

New Mixed Use Building
82 NW 5th Ave. – West Settlers Building

SECTION 07120 -FLUID-APPLIED ELASTOMERIC WATERPROOFING With SAND SET PAVER/STONE OR THIN SET PAVER/STONE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes: Provide a complete polyurethane waterproofing membrane system including all applicable sealants and elastomeric flashings needed to prevent water penetration at locations indicated.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Tile: Section
 - 3. Sealants: Section 7900
 - 4. Concrete: Section 3300

1.2 SUBMITTALS

- A. Product data:
 - 1. Materials list of items proposed to be provided under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
 - 3. Shop Drawings or catalog illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades;
 - 4. Manufacturer's current recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
 - 5. Written documentation of applicator's qualifications, including reference projects of similar scope and complexity, with current phone contacts of architects and owners for verification.
 - 6. Provide test documentation or manufacturer's certification that membrane and tin set mortar has been tested by Tile Council of America or other acceptable sources. Test results shall meet or exceed current ANSI requirements.
 - 7. Provide certification product and applications meet Metro Dade Product Notice of Approval.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- B. Applicator qualifications:
 - 1. Applicator shall have at least three years experience in installing materials of types specified and shall have successfully completed at least three projects of similar scope and complexity.
 - 2. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation.

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- C. Convene a pre-installation job-site conference four weeks prior to commencing work of this Section:
 - 1. Secure attendance by Architect, Contractor, applicator, and authorized representatives of the membrane system manufacturer and interfacing trades.
 - 2. Examine Drawings and Specifications affecting work of this Section, verify all conditions, review installation procedures, and coordinate scheduling with interfacing portions of the Work.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in manufacturer's unopened containers with all labels intact and legible at time of use.
- B. Maintain the products in accord with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.
- C. Comply with pertinent provisions of Section 01620.

1.5 SUBSTRATE CONDITIONS

- A. General:
 - 1. Provide applicator with surfaces that are broom clean, dry, sound and free of voids, bugholes, rockpockets, honeycombs, protrusions, excessive roughness, foreign matter, frost, ice and other contaminants which may inhibit application or performance of the waterproofing membrane system.
 - 2. Using suitable abrasive methods, remove residue of form release, curing compound, chemical retarders and other surface treatments, laitance, mortar smear, sawcutting residue, mill scale, rust, loose material and other contaminants from concrete, masonry and ferrous metal surfaces to receive the work of this Section.
- B. Concrete: Where work of this Section will be applied to concrete, provide applicator with surfaces that are smooth with finish equal to one that is light steel troweled followed by a fine hair broom. No curing compounds or sealers shall be used or must be removed prior to application of membrane.
- D. Decks:
 - 1. Slope deck surfaces to drains that have flanges at membrane level which are flush with deck surfaces.
 - 2. Rigidly install pipe, vents and other surface protrusions, properly flash them, and cover to prevent entry of membrane materials.
- E. Metal flashings: Where metal flashings are substrate to waterproofing membrane, set the flashings in continuous bedding bead of urethane sealant; install sealant S-bead between metal laps and mechanically fasten to substrate along leading edges at every 4" on center, staggered linearly, to lay flat without fishmouths.
- F. Joints: Configuration shall be consistent with this Section and with all other requirements of the Contract Documents.

1.6 WARRANTY

- A. Deliver to the Architect signed copies of the following written warranties against defective materials and workmanship for a period of five years following date of completion. Warrant that installed waterproofing membrane system shall be free of defects including adhesive failure, cohesive failure, and waterproofing failure resulting from substrate cracking up to 1/16 inch.
 - 1. Manufacturer's standard warranty covering materials;
 - 2. Applicator's standard warranty covering workmanship.

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2.1 GENERAL

- A. Provide a complete "Tremco/Vulkem 350 or 360NF" fluid applied elastomeric waterproofing membrane system manufactured by Tremco Inc. or approved equal.
- B. Provide membrane complying with ASTM C836-89a. Insure compatibility of membrane installation with tile or stone setting bed. Provide membrane that is 79-100 percent solids pure polyurethane designed for waterproofing concealed building components subject to hydrostatic head; Designed for use under ceramic tile on thin set mortar bed;

2.2 ACCESSORIES

- A. Primer: As recommended by waterproofing membrane system manufacturer;
- B. Joint backing: Closed-cell, polyethylene rod as recommended by membrane manufacturer;
- C. Elastomeric sheet flashing: Tremco Dual Flex™ Flashing System or Sika "Combiflex" System.
- D. Sealant: 1) non-moving joints use Vulkem 116/227), 2) expansion joint use sheet flashing system and Vulkem 45SSL 3) moving joints use (non-expansion) use Vulkem 45SSL , Tile joints use Spectrem 3, Spectrem 4, Vulkem 45SSL or Dymeric 240FC.
- E. Protection board: none unless required: as approved by membrane manufacturer.

2.3 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the membrane system manufacturer as compatible, subject to the approval of the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Applicator shall examine the areas and conditions under which work of this Section will be performed.
 - 1. Verify conformance with manufacturer's requirements;
 - 2. Report unsatisfactory conditions in writing to the Architect;
 - 3. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Surface preparation and detailing procedures to be in accord with waterproof membrane system manufacturer's instructions and recommendations except where more stringent requirements are indicated.
- B. Clean all deck surfaces to receive membrane system in accord with manufacturer's instructions; vacuum clean or blow clean with oil-free compressed air all surfaces to receive sealants, detailing materials or membranes immediately prior to installation. Existing membrane shall be compatible with the Vulkem system. Clean all existing membrane to be left in place of all contaminants. Remove all loose or non-recommended membrane by means deemed necessary.
- C. Rout, clean, prepare and detail surface cracks in accord with manufacturer's instructions; install backer rod where required.

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- D. Clean metal surfaces to bright metal by wire brushing or mechanical etching; scuff-sand lead flashing and plastic surfaces.
- E. Prime surfaces in accord with manufacturer's instructions.
- F. Install 1/4" diameter backer rod into corner of all horizontal-to-vertical junctures subject to movement and cover with 1" detail cant of approved sealant; install 1" detail cants at projections, curbs and other horizontal-to-vertical junctures.
- G. Install detail coats, joint and crack treatments, and liquid flashings in accord with manufacturer's instructions.
- H. Allow detail applications to cure in accord with manufacturer's instructions prior to general application of membrane.

