.
1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.

B. Asphalt Primer: Garla-Prime VOC: ASTM D 41 - VOC compliant.

C. Asphalt Roofing Cement: Flashing Bond: ASTM D 2822, asbestos free, VOC compliant as provided by the Membrane manufacturer and silver in color throughout the thickness

D. Mastic Sealant: Polyisobutylene, plain or modified bituminous, nonhardening, nonmigrating, nonskinning, and nondrying.

E. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions of FM 4470; designed for fastening base sheets, base-ply felts, and base flashings and for backnailing modified bituminous membrane to substrate; tested by manufacturer for required pullout strength; and acceptable to roofing system manufacturer.

F. Wood Nailer Strips: Furnish wood nailer strips complying with requirements of Division 6 Section "Rough Carpentry."

G. Cants: Wood Fiber Cants

H. Urethane Sealant: Tuff-Stuff MS: One-part, non-sag sealant as recommended and furnished by the membrane manufacturer for moving joints.

1. Tensile Strength (ASTM D412) 225 psi
2. Elongation (ASM D412) 450%
3. Hardness, Shore A (ASTM C920) 25-35
4. Bond Durability – Class 25 (ASTM C920) Passes

I. Liquid Flashing: Tuff-Flash Plus LO: A two-component, asphaltic-polyurethane, low odor, liquid flashing material designed for specialized details unable to be waterproofed with typical modified membrane flashings. Must be painted when cured.
1. Tensile Strength (ASTM D412) 650 psi
2. Elongation (ASTM D412) 325%
3. Density @77°F 8.3 lb/gal typical

J. Energy Star Acrylic Surfacing: Pyramic Plus LO; For use on all liquid flashing details. Energy Star approved white acrylic roof coating ASTM G26 with 81% reflectivity, 250% Minimum elongation and 250 psi tensile strength.
1. Weight/Gallon 12 lbs./gal. (1.44 g/cm3)
2. Non-Volatile % (ASTM D 1644) 66 min

K. Pitch Pocket Sealer: Use Liquid Flashing in lieu of pitch pockets wherever practical. Where pitch pockets are needed, use specified Liquid Flashing product to fill pitch pockets.

L. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design

M. Drain Flashings should be 4lb (1.8kg) sheet lead formed and rolled

N. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled.

O. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roofing membranes and affected flashings before installation. Inform Owner of existing conditions that could cause leaks that may be misconstrued as the result of the new work.

3.2 PREPARATION

A. Clean substrate of dust, debris, and other substances detrimental to roofing installation per roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 ROOFING MEMBRANE CUTTING AND PATCHING

A. General: Provide the highest quality roof patches that comply with the OEM requirements. Provide redundancy in weather proof membrane where possible.

B. Coordinate all work with work of other trades.

C. Lap new material onto old roofing material 12” minimum. Seal all junctions of new membrane to old membrane with 3-course mastic and mesh, except in areas to be coated with reinforced urethane system.

D. Provide positive drainage so that no detail or part of roof is required to resist ponded water.

E. Provide overlaps at counter flashings of minimum dimension to resist wind-blown rain.

F. Do not use pitch pockets without secondary sheet metal hood.

3.4 PROCEDURES FOR ADDITIONS/ALTERATIONS TO EXISTING MINERAL SURFACED ROOFS

A. Preparation For New Curbs
1. Identify the location of each new curb to be installed, coordinating with mechanical contractor.
2. Clean the roof surface within area of new curb, removing all debris, loose mineral, or dirt.
3. Cut out and remove the roof system and all insulation layers down to the structural deck. Use a stiff bristled broom and blower to clear away all dirt and debris from the work area.

B. Flashing New Curbs
1. New curb shall be set with minimum flashing height of 8” or greater above finished roof surface. Install wood blocking if needed to increase height of curb.
2. Install cant strip to the base of the curb set in Flashing Bond adhesive.
3. Prime the existing roof surface around the curb with Garla-Prime VOC to ensure proper adhesion. Apply at ½ gallon per 100 sq. ft. and allow to dry.
4. Install the Versiply 40 base sheet flashing ply, followed by the Stressply FR Mineral cap sheet to the curb in a solid application of specified flashing adhesive.
   a. Flashing Bond
5. Both flashing plies should extend up and over the curb. Fasten flashing plies to the top of the curb with cap nails. The base ply should extend onto the field a minimum of 6”, with the cap ply extending 3” beyond the base ply.
6. Apply three course reinforcement of Gar-Mesh and Flashing bond on vertical seams.
7. Allow new flashing membrane installation with Weatherking to cure 7 days minimum.
8. Paint exposed black flashings with one coat of Pyramic at a rate of .5 gal per 100 sq ft.
9. Install new equipment and securely fasten to the curb.

C. Flashing New Metal Curbs, Pitch Pockets, Lead Sleeves, and Equipment Stands (Stress-Ply Roof membranes)

1. Prime surface of existing roof with Garla-Prime or approved equal.
2. Set the flange of the flashing or the lead pan into an application of Flashing Bond asphalt mastic. Nail the flange 3" O.C. into the wood blocking.
3. Flash the flange with base and cap modified membrane stripping set in specified adhesive. Install the base ply to extend beyond the flange a minimum of 6”. The second ply should extend beyond the first a minimum of 3”.
   1) For cold adhesives, apply 2-3 gal/100 sq. ft.
4. Match surfaces:
   a. Paint surface of curb with appropriate roof coating to match existing, if necessary.
   b. On white mineral surfaced roofs, ensure loose minerals are broadcast into the bleed out of flashing adhesive.

5. All pitch pockets shall be filled with pourable sealer.
6. A hood or storm collar will be fabricated to cover all pitch pockets and sleeves as shown in the detail drawing.
7. The hood may be attached to the projection with a draw band or by welding.
8. Prime surface of existing roof with Garla-Prime or approved equal.
9. Set the flange of the flashing or the lead pan into an application of Flashing Bond asphalt mastic. Nail the flange 3" O.C. into the wood blocking.
10. Flash the flange with base and cap modified membrane stripping set in specified adhesive. Install the base ply to extend beyond the flange a minimum of 6". The second ply should extend beyond the first a minimum of 3".
    a. For cold adhesives, apply 2-3 gal/100 sq. ft.
11. Match surfaces:
    a. Paint surface of curb with appropriate roof coating to match existing, if necessary.
    b. On white mineral surfaced roofs, ensure loose minerals are broadcast into the bleed out of flashing adhesive.
12. All pitch pockets shall be filled with pourable sealer.
13. A hood or storm collar will be fabricated to cover all pitch pockets and sleeves as shown in the detail drawing.
14. The hood may be attached to the projection with a draw band or by welding.

D. Infill of Roofing after Equipment Removal
1. New decking shall be installed in all roof openings after removal of curbs.
2. Provide insulation matching up to height of existing roof assembly, including tapered boards as required to maintain roof drainage design. Properly matched tapered insulation must be provided as required to match existing tapered layout, provide for continuation of crickets, sumps, or other features of existing roof drainage design.
3. Mechanically fasten polyisocyanurate boards to metal deck using 11 fasteners per 4x8 board in Zone 1 of the roof. Increase fastening rate for work in Zone 2 (roof perimeter) to 17 fasteners per 4x8 board and in Zone 3 (corners) to 22 fasteners per board.
4. Subsequent layers of polyisocyanurate shall be adhered with Insul-Lock HR, ¾" beads applied 12" on center. Increase rate to 6" on center in Zone 2 and 4" on center in Zone 3.
5. All layers of insulation should be adhered on concrete roof decks. Follow above-referenced insulation adhesive pattern.
6. Install ½" roof cover board, adhered with Insul-Lock HR using the above-described fastening pattern. Ensure boards are set and properly bonded with edges flush and tightly fitted. Fill all gaps in insulation exceeding ¼" thick.
7. Install new roofing with all plies shingled in the direction of water. Stagger laps between base sheet and cap sheet.
8. Install new base ply (Flexbase 80) solidly bonded to the cover board with Weatherking adhesive at the rate of 2 gallons per 100 sq. ft. Broom or roll top of membrane to ensure bond with adhesive and eliminate wrinkles or trapped air.
9. Lap base sheet onto existing roof 8" minimum.
10. Install cap sheet (StressPly FR Mineral) solidly bonded over the base sheet with Weatherking adhesive at the rate of 2 gallons per 100 sq. ft. Broom or roll top of membrane to ensure bond with adhesive and eliminate wrinkles or trapped air. Lap cap sheet onto existing roof 4" minimum beyond edge of base sheet.
11. Flood coat area with Weatherking and broadcast gravel into flood coat.

E. Liquid Flashing Application

1. Provide manufacturer's liquid flashing (Tuff-Flash Plus LO, reinforced with Polyester Soft) at all roof penetration details such as pipe penetrations, conduit feeds, dunnage posts, etc.
2. Fill all gaps around projections with insulation and new roofing membrane before flashing work.
3. Mask target area on roof membrane with tape.
4. Clean all non-porous areas with isopropyl alcohol. Remove asphalt or adhesive residue from projections. Prepare existing urethane coated roofing with acetone solvent wipe.
5. Apply 32 wet mils base coat of liquid flashing over masked area and encasing projection, minimum 4" high above finished roof.
6. Embed polyester reinforcement fabric into the base coat of the liquid flashing.
7. Apply 48-64 wet mil top coat of the liquid flashing material over the fabric extending 2" past the scrim in all directions.
8. Apply minerals immediately or allow the liquid flashing material to cure 15-30 days and then install reflective coating (Pyramic Plus LO)

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Representative: Review installed work and determine if work meets the highest OEM standards. Provide written confirmation of work completed and compliance with OEM requirements, including warranty provisions, where applicable.

B. Contractor: Notify manufacturer's representative of work before starting to coordinate for inspections by the representative during the installation. Schedule a final inspection once all work is complete. A copy of the final inspection will be provided to the Architect and the Owner.

3.6 PROTECTING AND CLEANING

A. Protect modified bituminous membrane roofing from damage and wear during construction period. Adjacent roof areas must be fully protected from construction activities and traffic using means and methods approved by manufacturer holding the existing warranty. Provide minimum 2" extruded polystyrene insulation and ½" plywood protection laid down over any existing roofs to remain that will be used for transport of materials or personnel access to construction areas. Limit storage of materials to in-contract roof areas. Engage warranty holder for a post-construction inspection any roofs that may have been affected by construction traffic.

B. Correct deficiencies in or remove modified bituminous roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair base flashings to a condition free of damage and deterioration at the time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 50 00

SECTION 07 84 13 - PENETRATION FIRESTOPPING

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 through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
   1. Work includes protection of newly created penetrations as a result of the documented work.
   2. Work includes protection of existing penetrations in walls indicated as fire rated on the code compliance plan.

B. Related Sections include the following:
   1. Division 07 Section "Fire-Resistive Joint Systems."
   2. Division 22 and 23 Sections specifying duct and piping penetrations.
   3. Division 26, 27, and 28 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

A. General: For penetrations through the following fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
   1. Fire-resistance-rated walls including fire partitions and fire barriers.
      a. Refer to code plan for walls requiring protection. These include walls indicated as corridor walls. In the case of the existing corridor walls provide protection for a 1 hour rating.

B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814:
   1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
   2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
      a. Penetrations located outside wall cavities.
      b. Penetrations located outside fire-resistance-rated shaft enclosures.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
   1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
   2. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.4 SUBMITTALS

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

B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences 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 system configuration for construction and penetrating items.
2. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
1. Types of penetrating items.
2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.

D. Qualification Data: For Installer.

E. Product Certificates: For through-penetration firestop system products, signed by product manufacturer.

F. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors."

B. Installer Qualifications: A firm experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

C. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single qualified installer.

D. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.

E. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
   1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, OPL ITS, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
   2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. 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 the following:
         1) UL in its "Fire Resistance Directory."
         2) OPL in its "Directory of Listed Building Products, Materials, & Assemblies."
         3) ITS in its "Directory of Listed Products."
      c. Obtain engineering interpretations, sealed by professional engineer, from fire rated penetration manufacturer to substantiate selected fire rated penetration system when actual conditions do not fully comply with tested assembly. Modify system according to the engineering interpretation.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials for through-penetration firestop 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 through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

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

C. Notify building inspector of authorities having jurisdiction and inspection agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on days preceding each series of installations.

D. Do not cover up fire-resistive joint system installations that will become concealed behind other construction until building inspector of authorities having jurisdiction and inspection agency have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application that are produced by one of the following manufacturers:
1. A/D Fire Protection Systems Inc.
2. Grace, W. R. & Co. - Conn.
3. Hilti, Inc.
4. Johns Manville.
5. Nelson Firestop Products.
6. 3M; Fire Protection Products Division.
7. Tremco; Sealant/Weatherproofing Division.
8. USG Corporation.

2.2 FIRESTOPPING, GENERAL

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

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated.

2.3 MIXING

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
   1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
   2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

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

C. Install fill materials for firestop systems by proven techniques to produce the following results:
   1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
   2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
   3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

A. Inspecting Agency: Engage a qualified, independent inspecting agency to inspect through-penetration firestops. Independent inspecting agency shall comply with ASTM E 2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.

B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.5 CLEANING AND PROTECTING

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

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

END OF SECTION 07 84 13

SECTION 07 84 46 - 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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes fire-resistive joint systems for the following new fire rated walls or existing walls extended to roof or floor deck above and indicated with a fire rating:
   1. Head-of-wall joints.
   2. Scope of work includes new and newly created joints as a result of the documented work.

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: 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.

B. Joint Systems in and between Fire-Resistance-Rated Constructions: Provide systems with assembly ratings equaling or exceeding the fire-resistance ratings of construction that they join, indicated as determined by UL 2079.
   1. Load-bearing capabilities as determined by evaluation during the time of test.

C. For fire-resistive systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

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; also show 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. Field quality-control test reports.

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.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors."

B. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single qualified installer.

C. Source Limitations: Obtain fire-resistive joint systems, for each kind of joint and construction condition indicated, through one source from a single manufacturer.

D. Fire-Test-Response Characteristics: Provide fire-resistive joint systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
1. Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, OPL, ITS 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 methods indicated in Part 1 "Performance Requirements" Article and comply with the following:
    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 of the qualified testing and inspecting agency.
3. Obtain Engineering Interpretations from fire rated penetration manufacturer to substantiate selected fire rated joint system when actual conditions do not fully comply with tested assembly.

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 multi-component 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. Notify building inspector of authorities having jurisdiction and inspection agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on days preceding each series of installations.

D. Do not cover up fire-resistive joint system installations that will become concealed behind other construction until building inspector of authorities having jurisdiction and inspection agency have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide fire-resistive joint systems of one of the following:
1. A/D Fire Protection Systems Inc.
2. Grace, W. R. & Co. - Conn.
3. Hilti, Inc.
4. Johns Manville.
5. Nelson Firestop Products.
6. 3M; Fire Protection Products Division.
7. Tremco; Sealant/Weatherproofing Division.
8. USG Corporation.

