

SECTION 07115 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes cold-applied, cut-back and cold-applied, emulsified- asphalt dampproofing applied to the following surfaces:
 - 1. Cold-applied, cut-back at exterior, below-grade surfaces of concrete foundation and retaining walls.
 - 2. Cold-applied, emulsified- asphalt at exterior face of inner wythe of exterior masonry cavity walls.
- B. Related Sections include Division 7 Section "Self-Adhering Sheet Waterproofing" for waterproofing at terrace.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, coverage or thickness, and protection course.
- B. Material Certificates: For each product, signed by manufacturers.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt dampproofing to be performed according to manufacturers' written instructions.

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Cold-Applied, Cut-Back (Solvent-Based) Asphalt Dampproofing:
 - a. Karnak Corporation.
 - b. Koppers Industries, Inc.
 - c. Meadows, W. R., Inc.
 - d. Sonneborn, Div. of ChemRex, Inc.
 2. Cold-Applied, Emulsified-Asphalt Dampproofing:
 - a. Karnak Corporation.
 - b. Koppers Industries, Inc.
 - c. Meadows, W. R., Inc.
 - d. Sonneborn, Div. of ChemRex, Inc.
 3. Protection Course, Asphalt-Board Type:
 - a. Grace, W. R. & Co.; Construction Products Div.
 - b. Meadows, W. R., Inc.
 - c. Sonneborn, Div. of ChemRex, Inc.

2.2 BITUMINOUS DAMPPROOFING

- A. Odor Elimination: Provide dampproofing material warranted by manufacturer to be substantially odor free after drying for 24 hours under normal conditions.
- B. Cold-Applied, Cut-Back (Solvent-Based) Asphalt Dampproofing:
1. Trowel Coats: ASTM D 4586, Type I.
 2. Brush and Spray Coats: ASTM D 4479, Type I.
- C. Cold-Applied, Emulsified-Asphalt Dampproofing:
1. Trowel Coats: ASTM D 1227, Type II, Class 1.
 2. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
 3. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.3 MISCELLANEOUS MATERIALS

- A. Cut-Back Asphalt Primer: ASTM D 41.
- B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as

recommended by manufacturer.

- C. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.
- D. Protection Course, Asphalt-Board Type: Premolded, 1/8-inch- (3-mm-) thick, multi-ply, semirigid board consisting of a mineral-stabilized asphalt core sandwiched between layers of asphalt-saturated felt, and faced on 1 side with polyethylene film.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Applicator present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.
 - 1. Begin dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.
 - 1. Apply additional coats if recommended by manufacturer or required to achieve coverages indicated.
 - 2. Allow each coat of dampproofing to cure 24 hours before applying subsequent coats.
- B. Apply dampproofing to footings and foundation walls where opposite side of wall faces building interior whether indicated or not.
 - 1. Apply from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches (150 mm) over outside face of footing.
 - 2. Extend 12 inches (300 mm) onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 - 3. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch- (200-mm-) wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat required for embedding fabric is in addition to other coats required.

- C. Apply dampproofing to provide continuous plane of protection on exterior face of inner wythe of exterior masonry cavity walls.
 - 1. Lap dampproofing at least 1/4 inch (6 mm) onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.
 - 2. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe, and lap dampproofing at least 1/4 inch (6 mm) onto shelf angles supporting veneer.
 - D. Contractor's Options: Provide cold-applied, cut-back or cold-applied, emulsified- asphalt dampproofing, as specified in subsequent articles for substrates indicated, within the following limitations:
 - 1. Use cold-applied, cut-back asphalt dampproofing only on exterior below grade surfaces of building and exterior face of inner wythe of cavity walls.
 - 2. Use cold-applied, emulsified-asphalt dampproofing on surfaces other than below-grade exterior surfaces.
- 3.4 COLD-APPLIED, CUT-BACK ASPHALT DAMPPROOFING
- A. On Unparged Masonry Foundations: Apply primer and one trowel coat at not less than 4 gal./100 sq. ft. (1.6 L/sq. m).
 - B. On Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft. (0.4 L/sq. m).
- 3.5 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING
- A. On Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft. (0.4 L/sq. m).
- 3.6 INSTALLATION OF PROTECTION COURSE
- A. Where indicated, install protection course over completed-and-cured foundation dampproofing. Comply with dampproofing material manufacturer's written recommendations for attaching protection course. Support protection course with spot application of trowel-grade mastic where not otherwise indicated.
- 3.7 CLEANING
- A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

END OF SECTION 07115

SECTION 07130 - WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sheet waterproofing membrane.
- B. Primer.
- C. Cant strips.
- D. Crack Guard.
- E. Protective covering.

1.2 RELATED SECTIONS

- A. Sections 02310 – Earthwork for Buildings.
- B. Section 03300 – Cast-In-Place Concrete: Concrete substrate.
- C. Section 07210 - Building Insulation: Perimeter board insulation.
- D. Section 14240 – Hydraulic Elevator – Passenger: Elevator Pit.

1.3 REFERENCES

- A. ASTM C366 – Standard Test Methods for Measurement of Thickness of Sandwich Cores.
- B. ASTM C836 – Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
- C. ASTM D412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
- D. ASTM D570 – Standard Test Method for Water Absorption of Plastics.
- E. ASTM D882 – Standard Test Method For Tensile Properties of Thin Plastic Sheeting.
- F. ASTM D903 - Standard Test Method for Peel or Stripping of Adhesive Bonds.
- G. ASTM D1621 - Standard Test Method for Compressive Properties for Rigid Cellular Plastics.

- H. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test).
- I. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- J. ASTM D3767 Method A – Standard Practice for Rubber-Measurement of Dimensions.
- K. ASTM D3776 - Standard Test Method for Mass Per Unit Area (Weight) of Fabric.
- L. ASTM D4491 – Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- M. ASTM D5385 - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes.
- N. ASTM E96 - Standard Test Method for Water Vapor Transmission of Materials.
- O. ASTM E154 - Standard Test Method for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as ground Cover.
- P. NRCA (National Roofing Contractors Association) - Waterproofing Manual.

1.4 SYSTEM DESCRIPTION

- A. Waterproofing System: Bentonite waterproofing and prefabricated drainage composite system to prevent liquid water under hydrostatic pressure from entering the structure, and the installation of same, without defects, damage or failure. Waterproofing shall be two high strength geotextiles, interlocked, encapsulating a minimum 1.10 lbs. per sq. ft. of dry, granular Volclay sodium bentonite. This system is for elevator pit slab and wall waterproofing.
- B. Waterproofing System: Bentonite waterproofing system to prevent liquid water under hydrostatic pressure from entering the concrete slab, and the installation of same. Waterproofing shall be two puncture-resistant nonwoven polypropylene fabric sandwiching a uniform layer of sodium bentonite clay. This system is for the depressed Bowling Center concrete slab.

