SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

This Section includes the following:
1. Perimeter insulation under slabs.
2. Perimeter wall insulation (supporting backfill).
3. Continuous wall insulation
4. Concealed building insulation.
5. Vapor retarders (Including ceiling scrim where applicable).
6. Sound attenuation insulation.
7. Light Density, open celled, flexible, 100 percent water blown Polyurethane Foam insulation.

1.2 SUBMITTALS

Polyurethane Foam insulation:
1. Product test reports performed by a qualified independent testing agency evidencing compliance of insulation products with specified requirements including those for thermal resistance, fire-test-response characteristics, water-vapor transmission, water absorption, and other properties, based on comprehensive testing of current products.
2. Evaluation Report: Evidence of compliance of foam-plastic insulations with International Building Code (IBC), International Residential Code (IRC), International Energy Conservation Code (IECC)
3. Manufacturer’s certificate certifying insulation provided meets or exceeds specified requirements.
4. Manufacturer’s certificate for VOC compliance
5. Installer’s certificate showing the Icynene installation certification.

1.3 QUALITY ASSURANCE

Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

Polyurethane Foam insulation:
4. Toxicity/Hazardous Materials
   a. Provide product that is 100% Water Blown
   b. Provide products that contain no urea-formaldehyde
   c. Products and equipment requiring or using CFCs, HCFCs, or HFCs during the manufacturing or application process will not be permitted
   d. Provide products that contain no PBDEs
   e. Provide products that are “Low-emitting”

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 PROJECT CONDITIONS

Polyurethane Foam insulation: Do not expose to sunlight, except to extent necessary for period of installation and concealment.

1.6 WARRANTY

Rigid Continuous Insulation Weather and Air Barrier System: 15 Year Thermal, 10 Year Weatherization, and 6 month Exposure Limited Warranty.

Polyurethane Foam insulation: Manufacturer's standard Limited Lifetime Warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

2.2 FOAM-PLASTIC BOARD INSULATION (**under slabs and foundation insulation**)

Extruded-Polystyrene Board Insulation (XPS): ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:

1. Basis of design: Dow Styrofoam Brand Cavitymate Plus / Scoreboard / Square Edge Insulation
   Or equal by:
   a. DiversiFoam Products.
   b. Owens Corning.
   c. Pactiv Building Products Division (Kingspan Insulation LLC).
2. Physical Properties: Type IV, 25 psi, 1.55 lb/cu. ft., square edges, unless otherwise indicated.

2.3 FOAM-PLASTIC BOARD INSULATION **(at continuous wall insulation)**

Foil-Faced, Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class 1 or 2 with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, based on tests performed on unfaced core on thicknesses up to 4 inches.
1. Exterior Facer: 1.25 mil Acrylic Aluminum Facer
2. Compressive Strength (ASTM D1621): 25 psi, minimum.
3. Aged thermal Resistance (ASTM C518, measured at Mean Temp of 75F): [F-6.5 at I inch] [RSI 1.06 per 25 mm] of thickness with 10 year thermal warranty.
4. Flexural Strength (ASTM C203): Minimum 40 psi .
5. Water Absorption (ASTM C209): Minimum 0.1 percent by volume.
6. Water Vapor Permeance (ASTM E96): <0.03 perms.
7. Maximum Use Temperature: 250 degrees F.
   1) Basis of design:
      a) Dow THERMAX (ci)
   2) Approved equals:
      a) Hunter Panels Xci Foil (class A) -with approved liquid joint sealant
      b) Carlisle R2+ Sheathe -with approved liquid joint sealant
      c) RMAX ECOMAXci -with approved liquid joint sealant
      d) Ox ISO RED MAX WF(Silver) -with approved liquid joint sealant
      e) Atlas Energy Shield Pro -with approved liquid joint sealant

8. Accessories:
   a. Fasteners (Where insulation is exposed with a cavity wall): Provide insulated sheathing manufacturer's recommended polymer or other corrosion protective coated steel screw fasteners for anchoring sheathing to metal wall framing. Fastener length and size based on wall sheathing thickness.
      1) Acceptable Products:
         a) Rodenhouse, Inc. 2 inch diameter "Thermal-Grip" CI prong washer with "Grip-Deck" ceramic- coated, self-drilling screw.

b) Use the Grip-Lok auto-feed fastening system for high speed application (recommended for wall assemblies up to 2 inches in thickness. Contact Rodenhouse Inc. for more information at 616-454-3100.

b. Insulation Flashing: Provide insulation manufacturer's recommended board treatment for sealing joints, seams, and veneer tie penetrations through the insulation layer.
1) Acceptable Products:
a) The Dow Chemical Company LIQUIDARMOR™ -CM commercial liquid flashing and sealant.
b) The Dow Chemical Company LIQUIDARMOR™ -LT commercial silicone flashing & sealant.
c) Approved equal

c. Wall Opening Flashing: Provide insulated sheathing manufacturer's recommended flashing sealing window and door wall openings.
1) Acceptable Products:
a) The Dow Chemical Company LIQUIDARMOR™ -CM commercial liquid flashing and sealant
b) The Dow Chemical Company LIQUIDARMOR™ -LT commercial silicone flashing and sealant.
c) When greater widths are required for through wall flashings LIQUIDARMOR™ -LT commercial silicone flashing and sealant is recommended.
d) Approved equal

d. Penetration Filler: Provide insulated sheathing manufacturer's recommended polyurethane foam for sealing penetrations of insulated sheathing.
1) Acceptable Products:
a) The Dow Chemical Company "GREAT STUFF PRO™ Gaps & Cracks" single Component polyurethane insulating foam sealant.
b) The Dow Chemical Company "GREAT STUFF PRO™ Window & Door" single-component polyurethane low pressure foam sealant.
c) Approved equal

e. Gap Air Infiltration Filler: Two Component, Quick Cure Polyurethane Foam:
1) Acceptable Products:
a) The Dow Chemical Company FROTH-PAK™ Foam Insulation two component, quick-cure polyurethane foam
i. NFPA 286 Approval for Exposed use to the interior of the building without the need for a15-min thermal barrier
ii. ASTM E-84 Class A
b) Approved equal

f. Flexible polyethylene foam gasket strip to reduce air infiltration between a concrete foundation and sill plate.
1) Acceptable Products: The Dow Chemical Company "STYROFOAM™ Sill Seal Foam Gasket.
2) Approved equal

2.4 COMPOSITE FOAM-PLASTIC BOARD INSULATION AND SHEATHING (at continuous wall insulation) **(ALTERNATE TO INDIVIDUAL COMPONENT CONTINUOUS INSULATION & SHEATHING BEHIND MECHANICALLY FASTENED SIDINGS.**)

Basis-of-Design Manufacturer: Insulating panels shall be Xci-NB products produced by Hunter Panels, 15 Franklin Street, Portland, Maine 0410. Phone: (207) 761-5678 or (888) 746-1114. Fax: (717)-960-1611. Email: info@hpanels.com.
1. Substitutions: Not permitted

Board Insulation, Bonded to Wood Panel: High thermal resistive rigid insulation panel composed of a closed cell poly isocyanate foam core bonded on both sides to a premium performance coated facer and bonded to wood panel on one-side.
2. Type: ASTM C1289, Type V:
a. Compressive Strength: 25 psi, minimum.
3. Wood Panel Thickness:
a. 7/16" Oriented Strand Board (OSB).

4. Panel Size:
   a. 4 feet by 8 feet.
5. Thickness / R Value: based on ASTM C 518 at 75 degrees F:
   a. 2.0 inches / R Value 9.6 including 7/16 inch OSB facing.

Panel Fasteners (See also 2.5 below):

1. Fasteners shall be approved Hunter Panel fasteners. Fasteners are a corrosion resistant type with oversized heads. Length of fasteners shall be as recommended by the panel manufacturer.
   a. Fasten composite insulation to the structural wall base. Coordinate with cladding or wall finish manufacturer for the attachment requirements over panels. Contact panel manufacturer for guidance when determining fastening pattern.

2.5 FASTENERS FOR INDIVIDUAL COMPONENT CONTINUOUS INSULATION AND SHEATHING OR ALTERNATE COMPOSITE FOAM PLASTIC BOARD INSULATION AND SHEATHING:

Provide fasteners of type and length to secure sheathing and continuous insulation to substrate. Fastener length and size based on wall sheathing thickness

1. Minimum penetration:
   a. Steel Stud: 1inch
   b. Wood Stud: 1 ½ inch
   c. Concrete / CMU: 1 ½ inch

Attach directly to substrate at spacing indicated on drawings and designed to support the insulation/sheathing weight, exterior cladding system weight, wind pressures and maximum wind speeds indicated on the drawings.

Fastener Manufacturer:

2. Provide fasteners from the following manufacturer in accordance with NTA, Engineering Evaluation Report-TRU110910-21:
   a. TRUFAST – Altenloh, Brink & Ci. U.S., Inc., 02105 Williams County Road 12C, Bryan, Ohio 43506, www.trufast.com
      1) Fastener Types:
         a) TRUFAST SIP TP: Wood Framing
         b) TRUFAST SIP LD: Wood Framing, Cold Formed Steel Framing, CMU
         c) TRUGRIP Fasteners: Concrete
   b. Fasteners by other manufacturer are acceptable provided they have been to tested and evaluated by NTA and:
      1) They are sized and spaced in accordance with the associated Engineering Evaluation Report to support specified loads.
      2) They are approved by Hunter Panel when the alternate composite insulation and sheathing product is used.

