

SECTION 07411

METAL ROOF PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof Panels.
- B. Framing.
- C. Roof Insulation.
- D. Roof Ventilators.
- E. Roof Curbs and Jacks.
- F. Rain Drainage Components.
- G. Trim.

1.2 RELATED SECTIONS

- A. Section 07210 - Roof Insulation.

1.3 REFERENCES

- A. AISI SG-671 - Specification for the Design of Cold-Formed Steel Structural Members.
- B. ASTM A 570/A 570M - Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.
- C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated by the Hot-Dip Process.
- D. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- E. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot Dip Process.
- F. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- G. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).

- H. ASTM C 1086 - Standard Specification for Glass-Fiber Felt Thermal Insulation.
- I. ASTM D 2244 - Standard Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- J. ASTM D 4214 - Standard Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.

1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Vertical loads: Roof panel system, including structural support system, to withstand loads imposed by roof panel system, including structural support system, and live loading of the most severe of the following two conditions:
 - a. 50 pounds per square foot (244 kg/sq m), uniformly distributed.
 - b. 200-pound (90 kg) concentrated load, distributed over a 1-foot square (0.092 sq m) footprint, applied at mid-point of maximum span.
 - 2. Snow loads: Roof panel system, including structural support system, to withstand snow loads in accordance with requirements of local authorities having jurisdiction; imposed snow load is to be added to specified vertical loads when designing roof panel system.
 - 3. Wind uplift: Roofing panel system, including panels, clips, and fasteners to meet requirements of UL Class 90 for indicated exposure.
 - 4. Expansion/Contraction: Roof panel system to include provision for structural and thermal movement without loss of water resistance integrity.
 - 5. Ventilation: Roof ventilator array to deliver minimum of three (3) air changes per hour.
 - 6. Roof curbs: Support indicated equipment in horizontal position, and to deflect rain drainage around perimeter of curb; include provision for structural and thermal movement.
 - 7. Structural framing: In accordance with AISI SG-671, and local authorities having jurisdiction, to transfer specified live load, dead load, snow load, and wind uplift requirements directly to existing structure for maximum horizontal deflection of 1/180 of span.

- B. Performance Requirements:
 - 1. Color change of fluorocarbon paint finish, when tested in accordance with ASTM D 2244: Maximum 5 NBS units.
 - 2. Chalking of fluorocarbon paint finish, when tested in accordance with ASTM D 4214: Minimum rating 8.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's descriptive literature for roof panel system, including each specified component.
- C. Shop Drawings:
 - 1. Roof Plans: Dimensioned drawings indicating the following:
 - a. Layout of roof panels; include fastener locations.
 - b. Locations of roof ventilators, roof curbs, and penetrations through roof.
 - c. Locations of gutters, downspouts, and connections to roof drainage piping; indicate slopes for correct drainage.
 - d. Locations of trim and other sheet metal items.
 - 2. Details: Dimensioned drawings indicating the following:
 - a. Profile of each type trim and other sheet metal item.
 - b. Interface of roof panel system with adjacent construction.
 - c. Illustration of each type fastener.
- D. Selection Samples: Two sets of color chips representing manufacturer's full range of available colors and finishes.
- E. Verification Samples: Two samples, minimum size 6 inches (152 mm) square, of each selected color and finish, representing actual color and finish of products to be installed.
- F. Quality Assurance Submittals:
 - 1. Design Data: Structural design calculations, bearing seal and signature of professional structural

engineer licensed to practice in the State in which the project is located.

2. Test Reports: Certified reports documenting testing and compliance of roof panel system to specified wind uplift requirements.
3. Certificates:
 - a. Contractor's certification that:
 - 1) Manufacturer of roof panel system meets specified qualifications.
 - 2) Installer of roof panel system meets specified qualifications.
 - b. Manufacturer's certification that installer is approved.
4. Manufacturer's instructions: Printed installation instructions for each roof panel system component, including product storage requirements.

G. Closeout Submittals: Warranty documents specified in WARRANTY Article of PART 1 of this section.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Minimum ten (10) years documented experience producing roof panel systems similar to that specified in this section, and member of Metal Roofing Systems Association, Inc.
2. Installer: Minimum five (5) years documented experience installing roof panel systems similar to that specified in this section, authorized by roof panel system manufacturer, and having installation personnel whose training and qualifications are authorized by roof panel system manufacturer.

