SECTION 070553
FIRE AND SMOKE ASSEMBLY IDENTIFICATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Identification markings for fire and smoke rated partitions, and fire rated walls.

1.02 RELATED REQUIREMENTS

A. Section 099123 - Interior Painting: Paint finish.

B. Section 078123 - Intumescent Fire Protection

C. Section 078400 - Firestopping

1.03 REFERENCE STANDARDS

A. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of marking, indicating font, foreground and background colors, wording, and overall dimensions.

C. Schedule: Completely define scope of proposed marking, and indicate location of affected walls and partitions, and number of markings.

D. Samples: Submit two samples of each type of marking proposed for use, of size similar to that required for project, illustrating font, wording, and method of application.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.06 FIELD CONDITIONS

A. Do not install adhered markings when ambient temperature is lower than recommended by label or sign manufacturer.

B. Do not install painted markings when ambient temperature is lower than recommended by coating manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Partition Identification Labels:

1. Fire Wall Signs, Inc: www.firewallsigns.com/#sle.

2. Safety Supply Warehouse, Inc: www.safetysupplywarehouse.com/#sle.

3. Substitutions: See Section 016000 - Product Requirements.

2.02 FIRE AND SMOKE ASSEMBLY IDENTIFICATION

A. Regulatory Requirements: Comply with "Marking and Identification" requirements of "Fire-Resistance Ratings and Fire Tests" chapter of ICC (IBC).

B. Adhered Fire and Smoke Assembly Identification Signs: Printed vinyl sign with factory applied adhesive backing.

C. Languages: Provide sign markings in English.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

A. See Section 099123 for substrate preparation for painted markings.

3.03 INSTALLATION

A. Locate markings as required by ICC (IBC).

B. Install adhered markings in accordance with manufacturer's instructions.

C. Install applied markings in accordance with Section 099000 - PAINTING AND COATING.

D. Install neatly, with horizontal edges level.

E. Protect from damage until Date of Substantial Completion; repair or replace damaged markings.

END OF SECTION

SECTION 071300
SHEET WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sheet Waterproofing:
   1. Self-adhered modified bituminous sheet membrane.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Concrete substrate.

B. Section 076200 - Sheet Metal Flashing and Trim: Metal flashing.

C. Section 079200 - Joint Sealants: Sealing moving joints in waterproofed surfaces that are not required to be treated in this section.

1.03 ABBREVIATIONS

A. NRCA - National Roofing Contractors Association.

1.04 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016.

B. ASTM D570 - Standard Test Method for Water Absorption of Plastics 1998 (Reapproved 2018).

C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting 2018.

D. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds 1998 (Reapproved 2017).

E. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test) 2008, with Editorial Revision (2015).

F. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2019.

G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

H. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover 2008a, with Editorial Revision (2013).

I. NRCA (WM) - The NRCA Waterproofing Manual 2005.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for membrane and joint and crack sealants and drainage mat.

C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and acceptable installation temperatures.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.07 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

PART 2 PRODUCTS

2.01 MEMBRANE MATERIALS

A. Self-Adhered Modified Bituminous Sheet Membrane:
1. Thickness: 60 mils, 0.060 inch, minimum.
2. Sheet Width: 36 inches, minimum.
3. Tensile Strength:
   a. Film: 5000 pounds per square inch, minimum, measured according to ASTM D882 and at grip-separation rate of 2 inches per minute.
   b. Membrane: 325 pounds per square inch, minimum, measured according to ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches per minute.
4. Elongation at Break: 500 percent, minimum, measured according to ASTM D412.
5. Water Vapor Permeance: 0.05 perm, maximum, measured in accordance with ASTM E96/E96M.
6. Peel Strength: 7 pounds per inch, minimum, when tested according to ASTM D903.
7. Lap Adhesion Strength: 5 pounds per inch, minimum, when tested according to ASTM D1876.
8. Puncture Resistance: 48 pounds, minimum, measured in accordance with ASTM E154/E154M.
9. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 72 hour immersion.
10. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
11. Manufacturers:
    a. W.R. Meadows, Inc; MEL-ROL: www.wrmeadows.com/#sle.
    b. Substitutions: See Section 016000 - Product Requirements.

2.02 ACCESSORIES

A. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.

B. Drainage Panel: Drainage layer with geotextile filter fabric on earth side.

1. Composition: Dimpled polystyrene, polyethylene, or polypropylene core; polypropylene filter fabric.
    a. Manufacturers:
        1) W.R. Meadows, Inc; Mel-Drain 5012: www.wrmeadows.com/#sle.
        2) Substitutions: See Section 016000 - Product Requirements.

C. Flashings and Fillets: MEL-ROL Liquid Membrane by W.R. Meadows, Inc.

D. Pointing Mastic

E. Terminations Bar

F. Corner Tape: Detail Strip by W.R.Meadows, Inc.

G. Waterproofing Protection Course: Protection Course by W.R.Meadows, Inc.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions are acceptable prior to starting this work.

B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.

C. Verify items that penetrate surfaces to receive waterproofing are securely installed.

3.02 PREPARATION

A. Protect adjacent surfaces from damage not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.

C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.

D. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.

E. Seal moving cracks with sealant and non-rigid filler, using procedures recommended by sealant and waterproofing manufacturers.

F. Install corner tape on all inside and outside corners, including the footing.

G. Apply a 9" (229 mm) strip of self-adhering membrane over construction, control and expansion joints and over cracks greater than 1/16" (1.59 mm) wide.

H. Seal all terminations with pointing mastic.

3.03 INSTALLATION - MEMBRANE

A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.

B. Roll out membrane, and minimize wrinkles and bubbles.

C. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.

D. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.

E. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.

F. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.

G. Seal membrane and flashings to adjoining surfaces.

3.04 INSTALLATION - DRAINAGE PANEL and PROTECTION BOARD

A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward. Scribe and cut boards around projections, penetrations, and interruptions.

END OF SECTION

SECTION 072100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation and integral vapor retarder at cavity wall construction, perimeter foundation wall, underside of floor slabs, over roof deck, and over roof sheathing.

B. Rigid Polyurethane Foam Insulation at exterior walls.

C. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.

D. Batt insulation for acoustical separation of spaces.

E. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

F. See Part 2 "Performance Criteria" for specific work performance criteria required for this contract as part of the Work of this section.

1.02 RELATED REQUIREMENTS

A. 019020 - ENCLOSURE COMMISSIONING REQUIREMENTS

B. Section 061000 - Rough Carpentry: Supporting construction for batt insulation.

C. Section 072119 - Foamed-In-Place Insulation: Plastic foam insulation other than boards.

D. Section 072400 - Exterior Insulation and Finish Systems: Board insulation on exterior side of walls and/or soffits, finished with weatherproof coating.

E. Section 072500 - Weather Barriers: Separate air barrier and vapor retarder materials.

F. Section 075323 - EPDM Roofing: Installation requirements for board insulation over low slope roof deck specified in this section.

G. Section 092116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.03 REFERENCE STANDARDS

A. All work of this section shall conform to industry standards and/or manufacturer's recommendations.

B. ASTM C240 - Standard Test Methods for Testing Cellular Glass Insulation Block 2019.

C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications 2013 (Reapproved 2019).

D. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.

E. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2019.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

H. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C 2019a.

I. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies 2018.

J. FM DS 1-28 - Wind Design 2016.

K. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components 2019.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Product test reports from and based on tests performed by qualified independent testing laboratory evidencing compliance of insulation products with requirements including r-values (aged values for plastic foam insulation), fire performance characteristics, perm ratings, water absorption ratings, and other properties, based on comprehensive testing of current products.

1.05 QUALITY ASSURANCE

A. Allowable Thickness Variations: Manufacturer’s standard units that vary slightly from the thickness indicated may be acceptable, SUBJECT TO THE APPROVAL OF THE ARCHITECT.

B. Single-Source Responsibility: Obtain each type of insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.06 **DELIVERY, STORAGE AND HANDLING**

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources.

B. Store inside and in a dry location.

C. Comply with manufacturer’s recommendations for handling, storage, and protection during installation.

D. 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 ahead of installation time.

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

1.07 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 PERFORMANCE CRITERIA

A. Perform all work of this section with experienced workmen familiar with the work, and in accordance with industry standards and manufacturer's recommendations.

B. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristic: ASTM E84.

2. Fire resistance Ratings: ASTM E119.

C. Thermal Resistance: The thicknesses shown are for the thermal resistance (R-Value in accordance with ASTM C177 or ASTM C518) specified for each material. The R-Values specified are minimum acceptable. Provide adjusted thicknesses as directed for the use of material having a different thermal resistance.

2.02 APPLICATIONS

A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.

B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.

C. Insulation Inside Masonry Cavity Walls: Polyisocyanurate boardwith facers both sides.

D. Insulation Over Roof Deck: Extruded polystyrene (XPS) board.

E. Insulation for Thermal Separation/Isolation Joints in Exterior Walls: High-density rigid polyurethane insulation.

F. Glass fiber batt insulation: Flexible, preformed batt

G. Sound Attenuating Batt Insulation: Unfaced, fiberglass batt

H. See Section 072119 for Foamed-in-Place Insulation requirements.

2.03 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene Board Insulation Under Concrete Slabs: ASTM C578, Type VI; Extruded polystyrene board with either natural skin or cut cell surfaces; with the following characteristics:

1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.

2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.

3. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.

4. Board Size: 48 x 96 inch.

5. Board Thickness: 2 inches.

6. Board Edges: Square.

7. Thermal Resistance: R-value of 4.6 per 1 inch minimum at 75 degrees F mean temperature.

8. Compressive Resistance: 60 psi.

9. Board Density: 1.20 lb/cu ft.

10. Manufacturers:

a. Dow Chemical Co; Product "STYROFOAM Brand HIGHLOAD 60 Insulation": building.dow.com.

b. Owens Corning Corp: www.owenscorning.com.

B. Extruded Polystyrene Board Insulation at Perimeter of Foundation: ASTM C578, Type IV; Extruded polystyrene board with either natural skin or cut cell surfaces; with the following characteristics:

1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.

2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

3. Complies with fire-resistance requirements shown on the drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.

4. Board Size: 16 x 96 inch.

5. Board Thickness: 2 inches.

6. Board Edges: Square.

7. Thermal Conductivity (k factor) at 25 degrees F: 0.18.

8. Compressive Resistance: 25 psi.

9. Board Density: 1.6 lb/cu. ft..

10. Water Absorption, maximum: 0.3 percent, volume.

11. Manufacturers:

    a. Dow Chemical Co; Product "STYROFOAM Brand CAVITYMATE Insulation": building.dow.com.

    b. Owens Corning Corp: www.owenscorning.com.

    c. Pactiv Building Products: greenguard.pactiv.com.

12. Substitutions: See Section 016000 - Product Requirements.

C. Polyisocyanurate (ISO) Board Insulation with Facers Both Sides: Rigid cellular foam, complying with ASTM C1289.

1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.

2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.

3. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.

4. Board Size: 48 inch by 96 inch.

5. Board Thickness: 3 inches.

6. Board Edges: Square.

7. Manufacturers:

    a. Hunter Panels; Xci Foil (Class A): www.hunterpanels.com/#sle.

    b. Johns Manville; AP Foil-Faced: www.jm.com/#sle.

8. Substitutions: See Section 016000 - Product Requirements.

D. Polyisocyanurate Board Insulation over Roof Deck: **SEE SECTION 075323**

E. Rigid Polyurethane Foam Insulation: ASTM D1622/D1622M high-density rigid polyurethane block, with the following characteristics:

1. Fire Safety: Self-extinguising.

2. Type 1: Where indicated.

a. Block Size: As indicated.

b. Board Thickness: As indicated.

c. Board Edges: Square.

d. Thermal Conductivity: 0.388 Btu-inch/hr*ft*ft*degrees F when tested in accordance with ASTM C518.

e. Compressive Strength parallel to rise @75 degrees F: Minimum of 968 psi.

f. Compressive Strength perpendicular to rise @75 degrees F: Minimum of 1018 psi.

g. Water Absorption: In accordance with ASTM D2842, 0.009 lbs/ft/ft maximum.

h. Manufacturers:

1) Last-A-Foam R-9320 by General Plastics Manufacturing Company; https://www.generalplastics.com/r-9300.html.

3. Type 2: Where indicated.

a. Block Size: As indicated.

b. Board Thickness: 1 inch.

c. Board Edges: Square.

d. Thermal Conductivity: 0.512 Btu-inch/hr*ft*ft*degrees F when tested in accordance with ASTM C518.

e. Compressive Strength parallel to rise @75 degrees F: Minimum of 1998 psi.

f. Compressive Strength perpendicular to rise @75 degrees F: Minimum of 2287 psi.

g. Water Absorption: In accordance with ASTM D2842, 0.006 lbs/ft/ft maximum.

h. Manufacturers:

1) Last-A-Foam R-9330 by General Plastics Manufacturing Company; https://www.generalplastics.com/r-9300.html.

4. Substitutions: See Section 016000 - Product Requirements.

    a. Submit evidence that the proposed substitution complies with the specified requirements.

2.04 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket made of long, resilient glass fibers bonded with a thermosetting resin binder, complying with ASTM C665; friction fit.

1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.

2. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.

3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.

4. Formaldehyde Content: Zero.

5. Thermal Resistance: As indicated on drawings.

6. Width: As required to completely fill space between framing members. No voids will be tolerated.

7. Facing: Unfaced.

8. Manufacturers:

    a. CertainTeed Corporation: www.certainteed.com.

    b. Johns Manville: www.jm.com.

    c. Owens Corning Corp: www.owenscorning.com.

9. Substitutions: See Section 016000 - Product Requirements.

B. Sound Attenuating Batt (SAB): ASTM C665 Type 1

1. Description: unfaced, lightweight, flexible fiberglass insulation batts designed to deliver noise control

2. Flame/Smoke: <25/50

3. Rated non-combustible pursuant to ASTM E119.

4. Thickness: 3 inch. See drawings for wall thickness.

5. Width of batts shall completely fill space between framing members. No voids will be tolerated.

6. Manufactuers:

a. CertainTeed Corporation: www.certainteed.com.

b. Johns Manville: www.jm.com.

c. Owens Corning Corp: www.owenscorning.com.

7. Substitutions: See Section 016000 - Product Requirements.

C. Mineral Fiber Batt Insulation (SAFB): Flexible preformed batt or blanket, complying with ASTM C665; friction fit; unfaced.

