

## SECTION 07210 - INSULATION

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

#### 1.02 DESCRIPTION OF WORK:

- A. Extent of insulation work is shown on drawings and indicated by provisions of this section.
- B. Applications of insulation specified in this section include the following:
  - 1. Rigid insulation.
  - 2. Foundation wall insulation (supporting backfill).
  - 3. Safing Insulation.
  - 4. Blanket-type building insulation.
  - 5. Roof Corner insulation.
- C. Roof insulation is specified in the Division-7 section in which other roofing products, including roofing membrane is covered.

#### 1.03 QUALITY ASSURANCE:

- A. Thermal Resistivity: Where thermal resistivity properties of insulation materials are designated by r-values they represent the rate of heat flow through a homogenous material exactly 1" thick, measured by test method included in referenced material standard or otherwise indicated. They are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.
- B. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Surface Burning Characteristics: ASTM E 84.
- D. Fire Resistance Ratings: ASTM E 119.
- E. Combustion Characteristics: ASTM E 136.
- F. Maximum Allowable Asbestos Content of Inorganic Insulations: Provide insulations composed of mineral fibers or mineral ores which contain less than 0.25% by weight of asbestos of any type or mixture of types occurring naturally as impurities as determined by polarized light microscopy test per Appendix A of 40 CFR 763.

#### 1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's product literature and installation instructions for each type of insulation and vapor retarder material required.
- B. Certified Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including r-values (aged values for plastic

insulations), densities, compression strengths, fire performance characteristics, perm ratings, water absorption ratings and similar properties.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. General Protection: Protect insulation from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.
- B. Protection for Plastic Insulation:
  - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time.
  - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

- A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
  - 1. Manufacturers of Extruded Polystyrene Board Insulation:
    - a. Amoco Foam Products Co.
    - b. Dow Chemical U.S.A.
    - c. Minnesota Diversified Products, Inc.
    - d. UC Industries
  - 2. Manufacturers of Glass Fiber Insulation:
    - a. CertainTeed Corp.
    - b. Owens Corning
  - 3. Manufacturers of Semi-Refractory Fiber Insulation:
    - a. Manville Corp.
    - b. United States Gypsum Co.

2.02 INSULATING MATERIALS:

- A. General: Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.
- B. Preformed Units: Sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths and lengths.
- C. Extruded Polystyrene Board Insulation: Rigid, cellular thermal insulation with closed-cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 for Type indicated; with 5-year aged r-values of 5.4 and 5 at 40 and 75 deg. F (4.4 and 23.9 deg. C), respectively; and as follows:

1. Type IV, 1.6 lb./cu. ft. min. density, unless otherwise indicated.
- D. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 5 and 165, respectively.
- E. Unfaced Mineral Fiber Blanket/Batt Insulation: Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing); and as follows:
1. Mineral Fiber Type: Fibers manufactured from glass or slag.
  2. Combustion Characteristics: Passes ASTM E 136 test.
  3. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.
- F. Faced Mineral Fiber Blanket/Batt Insulation: Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 655 for Type III, Class A (blankets with reflective vapor-retarder membrane facing with flame spread of 25 or less); foil-scrim-kraft vapor-retarder membrane on one face, respectively; and as follows:
1. Mineral Fiber Type: Fibers manufactured from glass or slag.
  2. Combustion Characteristics: Unfaced blanket/batt passes ASTM E 136 test.
  3. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.
- G. Roof Corner Joint Sealant:
1. At junction of all metal roof deck and exterior masonry walls, apply urethane foam insulation to a maximum depth of 3" in the corner to uniformly seal this junction air tight. Use 2 lbs. density foam.
  2. Apply over foam after proper curing a coating of U.L. approved fire proofing of a tested thickness to achieve a one-hour fire protection rating.

## 2.03 AUXILIARY INSULATING MATERIALS:

- A. Mechanical Anchors: Type and size indicated or, if not indicated, as recommended by insulation manufacture for type of application and condition of substrate.
- B. Mastic Sealer: Type recommended by insulation manufacturer for bonding edge joints between units and filling voids in work.

## PART 3 - EXECUTION

### 3.01 INSPECTION AND PREPARATION:

- A. Require installer to examine substrates and conditions under which insulation work is to be performed. A satisfactory substrate is one that complies with requirements of the section in which substrate and related work is specified. Obtain Installer's written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

- B. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections which might puncture vapor retarders.

### 3.02 INSTALLATION, GENERAL:

- A. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
- B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.
- C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

### 3.03 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION:

On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of insulation.

### 3.04 INSTALLATION OF GENERAL BUILDING INSULATION:

- A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between closed-cell (non-breathing) insulation units by applying mastic or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with mastic or sealant.
- C. Set vapor retarder faced units with vapor retarder to war side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for fire stopping.
- D. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure air-tight installation.
- E. Set reflective foil-faced units accurately with air space in front of foil as shown. Provide not less than 0.75" air space where possible.

