SECTION 07 14 00
FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-Applied Waterproofing:
   1. Polyurethane waterproofing.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete substrate.

B. Section 07 21 00 - Thermal Insulation: Insulation used for protective cover.

C. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings.

D. Section 07 92 00 - Joint Sealants: Sealing moving joints in waterproofed surfaces that are not part of work in this section.

1.03 REFERENCE STANDARDS

A. ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course; 2015.

B. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).

C. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2014.

D. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).

E. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2017.

F. NRCA (WM) - The NRCA Waterproofing Manual; 2005.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for membrane, surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants.

C. Warranty:
   1. Submit manufacturer warranty and ensure that forms have been completed in Director's Representative's name and registered with manufacturer.
   2. Submit installer's certification that installation complies with warranty conditions for the waterproofing membrane.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.

B. Installer’s Qualifications: The Contractor shall demonstrate qualifications to perform the Work of this Section by submitting certification or license by the waterproofing membrane manufacturer as a trained and authorized applicator of the product the installer intends to use.

C. Source Limitations: All components listed in this section shall be provided by a single manufacturer or approved by the primary waterproofing manufacturer.

D. Waterproofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of waterproofing terms related to this section

1.06 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until cured.

B. All surfaces to receive the waterproofing membrane shall be free from visible water, dew, frost, snow and ice. Application of waterproofing membrane shall be conducted in well ventilated areas.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's standard warranty. Materials warranty shall be for a minimum of one year starting at the date of Substantial Completion. System warranty shall be for the following duration in accordance with specified system.
   1. Warranty Length: 5 years 60 mil system.
   2. Warranty Length: 10 years 90 mil system
   3. Warranty Length: 20 years 120 mil system and approved applicator

PART 2 PRODUCTS

2.01 FLUID APPLIED WATERPROOFING MATERIALS

A. Polyurethane Waterproofing: Cold-applied one or two component, bitumen-modified polyurethane, complying with ASTM C836/C836M.
   1. Cured Thickness: 120 mils, .12 inch, minimum.
   2. VOC Content: None.
   3. Tensile Strength: 400 psi, minimum, measured in accordance with ASTM D412.
   4. Ultimate Elongation: 405 percent, measured in accordance with ASTM D412.
   5. Durometer Hardness, Type A: 30, minimum, in accordance with ASTM D2240.
   6. Adhesion: Greater than 150 psi, measured in accordance with ASTM D4541.
   7. Brittleness Temperature: Based on minus 50 degrees F, measured in accordance with ASTM D746.
   8. Manufacturers:
      a. Sika Corporation; Sikalastic-320 NS; www.usa.sika.com.
      b. Sika Corporation; Sikagard 7600 VG; www.usa.sika.com.
      c. Or approved equal.

2.02 ACCESSORIES

A. Membranes and Coatings
   1. Base embedment coat with reinforcement per the waterproofing system build shall be a single component, cold fluid applied, moisture cure, bitumen modified, polyurethane base coat membrane
   2. Top coat with reinforcement per the waterproofing system build shall be a single component, cold fluid applied, moisture cure, bitumen modified, polyurethane base coat membrane.
   3. Base coat and top coat membranes shall be low in VOC's, and be a one component elastomeric polyurethane membrane that may be brush or roller applied. Membrane shall have the following physical properties and conforms to ASTM D7311-07: Standard Specification for a single component, cold fluid applied, moisture cure, bitumen modified, polyurethane membranes

B. Repair and Patching
   1. Cementitious repair mortar to repair bug holes, spalled areas, and other non-structural surface defects, to fill uneven areas and birdbaths, or to repitch decks shall be a two component, polymer-modified, Portland cement, fast-setting, trowel-grade mortar.
      a. Basis of Design: SikaQuick 1000 by Sika Corp

C. Fillet Bead and Penetration Sealant
   1. Sealant for fillet bead applications and membrane penetrations shall be one and two part polyurethane sealants suitable for fillet bead transition compound to be applied prior to the installation of the membrane system at changes in substrate direction, sealing reglet terminations, cracks in the substrate and penetrations of the waterproofing system.
      a. Basis of Design: Sikaflex 1a, 1a+

D. Primers
   1. Some warranties and/or substrates may require the use of a primer. Follow manufacturer's instructions to achieve warranty.
      a. Basis of Design: Sikalastic FTP Lo-VOC Primer for green or damp concrete (when required by warranty); Sikaflex Primer 449 for PVC; Sikalastic Recoat Primer for Fiberglass or before recoating on old Sikalastic 320; and Sikalastic PF Lo-VOC Primer for all other surfaces including concrete, EIFS, DensGlass, metal, and marine grade or high density plywood.

E. Membrane Reinforcement - Polyester
   1. Reinforcement for the waterproofing membrane system shall be a non-woven, needle-punched polyester fleece specifically designed to provide greater impact resistance and greater resistance to excessive thermal and structural movement while maintaining elasticity and membrane film integrity.
      a. Basis of Design: Sika Fleece by Sika Corp.

F. Protection Board
   1. Membrane should be protected as soon as possible with a protection board to protect from other trade work, backfill, overburden placement and as an added defense against water and moisture drive.
   2. Protection board to be compatible with waterproofing.

G. Drainage Mat
   1. Dimpled core polystyrene drainage mat with a non-woven and woven polypropylene filter fabric bonded to the topside of the mat, and a bonded protection sheet on the underside of the mat. To be installed between the waterproofing membrane and protection board.
      a. Basis of Design: Sika Drainage Mat 420 or 720 or approved equal.

H. Spray Equipment
   1. Refer to manufacturer's instructions for recommend spray equipment and fittings.

2.03 ACCESSORIES

A. Protection Board: Rigid insulation specified in Section 07 21 00.

B. Drainage Panel: 1/4 inch thick formed plastic, hollowed sandwich.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Surfaces shall be sound, clean and free of standing water, oil, grease, dirt, excess mortar or other contaminants. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full flush.

3.02 SURFACE PREPARATION

A. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters. Verify that all openings or penetrations through the intended substrate are secured back to solid blocking. Ensure all preparatory Work is complete prior to applying membrane.

B. All surfaces shall be blown clean using an air compressor to remove any remaining loose debris.

C. Refer to manufacturer's instructions for additional surface preparation requirements.

3.03 SUBSTRATE PREPARATION

A. Acceptable substrates include concrete, concrete block, solid wood/plywood sheathing, and metal.

B. Structural Concrete:
   1. Acceptable concrete substrates are limited to poured in place concrete decks.
   2. Minimum deck thickness for structural concrete is 4 inches (10.2 cm).
   3. Concrete surface to be light broom finish or equivalent.
   4. Curing agents shall be checked for compatibility with specified waterproofing materials. Most curing agents shall be completely removed from the substrate by grinding, scarifying, or other mechanical means.
   5. Concrete and masonry surfaces shall be low-pressure (5,000 psi or less) power-washed in accordance with ICRI Guideline No. 03732: Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays to remove all dirt, debris or surface contamination that would compromise bonding of the specified waterproofing membrane system. Remove oil or grease with solvents, or detergent and water. Rinse surface clean of remaining cleaning agents.

C. Refer to manufaturer instructions for additional substrate preparation requirements.

3.04 MEMBRANE REINFORCEMENT

A. Reinforcement of Cracks, Plywood and Cover Board Joints/Seams, and Base/Curb Flashing Transitions:
   1. For all locations where the specified membrane system is to be applied directly to the substrate surface, reinforcement of cracks and joints prior to applying the specified membrane system is conditional on the terms agreed to in a given warranty
   2. For all horizontal-to-vertical transitions, provide a ¾” x ¾” polyurethane sealant cant.
   3. Back roll reinforcement to fully embed reinforcement into the wet liquid polyurethane membrane. Add more liquid membrane as needed to fully embed the reinforcement.
   4. Ensure reinforcement is not in tension during embedment.

3.05 INSTALLATION

A. Install waterproofing to specified minimum thickness in accordance with manufacturers instructions and NRCA (WM) applicable requirements.