2.2 FIRE-RESISTIVE JOINT SYSTEMS

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 primers and 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.

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 of work.
1. 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 or damaging adjoining surfaces.

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. Inspecting Agency: Engage a qualified independent inspecting agency to inspect fire-resistive joint systems and prepare inspection reports.

B. Testing Services: Inspecting of completed installations of fire-resistive joint systems shall take place in successive stages as installation of fire-resistive joint systems proceeds. Do not proceed with installation of joint systems for the next area until inspecting agency determines completed work shows compliance with requirements.
1. Inspecting agency shall state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.

C. Remove and replace fire-resistive joint systems where inspections indicate that they do not comply with specified requirements.

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

E. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and fire-resistive joint systems comply with requirements.

3.5 CLEANING AND PROTECTING

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 07 84 46

SECTION 07 92 00 - JOINT SEALANTS

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 joint sealants for the following applications, including those specified by reference to this Section:
   1. New and newly created exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
      a. Control and expansion joints in unit masonry and natural stone.
      b. Joints in metal trim.
      c. Joints between different materials listed above.
      d. Perimeter joints between materials listed above and frames of doors, translucent panels and windows.
      e. Other joints as indicated.
   2. New and newly created interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Perimeter joints of exterior openings where indicated.
      c. Vertical joints on exposed surfaces of interior unit masonry walls.
      d. Perimeter joints between interior wall surfaces and frames of interior doors windows and ceilings.
      e. Joints between plumbing fixtures and adjoining walls, floors, and counters.
      f. Joints between different materials listed above
      g. Other joints as indicated.
   3. New and newly created interior joints in the following horizontal traffic surfaces:
      a. Isolation joints in cast-in-place concrete slabs.
      b. Other joints as indicated.

B. Related Sections include the following:
   1. Division 07 Section "EPDM Roofing" and “Standing Seam Metal Roofing” for sealing joints in these constructions.
   2. Division 08 Section "Glazing" for glazing sealants.
   3. Division 09 Section "Acoustical Panel Ceilings" for sealing edge moldings at perimeters of acoustical ceilings.

1.3 PERFORMANCE REQUIREMENTS

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

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

1.4 SUBMITTALS

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

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

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

D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.

F. Qualification Data: For Installer and testing agency.

G. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.

H. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

I. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used.
1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

J. Field Test Report Log: For each elastomeric sealant application.

K. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.

L. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

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

C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
1. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that 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: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period preceding the commencement of the Work.
1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
3. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: 5 years from date of Substantial Completion.

C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

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

B. Colors of Exposed Joint Sealants: Match Architect's samples for polyurethane sealants. For all other types of sealants, colors shall be as selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric 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.

B. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

C. Single-Component Neutral- Silicone Sealant ES-1:
   1. Available Products:
      a. Dow Corning Corporation; 791.
      b. GE Silicones; SilPruf NB SCS9000.
      c. Pecora Corporation; 895.
   2. Type and Grade: S (single component) and NS (nonsag).
   3. Class: 50.
   4. Use Related to Exposure: NT (nontraffic).
   5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
      a. Use O Joint Substrates: Aluminum coated with a high-performance coating, concrete block.
   6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

D. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant ES-2:
   1. Available Products:
      a. Dow Corning Corporation; 786 Mildew Resistant.
      b. GE Silicones; Sanitary SCS1700.
      c. Tremco; Tremsil 200 Sanitary, White.
   2. Type and Grade: S (single component) and NS (nonsag).
   3. Class: 25.
   4. Use Related to Exposure: NT (nontraffic).
   5. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.
      a. Use O Joint Substrates: Coated glass, color anodic aluminum, aluminum coated with a high-performance coating, ceramic tile and concrete masonry.

E. Multicomponent Nonsag Urethane Sealant ES-3:
   1. Available Products:

a. Pecora Corporation; Dynatrol II.
b. Tremco; Dymeric 240.

2. Type and Grade: M (multicomponent) and NS (nonsag).
3. Class: 50.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
   a. Use O Joint Substrates: Color anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, ceramic tile and porcelain, wood and concrete masonry.
6. Provide color packs to custom color match sealant color to Architect's sample.

F. Single Component Pourable Urethane Sealant ES-4:
1. Available Products:
   a. Bostik Findley; Chem-Calk 950.
   b. Pecora Corporation; Urexpan NR-201.
   c. Polymeric Systems Inc.; Flexiprene 952.
   d. Sika Corporation; Sikaflex - 1CSL.
   e. Tremco; Vulkem 45.
2. Type and Grade: S (single component) and P (pourable).
3. Class: 25.
4. Use Related to Exposure: T (traffic).
5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
   a. Use O Joint Substrates: Concrete and concrete masonry.

2.4 LATEX JOINT SEALANTS

A. Latex Sealant LS-1: Comply with ASTM C 834, Type P, Grade NF.

B. Available Products:
1. Bostik Findley; Chem-Calk 600.
2. Pecora Corporation; AC-20+.
3. Schnee-Morehead, Inc.; SM 8200.
4. Sonneborn, Division of ChemRex Inc.; Sonolac.
5. Tremco; Tremflex 834.

2.5 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. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

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

2.6 MISCELLANEOUS MATERIALS

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

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

3.2 PREPARATION

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

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

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

3.3 INSTALLATION OF JOINT SEALANTS

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

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

C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

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

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

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

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

3.4 CLEANING

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

3.5 PROTECTION

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

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application JS-1: Exterior vertical control and expansion joints in unit masonry and cast stone.
   1. Joint Sealant: Single-component nonsag urethane sealant ES-3.
   2. Joint-Sealant Color: Match mortar color.

B. Joint-Sealant Application JS-2: Exterior joints metal fascia, flashing and trim.
   1. Joint Sealant: Single-component neutral-curing silicone sealant ES-1.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

C. Joint-Sealant Application JS-3: Exterior perimeter joints between masonry (including cast stone) and frames of doors, windows and louvers.
   1. Joint Sealant: Multicomponent nonsag urethane sealant ES-3.
   2. Joint-Sealant Color Match Architect's Sample.

D. Joint-Sealant Application JS-4: Vertical control and expansion joints on exposed interior surfaces of exterior walls.
   1. Joint Sealant: Multicomponent nonsag urethane sealant ES-3.
   2. Joint-Sealant Color: Match Architect's Sample.

E. Joint-Sealant Application JS-5: Interior perimeter joints of exterior openings.
   1. Joint Sealant: Latex sealant.
   2. Joint-Sealant Color: Match Architect's Sample.

F. Joint-Sealant Application JS-6: Interior joints between plumbing fixtures and adjoining walls, floors, and counters.
   1. Joint Sealant: Single-component mildew-resistant acid-curing silicone sealant ES-2.
   2. Joint-Sealant Color: White.

G. Joint-Sealant Application JS-7: Vertical joints on exposed surfaces of interior unit masonry walls and partitions.
   1. Joint Sealant: Latex sealant.
   2. Joint-Sealant Color: Match Architect's Sample.

H. Joint-Sealant Application JS-8: Perimeter joints between interior wall surfaces and frames of interior doors, and perimeter of ceiling systems intersection with wall.
   1. Joint Sealant: Latex sealant.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

I. Joint-Sealant Application JS-9: Interior control, expansion, and isolation joints in horizontal traffic surfaces of concrete flooring.
   1. Joint Sealant: Single component, pourable urethane sealant ES-4.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 07 92 00

SECTION 08 14 16 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. Five-ply flush wood veneer-faced doors for transparent finish.
2. Fire-rated wood door frames.
3. Factory finishing flush wood doors.
4. Factory fitting flush wood doors to frames and factory machining for hardware

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door trim for openings.
5. Factory-machining criteria.
6. Factory- finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of frame for each frame type, including dimensions and profile.
4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.
8. Requirements for veneer matching.
9. Doors to be factory finished and application requirements.

C. Samples:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
3. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For door inspector.

1. Submit copy of DHI's Fire and Egress Door Assembly Inspector (FDAI) certificate.

B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Special warranties.

B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.7 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies shall comply with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.10 WARRANTY

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

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

a. Delamination of veneer.
b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors and frames.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain flush wood doors and wood paneling from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.

2.3 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with WDMA I.S. 1A.

2.4 FIVE-PLY FLUSH WOOD VENEER-FACED DOORS

A. Interior Doors:

1. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide doors manufactured by Masonite (Graham Series) or comparable product by one of the following:
a. Eggers Industries.
b. Lambton Doors.
c. Oshkosh Door Company.
d. VT Industries Inc.
e. Total Security
2. Performance Grade:
a. WDMA I.S. 1A Heavy Duty unless otherwise indicated on Drawings.
3. WDMA I.S. 1A Grade: Custom.
4. Faces: Single-ply wood veneer not less than 1/50 inch thick.
a. Species: Red Oak.

b. Cut: Plain sliced (flat sliced).
c. Match between Veneer Leaves: Book match.

5. Assembly of Veneer Leaves on Door Faces: Running match.
6. Pair and Set Match: Provide for doors hung in same opening.
7. Exposed Vertical Edges: Same species as faces or a compatible species – edge Type A.
   a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
   b. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
      1) Screw-Holding Capability: 475 lbf in accordance with WDMA T.M. 10.
8. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.
9. Core for Non-Fire-Rated Doors: WDMA I.S. 10 structural composite lumber.
   a. Screw Withdrawal, Face: 700 lbf.
   b. Screw Withdrawal, Edge: 400 lbf.
10. Core for Non-Fire-Rated Doors:
    a. Either glued wood stave or WDMA I.S. 10 structural composite lumber.
11. Construction:
    a. Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.5 LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood veneered noncompbustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

2.6 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
3. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.

C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."

2.7 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.

1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Transparent Finish:

1. WDMA I.S. 1A Grade: Custom.
2. Finish: WDMA I.S. 1A TR-6 Catalyzed Polyurethane.
3. Stain Color: Match existing doors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

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

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

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Install frames level, plumb, true, and straight.

1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
2. Anchor frames to anchors or blocking built in or directly attached to substrates.

a. Secure with countersunk, concealed fasteners and blind nailing.

b. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork.

1) For factory-finished items, use filler matching finish of items being installed.

3. Install fire-rated doors and frames in accordance with NFPA 80.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. 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 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. Section includes access doors and frames for walls and ceilings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Concealed Flanges:

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

a. Babcock-Davis.
b. JL Industries, Inc.; a division of the Activar Construction Products Group.
c. Karp Associates, Inc.
d. Larsens Manufacturing Company.
e. Milcor; Commercial Products Group of Hart & Cooley, Inc.

2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
3. Locations: Wall.

4. Door Size: Size as required to reasonably access required component unless noted otherwise on Drawings.
5. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed.
6. Frame Material: Same material and thickness as door.
7. Latch and Lock: Cam latch, key operated.

2.2 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A36.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879, with cold-rolled steel sheet substrate complying with ASTM A1008, Commercial Steel (CS), exposed.

C. Frame Anchors: Same material as door face.

D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153 or ASTM F2329.

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 mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.

D. Latch and Lock Hardware:

1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
2. Keys: Furnish two keys per lock and key all locks alike.
3. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in Section 087100 "Door Hardware."

2.4 FINISHES

A. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 Applicable provisions of the Conditions of the Contract and Division 01, General Requirements, govern work in this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of the furnishing of all materials, accessories, incidentals and the like necessary and/or required for the complete execution of finished hardware and related work for this project as required by the schedules, keynotes and drawings, including, but not limited to the following:
   1. All hardware items in connection with hollow metal doors and frames, aluminum door and frames.
   2. All hardware items in connection with wood doors set in hollow metal or custom fabricated wood frames as scheduled.
   3. Check after installation and certify as to proper installation and operating condition.
   4. Furnish all necessary screws, special screws, bolts, special bolts, expansion shields and all other items not specifically mentioned but necessary and required to make a complete job in all respects.
   5. Design of all fastenings shall harmonize with the hardware as to material and finish.

B. NOTES: All hardware will conform to governing codes and ADA guidelines.
   1. Finishing Hardware shall include but not be limited to:
      a. Hinges and pivots.
      b. Bored and/or mortise lock and latch sets
      c. Mortise Deadbolts
      d. Exit Devices
      e. Trim and Plates
      f. Closers
      g. Overhead Stops, Holders and Limit Arms
      h. Door Stops and Bumpers
      i. Manual and Automatic Flush Bolts and Strikes Surface
      j. Bolts
      k. Door Coordinators
      l. Silencers
      m. Thresholds
      n. Weatherstripping
      o. Door Interviewers
      p. Key Cabinets
      q. Electrified Hardware Items, Controls and Power Supplies
   2. Provide all finish hardware as necessary for complete operation or all doors and other items, with proper type screws and accessories for attachment of each item.
   3. Hardware finishes shall conform to Building Hardware Manufacturers Association (BHMA) finish standards or to U.S. standards listed.

1.3 RELATED WORK SPECIFIED ELSEWHERE - Entire Project Specification with specific reference to:

A. NOTE - This section does not cover items generally known as rough hardware nor items of finish hardware when noted elsewhere in the specifications as being furnished or included with unit items by other suppliers or contractors as well as the following.

B. Hardware required to be furnished under other sections of the Specifications shall not be included in the hardware required under this Section. The Contractor shall thoroughly familiarize himself with the hardware requirements of the other Sections, so that no duplication will occur.
1. Conduit and wiring for electrical connections and security systems.
2. Demolition
3. Rough Carpentry
4. Finish Carpentry
5. Hollow Metal Work
6. Wood Doors
7. Access Doors
8. Toilet Accessories

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

B. Keying Conference: Conduct conference at Project site or location specified by architect.

1.5 QUALITY ASSURANCE

A. Conform to all applicable codes. Provide all throws, projections, coatings, knurling, opening, and closing forces, and other special functions required by State and Local Building Codes, and all applicable Handicap Codes and conformance to ADA requirements.

B. For fire rated openings, provide hardware complying with NFPA 80 and NFPA 101 without exception. Provide only hardware tested and listed by UL for the type and size of door installed and fire resistance rating required.

C. Further, furnish all products to comply with the State Building Code and handicapped codes and regulations. This specification notwithstanding the Drawings, local, state, or jurisdictional authority shall take precedence. Any change required to meet such codes or authority shall be made by this Contractor and shall be a part of this work.

D. All hardware shall be of the best quality in construction, design, and finish, and free from defects and shall be of the proper kind for its required use and shall fit its intended location perfectly.

E. Should any hardware, as specified, fail to meet the intended requirements, or require any modification to suit the intended location, this matter or any other advance information shall be brought to the attention of the Architect in ample time to avoid delay in manufacture and delivery of the hardware. Any defective pieces shall be replaced by the Contractor at his own expense.