1. Flame Spread Index of 0 (zero) when tested in accordance with ASTM E84.

2. Smoke Developed Index of 0 (zero) when tested in accordance with ASTM E84.

3. Thermal Resistance: As indicated on drawings.

4. Thickness: 3 inch. See drawings for wall thickness.

5. Width: As required to completely fill space between framing members. No voids will be tolerated.

6. Use: In fire rated walls that call for sound attenuation insulation.

7. Manufacturers:

a. Johns Manville; MinWool Sound Attenuation Fire Batts: www.jm.com/#sle.

b. ROCKWOOL (ROXUL, Inc); AFB evo™: www.rockwool.com/#sle.

c. Substitutions: See Section 016000 - Product Requirements.

2.05 ACCESSORIES

A. Tape joints of rigid insulation in accordance with insulation manufacturers' instructions.

B. Insulation Fasteners: Impaling clip of copper-coated low carbon steel with washer retainer , to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

1. Self-Locking washer: Mild steel, 0.016-inch thick, sizes as required to hold insulation securely.

a. Where spindles will be exposed to human contact after installation, project ends with capped self-locking washers.

2. Insulation Fasteners for Board Insulation at Roofing: See Section 075323

C. Nails or Staples: Steel wire; galvanized; type and size to suit application.

D. Wire Mesh: Galvanized steel, hexagonal wire mesh; 16 gauge wire, spacing at 24" o.c., minimum.

E. Adhesive: Type recommended by insulation manufacturer for application with demonstrated capability to bond insulation or mechanical anchors securely to substrates indicated without damaging or corroding insulation, anchors, or substrates.

F. Insulation Vent Baffles: Provide rigid insulation baffles at vented eaves.

G. Sill Sealer: Flexible, high density polyethylene foam gasketing strip at exterior stud walls.

1. Product: Dow Chemical Company “WEATHERMATE™ SILL SEAL Foam Gasket"; building.dow.com.

H. Attic Measuring Rulers: "#RT240HD - 24" Heavy Duty R-Value Rulers" as manufactured by ADO Products, Inc.: www.energyconscious.com.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

C. Verify mechanical and electrical services within walls have been installed and inspected.

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

3.02 PREPARATION

A. Clean substrates of substances harmful to insulation or vapor retarders, including removal of projections that might puncture vapor retarders.

3.03 INSTALLATION, GENERAL

A. Butt insulation tight.

B. Fasten insulation in place at maximum 6 inches on center, tape in place, or retain in place with insulation fasteners or retain in place with wire mesh secured to framing members as required by manufacturer’s published instructions. Tape seal butt ends and lapped side flanges. Tape seal tears or cuts in membrane with material compatible with membrane, on an insulation that bears a facing.

C. Fill and seal spaces around windows, doors and other penetrations with foamed in place insulation specified in Section 072119; voids are not acceptable.

D. In exterior stud walls and insulated interior stud walls, cavities within studs placed adjacent to each other shall have insulation placed as stud assemblies are built. Likewise cavities in headers shall have insulation placed in any voids.

1. Use foamed in place insulation, specified in Section 072119 where batt insulation cannot be installed.

E. No voids in the insulation will be permitted.

1. Slit or place insulation around conduits, pipes, boxes or any other pieces in walls or roof.

2. Do not compress insulation when placed.

F. Fill and seal holes, voids, or spaces between heated and unheated spaces with foamed-in-place insulation specified in Section 072119; voids are not acceptable.

G. Provide sound-attenuating mineral fiber batt insulation (SAFB), friction-fit, in all rated partitions or as indicated by the wall type on the floor plans. Use metal clips or wire as required to ensure that the blankets remain in place in the rated assembly. Install the insulation consistently on one side of the partition.

3.04 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Provide at new exterior foundation walls. Extend from bottom of slab to top of footing.

B. Install insulation in accordance with manufacturer's instructions.

C. Apply adhesive to back of boards:

1. Three continuous beads per board length.

2. Full bed 1/8 inch thick.

D. Install boards horizontally on foundation perimeter.

1. Place boards to maximize adhesive contact.

2. Install in running bond pattern.

3. Butt edges and ends tightly to adjacent boards and to protrusions.

E. Extend boards over expansion joints, unbonded to foundation on one side of joint.

F. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

G. Prevent insulation from being displaced or damaged while placing concrete and backfilling.

3.05 BOARD INSTALLATION AT CAVITY WALLS

A. Secure impale fasteners to substrate at following frequency:

1. Six (6) per insulation board.

B. Apply adhesive to back of boards:

1. Three continuous beads per board length.

C. Install boards to fit snugly between wall ties.

1. Place membrane surface facing out, and tape seal board joints.

D. Install boards horizontally on walls.

1. Place boards to maximize adhesive contact.

2. Install in running bond pattern.

3. Butt edges and ends tightly to adjacent boards and protrusions.

4. Place impale fastener locking discs.

E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

F. Fill voids greater then 1/4" with spray insualtion or per manufacturer's recommendations.

3.06 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Extend insulation 48" horizontally beneath concrete slab.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

D. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.07 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

A. Installation of board insulation over low slope roof deck is specified in Section 075323 - Ethylene-Propylene-Diene-Monomer Roofing (EPDM).

B. Board Installation Over Roof Deck, General:

1. See applicable roofing specification section for specific board installation requirements.

2. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.

3. Do not apply more insulation than can be covered with roofing on the same day.

3.08 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation. Leave no gaps or voids.

E. Slit or place insulation around conduits, pipes, boxes or any other pieces in walls or roof.

F. Do not install insulation over or within 3 inches of recessed lighting fixtures unless light fixture is IC rated.

G. Install insulation to fill cavities within stud framing placed adjacent to each other as stud assemblies are constructed.

1. Apply foamed-in-place insulation where batt insulation cannot be installed.

H. Install insulation to fill voids within cavities of headers.

1. Apply foamed-in-place insulation where batt insulation cannot be installed.

I. Retain insulation batts in place with spindle fasteners at 12 inches on center.

J. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

K. Coordinate work of this section with construction of air barrier seal specified in Section 072500.

3.09 **PROTECTION**

A. Do not permit installed insulation to be damaged prior to its concealment. Provide temporary coverings or enclosures as required.

B. PROTECTION

1. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 072119
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Foamed-in-place insulation.

1. In masonry cavity walls.
2. In exterior framed walls.
3. In exterior wall crevices.
4. In ceiling cavities.
5. At junctions of dissimilar wall and roof materials.
6. At voids and joints between differing exterior building envelope systems.
7. As detailed and required on the Drawings.

B. Protective intumescent coating.

C. See Part 2 "Performance Criteria" for specific work performance criteria required for this contract as part of the Work of this section.

1.02 RELATED REQUIREMENTS

A. 019020 - ENCLOSURE COMMISSIONING REQUIREMENTS

B. Section 072500 Weather Barriers

1.03 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2017.

B. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics 2019.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

D. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene two weeks prior to commencing work of this section.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.

C. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

D. Samples: Submit two samples 6 inch x 6 inch of each air/vapor material required for the project.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience. Product produced in ISO9001 registered factory.

B. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum five years of documented experience and approved by manufacturer.

C. Single Source Responsibility: Single source product from one manufacturer with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

D. Allowable Thickness Variations: Manufacturer's standard units that vary slightly from the indicated thickness may be acceptable, subject to the approval of the Architect.

E. Thermal Resistance: The thicknesses shown are for the thermal resistance (R-Value inaccordance with ASTM C177 or ASTM C518) specified for each material. The R-Values specified are minimum acceptable. Provide adjusted thicknesses as directed for the use of material having a different thermal resistance.

1.07 MOCK-UP

A. See Section 042001 for Mock-Up requirements. Foam-in-place scope will be provided in mock-up to depict required locations in Contract Dcouments.

B. Locate where directed.

C. Mock-up may not remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

B. Store materials in an area protected from freezing and overheating damage and in accordance with manufacturer's instructions.

C. Protect materials during handling and application to prevent damage and contamination.

1.09 FIELD CONDITIONS

A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

B. Do not expose to sunlight, except to extent necessary for period of installation and concealment.

C. Do not apply foam when substrates are wet due to rain, frost, condensation or other causes.

D. Do not proceed with installation until contaminants capable of interfering with adhesion are removed from substrates.

PART 2 PRODUCTS

2.01 PERFORMANCE CRITERIA

A. Provide labor and materials necessary to provide a complete system, ensuring a completely insulated exterior building envelope.

B. Perform all work of this section with experienced workmen familiar with the work, and in accordance with industry standards and manufacturer's recommendations.

C. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristic: ASTM E84.

2. Fire resistance Ratings: ASTM E119.

D. Toxicity/Hazardous Materials:

1. Formaldehyde: Products containing urea-formaldehyde will not be permitted.

2. Chlorofluorocarbons (CFCs)/HCFCs: Products and equipment requiring or using CFCs or HCFCs during the manufacturing process will not be permitted.

2.02 MATERIALS

A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.

1. Aged Thermal Resistance (R-Value): Minimum of 6.0/inch as measured at 140 degrees F at 90 days in accordance with ASTM C518.

2. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.

3. Closed Cell Content: At least 90 percent.

4. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

5. Manufacturers:

    a. Johns Manville; JM Corbond III Closed Cell Spray Polyurethane Foam: www.jm.com/#sle.

    b. Rhino Linings Corporation; ThermalGuard CC2: www.rhinolinings.com/#sle.

    c. Substitutions: See Section 016000 - Product Requirements.

2.03 ACCESSORIES

A. Primer: As required by insulation manufacturer.

B. Overcoat: Non-flammable, water-based, intumescent ignition barrier coating of type recommended by insulation manufacturer and as required to comply with applicable codes; maximum flame-spread and smoke-developed indexes of 5 and 20, respectively, per ASTM E 84; compliant with NFPA 286 as a thermal barrier coating.

    1. Thickness: Minimum 20 mils dry film thickness, as required to meet 15 minute thermal barrier requirements for exposed polyurethane foam insulation.

    2. Color: White.

C. Ignition Barrier: Provide mineral fiber loose fill insulation over spray applied insulation in attic spaces as required to comply with applicable codes.

    1. Thickness: 1 1/2 inches.

    2. Manufacturer: USG Interiors, Inc.

D. Foam Sealant: Low pressure flexible polyurethane foam sealant, UL listed, Moisture-resistant skin.

    1. Products:

        a. Dow Great Stuff Window and Door Insulating Foam Sealant.

E. Attic Measuring Rulers: ADO Products; Product "24 inch Heavy Duty R-Value Rulers"; www.adoproducts.com

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify work within construction spaces or crevices is complete prior to insulation application.

B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

3.02 PREPARATION

A. Close off openings in cavities receiving foamed-in-place insulation to prevent the escape of insulation. Provide bronze or stainless steel screen (inside) where openings must be maintained for drainage or ventilation.

B. Mask and protect adjacent surfaces from over spray or dusting.

C. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

A. Apply insulation in accordance with manufacturer's instructions.

B. Apply insulation by spray method, to a uniform monolithic density without voids.

1. No more than 10 percent of the application area can be shy of the required minimum thickness by as much as minus (-) 1/2 inch.

C. The joint between the exterior wall Gypsum Wall Board and the roof deck shall be sealed against air infiltration. The exterior wall Gypsum Wall Board shall overlay the bottom plate.

D. All joints between a roof and a vertical wall above the roof shall be sealed against air leakage.

E. Provide thorough photo documentation of any installation in all trusses, all attic spaces, or any assemblies that are hidden from view to provide proof of insulation thicknesses.

F. Apply to a minimum cured thickness as indicated on drawings.

G. Apply to achieve a thermal resistance R value of 38 in attic spaces.

H. Apply to maintain a thermal resistance R value of 38 at junction point where horizontal attic spray insulation meets cavity wall vertical ridig insulation as detailed on Drawings.

I. Apply insulation to fill voids around doors and windows.

J. Apply insulation to fill voids around accessible service and equipment penetrations.

K. Apply insulation to unvented roof spaces and cathedral ceiling areas.

L. Apply insulation to seal plumbing stacks, electrical wiring, holes, voids, and other penetrations into unheated spaces.

M. Apply insulation to holes, voids, and spaces between heated and unheated spaces; voids are not acceptable.

N. Apply insulation in voids at joints between dissimilar exterior materials.

1. Provide batt insulation, specified in Section 072100, only where foamed-in-place insulation cannot be installed and only upon approval by Architect.

2. Provide sealant and backer rod at joints regardless of insulation type.

O. Apply overcoat to insulation that will remain exposed in attic areas.

1. Verify that substrates are ready to receive barrier coat.

2. Install in accordance with manufacturer's written instructions.

P. Any holes, voids or spaces between heated and unheated spaces shall be sealed with foamed in place insulation. Voids are not acceptable.

Q. Coordinate water piping located in insulated exterior walls, so that it is placed on warm side of insulation and insulation encapsulates piping.

R. Install attic measuring rulers no less than one every 300 sf; position for ease of inspection. Secure to trusses.

S. Thoroughly seal all penetrations between the apparatus bay and the otherwise occupied portions of the building to prevent the movement of air and airborne fumes.

T. Patch damaged areas.

U. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.

V. Trim excess away for applied trim or remove as required for continuous sealant bead.

W. Apply foam sealant in gaps around windows and doors to prevent the movement of air and airborne fumes. Apply according to directions to avoid bowing or distorting window and door frames.

3.04 FIELD QUALITY CONTROL

A. Field inspections and tests will be performed by an independent testing agency under provisions of Section 014000 - Quality Requirements.

B. Airtightness: It is intended that the building be as airtight as practical.

1. It is incumbent upon any Contractor to notify the Architect of any conflict or problem so the Architect may make revisions or modifications to the work.

2. **Notify Inspection Agency and allow 48 hours (minimum)** for inspection of the insulation and vapor barrier prior to covering or sealing of the work.

3.05 PROTECTION

A. Do not permit subsequent construction work to disturb applied insulation.

B. Protect insulation during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If damage or deterioration occurs, cut out and remove damaged or deteriorated insulation immediately so that repaired areas are indistinguishable from original work.

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END OF SECTION

SECTION 072400
EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Composite arched ceiling and soffit cladding of rigid insulation and reinforced finish coating ("Class PB").

B. Drainage and water-resistive barriers behind insulation board.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Sheathing on wood framing.

B. Section 076200 - Sheet Metal Flashing and Trim: Perimeter flashings.

C. Section 079005 - Joint Sealers

1.03 REFERENCE STANDARDS

A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2019.

B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.

C. ASTM C1397 - Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage 2013 (Reapproved 2019).

D. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive 2017.

E. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity 2015.

F. ASTM E2568 - Standard Specification for PB Exterior Insulation and Finish Systems; 2009.

G. ASTM E2570/E2570M - Standard Test Methods for Evaluating Water-Resistive Barrier (WRB) Coatings Used under Exterior Insulation and Finish Systems (EIFS) or EIFS with Drainage 2007, with Editorial Revision (2014).

H. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.

I. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).

J. ASTM E1677 - Standard Specification for an Air Barrier (AB) Material or System for Low-Rise Framed Building Walls 2011.

K. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies 2018.

L. ASTM E2485/E2485M - Standard Test Method for Freeze/Thaw Resistance of Exterior Insulation and Finish Systems (EIFS) and Water Resistive Barrier Coatings 2013 (Reapproved 2018).

M. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials 2013.

N. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials 2013.

O. ICC-ES AC219 - Acceptance Criteria for Exterior Insulation and Finish Systems 2009, with Editorial Revision (2014).

P. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies 2009, with Editorial Revision (2012).

Q. ISO 9001 - Quality management systems -- Requirements 2015.

R. NFPA 259 - Standard Test Method for Potential Heat of Building Materials 2018.

S. NFPA 268 - Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source 2017.

T. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components 2019.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.

C. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.

D. Verification Samples: Submit actual samples (up to three choices) of selected coating on specified substrate, minimum 12 inches square, illustrating project colors and textures.

E. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

1.05 QUALITY ASSURANCE

A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site during installation.

B. EIFS Manufacturer Qualifications: Provide EIFS products other than insulation from the same manufacturer with qualifications as follows:

1. Member in good standing of EIMA (EIFS Industry Members Association).

2. Manufacturer of EIFS products for not less than 5 years.

3. Manufacturing facilities ISO 9001 certified.

C. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.

D. Installer Qualifications: Company specializing in the type of work specified and with at least three years of documented experience.

1.06 MOCK-UP

A. Construct mock-up of typical EIFS application on specified substrate, size as required to include examples of all key conditions, and including flashings, joints, and edge conditions.

B. Locate mock-up where directed.

C. Mock-up may remain as part of the Work if undisturbed at time of Substantial Completion.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.

B. Storage: Store materials as directed by manufacturer's written instructions.

1. Protect adhesives and finish materials from freezing, temperatures below 40 degrees F and temperatures in excess of 90 degrees F.

2. Protect all materials from inclement weather and exposure to sunlight.

1.08 FIELD CONDITIONS

A. Do not prepare materials or apply EIFS under conditions other than those described in the manufacturer's written instructions.

B. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.

C. Do not install coatings or sealants when ambient temperature is below 40 degrees F.

D. Do not leave installed insulation board exposed to sunlight for extended periods of time.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's standard material warranty, covering a period of not less than 5 years.

C. Provide separate warranty from installer covering labor for repairs or replacement for a period of not less than 5 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers:

1. Dryvit Systems, Inc; Dryvit Outsulation Plus MD EIFS, Class PB with Moisture Drainage: www.dryvit.com/#sle.

2. BASF Wall Systems (Senergy, Finestone, Acrocrete, SonoWall); Product "Senerflex Channeled Adhesive Design": www.senergy.basf.com.

3. Sto Corp: www.stocorp.com.

2.02 EXTERIOR INSULATION AND FINISH SYSTEM

A. Exterior Insulation and Finish System: DRAINAGE type; reinforced finish coating on mechanically-fastened insulation board over sheet-type combination drainage layer/water-resistive barrier over substrate; provide a complete system that has been tested to show compliance with the following characteristics; include all components of specified system and substrate(s) in tested samples.

B. Fire Characteristics:

1. Flammability: Pass, when tested in accordance with NFPA 285.

2. Ignitibility: No sustained flaming when tested in accordance with NFPA 268.

3. Potential Heat of Foam Plastic Insulation Tested Independently of Assembly: No portion of the assembly having potential heat that exceeds that of the insulation sample tested for flammability (above), when tested in accordance with NFPA 259 with results expressed in Btu per square foot.

C. Water Penetration Resistance: No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes, when tested in accordance with ASTM E331 at 2.86 psf differential pressure with tracer dye in the water spray; include in tested sample at least two vertical joints and one horizontal joint of same type to be used in construction; disassemble sample if necessary to determine extent of water penetration.

D. Drainage Efficiency: Average minimum efficiency of 90 percent, when tested in accordance with ASTM E2273 for 75 minutes.

E. Salt Spray Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM

B117, using at least three samples matching intended assembly, at least 4 by 6 inches in size.

F. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 10 cycles, when tested in accordance with ICC-ES AC219 or ICC-ES AC235.

G. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000 hours of accelerated weathering conducted in accordance with ASTM G153 Cycle 1 or ASTM G155 Cycles 1, 5, or 9.

H. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D2247.

I. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D3273.

J. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D968 with 113.5 gallons of sand.

2.03 MATERIALS

A. Finish Coating Top Coat: Water-based, air curing, acrylic or polymer-based finish with integral color and texture.

1. Texture : Dryvit Systems, Inc., Specialty Finish Options; Lymestone.

2. Color: As selected by Architect from manufacturer's standard range.

B. Base Coat: Fiber-reinforced, acrylic or polymer-based product compatible with insulation board and reinforcing mesh, Class PB.

C. Reinforcing Mesh: Balanced, open weave glass fiber fabric, treated for compatibility and improved bond with coating, weight, strength, and number of layers as required to meet required system impact rating.

D. Insulation Board: Molded expanded polystyrene (EPS) board insulation, ASTM C578, Type XI, with the following characteristics:

1. Board Thickness: As indicated on drawings, but not less than thickness allowed by ASTM C1397.

2. Thickness Tolerance: plus/minus 1/16 inch maximum.

E. Combination Drainage Layer/Water-Resistive Barrier: Air- and water-resistive sheet complying with ASTM E1677 Type I, dimpled or otherwise profiled to maintain air and drainage space between insulation board and sheathing; minimum water vapor permeance of 20 perms; furnished or approved by EIFS manufacturer.

2.04 ACCESSORY MATERIALS

A. Insulation Fasteners: Fastener and plate system appropriate for substrate and as recommended by EIFS manufacturer.

B. Finish Fasteners: Provide brass or bronze escutcheon plate finishing plates at all EIFS soffit connection points.

C. Trim: EIFS manufacturer's standard trim accessories or as indicated on the Drawings, as required for a complete project and including starter track and drainage accessories.

D. Sealant Materials: As recommended by EIFS manufacturer; color(s) as selected by Architect from manufacturer's full range.

E. Exterior Soffit Vents: One piece, perforated, 24 oz. screened copper alloy, with flat panel edge and manufactured especially for soffit application. Provide ventilation area shown on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify, with Installer present, that substrate is sound and free of oil, dirt, other surface contaminants, efflorescence, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.

B. Verify that substrate surface is flat, with no deviation greater than 1/4 in when tested with a 10 ft straightedge.

3.02 PREPARATION

A. Apply primer to substrate as recommended by EIFS manufacturer for project conditions.

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

1. Apply conditioner by sprayer or roller to chalking or excessively absorptive surfaces.

2. Replace weather-damaged sheathing and repair damaged or cracked surfaces.

3. Level surfaces to comply with required tolerances.

3.03 INSTALLATION - GENERAL

A. Install in accordance with EIFS manufacturer's instructions and ASTM C1397.

1. Where different requirements appear in either document, comply with the most stringent.

2. Neither of these documents supercedes provisions of Contract Documents that defines contractual relationships between parties or scope of this work.

3.04 INSTALLATION - WATER-RESISTIVE BARRIER

A. Apply barrier coating as recommended by coating manufacturer; prime substrate as required before application.

B. Mechanically attach sheet materials to substrate using fasteners and fastener spacing recommended by EIFS manufacturer.

C. Seal substrate transitions and intersections with other materials to form continuous water-resistive barrier on exterior of sheathing, using method recommended by manufacturer.

D. At moving expansion joints, apply flexible flashing or flashing tape across and recessed into joint with U-loop forming continuous barrier but allowing movement.

E. Lap flexible flashing or flashing tape at least 2 inches on each side of joint or transition.

F. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations indicated on drawings. Provide vent area specified.

3.05 INSTALLATION - INSULATION

A. Install in accordance with manufacturer's instructions.

B. Prior to installation of boards, install starter track and other trim level and plumb and securely fastened. Install only in full lengths, to minimize moisture intrusion; cut horizontal trim tight to vertical trim.

C. Install back wrap reinforcing mesh at all openings and terminations that are not to be protected with trim.

D. On wall surfaces, install boards horizontally.

E. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch.

F. Fill gaps greater than 1/16 inch with strips or shims cut from the same insulation material.

G. Rasp irregularities off surface of installed insulation board.

H. Mechanical Fastening: Space fasteners as recommended by EIFS manufacturer.

I. Adhesive Attachment: Use method required by manufacturer to achieve drainage efficiency specified; do not close up drainage channels when placing insulation board.

3.06 CLEANING

A. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

3.07 PROTECTION

A. Protect ongoing work from inclement weather and other sources of damage until dry and permanent protection in the form of flashings, sealants, etc. are installed.

B. Protect completed work from damage and soiling by subsequent work.

END OF SECTION

SECTION 072500
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls water vapor-resistant and air tight. Use on outside surface of inside wythe of masonry cavity wall.

B. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

1.02 RELATED REQUIREMENTS

A. 019020 - ENCLOSURE COMMISSIONING REQUIREMENTS

B. Section 033000 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.

C. Section 072400 - Exterior Insulation and Finish Systems: Water-resistive barrier under exterior insulation.

D. Section 079200 - Joint Sealants: Sealing building expansion joints.

E. Section 092116 - Gypsum Board Assemblies: Water-resistive barrier under exterior cladding.

1.03 DEFINITIONS

A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders. Use on outside surface of sheathing of exterior walls.

C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Use on outside surface of inside wythe of masonry cavity wall.

1. Water Vapor Permeance: For purposes of conversion, 57.2 ng/(Pa s sq m) = 1 perm.

D. Material Transitions: Areas where the WRB / AB coated fiberglass-mat gypsum sheathing connects to beams, columns, slabs, parapets, foundation walls, roofing systems, and at the interface of dissimilar materials.

1.04 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.

B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.

C. ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course; 2012.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

F. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials 2013.

G. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing 2015.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on material characteristics.

C. Shop Drawings: Provide drawings of special joint conditions.

D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.06 WARRANTY

A. Provide manufacturer’s exposure warranty that offers twelve (12) months of coverage against in-place exposure damage (delamination, deterioration) beginning with the date of installation of the product.

B. Provide manufacturer's standard warranty for sheathing to be free of manufacturing defects that make it unsuitable for its intended use. Warranty period shall be Ten (10) years from the date of Substantial Completion.

C. Material Warranty: Provide material manufacturer’s standard product warranty, for a minimum three (3) years from date of Substantial Completion.

1.07 MOCK-UP

A. Install air barrier and vapor retarder materials in mock-up specified in Section - Masonry Veneer.

1.08 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

A. Air Barrier:

1. On outside surface of sheathing of exterior walls use air barrier sheet, mechanically fastened type.

B. Exterior Vapor Retarder:

1. On outside surface of inside wythe of masonry cavity wall use vapor retarder coating.

2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

A. Acceptable products: DensElement Barrier System as manufactured by Georgia-Pacific Gypsum, LLC.

1. Sheathing: DensElement Sheathing.

2. Fluid-applied flashing materials: Fluid-applied flashing as approved by Georgia-Pacific Gypsum, LLC.

3. Primers, backer rods and accessory materials: As approved by Georgia-Pacific Gypsum, LLC.

B. System Description: Weather-Resistant Barrier and Air Barrier assembly installed at exterior stud walls under exterior cladding, consisting of the following components as herein specified:

1. Sheathing: WRB / AB coated fiberglass mat gypsum sheathing.

2. Fluid-applied flashing to seal sheathing joints, inside and outside corners, penetrations, rough openings, and material transitions.

3. Primer to seal raw gypsum edges before applying fluid applied flashing.

C. Backer rods and accessory materials.

D. Air Barrier Sheet, Mechanically Fastened:

1. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.

2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (Desiccant Method) at 73.4 degrees F.

3. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 180 days of weather exposure.

4. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.

5. Seam and Perimeter Tape: Polyethylene self adhering type, mesh reinforced, 2 inches wide, compatible with sheet material; unless otherwise specified.

2.03 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

A. Vapor Retarder Coating: Liquid applied, resilient, UV-resistant coating and associated joint treatment.

1. Water Vapor Permeance: 0.08 perm, maximum, when tested in accordance with ASTM E96/E96M.

2. VOC Content: Less than 50 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).

3. Resistance to Fungal Growth: Pass AATCC Test Method 30.

4. Code Acceptance: Comply with applicable requirements of ICC-ES AC212.

5. Suitable for use on concrete, masonry, plywood and gypsum sheathing.

6. Joint Preparation Treatment: Coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.

7. Manufacturers:

a. Carlisle Coatings and Waterproofing, Inc; Barriseal-R: www.carlisleccw.com/#sle.

b. Grace Construction Products; Perm-A-Barrier Liquid: www.graceconstruction.com.

c. Henry Company; Air-Bloc 32MR; www.henry.com.

d. Substitutions: See Section 016000 - Product Requirements.

8. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.

2.04 ELEVATOR PIT WATERPROOFING SYSTEM

A. Basis of Design: Hycrete System W by Hycrete, Inc.: www.hycrete.com

1. Hycrete System W

a. Hydrophobic Concrete Mixture of Admixtures

b. Bentonite waterstops in all cold joints and penetrations

c. Groutable hose waterstop systems at vertical joints as directed by the manufacturer

d. Water/Cement Ratio for concrete batches to recevie Hycrete System W shall be 0.42 maximum

B. Substitutions: See Section 016000 - Product Requirements.

C. Vapor Retarder: Per Section 031000, install a Stego Wrap 15 mil vapor retarder under elevator pit concrete base slab.

2.05 ACCESSORIES

A. General: Weather barrier system manufacturers' recommended accessories as required for a complete weather barrier assembly, including but not limited to flashings, reinforcing strips, transition strips, substrate-patching membrane, and termination mastic.

B. Liquid Flashing: One part, fast curing, non-sag, elastomeric, gun grade, trowelable liquid flashing.

1. Manufacturers:

a. Pecora Corporation; R-Guard FastFlash: www.pecora.com/#sle.

b. Substitutions: See Section 016000 - Product Requirements.

C. Thinners and Cleaners: As recommended by material manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.03 VAPOR TIGHTNESS

A. No gaps in the vapor barrier will be allowed. Repair any gaps or punctures in vapor barriers immediately **BEFORE CONCEALMENT** by other work.

