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 the following:

1. Cold-applied, emulsified-asphalt dampproofing applied at the following locations:

    a. At inner face of cavity wall construction when the back of the cavity is masonry or concrete.
    b. On backfilled side of concrete retaining walls.
    c. Other locations where indicated in the drawings.

B. Related Sections include the following:

1. Division 4 Section "Unit Masonry" for masonry control and expansion joint fillers and gaskets, and for exterior sealants used at masonry joints.
2. Division 7 Section "Firestopping" for fire-resistant building joint-sealant systems.
3. Division 7 Section “Self Adhering Waterproofing” for waterproofing applied at footings and foundation walls where opposite side of wall faces building interior.
4. Division 7 Section "Insulation" for below grade insulation materials and installation.
5. Division 8 Section "Glazing" for glazing sealants.

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 dampproofing to be performed according to manufacturers' written instructions.

PART 2 – PRODUCTS

2.1 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

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. ChemMasters Corp.
2. Degussa Building Systems; Sonneborn Brand Products.
3. Gardner Gibson, Inc.
4. Henry Company.
5. Karnak Corporation.
6. Koppers Inc.
7. Malarkey Roofing Products.
8. Meadows, W. R., Inc.
9. Tamms Industries, Inc.

B. Trowel Coats: ASTM D 1227, Type II, Class 1.

C. VOC Content: 0.25 lb/gal. or less.

2.2 MISCELLANEOUS MATERIALS

A. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.

B. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.

C. Patching Compound: Manufacturer's fibered mastic of type recommended by dampproofing manufacturer.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.

1. Proceed with dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

2. Test for surface moisture according to ASTM D 4263.

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.

C. Apply patching compound for filling and patching tie holes, honeycombs, reveals, and other imperfections; cover with asphalt-coated glass fabric.

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 if required to achieve coverages indicated.
2. Allow each coat of dampproofing to cure 24 hours before applying subsequent coats.
3. Allow 48 hours drying time prior to backfilling.

B. 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 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 onto shelf angles supporting veneer.

C. On Backfilled Face of Concrete Retaining Walls: Apply 1 brush or spray coat at not less than 1.25 gal./100 sq. ft.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. On Concrete or Msonry: Apply 2 brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat, 1 fibered brush or spray coat at not less than 3 gal./100 sq. ft., or 1 trowel coat at not less than 4 gal./100 sq. ft.

3.5 CLEANING

A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

END OF SECTION

SECTION 07131 - SELF-ADHERING SHEET WATERPROOFING

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 rubberized-asphalt sheet waterproofing and molded-sheet drainage panels in the following locations:

1. Sheet waterproofing indicated for use as flashing at windows or doors and at joints in sheathing.
2. Sheet waterproofing and drainage board at vertical surfaces below grade.
3. Sheet waterproofing used under lowest level slabs. To be applied to the entirety of all such slabs whose elevations are lower than finished exterior grades.
4. Liquid applied waterproofing for use between footings and concrete foundation walls.
5. Sheet waterproofing at other areas where self-adhering waterproofing, protection board or drainage board are shown on the drawings.
6. Drainage panels and geotextile filter fabrics associated with self-adhering sheet waterproofing.

B. Related Sections include the following:

1. Division 7 Section "Insulation" for below grade insulation materials and installation.
2. Division 8 Sections for aluminum windows, curtainwall and installation.

1.3 PERFORMANCE REQUIREMENTS

A. Provide waterproofing that prevents the passage of water under hydrostatic pressure for the conditions encountered in the work.

1.4 SUBMITTALS

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

C. Samples: For the following products:

1. 12-by-12-inch square of each type of waterproofing and flashing sheet.

2. 12-by-12-inch square of geotextile and drainage panel.

D. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

E. Product Test Reports: From a qualified independent testing agency indicating and interpreting test results of waterproofing for compliance with requirements, based on comprehensive testing of current waterproofing formulations.

F. Sample Warranty: Copy of special waterproofing manufacturer's and Installer's warranty stating obligations, remedies, limitations, and exclusions before starting waterproofing.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who is authorized, approved, or licensed by waterproofing manufacturer to install manufacturer's products.

B. Source Limitations: Obtain waterproofing materials through one source from a single manufacturer.

C. Mockups: Apply waterproofing to 100 sq. ft. of wall to demonstrate surface preparation, crack and joint treatment, corner treatment, and execution quality.

1. If Architect determines mockups do not comply with requirements, reapply waterproofing until mockups are approved.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.

C. Remove and replace liquid materials that cannot be applied within their stated shelf life.

D. Store rolls according to manufacturer's written instructions.

E. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.8 WARRANTY

A. Special Manufacturer's Warranty: Written warranty, signed by waterproofing manufacturer agreeing to replace waterproofing material that does not comply with requirements or that does not remain watertight during specified warranty period.

1. Warranty Period: Seven years after date of Substantial Completion.

B. Special Installer's Warranty: Written waterproofing Installer's warranty, signed by Installer, covering Work of this Section, for warranty period of two years.

1. Warranty includes removing and reinstalling backfill, drainage panels, and landscaping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: The products of W.R. Grace and Company are specified. Products of the following companies, or approved equal, may be used, providing they are equal to the specified products in performance and in compliance with the technical requirements:

1. American Hydrotech, Inc.
2. Carlisle Corporation, Carlisle Coatings & Waterproofing Div.
3. T. C. Miradri.

2.2 SELF-ADHERING SHEET WATERPROOFING

A. At applications where Self-Adhering Waterproofing, Underlayment, or Rubberized Asphalt Sheet Waterproofing, are called for, provide the following products.

B. Underlayment for Applications Under Metal Panels: At applications under metal flashing or panels, use material designed to resist heat, Vycor Ultra as manufactured by W. R. Grace.

1. Physical Properties: As follows, measured per standard test methods referenced:

a. Material: Butyl rubber and high density cross laminated polyethylene.

b. Thickness 0.76 mm; ASTM D 3767 Method A.
c. Maximum Material Weight Installed: 1.1 kg/m^2; ASTM 461.
d. Maximum Permeance: 0.05 Perms; ASTM E96.
e. Tensile Strength: 250 psi (1.7 MPa) minimum; ASTM D 412, Die C, modified.
f. Elongation: 250 percent minimum; ASTM D 412, Die C, modified.
g. Low-Temperature Flexibility: Pass at minus 20 deg F (minus 29 deg C); ASTM D 1970.
h. Vapor Permeance: 0.05 perms (2.9 ng/Pa x s x sq. m); ASTM E 96, Water Method.

C. Rubberized Asphalt Self-Adhering Waterproofing Used as Flashing and Joint Sealing of Sheathing: At windows, doors, joints in sheathing and other above-grade, locations where rubberized asphalt membrane is called for, except as underlayment at metal flashing or panels, use Vycor Plus as manufactured by W. R. Grace.

1. Physical Properties: As follows, measured per standard test methods referenced:

a. Material: Rubberized Asphalt and high density cross laminated polyethylene.
b. Thickness 0.64 mm; ASTM D 3767 Method A.

D. Rubberized Asphalt Self-Adhering Waterproofing Used Below Grade on Vertical Surfaces: At below grade walls use Bituthene by W. R. Grace.

1. Physical Properties: As follows, measured per standard test methods referenced:

a. Material: Rubberized Asphalt and high density cross laminated polyethylene.
b. Thickness 0.60 mm; ASTM D 3767 Method A.
c. Tensile Strength: 250 psi (1.7 MPa) minimum; ASTM D 412, Die C, modified.
d. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
e. Low-Temperature Flexibility: Pass at minus 20 deg F (minus 29 deg C); ASTM D 1970.
f. Hydrostatic-Head Resistance: 150 feet (45 m) minimum; ASTM D 5385.
g. Vapor Permeance: 0.05 perms (2.9 ng/Pa x s x sq. m); ASTM E 96, Water Method.

E. HDPE Self-Adhering Waterproofing Used Below Lowest-Level Slabs: Below lowest level slabs (slabs in contact with grade) use Preprufe 300R by W. R. Grace.

1. Physical Properties: As follows, measured per standard test methods referenced:

a. Material: HDPE film, an aggressive pressure sensitive adhesive and a weather resistant protective coating.
b. Thickness 1.2 mm
c. Tensile Strength: (5 lbs/in.)
d. Ultimate Elongation: 300%
e. Low-Temperature Flexibility: Pass at minus 20 deg F (minus 29 deg C); ASTM D 1970.
f. Hydrostatic-Head Resistance: 230 feet (70 m) minimum; ASTM D 5385.
g. Vapor Permeance: 0.0 perms; ASTM E 96, Water Method.

F. Liquid-Applied Waterproofing: At joints between footings and basement walls, at laps of rubberized asphalt membrane, and at other locations where liquid-applied waterproofing is called for or recommended by membrane manufacturers, use Bituthene Liquid Membrane.

1. Physical Properties: As follows, measured per standard test methods referenced:

a. Solids Content: 100%.
b. Elongation: 250% minimum.
c. Peel Strength: 5 lbs/inch minimum.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid waterborne primer recommended for each substrate by manufacturer of sheet waterproofing material.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.

D. Sheet Strips: Self-adhering, rubberized-asphalt composite sheet strips of same material and thickness as sheet waterproofing.

E. Substrate Patching Membrane: Low-viscosity, two-component, asphalt-modified coating.

F. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

G. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch thick, predrilled at 9-inch centers.