F. Hardware in all spaces shall be a type which will always permit the door to be opened from the inside without direct manipulation of any locking device.

G. Qualification of Supplier:

1. A recognized supplier of architectural finish hardware with warehousing facilities, who has been furnishing hardware in the vicinity of the project for not less than five years, and who is, or who employs, an architectural hardware consultant.
2. Qualifications of Architectural Hardware Consultant (AHC): Certified by the Door and Hardware Institute.

1.6 SUBMITTALS

A. Schedules: Submit to the Architect four (4) copies of the complete hardware schedule within fourteen (14) days after the receipt of contract award. Submit therewith complete catalog cuts and descriptive data of all products specifically scheduled therein. No materials shall be ordered or templates issued until the hardware schedule has been approved by the Architect. The form and detail of hardware schedules shall be in vertical format in conformance to the Door and hardware Industry standards.

B. All hardware sets shall be clearly cross-referenced to the hardware group numbers listed in this specification.

C. Samples: If required, submit to the Architect for approval, a complete line of samples as directed. Samples shall be plainly marked, giving hardware number used in this Specification, project site to be stored. Samples will remain with the Architect until delivery of all hardware to the project is complete, after which time they will be turned over to the General Contractor for incorporation into the work.

D. Keying System Submission: Before cylinders are ordered, submit a complete proposed keying system for approval.

E. Manufacturers Material Safety Data Sheet (MSDS) must be submitted for each manufactured product.

F. Electric /Electronic Hardware submittals shall consist of:
   1. Wiring Diagrams: Provide complete wiring diagrams for each opening requiring electrified hardware, except openings where only magnetic hold-opens are specified. Provide a copy with each hardware schedule submitted after approval. Supply a copy with delivery of hardware to jobsite and another copy to owner at time of job completion

G. List all electrical components by opening in the hardware submittals.

H. Operational Descriptions: Provide complete operational descriptions of electronic components listed by opening in the hardware submittals.

I. Operations descriptions to detail how each electrical component functions within the opening incorporating all conditions of ingress and egress. Provide a copy with each hardware schedule submitted for approval. Supply another copy with delivery of hardware to jobsite. Provide required copies of "closeout" as specified in Section 01700.

J. Elevation Drawings: Provide elevation drawings of electronic hardware and systems identifying locations of the system components with respect to their placement in the door opening. Provide a copy with each hardware schedule submitted for approval. Supply another copy with delivery of hardware to jobsite. Provide required copies for "closeout" as specified in Section 01700.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING NOTE

A. Coordinate with Article 3.03 herein
   1. Delivery of hardware shall be made to the project by the Hardware Supplier in accordance with the instructions of the General Contractor. Package all hardware shipped to the jobsite in biodegradable packs such as paper or cardboard boxes and wrapping. Should non-biodegradable packing such as plastic, plastic bags or large amounts of Styrofoam be utilized, then the General Contractor will be responsible for the disposal of the non-biodegradable packing to a licensed or authorized collector for recycling of the non-biodegradable packing.
   2. The General Contractor shall provide adequate locked storage space with shelving for the hardware, shall be responsible for all items of hardware after receipt from the Supp lie r, and shall replace all hardware lost or damaged after delivery and receipt.
   3. The General Contractor shall furnish the Hardware Supplier with receipts for all hardware and accessory items received and shall send copies of these receipts to the Architect, if requested.

B. EXTENDED GUARANTEE/WARRANTY: Door Closers, 25 years

PART 2 - PRODUCTS

2.1 GENERAL

A. The “Schedule of Hardware”, as shown on the drawings or hereinafter included, is assumed to be complete. However, the omission or any item or items shall not relieve the Contractor from furnishing of same. Locks and other devices shall be furnished for all openings as called for in the "Schedule".

B. The "Schedule" is not intended to mention every particular item of hardware required but is intended to establish type and quality for the locations and types of openings where hardware will be applied. Items not specifically mentioned shall be supplied in quality and type equal to similar work included in the "Schedule". Doors without set numbers shall be supplied with hardware of comparable type.

C. Hardware sets are used to indicate the desired function and operation of doors. All modifications in hardware required by reason of the construction characteristics shall be such as to provide the specified operation of functional features, subject to approval of the Architect.

D. Specified numbers of certain manufacturers have been cited herein to simplify description and to establish a standard of quality.

2.2 TEMPLATES

A. The hardware supplier shall immediately, but not later than three (3) days after approval of the Schedule by the Architect, furnish the General Contractor with complete template information necessary for fabrication of doors, frames, etc. No templates shall be furnished prior to the approval of the Hardware Schedule.

2.3 HARDWARE FOR LABELED FIRE DOORS, EXIT DOORS, AND SMOKE DOORS

A. Hardware shall conform to requirements of NFPA 80 for labeled fire doors and NFPA 101 for exit doors, as well as to other requirements specified. Labeling and listing of UL Building Materials Directory, for class of door being used will be accepted as evidence of conformance to these requirements. Install minimum latch throw as specified on label of individual doors.

B. Provide hardware listed by UL except where heavier materials, large sizes, or better grades are specified herein. In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements. Specific hardware requirements of door and frame manufacturers which exceed sizes and weights of hardware listed herein shall be provided with no additional charge.

2.4 KEYS AND KEYING

A. All Locks/Cylinders shall be Grandmaster keyed and Master keyed in groups as directed by Owner/Architect at the Factory furnishing said hardware.

B. Cylinders: 6 or 7 pin design, fixed or removable core as specified, complying with performance requirements of ANSI A 156.5. All keys are made of nickel silver only.

C. After receipt of an approved Hardware Schedule and prior to ordering any locking devices, hardware supplier shall arrange through the General Contractor for a meeting with the Architect and/or Owner to discuss keying arrangements for this project. A Keying Layout Schedule shall be submitted for review within ten (10) days after such meeting.

D. Keys - Material, nickel silver only; Size bow, Standard. All keys shall be identified by BOW STAMPING BOTH KEYS AND CYLINDER.

E. Key quantity as follows:
1. 6 – Grand Master
2. 6 – Master Keys, each selection
3. 2 – Control keys (Removable core systems)
4. 10 – Construction Master Keys
5. 2 – Change Keys per Cylinder
6. 5% of total key requirements in blanks

F. Supply a bitting list for all change keys and master keys to the Owner.

G. All Grand Master, Master and change keys shall be delivered to the owner and/or Owner's representative via registered mail.

2.5 FASTENERS

A. Manufacture hardware to conform to published templates, generally prepared for machine screw installation.
1. Furnish screws, expansion shields, toggle bolts and other anchorage devices required for proper and code compliant installation, with each hardware item. Provide Phillips flat head screws except as otherwise indicated. Finish exposed screws to match the hardware finish, or if exposed in surfaces of other work, to match the finish of such other work as closely as possible, except as otherwise indicated.

2. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard manufactured units of the type specified are available with concealed fasteners. It is this supplier's responsibility to provide proper fasteners at mineral core doors, where special blocking is provided in mineral core doors, confirm with Architect if through bolts are required.
3. All closers and exit devices on labeled wood doors shall be thru bolted if required by the door manufacturer.
4. All thresholds shall be fastened with machine screws and anchors.
5. All hardware shall be installed only with fasteners supplied by manufacturers of specific products.
6. NOTE: If required by intended use, fasteners shall be "security" type.

2.6 PACKING AND MARKING

A. All hardware shall have the required screws, bolts, and fastenings necessary for proper installation and shall be wrapped in the same package as the hardware item with which to be used.

B. Each package shall be clearly labeled indicating the portion of the work for which it is intended.

2.7 FINISH HARDWARE DESCRIPTION

A. Hardware items shall conform to respective specifications and standards and to requirements specified herein.

B. Materials and Finish: Materials and finishes shall be as herein listed, unless specifically listed otherwise in hardware groups:
1. Exterior Butts: Linear hinges, cap to be in powder coat finish in color as selected by the Architect.
2. Interior Butts:
   a. 626 & 630 for interior doors.
   b. 626 & 630 for exterior doors.
   c. Door Closers: Sprayed to match hardware finish or plated.
   d. Exit Devices: 630 base metal standards with manufacturer of exit device.
   e. Kick, Push and Armor Plates: Metal 630.
   f. Door Pulls/Push- Pull Bar Sets: 630.
   g. All other hardware shall be: 626 service / 626 for public spaces.

C. Stops: Furnish at all doors. Wherever an opened door, or any item of hardware thereon, strikes a wall at 90 degrees, or within the maximum range of opening, provide wall bumpers, unless otherwise dictated by conditions.

D. NOTE: Overhead stop shall be used on doors where floor stops, or wall stops cannot be used or could cause a hazardous condition as well as at doors that swing into the center of the room and/or because of furniture or equipment layouts that permit the door to lay at the wall at 180 degrees.

E. Key Cabinet
1. Furnish one Aristocrat wall key cabinet as manufactured by Telkee Inc. or approved equal. The cabinet shall be complete with all hooks, tags, index cards, and other accessories for a complete Dual System.
2. Cabinet size sufficient to accommodate all lock keys related to this Contract, based on two keys per lock, with allowance for expansion of not less than 50%.

PART 3 - EXECUTION

3.1 INSPECTION AND ACCEPTANCE

A. Examine all surfaces and contiguous elements to receive work of this section and correct, as part 1 of the Work of this Contract, any defects affecting installation.

B. Commencement of work will be construed as complete acceptability of surfaces and contiguous elements.

3.2 INSTALLATION OF HARDWARE

A. Mounting Heights: Mount door hardware units at heights **to comply with the following** unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
1. Furnish permanent cores to Owner for installation.

E. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."

G. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.3 RESPONSIBILITY

A. The Contractor will be responsible for all hardware after the delivery to him until final completion and acceptance of the building.

B. Hardware supplier shall be responsible for:
1. Coordinating hardware with material to which it is applied.
2. Coordinating his material with other trades.
3. Obtaining shop drawings for materials to which hardware is applied.
4. Checking shop drawings and furnishing templates to other suppliers or Subcontractors requiring same.

C. The strikes for all latch and dead lock units shall be furnished with wrought boxes to match the finish specified.

D. Painted parts of closers exposed to weather shall be finished with a rust inhibitive paint.

E. All wrapping furnished by the manufacturer on knobs, handles and pulls shall be replaced upon the hardware as soon as it is installed and shall remain thereon until the completion of construction.

3.4 SHIPPING AND IDENTIFICATION

A. Ship all hardware with proper fastenings for secure application to intended substrate.

B. Each package of hardware shall be legibly marked indicating the part of the work for which it is intended. Markings shall correspond with the item numbers shown on the approved Hardware Schedule.

C. Keys shall be tagged within each package set and plainly marked on the face of the envelope with the Key Control number, door designation and all identification as necessary.

3.5 DOOR HARDWARE SCHEDULE

A. Follows:

LIST OF MANUFACTURERS		
ITEM	SPECIFIED MANUFACTURER	APPROVED SUBSTITUTION
Hinges	McKinney	Hager, Ives
Continuous Hinges	ABH	Pemko, Ives
Locksets, Cylinders	Best	None
Removable Cores	Best	None
Exit Devices	None Used	
Closers	Norton	LCN, Sargent

Overhead Stops	ABH	Rixson, GJ
Push, Pulls, Kick Plates, Stops	Rockwood	Ives, Trimco
Thresholds, Gaskets, Sealsp	Pemko	Zero, Reese
NOTE: Use only Manufacturers specified or listed acceptable. No others will be acceptable unless prior approved by the architect. Any manufacturer submitted without prior approval will be rejected.		

B. Hardware Set 1:

1. Doors: A117.2, A117.3, A118.2, A118.3, A121.2, A121.3, A122.2, A124.2
2. Each to receive:

3	EA	Hinge, Full Mortise	TA2714 4-1/2” x 4-1/2” US26D	MK
1	EA	Cylindrical Lock	9K37D 15D S3 626	BE
1	EA	Concealed Overhead Holder/Stop	4000 Series US32D	AH
3	EA	Silencer	608-RKW	RO

C. Hardware Set 2:

1. Doors: A122.3
2. Each to receive:

1	EA	Continuous Hinge	A110HD C 085	AH
1	EA	Cylindrical Lock	9K37D 15D S3 626	BE
1	EA	Concealed Overhead Holder/Stop	4000 Series US32D	AH
3	EA	Silencer	608-RKW	RO
3	EA	Filler Plate	DFF4	RO
1	EA	Filler Plate	SFASA	RO

D. Hardware Set 3:

1. Doors: D140.2
2. Each to receive:

3	EA	Hinge, Full Mortise	TA2714 4-1/2” x 4-1/2” US26D	MK
1	EA	Cylindrical Lock	9K30N 15D S3 626	BE
1	EA	Surface Closer	7500 (PA as req’d) 689	NO
1	EA	Kick Plate	K1050 8” x 2” LDW US32D	RO
1	EA	Gasket Head & Jambs	S773BL	PE

E. Hardware Set 4:
1. Doors: D140.3
2. Each to receive:

3	EA	Hinge, Full Mortise	TA2714 4-1/2” x 4-1/2” US26D	MK
1	EA	Cylindrical Lock	9K30N 15D S3 626	BE
1	EA	Door Stop	409/442 as req’d US26D	RO
1	EA	Gasket Head & Jambs	S773BL	PE
1	EA	Door Bottom	411APKL 36”	PE

F. Hardware Set 5:
1. Doors: D125.2
2. Each to receive:

6	EA	Hinge, Full Mortise	TA2714 4-1/2” x 4-1/2” US26D	MK
2	EA	Flush Bolt	555 US26D	RO
1	EA	Dust Proof Strike	570 US26D	RO
1	EA	Cylindrical Lock	9K37S 15D S3 626	BE
1	EA	Concealed Overhead Holder/Stop	4000 Series US32D	AH
1	EA	Surface Closer	CLP7500T 689	NO
2	EA	Kick Plate	K1050 8” x 1” LDW US32D	RO
2	EA	Silencer	608-RKW	RO

END OF SECTION 087100

SECTION 08 80 00 - 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. Section includes:

1. Glass for doors and glazed openings.
2. Glazing sealants and accessories.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass; 12 inches square.

1. Coated glass.
2. Insulating glass.

C. Glazing Accessory Samples: For sealants and colored spacers, in 12-inch lengths.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For glass.

C. Product Test Reports: For tinted glass, coated glass, insulating glass and glazing sealants, for tests performed by a qualified testing agency.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

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

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.12 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

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

B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these

publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: 6 mm.
2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.3 GLASS PRODUCTS

A. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

B. Ceramic-Coated Spandrel Glass: ASTM C 1048, Type I, Condition B, Quality-Q3.
C. Reflective- and Low-E-Coated Vision Glass: ASTM C1376.