B. Vapor barriers are to be installed over all exterior insulation, uninterrupted from slab to roof deck.

C. Holes and penetrations to the vapor barrier are unacceptable.

3.04 AIR TIGHTNESS

A. Infiltration Barrier

1. It is intended that the building be as airtight as practical.

2. No gaps in the infiltration barrier will be allowed. Repair any gaps or punctures in infiltration barriers immediately **BEFORE CONCEALMENT** by other work.

3. Infiltration barriers are to be installed over all exterior insulation, uninterrupted from slab to roof deck, according to manufacturer's instructions.

4. Fastener and penetration treatment: Treat all countersunk fasteners (penetrating through the fiberglass mat) with specified fluid applied flashing used for sealing joints.

5. Holes and penetrations to the infiltration barrier are unacceptable.

3.05 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Mechanically Fastened Sheets - On Exterior:

1. Install sheets shingle-fashion to shed water, with seams generally horizontal.

2. Overlap seams as recommended by manufacturer but at least 6 inches.

3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.

4. For applications specified to be air tight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.

5. Install air barrier and vapor retarder underneath the jamb flashings.

6. Install head flashings under weather barrier.

7. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.

C. Coatings:

1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.

2. Where exterior masonry veneer is to be installed, install masonry anchors before installing weather barrier over masonry; seal around anchors air tight.

3. Use flashing to seal to adjacent construction and to bridge joints.

D. Sealing Infiltration Barrier Joints using specified Fluid Applied Flashing

1. Apply fluid applied flashing over the joint in a zig-zag or ribbon pattern dispensed from a tube type container. Cover a minimum of 1” on both sides of the joint.

2. With a 4 or 6” straight edge knife or trowel, spread evenly over the sheathing joint.

3. Apply at a rate to achieve a wet mil thickness of 16 mils over the entire joint area.

E. Sealing Infiltration Barrier Vertical Corners using specified Fluid Applied Flashing

1. Prime exposed gypsum edges with specified primer.

2. Apply fluid applied flashing over the inside and/or outside corner in a zig-zag or ribbon pattern dispensed from either a tube type container. Cover a minimum of 2” on both sides of the corner.

3. With a 4 or 6” straight edge knife or trowel, spread evenly over the sheathing corner.

4. Apply at a rate to achieve a wet mil thickness of 16 mils over the corner area.

F. Sealing Infiltration Barrier Fasteners using specified Fluid Applied Flashing: Apply the fluid applied flashing material to fasteners, and wipe down with a straight edge tool; provide a minimum 16 mil thick coating over the fastener

G. Sealing Infiltration Barrier Rough Openings using specified Fluid Applied Flashing

1. Prime exposed gypsum edges with specified primer

2. Apply a bead of fluid applied flashing into the entire width of the inside corners of the opening dispensed from a tube type container.

3. Apply fluid applied flashing onto:

   a. Sills of openings

   b. Jambs of openings

   c. Headers of openings

4. Apply fluid applied flashing 2” over the entire width of the opening sill, jamb, and header on exterior set windows and doors. Apply fluid applied flashing over the entire width of the opening sill, jamb, and header on interior set windows and doors. Apply in a zig-zag or ribbon pattern dispensed from a tube type container.

5. Apply fluid applied flashing over the sheathing adjacent to the opening sill, jamb, and header in a zig-zag or ribbon pattern dispensed from a tube type container. Cover a minimum of 2” of the sheathing surface adjacent to the opening.

6. With a 4 or 6” straight edge knife or trowel, spread fluid applied flashing over entire width of the sill, jamb, header, and sheathing surface adjacent to the opening.

7. Apply at a rate to achieve a wet mil thickness of 16 mils over the opening area.

H. Sealing Infiltration Barrier material transitions using specified Fluid Applied Flashing

1. Sheathing joint and transition gaps to receive fluid-applied flashing shall be less than 1/4" (6.4 mm).

2. For gaps larger than 1/4" use shall be sealed with fluid-applied flashing as approved by Georgia-Pacific Gypsum, LLC

3. Gaps that are more than 1/8” and less than ¼” shall be filled with a backer rod to support the fluid applied flashing at the transition joint.

4. If necessary, prime the adjacent material with primer per the material manufacturer’s recommendations.

5. Apply fluid applied flashing over the sheathing and adjacent material in a zig-zag or ribbon pattern dispensed from a tube type container. Ensure the flashing is a minimum of 2” on each substrate material surface.

6. With a 4 or 6” straight edge knife or trowel, spread fluid applied flashing over material transition joint.

7. Apply at a rate to achieve a wet mil thickness of 16 mils.

3.06 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Coordination of ABAA Tests and Inspections:

1. Provide testing and inspection required by ABAA QAP.

2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.

3. Cooperate with ABAA testing agency.

4. Allow access to air barrier work areas and staging.

5. Do not cover air barrier work until tested, inspected, and accepted.

C. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

D. Take digital photographs of each portion of the installation prior to covering up.

3.07 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

B. Protect Infiltration Barrier assembly from damage during installation and during the construction period.

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END OF SECTION

SECTION 073113 - ASPHALT SHINGLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Asphalt shingle roofing (**Alternate DEDUCT GCC-03**).

B. Associated metal flashings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Roof sheathing.

B. Section 076200 - Sheet Metal Flashing and Trim: Edge and cap flashings; flashing reglets placed at vertical surfaces of masonry.

C. Section 077123 - Manufactured Gutters and Downspouts.

D. Section 077100 - Roof Specialties: Manufactured soffit vents; pipe and penetration flashings.

E. Section 077200 - Roof Accessories: Snow guards.

1.03 REFERENCE STANDARDS

A. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017.

B. ASTM D3161/D3161M - Standard Test Method for Wind-Resistance of Steep Slope Roofing Products (Fan-Induced Method) 2020.

C. ASTM D3462/D3462M - Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules 2019.

D. ASTM D4869/D4869M - Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing 2016a.

E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

F. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings 2020a.

G. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples 2018a.

H. ICC-ES AC207 - Acceptance Criteria for Polypropylene Roof Underlayments 2012, with Editorial Revision (2015).

I. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

J. UL (DIR) - Online Certifications Directory Current Edition.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating material characteristics, performance criteria, and limitations.

C. Shop Drawings: For metal flashings, indicate specially configured metal flashings, jointing methods and locations, fastening methods and locations, and installation details.

D. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern ; for color selection.

E. Manufacturer's Installation Instructions: Indicate installation criteria and procedures.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 016000 - Product Requirements, for additional provisions.
2. Extra Shingles: 200 sf of each type and color.

1.05 QUALITY ASSURANCE

A. Products are Required to Comply with Fire Resistance Criteria: UL (DIR) listed and labeled.

1.06 MOCK-UP

A. Provide mock-up of 200 sf including underlayment, shingles, eave protection membrane, and associated flashings.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.07 FIELD CONDITIONS

A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F.

1.08 **WARRANTY**

A. Provide roofing Special Warranty on installed work, agreeing to pay for repair or replacement of defective materials, including labor, as necessary to eliminate leaks. Period of Special Warranty: ten (10) years from Date of Substantial Completion.

B. Provide Special Warranty to include all flashing systems, underlayment systems, and shingle systems.

C. Provide shingle manufacturer’s standard 40 year minimum limited warranty, with a 20 year non-prorated limited warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Asphalt Shingles:
1. Basis of Design: CertainTeed Grand Mannor
2. NRCA (RM) - The NRCA Roofing Manual 2019.
3. Owens Corning Corp: www.owenscorning.com.

4. Substitutions: See Section 016000 - Product Requirements.

2.02 ASPHALT SHINGLES

A. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D3462/D3462M.
   1. Fire Resistance: Class A, complying with ASTM
   2. Wind Resistance: Class F, when tested in accordance with ASTM D3161/D3161M.
   3. Warranted Wind Speed: Not greater than Not less than tested wind resistance 110 mph.
   4. Algae Resistant.
   5. Weight: 425 lb/100 sq ft.
   6. Self-sealing type.
   7. Style: 2 layer laminated 4 tab.
   8. Hip and Ridge Cap Shingles: High profile, self healing; match selected shingle color.
      a. CertainTeed Grand Mannor hip and ridge.
   9. Color: Stongate Gray, to match existing asphalt shingles.

2.03 SHEET MATERIALS

A. Eave Protection Membrane: Self-adhering self-adhering rubberized asphalt membrane shingle underlayment having internal reinforcement and “split” back plastic release film; provide material warranty equal in duration to that of shingles being applied, complying with ASTM D1970/D1970M.
   1. Manufacturers:
      a. CertainTeed WinterGuard.

B. Underlayment: Synthetic non-asphaltic sheet, intended by manufacturer for mechanically fastened roofing underlayment without sealed seams.
   1. Type: Woven polypropylene with anti-slip polyolefin coating on both sides.
   2. Minimum Requirements: Comply with requirements of ICC-ES AC207 for non-self-adhesive sheet.
   3. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
   4. Flammability: Minimum of Class A, when tested in accordance with ASTM E108.
   5. Ultraviolet (UV) Resistance and Weatherability: Approved in writing by manufacturer for exposure to weather for minimum of six months.
   6. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
   7. Water Vapor Permeance: Vapor retarder; maximum of 1 perm, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
   8. Performance: Meet or exceed requirements for ASTM D226/D226M, Type II asphalt-saturated organic felt.
   9. Liquid Water Transmission: Passes ASTM D4869/D4869M.
   10. Fasteners: As recommended by manufacturer or building code qualification report or approval.
   11. Manufacturers:
      a. CertainTeed Diamond Deck.
      b. Substitutions: See Section 016000 - Product Requirements.

2.04 ACCESSORIES

A. Roofing Nails: Standard round wire shingle type, galvanized steel, stainless steel, aluminum roofing nails, or copper roofing nails, minimum 3/8 inch head diameter, 12 gage, 0.109 inch nail shank diameter, 1-1/2 inch long and complying with ASTM F1667.

B. Nails: Standard round wire shingle type, of hot-dipped zinc coated steel, 12 gage, 0.105 inch shank diameter, 3/8 inch head diameter, of sufficient length to penetrate through roof sheathing or 3/4 inch into roof sheathing or decking.

C. Nails for Metal Flashings: Standard round wire shingle type, of hot-dipped zinc coated steel, 12 gage, 0.105 inch shank diameter, [CHOICE TEXT]9/64 inch head diameter, of sufficient length to penetrate through roof sheathing or 3/4 inch into roof sheathing or decking.

D. Staples: Standard wire shingle type, of hot dipped zinc coated steel, 16 wire gage, 0.0508 inch diameter, 15/16 inch crown width, of sufficient length to penetrate through roof sheathing or 3/4 inch into roof sheathing or decking.
   1. Do not use unless allowed by shingle manufacturer's warranty.

E. Plastic Cement: ASTM D4586/D4586M, asphalt roof cement.

F. Ridge Vents: Copper formed continuous vents that do not permit direct water or weather entry.

2.05 METAL FLASHINGS

A. Metal Flashings: Provide sheet metal eave edge, gable edge, and other flashing indicated.
   1. Form flashings to profiles indicated on drawings.
   2. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
   3. Hem exposed edges of flashings minimum 1/4 inch on underside.
   4. Coat concealed surfaces of flashings with bituminous paint.

B. Sheet Metal: Prefinished aluminum, as specified in Section 076200.

C. Bituminous Paint: Acid and alkali resistant type; black color.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify that roof deck is of sufficient thickness to accept fasteners.

C. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.

D. Verify roof openings are correctly framed.

E. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.02 PREPARATION

A. Seal roof deck joints wider than 1/16 inch as recommended by shingle manufacturer.

B. At areas where eave protection membrane is to be adhered to substrate, fill knot holes and surface cracks with latex filler.

C. Broom clean deck surfaces before installing underlayment or eave protection.

D. Install eave edge and gable edge flashings tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced 12 inches on center, max.

3.03 INSTALLATION - EAVE PROTECTION MEMBRANE

A. Install eave protection membrane from eave edge to minimum 4 ft up-slope beyond interior face of exterior wall. Lap ends minimum 6 inches.

B. Install eave protection membrane in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

C. Vent Pipes: Install a 24 inch square piece of membrane lapping over underlayment; seal tightly to pipe.

D. Vertical Walls: Install membrane extending from at least 6 inches up the wall to 12 inches onto the roof surface, lapping over underlayment.

E. Roof Curbs: Install membrane from under the built-in counter flashing to 12 inches onto the roof surface lapping over underlayment.

3.04 INSTALLATION - UNDERLAYMENT

A. At Roof Slopes Up to 4:12 : Install two layers of underlayment over entire roof area, with ends and edges weather lapped minimum 4 inches. Stagger end laps of each consecutive layer. Nail in place.
   1. Apply a minimum 19-inch-wide-strip of underlayment parallel with and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide sheets of underlayment overlapping successive sheets 19 inches fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.

B. At Roof Slopes Greater Than 4:12 : Install underlayment perpendicular to slope of roof in shingle fashion, with ends and edges weather lapped minimum 4 inches. Stagger end laps of each consecutive layer. Nail in place. Weather lap minimum 4 inches over eave protection.

C. Weather lap and seal watertight with plastic cement any items projecting through or mounted on roof.

3.05 INSTALLATION - VALLEY PROTECTION

A. Install one ply of eave protection membrane, minimum 48 inches wide, centered over valleys.

B. Weather lap joints minimum 2 inches.

C. Nail in place minimum 18 inches on center, 1 inch from edges.

D. At Exposed Valleys: Install one layer of copper metal flashing, minimum 24 inches wide, centered over open valley and crimped to guide water. Weather lap joints minimum 2 inch wide band of lap cement along each edge of first, press roll roofing into cement, and nail in place minimum 18 inches on center, 1 inch from edges.

3.06 INSTALLATION - METAL FLASHING AND ACCESSORIES

A. Install flashings in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.

C. Secure in place with nails at 12 inches on center minimum. Conceal fastenings.

D. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight as indicated on the Drawings.

3.07 INSTALLATION - SHINGLES

A. Install shingles in accordance with manufacturer's instructions manufacturer's instructions and NRCA (RM) applicable requirements.
   1. Fasten individual shingles using two nails per shingle, or as required by manufacturer and local building code, whichever is greater.
   2. Fasten strip shingles using four nails per strip, or as required by manufacturer and local building code, whichever is greater.

B. Place shingles in straight coursing pattern with 5 inch weather exposure to produce double thickness over full roof area, and provide double course of shingles at eaves.

C. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counterflashings.

D. Complete installation to provide weather tight service.

3.08 PROTECTION

A. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 074113
METAL ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural roofing system of preformed aluminum panels.