1.5 SUBMITTALS FOR REVIEW

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Product Data: Provide data for chemical materials, crack protection system, joint and crack sealants, temperature range for application of waterproofing membrane and manufacturer's installation recommendations.
- C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials. Indicate requirements for porous fill placement.

- D. Product Samples: Submit two samples of each Bentonite geotextile membrane and two samples of prefabricated drainage composite.
- E. Material Certification: Submit manufacture's certificate, signed by manufacture, certifying materials comply with specified performance characteristics and physical requirements. Submit certification that waterproofing systems and components, drainage and protection materials are supplied by a single-source manufacturer.
- F. Contractor Certificate: Submit written certification that installer has current Approved Applicator status with waterproofing material manufacturer.

1.6 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention at both locations.

1.7 SUBMITTALS AT PROJECT CLOSEOUT

- A. Section 01700 - Contract Closeout: 01740 - Warranties: Procedures for submittals.
- B. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer. Provide Five year material warranty from manufacture.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Waterproofing Manual.
- B. Waterproofing Material Manufacturers: Cetco and Carlisle.
- C. Applicator: Company specializing in performing the work of this section with minimum ten years documented experience and approved by manufacturer.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Material and Equipment: Environmental conditions affecting products on site.
- B. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in factory sealed and labeled packaging to avoid delays, while minimizing on-site storage. Handle and store following manufacture's instructions and recommendations and material safety data sheets. Protect from construction operation related damage as well as damage from weather, excessive temperatures and prolonged sunlight. Remove material from site and dispose of in accordance with applicable regulations.

- B. Storage. Do not double-stack pallets during shipping or storage. Protect waterproofing materials from moisture, excessive temperatures and sources of ignition. Provide cover, top and sides for all stored on-site materials, allowing for adequate ventilation.

1.11 WARRANTY

- A. Section 01700 - Contract Closeout. 01740 – Warranties.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water.
- D. For warranty repair work, remove and replace materials concealing waterproofing.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Voltex bentonite geotextile waterproofing with applicable accessories as manufactured by Colloid Environmental Technologies Company (CETCO), 1500 West Shure Drive, Arlington Heights, Illinois 60004-1440, USA. Phone: (847)392-5800; Fax: (847)506-6195, and
- B. CCW MiraClay waterproofing with applicable accessories as manufactured by Carlisle Coatings and Waterproofing, 900 Hensley Lane, Wylie, Texas 75098. (800) 527-7092.

2.1 MATERIALS

A. ELEVATOR WATERPROOFING:

1. Sodium Bentonite: Specially selected Wyoming granular bentonite containing approximately 90% montmorillonite with 10% maximum unaltered volcanic ash and other native sediments. Free Swell Rating: 2 grams sifted into deionized water swells to occupy a minimum volume of 16 cc. Grading: Granular bentonite passes 90% through a 20-mesh sieve and less than 10% through a 200-mesh sieve.
2. NSF Certified: Standard bentonite geotextile waterproofing membrane shall be certified by NSF International to conform to the requirements of NSF Standard 61 - Drinking Water System Components - Health Effects.

B. Voltex bentonite geotextile waterproofing

1. Volclay Voltex: 4' x 15' (1.2 x 4.5m) roll of interlocked geotextiles encapsulating a minimum of 1.10 pound (0.5 kg) per square foot (0.1 sq m) of granular sodium bentonite. Composite shall consist of one woven and one non-woven

polypropylene geotextile, interlocked using a needle-punching process. The non-woven geotextile fibers shall pass through the bentonite layer and integrate into the woven geotextile to produce several interlocks each square inch (6.45 sq. cm) over the entire surface area of product.

C. Accessories

1. All accessory waterproofing materials shall be provided by the bentonite manufacturer.
 - a. Volclay Bentoseal: Trowel grade sodium bentonite compound used as detailing mastic around penetrations, corner transitions and grade terminations.
 - b. Volclay Hydrobar Tubes: 2" (5 cm) diameter x 2' 0" (60 cm) long, water soluble tube container filled with granular sodium bentonite; 3 lbs. (1.36 kg) per tube total weight.
 - c. Volclay Waterstoppage: 50 lbs. (22.7 kg) bag of specially processed dry granular sodium bentonite.
 - d. Volclay Waterstop-RX 101T: Rolls of flexible bentonite/butyl rubber strip waterstop for use in concrete construction joints. Secured with Volclay WB-Adhesive.

D. Prefabricated drainage composite

1. Aquadrain drainage composite by CETCO shall be used where specified to promote positive drainage, while serving as a protection course for the waterproofing. Use and install specific products as recommended by manufacturer.

E. BOWLING CENTER SLAB WATERPROOFING:

1. CCW MiraClay, bentonite clay waterproofing membrane: Uniform layer of sodium bentonite clay sandwiched between puncture resistant nonwoven polypropylene fabric and a high tensile strength woven polypropylene fabric. Thermally fused fibers and needlepunched. 1/4 inch thick x maximum panel size.
2. CCW Granules, for placement in all panels joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01039 - Coordination and Meetings: Verification of existing conditions before starting work.
- B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of waterproofing system.
- C. Verify that all concrete surfaces are smooth, free of honeycomb or pitting, form release agents, oils, etc., and not detrimental to full contact bond of waterproofing materials.
- D. Verify items which penetrate surfaces to receive waterproofing are securely installed.
- E. Verify that porous fill under Bowling Center slab is at proper elevations and compacted according to specifications.
- F. Verify that substrate is smooth and uniform, and without any projections.

3.2 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage or contamination from waterproofing products during installation operations.
- B. Soild Substrates: Provide mud slab beneath elevator pit slab. Concrete to receive waterproofing shall be of sound structural grade with a smooth surface finish, free of debris, oil, grease, laitenance, dirt, dust, or other foreign matter which will impair the performance of the waterproofing and drainage system and which do not comply with manufacture's warranty requirements.
 - 1. Remove fins, ridges, and other protrusions leveled and smoothly finished to match concrete surface. Completely fill honeycomb, aggregate pockets, holes, and other voids with non-shrink grout leveled and smoothly finished to match concrete surface.

3.3 GENERAL INSTALLATION GUIDELINES-ELEVATORS

- A. Install Voltex Waterproofing System with the woven side (dark gray) of the geotextile liner facing the concrete to be waterproofed in both horizontal and vertical applications, at elevators.
- B. Prevent bentonite waterproofing products from hydrating before material is contained with backfill. When thread of rain is imminent, installed benonite products not already protected with backfill shall be covered with polyethylene sheeting to decrease the chance of hydration. Remove polyethylene prior to backfilling.