2.4 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Spacer: Manufacturer's standard spacer material and construction.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.5 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact,

including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

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

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. 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; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, 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, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

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 of 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. Opaque Window Film, Blackout design Window film: 3M Fasara SH2BKOP, blackout film.

2.8 FABRICATION OF GLAZING UNITS

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

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

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

3.2 PREPARATION

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

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

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. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. 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.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches.

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 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.

G. 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.

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

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

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, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

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

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

F. Apply heel bead of elastomeric sealant.

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

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

3.5 GASKET GLAZING (DRY)

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

B. 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. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. 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 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. 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.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 INTERIOR GLASS SCHEDULE

A. Glass Type G-1: Clear fully tempered float glass.

1. Minimum Thickness: 6 mm.
2. Safety glazing required.

3.9 INSULATING GLASS SCHEDULE

A. Glass Type I-1: Insulated glass.

1. Overall Unit Thickness: 1 inch.
2. Minimum Thickness of Each Glass Lite: 6 mm.
3. Outdoor Lite: Clear fully tempered float glass.
4. Interspace Content: Air.
5. Indoor Lite: Clear fully tempered float glass.

END OF SECTION 088000

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes non-load-bearing steel framing members for the following applications:
   1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
      a. Work includes framing for architectural woodworking features and framed ceiling features to receive gypsum wall board.
   2. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).

B. Related Sections include the following:
   1. Division 05 Section "Cold-Formed Metal Framing" for floor joists, roof joists and partitions exceeding 10 feet in height.
   2. Division 06 Section “Interior Architectural Woodwork” for architectural features mounted on cold formed metal framing.
   3. Division 07 Section "Fire-Resistive Joint Systems" for head-of-wall joint systems installed with non-load-bearing steel framing.
   4. Division 05 Section "Cold-Formed Metal Framing" for horizontal bracing of interior metal stud walls. Walls shall be evaluated based on length (as well as height) and shall not deflect beyond L/240 in both the vertical and horizontal direction based on the application of 5psf of lateral pressure. Brace top of wall as required by stiffening the top track, bracing to underside of roof structure or other approved method. Bracing shall be subject to the requirements of Division 05 Section for Cold-Formed Metal Framing.

C. SUBMITTALS
   1. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Deflection Criteria: Stud depth and thickness shall be selected in accordance with manufacture published span data and shall comply with the following deflection criteria:
   1. Typical walls: L/240.
   2. Walls with ceramic tile: L/360.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

A. Framing Members, General: Comply with AISI S220 for conditions indicated.

1. Steel Sheet Components: Comply with AISI S220 requirements for metal, unless otherwise indicated.
2. Protective Coating: Comply with AISI S220; ASTM A653/ A653M, G40, hot-dip galvanized, unless otherwise indicated.

2.2 SUSPENSION SYSTEM COMPONENTS

A. Contractor's option, subject to dimensional limitations indicated on plans, to employ one or both of the following systems as specified herein.
1. Conventional carrying channels and furring.
2. Grid suspension system.

B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.

C. Hanger Attachments to Concrete:
1. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

D. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch, a minimum 1/2-inch-wide flange, with ASTM A 653, G40, hot-dip galvanized zinc coating; depth as needed to support impose loads, but not less than the following:
1. Overhead Structural Support Spacing up to 4 Feet: 1-1/2 inches.
2. Overhead Structural Support Spacing Between 4 Feet and 6 Feet: 2-1/2 inches.
3. Overhead Structural Support Spacing Between 6 Feet and up to 10 Feet: 4 inches.

F. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.
2. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
a. Minimum Base Metal Thickness: 0.0312 inch.

G. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:
a. Armstrong World Industries, Inc.; Drywall Grid Systems.
b. Chicago Metallic Corporation; 640-C Drywall Furring System.
c. USG Corporation; Drywall Suspension System.
3. Supplemental Supports: In locations where building structural elements supporting ceiling suspension systems are spaced more than 48 inches o.c. and where obstructions or other conditions prevent support of ceiling suspension systems at 48 inches o.c. or less, provide cold-formed metal framing to support ceiling systems to comply with specified standards, with depth of supplemental framing members not less than the following:
a. Overhead Structural Support Spacing up to 4 Feet: 1-1/2 inches.
b. Overhead Structural Support Spacing Between 4 Feet and 6 Feet: 2-1/2 inches.
c. Overhead Structural Support Spacing Between 6 Feet and 10 Feet: 4 inches.

2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES

A. Steel Studs and Runners: ASTM C 645; depth 3-5/8 inches unless otherwise indicated; thickness as follows: 33 mils / 0.0329 inch thickness (20 gauge), unless otherwise indicated or required by referenced standards to support indicated loads within maximum deflections specified.
   1. 20 gauge 'Equivalent' products (less than 33 mils / 0.0329 inch thickness) are not acceptable in the following applications:
      a. For studs supporting wall-mounted items.
      b. For studs in partitions that are not braced or secured at top.
      c. At fire door frames.
      d. Corridor walls.
      e. Walls in excess of 10 feet in total height.
      f. Walls with cement board, ceramic tile or stone tile finish.
      g. Walls with abuse resistant or high impact drywall.
      h. Where indicated.

B. 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.
      a. Products: Subject to compliance with requirements, provide one of the following:
         1) Steel Network Inc. (The); VertiClip SLD and Vertitrack VTD.
         2) Superior Metal Trim; Superior Flex Track System (SFT).
         3) Dietrich Metal Framing, Sliptrack Systems; SLP-TRK.

C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   2. Products: Subject to compliance with requirements, provide one of the following:
      a. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
      b. Metal-Lite, Inc.; The System.

D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
   1. Minimum Base-Metal Thickness: 0.0312 inch.

E. Cold-Rolled Channel Bridging: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges.
   1. Depth: 1-1/2 inches.
   2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
   1. Minimum Base Metal Thickness: 0.0179 inch.
   2. Depth: 7/8 inch.

G. Cold-Rolled Furring Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges.
   1. Depth: 3/4 inch.
   2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare-steel thickness of 0.0312 inch.
   3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:
1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
1. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
3. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.3 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension

system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.
1. Space studs as follows:
a. Single-Layer Application: 16 inches o.c., unless otherwise indicated.
b. Multilayer Application: 16 inches o.c., unless otherwise indicated.
c. Tile backing panels: 16 inches o.c., unless otherwise indicated.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
a. Install two studs at each jamb, unless otherwise indicated.
b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

A. Direct Furring:
1. Apply furring to existing and new masonry walls out of plumb and not suitable for direct lamination of gypsum wall board, backing board or cement board to masonry surfaces.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

B. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

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. Interior gypsum board.
2. Tile backing panels. (Cement Board)
3. Drywall aluminum trims & reveals

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of trim accessory indicated.

C. Samples for Verification: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for the following:
   a. Each level of gypsum board finish indicated for use in exposed locations.
2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.3 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. CertainTeed Gypsum, Saint Gobain
   b. Georgia-Pacific Gypsum LLC.
   c. PABCO Gypsum.
   d. USG Corporation.

2.4 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Thickness: 5/8 inch, unless noted otherwise on the drawings.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D3273, the panels meet or exceed ASTM C1396.

4. Basis of Design:
    a. USG USG SHEETROCK® BRAND - MOLD TOUGH® - FIRECODE® X PANELS

B. Abuse-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.

1. Core: 5/8 inch, Type X
2. Abrasion Resistance ASTM D4977: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
    a. When painted with one coat of primer and two coats of semigloss latex paint, the abrasion resistance increases to Level 3.
3. Indentation Resistance ASTM D5420: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
4. Soft-Body Impact ASTM C1629: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
5. Hard-body Impact ASTM C1629: ASTM C1629/C1629M, meets or exceeds Level 1 requirements
6. Long Edges: Tapered.
7. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
8. Nail pull resistance: ASTM C473 (B), Not less than 87 lbf (387 N), Per ASTM C1396.
9. Basis of Design:
    a. USG SHEETROCK® BRAND - MOLD TOUGH® - AR (Abuse Resistant) - FIRECODE® X PANELS

C. Gypsum Ceiling Board: ASTM C1396/C1396M.

1. Thickness: 1/2 inch, unless noted otherwise on the drawings.
    a. If required to achieve radius at curved soffits 2 layers of 1/4 inch may be used.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D3273, the panels meet or exceed ASTM C1396.
4. Basis of Design:
    a. USG SHEETROCK® BRAND ULTRALIGHT PANELS MOLD TOUGH®

2.5 SPECIALTY GYPSUM BOARD

A. Gypsum Board, Type C: ASTM C1396/C1396M. Manufactured to have increased fire-resistive capability.
1. Thickness: As required by fire-resistance-rated assembly indicated on Drawings.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D3273, the panels meet or exceed ASTM C1396.
4. Basis of Design:
    a. USG SHEETROCK® BRAND MOLD TOUGH® PANELS FIRECODE® C

2.6 TILE BACKING PANELS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    a. CertainTeed Corporation.
    b. Custom Building Products.
    c. James Hardie Building Products, Inc.
    d. National Gypsum Company.
    e. USG Corporation.

B. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.

1. Core: 5/8 inch, Type X.
2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
3. Basis of Design:
   a. USG DUROCK™ BRAND - GLASS-MAT TILE BACKERBOARD

C. Cementitious Backer Units (Cement Board): ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.

1. Thickness: 5/8 inch
2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
   a. Basis of Design:
      1) USG Durock® Brand Cement Board with EdgeGuard™

2.7 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material:
   a. Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:
   a. Cornerbead, typical
      1) Basis of Design: USG Sheetrock® Brand - Paper-Faced Metal Corner Bead - 30 year Warranty
   b. LC-Bead: J-shaped; exposed long flange receives joint compound.
   c. L-Bead: L-shaped; exposed long flange receives joint compound.
   d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
   e. Expansion (control) joint.
   f. Curved-Edge Cornerbead: With notched or flexible flanges.
   g. Zip-Strip at Material Transitions
      1) Basis of Design: ClarkDietrich – Rip Bead L-Bead
   h. Curved-Edge Cornerbead: With notched or flexible flanges

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Basis of Design:
   a. Manuf.: Fry Reglet
   b. Product: Where indicated in drawings.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified, unless noted otherwise.
4. GWB Reveal Trims
   a. Color: Standard Powder Coat Options
   b. Typical Shapes:
      1) Drywall Reveal Molding – ½” wide, unless noted otherwise
      2) Drywall “Z” Reveal
         a) ½” wide, unless noted otherwise
         b) 2” wide, where drywall finish meets stone veneer
      3) Drywall “F” Reveal
      4) Reveal Picture Hanger

5) "L" Trim Molding
6) Refer to drawings for additional shape products.

2.8 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:
1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.9 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

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

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
   1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
   2. Fit gypsum panels around ducts, pipes, and conduits.
   3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

K. Metal Stud Requirements at Abuse Resistant, Impact Resistant and Tile Backer Board / Cement Board installations over Metal Studs:
   1. Verify metal studs meet 33 mils, 0.032 inch minimum design thickness (actual 20 gauge, not equivalent product).
   2. Submit drywall manufacture product data regarding screw pull-out strength requirements.

3.3 INSTALLATION SCHEDULE FOR INTERIOR GYPSUM BOARD

A. Installation Schedule:
   1. Gypsum Board:
      a. Typical at walls in areas not required to have tile finish.
         1) Type X: Typical for locations not noted below.
         2) Abuse Resistant: Use on typical walls below 4 feet.
   2. Tile Backer Panels: At ceramic tile finish applications.
   3. Ceiling Gypsum Board:
      a. Typical at ceilings & soffits applications.

B. Single-Layer Application:

   1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
   2. On partitions/walls, apply gypsum panels unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
      a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
      b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
   3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
   4. Fastening Methods:
      a. Apply gypsum panels to supports with steel drill screws.
      b. Fastening methods to meet drywall manufacturer’s requirements.

C. Multilayer Application:

   1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
   2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
   3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
   4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until

fastening adhesive has set.

3.4 INSTALLATION OF TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.
   1. Core: 5/8 inch, Type X.
   2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

B. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.
   1. Thickness: 5/8 inch
   2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.
   1. Fastening Methods:
      a. Apply gypsum panels to supports with cement board screws.
      b. Fastening methods to meet drywall manufacturer’s requirements.

3.5 INSTALLATION OF TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings or if not indicated install in walls greater than 30 feet in length.

C. Interior Trim: Install in the following locations:

   1. Cornerbead: Use at exposed drywall corners, unless noted otherwise.
   2. LC-Bead: Use at exposed drywall panel edges.
   3. L-Bead: Use where indicated.
   4. Curved-Edge Cornerbead: Use at curved openings.
   5. Material Transitions: Use ‘zip-strip’ where gypsum wall board meets other finishes.
   6. Drywall Reveals & Trims:
      a. Refer to drawings for locations & size of reveal trim.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to

ASTM C840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile and panels that are substrate for acoustical tile.
1. Level 3: Areas scheduled to receive heavy or medium texture finishes before final painting, or where heavy grade wall coverings will be applied as final decoration.
2. Level 4: At impact resistant and abuse resistant boards and panel surfaces that will be exposed to view unless otherwise indicated.
    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
3. Level 5: Where indicated on Drawings and feature downlit walls.
    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 51 13 - 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. Section includes products for interior ceiling systems:
   1. Acoustical panels
   2. Exposed suspension systems

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For components with factory-applied finishes.

C. Samples for Verification:
   1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Ceiling suspension-system members.
   2. Structural members to which suspension systems will be attached.
   3. Method of attaching hangers to building structure.
      a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
   4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
   5. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
   6. Items penetrating finished ceiling and ceiling-mounted items.
   7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
   8. Minimum Drawing Scale: 1/8 inch = 1 foot.

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Acoustical Ceiling Units: Full-size panels equal to three (3) percent of quantity installed, round quantity up to full box.
   2. Suspension-System Components: Quantity of each exposed component equal to two (2) percent of quantity installed, round up to full box.

1.8 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. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:
   1. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings--Seismic Zones 0-2."

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Meetings."

E. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
   1. Pressurized Plenums: Where mechanical system is applicable to project, operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic restraints for ceiling systems.

B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: Class A according to ASTM E1264.
   2. Smoke-Developed Index: 50 or less.

C. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.3 ACOUSTICAL PANELS

A. Manufactures:
   1. Subject to compliance with requirements, provide products indicated on the Interior Finish Legend in the Construction Drawings, or provide comparable acoustical panel ceiling system by one of the following:
      a. Armstrong World Industries, Inc.

b. CertainTeed Corp.; Saint-Gobain
c. USG Interiors, Inc.

