

**SECTION 07 41 13**  
**STANDING SEAM METAL ROOFING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the installation of pre-finished, pre-formed architectural standing seam roof system. All metal trim, accessories, fasteners, insulation and sealants indicated on the drawings as part of this system

**1.2 RELATED WORK**

- A. Sealant: Section 07 92 00, JOINT SEALANTS.
- B. Fascia and Trim: 07 60 00, FLASHING AND SHEET METAL.
- C. Sustainable Design: Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS

**1.3 DESIGN REQUIREMENTS**

- A. Provide panels in continuous lengths up to manufacturer's standard longest lengths, with no joints or seams, except where indicated or specified. Ribs of adjoining sheets must be in continuous contact from eave to ridge.
- B. There cannot be exposed or penetrating fasteners except where shown on approved shop drawings. Fasteners into steel must be stainless steel, zinc cast head, or cadmium plated steel screws inserted into predrilled holes.
- C. Field-formed seam type system must be mechanically locked closed by the manufacturer's locking tool. Include a continuous factory applied sealant within the seam.
- D. Roof panel anchor clips must be concealed and designed to allow for longitudinal thermal movement of the panels, except where specific fixed points are indicated. Provide for lateral thermal movement in panel configuration or with clips designed for lateral and longitudinal movement.
- E. Design metal roof panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
  - 1. Structural Performance: Provide metal roof panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E1592.
  - 2. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class; design and size

components to withstand positive and negative wind loads, including increased loads at building corners as calculated according to local jurisdiction and ASCE 7.

3. Deflection: Provide panels capable of supporting design loads between unsupported spans with deflection of not greater than  $L/180$  of the span.

F. Single Source: Roofing panels, clips, closures, and other accessories must be standard products of the same manufacturer; be the latest design by the manufacturer; and have been designed by the manufacturer to operate as a complete system for the intended use.

G. Energy Performance, Energy Star: Provide roofing finish system that is listed on DOE's ENERGY STAR "Roof Products Qualified Product List" or listed on Cool Roof Rating Council (CRRC) product list.

#### **1.4 INSTALLATION REQUIREMENTS**

- A. Pre-Installation Conference: Convene a meeting on site, after submittals are received and approved but before any work, to review drawings and specifications, submittals, schedule, manufacturer instructions, site logistics and pertinent matters of coordination, temporary protection, governing regulations, tests and inspections; participants to include RE/COR and all parties whose work is effected or related to the work of this section.
- B. Install in accordance with SMACNA Architectural Sheet Metal Manual except as otherwise shown or specified.

#### **1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Show design, details of construction, flashing, and fastenings.
- C. Provide design calculations prepared by a professional engineer specializing in structural engineering verifying that system supplied and any additional framing meets design load criteria indicated. Coordinate calculations with manufacturer's test results. Include calculations for:
  1. Wind load uplift design pressure at roof locations.
  2. Clip spacing and allowable load per clip.
  3. Fastening of clips to structure or intermediate supports.
  4. Intermediate support spacing and framing and fastening to structure when required.

5. Allowable panel span at anchorage spacing indicated.
  6. Safety factor used in design loading.
  7. Governing code requirements or criteria.
  8. Edge and termination details.
- D. Installer Qualifications: Document installer is factory-trained, approved by the metal roofing system manufacturer to install the system, and has a minimum of three years' experience as an approved applicator with that manufacturer. The applicator must have applied five installations of similar size and scope as this project within the previous 3 years.

#### **1.6 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project requirements.

#### **1.7 REGULATORY REQUIREMENTS FOR RECYCLED CONTENT**

- A. Products and Materials with Post-Consumer Content and Recovered Materials Content:
1. Contractor is obligated by contract to satisfy Federal mandates for procurement of products and materials meeting recommendations for post-consumer content and recovered materials content; the list of designated product categories with recommendations has been compiled by the EPA - refer to <http://www.epa.gov/wastes/conservation/tools/cpg/products/>.
  2. Materials or products specified by this section may be obligated to satisfy this Federal mandate and Comprehensive Procurement Guidelines program.
  3. The EPA website also provides tools such as a Product Supplier Directory search engine and product resource guides.
- B. Fulfillment of regulatory requirements does not relieve the Contractor of satisfying sustainability requirements stipulated by Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, as it relates to recycled content; additional product and material selections with recycled content may be required, as determined by Contractor's Sustainability Action Plan.

#### **1.8 WARRANTY**

- A. Roofing work subject to the terms of the Article "Warranty of Construction", FAR clause 52.246-21, except extend the warranty period to five years.

## 1.9 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
- B. American Architectural Manufacturer Association (AAMA):
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|-------------|--|
| AAMA 621-02 | High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates |
|-------------|--|
- C. American Society for Testing and Materials (ASTM):
- |                |   |
|----------------|---|
| A463/A463M-09  | Steel Sheet, Cold-Rolled, Aluminum-Coated, by the Hot-Dip Process                                       |
| C920-11        | Elastomeric Joint Sealants  |
| E1514-98(2011) | Structural Standing Seam Steel Roof Panel Systems   |
| E1592          | Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference |
- D. American Society of Civil Engineers (ASCE):
- |           |   |
|-----------|---|
| ASCE 7-10 | Minimum Design Loads for Buildings and Other Structures |
|-----------|---|
- E. Cool Roof Rating Council (CRRRC):
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| CRRRC-1-10 | Product Rating Program, <a href="http://www.coolroofs.org">www.coolroofs.org</a> |
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- F. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual 2012
- G. Underwriters Laboratory (UL):
- |                      |  |
|----------------------|--|
| UL 580, 2006 Edition | Tests for Uplift Resistance of Roof Assemblies |
|----------------------|--|
- H. U.S. Department of Energy (DoE):
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| Roof Products Qualified Product List, <a href="http://www.energystar.gov">www.energystar.gov</a> |
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## PART 2 - PRODUCTS