### 3.05 INSTALLATION OF SAFING INSULATION:

- A. Cut safig insulation wider than gap to be filled to ensure compression fit and seal joint between insulation and edge of wall and metal deck or other material with caulking approved by safig insulation manufacturer for this purpose. Leave no voids in completed installation.

### 3.06 PROTECTION:

- A. General: Protect installed insulation and vapor retarders from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation of concealing work or, where that is not possible, by temporary covering or enclosure.

END OF SECTION 07210

## **SECTION 07460 – SIDING, SOFFIT & FACIA**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Furnish and install siding, soffits and facia.

#### **1.02 SUBMITTALS**

- A. Conform to Section 1300 - Submittals (Shop Drawings).
- B. Manufacturer's descriptive literature and recommended installation instructions.

#### **1.03 WARRANTY**

- A. Aluminum Products - Lifetime, 50-year transferable, non-prorated limited warranty. Includes material and labor.
- B. Steel Products - Lifetime, 50-year transferable, non-prorated limited warranty, including 50-year hail protection.

### **PART 2 - PRODUCTS**

#### **2.01 SIDING, SOFFIT AND FACIA**

- A. Steel Siding: Alcoa AS12VNT (12" vertical) finish PVC coating. Color to be selected by the Engineer.
- B. Soffit: Alcoa SVG12V20 (12" Ventilated Groove Panel) Aluminum soffit. 15 sq. inches net free ventilation area per linear foot. Material - Alcoa Aluminum. Color shall be selected by the Engineer.
- C. Facia: Alcoa Aluminum Ribbed 0.019" gauge facia; Color shall be selected by Engineer.

### **PART 3 - INSTALLATION**

#### **3.01 INSTALLATION**

- A. Before Starting Work:
  - 1. Verify building dimensions.
  - 2. Examine, clean and repair if necessary adjoining work and substrate.
  - 3. Starting work indicates acceptance of substrate and adjoining work.
- B. Install According To:
  - 1. Manufacturer's written instructions for installing steel siding.
  - 2. "Alcoa Aluminum Soffit Installation Planner", latest edition.
- C. Upon completion the Contractor shall clean all accessories, soffit and trim. Remove fingerprints, soiled areas and scape material.

- D. All fasteners, trim and accessories must be designed for and compatible with the specified products. All finishes must match adjacent surfaces.
- E. Fasteners must be adequate to create a weathertight envelope, plumb and square with no movement or vibration under normal wind conditions (up to 40 mph).

END OF SECTION 07460

## SECTION 07540 – THERMOPLASTIC MEMBRANE ROOFING

### PART 1 PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. This Section includes the following:
  - 1. Adhered membrane roofing system.
  - 2. Prefabricated flashings, corners, parapets, stacks, vents, and related details
  - 3. Fasteners, adhesives, and other accessories required for complete roof installation.
  - 4. Traffic protection.

#### 1.03 REFERENCES

- A. UL: Underwriters Laboratories.
  - 1. Roofing Materials and System Directory: TGFU.R10128.
- B. FMG: Factory Mutual Global.
  - 1. Factory Mutual Standard 4470 - *Approved Standard for Class 1 Roof Covers*.
- C. ASTM: American Society of Testing and Materials.
  - 1. ASTM C 578-04a, *Standard Specification For Rigid, Cellular Polystyrene Thermal Insulation*, © 2004, ASTM International.
  - 2. ASTM C 1177/C1177M-04e1, *Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing*, © 2004, ASTM International.
  - 3. ASTM C 1289-04, *Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*, © 2004, ASTM International.
  - 4. ASTM C 1396/C1396M-04, *Standard Specification for Gypsum Board*, © 2004, ASTM International.
  - 5. ASTM D 146-04, *Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing*, © 2004, ASTM International.
  - 6. ASTM D 570-98, *Standard Test Method for Water Absorption of Plastics*, © 1998, ASTM International.
  - 7. ASTM D 751-00e1, *Standard Test Methods for Coated Fabrics*, © 2000, ASTM International.
  - 8. ASTM D 828-97(2002), *Standard Test Method for Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus*, © 2002, ASTM International.
  - 9. ASTM D1079-05, *Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials*, © 2005, ASTM International.
  - 10. ASTM D 1204-02, *Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature*, © 2002, ASTM International.
  - 11. ASTM D 2136-02, *Standard Test Method for Coated Fabrics-Low-Temperature Bend Test*, © 2002, ASTM International.
  - 12. ASTM D3045-03, *Standard Practice for Heat Aging of Plastics Without Load*, © 2003, ASTM International.