B. Color: Match Basis-of-Design product, if not indicated then provide White.

C. Light Reflectance (LR): Match Basis-of-Design product, if not indicated then provide 0.85 minimum.

D. Ceiling Attenuation Class (CAC): Match Basis-of-Design product, if not indicated then provide 30.

E. Noise Reduction Coefficient (NRC): Match Basis-of-Design product, if not indicated then provide not less than 0.70.

F. Articulation Class (AC): Match Basis-of-Design product, if not indicated then provide not less than 170.

G. Edge/Joint Detail: Match Basis-of-Design product, if not indicated then provide reveal sized to fit flange of exposed suspension-system members

H. Thickness: Match Basis-of-Design product, if not indicated then provide 3/4 inch.

I. Modular Size: Match Basis-of-Design product, if not indicated then provide 24 by 48 inches.

J. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

K. Sag Resistance: Equivalent to Armstrong "HumiGuard Plus No Sag Warranty".

2.4 METAL SUSPENSION SYSTEM

A. Basis of Design Product: Subject to compliance with requirements, provide the following products as manufactured by Armstrong World Industries, Inc.:
1. Prelude XL 15/16 inch Exposed Tee, installed at typical locations, unless noted otherwise.
2. Where applicable to project, provide Prelude Plus XL Fireguard 15/16 inch Exposed Tee, installed at ‘wet’ locations with “scrub-able” panels (i.e. Kitchen/Cooking/Shower Areas).
3. Refer to Drawings / Finish Legend for additional information.

B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.
1. Manufacture of suspension system to match acoustical panel manufacture for maximum warranty protection.
2. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C635/C635M.
a. Provide at shower areas if receiving acoustical panel ceiling system.

C. Wide-Face, Capped, Double-Web, Class A Fire-Rated, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.

1. Structural Classification: Intermediate-duty system.
2. End Condition of Cross Runners: Butt Edge type.
3. Face Design: Flat, flush.
4. Cap Material:
   a. Cold-rolled steel, typical
   b. Aluminum at Kitchen Service Areas, if applicable to project
5. Cap Finish: Painted white, unless otherwise noted.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
   1. Anchors in Concrete: 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 according to ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
   2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.
   3. Stainless-steel Components: ASTM F 593 and ASTM F 594; for ceilings located in wet areas as follows:
      a. Applications: Shower Areas, kitchens and Dishwashing Areas: Alloy 304 or 316.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:
   1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
      a. Application: Typical locations.
   2. Nickel-Copper-Alloy Wire: ASTM B164, nickel-copper-alloy UNS No. N04400.
      a. Application: Wet areas including shower areas, kitchens and dishwashing areas.
   3. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch-diameter wire.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations 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. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

B. Extruded-Aluminum Edge Moldings and Trim:
   1. Where indicated in drawings, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.

a. Finish: It not indicated in drawings, Architect to select for manufacture’s standard finish options.

2.7 ACOUSTICAL SEALANT

A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

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

3.2 PREPARATION

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

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C636/C636M, seismic design requirements, and manufacturer's written instructions.
   1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

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 and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
   4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye

screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
7. Do not attach hangers to steel deck tabs.
8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

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 o.c. and not more than 3 inches from ends. 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. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. Arrange directionally patterned acoustical panels as follows:
   a. Install panels with pattern running in one direction parallel to [long] [short] axis of space.
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. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
5. Install hold-downnclips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
6. Install clean-room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.
7. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of non-cumulative.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 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. Thermoset-rubber base.
2. Rubber molding accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples.

C. Product Schedule: For resilient base and accessory products.
1. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials[, from the same product run,] that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
3. Stair Tread & Riser installation mock-ups:
    a. GC to have pre-installation meeting(s) with Architect and product representative to review substrate conditions.
    b. Mockups to confirm the following:
        1) Stair products are scribed to meet conditions, including:
            a) Steel stringers

b) Masonry walls

2) Review construction to meet building code requirements for riser heights and tread depths of individual steps and full stair runs.

3) Where installing products in existing buildings, review substrate preparation of existing conditions, including:
   a) Cementitious molding products to repair stair nosing where ex. metal nosing product is removed. Minimize use of stair nosing filler.
   b) Cementitious patching of substrate for receiving new finishes.
   c) Adherence of stair products to substrates, including existing angled metal & angled concrete riser conditions.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE

A. Comply with Division 01 requirements for substitutions of basis of design products.
   1. Acceptable Manufactures:
      a. Roppe
      b. Tarkett-Johnsonite
   2. Product: If product not indicated in drawings, provide:
      a. Roppe – Pinnacle Rubber Base

B. Product Standard: ASTM F1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
   1. Style: Standard Toe, unless noted otherwise in drawings.
   2. Height: 4 inches, unless noted otherwise in drawings
   3. Lengths: Coils in manufacturer's standard length

C. Corners
   1. Outside Corners: Job formed

2. Inside Corners: Job formed

D. Colors: Refer to drawings, if not indicated, to be selected from manufacture's full range of color products.

2.2 RUBBER MOLDING ACCESSORY

A. Basis of Design: Match Rubber Base manufacturer.

B. Description:
1. Rubber reducer strip for resilient floor covering
2. Rubber joiner for tile and carpet
3. Rubber transition strips
4. Rubber reducer strips

C. Locations, Profile and Dimensions: As noted on Interior Finish – Floor Transition Types schedule, if not indicated provide the following, or similar, & coordinate sectional profiles w/ adjacent floor finishes:
1. Resilient Tile > Carpet Tile:
   a. Roppe - Rubber #50 Tile/Carpet Joiner
2. Resilient Tile > Carpet Walk-Off:
   a. Roppe - #65 / #73 Rubber Rolling Traffic Transition
3. Resilient Tile > Concrete Substrate / Exist. Terrazzo Flooring:
   a. Roppe – Vinyl #168 Underslung Reducer
4. Resilient Tile > Rubber Athletic Flooring (3/8" thick):
   a. Roppe - #66 / #67 Rubber Rolling Traffic Transition

D. Colors and Patterns: Refer to drawings, if not indicated, then match adjacent rubber base.

E. ADA Compliant: Accessories to meet ANSI/ADA compliance requirements.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives:
1. Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
2. Where installed over ceramic tile or glazed/polished masonry, provide Contact Adhesive for non-porous substrates.
   a. Prepare substrate per manufacturer's recommendations for a 'smooth' finish installation that meets adherence requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

C. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

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

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:
1. Outside Corners:
a. Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
1) Form without producing discoloration (whitening) at bends.
2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
3. When using thick sculpted wall base, job-site formed corners are made similar to wood baseboard and wood molding. Use the Miter-Saw or D-Cut Mitering Methods for inside and outside corners. The use of the Coping Method is recommended for inside corners that are not square or plumb.
a. Miter or cope corners to minimize open joints.
b. Thick sculpted products include resilient base with any part of its profile thicker than 0.125 inches.

H. Where installing resilient products over non-porous substrate (ie. Ceramic Wall Tile, Glazed / Polished Masonry):
   1. Prep (abrade) non-porous surface per manufacturer's recommendations.
   2. Fill cracks, voids, divots, grout lines with a cementitious patching compound, similar to:
      a. Uzin 886
   3. Attach with adhesive per manufacturer’s recommendations, similar to:
      a. Roppe C-630 Contact Adhesive for non-porous substrates

3.4 RESILIENT ACCESSORY INSTALLATION

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

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:
   1. Remove adhesive and other blemishes from surfaces.
      a. Remove ‘mold release’ residue, used by manufacture during fabrication, from finish surface of installed product.
   2. Sweep and vacuum horizontal surfaces thoroughly.
   3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from resilient stair treads before applying liquid floor polish.
   1. Provide if recommended by product manufacture in number of coats recommended.
      a.
   2. Polish is not intended for Rubber TS products.

E. Cover resilient products subject to wear and foot traffic 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 Tile (VCT), patching

B. Related Sections:
   1. Division 03 Section - Hydraulic Cement Underlayment, for self leveling underlayments required prior to installation of new flooring.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of resilient floor tile.
   1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
   2. Show details of special patterns.

C. Samples: Each color, texture, and pattern of floor tile required.

D. Samples for Initial Selection: For each type of floor tile indicated.

E. Samples for Verification: Full-size units of each color and pattern of floor tile required.

F. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Coordinate mockups in this Section with mockups specified in other Sections.
      a. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations directed by Architect.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

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

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 FLOOR TILE

A. Manuf. / Product:
   1. Basis of Design: Armstrong – Vinyl Composition Tile – Standard Excelon Imperial Texture
      a. Substitutions must meet product data, including full range of color options and sizes. Submit options 10 business days prior to bid date for approval.
      b. Style/Color: If not indications in Drawings / Finish Legend, product to be selected from manufacture's full range of style & color options.
      c. Thickness: .125 inch
      d. Size: 12 inch x 12 inch
   2. Class I, Type A, smooth tile flooring
   3. Warranty: 15 years
   4. Static Coefficient of Friction: Greater than .6 (ASTM D2047)
   5. Dynamic Coefficient of Friction: .27 DCOF (ANSI/NFSI B101.3)

2.3 INSTALLATION MATERIALS

A. Cementitious Self Leveling and Trowelable Patching Compounds:
   1. Division 03 Section - Hydraulic Cement Underlayment and Topping

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

C. Floor Polish: Provide protective, liquid floor-polish products where recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

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

3.2 PREPARATION

A. Substrates: Prepare according to ASTM F710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9.
   4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. f, and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
      a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
      b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

B. Cementitious Underlayment:
   1. Fill cracks, holes, and depressions in substrates with cementitious leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
   2. Where flooring product meets existing flooring, grind sub-floor and flash patch to meet flush with adjacent flooring.
   3. Where threshold is noted to be installed, flash patch sub-floor to ensure threshold meets ANSI/ADA floor transition profile requirements.

C. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products, this includes:
   1. Substrate surface to meet “Roughness Profile” required.
      a. Provide bonding agent for proper adherence.

D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
   1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
   1. Lay tiles square with room axis, unless indicated otherwise in drawings.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern), unless indicated otherwise in drawings.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Adhere floor tiles to 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 protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:
1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Refer to floor finish manufacture’s requirements prior to applying wax to floor to confirm finish requires floor polish.

E. Cover flooring tile until Substantial Completion.

END OF SECTION 09 65 19

SECTION 09 68 13 - TILE 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. Section includes:

1. Modular Carpet Tile

B. Related Requirements:

1. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.
2. Section 096519 "Resilient Tile Flooring"

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
   a. Review delivery, storage, and handling procedures.
   b. Review ambient conditions and ventilation procedures.
   c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Shop Drawings: For carpet tile installation, plans showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.

7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

C. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockups at locations and in sizes shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI's "CRI Carpet Installation Standard."

1.10 FIELD CONDITIONS

A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, the following:

a. More than 10 percent edge raveling, snags, and runs.
b. Dimensional instability.
c. Excess static discharge.
d. Loss of tuft-bind strength.
e. Loss of face fiber.
f. Delamination.

3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Refer to “Interior Finish Legend” on drawings for manufacturers, products, styles, and colors.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

1. Adhesives shall have a VOC content of 50 g/L or less.

C. Transition Strips (Basis of Design) – Refer to drawings for related products:

1. Carpet to Ceramic Tile: (Metal Tile Edge Protection by Ceramic Tiling contractor)
2. Carpet to Resilient Tile: Roppe

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

B. Examine carpet tile for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

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

3.2 PREPARATION

A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.

B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.

C. Maintain dye-lot integrity. Do not mix dye lots in same area.

D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.

E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

H. Install pattern parallel to walls and borders, unless noted otherwise.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:
   1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
   2. Remove yarns that protrude from carpet tile surface.
   3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 68 13

SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Digital Graphic Wall Covering

B. Refer to other sections for related products:
1. Division 09, Gypsum Board, for wall substrate

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement, seams, and termination points.

C. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates in accordance with test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 450 or less.

2.2 DIGITAL GRAPHIC WALL COVERING [DG-WC]

A. Product: Basis-of-Design, Level Digital Wall Coverings, Textured Carta PVC-Free Wallcovering

B. Description: Provide wallcovering in rolls from same production run and that complies with ASTM F793/F793M.

1. Category: Type II Eco-Friendly PVC-Free.

C. Total Weight: 14 oz per linear yard.

D. Width: 54 inches.

E. Mildew Resistance: ASTM E96 Permeability, 66 Perms Dry Cup Method, Passed WA-101 8 Perms.

F. Features:

1. Face: Polyester/Natural Fiber Technology
2. Backing: Nonwoven 31% Post-Consumer Recycled Content
3. Inks: UV-LED inks with nearly zero VOC’s containing up to 50% naturally-derived monomers and oligomers. UL GREENGUARD Gold Certified meeting California CDPH Standard Method v1.2, Classroom and Office Environment.

G. Colors, Textures, and Patterns: Refer to drawings.
1. Base digital image to be selected from Level Wallcoverings Design Library.
2. Customization: Where noted, base image to be customized by manufacturer to meet Architect’s requirements.

2.3 ACCESSORIES

A. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.

B. Primer/Sealer: Mildew resistant, complying with requirements in Section 09 "Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.

PART 3 - EXECUTION

3.1 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, and mildew.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
2. Plaster: Allow plaster to cure for at least 90 days. Neutralize areas of high alkalinity. Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
3. Metals: If not factory primed, clean and apply metal primer as recommended in writing by metal-primer manufacturer and wall-covering manufacturer.
4. Gypsum Board: Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
5. Painted Surfaces:

    a. Check for pigment bleeding. Apply primer/sealer to areas susceptible to pigment bleeding as recommended in writing by primer/sealer manufacturer.
    b. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.

D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

E. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.2 INSTALLATION OF WALL COVERING

A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.

B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.

C. Install strips in same order as cut from roll.

D. Install wall covering without lifted or curling edges and without visible shrinkage.

E. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.

F. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

G. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.

H. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

SECTION 09 84 33 – SOUND ABSORBING WALL UNITS

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 shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
   1. Sound-absorbing wall panels.

1.3 DEFINITIONS

A. NRC: Noise Reduction Coefficient.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include fabric facing, panel edge, core material, and mounting indicated.

B. Shop Drawings: For unit assembly and installation.
   1. Include plans, elevations, sections, and mounting devices and details.
   2. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials.
   3. Include details at cutouts and penetrations for other work.

C. Samples for Initial Selection: For each type of fabric facing.
   1. Include Samples of hardware and accessories involving color or finish selection.

D. Samples for Verification: For the following products:
   1. Assembled Panels: Approximately 8 by 8 inches including edge profile and mounting methods.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Electrical outlets, switches, and thermostats.
   2. Items penetrating or covered by units including the following:

      a. Lighting fixtures.
      b. Air outlets and inlets.

c. Speakers.
d. Alarms.
e. Sprinklers.
f. Access panels.
g. Gymnasium equipment

B. Product Certificates: For each type of unit.

C. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Fabric: For each fabric, color, and pattern installed, provide length equal to 10 percent of amount installed, but no fewer than 5 sq. yd., full width of bolt.
2. Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than five devices, including unopened adhesives.