B. Apply primer or surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

C. Seal membrane and flashings to adjoining surfaces.

3.06 INSTALLATION - DRAINAGE PANEL AND PROTECTION BOARD

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

B. Place protection board directly against drainage panel; butt joints, and scribe and cut boards around projections, penetrations, and interruptions.

C. Adhere protection board to substrate with compatible adhesive.

3.07 PROTECTION

A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

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

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

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

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Field-applied termiticide for concrete slabs and foundations.

B. Section 05 40 00 - Cold-Formed Metal Framing: Board insulation as wall sheathing.

C. Section 07 21 19 - Foamed-In-Place Insulation: Plastic foam insulation other than boards.

D. Section 07 25 00 - Weather Barriers: Separate air barrier and vapor retarder materials.

E. Section 07 53 00 - Elastomeric Membrane Roofing: Insulation specified as part of roofing system.

F. Section 09 21 16 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.03 REFERENCE STANDARDS

A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.

B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

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

C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

D. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

E. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of contractor accreditation and installer certification on project site during and after installation. Present on-site documentation upon request.

1.05 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
   1. Installer Qualification: Use accredited contractors, certified installers, evaluated materials, and third-party field quality control audit.
   2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

PART 2 PRODUCTS

2.01 APPLICATIONS

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

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

C. Insulation Inside Masonry Cavity Walls: Extruded polystyrene (XPS) carbon black board.

D. Insulation Over Metal Stud Framed Walls, Continuous: Extruded polystyrene (XPS) carbon black board.

E. Insulation Above Lay-In Acoustical Ceilings: Batt insulation with no vapor retarder.

2.02 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
   1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.

B. Extruded Polystyrene (XPS) Continuous Insulation (CI) Board: Complies with ASTM C578, and manufactured using carbon black technology.
   1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
   4. Board Size: 48 inch by 96 inch.
   5. Board Thickness: 1-3/4 inch.
   6. Board Edges: Shiplap, at long edges.

C. Extruded Polystyrene (XPS) Cavity Wall Insulation Board: Complies with ASTM C578, and manufactured using carbon black technology.
   1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
   4. Board Size: 15-3/4 inch by 96 inch.
   5. Board Thickness: 1-3/4 inch.
   6. Board Edges: Square.

2.03 BATT INSULATION MATERIALS

A. Mineral Fiber Batt Insulation (Acoustic Insulation): Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
   1. Application: At all interior partitions to receive insulation.
   2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
   3. Sound Control: Absorbs sound and improves wall assembly STC ratings by up to 10 dB.
   4. Manufacturers:
      a. Johns Manville; MinWool Sound Attenuation Fire Batts: www.jm.com/#sle.

2.04 ACCESSORIES

A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
   1. Application: Sealing of interior circular penetrations, such as pipes or cables.
   2. Width: Are required for application.

B. Flashing Tape: Special reinforced film with high performance adhesive.
   1. Application: Window and door opening flashing tape.
   2. Width: As required for application.

C. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
   1. Length as required for thickness of insulation material and penetration of deck substrate.

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

E. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

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

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

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Install boards horizontally on foundation perimeter.

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

3.03 BOARD INSTALLATION AT EXTERIOR WALLS

A. Install boards horizontally on walls.

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

3.04 BOARD INSTALLATION AT CAVITY WALLS

A. Install boards to fit snugly between wall ties.

B. Install boards horizontally on walls.

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

3.05 BOARD INSTALLATION UNDER CONCRETE SLABS

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

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

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

3.06 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

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

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

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.07 PROTECTION

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

END OF SECTION

SECTION 07 21 19
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Foamed-in-place insulation.
   1. In exterior framed walls.
   2. In underside of roofs and ceilings.
   3. As indicated on drawings.

1.02 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.

B. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2012.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

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

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Foamed-In-Place Insulation:
   1. BASF Corporation; SPRAYTITE 158 Closed Cell: www.spf.basf.com/#sle.
   2. Or approved equal.

2.02 MATERIALS

A. Foamed-In-Place Insulation: Closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
   1. Thermal Resistance: R-value of 5.0, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
   2. Water Vapor Permeance: Vapor retarder; 2 perms, maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
   3. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
   4. Air Permeance: 0.04 cfm per square foot, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf.
   5. Closed Cell Content: At least 90 percent.
   6. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
   7. Manufacturers:
      a. BASF Corporation; SPRAYTITE 158: www.spf.basf.com/#sle.

2.03 ACCESSORIES

A. Primer: As required by insulation manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

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

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

3.02 PREPARATION

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

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

3.03 APPLICATION

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

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

C. Apply to achieve a thermal resistance R-Value as indicated in drawings.

D. Patch damaged areas.

3.04 FIELD QUALITY CONTROL

A. Field inspections and tests will be performed by an independent testing agency under provisions of Section 01 40 00 - Quality Requirements.

3.05 PROTECTION

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

END OF SECTION

SECTION 07 25 00
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water-Resistive Barrier (WRB): Under exterior wall cladding, over sheathing or other substrate; not air tight or vapor retardant.

B. Vapor Retarders (Vapor Barrier): Materials to make under insulation at concrete slab-on-grade water vapor resistant and air tight.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.

B. Section 06 13 13 - Insulating Sheathing: Sheathing with integral water-resistive and air barrier.

C. Section 07 21 00 - Thermal Insulation: Vapor retarder installed in conjunction with batt insulation.

D. Section 07 53 00 - Elastomeric Membrane Roofing: Vapor retarder installed as part of roofing system.

E. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.

F. Section 07 92 00 - Joint Sealants: Sealing building expansion joints.

G. Section 09 21 16 - Gypsum Board Assemblies: Water-resistive barrier under exterior cladding.

1.03 DEFINITIONS

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

B. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
   1. Water Vapor Permeance: For purposes of conversion, 57.2 ng/(Pa s sq m) = 1 perm.

C. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture resistant, to the degree specified, intended to be installed to shed water without sealed seams.

1.04 REFERENCE STANDARDS

A. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.

B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2013.

C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on material characteristics.

C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

D. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

E. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer

certification on site during and after installation, and present on-site documentation upon request.

1.06 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
   1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
   2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

A. Water-Resistive Barrier (WRB): Provide on exterior walls under exterior cladding and where indicated in other sections.
   1. Use asphalt felt unless otherwise indicated.
   2. ASTM D226 Type I felt (No. 15).

B. Exterior Vapor Retarder:
   1. Under the insulation and above the gravel at concrete slab-on-grade.
   2. Refer to Section 07 53 00 Section for vapor barrier at roof assembly.

2.02 WATER-RESISTIVE BARRIER MATERIALS (NEITHER AIR BARRIER OR VAPOR RETARDER)

A. Asphalt Felt: ASTM D226/D226M Type I felt (No.15).

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

A. Vapor Retarder Sheet (Vapor Barrier): Butyl, black color.
   1. Thickness: 45 mil, 0.045 inch.
   2. Water Vapor Permeance: 0.1 perm, maximum, when tested in accordance with ASTM E96/E96M.
   3. Seam Lap and Perimeter Adhesive: Elastomeric, same composition as sheet or other compatible material.

2.04 SEALANTS

A. Butyl Sealant: as specified in Section 07 90 05.

2.05 ADHESIVES

A. Mastic Adhesive : Compatible with sheet seal and substrate, thick mastic of uniform knife grade consistency .

2.06 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.

B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.

C. Self-Adhesive Sheet Flashing: ASTM D1970.

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

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

3.03 INSTALLATION

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

B. Water-Resistive Barriers: Install continuous barrier over surfaces indicated, with sheets lapped to shed water but with seams not sealed.

C. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

D. Mechanically Fastened Sheets - On Exterior:
   1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
   2. Overlap seams as recommended by manufacturer but at least 6 inches.
   3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.
   4. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.

E. Self-Adhered Sheets:
   1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
   2. Lap sheets shingle-fashion to shed water and seal laps air tight.
   3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
   4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
   5. At wide joints, provide extra flexible membrane allowing joint movement.