13. ASTM D 4434-96, *Standard Specification for Poly(Vinyl Chloride) Sheet Roofing*, © 1996, ASTM International.
14. ASTM D 5602-98, *Standard Test Method for Static Puncture Resistance of Roofing Membrane Specimens*, © 1998, ASTM International.
15. ASTM D 5635-04, *Standard Test Method for Dynamic Puncture Resistance of Roofing Membrane Specimens*, © 2004, ASTM International.
16. ASTM E 108-04, *Standard Test Methods for Fire Tests of Roof Coverings*, © 2004, ASTM International.
17. ASTM E 119-00a, *Standard Test Methods for Fire Tests of Building Construction and Materials*, © 2000, ASTM International.
18. ASTM G 154-00, *Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials*, © 2000, ASTM International.

#### **1.04 DEFINITIONS**

- A. Roofing Terminology: Refer to ASTM D1079 and glossary of NRCA's *The NRCA Roofing and Waterproofing Manual* for definition of terms related to roofing work in this Section.

#### **1.05 PERFORMANCE REQUIREMENTS**

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Physical Properties: Roof product must meet the requirements of type III PVC sheet roofing as defined by ASTM D4434-96 and must meet or exceed the following physical properties.
  1. Thickness: 60 mil (1.52 mm), nominal per ASTM D751.
  2. Breaking Strengths:  $\geq 472$  lbf. (MD) and  $\geq 366$  lbf. (XMD) per ASTM D751, Grab Method.
  3. Elongation at Break:  $\geq 31\%$  per ASTM D751, Grab Method.
  4. Heat Aging per ASTM D3045: 176°F for 56 days. No sign of cracking, chipping or crazing. (per ASTM D4434).
  5. Factory Seam Strength:  $\geq 456$  lbf per ASTM D751, Grab Method.
  6. Tearing Strength:  $\geq 68$  lbf. (MD) and  $\geq 92$  lbf. (XMD) per ASTM D751, Procedure B.
  7. Low Temperature Bend (Flexibility): Pass -40°F per ASTM D2136.
  8. Accelerated Weathering: No cracking, checking, crazing, erosion or chalking after 5,000 hours per ASTM G154 (formerly G53).
  9. Linear Dimensional Change:  $\leq 0.5\%$  per ASTM D1204 @  $176 \pm 2^\circ\text{F}$  for 6 hours.
  10. Water Absorption:  $\leq 3\%$  per ASTM D570 @ 158°F for 166 hours.
  11. Static Puncture Resistance:  $\geq 56$  lbs. per ASTM D5602.
  12. Dynamic Puncture Resistance:  $\geq 474$  pdl-ft per ASTM D5635.
- D. Minimum UL Class A fire rating.
- E. Attach roofing system using the fastener spacing requirements in the current edition of the manufacturer's Specification.
- F. Current International Code Council Evaluation Services Report or Legacy Report showing compliance with the International Building Code.

#### **1.06 SUBMITTALS**

- A. Product data: For each component of the roofing system.
- B. Shop Drawings: For roofing system. Include roof plan with fastening pattern, and roofing manufacturer's standard details that are representative of those that will be encountered during installation.
- C. Samples for verification: For the following products:
  - 1. 4-inch x 6-inch sample of roofing membrane, of color specified.
  - 2. Sample of roofing membrane with factory weld and T-shaped lap.
  - 3. 4-inch x 6-inch sample of walkway pad.
  - 4. Termination bar, fascia bar with cover, drip edge and gravel stop if to be used.
  - 5. A Sample of each fastener type to be used for installing membrane, insulation/recover board, termination bar and edge details.
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in *Performance Requirements* Article.
- F. ASTM D4434-96 Certification: Supply test results from qualified testing agency that states that the roofing product meets the requirements for type III PVC sheet roofing as defined in ASTM D4434-96.
- G. Maintenance Data: Outlining leak reporting procedure, maintenance requirements, and emergency repair procedures.
- H. Warranties: Submit a current sample of the manufacturer's warranty that will be issued for this project.

## **1.07 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
- B. Manufacturer Qualifications: A qualified manufacturer must utilize a Quality Control Manual during the production of the membrane roofing system that has been approved by and is inspected by Underwriters Laboratories.
- C. Source Limitations: Obtain components for membrane roofing system from roofing membrane manufacturer.
- D. There shall be no deviations from roofing membrane manufacturer's specifications or the approved shop drawings without the prior written approval of the manufacturer.
- E. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
  - 1. Exterior Fire-Test Exposure: Class A; ASTM E108, for application and roof slopes indicated.
  - 2. Fire-Resistance Ratings: ASTM E119, for fire-resistance-rated roof assemblies of which roofing system is a part.

- F. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Comply with requirements for preinstallation conferences in Division 1 Section *Project Management and Coordination*. Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
  2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
  4. Review structural loading limitations of roof deck during and after roofing.
  5. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
  6. Review governing regulations and requirements for insurance and certificates if applicable.
  7. Review temporary protection requirements for roofing system during and after installation.
  8. Review roof observation and repair procedures after roofing installation.

#### **1.08 DELIVERY, STORAGE AND HANDLING**

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
- C. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- D. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- E. Handle and store roof materials and place equipment in a manner to avoid permanent deflection of deck.