2.4 MOLDED-SHEET DRAINAGE PANELS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:

1. American Wick Drain Corporation.
2. Grace, W. R. & Co.; Construction Products Div.
3. Greenstreak/Western Textile Products.
4. Ling Industrial Fabrics, Inc.
5. TC Mirafi.
6. Sarnafil.

B. Description: Prefabricated, composite panels, 36 to 60 inches wide, and manufactured with geotextile facing laminated to molded-plastic drainage core.

C. Drainage Core: Three-dimensional, nonbiodegradable, molded PP or PS.

1. Minimum Compressive Strength: 12,000 psig when tested according to ASTM D 1621.
2. Minimum Flow Rate: 10 gpm per foot at hydraulic gradient of 1.0 and compressive stress of 12,000 psf when tested according to ASTM D 4716.

D. Geotextile: Woven geotextile fabric, manufactured for subsurface drainage, made from polyolefins or polyesters; with elongation less than 50 percent; complying with the following properties determined according to AASHTO M 288:

1. Survivability: Class 1.
2. Apparent Opening Size: No. 70 sieve, maximum.

E. Film Backing: Polymeric film bonded to drainage core surface.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Apply sheet membrane waterproofing in the following locations:

1. As flashing and air barrier around windows and doors as shown on the drawings.
2. As air barrier between panels of wall sheathing.
3. As underlayment at metal panels or flashing where indicated.
4. As waterproofing at below grade walls adjoining interior spaces.
5. As waterproofing below lowest level slabs.
6. At other locations where shown on the drawings or elsewhere specified.

B. Apply drainage board at the following locations:

1. Over sheet waterproofing at exterior of concrete or masonry walls in contact with earth or other backfill.
2. At other locations where shown on the drawings or elsewhere specified.

3.2 EXAMINATION

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

1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
2. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 SURFACE PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.

1. Install sheet strips and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.

F. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.

1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:

a. At footing-to-wall intersections, extend liquid membrane each direction from corner or install membrane strip centered over corner.

G. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.4 LIQUID APPLIED WATERPROOFING APPLICATION

A. At building footings, apply waterproofing according to ASTM C 898 and manufacturer's written instructions.

B. Start installing waterproofing in presence of manufacturer's technical representative.

C. Apply primer over prepared substrate if so recommended by waterproofing manufacturer.

D. Mix materials and apply waterproofing by spray, roller, notched squeegee, trowel, or other application method suitable to slope of substrate.

1. Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases, with an average dry film thickness of 60 mils and a minimum dry film thickness of 50 mils at any point.
2. Apply waterproofing to prepared wall terminations and vertical surfaces.

3. Verify wet film thickness of waterproofing every 100 sq. ft.

3.5 SHEET APPLICATION

A. Install self-adhering sheets according to waterproofing manufacturer's written instructions and recommendations in ASTM D 6135.

B. At metal panels or flashing, apply sheet continuously under metal surfaces and as indicated.

C. Determine type of primer appropriate for substrate from manufacturer. Apply primers at concrete, sheathing and plywood substrates as recommended by the manufacturer. Apply primer to substrates at required rate and allow to dry. If recommended by the manufacturer, apply more than one coat of primer. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

D. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure watertight installation.

1. When ambient and substrate temperatures range between 25 and 40 deg F (minus 4 and plus 5 deg C), install self-adhering, rubberized-asphalt sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F (16 deg C).

E. Horizontal Application: Apply sheets from low point to high point to ensure that laps shed water.

F. Apply continuous sheets over sheet strips bridging substrate at all joints and at cracks, construction, and contraction joints.

G. Seal exposed edges of sheets at terminations not concealed by metal counterflashings or ending in reglets with mastic or sealant. If recommended by the manufacturer, apply termination bars at edges of installation. Follow manufacturer's recommendations.

H. Install sheet waterproofing and auxiliary materials to tie into adjacent construction.

I. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheets extending 6 inches (150 mm) beyond repaired areas in all directions.

J. Correct deficiencies in or remove sheet waterproofing that does not comply with requirements, repair substrates, reapply waterproofing, and repair sheet flashings.

3.6 APPLICATIONS FOR FLASHING AND AS AIR BARRIER

A. Apply primers as indicated above for sheet applications.

B. Apply self-adhesive rubberized asphalt tape to joints between wall sheathing panels, and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

Apply tape between sheathing and windows and entrances as indicated in order to create a continuous barrier to air infiltration.

3.7 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

A. As shown in the drawings, place and secure molded-sheet drainage panels according to manufacturer's written instructions. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction. Apply drainage panels so fabric face is out. Continue geotextile from face of drainage panels wrapping around foundation drainage pipes.

3.8 PROTECTION AND CLEANING

A. Protect waterproofing from damage and wear during remainder of construction period.

B. Protect installed materials from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where materials cannot be concealed and protected by permanent construction immediately after installation. Do not exceed manufacturer’s recommend period for material exposure. Replace materials exposed for periods longer than manufacturer’s recommendations.

C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Vertical foundation wall insulation (supporting backfill).
2. Concealed batt insulation where indicated.
3. Vapor retarders for use at exterior walls and around collections' areas.
4. Foam-in-place insulation for use at exterior walls, at interior partitions around collections' areas, and as indicated.

B. Related Sections include the following:

1. Division 7 Section 'Sheet Metal Flashing and Trim," for sheet metal flashing.
2. Division 7 Section "Thermoplastic Single-Ply Membrane Roofing" for insulation specified as part of roofing construction.
3. Division 7 Section "Self-Adhering Sheet Waterproofing for drainage panels, vertical foundation waterproofing and other applications of sheet waterproofing.
4. Division 7 Section "Through Penetration Firestop Systems" for insulation associated with pipe and other penetrations through rated assemblies.
5. Division 9 Sections "Gypsum Board Assemblies" and "Gypsum Board Shaft-Wall Assemblies" for sound attenuation blankets in metal-framed assemblies.
6. Division 15 Sections for duct and pipe Insulation.

1.3 SUBMITTALS

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

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulation products.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having

jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

1.5 DELIVERY, STORAGE, AND HANDLING

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

B. Protect plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:

1. Extruded-Polystyrene Board Insulation:

   a. Dow Chemical Company.
   b. Owens Corning.

2. Glass-Fiber (Batt) Insulation:

   a. CertainTeed Corporation.
   b. Johns Manville Corporation.
   c. Owens Corning.

3. Spay Foam Insulation:
   a. Icynene Inc.

2.2 INSULATING MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards.

1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.

B. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indices of 75 and 450, respectively:

1. Type IV, 1.60 lb/cu. ft. (26 kg/cu. m), unless otherwise indicated.

C. Unfaced Mineral-Fiber Blanket Insulation: Thermal insulation combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665, Type I (blankets without membrane facing).

1. Mineral-Fiber Type: Fibers manufactured from glass.

D. Foam-In-Place Insulation: Two part sprayed foam-in-place polyicynene insulation for use at exterior walls, full height of interior walls around conservation storage areas, and other locations where spray-in-place insulation is indicated, formed from Polyicynene MDI and Polyicynene Resin forming a 2 pound density open colloid material.

1. Flame Spread: < 20
2. Smoke Development < 400
3. Fuel contribution: 0

2.3 VAPOR RETARDERS

A. Sheet vapor barrier: Zero Perm Vapor Barrier, Alumiseal Corporation (800) 235-2313.

B. Vapor barrier tape: Zero Perm Pressure Sensitive Tape.

C. Provide tape and adhesive for bonding to substrates indicated, scaling membrane seams, sealing joints of membrane and adjoining surfaces and projections through membrane.

1. Tapes: Use only pressure sensitive tape recommended by the sheet vapor barrier manufacturer.
2. Adhesives: Use only adhesive recommended by the sheet vapor barrier manufacturer.
3. Fasteners: Use only fasteners recommended by the sheet vapor barrier manufacturer.

2.4 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.

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

3.2 PREPARATION

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

3.3 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

A. Extend insulation over entire area under slabs on grade. Loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units. Provided minimum R Value of R8 or that required by the International Building Code, whichever is greater.

B. On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer. Provided minimum R Value of R8 or that required by the International Building Code, whichever is greater.

1. If not otherwise indicated, extend insulation to top of footings.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Install mineral-fiber blankets in cavities where so indicated on the drawings, and according to the following requirements:

1. Use blanket widths and lengths that fill the cavities. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
2. Place blankets in cavities formed to produce a friction fit between edges of insulation and edges of cavity.

C. Install board insulation on concrete substrates by adhesive as follows:

1. Fasten insulation to concrete substrates according to adhesive manufacturer's written instructions. Space adhesive according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.

D. Apply self-supported, spray-applied, foam-in-place insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make it even with studs or ceiling grillage by screeding or using other method recommended by insulation manufacturer. Spray foam-in-place insulation into miscellaneous voids and cavity spaces.

E. Install insulation in such a way that sprinklers or other water filled pipes are on the warm side of insulation and the insulation fully protects piping from exterior cold.

3.6 INSTALLATION OF VAPOR RETARDERS

A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission, which includes all exterior walls, and interior walls at perimeters of collections' storage areas. At interior walls, extend vapor retarders from floor slab to underside of structure. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.

C. Firmly attach vapor retarders to substrates with adhesives as recommended by vapor-retarder manufacturer.

D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.

E. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.7 PROTECTION

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

END OF SECTION

SECTION 07315 - SLATE SHINGLES

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 slate shingles for the roof of the Children's Gate.

B. Related Sections include the following:

1. Division 6 Section "Rough Carpentry" for roof deck, cant strips, battens, and nailers.
2. Division 7 Section "Sheet Metal Flashing, Roofing and Trim" for metal flashing, valleys, gutters, and downspouts.
3. Division 7 Section "Joint Sealants" for field-applied sealants.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.

B. Shop Drawings: Include plans, elevations, and sections at hips, gables, ridges, valleys, and eaves; component details; accessories; and attachments to other Work.

C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of slate shingle indicated.

D. Samples for Verification: Full-size units for each type of slate shingle indicated; in sets for each color, texture, shape, and size specified, showing the full range of variations expected. Prepare Samples from the same material to be used for the Work.

1.4 QUALITY ASSURANCE

A. Source Limitations for Slate: Obtain each variety of slate from one source with resources to provide materials of consistent quality in appearance and physical properties.

B. Mockups: Before installing slate shingle roofing, build mockups for each form of construction and condition required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups as part of the final work, as directed by Architect.
2. Include underlayments; battens; shingles; attachment provisions and devices; flashing; vents; snow guards; and other accessories required.
3. Coordinate gutter and downspouts with requirements in Division 7 Section "Sheet Metal Flashing and Trim."
4. Notify Architect seven days in advance of dates and times when mockups will be constructed.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mockups before starting slate shingle roofing construction.
7. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver slate shingles to Project site and store as close as possible to the point of installation to minimize damage while handling.

B. Store and handle roofing materials to prevent breakage and ensure dryness. Store in a dry, well-ventilated, weathertight place. Store rolls of felt and other sheet materials on end on pallets or another raised surface.

C. Do not leave unused felts on roof overnight or when roofing work is not in progress unless protected from weather or other moisture sources.

D. Handle and store materials and equipment in a manner to avoid significant or permanent deflection of deck.

1.6 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Slate Shingles: Full-size units equal to 5 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide slate shingles by one of the following:

1. Buckingham-Virginia Slate Corp.
2. Burlington Natstone, Inc.
3. Echeguren Slate, Inc.
4. Evergreen Slate Co., Inc.
5. Greenstone Slate Company.

6. Structural Slate Company.
7. U.S. Quarried Slate Products, Inc.
8. Vermont Structural Slate Company, Inc.
9. Williams & Sons Slate & Tile, Inc.

2.2 SHINGLES

A. Slate Shingles: Hard, dense, sound rock, machine punched or drilled for two nails located for proper head lap. No broken or cracked slates, no broken exposed corners, and no broken corners on covered ends that could sacrifice nailing strength or laying of a watertight roof. No ribbons in exposed portion of shingle, and curvature not to exceed 1/8 inch per 12 inches.

1. Classification: ASTM C 406.

    a. Grade S1: Expected service life more than 75 years.

2. Thickness: Matching existing slate.
3. Length: Matching existing slate.
4. Width: Matching existing slate.
5. Shape: Match existing slate.
6. Weather-Exposure Color Change: Permanent or unfading.
7. Color: Match color and color range of existing slate.
8. Patterns: Match pattern of existing slate.

2.3 SHEET METAL FLASHING

A. See Division 7 Section, “Sheet Metal Flashing and Trim.”

2.4 UNDERLAYMENTS

A. Felt Underlayment: ASTM D 226, Type II, No. 30 asphalt-saturated organic roofing felt; minimum 36-inch-wide rolls.

B. Modified Bituminous Underlayment: ASTM D1970, self-adhering, polymer-modified, bituminous sheet; 40 mils (1 mm) thick. Provide primer when recommended by manufacturer.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Nonreinforced: Polyethylene backed.

        1) CCW-707; Carlisle Coatings and Waterproofing.
        2) WinterGuard; CertainTeed Corporation.
        3) Grace Ice and Water Shield; W.R. Grace & Co.
        4) Nordshield Ice and WaterGard; Schuller International, Inc.

2.5 FASTENERS

A. Roofing Nails: 0.1055-inch-diameter-shank, stainless steel, barbed-shank roofing nails; minimum 3/8-inch-diameter head, and long enough to penetrate 3/4 inch into solid decking or to penetrate through plywood sheathing.

B. Slating Nails: 0.135-inch, diamond-point, smooth-shaft, hard copper-wire slating nails with large head; minimum 5/16-inch diameter, and long enough to penetrate either completely through or at least 3/4 inch into sheathing or blocking.

2.6 ACCESSORIES

A. Plastic Cement: ASTM C 1085, one-part, nonsag, nonstaining, solvent-release-curing, polymerized butyl sealant formulated with minimum of 75 percent solids; with a tack-free time of 24 hours or less.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Chem-Calk 300; Bostik Inc.
b. PTI 757; H.B. Fuller Company.
c. BC-158; Pecora Corporation.
d. PSI 301; Polymeric Systems, Inc.
e. Sonneborn Multi-Purpose Sealant; Sonneborn Building Products, Div. of ChemRex, Inc.
f. Tremco Butyl Sealant 505; Tremco, Inc.

B. Joint Sealant: One-part elastomeric polyurethane, polysulfide, or silicone-rubber sealant as recommended in writing by shingle manufacturer. Where sealant will be exposed, provide in color matching shingle.

C. Mastic: ASTM D 4586, nonasbestos, fibrated, asphalt cement designed for trowel application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate and conditions under which slate shingle Work is to be performed; notify Contractor in writing of unsatisfactory conditions. Proceed with slate shingle Work only after unsatisfactory conditions have been corrected.

B. Cover or otherwise plug drains to prevent entrance of slate shingle trimmings and debris.

3.2 PREPARATION

A. Substrate: Proceed with slate shingle installation only after substrate construction and penetrating work is complete and when substrate materials are dry.

3.3 INSTALLATION

A. Sheet Metal Flashing Installation: Install sheet metal flashing as indicated and in compliance with details and recommendations of NRCA's "Steep Roofing Manual."

1. Where flashings occur perpendicular to slope, return sheet metal a minimum of 4 inches under shingles.
2. If open valley length exceeds 12 feet, taper valleys by increasing width of valley flashing by 2 inches, for 1 inch on each side, for each 96 inches of valley.
3. Where required to create watertight installation, solder seams in zinc-coated copper in accordance with the requirements in Division 7 Section “Sheet Metal Flashing and Trim.”

B. Felt Underlayment Installation: Apply one layer of felt over entire roof surface, beginning at eaves, with courses perpendicular to slope of roof. Lap succeeding courses 2 inches minimum, with 6-inch-minimum end laps. Fasten with sufficient nails to hold in place until slate shingles are installed.

C. Perimeter Underlayment: Apply minimum 24-inch-wide layer at entire perimeter of surfaces to receive roofing slate, including eaves, ridges, valleys, and rakes.

D. Slate Shingle Installation: Beginning at eaves, install slate shingles according to written recommendations of manufacturer and details and recommendations of NRCA's "Steep Roofing Manual." Unless otherwise indicated, provide at least a 3-inch head lap between succeeding courses of slate shingles and break (stagger) joints between courses a minimum of 3 inches. Provide a 2-inch projection of slate at eaves and 1-inch projection at gables. Cut and fit slate neatly around projections through roof.

1. Nail slate shingles so nail heads just touch slate lightly. Do not drive nails home drawing slates downward or leave nail head protruding enough to interfere with overlapping shingle above.
2. Install slate at ridges and hips in pattern matching the adjoining slate roofs. Lay ridge and hip slates in plastic cement spread generously over unexposed surfaces of lower course of slate. Nail ridge slates in place through joints of underlying slate. Nail hip slates to supporting wood blocking. Align butts of combing slates at hips with butts of coursed shingles. Cover heads of exposed nails with plastic cement.
3. Cut slate at valleys to form open valleys with a straight border unless adjoining slate construction is detailed otherwise. Taper valleys from a 2-inch exposure of metal flashing on each side of valley at top and increase exposure by 1 inch (each side) per 96 inches of valley length.

3.4 ADJUSTING AND CLEANING

A. Remove and replace damaged or broken slates.

B. Remove excess slate and debris from Project site.

END OF SECTION

SECTION 07412 – EXPOSED FASTENER METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exposed-fastener, lap-seam metal wall panels for exterior wall clading at the East and North facades.

B. Related Sections:

1. Division 5 Section “Formed-Metal Fabrications” for flat metal panels at glazed curtainwalls and mechanical penthouse screening.
2. Division 5 Section "Cold-Formed Metal Framing" for support framing, including girts, studs, and bracing.
3. Division 7 Section "Sheet Metal Flashing and Trim" for flashing and other sheet metal work that is not part of metal wall panel assemblies.

1.3 DEFINITION

A. Metal Wall Panel Assembly: Metal wall panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weathertight wall system.

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Metal wall panel assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Delegated Design: Design metal wall panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of wall area when tested according to ASTM E 283 at the following test-pressure difference:

1. Test-Pressure Difference: 1.57 lbf/sq. ft.

D. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft.

F. Structural Performance: Provide metal wall panel assemblies capable of withstanding the effects the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 1592:

1. Wind Loads: Determine loads based on the following minimum design wind pressures:

a. Uniform pressure of 30 lbf/sq. ft., acting inward or outward.