F. Openings and Penetrations in Exterior Weather Barriers:
   1. Install self-adhesive flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs or adjacent wall plane; mechanically fasten stretched edges.
   2. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
   3. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Coordination of ABAA Tests and Inspections:
   1. Provide testing and inspection required by ABAA QAP.
   2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
   3. Cooperate with ABAA testing agency.
   4. Allow access to air barrier work areas and staging.
   5. Do not cover air barrier work until tested, inspected, and accepted.

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

3.05 PROTECTION

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

3.06 INSTALLATION

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

B. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

END OF SECTION

SECTION 07 31 00
WOOD SHINGLE ROOFING

PART 1 – GENERAL

1.1 Summary

A. The work of this Section includes all labor, materials and equipment to complete installation of wood shingle roofing as indicated on contract drawings, including:
   1. Manor Hall Porches

B. Removal and disposal of existing shingles and underlayment on same.

1.2 Related Sections

A. Section 02 10 00 – Selective Demolition, Removals and Salvage
B. Section 07 62 00 – Flashing and Sheet Metal

1.3 References

A. Cedar Shake and Shingle Bureau (CSSB) *New Roof Construction Manual*
B. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) *Architectural Sheet Metal Manual*, 2003.
C. Revere Copper Products, Inc. *Copper & Common Sense*.

1.4 Delivery, Storage and Handling

A. Keep materials dry during delivery. Store materials 6-inches minimum above ground surface. Protect against exposure to weather and contact with damp or wet surfaces.

1.5 Submittals

A. Shop Drawings: None Required.
B. Product Data
   1. Submit manufacturer's product literature for approval.
      a. Wood shingles

C. Samples
   1. Submit samples of wood shingles, two representative samples for each thickness and length specified.

D. Field Samples (Mock-ups): After approval of material product data and samples, prepare one mock-up of general shingle installation. Locate mock-up where instructed by Director's Representative.
   1. Roofing: 6 square feet of roofing at eave edge

PART 2. – PRODUCTS

2.1 - Materials

A. Wood Shingles and Shakes:

1. No. 1 Blue Label Certi-Sawn Yellow Cedar (*Cupressus Nootkatensis*) roofing shakes, containing 100% clear heart wood, 100% edge grain.
   a. Comply with CSSB-97 except as noted.
   b. Size: 18-inch Taper sawn, **5/8" butt thickness**, Premium Grade.
2. Please note exposure of shakes listed below and be sure to order sufficient quantity based on exposure.

B. Accessories

1. Fasteners:
   a. Stainless steel, of sufficient length to penetrate skip sheathing and nailers by a minimum of ½", but not so long as to break through underside of nailers/sheathing.

C. Underlayment (if required)

1.. Felt Underlayment (or Interlayment):
   a. 18" wide strips of No. 30 ASTM D226 Type II or No. 30 ASTM D4869 Type IV roofing felt laid over the top portion of shakes and extending onto the sheathing.
2. Breathable Underlayment:
   a. "Cedar Breather" by Benjamin Obdyke, Inc., 199 Precision Dr., Horsham, PA 19044, (benjaminobdyke.com), 1.800.346.7655. or approved equal.

PART 3 – EXECUTION

3.1 – General: Comply with Cedar Shake and Shingle Bureau (CSSB) *New Roof Construction Manual.*

3.2 – Installation

A. Preparation

1. Remove and dispose of all existing shingles roofing, related flashing, underlayment, and fasteners. Collect and legally dispose of all debris.
2. Examine the substrate to determine if it meets the Manufacturer's conditions for application of a new roofing system. Do not proceed until the substrate has been examined by the Director's Representative.
3. Correct defects in the substrate before commencing roofing work

4. Carefully remove and reinstall existing construction where necessary for proper installation of flashing.

B. Installation of Underlayment on Solid (Closed) Sheathing:

1. Where breathable underlayment is used: Install No. 30 felt providing 100% coverage with manufacturer's recommended overlap.
2. Install underlayment parallel to eaves. Secure only with enough fasteners to hold it in place until the shingles are installed.
3. At eaves install the underlayment over the metal drip edge; at rakes install the underlayment beneath the metal drip edge.
4. Install plastic "Cedar Breather" breathable underlayment over felt underlayment on solid (closed) sheathing. Follow manufacturer's written instructions for installation. Do not overlap.

C. Installation of Underlayment on Skip (Open) Sheathing:
1. Omit underlayment where open or skip sheathing (strapping) is used instead of solid (closed) sheathing, except at valleys.
2. Lay an 18-inch wide strip of No. 30 felt centered under valley flashing or where flashing meets dormer side walls.

D. Installation of Shingles & Shakes:
1. Fasten shingles in accordance with the shingle manufacturer's written instructions. Install with **5-1/2-inch exposure**.
2. Nailing:
   a. Install two nails per shingle regardless of shingle width.
   b. Drive nails flush with surface. ***Do not drive the nail heads into the shingle surface, crush the fibers on or indent the outer face of the shingles while nailing***. Due to variation in existing roof sheathing materials and thickness, hand-nailing of shingles may be required.
   c. Air nailers are permitted, provided only that nails can be installed in compliance with item "b." above.
   d. Place fasteners approximately 1-1/2 inches above the exposure line and ¾-inches away from the side edges.
3. Layout:
   a. Space shingles a minimum of ¼-inch apart and not more than 3/8" apart.
   b. Offset or separate joints of adjacent course by at least 1-1/2 inches apart.
   c. Eaves: Start shingles at eaves with a double thickness starter course.
   d. Overlap metal drip edge ½ - inch. Where no metal drip edge is used, bottom shingle courses must protrude over the eave

edge (fascia) by 1-1/2 -inches. Install starter course at eave edges to provide double layer thickness.

e. Rake (gable end): Overlap gable or rake end 1-inch

4. Stepped Metal Base Flashing: N/A.
5. Hips and Ridges: N/A

3.3 Installation of Metal Flashing:

A. General: Comply with the recommendations for forming and installing metal flashings in accordance with the referenced pages and plates of the *Architectural Sheet Metal Manual*, except as noted herein.

B. Eaves and Rakes: Furnish and install metal drip edge flashing in accordance with page 4.47, Figures 4-23C and 4-23D. Secure flashing with nails spaced 8 inches on center*. Note: Omit metal drip edge at porch roofs*.

D. Metal Base/Counter Flashing: Retain/repairl metal counter flashing at junction of shingle roof and exterior walls and windowsills. If flashing cannot be retained in good condition, replace in accordance with SMACNA page 4.45, Figure 4-22. Restore wood sill as indicated on Drawings and Window Schedule. Prime, caulk and paint as needed.

E. Restore any damaged or altered adjoining wood trim where required in accordance with Section 06 40 00 Architectural Woodwork

END OF SECTION

SECTION 07 42 13
METAL WALL PANELS

P1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Aluminum wall panel dry joint, pressure-equalized rainscreen system.
   2. Accessories including sub girts, aluminum panel splines, aluminum panel bases, head flashings, clips, shims, fasteners, and aluminum trim prefinished to match aluminum wall panels.

B. Related Sections:
   1. Section 05 40 00 - Cold-Formed Metal Framing
   2. Section 06 10 00 - Rough Carpentry
   3. Section 06 16 43 - Gypsum Sheathing
   4. Section 07 25 00 - Air Barriers
   5. Section 07 62 00 - Sheet Metal Flashing and Trim
   6. Section 07 92 00 - Joint Sealants

1.02 REFERENCES

A. American Architectural Manufacturers Association (AAMA):
   1. AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure
   2. AAMA 508-07 - Voluntary Test Method and Specifications for Pressure Equalized Rain Screen Wall Cladding Systems

B. ASTM International:
   1. ASTM B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus
   2. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
   3. ASTM D 294 - Method of Tumbler Test for Coke
   4. ASTM D 659 - Method of Evaluating Degree of Chalking of Exterior Paints
   5. ASTM D 968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
   6. ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
   7. ASTM D 2247 - Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
   8. ASTM D 3352 - Standard Test Method for Strontium Ion in Brackish Water, Seawater, and Brines
   9. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials
   10. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
   11. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
   12. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Conform to provisions of Section 01 31 13 for coordination with work of other Sections.