1.8 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials, fabrication, and installation.
1. Build mockup of typical wall area 48 inches wide by full height
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Lighting: Do not install units until a lighting level of not less than 50 fc is provided on surfaces to receive the units.

C. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.

D. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to the following:
      a. Acoustical performance.
      b. Fabric sagging, distorting, or releasing from panel edge.
      c. Warping of core.
   2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wall units specified in this Section from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 450 or less.
   2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.3 SOUND-ABSORBING WALL UNITS

A. Sound-Absorbing Wall Panel: Manufacturer's standard panel construction consisting of facing material stretched over front face of edge-framed core and bonded or attached to edges and back of frame

   1. Basis-of-Design: MBI Colorsonix #1818F-2060-ZIN
   2. Panel Shape: Flat
   3. Mounting: impaling clips with adhesive.
   4. Core: Manufacturer's standard
      a. Core-Face Layer: Manufacturer's standard tackable, high-density board

5. Edge Construction: Manufacturer's standard chemically hardened core with no frame
6. Edge Profile: Chamfered (beveled), unless noted otherwise in drawings.
7. Corner Detail in Elevation: Square
8. Acoustical Performance: Sound absorption NRC of not less than 0.90 according to ASTM C423 for Type A mounting according to ASTM E795.
9. Nominal Core Thickness: As indicated on Drawings, if not indicated, provide 3 inch thick core.
10. Panel Width & Height: As indicated on Drawings

2.4 MATERIALS

A. Core Materials: Manufacturer's standard.

1. Glass-Fiber Board: ASTM C612; of type standard with manufacturer; nominal density of 6 to 7 lb/cu. ft. unfaced, and dimensionally stable, molded rigid board; and with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
2. Tackable, Impact-Resistant, High-Density Board for Face Layer: 1/8-inch thick layer of compressed molded glass-fiber board with a nominal density of 16 to 18 lb/cu. ft. laminated to face of core.

B. Facing Material: As indicated on Drawings, if not indicated, to be selected by Architect from manufacturer's full range.

1. Applied Treatments: Stain resistance and flame retardant

C. Mounting Devices: Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:

1. Adhesive / Tape Strips: Manufacturer's standard
2. Impaling Clips: Manufacturer's standard
3. Metal Clips or Bar Hangers: Manufacturer's standard two-part metal "Z" clips, with one part of each clip mechanically attached to back of unit and the other part to substrate, designed to permit unit removal.

2.5 FABRICATION

A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

B. Edge Hardening: For glass-fiber board and mineral-fiber board cores, chemically harden core edges and areas of core where mounting devices are attached.

C. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.

D. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.

1. Square Corners: Tailor corners. Heat-seal vinyl fabric seams at corners.
2. Radius and Other Nonsquare Corners: Attach facing material so there are no seams or gathering of material.

3. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent units.

E. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:

1. Thickness.
2. Edge straightness.
3. Overall length and width.
4. Squareness from corner to corner.
5. Chords, radii, and diameters.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.

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

3.2 INSTALLATION

A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

C. Align fabric pattern and grain with adjacent units or as indicated on Drawings.

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.

B. Variation of Joint Width: Not more than 1/16-inch variation from hairline in 48 inches, noncumulative.

3.4 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION

SECTION 09 91 00 - **PAINTING**

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and field painting of the following:
   1. Exposed exterior items and surfaces.
   2. Exposed interior items and surfaces.
   3. Repainting and surface preparation at areas of remodeling.
   4. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.

C. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.

D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
   1. Prefinished items include the following factory-finished components.
      a. Architectural woodwork and casework, unless otherwise indicated**.**
      b. Acoustical wall panels.
      c. Toilet compartments.
      d. Metal lockers.
      e. Elevator entrance doors and frames.
      f. Elevator equipment.
      g. Finished mechanical and electrical equipment, unless otherwise indicated.
      h. Light fixtures.
      i. Distribution cabinets, except when in corridors or other normally occupied rooms.
   2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
      a. Foundation spaces.
      b. Furred areas.
      c. Ceiling plenums.
      d. Utility tunnels.
      e. Pipe spaces.
      f. Duct shafts.
      g. Elevator shafts.
   3. Finished metal surfaces include the following:
      a. Anodized aluminum.
      b. Fluoropolymer, powder coated or epoxy finished metal.
      c. Stainless steel, except exposed metal flashing indicated for field-painted finish.
      d. Chromium plate.
      e. Copper.
      f. Bronze and brass.
   4. Operating parts include moving parts of operating equipment and 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 (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

E. Related Sections include the following:
1. Division 05 Section "Structural Steel Framing": Shop priming structural steel.
2. Division 05 Section "Metal Fabrications": Shop priming ferrous metal; and factory finish for interior sheet metal closures.
3. Division 05 Section "Pipe and Tube Railings": Shop priming metal railings.
4. Division 06 Section “Sheathing” for wood subflooring to receive painted finish.
5. Division 07 Section "Sheet Metal Flashing and Trim": Stainless steel step flashing for field-applied painted finish.
6. Division 08 Section "Hollow Metal Doors and Frames": Shop priming steel doors and frames.
7. Division 09 Section "Gypsum Board": Surface preparation for gypsum board.
8. Division 09 Section "Resilient Flooring": Substrates for application of game line markings.
9. Division 32 Section "Flexible Asphalt Pavement": Traffic-marking paint

1.2 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
1. Flat: Lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell: Low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Satin: Low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
4. Semigloss: Medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
5. Full Gloss: High-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.3 SUBMITTALS

A. Product Data: For each paint system specified. Include block fillers and primers.
1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

B. Samples for Verification: For 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 materials and applications for each coat of each Sample. Label each Sample for location and application.
3. Submit Samples on the following substrates for Architect's review of color and texture only:
a. Concrete Unit Masonry: 4-by-8-inch Samples of masonry, with mortar joint in the center, for each finish and color.
b. Finished Wood: 12-inch-square Samples for each species on actual material.

c. Metal: 4-inch-square Samples of flat metal and 8-inch-long Samples of solid metal for each color and finish.

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

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type and color of coating and substrate required on the Project. Comply with procedures specified in PDCA P5. Duplicate finish of approved prepared samples.
1. Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted.
a. Wall Surfaces: Provide samples on at least 100 sq. ft. of wall surface.
b. Small Areas and Items: The Architect will designate an item or area as required.
2. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the Schedule or as specified. Provide required sheen, color, and texture on each surface.
a. After finishes are accepted, the Architect will use the room or surface to evaluate coating systems of a similar nature.
3. Final approval of colors will be from job-applied samples.

1.5 PRODUCT HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. 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 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.

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 above the dew point; or to damp or wet surfaces.
   1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.7 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to area designated by Owner.
   1. Quantity: Furnish the Owner with unopened containers of 2 gallon of each material and color applied.
      a. Provide not less than 1 gallon for each part of multi-part formulations such as epoxy coatings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products in the paint schedules.

B. Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:
   1. The Sherwin-Williams Company (SW).
   2. PPG Architectural Finishes, Inc. (PPG).

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Provide systems indicated. Where substrates are required to be finished, but no system is specified for that particular substrate, employ finish system most closely related to that scope of work but modified with appropriate primers. In the case of components on walls, use system for adjacent wall or trim as determined by Architect. In the case of components on or suspended from ceilings or decks, use semigloss paint system.

C. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

D. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

E. Colors: Match colors indicated by reference to manufacturer's color designations.

1. Provide contrasting colors for different elements exposed at ceiling level as selected by Architect, including steel trusses, roof deck, and ductwork.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.
   1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
   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. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
   2. Mask surfaces and construction adjacent to paint application areas to prevent paint from
   3. Preparing Previously Painted Surfaces: Remove existing paint from surfaces indicated using scrapers or chemical paint stripper as follows:
      a. Strip loose, chipped, alligatored or otherwise deteriorated paint using methods that will not damage existing surfaces.
      b. Remove paint to sound substrate. Sound, well-adhered paint may remain on surface.
      c. Rub steel surfaces to remove rust bloom, and solvent clean prior to priming.
      d. Allow surfaces to dry and sand smooth.
      e. Clean surfaces so they are free of dust and dirt.
      f. Fill cracks, gouges and nail holes with suitable filler prior to application of first coat.
      g. Complete surface preparation to produce a smooth, uniform substrate suitable for application of primer and finish coats specified.

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 before cleaning.
   1. 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 manufacturer's written instructions for each particular substrate condition and as specified.
   1. Provide barrier coats over incompatible primers or remove and reprime.
   2. Cementitious Materials: Prepare concrete and masonry surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
      a. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and

burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.

b. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.

3. 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. When transparent finish is required, backprime with spar varnish.
4. 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 the Steel Structures Painting Council's (SSPC) recommendations.
   a. Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of 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 paint manufacturer, and touch up with the same primer as the shop coat.
5. Architectural Exposed Structural Steel (AESS): Fill pits and mill marks with automotive body filler. Sand smooth so no evidence of filling is visible after paint is applied.
6. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
7. Stainless Steel: Mechanically abrade metal surface to create surface profile suitable for adhesion of paint, using No. 80 grit sandpaper and power sander.
   a. Wipe abrade surface with fast-drying thinner such as denatured alcohol or lacquer thinner.

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

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. 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.

5. 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.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
9. Sand lightly between each succeeding enamel or varnish coat.

B. 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. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
3. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces 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.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
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.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer. Use application rate to achieve finished dry film thickness (DFT) as indicated for each coat.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.

F. Mechanical items to be painted include, but are not limited to, the following:
1. Piping, pipe hangers, and supports.
2. Heat exchangers.
3. Tanks.
4. Ductwork.
5. Insulation.
6. Supports.
7. Motors and mechanical equipment.
8. Accessory items.

G. Electrical items to be painted include, but are not limited to, the following:
1. Conduit and fittings.
2. Switchgear.

3. Panelboards.

H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
   1. Provide a smooth, uniform finish, appearance, and coverage. Spotting, laps, roller marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
   2. Spray application will not be permitted unless combined with back rolling or squeegeeing. Do not thin filler. Apply sufficient material to allow back rolling or squeegeeing to fill surface.
   3. Where two filler coats are scheduled, allow first coat to fully dry before application of second. Back roll or squeegee both coats.
   4. Do not use squeegee for scored unit masonry; backroll in manner that prevents buildup of block filler in score joints.
   5. Extend block filler coats the full extent of exposed surfaces. Protect adjacent surfaces.

I. 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.

J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 EXTERIOR PAINT SCHEDULE

A. General: Provide the finish systems scheduled for each material type indicated, applied at spreading rate recommended by manufacturer to achieve the total dry film thickness (DFT) listed.
   1. Provide 2 finish coats over the listed base coats (primer, filler, bond coat) except as otherwise indicated.

B. Exterior Concrete, Stucco, and Masonry (Other than Concrete Masonry Units):
   1. Elastomeric Finish:
      a. Primer: Alkali-resistant, exterior, acrylic-latex primer or surface conditioner.
         1) SW: Loxon Concrete & Masonry Primer, LX02 Series.
         2) PPG: Perma-Crete Interior/Exterior Alkali Resistant Primer 4-603XI.
      b. First and Second Coats: High build elastomeric finish.
         1) SW: Conflex XL Elastomeric High Build Coating, A5-400 Series; 7.5 mils DFT.
         2) PPG: Perma-Crete Pitt-Flex Elastomeric Coating.

C. Exterior Ferrous Metal:
   1. Gloss, Urethane Finish:
      a. Primer: Provide primer over bare metal and over shop-applied primers.
         1) SW: Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series.
         2) PPG: Pitt-Tech Plus 4020 PF
      b. First and Second Coats: Gloss urethane finish.
         1) SW: WB Alkyd Urethane Enamel, B53 Semi-Gloss.
         2) PPG: Pitt Tech Plus Waterborne Acrylic, Semi-Gloss 4216HP

3.5 INTERIOR PAINT SCHEDULE

A. General: Provide the finish systems scheduled for each material type indicated, applied at spreading rate recommended by manufacturer to achieve the total dry film thickness (DFT) listed.
   1. Provide 2 finish coats over the listed base coats (primer, filler, bond coat) except as otherwise indicated.

B. Interior Concrete Walls: Allow to cure minimum 30 days.
   1. Semigloss, Water Based Epoxy Finish:
      a. Primer:
         1) SW: Loxon Concrete and Masonry Primer, 2.0-3.0 mils DFT.
         2) PPG: Perma Crete Primer 4603XI
      b. First and Second Coats: Semigloss acrylic epoxy finish.
         1) SW: ProIndustrial PreCatalyzed WaterBased Epoxy K-46, 2.5-3.0 mils DFT.
         2) PPG: Pitt-Glaze WB1 Interior Pre-Catalyzed Water-Borne Acrylic Epoxy

C. Interior Concrete Masonry Units (CMU):
   1. Semigloss, Water Based, Two Part Epoxy Finish: provide the following in corridors, janitor closets, mechanical rooms, toilet rooms, locker rooms and receiving rooms.
      a. Block Filler: Two Coats acrylic latex high build block filler.
         1) SW: PrepRite Block Filler, B25W25.
         2) PPG: Speedhide Latex Block Filler 6-15XI.
      b. First and Second Coats: Semigloss acrylic epoxy finish.

1) SW: ProIndustrial Pre-Catalyzed Water Based Epoxy, 2.5-3.0 mils DFT.
2) PPG: Pitt-Glaze WB Interior Pre-Catalyzed Water-borne Acrylic Epoxy, 2.0-5.0 mils DFT.

2. Low Luster, Acrylic-Enamel Finish: provide the in locations not specified above for epoxy.
   a. Block Filler: Two Coats acrylic latex high build block filler.
      1) SW: Prep Rite Block Filler B25W25
      2) PPG: Speedhide Latex Block Filler 6-15XI.
   b. First and Second Finish Coats: Low-luster acrylic-latex interior enamel.
      1) SW: ProMar 200 Zero VOC , Eg-Shel, 1.6 mills DFT.
      2) PPG: Speedhide Zero Interior Latex Eggshell 6-4310XI.

D. Gypsum Board Ceilings and Soffits:
   1. Flat Acrylic, Low-VOC Finish:
      a. Primer:
         1) SW: ProMar Ceiling Paint flat, 1.1 mils DFT.
         2) PPG: Speedhide Zero Interior Latex Primer 6-4900XI, 1.4 mils DFT.
      b. First and Second Coats:
         1) SW:ProMar Ceiling Paint flat ; 4.6 mils DFT.
         2) PPG: Speedhide Zero Interior Latex Flat 6-5110, 2.0-4.0 mils DFT.