3.3.A UNDER SLAB INSTALLATION

- A. Reinforced structural foundation slabs should be a minimum of 6" (150mm) thick when placed on a working mud slab. Reinforced concrete slab(s) on compacted grade shall be

a minimum of 4" (100 mm) thick. When hydrostatic conditions exist, install Voltex under all footings, elevator pits and grade beams

- B. Detail all penetrations with a 1/2" (1.2 cm) layer of Waterstoppage (granular bentonite) extending around each a minimum radius of 6" (15 cm).
- C. Place Voltex directly on properly prepared substrate (dark gray woven geotextile side up, facing installer), with adjoining edges overlapped a minimum of 4" (10 cm). Stagger sheet end seams a minimum of 24" (60 cm). Mechanically fasten or staple Voltex as required to prevent movement from construction operations or concrete placement. When the slab is poured in sections, extend Voltex a minimum 12" (30 cm) beyond the slab edge to enable proper overlapping.
- D. Cut Voltex to fit snugly around penetrations. Around base of penetrations trowel 3/4" (1.8 cm) thick fillet of Bentoseal and extend the Bentoseal onto Voltex.
- E. Provide a minimum of 12" (30 cm) overlap between underslab and vertical wall waterproofing by either extending the Voltex beyond the form or turning it up in the form and securing.
- F. Inspect finished Voltex installation and repair any damaged material prior to concrete placement. Assure that Voltex is not displaced during concrete placement.

3.3.B BACKFILLED POURED-IN-PLACE CONCRETE WALLS

- A. Place Hydrobar Tubes along the wall/footing intersection with ends butted together to form a continuous installation.
- B. Trowel 3/4" (1.8 cm) thick Bentoseal fillet at all inside corner transitions.
- C. Starting at the base of the wall, install Voltex sheet horizontally (dark gray woven geotextile against the wall) covering the Hydrobar Tubes and extending onto the footing a minimum of 6" (15 cm). For hydrostatic conditions, cover the entire footing and overlap under slab waterproofing a minimum of 6" (15cm). Attach Voltex using washer-headed mechanical fasteners centered 24" (60 cm) around the edge. Stagger all vertical overlap seams a minimum of 24"(60 cm).
- D. Detail around all penetrations with 3/4" (1.8 cm) cant of Bentoseal. Extend Bentoseal 1/4" (0.6 cm) thick over substrate a minimum radius of 6" (15 cm) around penetration. Cut Voltex to fit snugly around penetrations.
- E. Terminate at grade with metal termination bar fastened 12" (30 cm) on center. Cover top edge of Voltex with 1/2" (1.2 cm) thick, 2" (5 cm) wide layer of Bentoseal.

- F. Inspect finished Voltex installation and repair any damaged material prior to backfill placement. Assure that Voltex is not displaced during backfill placement or soil compaction.

3.3.C PREFABRICATED DRAINAGE COMPOSITE INSTALLATION

A. VERTICAL SURFACES

1. Over Voltex Waterproofing System: Starting at the base of the wall, place Aquadrain horizontally (plastic core side against Voltex) with the filter fabric toward the soil, flanged core side up. Use construction adhesive or washer-head mechanical fasteners to secure Aquadrain.
2. Connect adjacent panels at the end by pulling the filter fabric back to expose two rows of core dimples and interlocking the core dimples with the installed panel. With the next course, the flangeless panel edge should be placed over the top flange edge of the panel below and butted dimple to dimple. All connections should be completed in shingle fashion so that water will flow with the overlap and not against it. Overlap fabric in direction of water flow and secure with construction adhesive. Wrap all panel termination edges with the filter fabric flap by tucking it behind the plastic core.

3.3.D INSULATION

- A. Always apply Voltex waterproofing directly to properly prepared structural substrates. Insulation should be applied over the waterproofing.

3.3.E BACKFILL

- A. Closely coordinate Voltex installation with Backfill conducted under Division 2 work. Care should be used during backfill operation to avoid damage to the waterproofing system. Follow generally accepted practices for backfilling and compaction. Backfill should be added in 6" to 12" (15 - 30 cm) lifts and compacted to a minimum 85% Modified Proctor density. At grade line and other areas that can not be fully compacted, a termination bar is recommended across the top termination of the membrane.
- B. Carefully monitor backfill material. Remove any rocks, sharp metal objects, or other material that may puncture the insulation and waterproofing membrane. Special attention to this work shall be monitored by the Architect.

3.4 INSTALLATION-BOWLING CENTER SLAB

- A. Install CCW MiraClay over the properly prepared substrate with the non-woven side up. Overlap adjoining edges a minimum of 6 inches; stagger sheet ends a minimum of 24 inches; nail or staple edges together, to prevent any displacement when concrete is poured.

- B. When the slab is poured in sections, MiraClay shall extend a minimum of 12 inches beyond the slab edge. When the installation reaches the edge of the slab, continue the MiraClay up and out of the form a minimum of 12 inches. At the corner, MiraClay shall remain in contact with the substrate and inside the surface of the form.
- C. Follow all of manufacturer's written installation directions.

3.9 CLEAN UP

- A. In areas where adjacent finished surfaces are soiled by work of this Section, consult manufacturer of surfaces for cleaning advice and conform to their recommendations and instructions. Remove all tools, equipment and remaining product on-site. Dispose of section work debris and damaged product following all applicable regulations.

END OF SECTION

SECTION 07210

BUILDING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Board insulation at perimeter foundation wall, underside of floor slabs, and where shown on drawings
- B. Fiberglass Batt thermal Insulation as shown on the construction drawings
- C. Fiberglass Batt Insulation for sound control in interior walls and above ceilings as shown on the construction drawings
- D. Accessories for securing all insulation

1.2 RELATED SECTIONS

- A. Section 03300 - Cast In-Place Concrete
- B. Section 09260 - Gypsum Board Systems: Installation of sound attenuation blankets

1.3 REFERENCES

- A. ASTM C208 - Insulating Board
- B. ASTM C240 - Testing Cellular Glass Insulating Block
- D. ASTM C552 - Cellular Glass Block and Pipe Thermal Insulation
- E. ASTM C578 - Preformed, Cellular Polystyrene Thermal Insulation
- E. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation Board
- F. ASTM C665 - Mineral Fiber Blanket Thermal Insulation
- G. ASTM C728 - Perlite Thermal Insulation Board
- H. ASTM C578 - Preformed Cellular Polystyrene Thermal Insulation

- I. ASTM C1013 - Membrane Faced Rigid Cellular Polyurethane Roof Insulation
- J. ASTM D2842 - Water Absorption of Rigid Cellular Plastics
- K. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials

1.4 SYSTEM DESCRIPTION

- A. Materials of This Section: Provide continuity of thermal barrier at building enclosure elements.
- B. Provide continuity of sound barriers.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide data on product characteristics and performance criteria.
- C. Environmental Requirements - Submit the following in accordance with the requirements of Section 01011:
 - 1. Resource efficient product data: Submit required information concerning project recyclability (packaging), product recycled content and product recyclability.
 - 2. Environmental issues certification: Submit written certification stating that the products installed are essentially the same as those defined by the Project requirements (specification, submittals and/or test data) in terms of recycled content and indoor air quality.
 - 2. Indoor Air Quality: Submit Material Safety Data Sheets (MSDS) and emission test data.
- D. Manufacturer's Installation Instructions: Indicate special environmental conditions required for installation and installation techniques.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.7 SEQUENCING

- A. Sequence work under the provisions of Section 01600.
- B. Sequence work to ensure firestop materials are in place before beginning the Work of this section.