3.3 APPLICATION

- A. General: Install waterproofing system in accord with manufacturer's recommendations and instructions as applies to the Work except where more stringent requirements are indicated.
 - 1. Waterproofing membrane shall average 60 mil dry-film thickness (*note: if over occupied space below use 90 mils*).
 - 2. Apply base coat of membrane and allow to cure per manufacturer's recommendations. After cure install a second coat of base membrane while wet broadcast to rejection, pre-bagged 20-30 mesh silica aggregate approved by the manufacturer of the membrane system into the wet membrane. Allow to cure (Vulkem 350 must cure for 72 hours, Vulkem 360NF must cure for 24 hours) prior to tile installation.
- B. Verify proper dry condition of substrate using method recommended by membrane system manufacturer; perform adhesion checks prior to general application of membrane system using field adhesion test method recommended by manufacturer.
- C. Mask off adjoining surfaces not to receive membrane system.
- D. Wipe clean all detail coats with white rags wetted with Xylene solvent; do not saturate detail coat.
- E. Apply membrane uniformly and allow to cure in accord with manufacturer's instructions.
- F. Feather terminating edge when entire area cannot be completed in one day; clean area 6" wide along terminating edge of membrane with Xylene solvent on clean white rags prior to startup on next working day; use interlaminary primer per manufacturer's instructions as needed; overlap existing work by 6" with new work.
- G. Flood test: Plug drains on deck surfaces and use sand bags or other means to restrict runoff. Flood deck with water to depth of 2" (50 mm) and allow to stand at least 24 hours; repair leaks if occurs and retest.
- H. Install protection board or drainage mat over cured membrane in accord with manufacturer's instructions if required.
- I. Install edge course of pavers as required using an epoxy modified or approved thin-set mortar.

3.4 APPLICATION OF CEMENTITIOUS MATERIAL

1. Thin Set Applications

- A. Apply thin set adhesive and tile per the manufacturer's recommendations insuring all materials and methods are in accordance with the guidelines accepted by the TILE COUNCIL OF AMERICA'S latest publications

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- B. Thin set adhesive shall meet ANSI A 118.4 or ANSI A118.5 r as approved by Tremco.
 - 1. Use approved Euclid Chemical Company cementitious material.
 - 2. Grout shall conform to ANSI A108.10.
- C. All perimeter tile interfaces and control joints 10 feet on center shall have ¼ inch minimum joint formed by holding the tile away from the interface. Interface joint is to be sealed with THC 901, Vulkem 45SSL or Dymonic FC.
- 2. Thick Set Applications
 - A. Install mortar bed and reinforcing (mandatory) following guidelines as noted by ANSI 108.1A directly over the last coat of the waterproofing membrane. Slope to drain @1/4 inch per foot.
 - B. Provide unclogged weep holes at roof drains (by others)
 - C. Movement Joints installed per Method EJ 171 of the TCA guidelines.
 - D. Grout shall conform to ANSI A108.10

3.5 PROTECTION AND CLEAN-UP

- A. Promptly remove primer or membrane system material from adjacent surfaces with MEK, Toluene or Xylene; leave work area in broom clean condition.
- B. Prohibit traffic over completed work and protect against work overhead until protection course is installed; protect from damage until protected beneath overlaying work.

End of Section

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SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Cavity wall insulation.
 - 2. Concealed building insulation.
 - 3. Fire safing insulation.
 - 4. Vapor retarders.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Product test reports.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

PART 2 - PRODUCTS

2.1 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards and, for preformed units, in sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths, and lengths.
- B. Extruded-Polystyrene Board Insulation: 1½" thick sheets of closed cell polystyrene foam R-6 minimum. ASTM C 578, Type IV with maximum flame-spread and smoke-developed indices of 75 and 450, respectively.
- C. Sound Control Blanket Insulation: Shall be Type I Fiberglass Batts 3½" thick, friction fit, for interior stud walls. Flame spread, smoke, and fuel rating of less than 25. Type as recommended by manufacturer for maximum sound attenuation.
- D. Slage Wool - Fiber Board Safing Insulation: Semi rigid boards design for use as fire stop at openings to comply with ASTM C 612, type 1A and 1B; nominal density of 4 LB/CV. FT. passing ASTM E 136 for combustion characteristics. Thermal resistivity of 4 deg F x h x sq. Ft. at 75 deg F.
- E. Mineral-fiber blanket insulation consisting of fibers manufactured from glass:
 - 1. Unfaced Mineral-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

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2. Faced Mineral-Fiber Blanket Insulation: ASTM C 665, Type III, Class A; Category 1, faced with foil-scrim-kraft, foil scrim, or foil-scrim-polyethylene vapor-retarder membrane on one face. R-19 minimum.
- F. Provide MFGR Certification that materials contain recycled content of at least 26% post-industrial and 9% post-consumer recycled content (35% total) for LEED-MR credit 4.
- G. See Section 07512 for Roof Deck Insulation

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install insulation to comply with insulation manufacturer's written instructions applicable to products and application indicated. 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.
- B. Installation of General Building Insulation: 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.
 1. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant.
 2. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
 - a. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
 3. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
 - a. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - b. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.
 5. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
 - a. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions.
 - b. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
 - c. After adhesive has dried, install board insulation by pressing insulation

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into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.

- d. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
6. Stuff glass-fiber, loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

END OF SECTION 07210



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SECTION 07242 - EXTERIOR INSULATION AND FINISH SYSTEMS - CLASS PM

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes exterior insulation and finish system (EIFS), Class PM per classification developed by EIMA.

1.2 SUBMITTALS

- A. Product Data: For each product and assembly component indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, joints, penetrations, terminations, and attachments to other Work.
- C. Samples: For each EIFS system and for each color and texture required.
- D. Qualification Data: For Installer.
- E. Product certificates and test reports.
- F. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- G. Research/evaluation reports.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer, certified by manufacturer to install manufacturer's products.
- B. Fire-Test-Response Characteristics: Determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting agency.
 - 1. Insulation Board and Finish Coats: Flame-spread and smoke-developed indices of not more than 25 and 450, respectively, when tested individually per ASTM E 84.
 - 2. Full-Scale, Multistory Fire Test: Tested mockup complies with UBC Standard 26-4 for test method and required fire-test-response characteristics of exterior non-load-bearing wall panel assemblies containing foam-plastic insulation.
 - a. Mockup: Representative of completed multistory wall assembly required.
 - 3. Full-Scale Fire Test: Tested mockup shows no tendency to propagate flame over the surface or through finish to core, or to cause delamination of finish when vertically mounted exterior face is exposed 15 minutes to a fire source using flame-spread test per ASTM E 108 modified as indicated for testing vertical walls.
- C. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Build mockups as shown on Drawings.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 CLASS PM EXTERIOR INSULATION AND FINISH SYSTEMS