1. Section 07 25 00 for application of weather resistive barrier over exterior sheathing substrate specified. Section 06 16 43 following installation of sub girt system as required to seal and make a continuous air barrier.

B. Preconstruction Meetings: Conform to provisions of Section 01 31 19.
   1. Attendance: Contractor, Applicator, Owner, Architect, and those specifically requested to attend.
      a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Review methods and procedures related to aluminum metal panel installation, including manufacturer's written instructions.
      c. Examine support conditions for compliance with requirements, including alignment between and attachment to the structural members.
      d. Review flashings, special details, wall penetrations, openings, and condition of other construction that will affect aluminum wall panels.
      e. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
      f. Review temporary protection requirements for aluminum wall panel assembly during and after installation.
      g. Review wall panel observation and repair procedures after aluminum wall panel installation.
      h. Meeting Time: Minimum 3 weeks prior to beginning work of this Section and related work affecting work of this Section.
      i. Location: Project Site.

1.04 DESIGN REQUIREMENTS

A. Components: Designed and manufactured to withstand dead and live loads caused by positive and negative wind pressure acting normally to plane of aluminum wall panels in accordance with International Building Code, Chapter 16.

B. Wall Panel Deflection: L/180.

C. Perimeter Framing Deflection: L/180.

D. Thermal Movement: Design system to accommodate vertical and horizontal thermal movement of components without causing distortion, excessive stress on fasteners, and oil canning when subjected to recurring temperature variations.

E. Drainage: Design for positive drainage of water leakage and condensation to exterior of wall panel system.

F. Tolerance of Substructure: Design system to accommodate up to ¼ inch in 10 feet of variation out of plane.

G. Seismic Design: Conform to International Building Code for the Seismic Category appropriate for location of system installation.

1.05 PERFORMANCE REQUIREMENTS

A. Provide following testing documentation. Testing documentation must be current and meet or exceed specified design and performance requirements, and documented and certified by an independent testing agency acceptable to Architect and applicable building code jurisdiction.

B. Preload at +12.5 pounds per square foot.

C. Air Infiltration in accordance with ASTM E283 (at 1.57 pounds per square foot): Maximum of 0.126 cubic feet per minute per square foot.

D. Water Penetration in accordance with ASTM E331 (at 6.24 pounds per square foot): Approximately 0.43 square feet.

E. Water Penetration in accordance with AAMA 501.1 (at 6.24 pounds per square foot): Not to exceed 0.43 square feet.

F. Pressure Cycling in accordance with ASTM E1233 (100 cycles for 5 pounds per square foot to 25 pounds per square foot to 5 pounds per square foot): Not to exceed 0.03 seconds.

G. Pressure Equalized Rainscreen Performance: No streaming water or droplets/mist on more than 5% of weather resistive barrier in accordance with AAMA 508-07.

H. Structural Load Pressure in accordance with ASTM E 330-02 (at 110 pounds per square foot): Not to exceed 0.01 inches of deflection.

1.06 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Test Reports: Indicate compliance of products with requirements from qualified, independent testing agency.

C. Shop Drawings: Provide drawing details prepared by manufacturer or manufacturer's authorized agent showing openings and penetrations. Include details of each condition of installation and attachment. Provide details at a minimum scale of 1½ inch per foot of all required trim needed for complete installation. Provide shop drawings reflecting deviations from manufacturer's standard details and details differing from Contract Documents. Include components, metal panel profile, dimensions, joinery dimensions, configurations, and reason for deviation.

D. Product Data: Manufacturer's technical data, installation instructions, standard detail drawings specific to this project, and accessories showing conformance with specified requirements.
   1. Fasteners including clips, fastener types, and locations.
   2. Treatment at edges, terminations, and flashings.

E. Product Samples: 2x3" showing specified finish for each specified wall.

F. Manufacturer's Instructions: Indicate installation requirements, rough-in dimensions, special procedures, and conditions requiring special attention.

G. Sample Warranty: Meet or exceed provisions specified by this Section.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Minimum of 10 years' experience in fabricating and supplying metal wall panel systems.
   2. Responsible for technical design support as required for system conforming to panel manufacturer's warranty provisions.
   3. Provide review and approval of shop drawings differing from panel manufacturer's standard details prior to installation and conduct interim inspections during construction.

B. Installer Qualifications:
   1. Minimum 7 years' experience installing commercial metal wall panel systems.
   2. Trained and authorized by metal wall panel manufacturer prior to bid date.
   3. Employ job-site foreman, with minimum of 3 years' experience supervising installation of metal wall panel work of this section, dedicated to work of this contract.
   4. Foreman: Continuously on site for duration of work of this section for this project.

C. Single Source Responsibility:
   1. Provide system and components for this Section under responsibility of single metal wall panel manufacturer.
   2. Perform metal panel and related flashing and sheet metal work by or under supervision of single installer.

1.08 WARRANTY

A. Provide Warranties under provisions of Section 01 78 36.

B. Painted Finish Coatings Manufacturer/Applicator to Provide Twenty (20) Year Warranty of the Factory Applied Finish.
   1. WILL NOT chip, crack or peel (lose adhesion) but does not include minute fracturing which may occur in proper fabrication of building parts.
   2. WILL NOT chalk in excess of ASTM D-4214-89 number eight (8) rating, determined by the procedure outlined in ASTM D-4214-89 specification test.
   3. WILL NOT change color more than five (5) Delta-E Hunter units (square root of the sum of square Delta-L, Delta-A and Delta-B) as determined by ASTM method D-2244. It is acknowledged that fading or color changes may not be uniform if the surfaces are not equally exposed to the sun and elements.

C. Contractor: 5-year labor warranty for panel installation, including, flashings, sealants, fasteners, and accessories to remain watertight and weatherproof.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, aluminum wall panels, and other manufactured items to prevent damage or deformity. Package aluminum wall panels for protection during transportation and handling.

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

C. Store aluminum wall panels vertically, covered with suitable weather tight and ventilated covering. Store aluminum wall panels to ensure dryness, with positive slope for drainage of water. Do not store aluminum wall panels in contact with other materials that may cause staining, denting, or other surface damage. Do not allow storage space to exceed 120 degrees Fahrenheit.

PART 2 PRODUCTS

2.01 SYSTEMS

A. Aluminum Wall Panels: Plate aluminum wall panel on perimeter extrusion, dry joint, pressure-equalized rainscreen system: Install over substrate system.

2.02 MANUFACTURERS

A. Basis of Design: products manufactured by NorthClad Rainscreen Solutions, 11831 Beverly Park Rd, Bldg C, Everett, WA 98204, Telephone (425) 740-3702, E-mail: dkillian@northclad.com; Website: www.northclad.com.
   1. NorthClad AL-PR Series Extruded Mounted Plate Wall Panels:
      a. Panel Skin Material:
         1) ASTM B209, Aluminum Association Specification Sheet 3003-H14/5052-H32
         2) 5005-H34 for Anodized finish
      b. Panel Material Thickness: 0.125”

B. Or approved equal.

2.03 ALUMINUM PANEL MATERIALS

A. Composition:
   1. Panel Skin Material: ASTM B209, 0.125 inch thickness, Aluminum Association specification sheet 3003-H14/5052-H32 [5005-H34 for anodized finish].
   2. Aluminum Extrusions: ASTM B221 alloy 6063 T6 and 6005A T61.

B. Fabrications:
   1. Back-stiffen Aluminum panels to maintain flatness tolerances.

a. Not to exceed L/175 panel dimension in width and length for panel bow.
b. Allow for field adjustments as recommended by the manufacturer where final dimensions cannot be established by field measurement before completion of panel manufacturing.
c. Eliminate all warping and/or bucking in panel lines, breaks, and angles.