B. Commencement of work by the Contractor shall constitute acknowledgement by the Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer. No modification of the Contract Sum will be made for failure to adequately examine the Contract Documents or the project conditions.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Roof sheathing.

B. Section 061600 - Sheathing: Roof Sheathing.

C. Section 072100 - Thermal Insulation: Rigid roof insulation.

D. Section 076200 - Sheet Metal Flashing and Trim

E. Section 079200 - Joint Sealants: Sealing joints between metal roof panel system and adjacent construction.

1.03 REFERENCE STANDARDS

A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.

B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.

C. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2019.

D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: Before start of roofing work, Contractor shall hold a meeting to discuss the proper installation of materials and requirements to achieve the warranty.

1. Require attendance with all parties directly influencing the quality of roofing work or affected by the performance of roofing work.

2. Notify Architect well in advance of meeting.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Storage and handling requirements and recommendations.

2. Installation methods.

3. Specimen warranty.

C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.

1. Show work to be field-fabricated or field-assembled.

D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.

E. Test Reports: Indicate compliance of metal roofing system to specified requirements.

F. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 20 years, non-prorated, finish warranty from Date of Substantial Completion.

C. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of 20 years, non-prorated, finish warranty from Date of Substantial

Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Roof Panels:

1. Firestone Building Products LLC; Una-Clad UC-6: www.firestonebpco.com/#sle.

2. Petersen Aluminum Corporation; Tite-Loc Plus Panel: www.pac-clad.com/#sle.

B. Substitutions: See Section 016000 - Product Requirements.

2.02 METAL ROOF PANELS

A. Metal Roof Panels: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.

B. Metal Panels: Factory-formed panels with factory-applied finish.

1. Aluminum Panels:

a. Alloy and Temper: Aluminum complying with ASTM B209 (ASTM B209M); temper as required for forming.

b. Thickness: Minimum 18 gage (0.040 inch).

2. Profile: Standing seam, with minimum 2.0 inch seam height; concealed fastener system for field seaming with special tool.

3. Texture: Smooth.

4. Width: Maximum panel coverage of 18 inches.

5. UL-90 Compliant.

6. Miami-Dade NOA Compliant.

7. Design Loads: In accordance with ASCE 7, current edition.

a. Wind Uplift Resistance: Class 90 rating, minimum, when tested in accordance with UL 580.

b. Wind Pull-Off Resistance: No failure of roof panel or fasteners when tested in accordance with ASTM E1592 for negative loading equal to negative design wind load; for assemblies not tested, capacity for gauge, span, or loading may be determined by interpolating between test values only.

8. Air Infiltration: Maximum of 0.007 cfm/sq ft at pressure differential of 6.24 psf, when tested in accordance with ASTM E1680.

9. Water Leakage: No uncontrollable water leakage at pressure differential of 2.86 psf, when tested in accordance with ASTM E1646.

10. Thermal Effects: Design roof panels and their attachment to allow free movement in response to expansion and contraction forces resulting from temperature variation, as specified in the MBMA Metal Roofing Systems Design Manual.

11. External Fire Resistance: Class A, when tested in accordance with ASTM E108 or UL 790.

12. Provide all necessary members and connections, whether indicated in the manufacturer's standard detail drawings or not.

2.03 ATTACHMENT SYSTEM

A. Concealed System: Provide manufacturer's standard stainless steel concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.04 FABRICATION

A. Panels: Provide factory fabricated panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

2.05 FINISHES

A. Fluoropolymer Coil Coating System: Manufacturer's standard multi-coat aluminum coil coating system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss to match sample.

2.06 ACCESSORIES

A. Accessories and Their Fasteners: Capable of resisting the specified design wind uplift forces and allowing for thermal movement of the roof panel system, not restricting free movement of the roof panel system resulting from thermal forces except at designed points of roof panel fixity.

B. Miscellaneous Sheet Metal Items: Provide flashings, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.

C. Rib and Ridge Closures: Provide prefabricated, close-fitting components of combination steel and closed-cell foam.

D. Sealants:

1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.

2. Concealed Sealant: Non-curing butyl sealant or tape sealant.

E. Ridges: Provide perforated "Z" closures at all ridge flashing.

F. Underlayment: Self-adhering rubber-modified asphalt sheet complying with ASTM D1970/D1970M; 22 mil total thickness; with strippable release film and woven polypropylene sheet top surface.

1. Sheet Thickness: 40 mil, 0.040 inch minimum total thickness.

2. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.

3. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.

4. Water Vapor Permeance: 0.1 perm, maximum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).

5. Manufacturers:

a. Henry Company; Blueskin PE200HT: www.henry.com/#sle.

b. System Components Corporation, Inc; FelTex SA300: www.systemcomponents.net/#sle.

G. Sheathing: See Section 061600 Sheathing

PART 3 EXECUTION

3.01 EXAMINATION

A. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.

B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.

C. Verify that shop drawings prepared by metal roof panel manufacturer have been approved and are available to installers; do not use drawings prepared by others for installation drawings.

D. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.

E. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.

F. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.

G. Verify that the substructure installation is in accordance with the approved shop drawings and roof panel manufacturer’s requirements, that the fasteners are correct for the substrate, and the substrate is installed to accommodate and support the appropriate clip spacing and attachment.

H. Verify that installed work of other trades that such work is complete to a point where the roofing system installation may commence.

I. Verify that roof openings, curbs, pipes, sleeves, ducts, vents, and other penetrations through roof substrate are complete and properly located.

J. Perform work using competent and properly equipped personnel.

K. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.

L. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Broom clean wood sheathing prior to installation of roofing system.

B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.

C. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.

D. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.

1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.

2. Locate and space all fasteners in accordance with roof panel manufacturer's recommendations. For required exposed fasteners, use proper torque settings to obtain controlled uniform compression for a positive seal without rupturing the sealing washers.

3. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.

B. Accessories: Install all components required for a complete roofing assembly, including flashings, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.

C. G.Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

D. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.

3.04 FIELD QUALITY CONTROL

A. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).

B. Perform all corrections necessary for issuance of warranty.

3.05 CLEANING

A. Repair panels having minor damage.

B. Remove panels damaged beyond repair and replace with new panels to match adjacent undamaged panels.

C. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.06 PROTECTION

A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.

B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

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END OF SECTION

SECTION 074623
WOOD SIDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board siding for Walls .

B. Trim, flashings, accessories, and fastenings.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Siding substrate.

B. 075323 - Ethylene-Propylene-Diene-Monomer Roofing (EPDM)

C. Section 076200 - Sheet Metal Flashing and Trim: Product requirements for metal flashings and trim associated with wood siding for placement by this section.

D. Section 079200 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

E. Section 099113 - Exterior Painting: Prime and finish painting.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating materials, component profiles, fastening methods, jointing details, sizes, surface texture, finishes, and accessories.

1. Physical characteristics of components shown on shop drawings.

2. Storage and handling requirements and recommendations.

3. Installation instructions and recommendations.

C. Shop Drawings: Indicate dimensions, layout, joints, construction details, support clips, and methods of anchorage.

D. Samples: Submit two samples 6 inch by 12 inch in size illustrating surface texture.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store in ventilated areas with constant minimum temperature of 60 degrees F and maximum relative humidity of 55 percent.

PART 2 PRODUCTS

2.01 SIDING

A. Rain Screen Boards: Flat, Ipe, clear grade, maximum moisture content of 10 percent.

1. Size: 5/4 inch thick, 6 inch high nominal board.

2. Profile: Rainscreen siding.

3. Surface Texture: Sanded.

4. Finish: Semi-transparent stain - See Section 099113 - Exterior Painting .

2.02 ACCESSORIES

A. Aluminum Siding "H" clip:

1. Manufacturers:

a. For use with furring:

1) Brazilian Wood Depot: www.bwdepot.com: Siding H Clip.

2) Advantage Lumber: www.advantagelumber.com: Deckwise Siding Fasteners

3) Timberland Holdiongs: www.ganahllumber.com: Iron Woods Vanish Clip #VRSC OB

b. For use without furring:

1) Timberland Holdiongs: www.ganahllumber.com: Iron Woods Vanish Clip #VRSC NB

2) Mataverde Preium Siding: www.mataverdedecking.com: Climate-Shield CS 2 Rain Screen Clip

B. Nails: Aluminum type; non-staining, of size and strength to securely and rigidly retain the clips.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrates are ready to receive work.

B. Verify that water-resistive barrier has been correctly and completely installed over substrate.

C. Do not begin until unacceptable conditions have been corrected.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

A. Install siding in accordance with manufacturer's instructions.

B. Fasten siding in place, level and plumb.

1. Install siding as rainscreen.

2. Install "H" clips per manufacturer's instructions.

C. Sand work smooth and prepare for site finishing.

3.03 TOLERANCES

A. Maximum Variation From Plumb and Level: 1/4 inch per 10 feet.

B. Maximum Offset From Joint Alignment: 1/16 inch.

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END OF SECTION

SECTION 075323
ETHYLENE-PROPYLENE-DIENE-MONOMER ROOFING (EPDM)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. EPDM membrane roofing system, including all components specified.

B. Disposal of demolition debris and construction waste is the responsibility of Contractor. Perform disposal in manner complying with all applicable federal, state, and local regulations.

C. Commencement of work by Contractor shall constitute acknowledgement by Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer. No modification of the Contract Sum will be made for failure to adequately examine the Contract Documents or the project conditions.

1.02 RELATED REQUIREMENTS

A. Section 076200 - Sheet Metal Flashing and Trim: Formed metal flashing and trim items associated with roofing.

B. Section 077100 - Roof Specialties: Manufactured copings, fascias, gravel stops, and other flashing-related items.

C. Section 077200 - Roof Accessories: Roof hatches, vents, and manufactured curbs.

1.03 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 for definition of terms related to roofing work not otherwise defined in the section.

B. LTTR: Long Term Thermal Resistance, as defined by CAN-ULC-S770.

1.04 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019.

B. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board 2020.

C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2017.

D. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2019.

E. ASTM D1079 - Standard Terminology Relating to Roofing and Waterproofing 2020.

F. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics 2016.

G. ASTM D1622/D1622M - Standard Test Method for Apparent Density of Rigid Cellular Plastics 2014.

H. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.

I. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane 2015.

J. ASTM D4811/D4811M - Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing 2016.

K. CAN-ULC-S770 - Standard Test Method Determination of L-Term Thermal Resistance Of Closed-Cell Thermal Insulating Foams 2015.

L. FM 4470 - Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction 2016.

M. FM DS 1-28 - Wind Design 2016.

N. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components 2016, with Editorial Revision (2020).

O. PS 1 - Structural Plywood 2009.

P. PS 20 - American Softwood Lumber Standard 2020.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: Before start of roofing work, Contractor shall hold a meeting to discuss the proper installation of materials and requirements to achieve the warranty.

1. Require attendance with all parties directly influencing the quality of roofing work or affected by the performance of roofing work.

2. Notify Architect well in advance of meeting.

1.06 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data:

1. Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system

type specified; include data for each product used in conjunction with roofing membrane.

C. Samples: Submit two (2) samples of each product to be used.

D. Shop Drawings: Provide:

1. The roof membrane manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains.

2. For tapered insulation, provide project-specific layout and dimensions for each board.

E. Specimen Warranty: Submit prior to starting work.

F. Installer Qualifications: Letter from manufacturer attesting that the roofing installer meets the specified qualifications.

G. Pre-Installation Notice: Copy to show that manufacturer's required Pre Installation Notice (PIN) has been accepted and approved by the manufacturer.

H. Executed Warranty.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: Roofing installer shall have the following:

1. Current approval, license, or authorization as applicator by the manufacturer.

2. At least five years experience in installing specified system.

3. Inspection by Manufacturer: Provide a final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer.

a. Technical representative shall not perform any sales functions.

b. Contractor shall complete any necessary repairs required for issuance of warranty.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.

B. Store materials clear of ground and moisture with weather protective covering.

C. Keep combustible materials away from ignition sources.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.

C. Warranty: Manufacturer Limited Warranty covering membrane, roof insulation, and other indicated components of the system, for the term indicated.

1. Limit of Liability: No dollar limitation.

2. Scope of Coverage: Repair leaks in the roofing system caused by:

a. Ordinary wear and tear of the elements.

b. Manufacturing defect.

c. Defective workmanship used to install these materials.

d. Damage due to winds up to 110 mph.

3. Not Covered:

a. Damage due to winds in excess of 110 mph.

b. Damage due hurricanes or tornadoes.

c. Hail.

d. Intentional damage.

e. Unintentional damage due to normal rooftop inspections, maintenance, or service.

1.10 RESTRICTED WORK PERIOD

A. Do not perform the roofing and related Work between December 1st and April 1st unless approved otherwise, in writing, by the Architect. During this period, clear the roof of materials, equipment, and debris. Maintain the roof in a watertight condition.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer - Roofing System: Firestone Building Products LLC, Carmel, IN: www.firestonebpco.com/#sle.

1. Roofing systems manufactured by others are acceptable provided the roofing system is completely equivalent in materials and warranty conditions and the manufacturer meets the following qualifications:

a. Specializing in manufacturing the roofing system to be provided.

b. Minimum ten years of experience manufacturing the roofing system to be provided.

c. Able to provide a no dollar limit, single source roof system warranty that is backed by corporate assets in excess of one billion dollars.

d. Roofing systems manufactured by the companies listed below are acceptable provided they are completely equivalent in materials and warranty conditions:

1) Carlisle Syntec Incorporated PO Box 7000 Carlisle PA 17013-0925.

B. Manufacturer of Insulation and Cover Boards: As approved by the roofing manufacturer.

C. Substitutions: See Section 016000 - Product Requirements.

1. Submit evidence that the proposed substitution complies with the specified requirements.

2.02 ROOFING SYSTEM DESCRIPTION

A. Roofing System: Ethylene-propylene-diene-monomer (EPDM) single-ply membrane.

1. Membrane Attachment: Fully adhered.

2. Warranty: Full system warranty; Firestone 20 year Red Shield Limited Warranty covering membrane, roof insulation , and membrane accessories.

3. Slope: Different roof levels have different structural/insulation configurations. See the Roof Plan for which is where:

a. Deck is sloped, provide constant thickness of insulation with crickets by means of tapered insulation.

4. Comply with applicable local building code requirements.

B. Roofing System Components: Listed in order from the top of the roof down:

1. Membrane: Thickness as specified.

2. Insulation Cover Board: High density polyisocyanurate; cold adhesive attached

3. Insulation:

a. Maximum Board Thickness: 3 inches; use as many layers as necessary; stagger joints in adjacent layers.

b. Minimum Thickness: As required to maintain a MINIMUM R-38 throughout entire roof surface.

c. Top Layer: Polyisocyanurate foam board, non-composite; cold adhesive attached.

d. Bottom Layer: Polyisocyanurate foam board, non-composite; cold adhesive attached.