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- 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following or pre-approved equal.
 - 1. Sto Corp.; Sto Finish Systems Div.
- C. Class PM Exterior Insulation and Finish System (EIFS): Exterior assemblies of inner layer of board insulation, outer layer of glass-fiber-mesh-reinforced base coat applied directly to board insulation, and textured protective finish coat.
- D. Physical Properties: EIFS complying with performance standards and structural performance in "EIMA Guideline Specification for Exterior Insulation and Finish Systems, Class PM," including wind load per ASTM E 330 as indicated on structural drawings.
- E. Compatibility: Provide substrates, adhesive, board insulation, reinforcing meshes, sealants, and accessories that are compatible with one another and EIFS system and approved for use by system manufacturer.
- F. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), unperforated.
- G. Extruded-Polystyrene Board Insulation: Rigid, cellular with closed cells and integral high-density skin, formed using HCFCs as blowing agents to comply with ASTM C 578, Type IV.
 - 1. Size: Not more than 24 by 48 inches and in thickness indicated but not more than 4 inches or less than that allowed by system manufacturer.
- H. Mechanical Fasteners: Corrosion-resistant fasteners with thermal cap, standard washer and shaft attachments, and fastener; selected for properties of pullout, tensile, and shear strength required to resist design loads of application indicated; and capable of pulling fastener head below surface of insulation board.
 - 1. Fasteners to Steel Support Framing:
 - a. ASTM C 954 for steel studs from 0.033 to 0.112 inch (0.84 to 2.84 mm).
 - b. ASTM C 1002 for steel framing members not less than 0.0179 inch (0.45 mm) thick.
 - 2. Fasteners for Wood Substrates: ASTM C 1002, Type W for attachment to wood framing members and plywood sheathing.
 - 3. Fasteners for Masonry and Concrete Substrates: Sheathing dowel, plastic wing-tipped fastener with thermal cap, sized to fit insulation thickness indicated and to penetrate substrate to depth required to secure anchorage.
- I. Trim Accessories: Zinc alloy and complying with ASTM C 1063. Coordinate depth of accessories with thickness of base and finish coats required.
 - 1. Control Joints: Prefabricated, 1-piece type with expanded metal flanges, formed to provide double-keying action with protective coating, extending only to face of insulation, with removable tape on plaster face, and 1/4-inch joint sightline and bellows that extends to face of insulation .
 - 2. Corner Bead: Prefabricated small-nosed corner bead with expanded metal flanges extending a minimum of 2-7/8 inches from corner.
 - 3. Casing Bead: Prefabricated one-piece type for attachment to surface of insulation or behind insulation.

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- J. Reinforcing Mesh: ASTM D 578, balanced, alkali-resistant, open-weave glass-fiber mesh compatible with other system materials, with retained mesh tensile strength of not less than 120 lbf/in. per EIMA 105.01.
 - 1. Not less than 4.2 oz./sq. yd.
- K. Base-Coat Materials: Job-mixed portland cement (ASTM C 150, Type I, natural color), clean, washed, silica sand (ASTM C 897), alkali-resistant chopped glass fibers, and polymer-emulsion admixture.]
- L. Finish-Coat Materials: Polymer-modified portland cement formulation, containing portland cement, natural color or white; lime; natural sand aggregate; color-fast mineral pigments; and polymer-emulsion admixture
 - 1. Colors, Textures, and Patterns: As selected from manufacturer's full range.

2.2 ELASTOMERIC SEALANTS

- A. Elastomeric Sealant Products: System manufacturer's listed and recommended chemically curing, elastomeric sealant that is compatible with joint fillers, joint substrates, and other related materials, and complies with requirements for products and testing indicated in "EIMA Guide for Use of Sealants with Exterior Insulation and Finish Systems, Class PB."
 - 1. Comply with requirements in Division 7 Section "Joint Sealants" for [low-modulus, multipart, nonsag urethane] [low-modulus silicone] <Insert type> sealant.
- B. Sealant Color: As selected from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Exterior Cement Board: Comply with cement board manufacturer's written instructions.
 - 1. Cover exterior cement board with layer of asphalt-saturated organic felt.
- B. Mechanically attach insulation to substrate. Install sufficient number of fasteners to hold insulation board in place before applying reinforcing mesh. Install additional fasteners after applying reinforcing mesh to comply with manufacturer's written requirements.
 - 1. Vertical Fastener Spacing: Not more than 12 inches o.c. or more than 12 inches from bottom edge of starting course of insulation board.
 - 2. Horizontal Fastener Spacing: Not more than 16 inches o.c.
 - 3. Sheathed Substrates: Secure mechanical fasteners to framing members behind sheathing so they penetrate framing members 5/8 inch or more and recess flush with exterior surface of insulation board.
 - 4. Masonry or Concrete Substrates: Secure mechanical fasteners to penetrate substrate 1 inch or more and recess flush with exterior surface of insulation board.
 - 5. Apply insulation boards over dry substrates in courses with long edges oriented horizontally. Begin first course from a level base line and work upward.
 - 6. Stagger vertical joints in successive courses to produce running bond pattern. Locate joints so no piece of insulation is less than 12 inches wide or 6 inches high. Offset joints not less than 6 inches (150 mm) from corners of window and door openings.
 - a. Offset joints of insulation not less than 4 inches from joints in sheathing.
 - b. Offset joints of insulation not less than 4 inches from aesthetic reveals.
 - 7. Interlock ends at internal and external corners.

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8. Abut boards tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between insulation boards. If gaps greater than 1/16 inch occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
 9. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
 10. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/16 inch from surface of insulation and to remove yellowed areas due to sun exposure; smooth surface film created by extrusion process; do not create depressions deeper than 1/16 inch .
 11. Interrupt insulation at expansion joints.
 12. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
 13. Treat exposed edges of insulation board to comply with system manufacturer's written instructions.
 14. Coordinate flashing installation with installation of insulation to produce wall system that does not allow water to penetrate behind protective coating.
- C. Install expansion joints at locations indicated, where required by system manufacturer, and as follows:
1. Where expansion joints are indicated in substrates behind EIFS.
 2. Where EIFS adjoins dissimilar substrates, materials, and construction.
 3. At floor lines in multilevel wood-frame construction.
- D. Install control joints at locations indicated or, if not indicated, at locations complying with the following criteria and approved by Architect:
1. For wall areas defined by placement of control joints; area not to exceed 150 sq. ft..
 2. At a maximum spacing of 10 feet in any direction.
 3. At a maximum spacing of 12 feet in any direction, with no panel exceeding 144 sq. ft. in area.
 4. At a maximum spacing of 18 feet in any direction, with no panel exceeding 144 sq. ft. in area.
 5. Where required so no panel has a width-to-length ratio of more than 2-1/2:1.
 6. Where panels formed by system change in size, extend joints full width or height of protective coating.
 7. Above and below window and door openings.
- E. Mechanically fasten trim accessories to framing members, masonry, or concrete.
1. Corner beads and control joints may be attached to insulation with threaded plastic fasteners when approved by system manufacturer.
- F. Cover insulation with reinforcing mesh and fasten through insulation to framing members, masonry, or concrete.
- G. Apply base coat over and into reinforcing mesh in thickness specified by system manufacturer to produce flush, uniform surface with mesh fully embedded and prepared to receive finish coat.

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- H. Apply finish coat over dry base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by system manufacturer to produce uniform finish of color and texture matching approved sample.
 - I. Joint-Sealant Installation:
 - 1. Prepare joints and apply sealants, of type and at locations indicated, to comply with applicable requirements in Division 7 Section "Joint Sealants" and in "EIMA Guide for Use of Sealants with Exterior Insulation and Finish Systems, Class PB."
 - 2. Apply joint sealants after base coat has cured but before applying finish coat.
- 3.2 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 report whether tested Work complies with or deviates from requirements.
 - B. Correct deficiencies in or remove and replace EIFS that inspections and test reports indicate do not comply with requirements.
 - C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected Work with requirements.