2. Deflection Limits: Metal wall panel assemblies shall withstand wind loads with horizontal deflections no greater than 1/240 of the span.

G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of wall panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of metal wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory-, shop- and field-assembled work.

1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches:

a. Flashing and trim.
b. Anchorage systems.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Metal Wall Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal wall panel accessories.
2. Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
3. Accessories: 12-inch-long Samples for each type of accessory.

D. Delegated-Design Submittal: For metal wall panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Qualification Data: For Installer, professional engineer, and testing agency.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

G. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

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

B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

C. Source Limitations: Obtain each type of metal wall panel from single source from single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, metal wall panels, and other manufactured items so as not to be damaged or deformed. Package metal wall panels for protection during transportation and handling.

B. Unload, store, and erect metal wall panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal wall panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal wall panel for period of metal wall panel installation.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal wall panels to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal wall panel fabrication, and indicate measurements on Shop Drawings.

1.9 COORDINATION

A. Coordinate metal wall panel assemblies with rain drainage work, flashing, trim, and construction of girts, studs, soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal wall panel assemblies that fail in materials or workmanship within specified warranty period.

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

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Six years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

A. Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.

1. Surface: Smooth, flat finish.
2. Exposed Coil-Coated Finish: High-Performance Organic Finish: Four-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

a. Color and Gloss: Metallic “Pewter” color matching UC51713 XL “Duranar XL” Coating by PPG. Color of panels are intended to match exterior color of curtainwalls and aluminum windows.

3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

B. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal wall panels and remain weathertight; and as recommended in writing by metal wall panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.2 FIELD-INSTALLED THERMAL INSULATION

A. Refer to Division 7 Section "Building Insulation."

2.3 MISCELLANEOUS METAL FRAMING

A. Miscellaneous Metal Framing, General: ASTM C 645, cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G60 hot-dip galvanized or coating with equivalent corrosion resistance unless otherwise indicated.

B. Base or Sill Angles or Channels: 0.079-inch nominal thickness.

C. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, and depth required to fit insulation thickness indicated.

1. Nominal Thickness: As required to meet performance requirements.

D. Fasteners for Miscellaneous Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten miscellaneous metal framing members to substrates.

2.4 MISCELLANEOUS MATERIALS

A. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal wall panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

2.5 EXPOSED-FASTENER, LAP-SEAM, METAL WALL PANELS

A. General: Provide factory-formed metal wall panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.

B. Corrugated-Profile, Exposed-Fastener Metal Wall Panels: Formed with alternating curved ribs spaced at 2.67 inches o.c. across width of panel.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Econolap ½" by Centria Architectural Systems or comparable product by one of the following or approved equal:

a. Alcoa Architectural Products (USA).
b. Industrial Building Panels.
c. Metecno-Morin.

2. Material: Aluminum sheet, 0.032 inch thick.

a. Exterior Finish: 2-coat fluoropolymer.
b. Color: As selected by Architect from manufacturer's full range.

3. Panel Coverage: 37.3 inches.
4. Panel Height: 0.5 inch.

2.6 ACCESSORIES

A. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.

1. Closures: Provide closures, fabricated of same metal as metal wall panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

B. Flashing and Trim: Formed from aluminum sheet prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal wall panels.

2.7 FABRICATION

A. General: Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Fabricate metal wall panel joints with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, and that will minimize noise from movements within panel assembly.

E. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal wall panel manufacturer.

a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.8 GENERAL FINISH REQUIREMENTS

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

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
3. Verify that weather-resistant sheathing paper has been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
4. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal wall panel installation.

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

3.2 PREPARATION

A. Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorages according to ASTM C 754 and metal wall panel manufacturer's written recommendations.

3.3 METAL WALL PANEL INSTALLATION

A. Lap-Seam Metal Wall Panels: Fasten metal wall panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

1. Lap ribbed or fluted sheets one full rib corrugation. Apply panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal wall panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Provide sealant tape at lapped joints of metal wall panels and between panels and protruding equipment, vents, and accessories.
6. Apply a continuous ribbon of sealant tape to weather-side surface of fastenings on end laps; on side laps of nesting-type panels; on side laps of corrugated nesting-type, ribbed, or fluted panels; and elsewhere as needed to make panels weathertight.
7. At panel splices, nest panels with minimum 6-inch end lap, sealed with butyl-rubber sealant and fastened together by interlocking clamping plates.
8. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by metal wall panel manufacturer.

3.4 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Water-Spray Test: After completing the installation of 75-foot-by-story height area of metal wall panel assembly, test assembly for water penetration according to AAMA 501.2 in a 2-bay area directed by Architect.

C. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.

D. Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal wall panel installation, clean finished surfaces as recommended by metal wall panel manufacturer. Maintain in a clean condition during construction.

B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07412

SECTION 07533 - THERMOPLASTIC SINGLE-PLY MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Adhered membrane roofing at existing building and new construction
2. Mechanically fastened roof insulation.
3. Vapor retarder.
4. Modifications to existing through-wall flashing and curb flashing at roof of existing building to allow installation of new roofing, as indicated on drawings.

B. Related Sections include the following:

1. Division 1 Section “Selective Demolition,” for removal of existing roof and insulation materials.
2. Division 6 Section "Rough Carpentry" for wood nailers, curbs, cants, and blocking.
3. Division 7 Section “Preparation for Re-Roofing” for preparation of existing roof deck.
4. Division 7 Section "Sheet Metal Roofing, Flashing and Trim" for flashings and counterflashings.
5. Division 7 Section "Joint Sealants."
6. Division 15 Sections for roof drains.

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 for definition of terms related to roofing work not otherwise defined in this Section.

B. TPO: Thermoplastic polyolefin.

1.4 PERFORMANCE REQUIREMENTS

A. General: Install sheet membrane roofing and base flashing that are watertight; will not permit the passage of liquid water; and will withstand wind loads, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

C. FM Listing: Provide sheet membrane, base flashings, and component materials that meet requirements of FM 4450 and FM 4470 as part of a roofing system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM markings.

1. Roofing system shall comply with the following:

a. Fire/Windstorm Classification: Class 1A-90.

1.5 SUBMITTALS

A. Product Data: For each type of roofing product specified. Include data substantiating that materials comply with requirements.

B. Shop Drawings: Include plans, sections, and details of the following:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.

C. Samples for Initial Selection: Samples of all available colors of membrane, for initial selection of color.

D. Samples for Verification: Of the following products:

1. 12-by-12-inch square of sheet roofing, of color specified, including T-shaped side and end lap seam.
2. 12-by-12-inch square of roof insulation.

E. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install specified roofing system.

F. Manufacturer Certificates: Signed by roofing manufacturer certifying that the roofing system complies with requirements specified in the "Performance Requirements" Article. Upon request, submit evidence of meeting requirements.

G. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

H. Product Test Reports: Based on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, indicate compliance of components of roofing system with requirements based on comprehensive testing of current product compositions.

I. Research/Evaluation Reports: Evidence of roofing system's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

J. Maintenance Data: For roofing system to include in the maintenance manuals specified in Division 1.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing roofing similar to that required for this Project and who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's product.

B. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method indicated below by UL, FM, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and slopes indicated.
2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing materials are a part.

C. Preinstallation Conference: Before installing roofing system, conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings." Notify participants at least 5 working days before conference.

1. Meet with Owner; Architect; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
4. Review loading limitations of deck during and after roofing.
5. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
6. Review governing regulations and requirements for insurance, certificates, and inspection and testing, if applicable.
7. Review temporary protection requirements for roofing system during and after installation.
8. Review roof observation and repair procedures after roofing installation.
9. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid materials from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

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

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements.

1.9 WARRANTY

A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Standard Roofing Manufacturer's Warranty: Submit a written warranty, without monetary limitation, signed by roofing system manufacturer agreeing to promptly repair leaks resulting from defects in materials or workmanship for the following warranty period:

1. Warranty Period: 15 years.

PART 2 - PRODUCTS

2.1 TPO MEMBRANE ROOFING

A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.

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

a. Carlisle SynTec Incorporated.
b. Firestone Building Products Company.
c. GAF Materials Corporation.
d. Johns Manville.

2. Thickness: 60 mils (1.5 mm), nominal.
3. Exposed Face Color: Gray, as selected from manufacturer’s full range of colors.

2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as sheet membrane.

C. Bonding Adhesive: Manufacturer's standard.

D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

E. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick (25 mm wide by 1.3 mm thick), prepunched.

F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

G. Snow Guards: Provide polycarbonate snow guards for adhesive application to roofing membrane as indicated. Provide the following or equal by approved manufacturer:

1. Manufacturer: Zaleski Snow-Guards for Roofs, Inc., PO Box 700, New Britain, CT 06050, Tel. 860-225-1614, Fax. 860-225-1060, www.snowguards.com
2. Model: No. 15
3. Color: “Slate Grey” matching color of membrane.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.3 VAPOR RETARDER

A. Polyethylene Vapor Retarder: ASTM D 4397, 6 mils thick, minimum, with maximum permeance rating of 0.13 perm.

1. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.
2. Adhesive: Manufacturer's standard roofing adhesive, FM approved for vapor-retarder application.

2.4 INSULATION MATERIALS

A. General: Provide preformed roof insulation boards that comply with requirements, selected from manufacturer's standard sizes and of thicknesses indicated.