4. Vapor Retarder: Polyethylene Film, adhered.

2.03 EPDM MEMBRANE MATERIALS

A. Roofing and Flashing Membrane: Black, cured synthetic single-ply membrane composed of ethylene propylene diene monomer (EPDM) with the following properties:

1. Reinforcement: None; membrane complying with ASTM D4637/D4637M Type I.

2. Thickness: 0.060 inch.

3. Nominal Thickness Tolerance: Plus/minus 10 percent.

4. Acceptable Product: RubberGard Non-Reinforced EPDM Membrane by Firestone.

B. Flashing Membrane: Self-curing, non-reinforced membrane composed of nonvulcanized EPDM rubber, complying with ASTM D4811/D4811M Type II, and with the following properties:

1. Thickness: 0.055 inch.

2. Acceptable Product: RubberGard EPDM FormFlash by Firestone.

C. Self-Adhesive Flashing Membrane: Semi-cured 45 mil EPDM membrane laminated to 35 mil EPDM tape adhesive; QuickSeam Flashing by Firestone.

D. Pre-Molded Pipe Flashings: EPDM, molded for quick adaptation to different sized pipes; Firestone EPDM Pipe Flashing.

E. Self-Adhesive Lap Splice Tape: 35 mil EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer; QuickSeam Splice Tape by Firestone.

F. Splice Adhesive: Synthetic polymer-based, formulated for compatibility with EPDM membrane and metal surfaces; SA-1065 Splice Adhesive by Firestone.

G. Bonding Adhesive: Neoprene-based, formulated for compatibility with EPDM membrane and wide variety of substrate materials, including masonry, wood, and insulation facings; Bonding Adhesive BA-2004 by Firestone.

H. Adhesive Primer: Synthetic rubber based primer formulated for compatibility with EPDM membrane and tape adhesive, with VOC content less than 2.1 lb/gal; QuickPrime Plus LVOC by Firestone.

I. Seam Edge Treatment: EPDM rubber-based sealant, formulated for sealing exposed edges of membrane at seams; Lap Sealant HS by Firestone.

J. Pourable Sealer: Two-part polyurethane, two-color for reliable mixing; Pourable Sealer by Firestone.

K. Water Block Seal: Butyl rubber sealant for use between two surfaces, not exposed; Water Block Seal by Firestone.

L. Metal Plates and Strips Used for Fastening Membrane and Insulation: Steel with Galvalume coating; corrosion-resistance meeting FM 4470 criteria.

M. Termination Bars: Aluminum bars with integral caulk ledge; 1.3 inches wide by 0.10 inch thick; Firestone Termination Bar by Firestone.

2.04 VAPOR RETARDER MATERIALS

A. Polyethylene Film: ASTM D 4397, 6 mils (0.15 mm) thick, minimum, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).

1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2. Adhesive: Manufacturer's standard adhesive, FM Approvals approved for vapor-retarder application.

2.05 ROOF INSULATION AND COVER BOARDS

A. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with ASTM C1289 Type II Class 1, with the following additional characteristics:

1. Thickness: As indicated below.

2. Size: 48 inches by 96 inches, nominal.

3. R-value (LTTR):

a. 38.0 minimum at all areas.

4. Compressive Strength: 20 psi when tested in accordance with ASTM C1289.

5. UL-Classified and FM-approved for direct to steel deck applications.

6. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.

7. Acceptable Product: ISO 95+ GL Polyisocyanurate Insulation by Firestone.

B. High Density Polyisocyanurate Cover Board: Non-combustible, water resistant, high density closed cell polyisocyanurate core with coated glass mat facers, with the following characteristics:

1. Size: 48 inches by 96 inches, nominal.

a. Exception: Board to be attached using adhesive or asphalt may be no larger than 48 inches by 48 inches, nominal.

2. Thickness: 1/2 inch.

3. Thermal Value: R-value of 2.5, when tested in accordance with ASTM C518 and ASTM C177.

4. Surface Water Absorption: 3 percent, maximum, when tested in accordance with ASTM C209.

5. Compressive Strength: 120 psi, when tested in accordance with ASTM D1621.

6. Density: 5 pcf, when tested in accordance with ASTM D1622/D1622M.

7. Factory Mutual approved for use with FM 1-60 and 1-90 rated roofing assemblies.

8. Mold Growth Resistance: Passing ASTM D3273.

9. Acceptable Product: ISOGARD HD Cover Board by Firestone.

C. Adhesive for Insulation Attachment: Type as required by roof membrane manufacturer for roofing system and warranty to be provided; use only adhesives furnished by roof membrane manufacturer.

2.06 ACCESSORY MATERIALS

A. Wood Nailers: PS 20 dimension lumber, Structural Grade No. 2 or better Southern Pine, Douglas Fir; or PS 1, APA Exterior Grade plywood; pressure preservative treated.

1. Width: 3-1/2 inches, nominal minimum, or as wide as the nailing flange of the roof accessory to be attached to it.

2. Thickness: Same as thickness of roof insulation.

PART 3 INSTALLATION

3.01 GENERAL

A. Install roofing, insulation, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.

B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.

C. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.

D. Perform work using competent and properly equipped personnel.

E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight

condition.

F. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 degrees F.

G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.

1. Protect from spills and overspray from bitumen, adhesives, sealants and coatings.

2. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.

3. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.

H. Until ready for use, keep materials in their original containers as labeled by the manufacturer.

I. Consult membrane manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

3.02 EXAMINATION

A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.

B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.

C. Examine roof substrate to verify that it is properly sloped to drains.

D. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.

E. Verify that wood nailers have been properly installed.

3.03 PREPARATION

A. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.

B. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease and other materials that

may damage the membrane.

C. Fill all surface voids in the immediate substrate that are greater than 1/4 inch wide with fill material acceptable insulation to membrane manufacturer.

D. Seal, grout, or tape deck joints, where needed, to prevent bitumen seepage into building.

E. Wood Nailers: Provide wood nailers at all perimeters and other locations where indicated on the drawings, of total height matching the total thickness of insulation being used.

3.04 VAPOR RETARDER

A. Before installing insulation install vapor retarder directly over the deck.

B. Ensure that all penetrations and edge conditions are sealed to prevent moisture and air drive into the roofing system.

3.05 INSULATION AND COVER BOARD INSTALLATION

A. Install insulation in configuration and with attachment method(s) specified in PART 2, under Roofing System.

B. Install insulation in a manner that will not compromise the vapor retarder integrity.

C. Install only as much insulation as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.

D. Lay roof insulation in courses parallel to roof edges.

E. Neatly and tightly fit insulation to all penetrations, projections, and nailers, with gaps not greater than 1/4 inch. Fill gaps greater than 1/4 inch with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch.

F. Cold Adhesive Attachment: Apply in accordance with membrane manufacturer's instructions and recommendations; "walk-in" individual roof insulation boards to obtain maximum adhesive contact.

3.06 SINGLE-PLY MEMBRANE INSTALLATION

A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.

B. Lay out the membrane pieces so that field and flashing splices are installed to shed water.

C. Install membrane without wrinkles and without gaps or fishmouths in seams; bond and test seams and laps in accordance with membrane manufacturer's instructions and details.

D. Install membrane adhered to the substrate, with edge securement as specified.

E. Adhered Membrane: Bond membrane sheet to substrate using membrane manufacturer's recommended bonding material, application rate, and procedures.

F. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.

1. Exceptions: Round pipe penetrations less than 18 inches in diameter and square penetrations less than 4 inches square.

2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.

3.07 FLASHING AND ACCESSORIES INSTALLATION

A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane manufacturer's recommendations and details.

B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.

1. Follow roofing manufacturer's instructions.

2. Remove protective plastic surface film immediately before installation.

3. Install water block sealant under the membrane anchorage leg.

4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.

5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.

6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.

7. When the roof slope is greater than 1:12, apply seam edge treatment along the back edge of the flashing.

C. Scuppers: Set in sealant and secure to structure; flash as recommended by manufacturer.

D. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Install weathertight flashing at all walls, curbs, parapets, curbs, skylights, and other vertical and sloped surfaces that the roofing membrane abuts to; extend flashing at least 8 inches high above membrane surface.

1. Use the longest practical flashing pieces.

2. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane manufacturer's recommendations.

3. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.

4. Provide termination directly to the vertical substrate as shown on roof drawings.

3.08 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).

C. Perform all corrections necessary for issuance of warranty.

3.09 CLEANING

A. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.

B. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.

C. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

3.10 PROTECTION

A. Where construction traffic must continue over finished roof membrane, provide durable protection and replace or repair damaged roofing to original condition.

END OF SECTION

SECTION 076200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, sheet metal roofing, exterior penetrations, and other items indicated in Schedule.

B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

A. Section 042001 - Masonry Veneer: Metal flashings embedded in masonry.

B. Section 061000 - Rough Carpentry: Wood blocking for batten seams.

C. Section 061000 - Rough Carpentry: Field fabricated roof curbs.

D. Section 074113 - Metal Roof Panels: Roofing system.

E. Section 075323 Ethylene-Porpylene-diene-monomer Roofing (EPDM)

F. Section 077100 - Roof Specialties: Manufactured copings, flashings, and expansion joint covers.

G. Section 077123 - Manufactured Gutters and Downspouts.

H. Section 077200 - Roof Accessories: Manufactured metal roof curbs.

I. Section 079005 - Joint Sealers: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.

C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.

D. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017.

E. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing 2015a.

F. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free 2007 (Reapproved 2018).

G. CDA A4050 - Copper in Architecture - Handbook current edition.

H. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit two samples, 6 inch in size, to indicate each metal finish color from manufacturer's full line of standard colors.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Maintain one copy of each document on site.

C. Fabricator andInstaller Qualifications: Company specializing in sheet metal work with 5 years ofdocumented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Aluminum: ASTM B209 (ASTM B209M); 0.050 inch thick; anodized finish of color as selected.

1. Clear Anodized Finish: AAMA 611 AA-M12C22A41 Class I clear anodic coating not less than 0.7 mils thick.

2. Color Anodized Finish: AAMA 611 AA-M12C22A42/44 Class I integrally or electrolytically colored anodic coating not less than 0.7 mils thick.

3. See Section 077100 Roof Specialties for additional information.

B. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 0.050 inch thick; plain finish shop pre-coated with fluoropolymer coating.

1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.

2. Color: As selected by Architect from manufacturer's full colors.

3. See Section 077100 Roof Specialties for additional information.

2.02 ACCESSORIES

A. Fasteners: As determined by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

2.03 FABRICATION

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

B. Shop fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Tin edges of copper sheet to be soldered as indicated on the Drawings. Solder shop formed metal joints. After soldering, remove flux. Wipe and wash solder joints clean. Weather seal joints.

G. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

H. Fabricate vertical faces with bottom edge formed outward 3/4" or as otherwise indicated ont he Drawings and hemmed to form drip.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Seams: Fabricate nonmoving seams in sheet metal with flat lock seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.

B. Expansion Provisions: Where lapped or bayonet type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

C. Comply with drawing details.

D. Insert flashings into reglets to form tight fit; secure in place with lead wedges; pack remaining spaces with lead wool; seal flashings into reglets with sealant.

E. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..

F. Apply plastic cement compound between metal flashings and felt flashings.

G. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

H. Sealant Joints: Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.05 SCHEDULE

A. Flashing material types are as indicated on the Drawings

END OF SECTION

SECTION 077100
ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured roof specialties, including copings, gravel stops, and pipe flashings.

1.02 RELATED REQUIREMENTS

A. Section 075323 - Ethylene-Propylene-Diene-Monomer Roofing (EPDM)

B. Section 076200 - Sheet Metal Flashing and Trim

C. Section 077200 - Roof Accessories: Manufactured curbs, roof hatches, and snow guards.

1.03 REFERENCE STANDARDS

A. NRCA (RM) - The NRCA Roofing Manual 2019.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all products detailing shape of components, materials and finishes, anchor types and locations.

C. Samples:

1. Provide a full set of manufacturer colors of actual material samples for Architect selection for all roof edge flashing and coping.

2. Provide actual material color samples of soffit vents in manufacturer's full line of standard colors and finishes.

D. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Roof Edge Flashings and Copings:

1. Architectural Products Co: www.archprod.com.

2. Englert: www.emglertinc.com

B. Soffit Vents:

1. Width: 2 1/2" to 2 3/4"
2. Manufacturers
    a. GAF; Product "LSV8 Series Continuous Soffit Vents": www.gaf.com.
    b. Air Vent, Inc.; Product "Continuous Soffit Vent": www.airvent.com.
3. Substitutions: See Section 016000 - Product Requirements.
4. Material: Aluminum.
5. Ventilation: 9 square inches per foot, minimum.

C. Roof to Wall Ventilation System:
1. PAC-Clad; SS Ridge Vent - Slope to High Wall:
2. DCI Products; Product "SmartVent": www.dciproducts.com.
3. Substitutions: See Section 016000 - Product Requirements.
    a. Material: Aluminum.
    b. Thickness: 0.050.
    c. End Cap: Manufacturer's standard end cap.
    d. Color & Finish: As selected by the Architeect from the manufacturer's standard colors.

D. Ridge Vent:
1. Manufacturers:
    a. GAF; Snow Country Advanced rigid ridge vent: www.gaf.com.
    b. Air Vent, Inc; Shinglevent II Class A: www.airvent.com
2. Substitutions: See Section 016000 - Product Requirements.
3. Ventilation: 16 square inches per foot, minimum.

2.02 COMPONENTS

A. Pipe and Penetration Flashing: Base of rounded aluminum, compatible with sheet metal roof systems, and capable of accomodating pipes sized between 3/8 inch and 12 inch.
1. Caps: EPDM.
2. Color: As indicated on drawings.

B. Soffit Vents: Louvered, linear type; aluminum, hat-channel shape, 0.019 inch thick, 2 inches wide, color coated. Fabricate with 9 sq in per linear foot minimum free area of ventilation.

1. Texture: Smooth.

2. Color: To be selected by Architect from manufacturer's full range.

C. Shed Roof Ventilation System: Tapered, under-shingle attic intake vent; rigid corrugated plastic; 36" long x 10 1/2" wide x 3/4" tapered to 1/8". Fabricate with 9 sq in per linear foot minimum free area of ventilation.

2.03 FINISHES

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Coordinate installation of flashing flanges into reglets.

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SECTION 077123
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-finished aluminum gutters and downspouts.

B. Downspout Boots.

C. Accessories

D. See Part 2 "Performance Criteria" for specific work performance criteria required for this contract as part of the Work of this section.