END OF SECTION 07242

SECTION 07411 - MANUFACTURED ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes standing-seam, uninsulated roof panels.

1.2 PERFORMANCE REQUIREMENTS

- A. Air Infiltration: Permanent resistance to air leakage through assembly of not more than 0.09 cfm/sq. ft. of fixed roof area per ASTM E 1680 at static-air-pressure difference of 4.0 lbf/sq. ft. (192 Pa). Paragraph above and below are not applicable to nonstructural roofing.
- B. Water Penetration: No water penetration of assembly per ASTM E 1646 at a minimum differential pressure of 20 percent of inward acting, wind-load design pressure of not less than 6.24 lb/sq. ft. and not more than 12.0 lb/sq. ft. . Delete paragraph below if UL Class 90 roof is not required. Verify that product is listed in UL's "Building Material Directory."
- C. Wind-Uplift Resistance: UL 580, Class 90.
- D. Structural Performance: Capable of safely supporting design loads indicated under in-service conditions based on testing manufacturer's standard units according to ASTM E 1592 by a qualified independent testing and inspecting agency.
 - 1. Design Loads - See Structural
 - 2. Maximum Deflection: 1/140 of span.
- E. Solar Reflectance Index (SRI): Material and finish to have an approximate SRI rating of 57 for LEED credit SS 7.2.

1.3 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, sections, details of installation, and attachments to other Work.
 - 1. Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 2. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples: For each exposed finish and for each color and texture required.
- D. Product test reports.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Where indicated, provide products identical to those tested for fire resistance per ASTM E 119 by a testing agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
 - 2. Identify products with appropriate markings of applicable testing and inspecting agency.

1.5 WARRANTY

- A. Special Weathertight Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace roof panels that fail to remain weathertight within [five] <Insert number> years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof panels that show evidence of finish deterioration within [20] years from date of Substantial Completion. Deterioration of finish includes, but is not limited to, color fade, chalking, cracking, peeling, and loss of film integrity.

PART 2 - PRODUCTS

2.1 UNINSULATED ROOF PANELS

- A. Lap-Seam Assembly: Factory-formed, lap-seam roof panel assembly designed for mechanical attachment of panels to roof purlins or deck using exposed fasteners and sealants.
- B. Standing-Seam Assembly: Factory-formed, standing-seam roof panel assembly designed for concealed mechanical attachment of panels to roof purlins or deck.
 - 1. Clips: Minimum 0.0625-inch- (1.6-mm-) thick, stainless-steel panel clips designed to meet negative-load requirements.
 - 2. Cleats: Mechanically seamed cleats formed from minimum 0.0250-inch- (0.65-mm-) thick, stainless-steel or nylon-coated aluminum sheets.
- C. Batten-Seam Assembly: Factory-formed, batten-seam roof panel assembly designed to be installed between and attach to battens attached to roof.
 - a. Englert, Inc.
 - b. Or pre-approved equal.
 - 2. Surface: Smooth, flat, mill finish
 - 3. Thickness: [0.040 inch (1.0 mm)], unless otherwise indicated.
 - 4. Batten Caps: 0.032 inch (0.8 mm) thick.
 - 5. Organic Coating: Two-coat, fluoropolymer, thermocured system with fluoropolymer coat containing not less than 70 percent polyvinylidene fluoride resin by weight .
 - a. Color: As selected from manufacturer's full range.

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- b. Furnish appropriate air-drying spray finish in matching color for touchup.

2.2 UNDERLAYMENT MATERIALS

- A. Self-Adhering, Polymer-Modified, Bituminous Sheet Underlayment: ASTM D 1970, minimum of 40 mils (1 mm) thick. Provide primer when recommended by underlayment manufacturer.
- B. Building Paper: Minimum 5 lb/100 sq. ft. (2.4 kg/sq. m), rosin sized.
- C. Felts: ASTM D 226, Type [II (No. 30)], asphalt-saturated organic felts.

2.3 MISCELLANEOUS MATERIALS

- 1. Type: CC1, limited flammability.
- 2. Color: White
- 3. Mastic: Nonstaining, saturated, vinyl polymer as recommended by panel manufacturer for sealing laps.
- B. Laminated Backer Board: Hardboard, ANSI A135.4, Class 1 tempered, 1/8 inch (3 mm), thick unless otherwise indicated.
- C. Gypsum Board: Type X, ASTM C 442 or ASTM C 36.
- D. Thermal Spacers: Spacers recommended by panel manufacturer for use where panels attach directly to purlins.
- E. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.
 - 1. Exterior Fasteners: Aluminum or stainless steel.
 - 2. Interior Fasteners: Aluminum.
 - 3. Exposed Fasteners: With heads matching color of panel by means of plastic caps or factory-applied coating.
 - a. Provide metal-backed neoprene washers under heads of exposed fasteners bearing on weather side of panels.
 - b. Locate and space exposed fasteners in true vertical and horizontal alignment. Obtain controlled uniform compression for positive seal without rupture of neoprene washer.
- F. Accessories: Components required for complete roof panel assembly including trim, copings, fasciae, mullions, sills, corner units, ridge closures, clips, seam covers, battens, flashings, gutters, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of panels.
 - 1. Closure Strips: Closed-cell, self-extinguishing, expanded, cellular, rubber or crosslinked, polyolefin-foam flexible closure strips. Cut or premold to match configuration of panels. Provide closure strips necessary to ensure weathertight construction.

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2. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound with release paper backing; permanently elastic, nonsag, nontoxic, and nonstaining.
 3. Elastomeric Joint Sealant: ASTM C 920, of base polymer, type, grade, class, and use classifications required to seal joints in panel roofing and remain weathertight and recommended by panel manufacturer.
- G. Bituminous Coating: SSPC-Paint 12, cold-applied asphalt mastic compounded for 15-mil (0.4-mm) dry film thickness per coat that is inert, noncorrosive, and free of asbestos fibers, sulfur components, and other deleterious impurities.
- H. Expansion-Joint Sealant: Nonsetting, nonhardening, nonmigrating, heavy-bodied polyisobutylene sealant for use at hooked-type expansion joints that must be free to move.
- I. Snow Guards: Prefabricated, noncorrosive units designed to use with roof panels and complete with predrilled holes or hooks for anchoring.

2.4 FABRICATION

- A. General: Fabricate and finish panels and accessories at the factory to greatest extent possible.
- B. Sound Control: Where sound-absorption requirement is indicated, fabricate interior liner panels with 1/8-inch- (3-mm-) diameter holes uniformly spaced approximately 1000 holes/sq. ft. (10 750 holes/sq. m). Cover insulation with polyethylene film and provide inserts of wire mesh to form acoustical spacer grid.
- C. Panel Joints:
1. Fabricate to form weathertight seals.
 2. Fabricate for installation in a manner that prevents metal-to-metal contact and minimizes noise from movements within panel assembly.