1. Provide preformed, tapered insulation boards where indicated for sloping to drain. Fabricate with the following taper:

   a. 1/4 inch per 12 inches, unless otherwise indicated.

2. Minimum insulation thickness shall be 2".
3. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

B. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation with core formed by using HCFCs as blowing agents to comply with ASTM C 1289, classified by facer type as follows:

1. Facer Type: Type II, felt or glass-fiber mat on both major surfaces.

2.5 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with sheet roofing material.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions of FM 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Cover Board: Cellulosic-fiber insulating board, ASTM C 208, Type II, Grade 2, 1/2 inch thick.

2.6 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, approximately 3/16 inch thick, and acceptable to membrane roofing system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions under which roofing will be applied, with Installer present, for compliance with requirements.

B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.

C. Verify that wood nailers are in place and secured and match thicknesses of insulation required.

D. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

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

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of the roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 VAPOR-RETARDER INSTALLATION

A. Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches and 6 inches, respectively.

1. Seal laps with tape.

B. Completely seal vapor retarder at terminations, obstructions, and penetrations.

3.4 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated and to Shop Drawings.

D. Install layers of insulation under area of roofing to achieve required thickness. Install required thickness in 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Attached Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type indicated.

1. Fasten insulation according to requirements of FM's "Approval Guide" for specified Windstorm Resistance Classification and the insulation and roofing system manufacturers' written instructions.

H. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Loosely butt cover boards together and fasten to roof deck according to roofing system manufacturer's written instructions.

3.5 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.

1. Install sheet according to ASTM D 5036.

B. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

D. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.

E. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

F. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

G. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

H. Install membrane roofing and auxiliary materials to tie in to existing flashing to maintain weathertightness of transition and to not void warranty for existing membrane roofing system.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 SNOW GUARD INSTALLATION

A. Install three rows of snow guards as indicated on the roof plans. Snow guards are to be adhered to roof membrane as recommended by membrane manufacturer, but generally as follows.

1. Clean exposed membrane with weathered membrane cleaner.
2. Apply splicing cement or manufacturer's recommended primer to the membrane and snow guard base. Allow to dry until tack-free.
3. Install a section of splice tape approximately the size of the snow guard base to the membrane surface. Leave the release film in place and roll tape from center to the outer edges.
4. Remove release tape and carefully place snow guard base over splice tape.
5. Apply splicing cement or primer to membrane where sealant is to be applied. Allow to dry until tack-free. Seal all edges and any exposed areas of tape with sealant.

3.8 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

B. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

3.11 ROOFING INSTALLER'S WARRANTY

A. WHEREAS <**Insert name**> of <**Insert address**>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <**Insert name of Owner**>.
2. Address: <**Insert address**>.
3. Building Name/Type: <**Insert information**>.
4. Address: <**Insert address**>.
5. Area of Work: <**Insert information**>.
6. Acceptance Date: <**Insert date**>.
7. Warranty Period: <**Insert time**>.
8. Expiration Date: <**Insert date**>.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

   a. Lightning;
   b. Peak gust wind speed exceeding <**Insert wind speed**> mph (m/sec);
   c. Fire;
   d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
   e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
   f. Vapor condensation on bottom of roofing; and
   g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <**Insert day**> day of <**Insert month**>, <**Insert year**>.

1. Authorized Signature: <**Insert signature**>.
2. Name: <**Insert name**>.
3. Title: <**Insert title**>.

END OF SECTION

SECTION 07591 - PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Roof tear-off.
2. Temporary roofing membrane.
3. Roof re-cover preparation.
4. Removal of base flashings.

B. Related Sections:

1. Division 1 Section "Summary" for use of the premises and phasing requirements.
2. Division 1 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for reroofing preparation.
3. Division 7 Section “Thermoplastic Single-Ply Membrane Roofing,” for new roofing.

1.3 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 DEFINITIONS

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

B. Existing Membrane Roofing System: Single-ply roofing membrane, roof insulation, surfacing, and components and accessories between deck and roofing membrane.

C. Roof Tear-Off: Removal of existing membrane roofing system from deck.

D. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.

E. Existing to Remain: Existing items of construction that are not indicated to be removed.

1.5 SUBMITTALS

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

B. Temporary Roofing: Include Product Data and description of temporary roofing system. If temporary roof will remain in place, submit surface preparation requirements needed to receive permanent roof, and submit a letter from roofing membrane manufacturer stating acceptance of the temporary membrane and that its inclusion will not adversely affect the roofing system's resistance to fire and wind.

C. Fastener pull-out test report.

D. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Installer of new membrane roofing system.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Reroofing Conference: Conduct conference at Project site.

1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing system manufacturer's representative; deck Installer; roofing Installer including project manager, superintendent, and foreman; and installers whose work interfaces with or affects reroofing including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing system tear-off and replacement including, but not limited to, the following:

    a. Reroofing preparation, including membrane roofing system manufacturer's written instructions.
    b. Existing roof drains and roof drainage during each stage of reroofing, and roof drain plugging and plug removal requirements.
    c. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    d. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
    e. Structural loading limitations of deck during reroofing.
    f. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect reroofing.
    g. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
    h. Governing regulations and requirements for insurance and certificates if applicable.
    i. Existing conditions that may require notification of Architect before proceeding.

1.7 PROJECT CONDITIONS

A. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

C. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.

D. Hazardous Materials: It is not expected that hazardous materials such as asbestos-containing materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work. Existing roof will be left no less watertight than before removal.
2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS

2.1 TEMPORARY ROOFING MATERIALS

A. Design and selection of materials for temporary roofing are responsibilities of Contractor.

2.2 AUXILIARY REROOFING MATERIALS

A. General: Auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of existing and new membrane roofing system.

B. Base Sheet Fasteners: Capped head, factory-coated steel fasteners, listed in FM Approval's "Approval Guide."

C. Metal Flashing Sheet: Metal flashing sheet is specified in Division 7 Section "Sheet Metal Flashing and Trim."

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

B. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

C. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

D. Verify that rooftop utilities and service piping have been shut off before beginning the Work.

3.2 ROOF TEAR-OFF

A. Roof Tear-Off: Remove existing roofing membrane and other membrane roofing system components down to the deck.

1. Remove cover boards, roof insulation and substrate boards.
2. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen and felts and wet felts.
3. Remove fasteners from deck.

3.3 DECK PREPARATION

A. Inspect deck after tear-off of membrane roofing system.

B. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263 or by pouring 1 pint of hot roofing asphalt on deck at start of each day's work and at start of each roof area or plane. Do not proceed with roofing work if moisture condenses under the plastic sheet or if asphalt test sample foams or can be easily and cleanly stripped after cooling.

C. If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

3.4 TEMPORARY ROOFING MEMBRANE

A. Install approved temporary roofing membrane over area to be reroofed.

B. Remove temporary roofing membrane before installing new roofing membrane.

3.5 EXISTING BASE FLASHINGS

A. Remove existing base flashings around parapets, curbs, walls, and penetrations, with the following exception:

1. Retain wall counterflashing at existing parapet at south-east corner of existing roof.

B. Clean substrates of contaminants such as asphalt, sheet materials, dirt, and debris.

C. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings specified in Division 7 Section "Sheet Metal Flashing and Trim."

3.6 FASTENER PULL-OUT TESTING

A. Retain independent testing and inspecting agency to conduct fastener pull-out tests according to SPRI FX-1, and submit test report to roofing membrane manufacturer before installing new membrane roofing system.

1. Obtain roofing membrane manufacturer's approval to proceed with specified fastening pattern. Roofing membrane manufacturer may furnish revised fastening pattern commensurate with pull-out test results.

3.7 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

1. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property.

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:

1. Un-coated “red” copper at concealed sheet metal flashing at existing library and new construction.

2. Exposed un-coated “red” copper at existing library as follows:

   a. Sheet metal flashing at horizontal stone surfaces at chimney cap, parapet coping and projecting cornice of original building, and other locations where indicated.
   b. Metal cap and flashing between existing roof and 477 Conress Street Building.
   c. Existing gutters and rain leaders: Extend to grade and join to new sub-drainage system.

3. Exposed tin-zinc or lead coated copper at new construction as follows:

   a. New sheet metal flashing at cornices, copings and other locations where indicated. In general, sheet metal is required where copings or parapet caps are not indicated as formed aluminum.

B. Products furnished, but not installed, under this Section include the following:

1. Flashing, pan flashing and reglets in masonry installed as part of Division 4 Section "Unit Masonry Assemblies." Such flashing includes pan, jamb, loose lintel and relieving angle flashing, and such other flashing indicated and requiring installation within masonry walls.

C. Related Sections:

1. Division 5 Section “Formed Metal Fabrications” for formed aluminum fabrications at new construction.
1. Division 6 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Division 7 Section "Thermoplastic Single-Ply Membrane Roofing" for installing sheet metal flashing and trim integral with membrane roofing.

1.3 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Fabricate and install roof edge flashing and copings 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.: 60-lbf/sq. ft. perimeter uplift force, 90-lbf/sq. ft. corner uplift force, and 30-lbf/sq. ft. outward force.

C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

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 for each manufactured product and accessory.