2.6 GLASS-FIBER BLANKET INSULATION (Including sound attenuation at interior walls)

Available Manufacturers:

1. CertainTeed Corporation.
2. Guardian Fiberglass, Inc.
3. Johns Manville.
4. Knauf Fiber Glass.
5. Owens Corning.

Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively; passing ASTM E 136 for combustion characteristics.

2.7 VAPOR RETARDERS (WHEN APPLICABLE AT PROJECTS WITH EXPOSED CEILING INSULATION)

Polypropylene Scrim Vapor Retarders: ASTM E 96, 0.020” thick, with maximum permeance rating of 0.02 perm with maximum flame-spread and smoke-developed indexes of 15 and 35, respectively. Basis of Design: Lamtec WMP-Retro.

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

Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.

Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and with demonstrated capability to bond vapor retarders securely to substrates indicated.

2.8 VAPOR RETARDERS (AT WALLS)

Polyethylene Vapor Retarders: ASTM D 4397, 6 mils thick, with maximum permeance rating of 0.13 perm with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively.

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

Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.

Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and with demonstrated capability to bond vapor retarders securely to substrates indicated.

2.9 AUXILIARY INSULATING MATERIALS

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

2.10 POLYURETHANE SPRAY FOAM INSULATION

Polyurethane Spray Foam Insulation Basis of Design: ICYNENE Classic Ultra Select by Icynene Inc. (Contact: Brian Troy for Icynene Licensed Applicator. Ph: 813-362-0295 or btroy@icynene.com

1. Acceptable manufacturers: Icynene, Demilec (Sealection 500).
2. Intumescent Coating for 15min Thermal Barrier - required if insulation is not covered by ½" gypsum wall board.
   a. DC 315 by International Fireproof Technology, Inc.
   b. Other code or manufacturer approved thermal barrier coatings.
3. Provide insulating materials that comply with requirements and with referenced standards.
   : Low-density, hydrophobic, water-blown, containing no CFCs, HCFCs, or HFCs and conforming to the following:
4. Thermal Resistance (R-Value/inch @75 deg F): ASTM C 518; 3.7 hr/sq ft/degree F/BTU
   a. Heat Flow Reduction:
      1) Through 1 inch: 75 percent
      2) Through 3.5 inches 93 percent
      3) Through 5.5 inches 95 percent
      4) Through 10.5 inches 98 percent
5. Air Permeance (for 5.5 inches of material): ASTM E 2178; < 0.01 L/s.m^2 @ 75 Pa
6. Water Vapor Transmission (for 5.5 inches of material): ASTM E 96; 11 perms [627 ng /(Pa.s.m^2)]
7. Water Absorption ASTM D 2842-01: Pass <5% by Volume
8. Flame Spread and Smoke Developed Rating: ASTM E 84
   a. Flame Spread: Less than 20
   b. Smoke Development: Less than 400
   c. Oxygen Index 23 percent

9. Bacterial and Fungal Growth and Food Value: Texas Tech. University; not a source of food for mold (no growth)
10. Toxic Emissions SRC Report #12070-1C06: Pass
11. California Department of Public Health CDPH/ EHLB/ Standard Method Version 1.1 Evaluated the Emissions of VOC's: Pass
12. Corrosion: No significant corrosion when in contact with steel under 85 percent relative humidity and 118 degrees F.
13. Source Quality Control
    a. Manufacturer's Qualifications: Product produced in an ISO 9001 registered factory.
    b. Single Source Responsibility: Single Source product from on manufacturer.
    c. Installer Qualifications: Engage Icynene Licensed Dealer (installer) who is been trained and certified by Icynene.
14. Toxicity/ Hazardous Materials
    a. Provide product that contains no urea-formaldehyde
    b. Provide product that contains no PBDE's
    c. Provide product that is water-blown and are "Low-Emitting"

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 INSTALLATION, GENERAL

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

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

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

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

3.4 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units. Seal all joints between insulation panels with seam tape per manufacturer's recommendations.

Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection course with joints butted. Set in adhesive according to insulation manufacturer's written instructions.

Protect top surface of horizontal insulation from damage during concrete work by applying protection course with joints butted.

Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

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

Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

Set vapor-retarder-faced units with vapor retarder to warm-in-winter side of construction, unless otherwise indicated.

1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

Install mineral-fiber insulation in cavities formed by framing members according to the following requirements:

2. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
3. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

5. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
6. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
7. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
8. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..

3.6 INSTALLATION OF CONTINUOUS WALL INSULATION

Install insulation in accordance with manufacturer's recommendations. Fasten to exterior face of exterior metal stud wall framing using sheathing manufacturer’s recommended type and length screw fasteners with washers. Abut panels tightly together and around openings and penetrations.

1. Install sheathing panels horizontally with blue aluminum facing to exterior. Use maximum lengths to minimize number of joints. Locate edge joints parallel to and on framing. Center end joints over supports and stagger in each course. Provide additional framing wherever panel joints do not bear against framing, plates or sill members.
2. Fasten panels to each support with fasteners spaced 12 inches on center at perimeter and 16 inches on center in panel field. Set back perimeter fasteners 3/8" from edges and ends of panel units. Drive fasteners to bear tight and flush with surface of insulation. Do not countersink. Perimeter fasteners can be detailed to bridge the gap of abutting board joints due to the 1.75 or 2” diameter of the washer used to fasten the board to the studs. Maximum of two board joints may be bridged per fastener.
3. Install flashing at end and edge joints in accordance with sheathing manufacturer's joint sealing recommendations.
4. Install flashing tape behind wall tie and mechanical fastening assemblies for rain screen claddings.
5. Seal sheathing joints and penetrations of sheathing in accordance with sheathing manufacturer's joint and penetration sealing recommendations.
6. After base flashing, which may include a termination bar running horizontally along the top edge of the flashing, is installed on exterior of insulated sheathing, install with sheathing manufacturer's joint and penetration sealing to the exterior sheathing and lapped over the top edge of the base flashing.

3.7 INSTALLATION OPEN-CELL SPRAY POLYURETHANE FOAM

EXAMINATION:

1. Examine substrates and conditions, under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected.

2. Review placement area to determine final location will not be within 3 inches of any heat source where the temperature will exceed 200 deg F per ASTM C 411 or in accordance with authorities having jurisdiction.

PREPARATION

3. Clean substrates and cavities of loose materials capable of interfering with insulation placement.

APPLICATION

4. Site mix liquid components manufactured by Icynene and supplied by Independent Icynene Licensed Dealer.
5. Apply insulation to substrates in compliance with manufacturer's written instructions. Apply Insulation to a uniform density without voids
6. Apply insulation to produce thickness required for indicated R Value.
7. Extend insulation in thickness indicated to envelop entire area to be insulated.
8. Verify that other work on and within spaces to be insulated is complete prior to application
9. Mask and Protect adjacent surfaces from overspray or damage
10. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
11. Apply intumescent coating at 20 wet mils as a 15 minute thermal barrier over all exposed spray foam insulation as needed by code. Apply per manufacturer’s written instructions

3.8 PROTECTION

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

3.9 INSULATION SCHEDULE

1. Refer to drawing A-603 for insulation schedule and required R-values.

END OF SECTION 072100

SECTION 072419 - WATER-DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. EIFS-clad drainage-wall assemblies that are field applied over substrate.
   2. Water-resistive coatings.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each EIFS component, trim, and accessory.

B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer certificates.

B. Product certificates.

C. Product test reports.

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

E. Evaluation reports.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Possess a current Training and Listing Certificate issued by the EIFS manufacturer and for the specific EIFS system and/or specialty finish as specified herein..

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.
   1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Basis-of-Design Product: Subject to compliance with requirements, provide Dryvit Outsulation Plus MD System or comparable product by one of the following:
   1. Sto Corp.
   2. Synergy

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

2.2 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with ASTM E 2568 and ICC-ES AC219 and with the following:
1. Weathertightness: Resistant to uncontrolled water penetration from exterior, with a means to drain water entering EIFS to the exterior.
2. Impact Performance: ASTM E 2568, Standard impact resistance, unless otherwise indicated.
3. Bond Integrity: Free from bond failure within EIFS components or between EIFS and substrates, resulting from exposure to fire, wind loads, weather, or other in-service conditions.

2.3 EIFS MATERIALS

A. Primer/Sealer: Where required, EIFS manufacturer's standard substrate conditioner designed to protect substrates from moisture penetration and to improve the bond between substrate and insulation adhesive.

B. Water-Resistive Coatings: EIFS manufacturer's standard formulation and accessories for use as water-resistive barriers; compatible with substrate and complying with physical and performance criteria of ASTM E 2570.

C. Flexible-Membrane Flashing: Fluid-applied with mesh scrim reinforcing or Cold-applied, self-adhering, self-healing, rubberized-asphalt and polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.

D. Insulation Adhesive: EIFS manufacturer's standard formulation designed for indicated use; specifically formulated to be applied to back side of insulation in a manner that creates open vertical channels designed to serve as an integral part of the water-drainage system of the EIFS-clad drainage-wall assembly, compatible with water barrier.

E. Molded, Rigid Cellular Polystyrene Board Insulation: Comply with ASTM C 578, Type I.
1. Foam Build-Outs: Provide with profiles and dimensions indicated on Drawings.

F. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. according to ASTM E 2098. Provide Dryvit Panzer (20 oz.) mesh at all EIFS panels from grade to 8’-0” above grade.

G. Base-Coat Materials: EIFS manufacturer's standard formulation designed for indicated use.

H. Primer: Where required, EIFS manufacturer's standard factory-mixed, acrylic-polymer primer for preparing base-coat surface for application of finish coat.

I. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating with HDP Hydrophobic performance enhancement.
1. Colors:
a. See Drawings.
2. Textures:
a. Sandpebble Fine DPR

J. Trim Accessories: Where applicable, type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D 1784, manufacturer's standard cell class for use intended, and ASTM C 1063.

PART 3 - EXECUTION

3.1 EIFS INSTALLATION

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

B. General Contractor and Sub-contractor shall verify substrate compatibility with chosen EIFS manufacturer to ensure warranty is maintained. Provide only substrates that comply with chosen manufacturer's warranty requirements.

C. Weather Barrier: Install per Manufacturers requirements.

D. Trim: Where applicable, apply trim accessories at perimeter of EIFS. Coordinate with installation of insulation.

E. Board Insulation: Adhere insulation to substrate in compliance with ASTM C 1397 and the following:
1. Apply adhesive to insulation by notched-trowel method, with notches oriented vertically to produce drainage channels that remain functional after the insulation is adhered to substrate.
2. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and water-resistive barrier.

F. Expansion Joints: Install at locations indicated and where required by EIFS manufacturer.

G. Base Coat: Apply to exposed surfaces of insulation and foam build-outs in minimum thickness recommended in writing by EIFS manufacturer.

H. Reinforcing Mesh: Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are invisible.

I. Double-Layer Reinforcing-Mesh Application: Where indicated or required, apply second base coat and second layer of reinforcing mesh, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions in same manner as first application. Do not apply until first base coat has cured.

J. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings, extending 4 inches beyond perimeter. Apply additional 9-by-12-inch strip reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch- wide, strip reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4 inches on each side of corners.

K. Foam Build-Outs: Fully embed reinforcing mesh in base coat.

L. Double Base-Coat Application: Where applicable, apply second base coat in same manner and thickness as first application, except without reinforcing mesh. Do not apply until first base coat has cured.

M. Primer: Where applicable, apply over dry base coat according to EIFS manufacturer's written instructions.

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

3.2 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
1. As stipulated in Ch. 17 of the IBC.
2. According to ICC-ES AC235.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. EIFS Tests and Inspections: According to ICC-ES AC219.

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

END OF SECTION 072419

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Water resistant barriers and flashing to be used over sheathing substrates as indicated on the drawings.

1. Building paper.
2. Building wrap.
3. Self-adhering WRB membrane flashing.

1.2 RELATED SECTIONS

A. Section 047300 - Adhered Manufactured Stone Veneer for water resistant barriers on concrete unit masonry for AMSV.

B. Section 074243 – Aluminum Composite Panels

C. Section 092400 – Portland Cement Plastering for water resistant barriers on concrete unit masonry for stucco.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Laboratory Test Reports: For architectural adhesives, sealants, primers and architectural coatings used including, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers", latest version. The aforementioned products shall meet local and regional air quality management requirements of the authority with jurisdiction.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIER

A. Building Paper: Water-vapor-permeable, asphalt-saturated kraft building paper that complies with ICC-ES AC38, Grade D.

B. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. DuPont Building Innovations: E. I. du Pont de Nemours and Company. "Tyvek Commercial Wrap".
   b. Dow Chemical Company (The). "Weathermate Plus Brand Housewrap".

2. Water-Vapor Permeance: Not less than 5 perms, when tested in accordance with ASTM E96, Method A.
3. Water Vapor Transmission: Not less than 35g/m squared/24 hrs, when tested in accordance with ASTM E96, Method A.

4. Air Leakage Resistance: Less than 0.06 cfm/sq. ft.
5. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

C. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

D. Fasteners: As recommended by building wrap manufacturer for application.

2.2 SELF-ADHERING WRB MEMBRANE FLASHING

A. Rubberized-Asphalt Flashing: Cold applied, self-adhering membrane composed of an innovative and proprietary rubberized asphalt adhesive and interwound with a disposable release sheet. An embossed, slip resistant surface is provided on the high-performance film with UV barrier properties, to produce an overall thickness of not less than 40 mils (1.02 mm) per ASTM D3767 Method A.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Ice and Water Shield HT (High Temperature) - GCP Applied Technologies, Inc.

   b. Or equal by Carlisle Coatings & Waterproofing Inc.

2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

2.3 FLUID APPLIED WEATHER RESISTIVE BARRIER

A. Refer to Specification Section 074243 - Aluminum Composite Panels
1. Provide fluid applied weather resistive barrier at all aluminum composite panel locations in accordance with Miami-Dade County Notice of Acceptance (NOA)

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

A. Cover sheathing with water-resistive barrier as follows:

1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.

B. Building Wrap: Comply with manufacturer's written instructions and warranty requirements.

1. Seal seams, edges, fasteners, and penetrations with tape.
2. Extend into jambs of openings and seal corners with tape.

C. Building Paper: Apply horizontally with a 2-inch overlap and a 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails.

3.2 SHEET WATERPROOFING INSTALLATION

A. Apply sheet waterproofing where indicated to comply with manufacturer's written instructions.

1. Schedule installation such that underlayment is covered within the published exposure limit of the underlayment.
2. Do not install underlayment on wet or frozen substrates.
3. Install when surface temperature of substrate is a minimum of 40 degrees F (5 degrees C) and rising.
4. Remove dust, dirt, loose materials and protrusions from deck surface.

5. Install membrane on clean, dry, continuous structural deck. Fill voids and damaged or unsupported areas prior to installation.
6. Prime concrete and masonry surfaces using specified primer at a rate of 500-600 square feet per gallon (12-15 sqm/L). Priming is not required for other suitable clean and dry surfaces.
7. Install membrane such that all laps shed water. Work from the low point to the high point of the roof at all times. Apply the membrane in valleys before the membrane is applied to the eaves. Following placement along the eaves, continue application of the membrane up the roof. Membrane may be installed either vertically or horizontally after the first horizontal course. Side laps minimum 3-1/2 inches (89 mm) and end laps minimum 6 inches (152 mm) following lap lines marked on underlayment.
8. Patch penetrations and damage using manufacturer's recommended methods.

END OF SECTION 072500

SECTION 072600 – VAPOR RETARDER

PART 1 – GENERAL

1.1 SUMMARY

Products supplied under this section:

1. Under slab Vapor Retarder, seam tape, and mastic for installation under concrete slabs.
2. Optional Surface Applied Liquid Vapor retarder for existing concrete slabs.

Related sections:

1. Section 03 30 00 Cast-in-Place Concrete

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
1. ASTM E 1745-09 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
2. ASTM E 154-99 (2005) Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
3. ASTM E 96-05 Standard Test Methods for Water Vapor Transmission of Materials.
4. ASTM F 1249-06 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
5. ASTM E 1643-09 Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. American Concrete Institute (ACI):
1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.3 SUBMITTALS

A. Quality control/assurance:
1. Summary of test results as per paragraph 8.3 of ASTM E 1745.
2. Manufacturer’s samples, literature.
3. Manufacturer’s installation instructions for placement, seaming and penetration repair instructions.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Under slab Vapor Retarders must have all of the following qualities:
1. Permeance of less than 0.03 Perms [grains/(ft^2 · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E 1745 Section 7.1.
2. Other performance criteria:
    a. Strength: ASTM E 1745 Class A.
    b. Thickness: 10 mils minimum.

B. Under slab Vapor Retarder products:
1. Stego Industries; Stego Wrap 10 mil.
2. Fortifiber Corporation; Moistop Ultra 10.

3. W.R. Meadows: Perminator 10 mil.

C. Surface Applied Liquid Vapor retarder products: (for use on remodel/ retrofit projects at existing concrete slabs)
1. Permeance of less than 0.1 Perms [grains/(ft^2 · hr · inHg)] as tested in accordance with ASTM E96.
2. Adhesion: >200 psi as tested in accordance with ASTM D7234
3. Direct application onto green concrete up to 100% RH
4. Low VOC
5. Applied in 2 coats
6. Drying: dries within 3-4 hours
7. Basis of Design Manufacturer: H.B. Fuller Construction Products Inc.: TEC LiquiDam EZ Moisture Vapor Retarder.

2.2 ACCESSORIES

A. Seam tape:
1. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

PART 3 – EXECUTION

3.1 PREPARATION

A. Ensure that base material is approved by Architect or Geotechnical Engineer.
1. Level and compact base material.

3.2 INSTALLATION

A. Install vapor retarder in accordance with manufacturer’s instructions and ASTM E 1643.
1. Unroll vapor retarder with the longest dimension parallel with the direction of the concrete placement.
2. Extend vapor retarder to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor retarder. At the point of termination, seal vapor retarder to the foundation wall, grade beam or slab itself.
3. Overlap joints 6 inches and seal with manufacturer’s tape.
4. Apply seam tape to a clean and dry vapor retarder.
5. Seal all penetrations (including pipes) per manufacturer’s instructions.
6. No penetration of the vapor retarder is allowed except for reinforcing steel and permanent utilities.
7. If non-permanent stakes are driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
8. Repair damaged areas by cutting patches of vapor retarder, overlapping damaged area 6 inches and taping all sides with tape.

B. Install surface applied liquid vapor retarder in accordance with manufacturer’s instructions.

END OF SECTION 072600

SECTION 074213 - METAL SOFFIT PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal soffit panels.

1.2 PERFORMANCE REQUIREMENTS

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

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

a. Uniform pressure of **100 PSF**, acting inward or outward.

1.3 SUBMITTALS

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

B. Samples: For each type of exposed finish required.

C. Submit Miami Dade Notice of Acceptance (NOA) for selected products.

1.4 QUALITY ASSURANCE

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

1.5 WARRANTY

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

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

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

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

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

1. Surface: Smooth, flat finish & Solid
2. Exposed Coil-Coated Finish:

a. 1.0 mil total dry film thickness: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.

b. Siliconized-Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.