2.5 PANEL SUPPORTS AND ANCHORAGE

- A. Secondary Framing: Components complying with the Light Gage Structural Institute's "Guide Specifications," Section 07410, "Manufactured Roof and Wall Panels."
1. Roof Purlins: C- or Z-shaped sections fabricated from 0.0598-inch- (1.5-mm-) thick, shop-painted, roll-formed steel. Purlin spacers fabricated from 0.079-inch- (2.0-mm-) thick, cold-formed, galvanized steel sections.
 2. Eave Struts: Unequal flange, C-shaped sections formed to provide adequate backup for roof panels. Fabricate from 0.0598-inch- (1.5-mm-) thick, shop-painted, roll-formed steel.
 3. Flange and Sag Bracing: 1-5/8-by-1-5/8-inch (41-by-41-mm) angles, fabricated from 0.0598-inch- (1.5-mm-) thick, shop-painted, roll-formed steel.
 4. Base or Sill Angles: Fabricate from 0.079-inch- (2.0-mm-) thick, cold-formed, galvanized steel sections.
 5. Secondary Structural Members: Except columns and beams, use manufacturer's standard sections fabricated from 0.079-inch- (2.0-mm-) thick, cold-formed galvanized steel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Coordinate metal panel roofing with rain drainage work; flashing; trim; and construction of decks, parapets, walls, and other adjoining work to provide leakproof, secure, and noncorrosive installation.
- B. Secondary Structural Supports: Install according to the Light Gage Structural Institute's "Guide Specifications," Section 07410, "Manufactured Roof and Wall Panels."
- C. Panel Installation: Anchor securely in place with provisions for thermal and structural movement.
 - 1. Field cutting exterior panels by torch is not permitted.
 - 2. Install panels with concealed fasteners, unless otherwise indicated.
 - 3. Install panels over solid substrate.
 - a. Install felt and building-paper slip sheet on roof deck under metal panels. Use adhesive for temporary anchorage, where possible, to minimize use of mechanical fasteners under metal panels.
 - b. Install felt from lower edge up, with at least 3-inch (75-mm) side laps and 4-inch (100-mm) end laps.
 - 4. Coat back side of metal panels with bituminous coating where it will contact wood, ferrous metal, or cementitious construction.
- D. Accessories: Install components required for complete roof panel assembly.
 - 1. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying rubberized-asphalt underlayment to each metal surface, or by other permanent separation as recommended by manufacturers of dissimilar metals.
- E. Joint Sealers: Install gaskets, joint fillers, and sealants as required for weatherproof performance of panel assemblies.
 - 1. Install weatherseal under ridge cap. Flash and seal panels at eave and rake with rubber, neoprene, or other closures to exclude weather.
 - 2. Seal panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by panel manufacturer.
 - 3. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- F. Lap-Seam Roof Panels: Provide sealant tape at lapped joints of ribbed or fluted panels and between panels and protruding equipment, vents, and accessories.
 - 1. Apply continuous ribbon of sealant tape to clean, dry surface of weather side of fastenings on end laps; on side laps of corrugated nesting-type, ribbed, or fluted panels; and elsewhere as needed to make panels weatherproof to driving rains.

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- G. Standing-Seam Roof Panel Assembly: Fasten panels to supports with concealed clip.
1. Install clips at each support with self-drilling/self-tapping fasteners.
 2. At end laps of panels, install sealant tape between panels.
 3. Install factory-sealed cleats at standing-seam joints. Apply snap-on batten to panels to provide weathertight joint.
 4. Seaming: Complete seaming of panel joints by operating portable power-driven equipment of type recommended by panel manufacturer to provide weathertight joint.
- H. Cleaning: Remove temporary protective coverings and strippable films, if any, as soon as each panel is installed. After completing panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in clean condition during construction.

END OF SECTION 07411

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SECTION 07512 - BUILT-UP COAL-TAR ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes built-up coal-tar roof membrane **and roof insulation**.

1.2 PERFORMANCE REQUIREMENTS

- A. Install a watertight, built-up roofing membrane and base flashing roofing system with compatible components that will not permit the passage of liquid water and will withstand wind loads, thermally induced movement, and exposure to weather without failure.
- B. Solar Reflectance Index (SRI): Material and Finish to have a minimum SRI of at least 78 for LEED Credit SS 7.2.

1.3 SUBMITTALS

- A. Product Data: For each roofing product indicated.
- B. Shop Drawings: Include details of base flashings, cants, and membrane; **tapered insulation**.

1.4 QUALITY ASSURANCE

- A. Installer: A qualified installer, approved by manufacturer to install manufacturer's product; and who is eligible to receive standard roofing manufacturer's warranty.
- B. Exterior Fire-Test Exposure: Class A; complying with ASTM E 108, for application and slopes indicated.
- C. Preinstallation Conference: Conduct conference at Project site. Meet with Owner; Architect; Owner's insurer, if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation and signed by manufacturer, in which manufacturer agrees to promptly repair leaks in roof membrane and base flashings resulting from defects in materials or workmanship for a period of [20] years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 BUILT-UP COAL-TAR ROOFING

- 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. John Manville International, Inc.
 - 2. GAF Building Corp.
- C. Sheathing Paper: Red-rosin type, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).
- D. Base Sheet: [ASTM D 4601, Type II glass-fiber sheet], unperforated, asphalt impregnated and coated, and dusted with fine mineral surfacing on both sides.
- E. Roof Membrane Ply Felt: [ASTM D 4990, Type I, coal-tar-impregnated, glass-fiber felt].
- F. Flashing Backer Sheet: [ASTM D 2178, Type IV, asphalt-impregnated, glass-fiber felt].
- G. Flashing Sheet: Roofing system manufacturer's standard SBS-modified asphalt sheet, granular surfaced; composite polyester and glass-fiber mat or nonwoven polyester reinforced.
- H. Coal-Tar Pitch: ASTM D 450, Type I.
- I. Roofing Asphalt: ASTM D 312, Type III or Type IV, as recommended by roofing system manufacturer.
- J. Asphalt Roofing Cement: ASTM D 4586, asbestos free.
- K. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM 4470 and acceptable to roofing system manufacturer.
- L. Wood Nailer Strips and Cants: Comply with requirements in Division 6 Section "[**Rough Carpentry**]"
- M. Aggregate Surfacing: Glasskap cool roof cap sheet, complying with ASTM D 1863, SRI of at least 78.
- N. Thermal Barrier: [ASTM C 728, perlite board, 1 inch (25 mm) thick]
- O. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