E. Gypsum Board Walls.
   1. Low-Luster, Acrylic-Enamel, Low-VOC Finish:
      a. Primer:
         1) SW: ProMar 200 Zero Primer, 1.1 mils DFT.
         2) PPG: Speedhide Zero Interio Latex Primer 6-4900, 1.4 mils DFT.
   2. First and Second Coats:
         1) SW: ProMar 200 Zero VOC, Eggshell, 1.5 mils DFT.
         2) PPG: Speedhide Zero Interior Latex Eggshell, 6-5310, 1.0-3.0 mils DFT.

F. Gypsum Board, Moisture Conditions:
   1. Water-Reducible Epoxy Coating System: Provide the following for gypsum board surfaces located in toilet rooms.
      a. Primer: Latex-based, interior primer.
         1) SW: Extreme Block Waterbased Stain Blocking Primer; 1.6 mils DFT.
         2) PPG: Seal Grip Gripper Water Based Stain Blocking Primer 17-921XI, 1.4 mils DFT.
      b. First and Second Coats: Semi-gloss epoxy finish.
         1) SW: ProIndustrial Pre-Catalyzed Water-Based Epoxy; B70-200 Series; 3.0 DFT
         2) PPG: Pitt-Glazed WB1 Interior Pre-Catalyzed Water-borne Acrylic Epoxy, 2.0-5.0 mils DFT.

G. Ferrous and Non-Ferrous Metal Components at Ceiling Level: Apply the following coating system to exposed roof trusses and other structural steel in exposed high areas.
   1. Dry Fall, Acrylic Flat Finish: Where colors indicated exceed manufacturer's recommended pigment proportions, use semi-gloss paint system specified for interior ferrous metal.
      a. Primer: Metal primer.
         1) SW: ProIndustrial Pro-cryl, Universal Primer, B50, 2.0-5.0 mils DFT.
         2) PPG: Pitt Tech Plus EP DTM Acrylic Primer 90-1912, 2.2-3.5 mils DFT.
   2. First and Second Coats: flat dry fall finish.
         1) SW: Low VOC Waterborne Acrylic Dryfall Flat, B42, 3.5-5.0 mils DFT.
         2) PPG: Speedhide Super Tech Flat Acrylic Dry Fall, 1.5-2.0 mils DFT.

H. Interior Ferrous and Non-Ferrous Metal: Apply the following coating system to interior ferrous metal not scheduled to receive another coating.
   1. Semigloss, Acrylic-Enamel, Low-VOC Finish:
      a. Primer:
         1) SW: ProIndustrial ProCryl Universal Primer.
         2) PPG: Pitt Tech Plus Primer/ Finish 4020 PF, 2.2-3.5 mils DFT.
      b. First and Second Coats:
         1) SW: ProIndustrial WB Acrylic Urethane Enamel, Semigloss, B53, 1.4 mils DFT.
         2) PPG: Pitt-Tech Plus EP Interior/Exterior Acrylic Gloss DTM Industrial Enamel, Semi-Gloss, 2.0-4.0 mils DFT.

I. Painted Interior Woodwork:
   1. Semigloss, Latex-Enamel Finish:
      a. Primer: Latex-based, interior enamel undercoater.
         1) SW: ProMar 200 Zero VOC Primer; 1.6 mils DFT.
         2) PPG: Seal Grip Gripper Acrylic Universal Primer 17-921XI, 1.4 mils DFT.
      b. First and Second Coats: Semigloss, Latex, interior enamel.
         1) SW: Solo 100% Acrylic Latex, Semi-gloss, 1.4 mils DFT.
         2) PPG: Speedhide Zero Interior Latex Semi-Gloss, 6-5510, 1.4 mils DFT

3.6 CLEANING AND PROTECTION

A. Cleanup: At the end of each workday, 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.

B. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

C. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
   1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

END OF SECTION 09 91 00

SECTION 10 11 00 - VISUAL DISPLAY UNITS

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. Visual Display Board Assembly
   a. Markerboard (MB)
   b. Tackboard (TB)

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.
2. Include electrical characteristics for motorized units.

B. Shop Drawings: For visual display units.
1. Include plans, elevations, sections, details, and attachment to other work.
2. Show locations of panel joints.
3. Include sections of typical trim members.
4. Include wiring diagrams for power and control wiring.

C. Samples: For each type of visual display unit indicated.
1. Visual Display Panel: Not less than 8-1/2 by 11 inches, with facing, core, and backing indicated for final Work. Include one panel for each type, color, and texture required.
2. Trim: 6-inch long sections of each trim profile.
3. Display Rail: 6-inch long section of each type.
4. Accessories: Full-size Sample of each type of accessory.

D. Product Schedule: For visual display units.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranties: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For visual display units to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.

1.8 FIELD CONDITIONS

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

1.9 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

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

a. Surfaces lose original writing and erasing qualities.
b. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

2.2 VISUAL DISPLAY BOARD ASSEMBLY

A. Visual Display Board Assembly: Factory/Field fabricated.
1. Assembly – Drawings indicate:
a. MB = Markerboard
b. TB = Tackboard
2. Corners: Square.
3. Width: As indicated on drawings
4. Height: 48 inches, unless indicated otherwise on drawings.

5. Mounting Method: Direct to wall

B. Basis of Design: Claridge Products – Series #4
   1. MB: LCS Porcelain Magnetic Markerboard
   2. TB: Claridge Colored Cork on Hardboard
   3. Acceptable substitutions by:
      a. Everwhite (Warminster, PA)
      b. Platinum Visual Solutions – 555 Series

C. Markerboard Panel:
   1. Porcelain enamel steel writing surface on manuf. recommended core w/ moisture barrier backer.
   2. Magnetic Surface
   3. Color: White
   4. Thickness: ½ inch minimum
   5. Lifetime guarantee: Non-staining, non-porous dry erase surface.
   6. Music Classrooms: Provide music staff lines.

D. Tackboard Panel: Natural-cork tackboard panel on manuf. recommended core.
   1. Color and Pattern: As selected by Architect from full range of industry colors.

E. Aluminum Frames: Fabricated from not less than 0.062-inch- thick, extruded aluminum
   1. Field-Applied Trim: Manufacturer's standard, snap-on trim with no visible screws or exposed joints
   2. Aluminum Finish: Clear anodic finish, unless noted otherwise.
   3. Perimeter Frame Width: 5/8 inch

F. Joints: Make joints only where total length exceeds maximum manufactured length.
   1. Fabricate with minimum number of joints.

G. Combination Assemblies: Provide manufacturer's standard exposed trim between abutting sections of visual display panels.

H. Marker Tray:
   1. Manufacturer's standard; continuous.
      a. Claridge Products – ‘Flat Tray’

I. Map/Display Rail: Manufacturer's standard, extruded-aluminum display rail with plastic-impregnated-cork insert, end stops, and continuous paper holder, designed to hold accessories.
   1. Size: 2 inches high by full length of visual display unit
   2. Map Hooks: Two (2) map hooks for every 48 inches of display rail or fraction thereof.
   3. Map Hook Clips: Two (2) map hooks with flexible metal clips for every 48 inches of display rail or fraction thereof.
   4. Flag Holder: One for each room.
   5. Tackboard Insert Color: As selected by Architect from full range of industry cork colors
   6. Aluminum Color: Match finish of visual display assembly trim.

2.3 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motorized, sliding visual display units.

C. Examine walls and partitions for proper preparation and backing for visual display units.

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

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.
B. Clean substrates of substances, such as dirt, mold, and mildew, that could impair the performance of and affect the smooth, finished surfaces of visual display boards.
C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.
D. Prime wall surfaces indicated to receive visual display units and direct-applied, floor-to-ceiling visual display assemblies and as recommended in writing by primer/sealer manufacturer and visual display unit manufacturer.

3.3 INSTALLATION

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

B. Field-Assembled Visual Display Board Assemblies: Coordinate field-assembled units with grounds, trim, and accessories indicated. Join parts with a neat, precision fit.
   1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, as indicated on approved Shop Drawings.
   2. Where size of visual display board assemblies or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.

C. Factory-Fabricated Visual Display Board Assemblies: Adhere to wall surfaces with egg-size adhesive gobs at 16 inches o.c., horizontally and vertically.

D. Factory-Fabricated Visual Display Board Assemblies: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display board assemblies with fasteners at not more than 16 inches o.c. Secure tops and bottoms of boards to walls.

E. Visual Display Board Assembly Mounting Heights: Install visual display units at mounting heights indicated on Drawings, or if not indicated, at heights indicated below:

1. Mounting Height for Grades K through 3 24 inches above finished floor to top of markertray.
2. Mounting Height for Grades 4 through 8: 28 inches above finished floor to top of markertray.
3. Mounting Height for Grades 9 and Higher: 36 inches above finished floor to top of markertray.

3.4 CLEANING AND PROTECTION

A. Clean visual display units in accordance with manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.
B. Touch up factory-applied finishes to restore damaged or soiled areas.
C. Cover and protect visual display units after installation and cleaning.

END OF SECTION 10 11 00

SECTION 101200 - DISPLAY CASES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Display cases.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For [**display cases**] [**and**] [**bulletin boards**].

   1. Include plans, elevations, sections, and attachment details.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For tackboard panels, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 450 or less.

B. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 DISPLAY CASES

A. Basis-of-Design Products: Subject to compliance with requirements, provide AARCO Products, Inc. Recessed Display Case, or a comparable product by one of the following:
   1. A-1 Visual Systems
   2. Claridge Products and Equipment, Inc.

3. ADP Lemco

B. Recessed Display Case: Factory-fabricated display case; with finished interior, operable glazed doors at front, and trim on face to cover edge of recessed opening.

1. Display Case Cabinet: Hardwood veneer plywood.

a. Veneer Species: Red oak with natural lacquered finish.
2. Face Frame: Wood, species to match interior of cabinet b**ox** with natural lacquered finish.

C. Glazed Sliding Doors: Tempered glass; unframed; with extruded-aluminum top and bottom track; supported on nylon or ball-bearing rollers; with plastic top guide and rubber bumpers. Equip each door with ground finger pull and adjustable cylinder lock with two keys.

1. Number of Doors: Two.

D. Shelves: 6-mm-thick tempered glass; supported on adjustable shelf standards and supports.

1. Shelf Depth: 10 inches (250 mm).
2. Number of Shelves: Three.

E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04102; with shelf brackets, B04112; recess mounted in rear surface. Provide standards extending full height of display case.

F. Vinyl Back Panel: Vinyl-fabric-faced tackboard panel.

1. Color: As selected by Architect from manufacturer's full range.

G. Illumination System: Concealed top-lighting system consisting of LED-strip fixture. Include internal wiring with single concealed electrical connection to building system. Coordinate electrical characteristics with power supply provided.

a. Electrical Characteristics: Single phase, 120 V.

2.3 MATERIALS

A. Hardboard: ANSI A135.4, tempered.

B. Particleboard: ANSI A208.1, Grade M-1.

C. Hardwood Plywood: HPVA HP-1.

D. Vinyl Fabric: ASTM F793/F793M, Type II, **burlap weave**; weighing not less than 13 oz./sq. yd. (440 g/sq. m); with flame-spread index of 25 or less when tested in accordance with ASTM E84.

E. Extruded-Aluminum Bars and Shapes: ASTM B221 (ASTM B221M), Alloy 6063.

F. Aluminum Tubing: ASTM B429/B429M, Alloy 6063.

G. Clear Tempered Glass: ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality Q3, with exposed edges seamed before tempering.

2.4 FABRICATION

A. Fabricate display cases to requirements indicated for dimensions, design, and thickness and finish of materials.

B. Use metals and shapes of thickness and reinforcing required to produce flat surfaces, and to impart strength for size, design, and application indicated.

C. Fabricate cabinets and door frames with reinforced corners, mitered to a hairline fit, with no exposed fasteners.

D. Fabricate shelf standards plumb and at heights to align shelf brackets for level shelves.

2.5 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install units in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

B. Recessed Display Cases: Attach units to wall framing with fasteners at not more than 16 inches (400 mm) o.c. Attach aluminum trim over edges of recessed display cases and conceal grounds and clips. Attach trim with fasteners at not more than 24 inches (600 mm) o.c.

END OF SECTION 101200

SECTION 10 14 00 – 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. Flat Cut Dimensional characters.
   2. Panel signs.
   3. Stenciled lettering for above ceilings and accessible concealed areas at fire rated walls.

B. Related Sections include the following:
   1. Division 22 Section "Identification for Plumbing Systems" for labels, tags, and nameplates for plumbing systems and equipment.
   2. Division 23 Section "Identification for HVAC Systems" for labels, tags, and nameplates for HVAC systems and equipment.
   3. Division 26 for labels, tags, and nameplates for electrical equipment.
   4. Division 26 Section "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.
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.
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- long sections of extrusions and squares of sheet at least 4 by 4 inches.
   3. Acrylic Sheet: 8 by 10 inches for each color required.
   4. Stenciled Lettering: Sample of lettering applied to hardboard to gypsum wall board.
   5. Panel Signs: Not less than 12 inches square.
   6. 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 ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted 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 metal and polymer 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: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:
    1. Sheet: ASTM B 209 (ASTM B 209M).
    2. Extruded Shapes: ASTM B 221 (ASTM B 221M).
C. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).
D. Galvanized Steel Sheet: ASTM A 653, G60.
E. Sheet Steel: ASTM A 366, cold rolled, commercial quality, 0.0359-inch minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.

2.2 FLAT CUT DIMENSIONAL CHARACTERS

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. iSign Architectural Signage
    2. Signarama Lansdale
    3. Gemini Incorporated.
    4. InPro Corporation.
    5. Mohawk Sign Systems.
    6. Signature Signs, Incorporated.

B. Flat cut Characters: 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 process used and for use and finish indicated. Comply with the following requirements.
   1. Character Material: Aluminum.
   2. Thickness: 1/4-inch.
   3. Color(s): As selected by Architect from manufacturer's full range including clear anodized.
   4. Mounting: Concealed studs, non corroding, for substrates encountered.

C. Dimensional Character Sign Schedule:
   1. Dimensional Character Sign:
      a. Sign Construction: Aluminum.
      b. Character Size: As indicated on elevations
      c. Text/Message: As indicated on elevations.
      d. Font: Arial (unless noted otherwise on drawings)
      e. Mounting: Set off wall.

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. iSign Architectural Signage
   2. Signarama Lansdale
   3. APCO Graphics, Inc.
   4. ASI-Modulex, Inc.
   5. InPro Corporation
   6. Mills Manufacturing Company.