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

B. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C 920 as recommended in writing by metal wall panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.2 MISCELLANEOUS METAL FRAMING

A. Miscellaneous Metal Framing, General: ASTM C 645, cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G40 hot-dip galvanized or coating with equivalent corrosion resistance unless otherwise indicated.

B. Hat-Shaped, Rigid Furring Channels:

1. Nominal Thickness: **0.025 inch**.
2. Depth: **7/8 inch**.

2.3 MISCELLANEOUS MATERIALS

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

2.4 METAL SOFFIT PANELS

A. Provide factory-formed vented soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Metal Soffit Panels: Manufacturer’s products designed and tested to comply with the requirements of the Florida Building Code including High Velocity Hurricane Zone (HVHZ).

1. Refer to A700 series drawings for Notice of Approval design and installation requirements.

2. Windload: Refer to Structural Drawings for design windloads.

C. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. **Basis of Design:** Petersen Aluminum Corporation PAC-850.
   a. Exterior Finish: Silver at canopy soffit; Kynar 500 at building outrigger and tower outrigger.
   b. Color: Silver at canopy soffit; Slate Gray at building outrigger and tower outrigger.
2. Profile: V groove.
3. Material: Aluminum sheet, **0.032 inch** thick.
4. Panel Coverage: 12-inch.
5. Sealant: Factory applied within interlocking joint.

2.5 ACCESSORIES

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

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

B. Flashing and Trim: Formed from 0.018-inch minimum thickness, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal soffit panels.

2.6 FABRICATION

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

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

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

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

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

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 METAL WALL PANEL INSTALLATION

A. Metal Soffit Panels: Provide metal soffit panels full width of soffits. Install panels perpendicular to support framing.

1. Flash and seal panels with weather closures where metal soffit panels meet walls and at perimeter of all openings.

3.3 ACCESSORY INSTALLATION

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

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

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

3.4 CLEANING AND PROTECTION

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

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

END OF SECTION 074213

SECTION 074243 - COMPOSITE WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes metal-faced composite wall panels:
   1. One-piece, Tight-Fit Extruded Molding System

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal-faced composite wall panel assemblies capable of withstanding the effects of the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330:

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

      a. Uniform pressure of **120 lbf/sq. ft.**, acting inward or outward.

   2. Deflection Limits: Metal-faced composite wall panel assemblies shall withstand wind loads with horizontal deflections no greater than 1/175 of the span at the perimeter and 1/60 of the span anywhere in the panel of the span.

1.3 SUBMITTALS

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

B. Samples: For each type of exposed finish required.

C. Miami-Dade Notice of Acceptance (NOA).

1.4 QUALITY ASSURANCE

A. Fire-Resistance Ratings: Where indicated, provide metal-faced composite wall panels identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 WARRANTY

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

   1. Warranty Period: five years from date of Substantial Completion.

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

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

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

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

1. Surface: Smooth, flat finish.
2. Exposed Coil-Coated Finishes:

    a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.

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

B. Panel Sealants: ASTM C 920.

2.2 MISCELLANEOUS METAL FRAMING

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

B. Hat-Shaped, Rigid Furring Channels:

1. Nominal Thickness: **0.040 inch**.
2. Depth: **7/8 inch**.

2.3 MISCELLANEOUS MATERIALS

A. Aluminum Extrusions: ASTM B 221.

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

C. Fluid Applied, Weather resistive Barrier:
1. Henry Air-Bloc 31 MR Fluid Applied, Vapor Permeable Elastomeric Membrane
2. Provide at all Aluminum Composite Wall Panel locations as indicated on drawings.

2.4 METAL-FACED COMPOSITE WALL PANELS

A. General

1. Fire-Retardant Core: Noncombustible, with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

    a. Flame-Spread Index: 25 or less.
    b. Smoke-Developed Index: 450 or less.

2. Products: Subject to compliance with requirements, provide the following:
    a. **Basis of Design**: Omega-Lite as manufactured by Laminators Incorporated; 3255 Penn St., Hatfield, PA 19440. Tel: (215)723-8107

B. Aluminum-Faced Composite Wall Panels: Formed with 0.032-inch- thick, coil-coated aluminum sheet facings.

1. Panel Thickness: **0.236 inch** (6mm)
2. Core: Standard corrugated polyallomer (CPA) core with backer sheet.
3. Panel Backing: Random painted aluminum sheet, 0.013 inches (0.3302 mm) thick, ASTM B209 aluminum sheet.
4. Bond Test Performance: ASTM C481-A Cyclic Aging: Pass.
5. Exterior Finish: 2-coat fluoropolymer (Kynar 500).

    a. Color:

1) See drawings for colors.

C. Attachment System Components: Formed from material compatible with panel facing.

1. Include manufacturer's standard perimeter extrusions with integral weather stripping, panel stiffeners, panel clips and anchor channels.

2.5 ACCESSORIES

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

B. Flashing and Trim: Formed from 0.030-inch- minimum thickness, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal-faced composite wall panels. Provide a 12 inch (305 mm) wide lap strap under the flashing at abutted conditions and seal lapped surfaces with a full bed of non-hardening sealant.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 METAL-FACED COMPOSITE WALL PANEL INSTALLATION

A. Attachment System Installation, General: Install attachment system required to support metal-faced composite wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.

1. Install per manufacturer recommendation, include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals and molding as required.
2. Do not begin installation until weather barrier and flashings that will be concealed by composite panels are installed.

B. One-piece, Tight-Fit Extruded Molding System: attach moldings thru the sheathing directly to the back-up studs, or provide steel strapping as required behind the extrusion. Strapping must be attached directly to the studs.
1. Provide ‘J’ molding at entire perimeter and at perimeter of sign.
2. Provide horizontal and vertical ‘H-molding’ as shown on exterior elevations.
3. Provide outside corner molding (part #4535x) attached to sub-framing members at outside corners.
4. Provide molding of same color and finish as panels.

3.3 ACCESSORY INSTALLATION

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

1. Install components required for a complete metal-faced composite wall panel assembly.

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

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal-faced composite wall panel units within installed tolerance of 1/4 inch in 20 feet, nonaccumulative, on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING

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

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

END OF SECTION 074243

SECTION 074646 - FIBER CEMENT WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Exterior, panelized fiber cement cladding system and accessories to complete a drained and back-ventilated rainscreen.
B. Interior fiber cement panelized cladding system and accessories.

1.2 RELATED SECTIONS

A. Section 054000 - Metal Framing
B. Section 061053 – Miscellaneous Rough Carpentry
C. Section 061600 – Sheathing
D. Section 072100 - Thermal Insulation
E. Section 076200 - Flashing and Sheet Metal

1.3 REFERENCES

A. American Architectural Manufacturers Association (AAMA):
    1. AAMA 509-09 – Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems

B. ASTM International (ASTM):
    1. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
    2. ASTM C 1185 - Standard Test Methods for Sampling and Testing Non-Asbestos Fiber Cement.
    3. ASTM C 1186 – Standard Specification for Flat Fiber-Cement Sheets.
    4. ASTM E-84 - Standard Test for Surface Burning Characteristics of Building Materials.
    5. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
    6. ASTM E 228 - Standard Test Method for Linear Thermal Expansion of Solid Materials with a Vitreous Silica Dilatometer.
    7. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
    8. ASTM G 23 - Standard Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) with and without Water for Exposure of Nonmetallic Materials, Replaced by G152 and G153.

C. Florida Building Code - Test Protocol HVHZ
    1. Testing Application Standard (TAS) 201, 202, 203 – Impact Test Procedures

D. National Fire Protection Association (NFPA):
    1. NFPA 285 - Fire Test Method for Exterior Wall Assemblies Containing Combustible Material.NFPA 268 – Ignition Resistance of Exterior Wall Assemblies.

1.4 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Submit manufacturer’s product description, storage and handling requirements, and installation instructions.

C. Product Test Reports and Code Compliance: Documents demonstrating product compliance with local building code, such as test reports or Evaluation Reports from qualified, independent testing agencies.

D. Manufacturer’s Details: Submit drawings (.dwg, .rvt, and/or .pdf formats), including plans, sections, showing installation details that demonstrate product dimensions, edge/termination conditions/treatments, compression and control joints, corners, openings, and penetrations.

E. Samples: Submit samples of each product type proposed for use.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. All fiber cement panels specified in this section must be supplied by a manufacturer with a minimum of 10 years of experience in fabricating and supplying fiber cement cladding systems.
      a. Products covered under this section are to be manufactured in an ISO 9001 certified facility.
   2. Provide technical and design support as needed regarding installation requirements and warranty compliance provisions.

B. Installer Qualifications: All products listed in this section are to be installed by a single installer trained by manufacturer or representative.

C. Mock-Up Wall: Provide a mock-up wall as evaluation tool for product and installation workmanship.

D. Pre-Installation Meetings: Prior to beginning installation, conduct conference to verify and discuss substrate conditions, manufacturer's installation instructions and warranty requirements, and project requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Panels must be stored flat and kept dry before installation. A waterproof cover over panels and accessories should be used at all times prior to installation.

B. If panels are exposed to water or water vapor prior to installation, allow to completely dry before installing. Failure to do so may result in panel shrinkage at ship lap joints, and such action may void warranty.

C. Panels MUST be carried on edge. Do not carry or lift panels flat. Improper handling may cause cracking or panel damage.

D. Direct contact between the panels and the ground should be avoided at all times. It is necessary to keep panels clean during installation process.