2.2 ROOF INSULATION

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- A. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation with core formed by using HCFCs as blowing agents complying with ASTM C 1289, Type II, felt or glass-fiber mat on both major surfaces.
- B. Faced, Flexible, Glass-Fiber-Board Insulation: Thermal insulation board combining glass fibers with thermosetting resin binders and faced on one side with asphalt-coated fiberglass scrim and kraft paper, complying with ASTM C 726.
- C. Perlite Board Insulation: Rigid, mineral-aggregate thermal insulation board consisting of expanded perlite, cellulosic fibers, binders, and waterproofing agents with top surface seal-coated, complying with ASTM C 728.
- D. Cellulosic-Fiber-Board Insulation: Fibrous-felted, rigid insulation boards of wood fiber or other cellulosic-fiber and water-resistant binders, asphalt impregnated, chemically treated for deterioration, complying with ASTM C 208, Type II, Grade 1.
 - 1. Provide preformed, tapered insulation boards where indicated and saddles, crickets, and edge strips for sloping to drain. Fabricate tapered insulation with slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated.
- E. Cover Board: 3/4" FESCO Perlite – Based Roof Insulation Bd.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install thermal barrier with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt thermal-barrier boards together.
 - 1. Secure thermal barrier to top flanges of steel deck using at least 1 fastener for each 4 sq. ft. (0.38 sq. m) and at least 2 fasteners per board.
- B. Install built-up roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."
 - 1. Install roofing system according to applicable specification plates in NRCA's "The NRCA Roofing and Waterproofing Manual."
- C. Cant Strips: Install and secure preformed 45-deg ree cant strips at junctures of built-up membrane roofing system with vertical surfaces or angle changes greater than 45 deg rees.
- D. Bitumen Heating: Heat bitumen and apply within plus or minus 25 deg F (14 deg C) of equiviscous temperature, unless otherwise required by roofing system manufacturer. Do not raise bitumen temperature above the equiviscous temperature range more than one hour before time of application. Do not exceed bitumen manufacturer's recommended temperature limits during bitumen heating. Do not heat bitumen within 25 deg F (14 deg C) of flash point. Discard bitumen maintained for more than 4 hours at a temperature exceeding 325 deg F

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(163 deg C) for coal-tar pitch or 400 deg F (204 deg C) for roofing asphalt. Keep kettle lid closed, unless adding bitumen.

- E. Roofing Insulation: Install according to roofing system manufacturer's written instructions. Install with long joints of insulation in continuous straight lines with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Where roof slopes are greater than 1/4 inch per 12 inches (1:48), mechanically fasten to deck 4-inch nominal- (89-mm actual-) wide, wood nailer strips of same thickness as insulation. Run nailers perpendicular to slope of roof, spaced according to roofing system manufacturer's written recommendations.
 - 2. Fasten insulation according to insulation and roofing system manufacturers' written instructions.
- F. Cover Boards: Install 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. Tape joints of cover boards.
- G. Install one course of sheathing paper, lapping edges and ends a minimum of 2 inches (50 mm) and 6 inches (150 mm), respectively.
- H. Base Sheet: Install one lapped course of base sheet according to roofing system manufacturer's written instructions, extending sheet over cants.
- I. Roof Membrane Ply Felts: Install [four] ply felts according to roofing system manufacturer's written instructions. Embed each ply felt in a solid mopping of hot coal-tar pitch. Align ply felts without stretching and shingle side laps uniformly in direction to shed water. Extend ply felts over cants.
 - 1. Aggregate Surfacing: Flood-coat roof surface with not less than 70 lb/100 sq. ft. (3.5 kg/sq. m) of hot coal-tar pitch. While flood coat is hot and fluid, cast 400 lb/100 sq. ft. (20 kg/sq. m) of gravel or crushed stone or 300 lb/100 sq. ft. (15 kg/sq. m) of crushed slag in a uniform course.
- J. Install base flashing consisting of one or more flashing backer sheets and a flashing sheet and secure to substrates according to roofing system manufacturer's written instructions. Coordinate with installation of roof membrane ply felts.
- K. Install stripping where metal flanges and edgings are set on built-up roofing.
- L. Roof Drains: Set 30-by-30-inch (760-by-760-mm) metal flashing or 4-inch- (100-mm-) wide flanged and notched sheet metal gravel stop, 1-1/2 inches (38 mm) high, in bed of asphalt roofing cement on completed built-up roofing membrane. Cover metal flashing sheet or flanges of sheet metal gravel stop with stripping, extending a minimum of 4 inches (100 mm) beyond edge of metal flashing onto field of roof membrane. Clamp roof membrane, metal flashing, and stripping into roof-drain clamping ring.
- M. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

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- N. Protect built-up roofing from damage and wear during remainder of construction period.
- O. Correct deficiencies in or remove built-up roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair base flashings to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END OF SECTION 07512

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SECTION 07620 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes sheet metal flashing and trim for the following:
1. Roof Drainage System.
 2. Exposed trim, roof edge, and fasciae.
 3. Metal flashing.
 4. Sheet metal accessories.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
- C. Samples: For each exposed finish.

PART 2 - PRODUCTS

2.1 METALS

- A. Copper: 16 oz., ASTM B 370; temper H00, cold rolled except where temper 060 is required for forming; not less than 6 16 oz./sq. ft.
- B. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper indicated.
1. Factory-Painted Aluminum Sheet: ASTM B 209 (ASTM B 209M) ASTM B 209, alloy 3003-H14, with a minimum thickness of 0.080 inch for primary legs of extrusions that are anodized.
 2. Extruded Aluminum: ASTM B 22, alloy 6063-T52, with a minimum thickness of 0.080 inch (2.0 mm) 0.080 inch for primary legs of extrusions that are anodized.

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Solder: ASTM B 32, Grade Sn50, used with rosin flux.
- B. Fasteners: Same metal as sheet metal flashing or other non-corrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.
- C. Asphalt Mastic: SSPC-Paint 12, solvent-type, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.
- D. Mastic Sealant: Polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant.
- E. Elastomeric Sealant: As recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements specified in Division 7 Section "Joint Sealants."

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- F. Epoxy Seam Sealer: Two-part, non-corrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, including riveted joints.
- G. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.
- H. Paper Slip Sheet: 5-lb/square (0.244 kg/sq. m) 5-lb/square red rosin, sized building paper, FS UU-B-790, Type I, Style 1b.
- I. Polyethylene Underlayment: ASTM D 4397, minimum 6-mil thick black polyethylene film, resistant to decay when tested according to ASTM E 154.
- J. Metal Accessories: Sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; non-corrosive; size and thickness required for performance.
- K. Gutter Screen: ¼ inch (6mm) ¼ inch hardware cloth installed in sheet metal frames. Fabricate screen and frame of same basic material as gutter and downspouts.
- L. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

2.3 FABRICATION, GENERAL

- A. Sheet Metal Fabrication Standard: Fabricate units to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, material, metal thickness, and other characteristics of item indicated.
- B. Fabricate units that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- C. Form exposed sheet metal 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.
- D. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- E. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- F. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- G. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- H. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

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- I. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
- J. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, non-corrosive metal recommended by sheet metal manufacturer.
 - 1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but not less than thickness of metal being secured.
- K. Aluminum Extrusion Units: Fabricate with formed or extruded-aluminum joint covers for installation behind main members where possible. Fabricate mitered and welded corner units.