1.8 COORDINATION

- A. Coordinate work under provisions of Section 01039.

PART 2 PRODUCTS

2.1 INSULATION MATERIALS

- A. Perimeter below slab insulation shall be rigid, closed-cell, extruded polystyrene board complying with E84; 25 psi compressive strength; .4-1.1 perm maximum water absorption; thermal resistance of 5.0 R-value per inch at 75 degree F mean temperature. Provide 2 inch thick perimeter insulation, unless otherwise shown on the drawings.

1. Provide a product with minimum 50% recycled content.
2. Expanding agent: Shall not contain CFCs.

- B. Batt Insulation: ASTM C665 - Type III Class A, Category I; preformed glass fiber batt, formaldehyde-free, as manufactured by Johns Manville. To conform to the following:

1. Thermal Resistance: R-19 for walls, R-38 for floors.
2. Batt Size: 16 inch or 24 inch, as required to fit within structural members.
3. Facing: FSK -25: (Foil-Scrim-Kraft): < 25 flame spread and < 50 smoke developed.
4. Flame/Smoke Properties: in accordance with ASTM E84, UL 723, NFPA 255.
5. Recycled content: 25% total.
6. Foil Facing: Provide product with minimum 80% recycled aluminum.
6. Product shall emit no formaldehyde.
7. Provide encapsulated product where glass fiber is used.

- C. Batt Insulation for sound control: Unfaced. 3-1/2 inch thickness, unless otherwise shown.

2.2 ADHESIVES

- A. Adhesive: Type recommended by insulation manufacturer for application. No asbestos.
- B. Coordinate with environmental regulations listed within Section 01745 - Indoor Air Quality Management Plan regarding the use of low-emitting materials.

2.3 ACCESSORIES

- A. Insulation Fasteners: Impaling clip with washer retainer and clips, to be fastened to surface to receive board insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place, as recommended by the insulation manufacturer.
- B. Insulation Tape: Type recommended by Manufacture for sealing all joints of batt insulation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01039.
- B. Construction debris shall be removed from spaces to be insulated.
- C. Leaks in the walls, floors or ceiling shall be sealed with sealant to stop air infiltration.
- D. Ensure that edges around windows and doors are adequately sealed to prevent air infiltration.
- E. Gaps around pips and ducts penetrating walls or ceiling shall be sealed.
- F. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.

- G. Verify substrate surface is flat, free of irregularities, materials or substances that may impede adhesive bond.
 - H. Verify that all firestopping has been completed and approved by the City of Portsmouth Building Inspector.
- 3.2 INSTALLATION - UNDER CONCRETE SLABS
- A. Substrate shall be flat, dry and free of honeycombs, fins or foreign material that will impede adhesive bond or damage the insulation board.
 - B. Materials shall be protected from exposure to direct sunlight using an opaque, light-colored tarp or original manufacturer's packaging. Unwrapped material shall be rewrapped using an opaque, light-colored tarp or packaging.
 - C. Examine product, with installer present, for manufacturer's packaging. Product shall be free of ripped back and edges.
 - D. Insulation and substrate shall be completely dry prior to installation.
 - E. Substrate shall not be installed during predominantly inclement weather conditions.
 - F. Place insulation under slabs-on-grade after base for slab has been compacted.
 - G. Cut and fit insulation tight to protrusions or interruptions to the insulation plane.
 - H. Prevent insulation from being displaced or damaged while placing slab.
- 3.3 INSTALLATION - EXTERIOR WALLS AND ROOF FRAMING
- A. Install insulation that is dry and free of damage.
 - B. All building insulation shall be protected from high humidity conditions. In cases where glass fiber will dry naturally and regain its original R-value, insulation shall be allowed to dry thoroughly. Under conditions where the insulation will not dry thoroughly insulation shall be replaced.
 - C. Metal Accessories shall be inspected for signs of corrosion prior to the installing insulation and be replaced if necessary.

- D. Install insulation in accordance with manufacturer's instructions.
 - E. Install, as shown on the drawings, without gaps or voids. Do not compress insulation.
 - F. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
 - G. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.
 - H. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
 - I. Staple or nail facing flanges in place at maximum 6 inches oc. Tape in place or retain in place with spindle fasteners at locations where staples or nails are not practical.
 - J. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- 3.4 INSTALLATION OF SOUND ATTENUATION BLANKETS ABOVE CEILINGS
- A. Unfaced building insulation shall not be installed in an exposed location/surface where it will be subject to human contact.
 - B. Place sound batts around the perimeter of Classroom ceilings.
 - C. Place sound batts over entire ceilings where shown on Reflected Ceiling Plans.
 - D. Batts shall be placed tightly against each other to eliminate any gaps.
- 3.5 COMMISSIONING
- A. Commissioning Agent (CA) shall be notified reasonably head of time to allow for inspections. CA shall verify that that approved insulation material is used and installed as per specifications, after the preparation stage, and prior to covering insulation with interior finish.
- 3.6 CLEANING

- A. Final cleaning shall be as described in section 01745.
 - B. Remove and recycle excess materials as required by the Section 01565 - Construction Waste Management.
- 3.5 PROTECTION OF FINISHED WORK
- A. Protect finished Work under provisions of Section 01500.
 - B. Insulation manufacturer shall warrant that the actual thermal performance of the specified product when properly installed at specified thickness and sealed against air and water vapor infiltration for 5 years.
 - C. Do not permit work to be damaged prior to covering insulation.

END OF SECTION

SECTION 07313

PRESTAINED WOOD SHINGLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Prestained Cedar Wall Shingles
- B. Moisture shedding underlayment.
- C. Associated metal flashings and accessories.

1.2 RELATED SECTIONS

- A. Division 6 - Misc. Carpentry and Sheathing
- B. Division 7 - Sheet Metal Flashing and Trim
- C. Division 7 - Gutters and Downspouts.
- D. Division 8- Unit Skylights - Plastic Unit Skylights:
Skylight within shingled roof area.
- E. Division 15- Plumbing and Mechanical (wall
penetrations)

1.3 REFERENCES

- A. ASTM A361/A361M - Steel Sheet, Zinc-Coated
(Galvanized) by the Hot-Dip Process for Roofing and
Siding.
- B. ASTM B209/B209M - Aluminum and Aluminum-Alloy Sheet
and Plate.
- C. ASTM B370 - Copper Sheet and Strip for Building
Construction.
- D. ASTM D224 - Smooth-Surfaced Asphalt Roll Roofing
(Organic Felt).
- E. ASTM D226 - Asphalt-Saturated Organic Felt Used in
Roofing and Waterproofing.