#### **1.09 PROJECT CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

#### **1.10 WARRANTY**

- A. Contractor Warranty: The contractor shall warrant the roof application with respect to workmanship and proper application for two (2) years from the date of favorable inspection by the roof membrane manufacturer. Should any leaks covered under the warranty occur during this period, corrective action will be taken by the contractor to repair the roof to the satisfaction of the owner and the roof membrane manufacturer. All corrective work will be done at no cost to the owner or Duro-Last.
- B. Manufacturer Warranty: Must be no-dollar limit type and provide for completion of repairs, replacement of membrane or total replacement of the roofing system at the then-current material and labor prices for the first ten years of the warranty and then on a pro-rated basis based on the then-current material and labor prices during the second 10-years of the warranty. In addition the warranty must meet the following criteria:
  - 1. Warranty Period: 20 years from date issued.
  - 2. No exclusions for damages caused by ponded water or biological growth, or for incidental or consequential damages.
  - 3. Issued direct from and serviced by the roof membrane manufacturer.
  - 4. Transferable for the full term of the warranty.
  - 5. No additional charge for the warranty.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Manufactures or Equal:
  - 1. Duro-Last Roofing, Inc.

### **2.02 PVC ROOFING MEMBRANE**

- A. PVC Sheet: ASTM D4434, Type III, fabric reinforced, as follows:
  - 1. Thickness: 60 mil (1.52 mm), nominal.
  - 2. Exposed Face Color: white.

### **2.03 AUXILIARY MATERIALS**

- A. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.
- B. Prefabricated Flashing: Prefabricated flashings for pipes, curbs, inside and outside corners of same material, type, reinforcement, and color as PVC sheet membrane.
- C. Sealants and Adhesives: Caulk, pourable sealant, mastic and adhesives must be supplied by Duro-Last.
- D. Slip Sheet and Cover Boards: Slip sheet or cover boards, of type required by Duro-Last for the application.
- E. Termination Bars: Standard rigid exterior vinyl bar, 1.5-inch wide with slotted holes 6-inch on center must be manufactured by Duro-Last.
- F. Edge Detail: Fascia bar and cover, prefabricated Drip Edge, prefabricated Gravel Stop and 2-Piece Compression Metal Edge must be manufactured by Duro-Last.
- G. Vinyl Coated Metal: 24 gauge, hot-dipped galvanized, grade 90 metal with a minimum of 17 mil of manufacturers membrane laminated to one side.

- H. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and supplied by Duro-Last.

## **2.04 Walkways**

- A. Flexible Walkways: Provide non-skid, maintenance-free walkway pads in areas of heavy foot traffic and around mechanical equipment. Walkway pads must be manufactured by Duro-Last.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
  - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thickness of insulation.
  - 3. For steel decks, verify that surface plane flatness and fastening of the roof deck comply with requirements in Division 5 Section *Steel Deck*.
  - 4. For Concrete decks,
    - a. Verify that minimum concrete drying period recommended by Duro-Last has passed.
    - b. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
    - c. If roof components will be adhered to concrete deck, verify that concrete curing compounds that will impair adhesion of the components to roof deck have been removed.
  - 5. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to Duro-Last's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

### **3.03 ADHERED ROOFING MEMBRANE INSTALLATION**

- A. Install prefabricated roofing sections over area to receive roofing according to Duro-Last's written instructions.
  - 1. Confirm that substrate is approved by Duro-Last to receive adhered membrane.
  - 2. If membrane is to be adhered to a substrate board or an insulation board, confirm that the board is attached per Duro-Last's specification.
  - 3. Apply adhesive within the temperature range and at application rates specified by Duro-Last.

- B. Accurately align each prefabricated roofing section in order to maintain overlaps of the minimum dimensions required by Duro-Last.
- C. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to Duro-Last's written instructions to ensure a watertight seam installation.
  - 1. Hot-air welded seams must be a minimum of 1-1/2 inch wide.
  - 2. After seam has cooled make a *hands and knees* inspection with a probe. Repair any deficiencies found immediately.
- D. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- E. Penetrations: Utilize prefabricated flashings for penetrations such as pipes, equipment curbs, braces and pitch pockets. These flashings shall be made of the same membrane as the roof sections. Hot-air weld the flashing's skirt to the roofing section and properly terminate the flashing to the penetration per Duro-Last's specification.
- F. Drains and Scuppers: Follow Duro-Last's specification to properly terminate the roofing sections at drains and scuppers. Clamping rings may be used to terminate the roof section at roof drains. If the drain does not have a clamping ring, or it cannot be used, a prefabricated drain boot must be used. Prefabricated flashings must be utilized for scuppers.

#### 3.04 BASE FLASHING INSTALLATION

- A. Install prefabricated sheet flashings according to Duro-Last's specification.
- B. Utilize prefabricated flashings for roof penetrations.
- C. Utilize prefabricated inside and outside corners where necessary.
- D. Hot-air weld the flashing's skirt to the roofing section and properly terminate the flashing to the penetration per Duro-Last's specification.