### 2.1 METAL ROOF PANEL

- A. Aluminum-Zinc Alloy Coated Sheet Steel conforming to ASTM A463 and coated on both sides with 0.5 ounce of aluminum per square foot (0.15 Kg/sm); minimum 0.6 mm (24 gage) base metal thickness.
- B. Conform to ASTM E1514.
- C. Panels to be designed for attachment with concealed fastener clips, spaced as required by the manufacturer to provide for both positive and

negative design loads, while allowing for the expansion and contraction of the entire roof system resulting from variations in temperature.

D. Forming: Use continuous end rolling method. No end laps on panels. No portable rollforming machine will be permitted on this project, no installer-owned or installer-rented machines will be permitted. It is the intent of the Architect to provide Factory-Manufactured panel systems only for this project.

E. Panel Coverage: 406 mm (16 inches)

F. Seam Height: Minimum 44 mm (1-3/4 inch).

G. Acceptable Manufacturers: Basis of design, Aluminum Corporation  
Peterson Aluminum Corp,

Elk Grove Village, IL 800-323-1960, or approved equal.

## **2.2 SEALANTS**

A. Field-applied: ASTM C920.

B. Seam Cap Sealant: Factory applied hot melt, high viscosity, pressure sensitive adhesive with high heat resistance.

C. Type, Grade, and Class as recommended in writing by the manufacturer.

## **2.3 SEALANT TAPE**

A. Pressure sensitive, 100 percent solids, Gray Polyisobutylene compound with release-paper backing.

B. 12 mm (1/2 inch) wide x 3 mm (1/8 inch) thick.

## **2.4 UNDERLAYMENT**

A. Self-Adhering with reinforcing scrim, High-Temperature Sheet: Minimum 50 thick minimum, consisting of slip-resisting top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.

## **2.5 FASTENERS**

A. Self-drilling, or self-tapping zinc plated hex head carbon-steel screws with EPDM washer or stainless steel cap.

B. Concealed Standard Anchor Clips: Clips base must be minimum 1.2 mm (18 gauge) galvanized steel with 0.7 mm (22 gage) galvanized or stainless steel sliding top. Clips must be two (2) piece design; one-piece clips are not acceptable.

## **2.6 FINISHES**

A. Factory finished complying with SMACNA's recommendations for applying and designating finishes.

**B. Exterior Finish:**

1. 2-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.
2. Coating system must provide nominal 0.025 mm (1.0 mil) dry film thickness, consisting of primer and color coat.
3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.0125 mm (0.5 mil).

C. Color: As indicated in Section 09 06 00, Schedule for Finishes.

**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 work.
1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
- B. 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.
- C. 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. Install fascia and trim.

**3.3 METAL ROOF PANEL INSTALLATION, GENERAL**

- A. General: Provide metal roof panels of full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations. Anchor metal roof panels and other components of the Work securely in place, with provisions for thermal and structural movement.
1. Field cutting of metal roof panels by torch is not permitted.
  2. Install panels perpendicular to purlins.
  3. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction; predrill panels.

4. Provide metal closures at peaks, rake walls and each side of ridge and hip caps.
5. Flash and seal metal roof panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
6. Locate and space fastenings in uniform vertical and horizontal alignment.
7. Install ridge and hip caps as metal roof panel work proceeds.
8. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
9. Lap metal flashing over metal roof panels to allow moisture to run over and off the material.

B. Fasteners:

1. Steel Roof Panels: Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

D. Joint Sealers: 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.

1. Seal metal roof panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal roof panel manufacturer.

### **3.4 FIELD-ASSEMBLED METAL ROOF PANEL INSTALLATION**

A. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.

1. Install clips to supports with self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.

3. Form field-formed seam type system seams in the field with an automatic mechanical seamer approved by the manufacturer.

### **3.5 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.
  2. Details of installation which are not indicated must be in accordance with the SMACNA, panel manufacturer's approved printed instructions and details, or the approved shop drawings. Allow for expansion and contraction of flashing.
- B. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

### **3.6 ERECTION TOLERANCES**

- A. Installation Tolerances: Shim and align metal roof panel units within installed tolerance of 6 mm in 6 m (1/4 inch in 20 feet) on slope and location lines as indicated and within 3 mm (1/8 inch) offset of adjoining faces and of alignment of matching profiles.

### **3.7 INSTALLATION**

- A. Panels shall be installed plumb and true in a proper alignment and in relation to the structural framing. The erector must have at least five years successful experience with similar applications.
- B. Install metal panels, fasteners, trim and related sealants in accordance with approved shop drawings and as may be required for a weather-tight installation.
- C. Remove all strippable coating and provide a dry-wipe down cleaning of the panels as they are erected.

### **3.8 CLEANING AND PROTECTION**

- A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed, unless otherwise indicated in manufacturer's written installation instructions. 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.

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