B. 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. Produce sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner, complying with the following requirements:
   1. Produce signs with one of the following technologies for Tactile and Braille Signs to produce raised text and graphics with Braille 1/32 inch above surface in contrasting colors as selected by Architect from manufacturer’s full range.
      a. Laminated, Etched Photopolymer: Photoetched raised text with Braille laminated to acrylic back.
      b. Routed, Embedded Text: Face sheet of clear or opaque plastic routed to form grooves for text and raster balls. Opaque white text and clear raster balls are fused and embedded into face of sign. For clear sheet, paint back side (reserving slot for changeable message) in contrasting color.
   2. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
   3. Changeable Message Inserts: Where indicated fabricate signs to allow insertion of changeable messages in the form of transparent covers with paper inserts printed by Owner. Transparent covers shall be flush with face of sign without seams or with tight fused seams.
   4. Edge Condition: Square cut.
   5. Shape: Ref. Signage types in drawings for size & shape.
   6. Mounting: Framed and Unframed.
      a. Unframed: Surface mounted with two-face tape.
         1) Unframed mounting shall be used for all opaque backing plates for installations on glass.

b. Framed: PVC frame mechanically fastened to wall, panel sign retained in frame with 3M Dual Lock reclosable fastener.
1) Framed panel signs shall be used for all panel signage.

7. Color: As selected by Architect from manufacturer's full range.
8. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surface with contrasting colors.

C. Brackets: Fabricate brackets and fittings for bracket-mounted signs from extruded aluminum to suit panel sign construction and mounting conditions indicated. Factory paint brackets in color matching background color of panel sign.

D. 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 are UV and water resistant for five years for application intended.
1. Color: As selected by Architect from manufacturer's full range.

E. Panel Sign Schedule: Sign types and locations as indicated on plans.
1. Approved on the shop drawings.

2.4 STENCILED LETTERING

A. Provide lettering in size indicated and suitable for field application of paint to substrates for lettering. Stencil shall be suitable to spray or roller application.

B. Provide contrasting color paint to make letters visible in low light conditions. Provide paint suitable for substrates.

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. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
2. 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.
3. 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, medium gloss.

B. Clear Anodic Finish: Manufacturer's standard Class 1 clear anodic coating, 0.018 mm or thicker, over a satin (directionally textured) mechanical finish, complying with AAMA 611

2.9 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 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. Framed signs: Use two faced tape on glass, use mechanical anchors elsewhere.
4. Directories and Plaques: Use mechanical anchors.
5. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to conceal mounting materials.

C. Bracket-Mounted Signs: Provide manufacturer's standard brackets, fittings, and hardware for mounting signs that project at right angles from walls and ceilings. Attach brackets and fittings securely to walls and ceilings with concealed fasteners and anchoring devices to comply with manufacturer's written instructions.

D. Dimensional Characters: Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.

1. Flush Mounting: Mount characters with backs in contact with wall surface.
2. Projected Mounting: Mount characters at projection distance from wall surface indicated. Where surfaces are uneven, such as at segmented retaining wall, provide variable length studs to set letters off wall the minimum distance specified and so letters are in a single plane parallel to the average face of the wall.

E. Stenciled Letters: Provide above ceiling warning signs as indicated on plans and at spacing as indicated on plans. Lettering shall be visible in contrast with background color. Where

necessary provide a background color 4 inches wider and taller than required lettering. Allow background color to set, apply stencil as indicated.

F. Site Signs: All other standards including but not limited to post height, post embedment, and location off paved surfaces and curbs, shall comply with PennDOT standards.
   1. Concrete foundation shall be as specified in Section 03 30 00 “Cast In Place Concrete”

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 10 14 00

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for portable fire extinguishers.

1.2 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Conduct conference at Project site.
1. Review installation requirements prior to ordering to confirm available wall depth in area of installation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For fire-protection cabinets.

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

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.2 FIRE-PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with the requirements, available products that may be incorporated into the work include but are not limited to, the following:
   a. J.L. Industries, Inc.
   b. Larsen Manufacturing Company.
   c. Potter Roemer LLC.

B. Cabinet Construction: One-hour fire rated.

1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch- (1.09-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: Cold-rolled steel sheet.

D. Recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: 1-1/4- to 1-1/2-inch (32- to 38-mm) backbend depth.

E. Cabinet Trim Material: Stainless Steel sheet.

F. Door Material: Stainless Steel sheet.

G. Door Style: Full acrylic bubble with frame.

H. Door Glazing: Molded acrylic bubble.
1. Acrylic Bubble Color: Clear, transparent.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
3. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.

   a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

      1) Location: Applied to cabinet glazing.
      2) Application Process: Decals or Pressure-sensitive vinyl letters.
      3) Lettering Color: Black.
      4) Orientation: Vertical.

K. Materials:

1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304.
2. Finish: ASTM A480/A480M No. 4 directional satin finish**.**

3. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

2.3 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable depth and blocking where recessed cabinets will be installed.

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

3.2 INSTALLATION

A. Prepare recesses for fire-protection cabinets as required by type and size of cabinet and trim style.

B. Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

C. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

D. Identification: Apply decals or vinyl lettering at locations indicated.

E. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

3.3 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 locking device operate properly.

C. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

1. Products: Subject to compliance with requirements, provide products by one of the following:
   a. J.L. Industries, Inc.
   b. Larsen’s Manufacturing Company.
   c. Potter-Roemer; Div. of Smith Industries, Inc.
2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

B. Multipurpose Dry-Chemical Type in steel container: UL-rated 4-A:80-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.
1. Application: Typical Locations

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

   a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated or if not indicated as directed by architect.

1. Mounting Height: Top of fire extinguisher to be at 42 inches (1067 mm) above finished floor.

END OF SECTION 104416

SECTION 10 51 15 – ELECTROSTATIC PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Division 0 - Bidding and Contract Requirements and Division 1 General Requirements apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Electrostatic painting systems, for painting existing science hoods and related cabinets

1.3 SUBMITTALS

A. Product Data: provide manufacturers product date for electrostatic paint system.

B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain electrostatic paint through one source from a single manufacturer.

PART 2 - PRODUCTS

2.1 FINISHES, GENERAL

A. Finish surfaces as indicated in the drawings to receive electrostatic paint system.

B. 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. Provide mock up for owner and architect approval prior to painting of all surfaces. Mockup will serve as a benchmark.

2.2 ELECTROSTATIC REFINISHING

A. Preparation:

1. Schedule all work in accordance with the overall project schedule and to assure no interruption of class sessions.
2. Verify that all refurbishment work except installation of new number plates and final adjustment and lubrication has been completed prior to beginning finishing operations.

3. Remove all number plates and completely mask or remove all locks and operating hardware.
4. Thoroughly mask all adjacent surfaces including floors, walls and ceilings.
5. Mechanically abrade all surfaces of existing factory finish to dull and impart a surface profile that will promote adhesion of the subsequent coating system. Wash with a commercial cleaner/degreaser to remove all foreign contaminants, rinse thoroughly and allow to dry. Test for compatibility and adhesion with the existing coating system by applying a mock-up of 2-3 sq. Ft of the new system and testing for adhesion per ASTM D3359 after one week of curing.
6. Prime all rusted or bare areas with PPG Multi-Prime or approved equal. Provide a light coat of primer to assure proper adherence of finish to the balance of surfaces to be refinished.
7. Locations per drawings:
   a. Metal Shelving
   b. Metal Wall Panels
   c. Metal Ventilators, Radiators, Metal Grates

B. Refinishing:
1. Apply PPG Pitthane vandal-resistant two part polyurethane finish, or an approved equal, using an electrostatic airless method. Advise the Architect in writing if it is determined that there are surfaces which have been previously recoated which may not be suitable to receive the specified finish.
2. Remove masking materials, reinstall removed items and prepare lockers for installation of new number plates and final adjusting.
3. Color: Provide custom color to match Architect's sample.

C. Restoration:

1. Provide all new nameplates for any lockers being painted as a part of the project. Coordinate with owner for numbering sequence.
2. Replace any damaged or missing parts including hardware, operator latches, and dented doors and panels.

PART 3 - EXECUTION

3.1 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

B. Protect newly electrostatically painted surfaces from damage, abuse, dust, dirt, stain, or paint.

C. Touch up marred finishes on surfaces.

END OF SECTION 10 51 15

SECTION 11 6143 - STAGE CURTAINS

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. Stage curtains, scrims, and drops.
2. Draw-curtain tracks.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product and the following:

1. Tracks: Capability of each track to support the weight and operation of curtains that it supports.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and attachment details of curtains.
2. Include fabric assembly and hanging details.
3. Dimension operating clearances.
4. Include documentation of capacity of each batten, track, and attachment component to support loads.

C. Samples: For each type of stage curtain indicated. Include color charts showing full range of colors, textures, and patterns available, together with 12-inch-square Sample (any color) of each fabric type and seam.

D. Delegated-Design Submittal: For stage-curtain systems and attachments to structure, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and professional engineer.

B. Product Certificates: For the following, from manufacturer:

1. Fabric: Provide name of flame-retardant chemical used, identification of applicator, treatment method, application date, allowable life span for treatment, and details of any restrictions and limitations.

C. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For stage curtains and rigging to include in operation and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer of stage curtains.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install stage curtains until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Verify locations of supporting structural elements and construction contiguous with stage curtains and rigging by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of stage-curtain systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, faulty operation of rigging.
2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design stage-curtain systems, including comprehensive engineering analysis and attachments to building structure, using performance requirements.

B. Structural Performance: Stage-curtain systems and attachments to structure shall withstand the effects of gravity and operational loads.

C. Fire-Test-Response Characteristics: Provide stage curtains meeting the following requirements as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Flame-Propagation Resistance: Passes NFPA 701.

a. Permanently attach label to each fabric of curtain assembly indicating whether fabric is inherently and permanently flame resistant or is treated with flame-retardant chemicals and whether it requires retreatment after cleaning or after a designated time period of use.
b. Permanently attach 12-inch-square swatch of same fabric and dye lot for each fabric of a curtain assembly to the back of assembly for use as fire-resistance test strip.

2.2 CURTAIN FABRICS

A. General: Provide fabrics inherently and permanently flame resistant or chemically flame resistant by immersion treatment according to performance requirements indicated. Provide fabrics of each type and color from same dye lot.

B. Green Screen:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the following:

a. Chroma Key Background Green Screen manufactured by Chicago Canvas and Supply.

C. Stage Fabric:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the following:

a. Cyclo 200 CS Stage Fabric manufactured by ShowTex.

D. Backdrops:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the following:
a. Solid Colored Muslim Backdrops manufactured by Chicago Canvas and Supply.

1) Backdrop Color: As selected by Architect from manufacturer’s standard range

2.3 CURTAIN ACCESSORIES

A. Snap Hooks: Manufacturer's standard heavy-duty hooks.

2.4 STEEL CURTAIN TRACK

A. Steel Track: Roll-formed, galvanized, commercial-quality, zinc-coated steel sheet, ASTM A 653/A 653M; G60 coating designation; with continuous bottom slot and with each half of track in one continuous piece; complete with necessary accessories for support and operation.

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

    a. Chicago Canvas and Supply
    b. Automatic Devices Company.
    c. H & H Specialties Inc.
    d. Tru-Roll, Inc.

2. Curved Track: Factory-fabricated sections.
3. Cable Guides for Curved Track: Outside idlers, mule pulleys, spindles, and guides; quantity sufficient for configuration of curve(s) and length of track.
4. Steel Thickness: As recommended by manufacturer for loads and operation.

    a. Heavy Duty: Minimum 0.079 inch.

B. Curved-Suspended-Track Stiffener: NPS 1-1/2 steel pipe for supporting both sections of suspended curved tracks; curved to match track.

C. Clamp and Bracket Hangers: Steel clamps and brackets of sufficient strength required to support loads for attaching track to overhead support.

D. Heavy-Duty Track System: Equip track with heavy-duty components as recommended by manufacturer for loads and operation. Provide end stops for track.

1. Curtain Carriers: Standard carriers of plated steel with a pair of nylon-tired ball-bearing wheels riveted parallel to body. Equip carriers with rubber or neoprene bumpers to reduce noise, and heavy-duty, plated-steel swivel eye and trim chain for attaching curtain snap or S-hook. Provide quantity of curtain carriers sufficient for track length, to suit curtain fabrication.

    a. Master Curtain Carriers: One master carrier, for each leading curtain edge, of plated steel with two pairs of nylon-tired ball-bearing wheels and with two line guides per carrier.

2. Pulleys: One dead-end, single-wheel pulley; one live-end, double-wheel pulley; and one adjustable pulley to maintain proper tension on operating line; each with not less than 5-inch molded-nylon- or glass-filled-nylon-tired ball-bearing sheaves enclosed in steel housings. Provide pulleys with steel housing finished to match track and with bracket for securing off-stage curtain end.

E. Manual Cord Operation: Provide with cord operating line, 3/8-inch-diameter, stretch-resistant operating cord of braided synthetic-fiber jacket over solid, synthetic-fiber, linear filaments.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for supporting members, blocking, installation tolerances, clearances, and other conditions affecting performance of stage-curtain work.

B. Examine inserts, clips, blocking, or other supports required to be installed by others to support tracks and battens.

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

3.2 INSTALLATION, GENERAL

A. Install stage-curtain system according to curtain and track manufacturer's written instructions.

3.3 TRACK INSTALLATION

A. Ceiling-Mounted Track: Drill track at intervals not greater than manufacturer's written instructions for spacing, and fasten directly to structure.

B. Beam-Mounted Track: Install track by suspending from beam clamps securely mounted to I-beam structure at track-support spacing, according to manufacturer's written instructions.

C. Wall-Mounted Track: Install track by suspending from brackets securely mounted to wall construction at track-support spacing, according to manufacturer's written instructions.

D. Track-Support Spacing: According to manufacturer's recommendations for applied loads, but not exceeding the following dimensions between supports:

1. Heavy-Duty Track: 72 inches.
2. Medium-Duty Track: 48 inches.
3. Curved Walk-Along Track: 48 inches, with additional supports at curves and splices.

END OF SECTION 11 6143

SECTION 12 36 61 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material for the following:
   a. Countertops
   b. Backsplashes
   c. End splashes
   d. Apron fronts

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

C. Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ISFA 2-01.
   1. Basis of Design: DuPont Corian – Solid Surface
   2. Colors and Patterns: As selected by Architect from manufacturer's full range of options from Price Group #2.

B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
   1. Grade: Custom

B. Configuration:
   1. Front: 1-1/2-inch laminated bullnose
   2. Backsplash: Straight, slightly eased at corner
   3. End splash: Matching backsplash

C. Countertops: 1/2-inch-thick, solid surface material with front edge built up (1 ½" thick overall) with same material.

D. Backsplashes: 1/2-inch-thick, solid surface material.

E. Joints:
   1. Fabricate countertops without joints, unless spans are greater than 144 inches.

F. Cutouts and Holes:
   1. Where Undercounter Mounted Plumbing Fixtures are to be provided:
      a. Make cutouts for fixtures using template or pattern furnished by fixture manufacturer.
      b. Form cutouts to smooth, even curves.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer.

B. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

C. Install backsplashes and end splashes by adhering to wall and countertops with adhesive.

D. Install aprons to backing and countertops with adhesive.

E. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

F. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 12 36 61