

SECTION 074113 - METAL ROOF PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal roof panel system of preformed aluminum panels.
- B. Metal mansard roof system of preformed aluminum panels.
- C. Metal soffit panel system of preformed aluminum panels.
- D. Metal wall panel (back of parapet) system of preformed aluminum panels

1.2 RELATED REQUIREMENTS

- A. Section 061001 - Rough Carpentry - Architecture: Roof sheathing.
- B. Section 077100 - Roof Specialties: Fascias.
- C. Section 077123 - Manufactured Gutters and Downspouts.
- D. Section 079200 - Joint Sealants: Sealing joints between metal roof panel system and adjacent construction.

1.3 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).
- B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- D. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- E. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials.
- F. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- G. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
- H. ASTM E1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.

- I. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies.

1.4 SUBMITTALS

- A. See Section 013300 - Submittal Procedures for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Summary of test results, indicating compliance with specified requirements.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Specimen warranty.
- C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
 - 1. Show work to be field-fabricated or field-assembled.
- D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each roofing system specified, submit samples of minimum size 6 inches square, representing actual roofing metal, thickness, profile, color, and texture.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.
- H. Test Reports: Indicate compliance of metal roofing system to specified requirements.
- I. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section and with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.

1.6 MOCK-UPS

- A. Provide mock-up of 100 sq ft, including underlayment, shingles, eave protection membrane, and associated flashings.
- B. Locate as directed by Architect.
- C. Mock-up may remain as part of the work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.

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

1.8 FIELD CONDITIONS

- A. Do not install metal roof panels, eave protection membrane or underlayment when surface, ambient air, or wind chill temperatures are below 45 degrees F.

1.9 WARRANTY

- A. Finish Warranty: Provide 20-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.
- B. Special Warranty: Provide 2-year warranty for weathertightness of roofing system, including agreement to repair or replace metal roof panels that fail to keep out water commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide metal roof, mansard and soffit panels by same manufacturer as fascia panels in Section 077100 - Roof Specialties.
- B. Architectural Metal Roof and Mansard Panel Manufacturers:
 - 1. Basis of Design: Berridge Manufacturing Company; Single-Lock Zee-Lock Panel: www.berridge.com/#sle.
 - 2. ATAS International, Inc: www.atas.com/#sle.
 - 3. MBCI, a Cornerstone Building Brands Company: www.mbc.com/#sle.
 - 4. Petersen Aluminum Corporation: www.pac-clad.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- C. Metal Soffit Panels Manufacturers:
 - 1. Basis of Design: Berridge Manufacturing Company; Vented L-Panel Soffit: www.berridge.com/#sle.
 - 2. ATAS International, Inc: www.atas.com/#sle.
 - 3. MBCI, a Cornerstone Building Brands Company: www.mbc.com/#sle.
 - 4. Petersen Aluminum Corporation: www.pac-clad.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- D. Metal Parapet Wall Panels Manufacturers:
 - 1. Basis of Design: Berridge Manufacturing Company; FW-12 Panel: www.berridge.com/#sle.
 - 2. ATAS International, Inc: www.atas.com/#sle.
 - 3. MBCI, a Cornerstone Building Brands Company: www.mbc.com/#sle.
 - 4. Petersen Aluminum Corporation: www.pac-clad.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Metal Roof, Soffit and Wall Panels: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for compliance with the following minimum standards:
 - 1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed $L/180$ of span length(L) when tested in accordance with ASTM E1592.
 - a. Dead Loads: Weight of roofing system.
 - b. Live Loads: As required by ASCE 7.
 - 2. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
 - 3. Wind Uplift: Class 90 wind uplift resistance of UL 580.
 - 4. Air Infiltration: Maximum 0.06 cfm/sq ft at air pressure differential of 6.24 lbf/sq ft, when tested according to ASTM E1680.
 - 5. Water Penetration: No water penetration when tested in accordance with procedures and recommended test pressures of ASTM E1646; perform test immediately following air infiltration test.
 - 6. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F.
 - 7. Material: Aluminum.
 - 8. Minimum Thickness: 0.040 inch.