C. Condition: Panel surfaces will be free of scratches and marks caused during fabrication.

D. Custom Fabrications: Include fabrications to complete watertight and finished system.

E. Expansion/Contraction: Engineer panels to permit required expansion and contraction using concealed anchors.

F. Vapor Management: Fabricate panels for control of condensation and ventilation of the rainscreen cavity.

G. Panel Edge: Select One;
1. Back routed panel edge (with 1/13” radius) with non-welded corners.

2.04 FASTENERS

A. Supply Fasteners and clips tested to meet provisions of this section, as approved by fastener manufacturer and engineer of record.

B. Concealed Fasteners: Non-corrosive fasteners, and as instructed by engineer of record.

C. Fastener Lengths: Penetrate cold-formed metal framing and subgirts, and other metal framing systems in accordance with the recommendations of engineer of record.

2.05 SYSTEM COMPONENTS

A. Subgirts: Provide G90 galvanized steel of gauge and spacing for metal wall panel system’s structural requirements as recommended by the engineer of record. To avoid galvanic reaction, separate dissimilar materials.

2.06 FLASHINGS

A. Metal Flashing, Fascias and Trim: 0.040 inch minimum, material, color, and finish as wall panels, conforming to provisions of Section 07 60 00.

B. Cutting and Fitting: Make neat, square, and true. Saw-cut panels, de-burr edges, and clean filings from adjacent surfaces.

2.07 SEALANTS

A. Conform to Section 07 92 00 and manufacturer’s instructions.

2.08 FINISH

A. Factory Finish for Wall Panel:
1. Weather Face: Polyvinylidene Fluoride (PVDF) spray coating with 70 percent Kynar® 500 resin content.
2. Number of Coats: 2-Coat, 3-Coat, 4-Coat, chosen color dependent. Coating shall be factory applied on a continuous process paint line. Coating shall consist of a 0.2 mil prime coat, a 0.75 mil barrier coat[4-Coat], a 0.75 mil metallic/color coat containing 70 percent Kynar® resins[3-Coat][4-Coat], and a 0.5 mil clear coat containing 70 percent Kynar® resins (Note; mil thickness is approximate).
3. Relevant to the color selected, material to be painted in accordance with either AAMA specification 2604 or 2605.

2.09 PENCIL HARDNESS - ASTM D3352-74:

A. Use Eagle Turquoise HB-H pencil as a minimum.

2.10 IMPACT ADHESION – ASTM D294-84:

A. No cracking or loss of adhesion in coating.

B. Cure Test - NCCA 11-18:
   1. Withstand 50+ double rubs of MEK.

2.11 HUMIDITY RESISTANCE – ASTM D2247-85:

A. No blisters after 3,000 hours of 100 percent humidity at 95 degrees Fahrenheit.

2.12 SALT SPRAY RESISTANCE – ASTM B117-85:

A. After 3,000 hours of exposure to 5 percent salt fog at 95 degrees Fahrenheit, show few #8 blisters and less than 1/8 inch creepage from scribe.

2.13 WEATHEROMETER TEST – ASTM D882-86/G23-88:

A. No cracking, peeling, blistering or loss of adhesion after 2,000 hours in coating.

B. Chalking resistance – ASTM D659-86:
   1. No chalking greater than #8 after 10 years of Florida exposure at 45 degrees S.
      a. Color Change – ASTM D2244-74:
         1) Color change not to exceed 5 NBS units after 10 years of Florida exposure at 45 degrees S.
      b. After 5,000 hours in Atlas Weatherometer, coating shall show no objectionable chalking or color change.

2.14 ABRASION RESISTANCE – ASTM D968-81:

A. Resist 65 +/-15 liters/mil of falling sand on coating.

2.15 ANODIZED FINISH (IF SPECIFIED):

A. Class 1, Anodic Finish: AA-M12C22A41 (mechanical finish: M12 nonspecular as fabricated; chemical finish: C22 etched, medium matte; clear anodic coating: Architectural Class 1, 0.018 mm coating or thicker) complying with AAMA 607.1.

B. Class 1, Anodic Finish: AA-M12C22A44 (mechanical finish: M12 nonspecular as fabricated; chemical finish: C22 etched, medium matte; tinted anodic coating: Architectural Class 1, integrally colored or electrolytically deposited color coating, 0.018 mm coating or thicker) complying with AAMA 608.1.
   1. Performance:
      a. Change of Color: Maximum 5 DE (Hunter Units), tested to ASTM D2244.
      b. Chalking: No. 8 rating, tested to ASTM D4214, Photographic Reference Standard No. 1 Test Method D659.

2.16 P3 EXECUTION

2.17 EXAMINATION

A. Verify installation conditions satisfactory to receive work of this Section before beginning.

B. Verify substrate installation complete, flat, and true to plane.

2.18 PREPARATION

A. Field Measurements: Verify prior to fabrication of metal panels, trim and flashings.

B. Electrolytic Protection: Treat contacting surfaces of dissimilar metal of different galvanic range with non-absorptive tape, gaskets, or as instructed by manufacturer.

C. Protect surrounding areas and surfaces to preclude damage during work of this Section.

D. Lay out work before beginning installation as necessary for true, plumb, and aligned panel installations. Verify locations of joints and panel lengths.

2.19 INSTALLATION

A. Conform to manufacturer's instructions and provisions of Contract Documents.

B. Install to allow expansion of metal panels.

2.20 SUBGIRTS AND FASTENERS

A. Space, locate, align, and fasten subgirt hat channel framing, if required, over gypsum sheathing after application of air barrier specified by Section 07 25 00.

B. Install fasteners in lengths and locations to penetrate hat channels and structural metal wall framing in accordance with fastener manufacturers' instructions and engineer of record.

C. Torque fasteners as necessary for snug fit. To prevent damage to panels, do not over-torque fasteners.

2.21 METAL WALL PANELS

A. Do not stretch or compress.

B. Secure panel in place with panels aligned and without warp or deflection.

C. Make cutting and fitting neat, square, and true. Where required saw cut, de-burr edges, and clean filings from adjacent surfaces. No torch cutting permitted.

2.22 FLASHINGS AND TRIM

A. Install flashings and trim as part of manufacturer system as necessary to seal and close ends and to restrict water penetration behind wall panels.

B. Thermal Movement: Install flashing and trim systems to allow unrestricted thermal movement of metal panels on attachment clips.

C. Penetrations: Install per weather resistive barrier manufacturer instructions.

D. Metal Flashing:
   1. Detail per metal panel manufacturer's instructions.
   2. Make overlaps minimum 4 inches and in conformance to Section 07 60 00.
   3. Cutting and Fitting: Make neat, square and true. De-burr edges, and clean filings from adjacent surfaces.

2.23 ADJUSTING

A. Correct identified defects and irregularities.

B. Replace damaged, soiled and discolored work.

2.24 CLEANING

A. Leave installation clean and free from residue and debris from work of this Section.

2.25 PROTECTION

A. Take measures to protect metal panel installations from construction activities for duration of Project. Do not permit activities that may result in gouging, scratching or denting metal panels, trim or flashings.

END OF SECTION

SECTION 07 53 00
ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Elastomeric roofing membrane, ballasted conventional and ballasted protected membrane application.

B. Insulation, tapered.

C. Vapor retarder.

D. Deck sheathing.

E. Cover boards.

F. Flashings.

1.02 RELATED REQUIREMENTS

A. Section 05 31 00 - Steel Decking: Product requirements for acoustical insulation for deck flutes, for placement by this section.

B. Section 06 10 00 - Rough Carpentry: Wood cant strips.

C. Section 07 62 00 - Sheet Metal Flashing and Trim: Counterflashings.

1.03 REFERENCE STANDARDS

A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.

B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.

C. FM (AG) - FM Approval Guide; current edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.

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

1.05 DELIVERY, STORAGE, AND HANDLING

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

B. Store materials in weather protected environment, clear of ground and moisture.

C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

D. Protect foam insulation from direct exposure to sunlight.

1.06 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above ____ degrees F.

C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's 10 year, 15 year, 20 year, 25 year or 30 year Total System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 55, 72, 80, 90 mph measured at 10 meters above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage.