- F. ASTM D228 - Method Of Testing Asphalt Roll Roofing, Cap Sheets and Shingles.
- G. ASTM D249 - Asphalt Roll Roofing Surfaced with Mineral Granules.
- H. ASTM D2178 - Asphalt Impregnated Glass (Felt) Mat Used in Roofing and Waterproofing.
- I. ASTM D2822 - Asphalt Roof Cement.
- J. ASTM D4586 - Asphalt Roof Cement, Asbestos Free.
- K. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- L. NRCA - Steep Roofing Manual.
- M. RCSHSB (Red Cedar Shingles and Handsplit Shakes Bureau) - Grading Rules for Red Cedar Shingles and Handsplit Shakes.

1.4 SUBMITTALS FOR REVIEW

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Shop Drawings: Indicate metal flashings, jointing methods and locations, fastening methods and locations, and installation details. Provide color selection from full range of prefinished shingles.
- C. Product Data: Provide data indicating material characteristics, performance criteria, limitations, and warranty information.

1.5 SUBMITTALS FOR INFORMATION

- A. Section 01300 - Submittals: Procedures for submittals.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with RCSHSB instructions.
- B. Maintain one copy of each document on site.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable code for ASTM E84 flame spread on shingle type required.

1.8 MOCKUP

- A. Section 01400 - Quality Control: Requirements for mock-up.
- B. Provide mockup of 100 sq ft including underlayment and shingle installation, and associated flashings.
- C. Locate on rear of the building.
- D. Mockup may remain as part of the Work.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Material and Equipment: Environmental conditions affecting products on site.

1.10 EXTRA MATERIALS

- A. Section 01700 - Contract Closeout 01730 - Operation and Maintenance Data.
- B. Provide 100 sq ft of extra shingles.

PART 2 PRODUCTS

2.1 SHINGLES

- A. Manufacturers:
 - 1. Michigan PreStain
 - 2. Substitutions: Refer to Section 01600.
- B. Western Red Cedar Shingles: RCSHSB sized and graded, No. 1 (Blue Label; 18" inches long, sanded, re-squared and re-butted, 5" exposure, pre-stained semi-transparent shingles, color: Mountain Ash. Install with stainless steel nails.

2.2 SHEET MATERIALS

- A. Underlayment: Sheet barrier of rubberized asphalt bonded to sheet polyethylene, 40mil total thickness, with strippable treated release paper; manufactured by WR Grace or equal.

2.3 ACCESSORIES

- A. Nails: Standard shingle type stainless steel type, minimum 13/64 inch (5 mm) head diameter and 0.080 inch (2 mm) shank diameter, 1 1/4 inch of sufficient length to penetrate 3/4 inch into wall sheathing.

2.4 FLASHING MATERIALS

- A. Sheet Flashings: ASTM B370; cold rolled copper, 16 oz/sq ft; natural finish.
- B. Bituminous Paint: Acid and alkali resistant type; black color.
- C. Nails: Standard round wire roofing type, copper compatible; of sufficient length to penetrate through roof sheathing.

2.5 FLASHING FABRICATION

- A. Form flashings to profiles indicated on Drawings, and to protect materials from physical damage and shed water.
- B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
- C. Hem exposed edges of flashings minimum 1/4inch on underside.
- D. Apply bituminous paint on concealed surfaces of flashings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01039 - Coordination and Meetings:
Verification of existing conditions prior to beginning work.
- B. Verify that wall penetrations are in place and flashed to sheathing surface.
- C. Verify wall openings are correctly framed.
- D. Verify surfaces are dry, free of ridges, warps, or voids.

3.2 INSTALLATION - Underlayment

- A. 30# building felt installed in accordance with manufacturer's instructions to cover entire wall surface.

3.7 INSTALLATION - SHINGLES

- A. Install shingles in accordance with manufacturer's instructions.

***** [OR] *****

- A. Place shingles in accordance with RCSHSB requirements to produce straight coursing pattern with 5 inch weather exposure to produce triple thickness over wall area.
- B. Coordinate installation of wall components or work projecting through wall with weather tight placement of counter flashings.
- C. Complete installation to provide weather tight service.
- D. Coordinate shingle installation with trim, corner boards, and backer plates for light fixtures, vents, etc.

Duck Town Hall
Duck, North Carolina

END OF SECTION

SECTION 07610

METAL ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Aluminum roofing, associated integral flashings, and underlayment.
- B. Counterflashings.
- C. Moisture shedding underlayments, eave, edge, and ridge protection.

1.2 RELATED SECTIONS

- A. Section 06114 - Wood Blocking and Curbing. Roof Sheathing.
- B. Section 07620 - Sheet Metal Flashing and Trim.
- C. Section 07900 - Joint Sealers.

1.3 REFERENCES

- A. AA (Aluminum Association) - Aluminum Construction Manual: Aluminum Sheet Metal Work in Building Construction.
- B. ASTM A361 - Steel Sheet, Zinc coated (Galvanized) by the Hot-Dip Process for Roofing and Siding.
- C. ASTM A446 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
- D. ASTM B209 - Aluminum and Alloy Sheet and Plate.
- E. ASTM B32 - Solder Metal.
- F. ASTM B486 - Paste Solder

- G. ASTM D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- H. ASTM D2178 - Asphalt Impregnated Glass Mat for Roofing and Waterproofing.
- I. ASTM D4586 - Asphalt Roof Cement, Asbestos-Free.
- J. NRCA (National Roofing Contractors Association) - Roofing Manual.
- K. SMACNA - Architectural Sheet Metal Manual - Fourth Edition.
- L. ASTM D-1970 for Self adhering Polymer modified bituminous sheet (Ice & Watershield)

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300 - Submittals.
- B. Shop Drawings: Must be in a scale large enough to clearly show all layers; indicate material profile, jointing pattern, jointing details, size and spacing of fasteners, fastening methods, flashings, material thicknesses and finishes, terminations, ice and water shield, and other details in proximity with roof. Show details of weather-proofing at all edges and penetrations. Identify coordination with other trades. Manufacturer shall provide or review shop drawings before submittal to Architect. Installation shall not begin until shop drawings have been approved.
- C. Product Data:
 - 1. Provide data on metal types, finishes, characteristics and accessories.
 - 2. Resource efficient product data: Submit required information concerning Environmental Requirements listed under Part 2 - Products.
 - 3. Environmental issues certification: Submit written certification stating that the products installed

are essentially the same as those defined by the Project requirements (specifications, submittals and/or test data) in terms of recycled content and recyclability.

4. Indoor Air Quality: Submit Material Safety Data Sheets (MSDS) and emission test data.

- D. Submit Manufacturer's 20 year paint finish warranty covering finish fade, chalk, and peel.
- E. Submit two samples, 12 x 18 inch in size, illustrating metal roofing mounted on plywood backing illustrating typical standing seam, external corner, ridge, and counterflashing at intersection with metal insulated panels.
- F. Submit two clip and fasteners samples.
- G. Submit two sealant (gunable grade) and sealant tape samples.
- H. Submit four samples, 3 x 3 inch in size, illustrating custom metal finish color.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with AA, SMACNA, and NRCA standard details and requirements.