2.4 ALUMINUM FINISHES

- A. High-Performance Organic Coating Finish: Fluoropolymer two-coat system with fluoropolymer coat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
 - 1. Color and Gloss: Match existing - as selected from manufacturer's full range, submit to Architect and Owner for approval prior to ordering.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual."
 - 2. Anchor units of Work securely in place, providing for thermal expansion of metal units; conceal 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 weatherproof.
- B. Install exposed units 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.
- C. Install units to fit substrates and to result in waterproof and weather-resistant performance.
- D. Expansion Provisions: Accommodate thermal expansion of exposed sheet metal. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- E. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-temper edges of sheets to be soldered to a width of 1-1/2 inches, except where pre-tempered surface would show in finished Work.
 - 1. Do not solder aluminum.
 - 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.

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- F. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.
 - 1. Use joint adhesive for nonmoving joints specified not to be soldered.
- G. Seams: Install flat-lock seams at nonmoving seams. Tin edges to be seamed, form seams, and solder.
- H. Seams: Install flat-lock seams at nonmoving seams in aluminum. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- I. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.
 - 1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install slip sheet of red-rosin paper and course of polyethylene underlayment.
 - 2. Bed flanges of Work in thick coat of roofing cement where required for waterproof performance.
- J. Counterflashings: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant, lead wedges and sealant, interlocking folded seam, or blind rivets and sealant. Lap counterflashing joints a minimum of 2 inches and bed with sealant.
- K. Roof-Penetration Flashing: Coordinate roof-penetration flashing installation with roofing and installation of items penetrating roof. Install flashing as follows:
 - 1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
 - 2. Seal and clamp flashing to pipes penetrating roof, other than lead flashing on vent piping.
- L. Roof-Drainage System: Install drainage items fabricated from sheet metal, with straps, adhesives, and anchors recommended by SMACNA's Manual or the item manufacturer, to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation. Coordinate flashing and sheet metal items for steep-sloped roofs with roofing installation.
- M. Splash Pans: Install where downspouts discharge on low-sloped roofs, unless otherwise indicated. Set in roof cement or sealant compatible with roof membrane.
- N. Install continuous gutter screens on gutter with non-corrosive fasteners, arranged as hinged units to swing open for cleaning gutters.
- O. Immediately after installation, clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

END OF SECTION 07620

SECTION 07720 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Roof curbs.
2. Equipment supports.
3. Ridge vents.
4. Roof walkways.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
- C. Coordination Drawings: Roof plans drawn to scale and coordinating penetrations and roof-mounted items.
- D. Samples: For each exposed finish.

1.3 QUALITY ASSURANCE

A. Standards: Comply with the following:

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum:

1. Sheet: ASTM B 209 (ASTM B 209M) for alclad alloy 3005H25 or alloy and temper required to suit forming operations, with mill finish, unless otherwise indicated.
2. Extrusions: ASTM B 221 (ASTM B 221M) alloy 6063-T52 or alloy and temper required to suit structural and finish requirements, with mill finish, unless otherwise indicated.

- B. Galvanized Steel Sheet: ASTM A 653/A 653M with G90 (Z275); commercial steel, unless otherwise indicated.

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1. Structural Quality: Grade 40 (Grade 275), where indicated or as required for strength.
- C. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M with Class AZ-50 (AZ-150) coating, structural quality, Grade 40 (Grade 275), or as required for strength.
- D. Plastic Sheet: Unless additional thickness is required for light transmittances, sheet thickness required for 40-lbf/sq. ft. (1.9-kPa) external and 20-lbf/sq. ft. (0.95-kPa) internal loading pressures as recommended by manufacturer for size and shape indicated.
 1. Acrylic: ASTM D 4802, thermoformable, cell-cast or continuous-cast acrylic (methacrylate), Category A-1 or A-2, Type UVA containing ultraviolet absorber, with smooth or polished Finish 1, unless otherwise indicated.
 2. Polycarbonate: Thermoformable, monolithic extruded polycarbonate sheets, burglar-resistance rated per UL 972 with average impact strength of 16 ft-lbf/in. (850 J/m) of width when tested according to ASTM D 256, Method A (Izod).
- E. Insulation: Manufacturer's standard rigid or semirigid glass-fiber board of thickness indicated.
- F. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches (38 mm) thick.
- G. Security Grilles: 3/4-inch- (19-mm-) diameter, hardened steel bars spaced 6 inches (150 mm) o.c. in one direction and 12 inches (300 mm) o.c. in other. Weld bar intersections and ends of bars to structural frame or primary curb walls. Clean and paint with rust-inhibitive metal primer.
- H. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
 1. Provide nonremovable fastener heads.
- I. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
- J. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coating.
- K. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- L. Elastomeric Sealant: Recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade NS, Class 25.
- M. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.2 ROOF CURBS AND EQUIPMENT SUPPORTS

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- 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AES Industries, Inc.
 2. Colony Custom Curbs.
 3. Commodity Products Company, Inc.
 4. Conn-Fab Sales, Inc.
 5. Curbs Plus, Inc.
 6. Custom Curb, Inc.
 7. Gieske Custom Metal Fabricators.
 8. Goeller Enterprises.
 9. LMCurbs.
 10. Loren Cook Company.
 11. Metallic Products Corporation.
 12. Pate Co. (The).
 13. Roof Products & Systems Corp.
 14. ThyCurb, Inc.
 15. Uni-Curb, Inc.
 16. Vent Products Co., Inc.
- C. General: Units capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Coordinate dimensions with equipment to be supported.
1. Provide preservative-treated wood nailers at tops of units and formed flange at perimeter bottom for mounting to roof.
 2. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
 3. Fabricate units to minimum height of 8 inches (200 mm), unless otherwise indicated.
 4. Where slope of roof deck exceeds 1/4 inch per foot (1:48), fabricate support units with height tapered to match slope to level tops of units.
- D. Roof Curbs:
1. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.0747-inch- (1.9-mm-) thick, structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.
 2. Insulation: Manufacturer's standard rigid or semirigid insulation where indicated.
 3. Cants: Formed cants and base profile coordinated with roof insulation thickness.
- E. Equipment Supports: Capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Coordinate dimensions with equipment to be supported.
1. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.0747-inch- (1.9-mm-) thick, structural-quality, hot-dip galvanized or

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aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.

2.3 RIDGE VENTS

- 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Englert, Inc.
- C. General: Ventilating ridge cap with ventilating mesh providing a minimum net free area of 18 sq. in./ft. (380 sq. cm/m).
- D. Aluminum Ridge Cap: Fabricate from sheet aluminum with baffles to prevent snow and rain entering and with weep holes to allow water to drain to roof. Provide required splice plates and end caps.
 - a. Color: [As selected from full range of industry colors and densities].
 - 2. High-Performance Organic Coating Finish: Fluoropolymer [two] [three]-coat system with topcoats containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with ASCA 96 or AAMA 620.
 - a. Color and Gloss: [As selected from manufacturer's full range] .

