



# PAC-CLAD Ridge-Lok

SECTION 07 41 13

INSULATED METAL ROOF PANELS

OCTOBER 2024

GENERAL SPECIFICATION FOR COMMERCIAL/INDUSTRIAL AND ARCHITECTURAL APPLICATIONS.

## PART 1 - GENERAL

### 1.01 Summary

- A. The contract drawings indicate the extent and general details of the roofs. This section includes requirements for the factory-formed, pre-insulated, metal, roof panel cladding system and the corresponding metal flashings, sealants, fasteners, clips and other accessories.

### 1.02 Related Sections

- A. Section 06 10 00 – Rough Carpentry: Wood nailers associated with roofing and roof insulation.
- B. Section 07 62 00 – Sheet Metal Flashing and Trim: Formed metal flashing and trim items associated with roofing.
- C. Section 07 72 00 – Roof Accessories: Roof hatches, vents and manufactured curbs.

### 1.03 References

- A. AISC - Steel Construction Manual – 13th Edition
- B. AISI - North American Specification for the Design of Cold-Formed Structural Members, 2007
- C. ASCE 7 - Minimum Design Loads for Buildings and Other Structures
- D. ASTM
  1. ASTM C 518-10 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
  2. ASTM C 1363-05 Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
  3. ASTM C 273-07 Standard Test Method for Shear Properties of Sandwich Core Materials
  4. ASTM D 1621-10 Standard Test Method for Compressive Properties of Rigid Cellular Plastics
  5. ASTM D 1623-09 Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
  6. ASTM D 1622-08 Standard Test Method for Apparent Density of Rigid Cellular Plastics
  7. ASTM D 6226-10 Standard Test Method for Open Cell Content of Rigid Cellular Plastics
  8. ASTM E 72-10 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
  9. ASTM E 84-10b Standard Test Method of Surface Burning Characteristics of Building Materials
  10. ASTM E 1680-11 Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems

11. ASTM E 1646-95(2011) Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
  12. ASTM E 1592-05 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
- E. FM Global
1. FM 4880 Approval Standard for Class 1 Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings and Exterior Wall Systems
  2. FM 4471 Approval Standard for Class 1 Panel Roofs
- F. International Building Code (IBC)

#### **1.04 Submittals**

- A. Manufacturer's product literature. Include product data and installation instructions.
- B. Manufacturer's written installation instructions: Provide manufacturer's written instructions to installer, marked to show component installation; Where instructions allow installation options, indicate option for use.
- C. Shop drawings showing elevations, panel layout and calling out panel profile, thickness, gauge, width, finish and texture. Include roof plan, details, specified loads, flashings, trims, terminations and expansion joints.
1. The drawings shall illustrate product components including fasteners, clips, sealants, trims and any other necessary accessories.
- D. Engineering package illustrating the panels will resist the code stipulated loads.
- E. Color chip and/or chart.
- F. Samples: 12" long sample of roof panel. Provide color chips for selection of color and sheen. Provide (2) 3" x 5" finish samples in color selected.
- G. Sample warranties (substrate and finish).
- H. Letter of Certification stating that all parts of this specification were satisfied.

#### **1.05 Delivery, Storage and Handling**

- A. Deliver panels in the original manufacturer's weather-resistant, shrink-wrapped packaging with clearly marked, weather-resistant labeling.
- B. Store the panels in a clean, level, protected and sufficiently compacted area. Provide ventilation if the bundles are exposed to moisture; further, elevate one end of the bundle to ensure adequate runoff. Do not stack more than two bundles high. Stack material to prevent twisting, bending, abrasion, scratching and denting.
- C. Use proper care in unloading, storing and installing the wall panels. Handle panels in a fashion that will not bend, dent, scratch or otherwise damage the product.
- D. Refer to the PAC-CLAD IMP Insulated Metal Panel Handling & Maintenance Guide for more specific information regarding handling, storage, strippable film, steel debris, corrosion, cleaning and field painting.

#### **1.06 Project Conditions**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

#### **1.07 Warranty**

- A. The manufacturer warrants the panels as free of defects in material and workmanship for a period of (2) years from the date of production. This excludes the material coatings and finishes which are covered under separate warranties.

- B. The manufacturer warrants the GALVALUME® substrate for a period of 20-years subject to the terms and conditions set forth in the manufacturer's GALVALUME® 20-Year Limited Warranty.
- C. The manufacturer warrants the Kynar 500® coating system for a period of 25-years subject to the terms and conditions set forth in the manufacturer's Coating System Limited Warranty.
- D. The installer warrants the panels as free of defects in material installation and workmanship for a period of (2) years from the date of substantial completion.