Note: For projects specified with warranties 20 year and/or wind coverage specified greater than 72 mph, additional design enhancements are required. Refer to Carlisle published Sure-Tough Specifications

Warranty Length	Minimum Membrane Thickness
10 or 15 year	45-mil Sure-Tough
20 year	60-mil Sure-Tough
25 or 30 year	75-mil Sure-Tough

(After selecting a warranty duration from the above table delete all condtions below which do not apply)

C. Warranty shall also cover leaks caused by accidental punctures:
1. 32 man-hours per year for 75-mil Sure-Tough

D. Pro-rated System Warranties shall not be accepted.
1. Evidence of the manufacturer's warranty reserve shall be included as part of the project submittals for the specifier's approval.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. EPDM Membrane Materials:
1. Carlisle Roofing Systems, Inc; Sure-Tough EPDM: www.carlisle-syntec.com/#sle.

B. Or approved equal.

C. Unless otherwise approved by the specifier and accepted by the membrane manufacturer, all products (including insulation, fasteners, fastening plates and edgings) must be manufactured and supplied by the roofing system manufacturer and covered by the warranty.

D. Manufacturer of roof membrane shall also manufacture all polymeric components for the roofing system, including, but limited to, membrane, adhesives, primers, flashings, caulks and tapes.

2.02 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Furnish 75-mil thick reinforced EPDM (Ethylene, Propylene, Diene Terpolymer) conforming to the minimum physical properties of ASTM D4637 in the largest sheet possible with 3" or 6" Factory-Applied Tape (FAT). (Splice tape shall be a butyl/EPDM based polymer with a minimum thickness of 25-mil.) The membrane shall be manufactured in a single panel with no factory splices to reduce splice intersections. Membrane sheets are available in rolls of 6.5', 8' or 10' widths and 100' in length.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Colored Finish Coating: Neoprene/hypalon, with aluminum powder concentrate; finish coat of white color.

D. Vapor Retarder: reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film, complying with requirements of fire rating classification; compatible with roofing and insulation materials.
   1. Fire-retardant adhesive.
   2. Product: VapAir Seal 725TR manufactured by Carlisle or approved equal.

E. Flexible Flashing Material: Same material as membrane.

2.03 DECK SHEATHING

A. Deck Sheathing: Glass-mat faced gypsum panels complying with ASTM C1177/C1177M.
   1. Thickness: 5/8 inch, Type X, fire-resistant.
   2. Manufacturers:
      a. DenDeck Roof Board by Carlisle or approved equal.

2.04 COVER BOARDS

A. Cover Boards: Faced with high compressive strength polyisocyanurate (ISO) insulation complying with ASTM C1289, and the following characteristics:
   1. Classification: Type II, Class 4 - Faced with coated or uncoated polymer-bonded glass fiber mat facers on both major surfaces of the core foam.
   2. Grade and Compressive Strength: Grade 1, 80 psi.
   3. Board Thickness: 1/2 inch.
   4. Insulation Thermal Resistance, R-value: 2.5, nominal.
   5. Manufacturers:
      a. SecureShield HD Plus Polyiso by Carlisle or approved equal.

2.05 INSULATION

A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
   1. Classifications:
      a. Type II:
         1) Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
         2) Compressive Strength: Classes 1-2-3, Grade 3 - 25 psi (172 kPa), minimum.
         3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
   2. Board Size: 48 by 96 inch.
   3. Board Thickness: 2.0 inch.
   4. Manufacturers:
      a. InsulBase HD Polyiso by Carlisle or approved equal.

2.06 ACCESSORIES

A. Cant Strips: Wood; pressure preservative treated.

B. Sheathing Joint Tape: Paper type, 4 inch wide, self-adhering.

C. Membrane Adhesive: As recommended by membrane manufacturer. Basis of Design: Carlisle CAV-GRIP III Low-VOC Adhesive/Primer or approved equal.

D. Insulation Adhesive: As recommended by insulation manufacturer. Basis of Design: Carlisle Flexible FAST Adhesive, or approved equal, at 6" on center bead spacing in the field, perimeter and corners.

E. Thermal Barrier: DensDeck Prime, or approved equal: 5/8" [4'x8' boards] mechanically fastened with 12 Carlisle HP fastners and 3" insualtion plates in the field, perimeter and corners.

F. Vapor Barrier: VapAir Seal 725TR air and Vapor Barrier, or approved equal, adhered to the primed thermal barrier.

G. Sealants: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 PREPARATION - METAL DECK

A. Install preformed acoustical glass fiber insulation strips, specified in Section 05 31 00, in roof deck flutes and in accordance with manufacturer's instructions.

B. Install deck sheathing on metal deck.
   1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
   2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
   3. Tape joints.

3.03 INSTALLATION - VAPOR RETARDER AND INSULATION, UNDER MEMBRANE

A. Install vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
   1. Extend vapor retarder under cant strips and blocking to deck edge.
   2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.

B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.

C. Attachment of Insulation: Embed each layer of insulation in adhesive in full contact, in accordance with roofing and insulation manufacturers' instructions.

D. Cover Boards: Mechanically fasten cover boards in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.

E. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.

F. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.

G. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

H. Do not apply more insulation than can be covered with membrane in same day.

3.04 INSTALLATION - MEMBRANE

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Fully Adhered Application: Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

E. At intersections with vertical surfaces:
   1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to nailing strips.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.

G. Coordinate installation of roof drains and sumps and related flashings.

3.05 INSTALLATION - MEMBRANE FINISH COATING/COVER

A. Install finish coating to membrane and flashing surfaces exposed to view, in accordance with manufacturer's instructions.
   1. Prime membrane.
   2. Apply per manufacturer's instructions.
   3. Finish with colored coating.

3.06 INSTALLATION - INSULATION OVER MEMBRANE

A. Place insulation boards over roofing membrane; butt edges in close contact; place channel cut face down; bevel insulation to allow snug fit at cant strips; cut neatly around protrusions through roof.

3.07 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.

B. Require site attendance of roofing and insulation material manufacturers daily during installation of the work.

3.08 CLEANING

A. See Division 01 for additional requirements.

B. Remove bituminous markings from finished surfaces.

C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.

D. Repair or replace defaced or damaged finishes caused by work of this section.

3.09 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 62 01
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and other items as indicated in drawings.

B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

A. Section 07 62 00 - Flashing & Sheet metal

B. Section 07 92 00 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS

A. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2012.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007, with Editorial Revision (2012).

D. CDA A4050 - Copper in Architecture - Handbook; current edition.

E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

A. See Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, fastening methods, installation details and frame sizes.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 3 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

1.07 PROJECT CONDITIONS

A. Coordinate with the work of Division 6 for installing flashing and screens associated with wood framing and composite panel installation.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Copper: ASTM B370, cold rolled 16 oz/sq ft (24 gauge) (0.0216 inch) thick; natural finish.

B. Gutters and Downspouts Base Metal: Tin/Zinc Coated Copper Sheet: ASTM B370, H00 temper, cold rolled copper sheet “Freedom Gray” by Revere Copper with Zinc-Tin (Z-T) Coating: Coated copper both sides with zinc-tin alloy approximately 0.5 mils thick. Composition

of alloy shall be approximately 50% zinc and 50% tin with trace elements controlled for durability, corrosion resistance and color.

1. Provide sixteen (16) ounce base metal where specified.

2.02 ACCESSORIES

A. Fasteners: Copper, hardware bronze or Series 300 stainless steel.

B. Fasteners: Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

C. Primer: Zinc chromate type.

D. Protective Backing Paint: Zinc molybdate alkyd.

E. Sealant to be Concealed in Completed Work: One-part, copper compatible elastomeric polyurethane, polysulfide, butyl or silicone rubber sealant as tested by sealant manufacturer for copper substrates.

F. Sealant to be Exposed in Completed Work: ASTM C920; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.

G. Solder: ASTM B 32; Provide 50-50 tin/lead or lead free alternative of similar or greater strength solder. Killed acid flux.

H. Flux: Muriatic acid neutralized with zinc or approved brand of soldering flux.

I. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of and compatibility with flashing sheet.