#### 3.05 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to roof membrane according to Duro-Last's specification.

#### 3.06 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for Duro-Last's technical representative to inspect roofing installation on completion.
  - 1. Deficiencies: Any deficiencies identified during the inspection will be corrected and made ready for reinspection within five (5) working days. Such corrections will be made at no expense to the Owner.
  - 2. Warranty: Upon receipt of the required materials, certifying inspection and acceptance of the installation by Duro-Last, the warranty shall be duly executed and issued to the Owner.

#### 3.07 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing

for deterioration and damage, describing its nature and extent in a written report, with copies to the Owner.

- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by Duro-Last.

END OF SECTION 07540

## SECTION 07600 - FLASHING AND SHEET METAL

### PART 1 - GENERAL

#### 1.01 THE REQUIREMENT:

- A. The Contractor shall furnish and install all sheet metal and appurtenant work, complete and in accordance with the requirements of the Contract Documents.
- B. The principal items of sheet metal work shall include, but not be limited to, the following: sheet metal flashings, and collars all roof penetrations.

#### 1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Protective Coatings. Section 009800
- B. Architectural Paint Finishes. Section 09900

#### 1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS:

- A. All work specified herein shall conform to or exceed the requirements of the Building Code and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section.
- B. Products and their installation shall be in accordance with the following trade standards, as applicable.
  - 1. Manufacturer's printed recommendations and specifications
  - 2. Sheet Metal and Air Conditioning Contractors National Association "Architectural Sheet Metal Manual" (ASMM)
  - 3. The Aluminum Association "Specifications for Aluminum Sheet Metal Work in Building Construction"
  - 4. American Society for Testing and Materials (ASTM)
  - 5. American Welding Society (AWS)

#### 1.04 CONTRACTOR SUBMITTALS:

- A. Shop drawings showing materials, gages, finishes, layout, jointing, profiles, fasteners, fabrication of special shapes and method of attachment to adjacent construction shall be submitted in accordance with Section 01300 entitled, "Contractor Submittals".
- B. Material and color samples shall be submitted where required for appearance and color selections by the Engineer.

### PART 2 - PRODUCTS

#### 2.01 GENERAL:

- A. Sheet metal shall be galvanized steel unless otherwise indicated. Sheet metal work in connection with roofing shall be in accordance with roofing manufacturer's published specifications and as shown on the Drawings.

- B. All sheet metal flashings necessary to make building weathertight shall be provided, whether or not shown or specified.

2.02 FERROUS METALS:

- A. Galvanized steel shall be 24-gage minimum thickness conforming to ANSI/ASTM A 526 with coating designation conforming to G90, ANSI/ASTM A 525M.

2.03 LEAD AND SOLDERING MATERIALS:

- A. Lead shall be 4-6% antimony and remainder shall be lead. Lead sheet shall be soft temper, except hard temper for flanges. Weight shall be not less than 4-lb. per sq. ft. unless shown otherwise.
- B. Solder shall conform to ANSI/ASTM B 32-76 Alloy 5b, 50% tin, 50% lead.
- C. Soldering flux shall meet FS O-F-506c, or a type not injurious to metal surface being treated.

2.04 FASTENERS:

- A. Fastening devices shall be galvanized or stainless steel. Fasteners shall have neoprene washers where water tightness is required.

2.05 PLASTIC CEMENT:

- A. Plastic cement shall conform to ANSI/ASTM D 2822.

2.07 SHOP FABRICATION REQUIREMENTS:

- A. Galvanized steel corner joints and other joints where specified or shown shall be soldered.
- B. All reglets and counter-flashing and associated flashings shall be fabricated by the same manufacturer and be installed as a complete flashing system. All flashings shall be creased longitudinally or otherwise formed with sufficient spring action to hold bottom edges firmly against base flashing or similar material.
- C. Intersecting corners of coping shall be accurately fitted and soldered. Coping shall be per ASMM Plate 68, except modified as shown.
- D. Dryer vents shall be fabricated or stainless steel and be provided with rainhood and self closing flap and interior and exterior escutcheon plates.
- E. Flashing required through concrete or clay tile shall be flexible flashing in order to assure against undue separation between tiles on account of rigidity or the flashing material.

Flashing around pipes, drains, vents, flues, chimneys, etc. shall be of lead or galvanized steel.

2.08 FABRICATED SHEET METAL WORK:

- A. Scuppers in walls shall be constructed of 20-gage galvanized steel with all joints soldered.
- B. Pitch pockets and equipment supports conforming to reference standards shall be provided where required or necessary and may be of galvanized steel construction unless shown otherwise. Pitch pockets shall be designed per ASMM Plate 61. Equipment support (sleeper) caps shall be designed per ASMM Plate 61, Figure B.