1.7 WARRANTY

A. Provide manufacturer's 50-year warranty against manufactured defects in fiber cement panels.

B. Provide manufacturer's 15-year warranty against manufactured defects in panel finish.

C. Warranty provides for the original purchaser. See warranty for detailed information on terms, conditions and limitations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Nichiha Corporation, 18-19 Nishiki 2-chome Naka-ku, Nagoya, Aichi 460-8610, Japan.

B. Acceptable Manufacturer's Representative: Nichiha USA, Inc., 6465 E. Johns Crossing, Suite 250, Johns Creek, GA 30097. Toll free: 1.866.424.4421, Office: 770.805.9466, Fax: 770.805.9467, www.nichiha.com.

   1. Basis of Design Product: **Nichiha VintageWood**

      a. Profile colors: **See drawings.**
      b. Profiles: Wood plank texture with three, 3/8" grooves running lengthwise, spaced 5-5/8" apart.
      c. Accessory/Component Options:
         i. Manufactured Corners with 3-1/2" returns for each profile color.
         ii. Aluminum trim to be painted per finish schedule: Outside corners (Corner Key),

vertical expansion joints (H-Mold), terminations (J-Mold)

iii. Essential Flashing System: Starter, Compression Joint, Overhang.

d. Dimensions - AWP-1818: 455mm (17-7/8”) (h) x 1,818 mm (71-9/16”) (l).
e. Panel Thickness: 16 mm (5/8").
f. Weight: 35.27 lbs. per panel.
g. Coverage: 8.8 sq. ft. per panel.
h. Factory sealed on six [6] sides.

2. Basis of Design Product: **Nichiha Metallic Series (When called for on drawings).**

a. Profile colors: **See drawings**
b. Profile: Large (with ribs, installed vertically)
c. Accessory/Component Options:
i. Manufactured Corners with 3-1/2” returns for each profile color.

ii. Aluminum trim to be painted per finish schedule: Outside corners (Corner Key),

vertical joints (H-Mold), terminations (J-Mold)

iii. Essential Flashing System: Starter, Compression Joint, Overhang.

d. Dimensions – AWP-1818: 455mm (17-7/8”) (h) x 3,030 mm (119-5/16”) (l).
e. Panel Thickness: 16 mm (5/8").
f. Finish: brushed metal textured.
g. Weight: 35.27 lbs. per panel
h. Coverage: 8.88 sq. ft. per panel
i. Factory sealed on six [6] sides.

3. Basis of Design Product: **Nichiha TuffBlock (When called for on drawings).**

a. Profile colors: **See drawings.**

b. Profile: Large (without score line).

c. Accessory/Component Options:

i. Manufactured Corners with 3-1/2” returns for each profile color.

ii. Aluminum trim to be painted per finish schedule: Outside corners (Corner Key), vertical joints

(H-Mold), terminations (J-Mold)

iii. Essential Flashing System: Starter, Compression Joint, Overhang.

d. Dimensions – AWP-1818: 455mm (17-7/8”) (h) x 1,818 mm (71-9/16”) (l).

e. Panel Thickness: 16 mm (5/8").

f. Finish: Matte, moderately textured.

g. Weight: 35.27 lbs. per panel.

h. Coverage: 8.88 sq. ft. per panel.

i. Factory sealed on six [6] sides.

C. Substitutions: Not permitted.

D. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 MATERIALS

A. Fiber cement panels manufactured from a pressed, stamped, and autoclaved mix of Portland cement, fly ash, silica, recycled rejects, and wood fiber bundles.

B. Panel surface pre-finished and machine applied.

C. Panels profiled along all four edges, such that both horizontal and vertical joints between the installed panels are ship-lapped.

D. Factory-applied sealant gasket added to top and right panel edges; all joints contain a factory sealant.

2.3 PERFORMANCE REQUIREMENTS:

A. Fiber Cement Cladding – Must comply with ASTM C-1186, Type A, Grade II requirements:
   1. Wet Flexural Strength, lower limit: 1015 psi.
   2. Water Tightness: No water droplets observed on any specimen.
   3. Freeze-thaw: No damage or defects observed.
   4. Warm Water: No evidence of cracking, delamination, swelling, or other defects observed.
   5. Heat-Rain: No crazing, cracking, or other deleterious effects, surface or joint changes observed in any specimen.

B. Mean Coefficient of Linear Thermal Expansion (ASTM E-228): Max 1.0*10^-5 in./in. F.

C. Surface Burning (CAN-ULC S102/ASTM E-84): Flame Spread: 0, Smoke Developed: 5.

D. Wind Load (ASTM E-330): Contact manufacturer for ultimate test pressure data corresponding to framing type, dimensions, fastener type, and attachment clips. Project engineer(s) must determine Zone 4 and 5 design pressures based on project specifics.
   1. Minimum lateral deflection: L/120.

E. Water Penetration (ASTM E-331): No water leakage observed into wall cavity

F. Weather Resistant (ASTM G-23): No cracking, checking, crazing, erosion, or other detrimental effects observed.

G. Steady-State Heat Flux and Thermal Transmission Properties Test (ASTM C-518): thermal resistance R Value of 1.23.

H. Fire Resistant (ASTM E-119): The wall assembly must successfully endure 60-minute fire exposure without developing excessive unexposed surface temperature or allowing flaming on the unexposed side of the assembly.

I. Ignition Resistance (NFPA 268): No sustained flaming of panels, assembly when subjected to a minimum radiant heat flux of 12.5 kW/m2 ± 5% in the presence of a pilot ignition source for a 20-minute period.

J. Fire Propagation (NFPA 285): Wall assembly of Nichiha AWP, Ultimate Clips and Starter Track, Tyvek Commercial Wrap, ½" Densglass Gold Sheathing, 16" o.c. 18 gauge steel studs, mineral wool in-cavity insulation, and interior 5/8" Type X gypsum met the acceptance criteria of NFPA 285.

K. Fire Propagation (CAN/ULC S-134): Wall assembly of Nichiha AWP, Ultimate Clips and Starter Track, Tyvek Housewrap, 5/8" FRT plywood, 16" o.c. 2x wood studs, fiberglass in-cavity insulation, and interior 5/8" Type X gypsum met the acceptance criteria of CAN/ULC S-134.

L. Drained and Back Ventilated Rainscreen (AAMA 509-09): System must pass all component tests.

M. Florida Building Code - Test Protocol HVHZ (TAS 201, 202, 203): Passed.

2.4 INSTALLATION COMPONENTS

A. Ultimate Clip System:
   1. Starter Track:
   a. Horizontal Panel Installations - FA 700 – 3,030mm (l) galvalume.
   b. Vertical Panel Installations (AWP-3030 only) – FA 710T – 3,030mm (l) galvalume.
   2. Panel Clips: JEL 777 "Ultimate Clip" (10mm rainscreen for 16mm AWP) – Zinc-Aluminum-Magnesium alloy coated steel.
   a. Joint Tab Attachments (included) – used at all AWP-1818 panel to panel vertical joints – NOT used with AWP-3030 installations.
   3. Single Flange Sealant Backer – FHK 1017 (10mm) – 6.5' (l) fluorine coated galvalume.
   4. Double Flange Sealant Backer – FH 1020 (10mm) – 10' (l) fluorine coated galvalume.
   5. Corrugated Spacer – FS 1005 (5mm), FS 1010 (10mm) – 4' (l).
   6. Finish Clip (optional) – JE310 (5mm)

B. Aluminum Trim: Prefinished as specified in finish schedule.

C. Essential Flashing System (prefinished as specified on finish schedule):
   1. Starter – main segments (3,030mm), inside corners, outside corners
   2. Compression Joint – main segments (3,030mm)
   3. Overhang – main segments (3,030mm), inside corners, outside corners, joint clips

D. Fasteners: Corrosion resistant fasteners, such as hot-dipped galvanized screws appropriate to local building codes and practices must be used. Use Stainless Steel fasteners in high humidity and high-moisture regions. Panel

manufacturer is not liable for corrosion resistance of fasteners. Do not use aluminum fasteners, staples or fasteners that are not rated or designed for intended use. See manufacturer's instructions for appropriate fasteners for construction method used.

E. Flashing: Flash all areas specified in manufacturer's instructions. Do not use raw aluminum flashing. Flashing must be galvanized, anodized, or PVC coated.

F. Sealant: Sealant shall comply with ASTM C920.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
1. Fiber cement panels can be installed over braced wood, steel studs and sheathing including plywood, OSB, plastic foam or fiberboard sheathing. Fiber cement panels can also be installed over Structural Insulated Panels (SIP's), Concrete Masonry Units (CMU's) and Concrete Block Structures (CBS's) with furring strips, and Pre-Engineered Metal Construction. Insulated Concrete Forms (ICFs) are NOT an approved substrate under any condition.
2. Allowable stud spacing: 16" o.c. maximum.
3. A weather resistive barrier is required when installing fiber cement panels. Use an approved weather resistive barrier (WRB) as defined by the 2015 IBC or IRC. Refer to local building codes.
4. Appropriate metal flashing should be used to prevent moisture penetration around all doors, windows, wall bottoms, material transitions and penetrations. Refer to local building codes for best practices.