J. Plastic Cement: ASTM D4586, Type I.

2.03 FABRICATION

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

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

2.04 GUTTER AND DOWNSPOUT FABRICATION

A. Gutters: SMACNA (ASMM), Semi-circular profile.

B. Downspouts: Round profile.

C. Gutters and Downspouts: Sizes indicated.

D. Accessories: Profiled to suit gutters and downspouts.
   1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
   2. Gutter Supports: Brackets.
   3. Downspout Supports: Brackets.

E. Seal metal joints.

2.05 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Primer: Zinc chromate type.

C. Concealed Sealants: Non-curing butyl sealant.

D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

E. Plastic Cement: ASTM D4586/D4586M, Type I.

PART 3 EXECUTION

3.01 EXAMINATION

A. General: Examine conditions and proceed with work when substrates are ready.

B. Confirm that substrate system is even, smooth, sound, clean, dry, and free from defects.

3.02 PREPARATION

A. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with the "Copper in Architecture" handbook published by the Copper Development Association Inc. (CDA). Anchor units of work securely in place by methods indicated, providing for thermal expansion of units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.
   1. Install units plumb, level, square, and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding construction.
   2. Apply asphalt mastic on copper surfaces of units in contact with dissimilar metals.
   3. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
   4. Miter, lap seam and close corner joints with solder. Seal seams and joints watertight.
   5. Install expansion joints at frequency recommended by CDA. Do not fasten moving seams such that movement is restricted.
   6. Coordinate with installation of roofing system and roof accessories.

B. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..

C. Secure gutters and downspouts in place with concealed fasteners.

D. Slope gutters 1/4 inch per 10 feet, minimum.

3.04 CLEANING

A. Remove protective film (if any) from exposed surfaces of copper promptly upon installation. Strip with care to avoid damage to finishes.

B. Clean exposed copper surfaces, removing substances that might cause abnormal discoloration of metal.

C. Upon completion of each area of soldering, carefully remove flux and other residue from surfaces. Neutralize acid flux by washing with baking soda solution, and then flushing with clear water rinse. Use special care to neutralize and clean crevices.

D. Clean exposed metal surfaces of substances that would interfere with normal oxidation and weathering.

3.05 FIELD QUALITY CONTROL

A. See Quality Requirements, for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.06 PROTECTION

A. Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Substantial Completion.

END OF SECTION

SECTION 07 72 53
ROOF SNOW GUARDS

PART 1 – GENERAL

1.01 SUMMARY

A. WORK INCLUDES
   1. ST11 SnowTrapper snow guard attaches directly to the roof deck.
   2. Coordinate with the installation of the roof to assure proper placement of the snow guards.
   3. Provide appropriate snow guard and fasteners for the roof system

B. RELATED SECTIONS
   1. Section 07 60 00: Flashings and Sheet Metal

1.02 SYSTEM DESCRIPTION

A. COMPONENTS
   1. ST11 snow guard system consists of individual metal snow guards
   2. Fasteners
      a. To be of metal compatible with snow guards
      b. Fasteners should be selected for compatibility with roof deck
      c. All snow guards must be mechanically fastened to the roof deck.
         1) Sealant
            (a) To be approved by the roofing material manufacturer

B. DESIGN REQUIREMENTS
   1. Spacing to be recommended by manufacturer or building engineer.
   2. Minimum 2 fasteners per snow guard.
   3. It is important to design new structures or assess existing structures to make sure that they can withstand retained snow loads.

1.03 SUBMITTAL

A. Submit manufacturer's specifications, standard detail drawings, recommended layout and installation instructions.

1.04 QUALITY ASSURANCE

A. Installer to be experienced in the installation of specified roofing material and snow guards for not less than 5 years in the area of the project.

1.05 DELIVERY / STORAGE / HANDLING

A. Inspect material upon delivery and order replacements for any missing or defective items. Keep material dry, covered and off the ground until installed.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Acceptable Manufacturer: Rocky Mountain Snow Guards, Inc.; 2055 S. Raritan Street, Unit B, Denver, CO 80223; O: 720.379.7756; F: 720.387.8361; web: www.RockyMountainSnowGuards.com

2.02 ROOF SNOW GUARDS

A. Basis of Design: ST11, Retrofit Installation by Rocky Mountain Snow Guards or approved equal.
   1. Materials
      a. Copper – all snow guard components are 16 oz. copper.
      b. Aluminum – All snow guard components are .032 Aluminum.
   2. Finish
      a. Mill Finish

b. Kynar 500 prefinished sheet – Aluminum only.
c. Powder Coated, exterior grade powder only.

3. Accessories
   a. Woodbinder Eclipse Fasteners, or approved equal
   b. Material: AZ55 Galvalume
4. Performance Data,Pull out strength:
   a. ¾" Ply: 716 LBS.ULT.
   b. 5/8" Ply: 515 LBS.ULT.
   c. ½" Ply: 398 LBS.ULT.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Substrate
   1. Inspect structure to verify that roofing structure will withstand additional retained snow loads. Notify owner or general contractor of any deficiencies before installing snow guards.
   2. Verify that roofing material has been installed properly prior to installing snow guards.

3.02 INSTALLATION

A. Comply with architectural drawings for location and with Manufacturer's instructions for installation and layout.

END OF SECTION

SECTION 07 91 00
EXTERIOR WALL JOINT SEALS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Preformed, precompressed, expanding foam joint seals for expansion joints in exterior walls.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 07 9200 - Joint Sealers.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Convene at Project site 2 weeks prior to beginning work of this Section.
   2. Attendance: Director's Representative, joint seal installer, and related trades
   3. Review and discuss:
      a. Joint seal manufacturer’s requirements, project conditions, allowable structural movement at joints, and protection of completed work.
      b. Transitions in plane and direction, and requirement for continuity of seal through watertight transitions from wall expansion joint to other interfacing expansion joint systems at adjacent construction.

1.03 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings:
      a. Indicate joint locations, dimensions, and adjacent construction.
      b. Provide details for transitions in plane and direction for continuity of seal through watertight transitions from wall expansion joint to other interfacing expansion joint systems at adjacent construction.
   2. Product Data: Material description and application instructions.
   3. Samples:
      a. Minimum 2 x 2 inch [50.8mm x 50.8mm] joint seal samples showing available colors.
      b. Minimum three 2 inch long samples [of each joint seal].

B. Informational Submittals:
   1. Manufacturer’s certification that:
      a. Products are capable of withstanding temperature of 150 degrees F (65 degrees C) for 3 hours while compressed to minimum of movement capability dimension without evidence of bleeding of impregnation medium from material.
      b. Same material after heat stability test and after cooling to room temperature will self-expand to maximum of movement capability dimension within 24 hours at 68 degrees F (20 degrees C).

C. Sustainable Design Submittals: Refer to Division 01.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Minimum 10 years documented experience in production of specified materials.
   2. Certified to ISO 9001 and 14001.

