

**SECTION 07411**  
**STANDING SEAM METAL ROOFING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes the following:
  - 1. Standing-seam metal roof.
  - 2. Metal gutters.

**1.2 DEFINITIONS**

- A. Metal Roof Panel Assembly: Metal roof panels, waterproofing membrane (underlayment), attachment system components, metal gutters and accessories necessary for a complete roofing system.

**1.3 PERFORMANCE REQUIREMENTS**

- A. General Performance: Metal roof panels shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
  - 1. Wind Loads: As indicated on Contract Plans.
- C. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
- D. Water Penetration: No water penetration when tested according to ASTM E 331 at 6.24 lbf/sq.ft. test pressure difference.
- E. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

**1.4 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of roof panel and accessory.

- B. Shop Drawings: Show fabrication and installation layouts of metal roof panels; details of edge conditions, side-seam and endlap joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and details. Distinguish between factory- and field-assembled work.
  - 1. Provide engineered shop drawings prepared by a professional engineer registered in the state of Florida.
- C. Samples for Verification: For exposed finish required, prepared on Samples of size indicated below:
  - 1. Metal Roof Panels: 8-inch long sample of panel including clips.
- D. Warranties: Specimen copy of warranty indicated.
- E. Certified Installers Qualifications: Submit certificate from manufacturers

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An approved installer certified by manufacturer specifically for metal roof system provided.
- B. Source Limitations: Obtain each type of metal roof panels from single source from single manufacturer.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockup of typical roof eave, including fascia, as shown on Contract Plans; approximately four panels wide by full eave width, including underlayment, attachments, and accessories.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless the Engineer specifically approves such deviations in writing.
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Final Acceptance.
- D. Preinstallation Conference: Conduct conference at Project site.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, metal roof panels, and other manufactured items so as not to be damaged or deformed. Package metal roof panels for protection during transportation and handling.
- B. Unload, store, and erect metal roof panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal roof panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause staining, denting, or other surface damage.

- D. Protect strippable protective covering on metal roof panels from exposure to sunlight and high humidity, except to extent necessary for period of metal roof panel installation.

## 1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit metal roof panel work to be performed according to manufacturer's written instructions and warranty requirements.
- B. Field Measurements: Verify actual dimensions of construction contiguous with metal roof panels by field measurements before fabrication.

## 1.8 WARRANTY

- A. Assignment of Warranties:
  - 1. Wherever in this Section a product notes manufacturer's warranties the following language is deemed to be included: Contractor hereby assigns to the Department any and all manufacturers' or other sellers' warranties that come with any products, material or supplies which are incorporated into or are consumed in the project in any way. To the extent that any such warranties do not extend to subsequent purchasers or owners or such warranties contain a limitation on assignment, Contractor agrees that Contractor purchased the products, materials and supplies on behalf of the Department with the intent that the Department be the intended recipient of any warranties. All documents associated with or describing any such warranties shall be delivered to the Department along with the other project final acceptance documents and shall be deemed to be a part of the required final acceptance documentation. Contractor shall not take any action or fail to act in any way which voids any such warranties. All subcontracts shall contain a similar provision which requires subcontractors to assign any such warranties to the Department.
- B. Manufacturer's Finish Warranty: Provide manufacturer's standard warranty agreeing to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Warranty Period: 20 years following the date of Final Acceptance.

## PART 2 - PRODUCTS

### 2.1 STANDING SEAM ROOF

- A. General: Provide factory-formed roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

B. Roof Panels: Vertical-rib, batten seamed-joint, standing-seam metal roof panels formed with vertical ribs designed for sequential installation by mechanically attaching panels to supports using concealed clips.

1. Florida Product Approval Number: Provide current product approval certification in accordance with the Code.

a. Panel Description:

- 1) Finish: Smooth.
- 2) Panel Width: Refer to the Materials Schedule in the Plans.
- 3) Standing Seam Profile Height: Refer to the Materials Schedule in the Plans.
- 4) Exposed Paint Finish: 2-coat fluoropolymer.
- 5) Concealed Paint Finish: Manufacturer's standard.
- 6) Colors: Refer to the Materials Schedules in the Plans.