- C. The roof penetrations shall be provided with the following flashing:
- |    |                             |   |
|----|-----------------------------|---|
| 1. | Vent Pipes or Multi-Pipes   | Sheet metal with w/Curb: sealant and draw bands. Ref. ASMM 59.                |
| 2. | Equipment Support:          | Sheet metal. Ref. ASMM Plate 60 & 61.   |
| 3. | Sleeper Covers:             | Sheet metal. Ref. ASMM Plate 60, Figure C & D.                                |
| 4. | Pitch Pockets for Supports: | Sheet metal with all joints welded or soldered. Ref. ASMM Plate 61, Figure E. |
| 5. | Ducts w/Curb: 113 (similar) | Sheet metal. Ref. ASMM  |
| 6. | Equipment Platform:         | Sheet metal. Ref. ASMM Plate 101, Figure B (similar).                         |

### PART 3 - EXECUTION

#### 3.01 GENERAL:

- A. The Contractor shall coordinate the flashings necessary with the different trades to make sure all items which penetrate the roof are provided with all necessary sheet metal items and work, such as, but not limited to, the following: pipes, ducts, support racks, equipment platforms or sleepers and supports.
- B. All work shall conform to reference standards. Flashing work shall be coordinated with roofing work. Sheet metal and roofing shall provide a weather-tight and watertight assembly.

#### 3.02 INSTALLATION:

- A. Sheet metal work shall be accurately formed to dimensions and shapes shown. Work shall be fitted snugly, with straight, true lines with exposed faces aligned in proper plane, free from waves and buckles. Arises and angles shall have true and sharp lines and surfaces shall be free from waves and buckles. All exposed edges shall be hemmed. Holes for fasteners within sheet metal work exposed to temperature changes shall be elongated holes for material expansion and movement.
- B. All sheet metal work shall be furnished complete with supports, hangers, bracing, anchors and other devices as required for reinforcement and proper attachment to adjacent construction. Fastenings shall be concealed wherever possible. Joints, fastenings, reinforcements and supports shall be sized and located as required to preclude distortion or displacement due to thermal expansion and contraction.
- C. Dissimilar materials shall be isolated with two (2) coats of asphaltic paint, asphaltic coating compound, or sealer tape. Only stainless steel fasteners shall be used to connect isolated dissimilar metals.
- D. Joints shall be sized and spaced to permit sheet movement for thermal expansion and contraction of 1/4-inch per 10-foot length on 100 deg. F temperature difference. Holes for fasteners or anchors shall be elongated to provide for movement.
- E. Flashings shall be installed at intersections of roof with vertical surfaces and at projections through roof. Corner units shall be factory-fabricated and shall have mitered soldered or

welded corner joints and shall be installed with 3-inch (min) lap joint over flashings on each side.

END OF SECTION 07600

## SECTION 07610 STANDING SEAM METAL ROOF

### PART 1 GENERAL

#### 1.1 Summary

- A. Scope of Work: Furnish and install a pre-formed, tension leveled, metal panel system with continuous interlocking panel connections. Provide all necessary accessories, ridges, hips, valleys, eaves, rakes, corners, miscellaneous flashings, attachment clips and closure members to ensure a weathertight installation.

#### 1.3 References

- A. AA DAF-45 - Designation System for Aluminum Finishes; The Aluminum Association, Inc.
- B. AAMA 607.1 - Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum; American Architectural Manufacturers Association.
- C. 1.3.3 AAMA 608.1 - Voluntary Guide Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum; American Architectural Manufacturers Association.
- D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. ASTM A 755/A 755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil Coating Process for Exterior Exposed Building Products.
- F. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- G. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction.
- H. ASCE 7-95 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers.
- I. BOCA National Building Code (BOCA); Building Officials and Code Administrators International, Inc. (BOCA).
- J. Dade County Protocol PA 100-95: Standard Test Method for Positive and Negative Loads and Wind Driven Rain.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand load caused by wind pressures as specified in ASCE 7-95.
- B. System movement - Accommodate movements due to thermal expansion and contraction, dynamic loading and deflection of structural support system without damage to panel system or loss of weatherproofing capability. Clip design for panel attachment shall accommodate an unlimited allowance for expansion and contraction in the longitudinal direction of the panel system.

- C. Fabricate panels in full length with no end laps when panel lengths are 70'-0" or less. The use of end laps shall be acceptable for lengths greater than 70'-0". Manufacturer's details for end lap conditions shall be strictly adhered to.
- D. All panels shall be fastened to the framing members or underlayment in accordance with manufacturer instructions.
- E. Provide fastener pull-out test report and calculations.
- F. All trim and flashing components shall be fabricated in lengths of 12'-0" to minimize joint details. Allowance for thermal expansion and contraction of trim and flashing components shall be incorporated in their design.
- G. Drainage - Provide positive drainage to exterior to prevent moisture from entering building enclosure or condensation occurring within exterior building envelope.

### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Manufacturer's Certifications: Certified statement that the manufacturer has a minimum of five (5) years experience in the roll forming process of metal panel systems.
- C. Product Data: Manufacturer's current product specifications and installation instructions.
- D. Test Reports: Submit the following test reports, certified by an independent testing laboratory or independent professional engineer, to verify that the proposed materials will meet the performance criteria of the specification.
  - 1. Fastener pull out test and calculations
  - 2. Coating quality.
- E. Shop Drawings: Prior to fabrication, contractor is to submit drawings showing a small scale roof plan and/or elevations, as required. Show details of trim and flashing conditions, fastening and anchoring methods, weatherproofing techniques, terminations, and penetrations of metal roofing work. Panel installation shall not start until drawing approval by architects.
- F. Selection Samples: Submit samples of the following: metal panel, anchor clips, fasteners, closures, sealant and actual metal chips with full range of colors available for owner's selection.
- G. Verification Samples: Submit two samples of each type of metal panel required, not less than 12 inches (305 mm), and illustrating finished panel profile, color, sheen, and texture.
- H. Upon bid proposal contractor is to provide qualifications and/or exceptions to the drawings and specifications..

### 1.6 QUALITY ASSURANCE

- A. All panels are to be factory formed and packaged as per job requirements.

- B. Installer Qualifications: Company specializing in the type of work required for this project, with not less than 2 years of documented experience applying this type of panel system with successful completion of projects of similar scope.
- C. Field Measurements: Field measurements should be taken by the installer for verification of dimensional correctness in relationship to original plans, prior to providing manufacturer with a bill of material.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. Precoated Galvanized Steel Sheet: ASTM A 755/A 755M;ASTM A 653/A 653M, Structural Quality Grade 33/230, G90 Coating Designation, precoated with Kynar 500<sup>®</sup>/Hylar 5000<sup>®</sup> finish.
  - 1. Gauge: 24 gauge (.61 mm) G90 Galvanized steel
  - 2. Panel Profile: 12 5/8 inch (321 mm): PCP120
  - 3. 1 inch (25 mm) high by 1½ inch (38 mm) Wide Batten: PCB001
  - 4. Texture: Smooth

### **2.4 ACCESSORIES**

- A. Provide formed accessories of same gage and finish as the primary panel system, unless otherwise indicated on the drawings, compliant with specified requirements.
- B. All flashing components shall be fabricated in a minimum of 12'-0" lengths.
- C. Anchor Clips: Required based upon panel type. Clips are to be a concealed type; designed to allow for thermal movement of panels. Clips are to be a minimum of 22 GA stainless steel unless substrate and uplift requirements allow for a 24 GA Galvanized steel clip.
- D. Sealants:
  - 1. Apply sealant where necessary to complete a weathertight roof system.
  - 2. Consult manufacturer for sealant recommendations.
  - 3. Fasteners: As recommended by manufacturer for project conditions and panel type.
- E. Snow Rails
  - 1. Components:
    - a. Rail clamps for standing seam roofing, extruded and milled 6061-T6 and 6005-T5 Aluminum as manufactured by Alpine Snow Guards #4000 or equal.
    - b. Extruded aluminum tubing, 6061-T6 1" outside diameter and 1/8" wall thickness.
    - c. Couplings, 3" long, 2011 aluminum.
    - d. End caps, 302 stainless steel
  - 2. Design Requirements
    - a. Spacing as recommended by manufacturer

- b. Use 3 set screws per clamp

### **PART 3 EXECUTION**

#### **3.1 INSTALLATION:**

- A. Install metal panels and accessories in strict accordance with manufacturer's instructions, shop drawings, and applicable codes.
- B. Protect surfaces from coming in contact with cementitious materials and dissimilar metals with a neutral coating such as bituminous paint.
- C. Fasten panels to structural supports with concealed anchor clips, except where fixed attachment points are necessary.
- D. Entire system shall be installed plumb, level, and true to line.
- E. Fully interlock or overlap panels (dependent upon panel design) with adjacent panels; apply sealants as recommended by panel manufacturer to achieve weathertight installation.
- F. Roll-formed panels designed for eave to ridge installation should be installed with no transverse seams.
- G. Workmanship complies with standards established by the Architectural Sheet Metal community.
- H. Care should be taken during handling of panels to prevent bending, twisting, abrasion, scratching, denting, etc.
- I. Do not allow shavings, metal dust, or chips to fall on panels.

#### **3.2 PROTECTION**

- A. Provide protection as required to assure that completed work of this section will be without damage or deterioration at date of substantial completion.
- B. Protect work area as required to protect from damage by other trades.

END OF SECTION 07610

## SECTION 07920 - SEALANTS, CAULKING AND BELOW GRADE WATERPROOFING

### PART 1 - GENERAL

#### 1.01 THE REQUIREMENT:

- A. The Contractor shall perform all caulking, sealing, moisture protection and appurtenant work complete and in accordance with the requirements of the Contract Documents.