### 1.08 Maintenance

- A. Keep the interior and exterior panel surfaces clean. Immediately remove dust, dirt, mud, mortar, chalk, excess sealants or any other type of foreign substance from the panel surfaces.
- B. Refer to the PAC-CLAD IMP Handling & Maintenance Guide for more specific information regarding handling, storage, strippable film, steel debris, corrosion, cleaning and field painting.

## PART 2 - PRODUCT

### 2.01 Manufacturer / Supplier:

Petersen Aluminum Corporation  
 1005 Tonne Road  
 Elk Grove Village, IL 60007  
 Phone: (800) PAC-CLAD  
 Fax: (800) 722-7150  
 E-mail: [info@pac-clad.com](mailto:info@pac-clad.com)  
 Internet: [www.pac-clad.com](http://www.pac-clad.com)

### 2.02 System:

- A. Insulated standing-seam metal roof panel with patented tee-seam allowing to be slid together.
  - 1. The interior tongue-and-groove joint and factory-caulked batten provide a double layer of weather-tight protection.

### 2.03 Components / Materials:

- A. Panels
  - 1. Type: Insulated Metal Roof Panels consisting of roll-formed interior and exterior profiles chemically bonded to a continuously, foamed-in-place, polyisocyanurate, insulating core.
  - 2. Classification:
    - a. FM Global 4880 Approved Class 1 Fire Rated Insulated Wall/Ceiling System.
    - b. FM Global 4471 Approved Class 1 Panel Roofs.
    - c. State of Florida Approved Building Product
    - d. Miami Dade County Approved
  - 3. *Ridge-Lok*
    - a. Exterior profile: Ridge-Lok (Standing Seam Roof).
    - b. Interior profile: MesaLok.
    - c. Exterior material gauge: 26, 24 or 22.
    - d. Interior material gauge: 26.
    - e. Substrate: Galvalume®, G90 galvanized or stainless steel.
    - f. Panel thickness: 2.5, 3, 4, 5 or 6-inch.
    - g. Panel width: 42-inch.
    - h. Exterior Texture: smooth.
    - i. Interior Texture: embossed or smooth.
- B. Flashing
  - 1. Match all flashings and trims with the adjacent panels in material gauge and finish. Install these trims per the panel manufacturer's details.

### C. Accessories

1. Clips – 16-ga., 4" wide, 5-hole roof panel clip
2. Fasteners - ¼-14 x 2-¼", Self-Drilling, Hex Head, with Shoulder.
3. Batten – min. 24-ga.

### D. Sealers

1. Sidelap – factory applied in batten
2. Tube Sealants
3. Non-skinning butyl
4. Polyurethane
5. Tape Sealants
  - a. Butyl

## 2.04 System Performance

### A. Structural

1. Load Capacity - Determine positive and negative load resistance based on tests conducted in accordance with ASTM E 1592 and/or ASTM E 72.
2. Load Calculation – Dictated by ASCE 7 10 and the building dimensions
3. Deflection Limit – per code or L/180, whichever is greater.
4. Connection – Designed considering the load (psf), tributary area (sqft), ultimate fastener pullout/pullover (lbs.) and appropriate factor of safety.
5. Factor of Safety (panel): 2.0
6. Factor of Safety (fasteners)
  - a. Two fasteners into steel: 2.25
  - b. One fastener into steel or two fasteners into wood: 3.00
  - c. One fastener into wood: 4.00
  - d. One or two fastener into masonry: 4.00
7. Material Thickness – The delivered material thickness (steel) shall be within 95% of the design thickness.
8. Impact Resistance
  - a. Severe hail resistance when tested in accordance with FM Standard 4471.
  - b. Foot Traffic Resistance when tested in accordance with FM Standard 4471
  - c. Large Missile Impact tested in accordance with Miami Dade County TAS 201.
9. Water-tightness
  - a. Verify the panels allow no uncontrolled water penetration when subjected to a pressure differential of 12-psf when tested in accordance with ASTM E 1646.
  - b. Verify the panel endlaps and sidelaps allow no uncontrolled water penetration when tested in accordance with Factory Mutual 4471 Appendix G (6-inch water head for 7 days).
10. Air-tightness
  - a. Verify the panels allow no more than 0.001 cfm/sf at a pressure differential of 12-psf when tested in accordance with ASTM E 1680.
11. Metal Facing to Foam Core Bond Strength
  - a. Fatigue – Upon being subjected to two-million alternating cycles of L/180 deflection, the panels shall exhibit no evidence of delamination of the fascia or liner elements, cracking of the foam core, or permanent set.
  - b. Freeze/Heat Cycling – At the conclusion of twenty-one (21) eight-hour temperature cycles (-20° F to 180° F), the panels shall exhibit no evidence of delamination, blistering or permanent set.
  - c. Humidity – After enduring 1200 hours of 93% humidity at a temperature of 158° F, the panels shall exhibit no evidence of delamination, blistering or interface corrosion.
  - d. Autoclave – When exposed to 218°F and a pressure of 2-psig for 2-1/2 hours, the panels shall exhibit no delamination of the foam core from the metal skins.
12. Energy Efficiency

- a. When tested in accordance with ASTM C 518 the panels provide a K-factor of: 0.139 Btu-in/hr- ft<sup>2</sup>-F° @ 75° F mean temperature (R-7.20) and 0.129 Btu-in/hr-ft<sup>2</sup>-F° @ 35° F mean temperature (R-7.75).
- 13. Fire Safety
  - a. The panels shall be classified for below deck combustibility according to FM Approval Standard 4880.
  - b. The panels shall be classified for above deck combustibility (Class A, severe exposure) according to FM Approval Standard 4471 (ASTM E 108 Fire Test of Roof Coverings).
- 14. Surface Burning Characteristics
  - a. Verify the panels have a maximum Flame Spread of 25 and maximum Smoke Developed of 450 when tested in accordance with ASTM E84.
- 15. Material Compatibility
  - a. Prevent galvanic action of dissimilar metals. This includes but is not limited to any direct contact of panels and/or trim with treated lumber or copper lightning attenuation equipment or indirect contact constituted by water runoff from HVAC drain-lines, etc.

## **PART 3 - EXECUTION**

### **3.01 General**

- A. The Contractor, upon entering into a contract to erect the Roof Panel System, claims itself competent in the erection of these systems and is responsible for complying with all applicable local federal and state construction and safety regulations, including OSHA regulations.

### **3.02 Preparation**

- A. Contractor - Before roof panel installation begins, meticulously review and accept the shop drawings as correct.

### **3.03 Examination**

- A. Shipment - Immediately upon delivery of the roof panels and accessories, crosscheck the delivered materials against the shipper to insure a complete shipment.
- B. Substrate – Before installation begins, inspect and accept the structure with regard to plumb, level and true. The maximum deviation of steel alignment shall be limited to 0 (+\-) 3/16" from the control with a 1/8" maximum change in deviation for any member of any 10-ft panel run. The Contractor shall not proceed with installation if the structural steel is not within the specified tolerances.
- C. Panels – During installation, examine the individual panels. Immediately notify the manufacturer of any panel defects. Do not install defective panels.

### **3.04 Installation**

- A. Panels
  - 1. Install in accordance with the manufacturer's recommended procedures, details and the construction drawings. Install the panels plumb, level and true. If necessary, make panel cuts with a "metal cutting" circular saw.
- B. Fasteners
  - 1. Fasten panels to structural supports.
  - 2. Install fasteners in the locations shown on the construction drawings. Take care not to overdrive fasteners. Replace stripped fasteners by installing a new fastener in a different location.
  - 3. For required exposed fasteners, use manufacturer's written torque settings for positive seal without rupturing sealing washers.
- C. Trim

1. Install the flashing true-to-line and level or plumb and in accordance with the manufacturer's details and the construction drawings.

D. Sealants

1. Before sealants are applied, clean and prime the surfaces according to the sealant manufacturer's guidelines. Locate the sealants per the manufacturer's details and the shop drawings without skips or voids.

**3.05 Installation Guide:**

- A. Refer to the PAC-CLAD IMP Installation Guide for specific information regarding accountability, conditions, heavy equipment, verification of structure, alignment, side-joints, vapor barrier, sealants, field applied insulation, threaded fasteners, strippable film, field cutting, appearance, general installation sequence and details.
  1. Do not place utility penetrations through panel seams.
  2. Do not allow panels or trim to come into contact with dissimilar materials. Protect from water run-off from these materials.

**3.06 Protection**

- A. Protect metal roof panels until completion of project.
- B. Remove any and all strippable films either prior to or directly following installation. Take measures to avoid exposure of the film to direct sunlight for more than 24 hours.

**3.07 Cleaning**

- A. Touch Up – "Touch up" minor damage to factory applied finishes using factory approved, matching coatings provided by the manufacturer.
- B. If necessary, clean panel surfaces with water. Rinse with clean water.

**END OF SECTION**