B. Installer Qualifications: Minimum 2 years documented experience in work of this Section.

1.05 DELIVERY, STORAGE AND HANDLING

A. In accordance with manufacturer's instructions.

1.06 PRODUCTS

1.07 MANUFACTURERS

A. Contract Documents are based on products by Emseal Joint Systems, Ltd., 800-526-8365, www.emseal.com.

B. Or approved equal.

1.08 MATERIALS

A. Exterior Wall Joint Seal:
   1. Source: Seismic Colorseal/Colorseal.
   2. Description: Silicone coated, ultraviolet resistant, watertight, primary wall seal with factory-applied adhesive on one side.
   3. Form: Precompressed to less than nominal material size for installation into designed joint size equal to material nominal size.
   4. Movement capability: Plus and minus 50% (total 100%) of nominal material size.
   5. R-value: 2.15 per inch depth at nominal joint size compression, tested to ASTM C518.
   6. STC rating: 52 in STC 56 wall, tested to ASTM E90.
   7. OITC rating: 38 in OITC 38 wall, tested to ASTM E90.
   8. Air permeability: Maximum 0.02 liter per second per square meter, tested to ASTM E283 at 75 Pa.
   9. Water penetration: No water penetration, tested to ASTM E331 at 5000 Pa test pressure.
   10. Wind loading:
      a. 0.1 mm net deflection, tested to ASTM E330 at 2730 Pa or 150 MPH wind.
      b. 0.6 mm net deflection, tested to ASTM E330 at 4854 Pa or 200 MPH wind.
   11. Weathering: Sealing of outside wall joints per DIN 18542-1999 / G155-2013: Pass
   12. VOC Emissions: CDPH-1.2-2017: Pass
   13. Color: To be selected from manufacturer's full color range.
   14. Silicone: Field applied corner bead at face of seal to substrate interface, furnished by joint seal manufacturer, in same material and color as used in factory coating.
      a. Abrasion Resistance: Less than 1% weight loss, tested to ASTM D4060
      b. Fuel Resistance: Pass, tested to ASTM C719/C1135

B. DSM horizontal-plane expansion joint location
   1. Silicone coating to be highway-grade, low-modulus, jet-fuel resistant silicone applied to the impregnated foam sealant at a width greater than maximum allowable joint extension and which when cured and compressed will form a bellows.
   2. Material shall be capable of movements of +50%, -50% (100% total) of nominal material size. Standard sizes from 1/2" (12mm) to 4" (150mm). Depth of seal as recommended by manufacturer.
   3. DSM to be installed into manufacturer's standard field-applied epoxy adhesive.
   4. DSM is to be installed slightly recessed from the surface such that when the field-applied injection band of silicone is installed between the substrates and the foam-and-silicone-bellows, the system will be essentially flush with the substrate surface.

C. Roof Joint
   1. Heat weldable, Nitrile PVC or TPV thermoplastic extrusion with dual-level flange and,
   2. Manufacturer supplied termination bar and anchors and,
   3. Factory welded downturn transition in the RoofJoint gland that is sealed at a ship lapped 45-degree angle to mate with an interlocking factory-fabricated RoofJoint/SEISMIC COLORSEAL transition piece.

4. Final selection of the extrusion size to be coordinated between manufacturer, designer, and contractor(s) in consideration of expected movements as a product of structural design and expected temperature variations, taking into account as-built joint-gap sizes and temperatures at expected installation time. Width of joint-gaps at time of casting or cutting to be adjusted, if necessary, from baseline temperature used and specified by designer in determining system suitability

D. Universal-90 Transitions:
   1. Source: Seismic Colorseal/Colorseal.
   2. Description: Silicone coated, ultraviolet resistant, watertight, primary wall seal with factory-applied adhesive on one side.
   3. Form: Precompressed to less than nominal material size for installation into designed joint size equal to material nominal size.
   4. Movement capability: Plus and minus 50% (total 100%) of nominal material size.
   5. R-value: 2.15 per inch depth at nominal joint size compression, tested to ASTM C518.
   6. STC rating: 52 in STC 56 wall, tested to ASTM E90.
   7. OITC rating: 38 in OITC 38 wall, tested to ASTM E90.

1.09 EXECUTION

1.10 PREPARATION

A. Clean joints thoroughly; remove loose and foreign matter that could impair adhesion or performance.

B. The contractor shall provide properly formed and prepared expansion joint openings constructed to the exact dimensions and elevations shown on manufacturer’s standard system drawings or as shown on the contract drawings. Deviations from these dimensions will not be allowed without the written consent of the engineer of record.

C. The contractor shall clean the joint opening of all contaminants immediately prior to installation of expansion joint system. Repair spalled, irregular or unsound joint surfaces using accepted industry practices for repair of the substrates in question. Remove protruding roughness to ensure joint sides are smooth. Refer to Manufacturers Installation Guide for detailed step-by-step instructions.

D. System to be installed by qualified sub-contractors only according to detailed published installation procedures and/or in accordance with job-specific installation instructions of manufacturer’s field technician. The applicator must be the same contractor as will be installing the deck waterproofing system. Bids must include for presence of paid-for manufacturer’s field technician to be present during initial preparation, inspection, and material installation.

1.11 INSTALLATION

A. Install joint seal in accordance with manufacturer's instructions and approved Shop Drawings.

B. Remove joint seal from precompressed packaging, immediately insert into joint, and allow to expand.

C. Use temporary retainers if required to maintain joint seals in position until expansion is complete.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 25 00 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.

B. Section 08 71 00 - Door Hardware: Setting exterior door thresholds in sealant.

C. Section 09 21 16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

D. Section 09 30 00 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.

B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015a.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

D. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.

E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

F. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.

G. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).

H. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.

C. Samples for Verification: Where custom sealant color is specified, obtain directions from Director's Representative and submit at least two physical samples for verification of color of each required sealant.

D. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

1.05 QUALITY ASSURANCE

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

B. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
   1. Adhesion Testing: In accordance with ASTM C794.
   2. Compatibility Testing: In accordance with ASTM C1087.
   3. Allow sufficient time for testing to avoid delaying the work.
   4. Deliver to manufacturer sufficient samples for testing.
   5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
   6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Wall and floor expansion and control joints.
      b. Joints between differing exposed materials.
      c. Joints between column base and limestone top stair.
      d. Openings below ledge angles in masonry.
      e. Other joints indicated in drawings.
   2. Do not seal the following types of joints.
      a. Intentional weepholes in masonry.
      b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
      c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      d. Joints where installation of sealant is specified in another section.

B. Exterior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

2.02 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

B. Color: As selected by Director's Representative.

2.03 NONSAG JOINT SEALANTS

A. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
   1. Color: To be selected by Director's Representative from manufacturer's standard range..

B. Polyurethane Sealant: ASTM C920, Type S, Grade NS, Class 35, Uses T, NT, O, M, G, I, and A; single or multi-component. Can be used in green and damp concrete applications.
   1. Movement Capability: Plus and minus 35 percent, minimum.
   2. Color: To be selected by Director's Representative from manufacturer's standard range.
   3. Manufacturers:
      a. Sika Corporation; Sikaflex-1a: www.usa-sika.com/#sle.
      b. Or approved equal.

C. Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag; not expected to withstand continuous water immersion or traffic.
   1. Hardness Range: 10 to 30, Shore A, when tested in accordance with ASTM C661.
   2. Color: Match adjacent finished surfaces.
   3. Service Temperature Range: Minus 13 to 180 degrees F.
   4. Shore A Hardness Range: 10 to 30.
   5. Manufacturers:
      a. Bostik Inc: www.bostik-us.com
      b. Pecora Corporation: www.pecora.com
      c. Sherwin-Williams Company; Storm Blaster All Season Sealant: www.sherwin-williams.com/#sle.
      d. Or approved equal.

2.04 SELF-LEVELING SEALANTS

A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Color: To be selected by Director's Representative from manufacturer's standard range.
   3. Manufacturers:
      a. Sika Corporation; Sikaflex-1c SL: www.usa-sika.com/#sle.
      b. Or approved equal.

B. Self-Leveling Polyurethane Sealant for Horizontal Expansion Joints: ASTM C920, Grade P, Uses T, M and O; multi-component; explicitly approved by manufacturer for horizontal expansion joints.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Hardness Range: 30 to 35, Shore A, when tested in accordance with ASTM C661.
   3. Color: To be selected by Director's Representative from manufacturer's standard range.

C. Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
   1. Composition: Multi-component, 100 percent solids by weight.
   2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
   3. Color: To be selected by Director's Representative from manufacturer's standard colors.
   4. Joint Width, Minimum: 1/8 inch.

2.05 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

B. Preformed Extruded Silicone Joint Seal: Pre-cured low-modulus silicone extrusion, in sizes to fit applications indicated on drawings, combined with a neutral-curing liquid silicone sealant for bonding joint seal to substrates.
   1. Size: 1 inch wide, in rolls 100 feet long.
   2. Thickness: 0.78 inch, with ridges along outside bottom edges for bonding area.

C. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Install bond breaker backing tape where backer rod cannot be used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

G. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

3.06 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at low temperature in thermal cycle. Report failures immediately and repair.

END OF SECTION