B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:

1. Identification of 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 joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
4. Details of termination points and assemblies, including fixed points.
5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
7. Details of special conditions.
8. Details of connections to adjoining work.
9. Detail formed flashing and trim at a scale of not less than 1-1/2 inches per 12 inches.

C. Qualification Data: For qualified fabricator.

1.5 QUALITY ASSURANCE

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

B. Copper Sheet Metal Standard: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

C. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Architect, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Review special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect sheet metal flashing.
5. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

PART 2 – PRODUCTS

2.1 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Copper Sheet for Use at the Existing Library and concealed applications in the new construction: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.

1. Non-Patinated Exposed Finish: Mill.

C. At exposed applications in the new construction, provide one of the following:

1. Zinc-Tin Alloy-Coated Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 temper, of minimum uncoated weight (thickness) indicated; coated on both sides with a zinc-tin alloy (50 percent zinc, 50 percent tin).
2. Lead-Coated Copper Sheet: ASTM B 101, Type I, Class A, consisting of cold-rolled copper sheet of weight (thickness) indicated below, coated both sides with lead weighing not less than 12 lb/100 sq. ft. (0.6 kg/sq. m) nor more than 15 lb/100 sq. ft. (0.7 kg/sq. m) of copper sheet (total weight of lead applied to both sides).

2.2 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

B. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.

2.3 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 and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

    a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
    b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Copper Sheet: Copper, hardware bronze or Series 300 stainless steel.

C. Solder:

1. For Copper and Lead-Coated Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
3. For Zinc-Tin Alloy-Coated Copper: ASTM B 32, 100 percent tin.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Through-Wall Ribbed Sheet Metal Flashing: Manufacture through-wall sheet metal flashing for embedment in masonry with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond. Manufacture through-wall flashing with interlocking counterflashing on exterior face, of same metal as reglet.

B. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -soldered corners and junctions with interlocking counterflashing on exterior face, of same metal as reglet.

1. Material: Coated Copper, 16 oz./sq. ft.
2. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
3. Accessories:

    a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
    b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

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, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. 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.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form 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.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

E. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

G. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

I. Do not use graphite pencils to mark metal surfaces.

2.6 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch-high, end dams where flashing is discontinuous. Fabricate from the following materials:

1. Copper: 16 oz./sq. ft.

2.7 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Coated Copper: 16 oz./sq. ft.

2.8 SILL PANS AT WINDOWS AND LOUVERS

A. Provide “pan” type flashing at all windows, louvers and similar openings in exterior masonry walls. Flashing shall be fabricated from 16 oz./sq.ft. Coated Copper. Lap and solder the corners of upturned sides and backs of pans in order to create a positively weeping pan draining to the exterior in a controlled manner.

B. In general fabricate flashing so the back of the pan is concealed within the slotted bottom of the aluminum sill extrusion.

C. Provide sill pans at doorways that are continuous with the sill pans of the adjoining fixed glazing. At door sills conceal the back upturn of the sill pan within the extruded aluminum door sill.

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 the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

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

3.2 UNDERLAYMENT INSTALLATION

A. General: Install underlayment as indicated on Drawings.

B. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

3.3 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. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. 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.
3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.
7. Do not use graphite pencils to mark metal surfaces.

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 SMACNA.

1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

D. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F , set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.

1. At zinc-tin coated copper, remove factory applied paint-like finish with lacquer remover before tinning. At copper and zinc-tin coated copper, pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work. Pre-tinning is not required for lead-coated copper.
2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

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. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 4 Section "Unit Masonry Assemblies."

C. Reglets: Installation of reglets is specified in Division 4 Section "Unit Masonry Assemblies."

3.5 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.7 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.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. 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

SECTION 07811 - SPRAYED FIRE-RESISTIVE MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Concealed SFRM for use at steel framing around elevator shafts and other shafts, new exit stair, and at other fire-rated construction as indicated on architectural and structural drawings. Steel framing shall include all columns, beams and other structural members which are required for the integrity of the shafts under fire conditions, whether they are within the shaft or not. Fireproof all such framing throughout their load path. Where shafts terminate above the lowest level slab, provide sprayed fire-resistive material at the lowest floor level of the shaft. Ratings of spray fire-resistive materials on structural members shall be no less than the ratings of the shaft wall construction.

B. Related Sections include the following:

1. Division 5 Section "Structural Steel" for surface conditions required for structural steel receiving sprayed fire-resistive materials.

1.3 DEFINITIONS

A. Concealed sprayed fire-resistive material is applied to surfaces that are concealed from view behind other construction when the Work is completed.

1.4 SUBMITTALS

A. Product Data: For each fire-resistive product specified.

B. Product Certificates: Signed by manufacturer of sprayed fire-resistive material certifying that the products furnished comply with requirements.

C. Research/Evaluation Reports: Evidence of sprayed fire-resistive material's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by sprayed fire-resistive material manufacturer as having the necessary experience, staff, and training to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its sprayed fire-resistive materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.

B. Source Limitations: Obtain each type of sprayed fire-resistive material from one source and by a single manufacturer.

C. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials and assemblies identical to those tested for the following fire-test-response characteristics per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify packages (bags) containing sprayed fire-resistive material with appropriate markings of applicable testing and inspecting agency.

1. Fire-Resistance Ratings: As indicated by reference to fire-resistive designs listed in UL's "Fire Resistance Directory," or in the comparable publication of another testing and inspecting agency acceptable to authorities having jurisdiction, for sprayed fire-resistive material serving as direct-applied protection, tested per ASTM E 119.
2. Surface-Burning Characteristics: As indicated for each sprayed fire-resistive product required, tested per ASTM E 84.

D. Provide products containing no detectable asbestos as determined according to the method specified in 40 CFR, Part 763, Subpart E, Appendix E, Section 1, "Polarized Light Microscopy."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; shelf life, if applicable; and fire-resistance ratings applicable to Project.

B. Use materials with limited shelf life within period indicated. Remove from Project site and discard materials whose shelf life has expired.

C. Store materials inside, under cover, aboveground, so they are kept dry until ready for use. Remove from Project site and discard materials that have deteriorated.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply sprayed fire-resistive material when ambient or substrate temperatures are 40 deg F (4 deg C) or lower, unless temporary protection and heat is provided to maintain temperatures at or above this level for 24 hours before, during, and for 24 hours after product application.

B. Ventilation: Ventilate building spaces during and after application of sprayed fire-resistive material. Use natural means or, where this is inadequate, forced-air circulation until fire-resistive material dries thoroughly.

1.8 SEQUENCING

A. Sequence and coordinate application of sprayed fire-resistive materials with other related work specified in other Sections to comply with the following requirements:

1. Provide temporary enclosures for interior applications to prevent deterioration of fire-resistive material due to exposure to unfavorable environmental conditions.
2. Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.
3. Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
4. Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
5. Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, and corrections have been made to defective applications.

PART 2 - PRODUCTS

2.1 CONCEALED SPRAYED FIRE-RESISTIVE MATERIALS

A. General: For concealed applications of sprayed fire-resistive materials, provide manufacturer's standard products complying with requirements indicated in this Article for material composition and physical properties representative of installed products.

B. Material Composition: As follows:

1. Cementitious sprayed fire-resistive material consisting of factory-mixed, dry formulation of gypsum or portland cement binders and lightweight mineral or synthetic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.

C. Physical Properties: Minimum values, unless otherwise indicated, or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property listed as follows:

1. Dry Density: 15 lb/cu. ft. (240 kg/cu. m) for average and individual densities regardless of density indicated in referenced fire-resistive design, or greater if required to attain fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A, Appendix A, "Alternate Method for Density Determination."
2. Thickness: Provide minimum average thickness required for fire-resistive design indicated according to the following criteria, but not less than 0.375 inch (9 mm), per ASTM E 605.

    a. Where the referenced fire-resistive design lists a thickness of 1 inch (25 mm) or greater, the minimum allowable individual thickness of sprayed fire-resistive material is the design thickness minus 0.25 inch (6 mm).
    b. Where the referenced fire-resistive design lists a thickness of less than 1 inch (25 mm) but more than 0.375 inch (9 mm), the minimum allowable individual thickness of sprayed fire-resistive material is the greater of 0.375 inch (9 mm) or 75 percent of the design thickness.

c. No reduction in average thickness is permitted for those fire-resistive designs whose fire-resistance ratings were established at densities of less than 15 lb/cu. ft. (240 kg/cu. m).

3. Bond Strength: 150 lbf/sq. ft. (7.2 kPa) per ASTM E 736 under the following conditions:

a. Field test sprayed fire-resistive material that is applied to flanges of wide-flange structural-steel members on surfaces matching those that will exist for remainder of steel receiving fire-resistive material.
b. If surfaces of structural steel receiving sprayed fire-resistive material are primed or otherwise painted, perform series of bond tests specified in UL's "Fire Resistance Directory" for coating materials.
c. Minimum thickness of sprayed fire-resistive material tested in laboratory shall be 0.75 inch (19 mm).

4. Compressive Strength: 5.21 lbf/sq. in. (35.9 kPa) as determined in the laboratory per ASTM E 761. Minimum thickness of sprayed fire-resistive material tested shall be 0.75 inch (19 mm) and minimum dry density shall be as specified, but not less than 15 lb/cu. ft. (240 Corrosion Resistance: No evidence of corrosion per ASTM E 937.
5. Deflection: No cracking, spalling, delamination, or the like per ASTM E 759.
6. Effect of Impact on Bonding: No cracking, spalling, delamination, or the like per ASTM E 760.
7. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. (0.27 g/sq. m) in 24 hours per ASTM E 859. For laboratory tests, minimum thickness of sprayed fire-resistive material is 0.75 inch (19 mm), maximum dry density is 15 lb/cu. ft. (240 kg/cu. m), test specimens are not prepurged by mechanically induced air velocities, and tests are terminated after 24 hours.