#### 1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Joints In Concrete. Section 03290

#### 1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS:

- A. Federal Specifications:

TT-S-00230C(2) Sealing Compound, Elastomeric Type, Single Component, (For Caulking, Sealing and Glazing in Buildings and Other Structures).

TT-S-001543A Sealing Compound, Silicone Rubber Base, (For Caulking, Sealing and Glazing in Building and Other Structures).

- B. Commercial Standards:

ASTM D 41 Specification for Asphalt Primer Used in Roofing and Waterproofing.

ASTM D 226 Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

ASTM D 312 Specification for Asphalt Used in Roofing.

ASTM D 4551 Standard for PVC Flexible Sheeting for Concealed Water Containment Membranes.

#### 1.04 CONTRACTOR SUBMITTALS:

- A. Samples: The Contractor shall submit to the Engineer for review, samples, including color samples of all the caulking and sealant materials and other moisture protection materials he proposes to use. The samples shall be clearly marked with the manufacturer's name and product identification and shall be submitted along with the manufacturer's technical data and application instructions.

- B. The Contractor shall submit copies of the manufacturer's technical literature, specifications, warranty, and installation instructions.

## PART 2 - PRODUCTS

### 2.01 SEALANTS AND CAULKING MATERIALS:

- A. All caulking and sealing materials shall conform to the following requirements:
1. Sealant for joints in concrete is specified under Section 03290, entitled "Joints in Concrete".
  2. Sealant for general exterior and/or interior architectural use shall be 2-part polyurethane, gun grade, such as Products Research Corp "210"; Progress Unlimited "Iso-Flex 2000"; or equal. Sealant for interior use may be 1-part acrylic tripolymer sealant, such as Tremco's "Mono"; Dap One-Part Acrylic; or equal.
  3. The sealants used with aluminum doors, windows, storefronts and frames shall be silicone sealant conforming to Federal Specifications TT-S-001543A (Class A) and TT-S-00230C(2) (Type II, Class A).
  4. Filler material shall be resilient, closed-cell polyethylene foam and/or bond breakers of proper size for joint widths. It shall be compatible with sealant manufacturer's product.
  5. Primers shall be as recommended in the manufacturer's printed instructions for caulking and sealants.
  6. Cleaning and cleanup solvents shall be as recommended in the manufacturer's printed instructions for caulking and sealants.

## PART 3 - EXECUTION

### 3.01 GENERAL INSTALLATION REQUIREMENTS:

- A. All work under this Section and all testing, where applicable, shall be performed in accordance with manufacturer's printed recommendations, specifications and installation instructions except where more stringent requirements are shown or specified herein; and, except where project conditions require extra precautions or provisions to assure performance of the waterproofing system.
- B. Authorized Installers: Caulking, sealants and moisture protection shall be complete systems and installed only by installers authorized and approved by the respective manufacturers.
- C. Sub-Slab Membrane: A sub-slab membrane shall be installed under all new building floor slabs with vinyl composition tile finishes and at other locations designated in the Contract Documents.
- D. Showers: Showers shall be provided with a shower pan membrane waterproofing system as specified herein for moisture protection.

### 3.02 SEALANT FILLED JOINTS:

- A. The Contractor shall be responsible for providing the on-site services of the sealant manufacturer's representative prior to sealant work to inspect the joints to be sealed and to instruct the installer in the proper use of the materials. Joints and spaces to be sealed shall be clean, dry and free of dust, loose mortar and other foreign materials. Ferrous metal surfaces shall be cleaned of all rust, mill scale and other coatings by wire brush, grinding or sandblasting. Oil and grease shall be removed by cleaning in accordance with sealant

manufacturer's printed recommendations. Protective coatings shall be removed from all aluminum surfaces against which caulking or sealing compound is to be placed. Bituminous or resinous materials shall be removed from surfaces to receive caulking or sealants. Where required by the manufacturer, sides of joints of porous materials shall be primed immediately prior to caulking or sealing.

- B. Sealant depth in expansion joints shall be 1/2 of the width of joint, but not less than 1/8-inch deep and 1/4-inch wide nor more than 1/2-inch deep and 1-inch wide. All joints shall have a rigid filler material installed to proper depth prior to application of sealant.
- C. A full bead of sealant shall be applied into the joint under sufficient pressure with the nozzle drawn across sealant to completely fill the void space and to ensure complete wetting of contact area to obtain uniform adhesion. Sealants shall be tooled immediately after exposure with caulking tool or soft bristled brush moistened with solvent. The finished sealant filled joint shall be slightly concave unless detailed otherwise.
- D. After application of sealant and caulking materials, adjacent materials which have been soiled shall be cleaned and left in a neat, clean, undamaged or discolored condition. On porous surfaces, excess sealant shall be removed per sealant or caulking manufacturer's printed instructions.

END OF SECTION 07920