B. Examine site to ensure substrate conditions are within specification for proper installation.

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

D. Do not install panels or components that appear to be damaged or defective. Do not install wet panels.

3.2 INSTALLATION

A. General: Install products in accordance with the latest installation guidelines of the manufacturer and all applicable building codes and other laws, rules, regulations and ordinances. Review all manufacturer installation, maintenance instructions, and other applicable documents before installation.
1. Consult with your local dealer or Nichiha Technical Department before installing any Nichiha fiber cement product on a building higher than 45 feet or three stories or for conditions not matching prescribed standard installation guide requirements and methods. Special installation conditions may be required via a Technical Review and Special Applications Form (SAF) process.
2. V*ertical Control/Expansion Joints* are required within 2-10 feet of outside corners finished with metal trim *and* approximately every 30 feet thereafter.
3. *Horizontal/Compression Joints* are required for multi-story installations of AWP. Locate joints at floor lines. Joints are flashed minimum ½" breaks. Do not caulk. Refer to installation guide(s).
a. Wood framed buildings of three or more floors require a compression joint at each floor.
b. Steel framed buildings (including reinforced concrete core with LGMF exterior walls) of more than three floors (or 45 feet) require a compression joint every 25 feet at a floor line.
4. Fastening to 1/2" CDX Plywood:
- 5 Fasteners per clip @ 6" o.c.
- #8 or #10 full thread wood screw, 1" long
- Fasten starter track @ 12" o.c.
- #8 or #10 full thread wood screw, 1" long

B. Panel Cutting

1. Always cut fiber cement panels outside or in a well ventilated area. Do not cut the products in an enclosed area.
2. Always wear safety glasses and NIOSH/OSHA approved respirator whenever cutting, drilling, sawing, sanding or abrading the products. Refer to manufacturer SDS for more information.
3. Use a dust-reducing circular saw with a diamond-tipped or carbide-tipped blade.

a. Recommended circular saw: Makita 7-1/4” Circular Saw with Dust Collector (#5057KB).

b. Recommended blade: Tenryu Board-Pro Plus PCD Blade (#BP-18505).

c. Shears (electric or pneumatic) or jig saw can be used for complicated cuttings, such as service openings, curves, radii and scrollwork.

4. Silica Dust Warning: Fiber cement products may contain some amounts of crystalline silica, a naturally occurring, potentially hazardous mineral when airborne in dust form. Consult product SDS or visit https://www.osha.gov/dsg/topics/silicacrystalline/.

3.3 CLEANING AND MAINTENANCE

A. Review manufacturer guidelines for detailed care instructions.

END OF SECTION 074646

SECTION 076201 - SHEET METAL FLASHING AND TRIM -GC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Formed flashing and counterflashing.
2. Formed wall sheet metal fabrications.

1.2 SUBMITTALS

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

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

1. Include details for forming, joining, supporting, and securing sheet metal flashing and trim, including pattern of seams, termination points, fixed points, expansion joints, expansion-joint covers, edge conditions, special conditions, and connections to adjoining work.

C. Maintenance data.

D. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

B. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 SHEET METALS

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

B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
1. Exposed Coil-Coated Finishes:

a. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.

2. Color: Slate Gray

2.2 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.
2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

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

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

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

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
3. Fasteners for Aluminum-Zinc Alloy-Coated Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.

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

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

E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

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

2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Obtain field measurements for accurate fit before shop fabrication.
2. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.

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

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

E. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.

2.5 WALL SHEET METAL FABRICATIONS

A. Base Flashing: Fabricate from the following materials:

1. Aluminum: **0.040 inch** thick.

2. Color: Match color of adjacent materials; provide samples for Owner approval.

B. Counterflashing and Flashing Receivers: Fabricate from the following materials:

1. Aluminum: **0.040 inch** thick.

2. Color: Match color of adjacent materials; provide samples for Owner approval.

C. Brake metal trim at window heads, jambs and sills: Fabricate from the following materials:

1. Aluminum: **0.040 inch** thick.

2. Color: Match color of adjacent materials; provide samples for Owner approval.

D. Sill Flashing at base of EIFS: Fabricate from the following materials:

1. Aluminum: **0.040 inch** thick.

2. Color: Match color of adjacent materials; provide samples for Owner approval.

E. Through-Wall Flashing: Flexible Flashing: Use one of the following unless otherwise indicated:

1. Self-adhering 40 mil thick (25 mil Elvaloy sheet bonded to 15 mil rubberized asphalt with release paper. Use only where flashing is fully concealed in masonry.

a. Products: Subject to compliance with requirements, provide one of the following:
1) Flex Flash - as manufactured by Hohmann & Barnard, Inc..
2) Hyload Surface Adhered Flashing Membrane (no drip) – as manufactured by Hyload, Inc.

b. Include approved primer, termination bar, pre-formed corners and compatible sealants.

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

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement so that completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Coat back side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

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

D. Fastener Sizes: Use fasteners of sizes that will penetrate metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

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

F. Rivets: Rivet joints in uncoated aluminum where indicated and where necessary for strength. Rivets to be colored to match sheet.

3.2 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Parapet Scuppers: Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

3.3 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 04 Section "Unit Masonry."

3.4 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION 076201

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.
3. Latex joint sealants.
4. Preformed joint sealants.

1.2 SUBMITTALS

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

B. Samples: For each kind and color of joint sealant required.

C. Laboratory Test Reports: For sealants, sealant primers, and adhesives used, including, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers." Products shall conform to local and regional air quality management standards of the authority with jurisdiction.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

B. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

2.2 SILICONE JOINT SEALANTS

A. Neutral-Curing Silicone Joint Sealant JS**SS-1**: ASTM C 920.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. BASF Building Systems.
b. Dow Corning Corporation.
c. GE Advanced Materials - Silicones.
d. May National Associates, Inc.
e. Pecora Corporation.
f. Polymeric Systems, Inc.
g. Schnee-Morehead, Inc.
h. Sika Corporation; Construction Products Division.
i. Tremco Incorporated.

j. Custom Building Products – Polyblend Siliconized Caulk

2. Type: Single component (S).
3. Grade: Nonsag (NS).
4. Class: 100/50.
5. Uses Related to Exposure: Nontraffic (NT).

B. Acid-Curing Silicone Joint Sealant JS**SS-2**: ASTM C 920.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. BASF Building Systems.
b. Dow Corning Corporation.
c. GE Advanced Materials - Silicones.
d. May National Associates, Inc.
e. Pecora Corporation.
f. Polymeric Systems, Inc.
g. Schnee-Morehead, Inc.
h. Sika Corporation; Construction Products Division.
i. Tremco Incorporated.

2. Type: Single component (S).
3. Grade: Nonsag (NS).
4. Class: 100/50.
5. Uses Related to Exposure: Nontraffic (NT).

C. Mildew-Resistant Silicone Joint Sealant JS**SS-3**: ASTM C 920.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. BASF Building Systems.
b. Dow Corning Corporation.
c. GE Advanced Materials - Silicones.
d. May National Associates, Inc.
e. Pecora Corporation.
f. Polymeric Systems, Inc.
g. Schnee-Morehead, Inc.
h. Sika Corporation; Construction Products Division.
i. Tremco Incorporated.

2. Type: Single component (S).
3. Grade: Nonsag (NS).
4. Class: 100/50.
5. Uses Related to Exposure: Nontraffic (NT).

2.3 URETHANE JOINT SEALANTS

A. Urethane Joint Sealant JS**US-1**: ASTM C 920.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. BASF Building Systems.
b. Bostik, Inc.
c. Lymtal, International, Inc.
d. May National Associates, Inc.
e. Pacific Polymers International, Inc.
f. Pecora Corporation.
g. Polymeric Systems, Inc.
h. Schnee-Morehead, Inc.
i. Sika Corporation; Construction Products Division, “**Sikaflex-2c NS**”.
j. Tremco Incorporated, “**Dymeric 240 FC”.**

2. Type: Multicomponent (M).
3. Grade: Pourable (P).
4. Class: 50.
5. Uses Related to Exposure: Traffic (T).

2.4 POLYUREA JOINT SEALANTS

A. Polyurea Joint Sealant JS**PU- 1**: Semi-rigid joint filler acceptable for use in USDA and FDA regulated facilities.

1. Manufacturers/Products: Subject to compliance with requirements, provide products by one of the following:

a. Metzger/ McGuire; Spal-Pro RS-88.

b. VersaFlex; SL 60.

B. Polyurea Joint Sealant JS**PU- 2**: Semi-rigid joint filler acceptable for use in USDA and FDA regulated facilities.

1. Manufacturers/Products: Subject to compliance with requirements, provide products by one of the following:

a. Metzger/ McGuire; Spal-Pro RSF.

2.5 LATEX JOINT SEALANTS

A. Latex Joint Sealant JS**LS-1**: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. BASF Building Systems.
b. Bostik, Inc.
c. May National Associates, Inc.
d. Pecora Corporation.
e. Schnee-Morehead, Inc.
f. Tremco Incorporated.

2.6 PREFORMED JOINT SEALANTS

A. Preformed Foam Joint Sealant JS**PS-1**: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Dayton Superior Specialty Chemicals.
b. EMSEAL Joint Systems, Ltd.
c. Sandell Manufacturing Co.
d. Schul International, Inc.
e. Willseal USA, LLC.

2.7 JOINT SEALANT BACKING

A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.8 MISCELLANEOUS MATERIALS

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

B. Stain Preventing Film: Stain preventing film for polyuria joint fillers, **"Spal Pro Spf"** by Metzger/McGuire.

C. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

D. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

1. Remove laitance and form-release agents from concrete.
2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

B. Install sealant backings of kind 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.

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

D. 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.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

F. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.3 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

a. Perform **10** tests for the first **1000 feet** of joint length for each kind of sealant and joint substrate.
b. Perform 1 test for each **1000 feet** of joint length thereafter or 1 test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation and contraction joints in cast-in-place concrete slabs.
b. Tile control and expansion joints.
c. Joints between different materials listed above.