D. Fire-Test-Response Characteristics: Provide sprayed fire-resistive materials with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Flame Spread: 10 or less.
2. Smoke Developed: 0.

E. Products: Subject to compliance with requirements, provide products by one of the following or approved equal:

1. Cementitious Sprayed Fire-Resistive Material:

a. Pyrolite 15; Carboline Co., Fireproofing Products Div.
b. Pyrolite 15 Blue; Carboline Co., Fireproofing Products Div.
c. Monokote Type MK-6/CBF; W.R. Grace & Co.--Conn., Construction Products Div.
d. Monokote Type MK-6/ED; W.R. Grace & Co.--Conn., Construction Products Div.
e. Retro-Gard; W.R. Grace & Co.--Conn., Construction Products Div.
f. Cafco 280; Isolatek International Corp., Cafco Products.
g. Cafco 300; Isolatek International Corp., Cafco Products.
h. Cafco 300 SB; Isolatek International Corp., Cafco Products.
i. Mandolite CP2; Mandoval Vermiculite Products, Inc.
j. 5EF; Southwest Vermiculite Co., Inc.
k. 5GP; Southwest Vermiculite Co., Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, to determine whether they are in satisfactory condition to receive sprayed fire-resistive material. A substrate is in satisfactory condition if it complies with the following:

1. Substrates comply with requirements in the Section where the substrate and related materials and construction are specified.
2. Substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt, or other foreign substances capable of impairing bond of fire-resistive material with substrate under conditions of normal use or fire exposure.
3. Objects penetrating fire-resistive material, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
4. Substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying fire-resistive material.

B. Conduct tests according to fire-resistive material manufacturer's written recommendations to verify that substrates are free of oil, rolling compounds, and other substances capable of interfering with bond.

C. Do not proceed with installation of fire-resistive material until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances that could impair bond of fire-resistive material, including oil, grease, rolling compounds, incompatible primers, and loose mill scale.

B. Prime substrates where recommended in writing by fire-resistive material manufacturer, unless compatible shop primer has been applied and is in satisfactory condition to receive fire-resistive material.

C. Cover other work subject to damage from fallout or overspray of fire-resistive materials during application. Provide temporary enclosure as required to confine spraying operations, protect the environment, and ensure maintenance of adequate ambient conditions for temperature and ventilation.

3.3 INSTALLATION, GENERAL

A. Comply with fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to convey and spray on fire-resistive material, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

B. Apply sprayed fire-resistive material that is identical to products tested as specified in Part 1 in "Submittals" Article, with respect to rate of application, accelerator use, sealers, topcoats, tamping, troweling, water overspray, or other materials and procedures affecting test results.

C. Install metal lath, as required, to comply with fire-resistance ratings and fire-resistive material manufacturer's written recommendations for conditions of exposure and intended use. Securely attach lath to substrate in position required for support and reinforcement of fire-resistive material. Use anchorage devices of type recommended in writing by fire-resistive material manufacturer. Attach lathing accessories where indicated or required for secure attachment to substrate.

D. Extend fire-resistive material in full thickness over entire area of each substrate to be protected. Unless otherwise recommended in writing by fire-resistive material manufacturer, install body of fire-resistive covering in a single course.

E. Spray apply fire-resistive materials to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by manufacturer.

3.4 INSTALLING CONCEALED SPRAYED FIRE-RESISTIVE MATERIALS

A. Apply concealed fire-resistive material in thicknesses and densities indicated, but not less than those required to achieve fire-resistance ratings designated for each condition, and comply with requirements for thickness specified in Part 2 "Concealed Sprayed Fire-Resistive Materials" Article.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Testing and inspecting of completed applications of sprayed fire-resistive material will take place in successive stages, in areas of extent and using methods as follows. Do not proceed with application of fire-resistive material for the next area until test results for previously completed applications of fire-resistive material show compliance with requirements.

1. Extent: For each 1000-sq. ft. area, or partial area, on each floor, testing and inspecting agency will evaluate the following characteristics. Tested values must equal or exceed values indicated and values required for approved fire-resistance design.

a. Thickness for Structural Frame Members: From a sample of 25 percent of structural members per floor, taking 9 measurements at a single cross section for structural frame beams or girders, 7 measurements of a single cross section for joists and trusses, and 12 measurements of a single cross section for columns per ASTM E 605.

b. Density for Structural Frame Members: At frequency and from sample size indicated for determining thickness of each type of construction, per ASTM E 605 or AWCI Technical Manual 12-A, Appendix A, "Alternate Method for Density Determination."
c. Bond Strength for Structural Framing Members: Cohesion and adhesion at frequency and from sample size indicated for determining thickness of each type of construction, per ASTM E 736.

2. When testing discovers applications of fire-resistive material not in compliance with requirements, testing and inspecting agency will perform additional random testing to determine extent of noncompliance.

C. Remove and replace applications of fire-resistive material where test results indicate that they do not comply with specified requirements for cohesion and adhesion or for density, or both.

D. Apply additional fire-resistive material per manufacturer's written instructions where test results indicate that thickness does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 CLEANING, PROTECTING, AND REPAIR

A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

B. Cure exposed cementitious sprayed fire-resistive material according to product manufacturer's written recommendations to prevent premature drying.

C. Protect fire-resistive material, according to advice of product manufacturer and Installer, from damage resulting from construction operations or other causes so fire protection will be without damage or deterioration at the time of Substantial Completion.

D. Coordinate application of fire-resistive material with other construction to minimize the need to cut or remove fire protection. As installation of other construction proceeds, inspect fire-resistive material and patch any damaged or removed areas.

E. Repair or replace work that has not been successfully protected.

3.7 SCHEDULE

A. The following schedule indicates the locations and ratings for sprayed fire-resistive materials. See Division 9 Section, “Intumescent Paints,” for requirements for intumescent paint.

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 15 Sections specifying duct and piping penetrations.
2. Division 16 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

A. General: For penetrations through 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.

B. 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.

1.4 SUBMITTALS

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

B. Product Certificates: For through-penetration firestop system products, signed by product manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 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.

1.7 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 FIRESTOPPING, GENERAL

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

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:

1. A/D Fire Protection Systems Inc.
2. DAP Inc.
3. Firestop Systems Inc.
4. Hilti Construction Chemicals, Inc.

5. Instant Firestop Mfg. Inc.
6. International Protective Coatings Corp.
7. Isolatek International.
8. Nelson Firestop Products.
9. NUCO Industries.
10. RectorSeal Corporation (The).
11. Specified Technologies Inc.
12. 3M Fire Protection Products.
13. Tremco.
14. United States Gypsum Company

2.3 MIXING

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

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.

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.

3.5 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Firestop Systems for Metallic Pipes, Conduit, or Tubing FS-2: Comply with the following:

1. UL-Classified Systems for Framed Floors: F - C 1001-1999.
2. UL-Classification for Masonry Walls with a Minimum Thickness Less Than or Equal to 8 Inches: C-AJ-1001-1999; C-BJ-1001-1999; W-J- 1001-1999.
3. UL-Classification for Masonry Walls with a Minimum Thickness Greater Than 8 Inches: C-BK-1001-1999; W-K-1001-1999.
4. UL-Classification for Framed Walls: W-L-1001-1999.
5. Type of Fill Materials: One or more of the following:

    a. Silicone sealant.
    b. Intumescent putty.
    c. Mortar.

C. Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing FS-3: Comply with the following:

1. UL-Classified Systems for Framed Floors: F - C 2001-2999.
2. UL-Classification for Masonry Walls with a Minimum Thickness Less Than or Equal to 8 Inches: C-AJ-2001-2999; C-BJ-20001-2999; W-J-2001-2999.
3. UL-Classification for Framed Walls: W-L-2001-2999.
4. Type of Fill Materials: One or more of the following:

    a. Silicone sealant.
    b. Intumescent putty.
    c. Intumescent wrap strips.
    d. Firestop device.

D. Firestop Systems for Electrical Cables FS-4: Comply with the following:

1. UL-Classified Systems for Framed Floors: F - C 3001-3999.
2. UL-Classification for Masonry Walls with a Minimum Thickness Less Than or Equal to 8 Inches: C-AJ-3001-3999; C-BJ-30001-3999; W-J-3001-3999.
3. UL-Classification for Framed Walls: W-L-3001-3999.
4. Type of Fill Materials: One or more of the following:

    a. Silicone sealant.
    b. Intumescent putty.
    c. Silicone foam.

E. Firestop Systems for Insulated Pipes FS-6: Comply with the following:

1. UL-Classified Systems for Framed Floors: F - C 5001-5999.
2. UL-Classification for Masonry Walls with a Minimum Thickness Less Than or Equal to 8 Inches: C-AJ-5001-5999; W-J-5001-5999.
3. UL-Classification for Framed Walls: W-L-5001-5999.
4. Type of Fill Materials: One or more of the following:

    a. Intumescent putty.
    b. Silicone foam.
    c. Intumescent wrap strips.