B. Pre-Installation Meetings:

1. Convene at job site seven (7) calendar days prior to scheduled beginning of construction activities of this section to review requirements of this section.
2. Require attendance by representatives of the following:
 - a. Installer of this section.
 - b. Other entities directly affecting, or affected by, construction activities of this section.
3. Notify Architect four (4) calendar days in advance of scheduled meeting date.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products of this section in manufacturer's unopened packaging until installation.
- B. Maintain storage area conditions for products of this section in accordance with manufacturer's instructions until installation.

1.8 PROJECT/SITE CONDITIONS

- A. Field Measurements: When construction schedule permits, take field measurements of areas to receive roof panel system; indicate measurements on submitted shop drawings, noting discrepancies.

1.9 WARRANTY

- A. Special Warranty:
 - 1. Contractor shall warrant roof panel system, as installed, to be in accord with the Contract Documents and free from leaks, faults, and defects in materials and installation for a period of _____ (__) years.
 - 2. Have warranty countersigned by representative of roofing system manufacturer and by installer of the work of this section.
- B. Manufacturer's Warranty: Manufacturer's warranties against defects in products as follows:
 - 1. Failure of roof panel due to rupture, structural failure, or perforation: 20 years.
 - 2. Fluorocarbon paint finish: 25 years against blistering, peeling, cracking, flaking, checking, or chipping; 20 years against color change in excess of 5 NBS units when tested in accordance with ASTM D 2244, or chalking rating less than 8 when tested in accordance with ASTM D 4214.
 - 3. Water leakage: 20 years, liability limited to contract sum of installed system; includes structural framing, roof panels, flashings, curbs, interior gutters.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: STEELOX Roofing Systems; 5412 Courseview Drive, Suite 300, Mason OH 45040-8181;. ASD. tel. (800) 800-8135, fax (513) 573-5510; email address info@steelox.com; web site <http://www.steelox.com>
- B. Requests for substitution will be considered in accordance with provisions of Section 01600.
- C. Substitutions: Not permitted.
- D. Unless otherwise specified for an individual product or material, obtain all products specified in this section from the same manufacturer.

2.2 COMPONENTS

- A. Roof Panels:
 - 1. Acceptable product: STEELOX CF Interlocking Standing Seam Roof Panel:
 - 2. Material: Galvalume(R) steel sheet aluminum-zinc alloy-coated, conforming to ASTM A 792/A 792M, Structural Quality (SQ), Grade 33 (230), Coating Designation AZ55 (AZ 165), 24 gage (0.6 mm) minimum sheet thickness.
 - 3. Profile: Factory-formed standing seam pan with flush horizontal and vertical surfaces, having integral male/female interlocking side seams with continuous factory-applied non-hardening sealant, for mechanical crimping of seams at installation; site-formed panels, or panel configurations requiring battens or other supplemental closure devices, not acceptable.
 - 4. Finish: Unpainted mill finish.
 - 5. Finishes:
 - a. Interior face: Factory-applied corrosion-resistant wash coat, 0.20 mil (0.005 mm) dry film thickness (DFT).
 - b. Exterior face: Factory-applied fluorocarbon paint coating containing minimum 70% KYNAR(R) resins by volume, 1.0 mil (0.025 mm) dry film thickness (DFT), color selected from manufacturer's standard colors.
- B. Panel Clips: Type requiring no penetration of roof panels to secure panels to structure; self-centering to allow 1-inch (25 mm) movement each way (2-inch (50 mm) total movement capability).
- C. Framing: Galvanized steel conforming to ASTM A 653/A 653M, Coating Designation G90 (Z275), and as follows:

1. Support Members: 16 gage (1.9 mm) minimum sheet thickness.
 2. Bracing: 24 gage (0.6 mm) minimum sheet thickness.
- D. Roof Insulation: Unfaced glass-fiber batts specified in Section 07210.
- E. Roof Insulation:
1. Type: Unfaced glass-fiber batts conforming to ASTM C 1086.
 2. Thickness: Nominal 4 inches (101 mm); thermal resistance value R-13 (2.2 metric equivalent).
 3. Thickness: Nominal 6 inches (152 mm); thermal resistance value R-19 (3.3 metric equivalent).
 4. Thickness: Nominal 8 inches (203 mm); thermal resistance value R-25 (4.4 metric equivalent).
 5. Thickness: Nominal 12 inches (304 mm); thermal resistance value R-38 (6.7 metric equivalent).
- F. Roof Ventilators: Gravity or wind-powered.
- G. Roof Jacks: EPDM seal with aluminum sealing base ring; for roof openings 12 inches (304 mm) diameter, maximum.
- H. Roof Curbs: Fabricated of aluminum sheet conforming to ASTM B 209/B 209M, Alloy 1100, Temper H-14, 0.080 inch (2.0 mm) minimum sheet thickness, with continuously welded seams, mill finish; having base conforming to roof slope with seal or flashing, and flanged top projecting minimum 12 inches (304 mm) above weather surface plane.
- I. Interior Gutters: Formed stainless steel sheet conforming to ASTM A 666, 20 gage (0.9 mm) minimum sheet thickness, with continuously welded seams.
- J. Trim and Gutters:
1. Manufacturer's standard trim profiles for indicated project conditions, formed of steel sheet conforming to ASTM A 570/A 570M, 26 gage (0.45 mm) minimum sheet thickness, with factory-applied fluorocarbon paint coating containing minimum 70% KYNAR(R) resins by volume, 1.0 mil (0.025 mm) dry film thickness (DFT), color selected from manufacturer's standard colors.
 2. Trim includes, but is not limited to, the following:
 - a. Fascia.
 - b. Closures.
 - c. Panel terminations.
 - d. Perimeter and termination flashings.

e. Gutters and downspouts.

K. Factory-Finished Metal Sheet:

1. Steel sheet conforming to ASTM A 570/A 570M, 24 gage (0.6 mm) minimum sheet thickness, with factory-applied fluorocarbon paint coating containing minimum 70% KYNAR(R) resins by volume, 1.0 mil (0.025 mm) dry film thickness (DFT), color selected from manufacturer's standard colors.
2. Obtain from roof panel manufacturer for site-forming of indicated sheet metal items that are not manufacturer's standard trim profiles.

L. Joint Sealants: Specified in manufacturer's instructions for indicated use, supplied by roof panel manufacturer.

M. Fasteners:

1. For structural framing: Non-corroding fasteners of types specified by roof panel system manufacturer for indicated substrates.
2. For metal trim and roof penetration devices: Non-corroding die-cast head steel screws, aluminum-zinc alloy-coated, with weathersealing washers.

N. Protective Primer: Corrosion-inhibitive primer which prevents electrolytic action between adjacent dissimilar metals, type recommended by roof panel manufacturer.

2.3 FABRICATION

A. Fabricate indicated site-formed metal items from factory-finished metal sheet to roof panel manufacturer's specifications for factory-formed trim in accordance with Architect-accepted shop drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Existing substrate is ready to receive roof panel system.
2. Existing structure is capable of accepting specified loads.
3. Roof penetrations are completed.

4. Existing rain drainage system is capable of accepting anticipated water volume, if rain drainage system is to be connected to existing piping.

B. Installer's Examination:

1. Have installer of this section examine conditions under which construction activities of this section are to be performed, then submit written notification if such conditions are unacceptable.
2. Transmit two copies of installer's report to Architect within 24 hours of receipt.
3. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
4. Beginning construction activities of this section indicates installer's acceptance of conditions.

3.2 PREPARATION

- A. Surface Preparation: Remove loose gravel and debris from existing roof surface before beginning construction activities of this section.
- B. Apply two (2) coats protective primer to surfaces of trim items that will be concealed in finished Work.

3.3 INSTALLATION

- A. Install roof panel system components in accordance with Architect-accepted shop drawings, manufacturer's instructions, and as follows:
 1. Support system: In accordance with maximum tolerances specified in AISI reference.
 2. Roof panels: Install in correct alignment with structural framing.
 3. Rain drainage components: Install with correct slope for rain drainage.
 4. Trim: Install level; lap end joints minimum two (2) inches (50 mm); apply joint sealant to concealed joint surfaces.

3.4 CLEANING

- A. Remove strippable coating from panels and trim, when provided, and perform dry wipe-down cleaning of panels as installed.

3.5 PROTECTION

- A. Protect installed products from damage by subsequent construction activities.
- B. Replace products having damage other than minor finish scratches.
- C. Repair minor finish scratches in accordance with panel manufacturer's recommendations; replace panels which cannot be repaired to Architect's acceptance.

END OF SECTION