2.3 METAL ROOF, MANSARD, WALL AND SOFFIT PANELS

- A. Metal Roof , Mansard, and Soffit Panels: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.
- B. Metal Roof and Mansard Panels: Factory-formed panels with factory-applied finish.
 - 1. Aluminum Panels:
 - a. Alloy and Temper: Aluminum complying with ASTM B209/B209M; temper as required for forming.
 - b. Thickness: Minimum 18 gauge, 0.040 inch.
 - 2. Profile: Standing seam, with minimum 2-inch seam height; concealed fastener system for field seaming with special tool.
 - 3. Texture: Smooth.
 - 4. Length: Full length of roof slope, without lapped horizontal joints.
 - 5. Width: Maximum panel coverage of 16 inches.
 - 6. Color: As selected by Architect from manufacturer's standard line.
- C. Metal Soffit Panels:
 - 1. Profile: Style as indicated, with venting provided.
 - 2. Material: Precoated aluminum sheet, 20 gauge, 0.032 inch minimum thickness.
 - 3. Texture: Smooth.
 - 4. Width: Maximum panel coverage of 16 inches.
 - 5. Color: As selected by Architect from manufacturer's standard line.
- D. Metal Wall Panels (back of soffit):
 - 1. Profile: Style as indicated.
 - 2. Material: Precoated aluminum sheet, 20 gauge, 0.032 inch minimum thickness.
 - 3. Texture: Smooth.

4. Width: Maximum panel coverage of 16 inches.
5. Color: As selected by Architect from manufacturer's standard line.

2.4 ATTACHMENT SYSTEM

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

2.5 FABRICATION

- A. Panels: Provide factory fabricated panels and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.
- B. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

2.6 FINISHES

- A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss as selected by Architect from manufacturer's standard line.
 1. Products:
 - a. Arkema, Inc; Kynar 500: www.arkema.com/#sle.
 - b. Beckers Group; Beckry Fluor: www.beckers-group.com/#sle.
 - c. PPG; Duranar: www.ppgmetalcoatings.com/#sle.
 - d. Sherwin-Williams Company; Fluoropon: www.coil.sherwin.com/#sle.
 - e. Substitutions: See Section 016000 - Product Requirements.

2.7 ACCESSORIES

- A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.
- C. Sealants:
 1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
 2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
 3. Seam Sealant: Factory-applied, non-skinning, non-drying type.
- D. Underlayment: Self-adhering polymer modified asphalt sheet complying with ASTM D1970/D1970M, with strippable release film and top surface of woven polypropylene sheet.

1. Sheet Thickness: 40 mils, 0.040 inch, minimum.
2. Self Sealability: Nail sealability in accordance with ASTM D1970/D1970M.
3. Low Temperature Flexibility: Comply with ASTM D1970/D1970M.
4. Water Vapor Permeance: 0.1 perm, maximum, when tested in accordance with ASTM E96/E96M using Desiccant Method (Method A).
5. Functional Temperature Range: Minus 45 degrees F to 250 degrees F.
6. Products:
 - a. Basis of Design: Carlisle Companies, Inc.; WIP 250HT: www.carlislewipproducts.com.
 - b. Certainteed Roofing; WinterGuard Metal Waterproofing Underlayment: www.certainteed.com/#sle.
 - c. GCP Saint-Gobain; Grace Ice and Water Shield: www.gcpat.com.
 - d. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Broom clean wood sheathing prior to installation of roofing system.
- B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to ensure that completed roof will be free of leaks.
- C. Coordinate installation of waterproof membrane over roof sheathing with Section 061001.
- D. Remove protective film from surface of roof panels immediately prior to installation; strip film carefully to avoid damage to prefinished surfaces.
- E. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by metal roof panel manufacturer.
- F. Protect surrounding areas and adjacent surfaces from damage during execution of this work.
- G. At locations where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.3 INSTALLATION

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

1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
 2. Minimize field cutting of panels. Where field cutting is required, use methods that will not distort panel profiles. Use of torches for field cutting is prohibited.
- B. Accessories: Install necessary components that are required for complete roofing assembly, including flashings, gutters, downspouts, trim, closure strips, preformed crickets, caps, rib closures, ridge closures, and similar roof accessory items.
- C. Roof Panels: Install metal roof panels in accordance with manufacturer's installation instructions, minimizing transverse joints except at junction with penetrations.
1. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by panel manufacturer.
 2. Provide sealant tape or other approved joint sealer at lapped panel joints.
 3. Install sealant or sealant tape at end laps and side joints as recommended by metal roof panel manufacturer.

3.4 CLEANING

- A. See Section 017700 - Closeout Procedures for additional requirements.
- B. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.5 PROTECTION

- A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
- B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

END OF SECTION 074113