F. Firestop Systems for Miscellaneous Electrical Penetrants FS-7: Comply with the following:

1. UL-Classification for Masonry Walls with a Minimum Thickness Less Than or Equal to 8 Inches: C-AJ-6001-6999.
2. UL-Classification for Framed Walls: W-L-6001-6999.
3. Type of Fill Materials: One or both of the following:

    a. Intumescent putty.
    b. Mortar.

G. Firestop Systems for Miscellaneous Mechanical Penetrations FS-8: Comply with the following:

1. UL-Classified Systems for Framed Floors: F - C 7001-7999.
2. UL-Classification for Masonry Walls with a Minimum Thickness Less Than or Equal to 8 Inches: C-AJ-7001-7999; W-J-7001-7999.

3. UL-Classification for Framed Walls: W-L-7001-7999.
4. Type of Fill Materials: One or both of the following:

    a. Latex sealant.
    b. Mortar.

H. Firestop Systems for Groupings of Penetrations FS-9: Comply with the following:

1. UL-Classified Systems for Framed Floors: F - C 8001-8999.
2. UL-Classification for Masonry Walls with a Minimum Thickness Less Than or Equal to 8 Inches: C-AJ-8001-8999; C-BJ-8001-8999; W-J-8001-8999.
3. UL-Classification for Framed Walls: W-L-8001-8999.
4. Type of Fill Materials: One or more of the following:

    a. Mortar.
    b. Intumescent wrap strips.
    c. Firestop device.

END OF SECTION

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 sealants for the following applications, including those specified by reference to this Section. Provide sealants at the locations listed below, and at other locations indicated on the drawings:

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

    a. Control and expansion joints in unit masonry.
    b. Joints at metal panels.
    c. Joints between dissimilar materials.
    d. Perimeter joints at frames of doors and windows.
    e. Control and expansion joints in ceiling and overhead surfaces.
    f. Other joints as indicated.

2. Exterior joints in the following horizontal traffic surfaces:

    a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
    b. Tile control and expansion joints.
    c. Joints between different materials.
    d. Other joints as indicated.

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

    a. Control and expansion joints on exposed interior surfaces of exterior walls.
    b. Perimeter joints of exterior openings where indicated.
    c. Tile control and expansion joints.
    d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
    e. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    f. Other joints as indicated.

4. Interior joints in the following horizontal traffic surfaces:

    a. Control and expansion joints in concrete flooring.
    b. Other joints as indicated and not excluded below.

B. Related Sections include the following. Sealants indicated below are not part of the work of this Section, “Joint Sealants.”

1. Division 7 Section "Firestopping" for fire-resistant building joint-sealant systems.
2. Division 8 Section "Aluminum Windows, Entrances and Storefront" for provision and installation of all sealants between glazing and aluminum frames, and between aluminum window frames, aluminum storefront and aluminum entrance assemblies. Sealant for such uses are specified in this Section “Joint Sealants.”
3. Division 8 Section “Glazing” for provision and installation of other glazing sealants.
4. Division 9 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.

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: For standard colors, manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Approval: For custom and standard colors of joint sealant required. Install joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants. Obtain Architect=s approval.

D. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates as follows:

1. Locate test joints as directed by Architect.
2. Conduct field tests for each application indicated below:

    a. Each type of elastomeric sealant and joint substrate indicated.
    b. Each type of nonelastomeric sealant and joint substrate indicated.

3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Test Method: Test joint sealants by hand-pull method described below:

    a. Install joint sealants in 60-inch-long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow sealants to cure fully before testing.
    b. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
    c. Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
    d. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.

5. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

D. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:

    1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

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

B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
2. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.
3. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are different than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Installer's Warranty: Written warranty, signed by Installer agreeing 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.

C. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing 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: 20 years from date of Substantial Completion.

D. 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 PRODUCTS AND MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated for each type in the sealant schedules at the end of Part 3.

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 for this characteristic.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant in the Elastomeric Joint-Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class, and uses.

B. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.

C. Stain-Test-Response Characteristics: Where elastomeric sealants are specified in the Elastomeric Joint-Sealant Schedule 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.

2.4 LATEX JOINT SEALANTS

A. Latex Sealant Standard: Comply with ASTM C 834 for each product of this description indicated in the Latex Joint-Sealant Schedule at the end of Part 3.

2.5 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant for Exposed and Concealed Joints: For each product of this description indicated in the Acoustical Joint-Sealant Schedule at the end of Part 3, provide manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following:

1. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

B. Acoustical Sealant for Concealed Joints: For each product of this description indicated in the Acoustical Joint-Sealant Schedule at the end of Part 3, provide manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.6 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Type C: Closed-cell material with a surface skin.

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.

2.7 MISCELLANEOUS MATERIALS

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

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

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, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces 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.

    a. Metal.
    b. Glass.
    c. 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 of 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 back of joints.

E. Install sealants by proven techniques to 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 provided for 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 sealants from surfaces adjacent to joint.
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.

3.4 FINISHING SEALANTS IN MASONRY

A. At sealants in vertical surfaces of brick masonry, apply mortar sand to freshly tooled uncured sealant joints to simulate texture and appearance of mortar joints. Use same mix of masonry sand as that used in mortar. Apply sand by blowing or throwing sand at joints. Take care to apply sand evenly to sealant. Do not attempt to mix sand into sealant.

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 the original work.

3.6 ELASTOMERIC JOINT-SEALANT SCHEDULE

A. Medium-Modulus Neutral-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following:

a. Spectrem 2; Tremco.
b. Dow Corning Corporation; 799.
c. GE Advanced Materials - Silicones; UltraGlaze SSG4000

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Color to be selected from manufacturer's standard colors.
5. Use Related to Exposure: NT (nontraffic).
6. Uses Related to Joint Substrates: G, A, and, as applicable to joint substrates indicated, O.

a. Use O Joint Substrates: Coated glass, aluminum coated with a high-performance coating.

7. Applications: For wet sealing between glass and aluminum window framing.

B. Mildew-Resistant Silicone Sealant: Where joint sealants of this type are indicated, provide products formulated with fungicide that are intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes, and that comply with the following:

1. Products: Provide one of the following:

a. 786 Mildew Resistant; Dow Corning.
b. Sanitary 1700; GE Silicones.
c. NuFlex 302; NUCO Industries, Inc.
d. 898 Silicone Sanitary Sealant; Pecora Corporation.
e. PSI-611; Polymeric Systems, Inc.
f. Tremsil 600; Tremco.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Color to be selected from manufacturer=s standard colors.
5. Use Related to Exposure: NT (nontraffic).
6. Uses Related to Joint Substrates: O.

a. Use O Joint Substrates: Ceramic tile, porcelain fixtures, plastic laminate.

7. Applications: For use at ceramic tile, plumbing fixtures, or plastic laminate counters.

C. Multicomponent Nonsag Urethane Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following:

a. Vulkem 922; Mameco International.
b. Dynatrol II; Pecora Corporation.
c. Flexiprene 2000; Polymeric Systems, Inc.
d. Sikaflex - 2c NS; Sika Corporation.
e. NP 2; Sonneborn Building Products Div., ChemRex Inc.
f. Dymeric 511; Tremco.

2. Type and Grade: M (multicomponent) and NS (nonsag).
3. Class: 25.
4. Custom color to match Architect's sample.
5. Additional Movement Capability: 50 percent movement in extension and 50 percent in compression for a total of 100 percent movement.
6. Use Related to Exposure: NT (nontraffic).
7. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.

a. Use O Joint Substrates: Aluminum coated with a high-performance coating, painted steel, galvanized steel, brick, limestone and cast stone.

8. Applications: For use in sealing at masonry walls, between masonry openings and window or door frames, and at stone veneer walls. Primer is required at window frames and galvanized steel. Manufacturer, or pre-construction adhesion testing, may indicate requirements for additional priming.

D. Multicomponent Pourable Urethane Products: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following:

a. Chem-Calk 550; Bostik Inc.
b. Vulkem 245; Mameco International.
c. Pourthane; W.R. Meadows, Inc.
d. Elasto-Thane 920 Pourable; Pacific Polymers, Inc.
e. NR-200 Urexpan; Pecora Corporation.
f. PSI-270SL; Polymeric Systems, Inc.
g. Sikaflex - 2c SL; Sika Corporation.
h. SL 2; Sonneborn Building Products Div., ChemRex Inc.
i. THC-900; Tremco.

2. Type and Grade: M (multicomponent) and P (pourable).
3. Class: 25.
4. Custom color to match Architect's sample.
5. Uses Related to Exposure: T (traffic).
6. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.

a. Use O Joint Substrates: Stone, concrete, and cast stone paving.

7. Applications: For use at paving control or expansion joints.

3.7 LATEX JOINT-SEALANT SCHEDULE

A. Latex Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following:

    a. Chem-Calk 600; Bostik Inc.
    b. NuFlex 330; NUCO Industries, Inc.
    c. LC 160 All Purpose Acrylic Caulk; Ohio Sealants, Inc.
    d. AC-20; Pecora Corporation.
    e. PSI-701; Polymeric Systems, Inc.
    f. Sonolac; Sonneborn Building Products Div., ChemRex, Inc.
    g. Tremflex 834; Tremco.

2. Color to be selected from manufacturer's standard colors.
3. Applications: Non-working interior joints.

END OF SECTION