2. Joint Sealant: JS**US-1**.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Construction joints in cast-in-place concrete.
b. Control and expansion joints in unit masonry.
c. Joints between metal panels.
d. Joints between plaster assemblies.
e. Joints between stone veneer assemblies.
f. Joints between different materials listed above.
g. Perimeter joints between materials listed above and frames of doors, windows and louvers.
h. Control and expansion joints in overhead surfaces.

2. Joint Sealant: JS**SS-1**.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation joints in cast-in-place concrete slabs.

2. Joint Sealant: JS**US-1**.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

   a. Sawn contraction joints in cast-in-place concrete slabs.

2. Joint Sealant: JS**PU-1**.
   Joint-Sealant Color: Standard Gray.

E. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

   a. Sawn contraction joints in cast-in-place concrete slabs in refrigerator/freezer.

2. Joint Sealant: JS**PU-2**.
   Joint-Sealant Color: Standard Gray.

F. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non traffic surfaces.

1. Joint Locations:

   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where indicated.
   c. Tile control and expansion joints.
   d. Vertical joints on exposed surfaces of interior unit masonry, walls and partitions.
   e. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
   f. Perimeter joints between interior wall surfaces and suspended ceiling grid framing.

2. Joint Sealant: JS**LS-1**.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

G. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

   a. Exposed joints within aluminum entrance framing systems.

2. Joint Sealant: JS**SS-2**.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

H. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Sealant Location:

   a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   b. Tile control and expansion joints where indicated.
   c. In toilet rooms and break room.
   d. Sales floor joints between SSBR at Cooler/Freezer and MVT
   e. Sales floor joints columns and MVT

2. Joint Sealant: JS**SS-3**.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

I. Joint-Sealant Application: Joints between millwork and wall surfaces.

1. Joint Sealant Location:

    a. Joints between wall and sacking counter
    b. Joints between wall and Break Room Counter
    c. Joints between wall and Office Counter

2. Joint Sealant: JS**SS-1**.
3. Joint-Sealant Color: as selected by owner.

END OF SECTION 079200

SECTION 079999 – ALDI GC ROOFING INSTRUCTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. ALDI GC Roofing Instructions.
2. Special instructions for roofing related to Photovoltaic systems.

1.2 SPECIAL INSTRUCTIONS

A. The ALDI GC shall refer to specifications Appendix “B” for Roof Scope of Work. The ALDI GC shall then verify this with Aldi Construction Manager during Bidding and adjust bid accordingly:

- Verify whether roofing shall be by ALDI Vendor or by GC.
- Verify roofing system type.

B. Upon verification of scope of work, the ALDI GC shall verify appropriate roofing details and instructions with ALDI Roofing Vendor and Roofing Manufacturer and provide the work within his scope.

C. The Solar energy system is shown on the drawings for reference only and will be provided by others under separate contract with ALDI.

D. The Aldi GC is responsible for coordination with the solar system contractor and with the roofing Vendor for all work that will affect roof system installation and warranty. –See attached roof system instructions.

1.3 QUALITY ASSURANCE

A. The ALDI GC shall organize and conduct a conference at the site to coordinate installation of roofing system and Photovoltaic system.

PART 2 - EXECUTION –N/A

To: Building Owner

Re: Letter of Compliance – Photovoltaic Installation on Carlisle Warranted Roof

This memo outlines Carlisle's recommendations concerning the installation of Photovoltaic (PV) systems over a Carlisle warranted roofing system in order to facilitate the installation of the PV system with limited disturbance to the Carlisle roofing system. The determination of the most suitable PV technology, racking and installation method is the responsibility of the Building Owner or its designated representative. Listed below are the recommendations along with conditions that may impact the Carlisle warranty.

Please note that this list is not an exhaustive one:

1. Determine the building's structural ability to withstand the PV system.
2. The roofing system should be protected during installation of the PV system to prevent damage. This includes the staging and assembly areas and other areas heavily traveled.
3. To avoid PV system removal costs to the building owner, the PV system should provide adequate clearance for access to the roof membrane should maintenance or repair be required.
4. Field seams that may be concealed by the PV system, and therefore harder to access, should be overlaid by a Carlisle authorized roofing applicator using approved details and products.
5. For non-penetrating PV racking systems, a protection course consisting of Carlisle's Pressure-Sensitive Molded Walkway Pads is recommended between the PV support system and the roofing membrane. Walkway pads of thickness and density equal or greater to those which can be provided by Carlisle SynTec may be used to prevent damage to the roofing membrane.
6. PV laminates must not be adhered directly to the Carlisle primary membrane. A compatible Carlisle membrane shall be used as a slip sheet and spliced to existing membrane.
7. Walkway pads, protection pads, slip sheets and sacrificial sheets shall be of the same color as the roofing membrane.
8. Racking systems that require penetration of the roofing membrane must be flashed in accordance with the appropriate Carlisle published detail. All flashing details must be performed by a Carlisle authorized roofing applicator.

It is recommended that areas frequently accessed for the purpose of operation or maintenance of the PV system be protected by walkways installed in accordance with the Carlisle published specifications and details. Should Carlisle be contacted to investigate a warranty claim, or to make warranty related repairs, providing access to the membrane (removal and replacement of the PV System) is the responsibility of the Building Owner.

The following table lists the roofing inspections during the PV system installation to ensure continuation of the Carlisle warranty. Upon completion of the roof alteration, an inspection must be scheduled and performed by a Carlisle Field Services Representative.

P.O. Box 7000 Carlisle, PA 17013 Phone: 800.479.6832 Fax: 717.245.7053 www.carlisle-syntec.com

Field Assessment & Inspection Fees for PV Systems per Project
Inspection fees must be pre-paid via credit card prior to being scheduled

Inspection	Required	Fee
Initial assessment prior to PV system staging, assembly and installation	Not required but highly recommended	$1000
Roof Inspection after penetrating PV system installation (penetrating PV system includes any array with 25 or more penetrations)	Required	$2000
Roof Inspection after non-penetrating PV system installation	Required	$1000
Re-Inspection(s)	Required if post inspection(s) are rejected	$500

Warranty Document
Upon inspection and acceptance, and payment of all fees, a warranty continuance letter will be issued by Carlisle and forwarded to the Building Owner. The continuance letter will outline additional warranty terms and should be retained along with the original warranty for future reference.

As your acknowledgement of the recommendations cited herein, Carlisle SynTec requires that this document be signed by the Owner. Failure to sign and return this document will prevent the warranty from being re-instated after PV installation is completed.

To be completed by building owner:

Owner (company):	Date:
Signature:	Printed Name:
Building Name:	Building Location:
Warranty#:	

To be completed by solar integrator:

Company Name:	Contact:
Address:	Phone:
Email:	Fax:
Estimated Start Date of Install:	Estimated Completion Date of Install:

Completed form may be emailed or faxed to the following:

Attn: Technical Coordinator
Phone: 800.441.9773
Fax: 717.245.7121
Email: PVLOC-WarrantyServices@CarlisleCCM.com

Rev. 02/13/2013

P.O. Box 7000 Carlisle, PA 17013 Phone: 800.479.6832 Fax: 717.245.7053 www.carlisle-syntec.com

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Sika Corporation Photovoltaic Installation/Warranty Policy
ALDI PROJECTS

INTRODUCTION

Rooftops are an attractive platform for the installation of solar photovoltaic (PV) systems (a "PV System"). Sika Corporation ("Sika") has for many years been an advocate of roof-mounted PV Systems. When considering the installation of a PV System on your new or existing Sika roofing system (a "Roofing System"), it is important to remember that:

a.) The Roofing System's function is first and foremost to protect the building from the elements;
b.) A PV System installation imposes numerous additional loads on the Roofing System, both during installation and throughout its service life; and
c.) The investment horizon for a typical PV System installation is quite lengthy. The remaining service life of the Roofing System should at least match that of the PV System.

The enclosed booklet "Successful Rooftop Photovoltaics: How to achieve a high quality, well maintained, compatible rooftop PV system", prepared by the Center for Environmental Innovation in Roofing (CEIR), provides useful information and advice.

When considering whether to install a PV System on a new or existing Sika Roofing System, it also is important to take into account and understand the impact such installation will have on the warranty issued by Sika on the existing Roofing System or the warranty to be issued by Sika on a newly-installed Roofing System (the "Roofing Warranty"). A PV System, and the installation thereof, enhances the potential of leaks in the Roofing System due to significant roof top traffic that occurs during the installation and the numerous additional loads put on the Roofing System during installation and throughout the Roofing System's service life.

Accordingly, the Roofing Warranty for an existing Roofing System will be suspended during the installation of a PV System. With respect to a newly-installed Roofing System, Sika will not consider issuing a Roofing Warranty for such Roofing System unless and until the installation of the PV System is completed. This Sika Photovoltaic Installation/Warranty Policy (the "PV

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Policy") describes the requirements and conditions that must be satisfied in order for Sika to determine whether to reinstate or issue a Roofing Warranty after the installation of the PV System is completed, which determination is within the commercially reasonable discretion of Sika.

The following guidelines and requirements also will help you realize the expected service life of your Sika Roofing System should you elect to proceed with the installation of a PV System.