2.4 ROOF WALKWAYS

- 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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Johns Manvill International, Inc.
 - 2. GAF Building Corp.
- C. Roof Capsheet: Apply second layer of GlassKap cool roof cap sheet, 36' wide continuous strip between roof top units.
 - 1. For Flat Roofs: Provide resilient, hard rubber pads under each support unit to isolate supports from and protect roof membrane.

PART 3 - EXECUTION

3.1 INSTALLATION

ROOF ACCESSORIES

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- A. General: Coordinate installation of roof accessories with installation of roof deck, roof insulation, flashing, roofing membranes, penetrations, equipment, and other construction to ensure that combined elements are waterproof and weathertight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.
- B. Install roof accessory items according to construction details in NRCA's "Roofing and Waterproofing Manual," unless otherwise indicated,
- C. Separation: Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
- D. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form seal.
- E. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counterflashing). Seal overlap with thick bead of mastic sealant.
- F. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.
- G. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION 07720

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SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes sealants for the following:

1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces.
2. Exterior joints in horizontal traffic surfaces.
3. Interior joints in vertical surfaces and horizontal nontraffic surfaces.
4. Interior joints in horizontal traffic surfaces.
5. See Section 01352, LEED requirements 2.5 A for VOC limits.

1.2 SUBMITTALS

A. Product Data: For each joint sealant product indicated.

B. Samples: For each joint sealant product indicated.

1.3 QUALITY ASSURANCE

A. Comply with governing code and regulations. Provide products of acceptable manufacturers that have been in satisfactory use in similar service for three years. Use experienced waterproofing installers. Deliver, handle and store materials according to manufacturers written instructions.

1.4 WARRANTY

A. Special Installer's Warranty: Written warranty in which Installer agrees to repair or replace elastomeric joint sealants that do not meet requirements specified in this Section or fail in adhesion within specified warranty period two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with requirements specified in this Section within 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

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

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

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demonstrated by sealant manufacturer based on testing and field experience.

- B. Colors of Exposed Joint Sealants: Match color of adjacent materials.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants, General: ASTM C 920.

1. Continuous-Immersion Sealants: For immersion in water, products tested according to ASTM C 1247, including initial six-week immersion period and one additional immersion four-week immersion period(s), without failing in adhesion or cohesion when tested with substrates indicated.

- B. Mildew-Resistant Silicone Sealant:

1. Products:
 - a. Pecora Corporation; 898 Silicone Sanitary Sealant.
 - b. Tremco; Tremsil 600 White.
2. Type and Grade: S (single component) and NS (nonsag).

- C. Multicomponent Pourable Urethane Sealant:

1. Products:
 - a. Mameco International; Vulkem 245.
 - b. Sonneborn Building Products Div., ChemRex Inc.; SL 2.
 - c. Tremco; THC-900.

- D. Single-Component Nonsag Urethane Sealant:

1. For joints subject to traffic and not subject to traffic, provide the following:
 - a. Products:
 1. Mameco International; Vulkem 116.
 2. Sika Corporation; Sikaflex - 1a.
 3. Sonneborn Building Products Div., ChemRex Inc.; NP 1.
 - b. Type and Grade: S (single component) and NS (nonsag).
 - c. Class: 25.
2. Exposure: Use T (traffic) and NT (nontraffic).
3. Substrates: Uses M, A, and, as applicable to joint substrates indicated, O.
4. For joints not subject to traffic, provide the following:
 - a. Products:
 1. Mameco International; Vulkem 921.
 2. Pecora Corporation; Dynatrol I.
 3. Tremco; DyMonic.

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- b. Type and Grade: S (single component) and NS (nonsag).
- c. Class: 25.
- d. Exposure: Use NT (nontraffic).

2.4 LATEX JOINT SEALANTS

A. Latex Sealant: ASTM C 834.

1. Products:

- a. Pecora Corporation; AC-20.
- b. Sonneborn Building Products Div., ChemRex, Inc.; Sonolac.
- c. Tremco; Tremflex 834.

2.6 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products:

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

B. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

1. Products:

- a. Pecora Corporation; BA-98.
- b. Tremco; Tremco Acoustical Sealant.

2.7 PREFORMED JOINT SEALANTS

A. Preformed Silicone-Sealant System: Precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.

1. Products:

- a. Dow Corning; 123 Silicone Seal.
- b. Pecora Corporation; Sil-Span.

2.8 JOINT-SEALANT BACKING

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

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- B. Cylindrical Sealant Backings: ASTM C 1330, 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. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg. F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.9 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.
 - 1. Remove foreign material from joint substrates that could interfere with adhesion of joint sealant.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues could interfere with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. 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

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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.

- D. Sealant Installation: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- E. Acoustical Sealant Installation: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- F. Install sealant backings to support sealants during application and at position required to produce 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.
- G. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.
- H. Place sealants so they directly contact and fully wet joint substrates.
 - 1. Completely fill recesses provided for each joint configuration.
 - 2. Produce uniform, cross-sectional shapes and depths that allow optimum sealant movement capability.
- I. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads, 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 by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Joint Configuration: Concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
- J. Installation of Preformed Silicone-Sealant System:
 - 1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 - 2. Complete installation of horizontal joints before installing vertical joints. Lap vertical joints over horizontal joints. At end of joints, cut silicone extrusion with a razor knife.
- K. Clean excess sealants or sealant smears adjacent to joints as installation progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.2 JOINT SEALANT SCHEDULE

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

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1. Control and Expansion Joints in Cast-in-Place Concrete: Multi-Part Pourable Urethane Sealant.
 2. Control and Expansion Joints in Unit Masonry: One-Part Urethane Sealant.
 3. Joints between Metal Panels: One-Part Acid Curing Silicone Sealant.
 4. Perimeter Joints between Materials Listed above and Frames of Doors and Windows: Acrylic-Emulsion Sealant.
 5. Interior Joints in vertical surfaces of ceramic tile in toilet rooms: One-Part Mildew-Resistant Silicone Sealant.
- B. Exterior joints in the following horizontal traffic surfaces: Control, Expansion, and Isolation Joints in Cast-in-Place Concrete Slabs: Preformed Silicone-Sealant System.
- C. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
1. Control and Expansion Joints on Exposed Interior Surfaces of Exterior Walls: One-Part Sealant Urethane Sealant.
 2. Perimeter Joints of Exterior Openings Where Indicated: One-Part Sealant Urethane Sealant.
 3. Perimeter Joints between Interior Wall Surfaces and Frames of Interior Doors, Windows, and Elevator Entrances: Acrylic-Emulsion Sealant.
 4. Joints between plumbing fixtures and Adjoining Walls, Floors and Counters: One-Part Mildew-Resistant Silicone Sealant.
- D. Interior joints in the following horizontal traffic surfaces: Control and Expansion Joints in Cast-in-Place Concrete Slabs: Multi-Part Pourable Urethane Sealant.

END OF SECTION 07920