## 2.2 PANEL MATERIALS

A. Steel Sheet: Manufacturer's standard coated steel sheet required for roof panels indicated.

1. Surface Finish: Smooth.

2. Exposed Finish:

a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

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

B. Panel Sealants:

1. Joint Sealant: ASTM C 920; elastomeric silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.

2. Tape Sealant: Type recommended by manufacturer that are compatible with panel materials, are non-staining, and do not damage panel finish.

## 2.3 UNDERLAYMENT MATERIALS

A. Description: Self-adhering, high-temperature resistant sheet 30 to 40 mils thick minimum, consisting of slip-resisting, polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: Stable after testing at 240 degrees F; ASTM D 1970.

- B. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

## 2.4 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 2, Grade 2 or Grade 3, glass-fiber mat facer on both major surfaces.
  - 1. R-Value: As indicated on the Plans.
  - 2. Thickness: As required for R-Value indicated.

## 2.5 MISCELLANEOUS METAL FRAMING

- A. Miscellaneous Metal Framing, General: ASTM C 645, cold-formed metallic-coated steel sheet, ASTM A 653, G40 hot-dip galvanized or coating with equivalent corrosion resistance unless otherwise indicated.
- B. Fasteners for Miscellaneous Metal Framing: Of type, material, size, corrosion resistance, holding power and other properties required to fasten miscellaneous metal framing members to substrates.
- C. Fasteners for Insulation: Type recommended by the insulation manufacturer for application indicated.

## 2.6 MISCELLANEOUS MATERIALS

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

## 2.7 ACCESSORIES

- A. Roof Panel Accessories: Provide components approved by roof panel manufacturer and as required for a complete metal roof panel assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
  - 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal roof panels.
  - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

- B. Flashing and Trim: Formed from same material as roof panels, painted to match roof panels. Provide flashing and trim as required to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, and ridges. Finish flashing and trim with same finish system as adjacent metal roof panels.
- C. Gutters: Formed from same material roof panels. Match profiles indicated complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch-long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports fabricated from same metal as gutters.
  - 1. Wire-Ball Downspout Strainer: Aluminum.
  - 2. Continuous Leaf Screen: Perforated aluminum sheet.
- D. Joint Sealant: One-part elastomeric sealant approved by the metal roof system manufacturer.

## 2.8 FABRICATION

- A. Fabricate and finish metal roof panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal roof panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weathertight and minimize noise from movements within panel assembly.
- D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
  - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  - 2. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
  - 3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
  - 4. Fabricate cleats and attachment devices of size and metal thickness recommended by SMACNA's "Architectural Sheet Metal Manual" or by metal roof panel manufacturer for application, but not less than thickness of metal being secured.

## 2.9 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of the Work.
- B. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
- C. Examine roughing-in for components and systems penetrating metal roof panels to verify actual locations of penetrations relative to seam locations of metal roof panels before metal roof panel installation.
- D. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.
- B. Miscellaneous Framing: Install eave angles, furring, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer's written instructions.

### 3.3 INSULATION INSTALLATION

- A. Install insulation with long joints of insulation in a continuous straight line, with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
  - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- B. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.0 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

- C. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

- 1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

### 3.4 UNDERLAYMENT INSTALLATION

- A. General: Install in accordance with manufacturer's instructions and recommendations. Apply primer if required by manufacturer.

- 1. Comply with temperature restrictions of underlayment manufacturer for installation.
  - 2. Apply at locations indicated, wrinkle free, in shingle fashion to shed water.

- B. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.

### 3.5 METAL ROOF PANEL INSTALLATION, GENERAL

- A. Panel Sizes: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.

- B. Thermal Movement. Rigidly fasten metal roof panels to structure at one and only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction. Predrill panels for fasteners.

- 1. Avoid attaching accessories through roof panels in a manner that will inhibit thermal movement.

- C. Fasteners: Non-corrosive types recommended by the panel manufacturer for installations indicated.

- D. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

- E. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by metal roof panel manufacturer.

- F. Sealants: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal roof panel manufacturer.

### 3.6 STANDING SEAM ROOF INSTALLATION

- A. General: Install in accordance with manufacturer's instructions and recommendations.

- 1. Fasten metal roof panels to supports with concealed clips at spacing required with fasteners recommended by manufacturer.



### 3.7 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
  - 1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- C. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
  - 1. Install leaf screens.

### 3.8 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing.
- B. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.
- C. Additional inspections when directed by the Engineer, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

### 3.9 CLEANING

- A. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07411