1.6 QUALIFICATIONS

- A. Manufacturer: Shall have a permanent indoor production facility available for inspection by Architect or Owner. Manufacturer shall have at least ten years experience using structural standing seam products in architectural applications and the product proposed for use on this project shall have been in use for a minimum of ten years. Manufacturer shall upon request supply a list of at least five projects similar in size and complexity to this project. Include contact information for Owner, Architect, Installer and General Contractor.
- B. Installer: Company specializing in sheet metal roof installations with minimum ten years documented

experience. Installer shall be authorized by the manufacturer and the actual work shall be supervised by personel trained by the manufacturer in the proper installation of the product.

1.7 PRE-INSTALLATION CONFERENCE

- A. Convene two weeks prior to commencing work of Section 07420 - Metal Siding, under provisions of Section 01039.
- B. Review flashing and counterflashing required at intersection of standing seam metal roof and insulated metal wall panels.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
- B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials which may cause discoloration or staining.
- D. Store materials out of traffic areas.

1.9 WARRANTY

- A. Manufacturer to provide a five year warranty to include coverage for the structural materials, weather tightness (valid till the design windspeed) and hurricanes. Installer and General Contractor are required to back the manufacturer's warranty. 0.
- B. Manufacturer to provide twenty year paint finish warranty covering finish fade, chalk, and peel.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Sentrigard

- B. Centria SRS III.
- C. Imetco Series 300.
- D. Substitutions: Under provisions of Section 01600.

2.2 ENVIRONMENTAL REQUIREMENTS

- A. Applicable components of metal roofing shall comply with LEED Edition 2007 credit requirements listed below.

- 1. Credits MR 4.1 & 4.2, Recycled Content:

- a. Alum. Metal Roofing; Minimum 50% post-consumer recycled content.

- 2. Credits MR 5.1 & 5.2, Regional Materials:

- a. Product (or a fraction of a product or material) shall be extracted, harvested/recovered as well as manufactured within 500 miles of the project.

- 3. Credit EQ 4, Low-Emitting Materials:

- a. All applicable products shall meet requirements as stated in Section 01745, Indoor Air Quality Management.

- 4. Recyclability: Project goal is to provide products that are 100% recyclable/reusable.

2.3 SHEET MATERIALS

- A. Metal Sheet: ASTM B209 & ASTM 1592, .0253 thickness, 22 gauge 3105-H14 aluminum. Seam height of 1 1/2" inch. 17 3/4 inch coverage maximum. Snap lock seam, roll form roofing. Panel fastener shall be (2)#14 per clip, minimum 3/4" penetration through roof deck, maximum spacing at 6" on center. Tested in accordance with the principles of ASTM E-1592, panel system to be tested to failure with a factor of safety applied to achieve safe working loads and UL-580 resulting in a

130 mph wind load rating. Calculations will not be acceptable in lieu of testing. No stiffening ribs.

- B. Color: Kynar 500. 1 mil nominal film thickness including primer on top side, .5 mil backer coat on bottom side. Architect to select from manufacturer's full range of standard colors. Color to have an SRI of 29 or greater in accordance with ASTM E 1980.
- C. Finish: Smooth.
- D. Flashing and Trim: Gauge to be the same as aluminum sheets, unless otherwise shown on the drawings. Temper may be reduced to facilitate forming.

2.4 ACCESSORIES

- A. Fasteners: Aluminum or stainless steel, finished to match flashing metal to the greatest extent possible and spacing as recommended by the Manufacturer. Clips shall be stainless steel with a galvanized base or extruded aluminum coated with nylon.
- B. Underlayment:
 - 1. Entire roof: Grace Ice and water Shield by Grace Construction Products or approved equal.
- C. Slip Sheets: Rosin sized building paper.
- D. Protective Backing Paint: Zinc chromate alkyd.
- E. Sealant: As specified in Section 07900.
- F. Bedding Compound: Rubber-asphalt type.
- G. Plastic Cement: ASTM D4586, Type I.

2.5 SHOP FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

- B. Fabricate cleats of same material as sheet, interlockable with sheet.
- C. Form pieces in single length sheets.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with standing seams.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer to inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections that might inhibit performance of roof system.
- B. Verify deck is dry and free of snow or ice. Verify joints in wood deck are solidly supported and fastened.
- C. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
- D. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 INSTALLATION

- A. Conform to drawing details as shown on the approved shop drawings.
- B. Apply underlayment in accordance with Manufacturer's written instructions.

3.3 STANDING SEAM ROOFING

- A. Space standing seams at 17 3/4 inches on center. Verify first panel is square and perpendicular to ridge and eave, and parallel to sides.
- B. Lay sheets with long dimension perpendicular to eaves.

- C. Lock cleats into seams.
- E. Finish standing seams 1 1/2" inch high.
- H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- I. Seal all metal joints watertight. Apply sealant before assembly of joint so sealant is captured between layers of metal.

3.4 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01400.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01500.
- B. Do not permit traffic over unprotected roof surface.

END OF SECTION

SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following sheet metal flashing and trim:
 - 1. Manufactured through-wall flashing.
 - 2. Formed wall flashing and trim.
 - 3. Sheet metal reglets built into concrete.
 - 4. Formed equipment support flashing.
- B. Related Sections include the following:
 - 1. Division 4 Section "Unit Masonry Assemblies" for installing concealed through-wall flashing, and other sheet metal flashing and trim.
 - 2. Division 6 Section "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
 - 3. Division 7 Section "PVC Membrane Roof With 2-PLY SBS Base" for installing sheet metal flashing and trim integral with roofing membrane.
 - 4. Division 7 Section "Sheet Metal Roofing" for custom-formed sheet metal roofing and flashing and trim not part sheet metal flashing and trim.
 - 5. Division 7 Section "Manufactured Roof Specialties" for copings, roof edge flashings (fascia), roof edge drainage system.
 - 6. Division 15 – Mechanical for set-on-type roof curbs and equipment supports.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install roof edge flashing capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:
 - 1. Wind Zone 1: For velocity pressures of 21 to 30 lbf/sq. ft. (1.00 to 1.44 kPa): 60-lbf/sq. ft. (2.87-kPa) perimeter uplift force, 90-lbf/sq. ft. (4.31-kPa) corner uplift force, and 30-lbf/sq. ft. (1.44-kPa) outward force.
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of

joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
1. Identify material, thickness, weight, and finish for each item and location in Project.
 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
1. Sheet Metal Flashing: 12 inches (300 mm) long. Include fasteners, closures, and other attachments.