TECHNICAL REQUIREMENTS

With respect to any PV System installation, whether on a newly-installed or existing Roofing System, in order for Sika to consider whether to issue or reinstate a Roofing Warranty, as the case may be, following the completion of the PV System installation, the Sika Roofing System must at least meet the following minimum technical requirements:

- **Sarnafil G410 or S327**
  - **60 mil membrane thickness or greater**
  - **And an approved cover board (Dens Deck, Dens Deck Prime, Securock, High Density Isocyanurate Insulation) under the membrane**
  - **OR**
  - **80 mil thickness or greater without a cover board**
- **Membrane must be no more than five (5) years old.**

Acceptable High Density Isocyanurate Insulation Boards:

1. Sarnatherm Roof Board-A
2. Sarnatherm Roof Board-H
3. Sarnatherm Roof Board-M

- All Penetrations are to be round in shape and be able to be flashed a minimum of eight inches (8") above the finished roof level.
- Sika G410 or S327 protection sheets of a minimum 60 mil thickness must be used under the solar racking or mounting systems, each ballast pan, rail or other component in contact with the roofing membrane.
- No Self Adhered, welded or other similar attachment methods of securing the PV System directly on to the membrane will be allowed without Sika's written approval
- The PV System must not impede drainage from the roof surface.
- The PV System shall not impede repairs of the roof membrane throughout the Roofing

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System's service life.

- Any PV components hindering leak investigations and/or warranty repairs are to be disconnected and removed at the building owner's expense.
- The building owner will be responsible for mitigating any hazards (including but not limited to electrical) and insuring that areas to be investigated and/or repaired under warranty are safe.

ACCEPTED RACKING SECUREMENT SYSTEMS:

To the extent OMG Powergrip or U-Anchor anchoring component products (the "Anchoring Products") are included as part of, or incorporated into, the PV System, Sika will consider issuing, reinstating or continuing a Roofing Warranty only if Anchoring Products having a target patch made of Sika membrane are used and the Anchoring Products are installed by the Sika authorized applicator in strict conformance with all Sika's installation guidelines and requirements and in accordance with the terms of this PV Policy.

Please be advised that Sika has not tested, and cannot comment upon the suitability, effectiveness, durability or other aspects of the Anchoring Products that may be installed or used in connection with a particular roofing/PV project or a particular PV System. Also, Sika cannot, and therefore does not, predict any short- or long-term impacts the installation of Anchoring Products and other components of a PV System may have upon the Sika Roofing System, particularly after any installed Anchoring Products or other attachment or solar paneling systems are subjected to a thermal expansion and contraction, windloads, shear forces and the like. By allowing U-Anchor or OMG Powergrip components to be installed on Sika Roofing Systems, Sika in no way intends to, nor does Sika, make any endorsement of either U-Anchor or OMG Powergrip products.

Sika disclaims any and all responsibility for any and all damages, leaks, defects or other problems or claims that may result, either directly or indirectly, from any and all aspects of the use and installation of the Anchoring Products on, or in connection with, Sika Roofing Systems.

ROOFS NOT MEETING THE TECHNICAL REQUIREMENTS NOTED ABOVE

In the event that a new or existing Roofing System does not meet the technical requirements for the membrane and cover board specified above, Sika will consider issuing or reinstating a Roofing Warranty, as the case may be if, in addition to the requirements set forth in this PV Policy, the following actions are implemented:

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A) Sarnafil G410-12 (48 mils), S327-12 (48 mils) or any Sikaplan membrane with an approved cover board:
   - All systems: mandatory Sarnatred around all combiner boxes and between roof entry/exit point and arrays.
   - For ballasted systems: minimum 72 mil protection layer of Sarnafil G410 or S327 under the solar racking or mounting system, each ballast pan, rail or other system component in contact with the membrane.

B) Any Membrane without an approved cover board installed under it:
   - All requirements listed under A) above
   - Owner to sign warranty coverage limitation letter.

C) Installation of PV System on any membrane that is more than five (5) years old will **void** any existing Roofing Warranty with respect to such membrane.

ADMINISTRATIVE REQUIREMENTS

The following steps must be followed and conditions met with respect to a PV System installation in order for Sika to consider issuing or reinstating a Roofing Warranty for the Sika Roofing System on which the PV System will be installed:

- Sika must review the type of PV System to be used solely for the purposes of considering whether to issue or reinstate the Roofing Warranty following the installation of the PV System. Installation details and roof plans outlining the layout, as well as information regarding the manufacturer of the racking system used for the PV System and the manufacturer of other components of the Roofing System will also be required. Please allow a minimum of three (3) weeks for review. Sika does not assume any responsibility or liability regarding the PV System or the design thereof by reviewing the system for purposes of determining whether or not to issue or reinstate a Roofing Warranty following the installation of the PV System.
- In the case of an existing Sika Roofing System, an inspection of the Sika Roofing System prior to the PV System installation ($500.00) must be conducted. In the case of a newly-installed Sika Roofing System, a technically acceptable "final" inspection for warranty issuance of the newly-installed Sika Roofing System must be completed prior to the installation of the PV System in satisfaction of the Pre-PV System Installation inspection requirement. This "final" inspection, however, will be conducted at Sika's cost. In both cases, an inspection after the PV System is installed ($500.00) must be conducted. Fees for inspections shall be payable in advance prior to issuance or reinstatement of the Roofing Warranty, as the case may be. These inspections will be conducted by a Sika

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Technical Representative. Any repairs identified in these inspections that would not otherwise be covered under the Sika warranty must be completed at the owner's expense by the original Sika Authorized Applicator who installed the roof assembly unless otherwise agreed to by Sika.

- The Owner shall enter into an agreement with Sika acknowledging and accepting certain rights, duties and obligations with respect to the PV System and the installation thereof.
- The original installing Sika authorized roof applicator must perform all flashing work on all penetrations associated with the installation of the PV Systems and accessories unless specifically agreed to in writing by Sika.
- Sika reserves the right to view the installation of the PV System at the owner's expense ($500.00/visit) during the installation process.
- Issuance or reinstatement of a Roofing Warranty will be at the commercially reasonable discretion of Sika and subject to payment of all fees and completion of all repairs to the Roofing System.

RECOMMENDATIONS:

- It is strongly recommended that the Owner engages a Roof Integrated Solar Energy (RISE) Certified Solar Roofing Professional (CSRP) for integrating the Roofing System and the PV System.
- It is strongly recommended that the Solar Integrator/ PV installer ensure with Owners' architect or designer that the PV system does not affect the roof system's fire resistance ratings, UL or other code approvals, insurance and other ratings
- It is strongly recommended that the PV installer ensure with the Owners' architect or designer that the additional weight of a PV System can be accommodated by the building structure, taking into account all dead and live loads, including wind uplift
- It is strongly recommended that the PV installer ensure with the Owners' architect or designer that the roof assembly be able to resist the installation construction traffic, the dead load, and the increased maintenance traffic.
- Additional Sarnatred or Sarnafil approved walkways should be installed around all combiner boxes and between the arrays and the roofs entry/exit points or in areas of expected heavy foot traffic.

10/__/2016

1000 Venture Blvd., Wooster, Ohio 44691
tel. 800/927-8578 fax 800/649-2737
www.fibertite.com www.seamancorp.com

January 12, 2017

RE: FiberTite Roofing Systems & Photovoltaic Arrays

Commercial rooftops are an attractive platform for the installation of solar photovoltaic (PV) electricity producing systems. It is important to remember, however, that the roof's function is first and foremost to protect the building contents and its people from the elements.

The determination of the most suitable PV technology, racking and installation method is the responsibility of the Building Owner and/or designer of record. Seaman Corporation does not recommend self-adhered amorphous PV systems.

Seaman Corporation has no objection to the use or installation of roof top photovoltaic array over a new or existing FiberTite Roofing System. The photovoltaic array in itself does not present a physical or material compatibility issue and will not nullify a new or existing FiberTite Commercial Roofing System Warranty. However, the array is considered an "overburden" per the terms and conditions of our commercial warranties. Should Seaman Corporation be contacted to investigate a warranty claim, or to make warranty related repairs, providing access to the membrane, including removal and replacement of the array, if necessary, will be the responsibility of the Building Owner.

The following guidelines and recommendations apply to all roof top PV systems installed over a FiberTite Roofing System.

- The structural integrity of the building must be such that it will safely support the roof to array.
- The composite below the membrane must be in sound condition and capable of supporting the array.
- A coverboard between the insulation and FiberTite membrane is strongly recommended.
- The array must be designed and installed by an authorized/licensed integrator
- **GENERAL CONSIDERATIONS**
  - Racks should have enough clearance above the membrane to service the roof.
  - Set PV arrays so that all field seams and penetration are accessible
  - High traffic areas and access points shall be protected with FiberTite Tuff-Trac protection pads and walkways.
  - It is the responsibility of the building owner to ensure compliance with local building codes.

- For ballast style and non-penetrating racking systems, the array's supports must be installed over a protective layer of FiberTite Tuff-Trac protection pad.
- FiberTite Tuff-Trac protection pads shall be installed at all access points within and around the array
- A notice of roof alteration must be filed with FiberTite Technical Services prior to the commencement of the work.
- Any incidental roof modifications, including penetrating the FiberTite membrane, required or performed as a result of the photovoltaic installation must be performed by an Authorized FiberTite Contractor.
- Seaman Corporation may at its option, recommend or require specific roof detailing consistent with our FiberTite Commercial Roofing warranty requirements
- Seaman Corporation will perform a pre-installation and post installation inspection of the roof(s) subject to FiberTite warranty commitments for a fee based upon the schedule below.
- The cost of all inspections associated with the FiberTite Roof System and the installation of the PV array as well as any recommended/required repairs shall be borne by the owner or the designated dealer of record.

If you have any questions or require additional information regarding our FiberTite Roofing Systems and our acceptance with regard to photovoltaic systems, please feel free to contact **FiberTite Technical Services at: 800.928.8578.**

INSPECTION FEE SCHEDULE

Pre-installation and staging inspection of the roof system:	$1,000.00
Post installation inspection of the roof system:	$1,000.00
Re-inspection fees:	$ 700.00

END OF SECTION 079999