1.02 RELATED REQUIREMENTS

A. Section 074113 - Metal Roof Panels

B. Section 076200 - Sheet Metal Flashing and Trim.

1.03 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.

B. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Conform to SMACNA Architectural Sheet Metal Manual for sizing components for rainfall intensity determined by a storm occurrence of 1 in 100 years.

B. Conform to 2015 New York State Building Code for size and method of rain water discharge.

C. Maintain one copy of each document on site.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on prefabricated components.

C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

D. Samples: Submit one sample, six inch long illustrating component design, finish, color, and configuration.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Pursuant to manufacturer's published instructions.

B. Protect against moisture exposure and damage.

C. Store all delivered products in a clean, dry location prior to installation.

D. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.

E. Prevent contact with materials that could cause discoloration, staining, or damage.

F. Products furnished with strippable protective plastic film should have film removed prior to installation. Such film coated products shall not be exposed to sunlight for more than thirty (30) minutes without removing film.

G. Use diligent care to avoid damage, scars and abrasions to product when handling.

PART 2 PRODUCTS

2.01 PERFORMANCE CRITERIA

A. Perform all work of this section with experienced workmen familiar with the work and according to manufacturer's recommendations and industry standards.

B. Installer shall be responsible for installing gutter system in accordance with manufacturer's printed instructions. Follow primary roofing material manufacturer's printed instructions for installation of joining eave trims.

2.02 MANUFACTURERS

A. Gutters and Downspouts:

1. SAF Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc.; Designer Series Commercial Formed Gutters: www.saf.com/persys.

a. Profile: As indicated on the Drawings.

2. Substitutions: See Section 016000 - Product Requirements.

2.03 MATERIALS

A. Pre-Finished Aluminum Sheet: ASTM B209 (ASTM B209M); 0.040 inch thick.

1. Finish: Plain, two coat, shop applied 70% Kynar Finish System coating.

2. Color: As selected from manufacturer's standard colors.

B. Protective Backing Paint: Zinc molybdate alkyd.

2.04 COMPONENTS

A. Gutters: Profile as indicated.

1. Liner: Aluminum sheet; manufactured in 10’-0” lengths; tapered and notched to provide a one inch telescoping lap joint; prepunched at 12 inches o.c.; provide for thermal movement after installation; provided with alternating bracket slots to interconnect associated brackets.

2. Snap-Over Fascia: Pre-finished aluminum sheet; press formed in 10’-0” lengths with true and repeated shapes. Provide 6" concealed splice plates at fascia joints with finish to match fascia.

a. Fascia Splices: Aluminum sheet; 6 inch lengths, formed to fit the inside of the snap-on fascia.

3. Provide factory mitered corners for both fascia and liner.

4. Provide factory mitered sculptured end caps for fascias.

5. Provide indicated profile cornice returns at gutter terminations.

B. Downspouts: Profile as indicated.

C. Anchors and Supports: Profiled to suit gutters and downspouts.

1. Anchoring Devices, including support brackets, keeper brackets, and interior straps: Type recommended by fabricator for installation at 30 inches o.c.

2. Gutter Supports: Brackets; 1/8 inch by 1 inch extruded aluminum bar, designed to provide a resistance lock fit for the snap-over fascia.

3. Downspout Supports: Brackets.

D. Fasteners: Stainless steel .

2.05 ACCESSORIES

A. Furnish and installall required accessories as required to provide a complete system as detailed on contract drawings. Use manufacturer's standard or custom accessories.

B. Downspout Boots: Cast aluminum.

1. Manufacturer: Barry Pattern & Foundry; www.barrycraft.com.

2. Model No.: B25A.

C. Leaf and Debris Gutter Protection System: Polypropylene; UV stabilized; provide at all gutters.

1. Manufacturer: Raindrop Gutter Guard Systems; www.raindropgutterguard.com.

2. Model No.: "Gutter Guard" #RF75.

a. Miter Corners: On gutter system corners, use the 1" individual miter; product #M008

D. Liner Expansion Joints: Manufacturer's standard elastomeric; provide every 40', min.

2.06 FABRICATION

A. Form gutters and downspouts of profiles and size indicated.

B. Fabricate with required connection pieces.

C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; seal watertight.

2.07 FINISHES

A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that surfaces are ready to receive work.

3.02 PREPARATION

A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions and as follows:

1. Support Bracket Installation: Install support backets at 30" on center and allow a maximum 1/2 inch per 40 foot slope. Attach brackets with #10d x 2” stainless steel wood screws.

2. Liner Installation: Install liner from left to right (roofside) into support brackets. Lap each telescoping section a distance of 1" seal rivet at 2" O.C. Nail rear of liner with 1-1/2" aluminum or stainless steel nails.

3. Fascia Installation: Position Snapover Fascia on liner assembly. Insert inside straps (alternating with support brackets) with hook portion of strap positioned to lock Snap-over Fascia. Strap shall be hooked into slotted holes at leading edge of liner and riveted at its rear side.

4. Install manufacturer's welded miters at corners.

5. Install manufacturer's end caps at all end terminations.

6. Outlets: Field cut outlet holes for downspouts in a neat workmanlike manner. Locate holes one inch from backside of gutter. Field cut Snap-over Fascia to accommodate downspouts.

B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.

C. Slope gutters 1/8 inch per foot, one percent minimum.

D. Connect downspouts to downspout boots at 18 inches above grade. Seal connection watertight.

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END OF SECTION

SECTION 077200
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured curbs, equipment rails, and pedestals.

B. Roof penetrations mounting curbs.

C. Non-penetrating pedestals.

D. Snow guards.

1.02 RELATED REQUIREMENTS

A. Section 074113 - Metal Roof Panels.

B. Section 076200 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

C. Section 077100 - Roof Specialties: Other manufactured roof items.

D. Section 077123 - Manufactured Gutters and Downspouts.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

C. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

4. Maintenance requirements.

C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

D. Warranty Documentation:

1. Submit manufacturer warranty.

2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

3. Submit documentation that roof accessories are acceptable to roofing manufacturer, and do not limit the roofing warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

1.06 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOF CURBS

A. Manufacturers:

1. AES Industries Inc: www.aescurb.com.

2. The Pate Company: www.patecurbs.com.

3. Roof Products & Systems (RPS): www.rpscurbs.com.

4. Substitutions: See Section 016000 - Product Requirements.

5. See division 23 specification sections for products specifications.

2.02 NON-PENETRATING ROOFTOP SUPPORTS/ASSEMBLIES

1. PHP Systems/Design: www.phpsd.com.

B. Non-Penetrating Rooftop Support/Assemblies: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, and not requiring any attachment to roof structure and not penetrating roofing assembly.

1. Design Loadings and Configurations: As required by applicable codes.

2. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.

3. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.

4. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.

C. Pipe Supports: Provide attachment fixtures complying with MSS SP-58 and as indicated.

1. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.

2. See relevant piping system specification section for additional requirements.

D. Duct Supports: Provide extruded aluminum supports and sized in accordance with diameter of supported ducts, and with base that is non-penetrating of roofing membrane.

2.03 SNOW GUARDS

A. Fence Type Snow Guard: Continuous snow guard; tubing set in clamps.

1. Pipe or Square Tube: Stainless steel.

a. Outside Diameter, Round: 3/8 inch.

b. Couplings: As recommended by manufacturer.

c. End Collars and Caps: Metal to match tube.

B. Clamps for Standing Seam Roof: Stainless steel clamps attached to standing seams of roof panels; for attachment of fence type snow guard.

C. Manufacturers:

1. Alpine Snow Guards; ASG4025 - mini snow guard system: www.alpinesnowguards.com.

2. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 CLEANING

A. Clean installed work to like-new condition.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 077600
ROOF PAVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof pavers.

1.02 RELATED REQUIREMENTS

A. Section 075323 - Ethylene-Propylene-Diene-Monomer Roofing (EPDM)

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data indicating paver and pedestal materials.

C. Shop Drawings: Submit shop drawings that indicate paver and pedestal layout, including overall plan and detail drawings of system components.

D. Samples of Pavers: Submit two samples for each type, color and texture indicated.

E. Manufacturer's Installation Instructions: Indicate substrate precautions, special procedures, and perimeter conditions requiring special attention.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Warranty Documentation:

1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

2. Submit installer's certification that installation complies with warranty conditions for roof paver system.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with at least three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.

B. Store materials at least 4 inches above ground in dry location, and covered with polyethylene sheet to protect from contact with materials that may cause staining or discoloration.

1.08 FIELD CONDITIONS

A. Do not install roof paver components during cold or wet weather conditions.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Material Warranty: Provide roof paver manufacturer's warranty to replace material that shows manufacturing defects within ten years after Date of Substantial Completion.

C. Installation Warranty: Installer of roof paver system to provide warranty that includes coverage for defects of labor and/or workmanship within three years after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOF PAVERS

A. Precast Concrete Roof Pavers: Precast concrete tiles, with texture and color as indicated; supported by adjustable pedestal system.

1. Comply with local wind load resistance requirements of ASCE 7.

2. Texture and Color: As selected by Architect from manufacturer's standard line.

3. Length and Width: 18 by 24 inches, nominal.

4. Thickness: 2 inches, nominal.

5. Weight: 24 psf, nominal.

6. Pedestals: High impact components to level and adjust height of pavers. Provide all accessories for spacing, leveling, and shimming the pavers as required for a complete

system.

7. Manufacturers:

   a. Hanover Architectural Products; Prest Pavers: www.hanoverpavers.com.

   b. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive this work.

B. Verify substrate is supported and secure.

C. Verify substrate is clean and smooth, dry and free of snow or ice, flat without depressions, waves or projections, properly sloped and suitable for installation of roof paver system.

D. Verify system elevations, required pedestal heights, and substrate dimensions.

3.02 PREPARATION

A. Use of pedestal system is for pedestrian traffic only and each side of deck system must be restrained containing decking panels with perimeter blocking or walls; movement of decking panels laterally is not permitted.

B. Membrane waterproofing and protection board surfaces used to support pedestals to be broom clean, free of frost, dirt, oil or any rough foreign matter that may impair substrate material manufacturer's warranty requirements.

C. Provide substrate for pedestals with slope and positive drainage in accordance with applicable building codes.

D. Substrate surface that will support paver and pedestal system must be structurally capable of carrying dead and live loads anticipated.

3.03 INSTALLATION

A. Perform work in accordance with manufacturer's written installation instructions and applicable requirements in coordination with project attributes, paver type being installed, pattern, grid layout, starting point, and finished elevation as indicated on approved shop drawings.

B. Install pavers on pedestals in accordance with manufacturer's instructions.

   1. Fully support edges; shim and adjust pavers to provide level surface.

   2. Provide approximately 1/8 inch space between pavers to permit surface water drainage.

3.04 CLEANING

A. See Section 017419 - Construction Waste Management and Disposal for additional requirements.

B. Remove markings from finished surfaces, or replace defaced components of roof pavers system if markings cannot be removed.

C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.

D. Repair or replace defaced or damaged finishes caused by work of this section.

3.05 PROTECTION

A. Protect installed roof pavers from construction operations.

B. Where traffic must continue over finished roof pavers, protect surfaces using durable materials.

END OF SECTION

SECTION 078123
INTUMESCENT FIRE PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Thin-film intumescent fire protection.

B. Compressible-rod intumescent fire protection.

1.02 RELATED REQUIREMENTS

A. Section 051200 - Structural Steel Framing.

B. Section 052100 - Steel Joist Framing.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.

B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness 2015, with Editorial Revision (2017).

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

D. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2019.

E. SSPC-PA 2 - Procedure For Determining Conformance To Dry Coating Thickness Requirements 2015, with Editorial Revision (2018).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittals procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Performance characteristics and test results.

2. Preparation instructions and recommendations.

3. Storage and handling requirements and recommendations.

4. Installation methods.

C. Certificates: Certify that intumescent fireproofing provided for this project meets or exceeds specified requirements in all respects.

D. Test Reports: Published fire resistive designs for structural elements of the types required for the project, indicating hourly ratings of each assembly.

E. Field Quality Control Submittals: Submit field test report.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company that specializes in manufacturing the type of products specified, with minimum of 5 years of documented experience.

B. Installer Qualifications: Approved, certified, or supervised by manufacturer of intumescent fireproofing.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer’s original, unopened containers with identification labels and testing agency markings intact and legible.

B. Store products in manufacturer's unopened packaging until ready for installation.

1. Store at temperatures not less than 50 degrees F in dry, protected area.

2. Protect from freezing, and do not store in direct sunlight.

3. Dispose of any materials that have come into contact with contaminants of any kind prior to application.

C. Dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 FIELD CONDITIONS

A. Protect areas of application from windblown dust and rain.

B. Maintain ambient field conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under ambient conditions outside manufacturer's absolute limits.

1. Provide temporary enclosures as required to control ambient conditions.

2. Do not apply intumescent fireproofing when ambient temperatures are below 50 degrees F without specific approval from manufacturer.

3. Maintain relative humidity below 85% percent in areas of application.

4. Maintain ventilation in enclosed spaces during application and for not less than 72 hours afterward.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fire Resistive Coating System: Thin-film intumescent fire protection system for structural steel, gypsum board, wood, oriented strand board (OSB), concrete, and concrete masonry units (CMU).

1. Surface Burning Characteristics: Tested in accordance with ASTM E84.

a. Flame Spread Index (FSI): 0, maximum.

b. Smoke Developed Index (SDI): 20, maximum.

2. For Interior Use:

a. Use only water-based products.

b. VOC Content: Less than 500 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).

c. Durometer Hardness, Type D: 65, minimum, in accordance with ASTM D2240.

d. Basis of Design: Isolatek CAFCO SprayFilm WB 3.

e. Substitutions: See Section 016000 - Product Requirements.

B. Fire Resistive Compressible-Rod System: Compressible intumescent fire protection system for structural steel, gypsum board, wood, oriented strand board (OSB), concrete, and concrete masonry units (CMU).

C. Sealers and Primer: As required by tested and listed assemblies, and recommended by fireproofing manufacturer to suit specific substrate conditions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates to determine if they are in satisfactory condition to receive intumescent fire protection; verify that substrates are clean and free of oil, grease, incompatible primers, or other foreign substances capable of impairing bond to fireproofing system.

B. Do not begin installation until substrates have been properly prepared.

C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 APPLICATION

A. Comply with manufacturer's instructions for each particular intumescent fire protection system installation application as indicated.

B. Apply manufacturer’s recommended primer to required coating thickness.

C. Apply fireproofing to full thickness over entire area of each substrate to be protected.

D. Apply coats at manufacturer’s recommended rate to achieve dry film thickness (DFT) as required for fire resistance ratings designated for each condition.