1.5 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
1. Copper Standard: Comply with CDA's "Copper in Architecture Handbook."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 SHEET METALS

- A. Copper Sheet: ASTM B 370, Temper H00 or H01, cold-rolled copper sheet.
- B. Lead-Coated Copper Sheet: ASTM B 101, Temper H00 and H01, cold-rolled copper sheet, of weight (thickness) indicated below, coated both sides with lead weighing not less than 12 lb/100 sq. ft. (0.59 kg/sq. m) nor more than 15 lb/100 sq. ft. (0.73 kg/sq. m) of copper sheet (total weight of lead applied equally to both sides).
- C. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.

2.3 UNDERLAYMENT MATERIALS

- A. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- B. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. Nails for Copper Sheet: Copper or hardware bronze, 0.109 inch (2.8 mm) minimum and not less than 7/8 inch (22 mm) long, barbed with large head.
 - 2. Blind Fasteners: copper rivets.
- C. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
- D. Solder for Lead-Coated Copper: ASTM B 32, Grade Sn60, 60 percent tin and 40 percent lead.
- E. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- F. Elastomeric Sealant: ASTM C 920, elastomeric polysulfide polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- G. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2 .5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 1. Seams: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 2. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
 - 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

- D. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
- E. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- F. Fabricate cleats and attachment devices from same material as accessory being anchored.
 - 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.6 ROOF SHEET METAL FABRICATIONS

- A. Counterflashing: Fabricate from the following material:
 - 1. Lead-Coated Copper: 17.2 oz./sq. ft. (0.60 mm thick).
- B. Flashing Receivers: Fabricate from the following material:
 - 1. Lead-Coated Copper: 17.2 oz./sq. ft. (0.60 mm thick).
- C. Roof-Drain Flashing: Fabricate from the following material:
 - 1. Lead: 4.0 lb/sq. ft. (1.6 mm thick), hard tempered.

2.7 FINISHES

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding

rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and butyl sealant.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 1. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
 1. Copper Use copper.
- H. Seal joints with butyl sealant as required for watertight construction.
 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm) except where pre-tinned surface would show in finished Work.
 1. Pre-tinning is not required for lead-coated copper and lead.
 2. Copper Soldering: Tin uncoated copper surfaces at edges of sheets using solder recommended for copper work.
 3. Where surfaces to be soldered are lead coated, do not tin edges, but wire brush lead coating before soldering.

4. Lead-Coated Copper Soldering: Wire brush edges of sheets before soldering.
5. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

3 .3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Counterflashing at : Coordinate installation of counterflashing with installation of masonry and base flashing. Insert counterflashing in receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with butyl sealant.
 1. Secure to in-wall flashing in a waterproof manner by means of interlocking folded seam.

3 .4 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Concealed Through-Wall Flashing: Installation of manufactured through-wall flashing is specified in Division 4 Section "Unit Masonry Assemblies."

3 .5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07620

SECTION 07631

GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Gutters, leader boxes and downspouts.
- B. Accessories.
- C. Precast concrete splash pads.

1.02 RELATED SECTIONS

- A. Section 07510 - Metal Roofing.
- B. Section 07313 - Prestained Wood Shingles
- C. Section 06105- Miscellaneous Carpentry

1.03 REFERENCES

- A. SMACNA - Architectural Sheet Metal Manual.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- C. Product Data: Provide data on prefabricated components.
- D. Samples: Submit two samples, illustrating component design, finish, color, and configuration.

1.05 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for size and method of rain water discharge.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600 - Material and Equipment.
- B. Stack preformed and prefinished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.01 Prefinished painted aluminum .040 minimum thickness, ASTM B209 - Aluminum and Aluminum Alloy Sheet and Plate.

2.02 COMPONENTS

- A. Gutters: SMACNA Half-round style profile, 5" diameter.
- B. Downspouts: SMACNA Round profile 3" diameter.
- C. Leader Boxes: Profile as shown on drawings.
- D. Accessories: Profiled to suit gutters and downspouts.

2.03 ACCESSORIES

- A. Anchorage Devices: SMACNA requirements. Type recommended by fabricator.
- B. Gutter Supports: SMACNA requirements. Type recommended by fabricator.
- C. Downspout Supports: SMACNA requirements. Type recommended by fabricator.
- D. Fasteners: SMACNA requirements. Type recommended by fabricator.

2.04 FABRICATION

- A. Form gutters and downspouts of profiles and to SMACNA requirements.
- B. Fabricate with required connection pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.05 FINISHES

- A. Prefinished painted exterior surfaces (color to be white)

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.

3.02 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with SMACNA instructions.
- B. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Slope gutters 1/32" inch per foot, minimum.
- D. Seal metal joints watertight.

END OF SECTION

SECTION 07841 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
- B. Related Sections include the following:
 - 1. Division 7 Section "Fire-Resistive Joint Systems." For fire resistive joints in rated walls and partitions.
 - 2. Division 13 Sections specifying fire-suppression piping penetrations.
 - 3. Division 15 Sections specifying duct and piping penetrations.
 - 4. Division 16 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 smoke barriers.
 - 2. Fire-resistance-rated horizontal assemblies including floors and roofs.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 with a minimum positive pressure differential of 0.01-inch wg (2.5 Pa):
 - 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.
- 3. L-Rated Systems: Where through-penetration firestop systems are indicated in smoke barriers, provide through-penetration firestop systems with L-ratings of not more than 3.0 cfm/sq. ft (0.01524cu. m/s x sq. m) at both ambient temperatures and 400 deg F (204 deg C).
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches (100 mm) in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
 - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- D. 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 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 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.
- B. Installation Responsibility: Assign installation of through-penetration firestop systems in Project to a single qualified installer.
- C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.
- D. 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, 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 systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings"

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials 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. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, through-penetration firestop systems that may be incorporated into the Work include, but are not limited to, those systems indicated in the Through-Penetration Firestop System Schedule on drawings and 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. RectorSeal Corporation (The).
 - 7. Specified Technologies Inc.
 - 8. 3M; Fire Protection Products Division.
 - 9. Tremco; Sealant/Weatherproofing Division.
 - 10. 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. Accessories include, but are not limited to, the following items:
1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule on drawings by referencing the types of materials described in this Article. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

2.4 MIXING

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
 - 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 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 07841

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

- 1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:

- a. Construction joints in cast-in-place concrete.
- b. Control and expansion joints in unit masonry.
- c. Joints between different materials listed above.
- d. Perimeter joints between materials listed above and frames of doors windows, curtain walls and louvers.
- e. Cast stone coping and other cast stone work indicated.
- f. Other joints as indicated.

- 2. Exterior joints in the following horizontal traffic surfaces:

- a. Isolation and contraction joints in cast-in-place concrete slabs.
- b. Joints between different materials listed above.
- c. Other joints as indicated.

- 3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:

- a. Perimeter joints of exterior openings where indicated.
- b. Vertical joints on exposed surfaces of interior unit masonry walls and partitions.
- c. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
- d. Joints between plumbing fixtures and adjoining walls, floors, and counters.
- e. Other joints as indicated.

- B. Related Sections include the following:

- 1. Division 2 Section "Joint Sealants for Site" for site work related joint sealants.
- 2. Division 4 Section "Unit Masonry Assemblies" for masonry compressible filler and preformed control-joint gaskets.
- 3. Division 7 Section "Fire-Resistive Joint Systems." For fire resistive joints in rated walls

- and partitions.
4. Division 8 Section "Glazing" for glazing sealants.
 5. Division 8 Section "Glazed Aluminum Curtain Walls and Windows" for structural and other glazing sealants.
 6. Division 9 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
 7. Division 9 Section "Ceramic Tile" for sealing tile joints.

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. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- D. 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.
- E. Field Test Report Log: For each elastomeric sealant application.
- F. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.
- G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- B. 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.
- C. 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 (5 deg C).
 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.

1.6 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: Five 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: Five 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. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, 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: 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. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Single-Component Nonsag Polysulfide Sealant ES-1:
 - 1. Available Products:
 - a. Pacific Polymers, Inc.; Elastoseal 230 Type I (Gun Grade).
 - b. Polymeric Systems Inc.; PSI-7000.
 - 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: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: aluminum coated with a high-performance coating galvanized steel brick.
- D. Multicomponent Pourable Polysulfide Sealant ES-2:
 - 1. Available Products:
 - a. Meadows, W. R., Inc.; Deck-O-Seal.
 - b. Pacific Polymers, Inc.; Elastoseal 227 Type I (Pourable).
 - 2. Type and Grade: M (multicomponent) and P (pourable).
 - 3. Class: 25.
 - 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).

5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
 - a. Use O Joint Substrates: Brick and cast stone.
- E. Single-Component Neutral-Curing Silicone Sealant ES-3:
 1. Available Products:
 - a. GE Silicones; SilPruf SCS2000.
 - b. Pecora Corporation; 890.
 - c. Sonneborn, Division of ChemRex Inc.; Omniseal.
 - d. Tremco; Spectrem 3.
 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: anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, brick, wood.
 6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
- F. Single-Component Pourable Neutral-Curing Silicone Sealant ES-4:
 1. Available Products:
 - a. Pecora Corporation; 300 Pavement Sealant (Self Leveling).
 - b. Dow Corning Corporation; SL Parking Structure Sealant.
 2. Type and Grade: S (single component) and P (pourable).
 3. Class: 100/50.
 4. Use[] Related to Exposure: NT and T (traffic). s
 5. Uses Related to Joint Substrates: M A and O, as applicable to joint substrates indicated.
 - a. Use O Joint Substrates: concrete and metal.
- G. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant ES-5:
 1. Available Products:
 - a. Pecora Corporation; 898.
 - b. Tremco; Tremsil 600 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: M, G, A, and, as applicable to joint substrates indicated, O.

a. Use O Joint Substrates: ceramic tile, solid surfacing and plastic laminate.

2.4 SOLVENT-RELEASE JOINT SEALANTS

A. Butyl-Rubber-Based Solvent-Release Joint Sealant SRS-1: Comply with ASTM C 1085.

1. Available Products:

- a. Bostik Findley; Bostik 300.
- b. Pecora Corporation; BC-158.
- c. Sonneborn, Division of ChemRex Inc.; Sonneborn Multi-Purpose Sealant.
- d. Tremco; Tremco Butyl Sealant.

2.5 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. Sonneborn, Division of ChemRex Inc.; Sonolac.
4. Tremco; Tremflex 834.

2.6 PREFORMED JOINT SEALANTS

A. Preformed Foam Sealant/filler PS-1: Manufacturer's standard preformed, precompressed, open-cell foam sealant that is manufactured from high-density urethane foam impregnated with a nondrying, water-repellent agent; is factory produced in precompressed sizes in roll or stick form to fit joint widths indicated; is coated on one side with a pressure-sensitive adhesive and covered with protective wrapping; develops a watertight and airtight seal when compressed to the degree specified by manufacturer; and complies with the following:

1. Available Products:

- a. EMSEAL Joint Systems, Ltd.; Emseal 25V.
- b. Polytite Manufacturing Corporation; Polytite B.
- c. Sandell Manufacturing Co., Inc.; Polyseal.

2. Properties: Permanently elastic, mildew resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants.

a. Density: Manufacturer's standard.

2.7 PREFORMED JOINT FILLER

- A. Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
 - 1. Locations:
 - a. At perimeter of concrete fill at parapet wall.
 - b. At paving intersection with masonry wall.
 - c. Where indicated.

2.8 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.

2.9 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.
- D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

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.
 - 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.
- 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. 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.

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

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

- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified 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.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

- G. Installation of Preformed Tapes: Install according to manufacturer's written instructions.

- H. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
 - 1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 - 2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch (10 mm). Hold edge of sealant bead 1/4 inch (6 mm) inside masking tape.
 - 3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
 - 4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

- I. Installation of Preformed Foam Sealants: Install each length of sealant immediately after

removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

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 and horizontal nontraffic construction joints in cast-in-place concrete.
 - 1. Joint Sealant: Single-component nonsag polysulfide sealant ES-1.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- B. Joint-Sealant Application JS-2: Exterior horizontal nontraffic isolation and contraction joints in cast-in-place concrete slabs.
 - 1. Joint Sealant: Single-component pourable neutral-curing silicone sealant ES-4.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- C. Joint-Sealant Application JS-3: Exterior vertical control and expansion joints in unit masonry and cast stone.
 - 1. Joint Sealant: Single-component neutral-curing silicone sealant ES-3.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- D. Joint-Sealant Application JS-4: Exterior vertical joints between different materials listed above.
 - 1. Joint Sealant: Single-component neutral-curing silicone sealant ES-3.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- E. Joint-Sealant Application JS-5: Exterior perimeter joints between brick masonry and frames of doors, windows and louvers.
 - 1. Joint Sealant: Single-component neutral-curing silicone sealant ES-3.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

- F. Joint-Sealant Application JS-6: Exterior control and expansion joints in horizontal traffic surfaces of brick pavers and concrete paving.
 - 1. Joint Sealant: Multicomponent pourable polysulfide sealant ES-2.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- G. Joint-Sealant Application JS-7: Vertical control and expansion joints on exposed interior surfaces of exterior walls.
 - 1. Joint Sealant: Latex sealant.
 - 2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- H. Joint-Sealant Application JS-8: Interior perimeter joints of exterior openings.
 - 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 joints between plumbing fixtures and adjoining walls, floors, and counters.
 - 1. Joint Sealant: Single-component mildew-resistant neutral -curing silicone sealant ES-5.
 - 2. Joint-Sealant Color: White.
- J. Joint-Sealant Application JS-10: Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
 - 1. Joint Sealant: Latex sealant.
 - 2. Joint-Sealant Color: White

END OF SECTION 07920