E. Apply intumescent fire protection by spraying to maximum extent possible, and as necessary complete coverage by roller application or other method acceptable to manufacturer.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 014000 - Quality Requirements.

1. Arrange for testing of installed intumescent fire protection by an independent testing laboratory using magnetic pull-off dry film thickness gage in accordance with SSPC-PA 2, and ensure it meets requirements of authorities having jurisdiction (AHJ).

2. Submit field test reports promptly to Contractor and Architect.

B. Repair or replace intumescent fire protection at locations where test results indicate fireproofing does not meet specified requirements.

3.04 CLEANING

A. Immediately after installation of fireproofing in each area, remove overspray and fallout from other surfaces and clean soiled areas.

3.05 PROTECTION

A. Protect installed intumescent fire protection from damage due to subsequent construction activities, so fireproofing is without damage or deterioration before Date of Substantial Completion.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 078400
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping of joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

A. Section 017000 - Execution and Closeout Requirements: Cutting and patching.

B. Section 070553 - Fire and Smoke Assembly Identification.

C. Section 078123 - Intumescent Fire Protection

D. Section 092116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS

A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2019.

B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).

C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems 2015 (Reapproved 2019).

D. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestops 2019.

E. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers 2010a (Reapproved 2015).

F. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus 2020.

G. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies 2013 (Reapproved 2017).

H. FM 4991 - Approval Standard for Firestop Contractors 2013.

I. UL 1479 - Standard for Fire Tests of Penetration Firestops Current Edition, Including All Revisions.

J. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems Current Edition, Including All Revisions.

K. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Installer Qualification: Submit qualification statements for installing mechanics.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section and:

1. Trained by manufacturer.

2. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:

3. Verification of minimum three years documented experience installing work of this type.

4. Verification of at least five satisfactorily completed projects of comparable size and type.

5. Licensed by local authorities having jurisdiction (AHJ).

1.06 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Manufacturers:

1. 3M Fire Protection Products: www.3m.com/firestop.

2. Hilti, Inc: www.us.hilti.com/#sle.

3. Specified Technologies Inc;: www.stifirestop.com/#sle.

B. Firestopping Materials: Any materials meeting requirements.

C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

D. Fire Ratings: Refer to drawings for required systems and ratings.

2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.

B. Head-of-Wall Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.

C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.

D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

2.03 FIRESTOPPING FOR FLOOR-TO-FLOOR, WALL-TO-FLOOR, AND WALL-TO-WALL JOINTS

A. Concrete and Concrete Masonry Walls and Floors:

1. Top of Wall Joints at Concrete/Concrete Masonry Wall to Concrete Over Metal Deck Floor:

a. 3 Hour Construction: UL System HW-D-0139; Specified Technologies Inc. AS200 Elastomeric Spray.

2. Top of Wall Joints at Concrete/Concrete Masonry Wall to Concrete Floor:

a. 3 Hour Construction: UL System HW-D-1058; Hilti CFS-SP WB Firestop Joint Spray and CP 672.

3. Concrete/Concrete Masonry Wall to Wall Joint Systems That Have Movement Capabilities (Dynamic):

a. 3 Hour Construction: UL System WW-D-1001; Specified Technologies Inc. SIL silicone sealant.

B. Gypsum Board Walls:

1. Wall to Wall Joints That Have Movement Capabilities (Dynamic):

a. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.

2. Top of Wall Joints at Underside of Steel Beam and Concrete Over Metal Deck Floor with Sprayed On Fireproofing:

a. 1 Hour Construction: UL System HW-D-0259; Hilti CFS-SP WB Firestop Joint Spray and CP 672.

3. Top of Wall Joints at Concrete Over Metal Deck, Wall Parallel to Ribs:

a. 1 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.

4. Top of Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Cut to Fit Ribs:

a. 1 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.

2.04 FIRESTOPPING FOR FLOOR-TO-WALL JOINTS

A. Floor-To-Wall Joint System That Have Movement Capabilities (Dynamic):

1. 3 Hour Construction: UL System FW-D-1001; Specified Technologies Inc. SIL silicone sealant.

2.05 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

A. Blank Openings:

1. In Floors or Walls:

a. 3 Hour Construction: UL System C-AJ-0061; Specified Technologies Inc. SSB Intumescent Firestop pillows.

b. 3 Hour Construction: UL System C-AJ-0113; Specified Technologies Inc. Composite Sheet.

B. Penetrations Through Floors or Walls By:

1. Multiple Penetrations in Large Openings:

a. 3 Hour Construction: UL System C-AJ-8181; Specified Technologies Inc. Composite Sheet.

b. 3 Hour Construction: UL System C-AJ-8099; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2. Uninsulated Metallic Pipe, Conduit, and Tubing:

a. 3 Hour Construction: UL System C-AJ-1226; Hilti FS-ONE MAX Intumescent Firestop Sealant.

3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:

a. 3 Hour Construction: UL System C-AJ-2109; Hilti CP 643N/644 Firestop Collar.

4. Electrical Cables Not In Conduit:

a. 3 Hour Construction: UL System C-AJ-3312; Specified Technologies Inc. FP Intumescent Firestop Plug.

5. Insulated Pipes:

a. 3 Hour Construction: UL System C-AJ-5090; Hilti FS-ONE MAX Intumescent Firestop Sealant.

6. HVAC Ducts, Uninsulated, No Fire Dampers:

a. 3 Hour Construction: UL System C-AJ-7051; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.06 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

A. Blank Openings:

1. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.

B. Penetrations By:

1. Multiple Penetrations in Large Openings:

a. 1 Hour Construction: UL System W-L-8079; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2. Uninsulated Metallic Pipe, Conduit, and Tubing:

a. 1 Hour Construction: UL System W-L-1164; Hilti FS-ONE MAX Intumescent Firestop Sealant.

3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:

a. 1 Hour Construction: UL System W-L-2128; Hilti FS-ONE MAX Intumescent Firestop Sealant.

4. Electrical Cables Not In Conduit:

a. 1 Hour Construction: UL System W-L-3065; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.

5. Cable Trays with Electrical Cables:

a. 1 Hour Construction: UL System W-L-4011; Hilti CFS-BL Firestop Block.

b. 1 Hour Construction: UL System W-L-4060; Hilti FS-ONE MAX Intumescent Firestop Sealant.

6. Insulated Pipes:

a. 1 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.

b. 1 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Install self-adhering, plastic firestop system labeling required by code within 2 inches of the firestop system. Include UL System and hourly rating on label.

3.04 FIELD QUALITY CONTROL

A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174, and ASTM E2393.

B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

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END OF SECTION

SECTION 079200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

D. Owner-provided field quality control.

1.02 RELATED REQUIREMENTS

A. Section 072500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.

B. Section 078400 - Firestopping: Firestopping sealants.

C. Section 088000 - Glazing: Glazing sealants and accessories.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015.

B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants 2018.

C. ASTM C834 - Standard Specification for Latex Sealants 2017.

D. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications 2018.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

F. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems 2016.

G. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.

H. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants 2018.

I. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants 2018.

J. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints 2019 (Reapproved 2020).

K. SCAQMD 1168 - Adhesive and Sealant Applications 1989 (Amended 2017).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.

2. List of backing materials approved for use with the specific product.

3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.

4. Substrates the product should not be used on.

5. Substrates for which use of primer is required.

6. Substrates for which laboratory adhesion and/or compatibility testing is required.

7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.

8. Sample product warranty.

9. Certification by manufacturer indicating that product complies with specification requirements.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard cured samples of colors available for selection. **THE SAME COLOR SEALANT WILL NOT BE USED THROUGHOUT THIS PROJECT.**

E. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

F. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

G. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

H. Manufacturer's Qualification Statement.

I. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

C. Preconstruction Testing: Test each combination of sealant, substrate, backing, and accessories.

1. Conduct field tests for each application indicated below:

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

b. Each type of non-elastomeric sealant and joint substrate indicated.

2. Notify Architect seven days in advance of dates and times when test joints will be erected.

3. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193.

4. Adhesion Testing: In accordance with ASTM C794.

5. Compatibility Testing: In accordance with ASTM C1087.

6. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

7. Allow sufficient time for testing to avoid delaying the work.

8. Report recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.

9. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

D. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.

E. Field Adhesion Test Procedures:

F. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.

1. Sample: At least 18 inches long.

2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by

two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

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

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

1.07 PROJECT CONDITIONS

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

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.

2. When joint substrates are wet due to rain, frost, condensation or other causes.

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

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

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for Project.

C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C1247 and qualify for the length of exposure indicated by reference to ASTM C920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:

1. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.

a. Wall expansion and control joints.

b. Joints between door, window, and other frames and adjacent construction.

c. Joints between different exposed materials.

d. Openings below ledge angles in masonry.

e. Other joints indicated below.

3. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.

a. Joints between door, window, and other frames and adjacent construction.

b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.

1) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated assemblies.

c. Other joints indicated below.

4. Do not seal the following types of joints.

a. Intentional weepholes in masonry.

b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.

c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.

d. Joints where installation of sealant is specified in another section.

e. Joints between suspended panel ceilings/grid and walls.

B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.

C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

1. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; color as selected by Architect from Manufacturer's standard colors.

2. In Sound-Rated Assemblies: acoustical sealant sealant.

D. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

E. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.03 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

2.04 NONSAG JOINT SEALANTS

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Class 50, Uses NT, M, G, O, and A; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 50 percent, minimum.

2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.

3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.

5. **Use: Entrances, Storefronts, Windows, Flashing and other exterior locations.**

6. Color: To be selected by Architect from manufacturer's full range including on demand colors.

7. Cure Type: Single-component, neutral moisture curing.

8. Service Temperature Range: Minus 20 to 180 degrees F.

9. Manufacturers:

    a. ADFAST Corporation; ADSEAL DWS 4580 Series: www.adfastcorp.com/#sle.

    b. Dow Chemical Company; DOWSIL 791 Silicone Weatherproofing Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.

    c. GE Construction Sealants; SCS2000 SilPruf; www.siliconeforbuilding.com.

    d. Substitutions: See Section 016000 - Product Requirements.

B. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Class 100/50, Uses NT, M, G, O, and A; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus 100 percent and minus 50 percent, minimum.

2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.

3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

4. Hardness Range: 20 - 30, Shore A, when tested in accordance with ASTM C661.

5. **Use: Masonry and other exterior locations.**

6. Color: To be selected by Architect from manufacturer's full range including on demand colors.

7. Cure Type: Single-component, neutral moisture curing.

8. Service Temperature Range: Minus 20 to 180 degrees F.

9. Manufacturers:

    a. ADFAST Corporation; ; ADSEAL LM 4600 Series: www.adfastcorp.com/#sle.

    b. Dow Chemical Company; ; DOWSIL 795 Silicone Building Sealant.

    c. Substitutions: See Section 016000 - Product Requirements.

C. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.

1. Color: White.

2. Use: Interior wet applications.

3. Manufacturers:

    a. ADFAST Corporation; ADSEAL KB 4800 Series: www.adfastcorp.com/#sle.

    b. BASF Building Systems; Omniplus; www.master-builders-solutions.basf.us.

    c. Dow Corning Corporation; 786 Mildew Resistant; www.dow.com/en-us.

    d. GE Silicones; Sanitary SCS1700; www.siliconeforbuilding.com.

    e. Substitutions: See Section 016000 - Product Requirements.

D. Polyurethane Sealant: ASTM C920, Grade NS, Class 35, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.

1. Movement Capability: Plus and minus 25 percent, minimum.

2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.

3. Color: To be selected by Architect from manufacturer's full range.

4. Service Temperature Range: Minus 40 to 180 degrees F.

5. Use: Interior Control and Expansion Joints.

6. Manufacturers:

    a. BASF; MasterSeal NP 1: www.master-builders-solutions.basf.us

    b. Pecora Corporation; Dynatrol I-XL: www.pecora.com/#sle.

    c. Tremco Commercial Sealants & Waterproofing; Dymonic FC: www.tremcosealants.com/#sle.

    d. Substitutions: See Section 016000 - Product Requirements.

E. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging, paintable; not intended for exterior use.

1. Color: To be selected by Architect from manufacturer's standard range.

2. Grade: ASTM C834; Grade NF.

3. **Use: Interior Material and Non-Moving Joints**

4. Manufacturers:

    a. Silco, Inc.; PeriBond PB-3: http://www.silco-inc.com.

    b. Pecora Corporation; AC-20 +Silicone: www.pecora.com/#sle.

c. Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com/#sle.

d. BASF Building Systems; Sonolac; www.master-builders-solutions.basf.us.

e. Substitutions: See Section 016000 - Product Requirements.

F. Acoustical Sealant for Exposed and Concealed Joints: nonsag, paintable, nonstaining latex sealant.

1. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.

2. Standard: ASTM C834.

3. Color:

a. To be selected by Architect from manufacturer' s full range of actual material samples of colors.

4. Manufacturers:

a. Pecora Corporation; BA-98.

b. Tremco; Acoustical Sealant.

5. Substitutions: See Section 016000 - Product Requirements.

2.05 SELF-LEVELING SEALANTS

A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .

1. Movement Capability: Plus and minus 25 percent, minimum.

2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.

3. **Use: Interior Horizontal Concrete Control and Expansion Joints.**

4. Color: To be selected by Architect from manufacturer's standard range.

5. Service Temperature Range: Minus 40 to 180 degrees F.

6. Manufacturers:

a. Pecora Corporation; Dynatrol II-SG: www.pecora.com/#sle.

b. BASF Building Systems; MasterSeal SL 2: www.master-builders-solutions.basf.us/en-us.

c. Tremco; THC-900: www.tremcosealants.com

d. Substitutions: See Section 016000 - Product Requirements.

2.06 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type C - Closed Cell Polyethylene.

2. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.

3. Manufacturers:

a. ADFAST Corporation; ADSEAL BR-2600 (Backer Rod): www.adfastcorp.com/#sle.

b. Nomaco, Inc: www.nomaco.com/#sle.

c. Substitutions: See Section 016000 - Product Requirements.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.

1. Notify Architect of date and time that tests will be performed, at least seven days in advance.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

E. Install bond breaker backing tape where backer rod cannot be used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

I. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

J. 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.

K. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

L. Avoid 3-sided joints. Use backer rod or bond breaker tape to create 2-sided joints pursuant to sealant manufacturer's published instructions.

M. Avoid vee shaped joints. Use backer rod to bring width of joint back closer to width of joint front.

N. Apply to achieve a solid bond to both joint bond surfaces. Tool sealant surface concave.

O. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION