Green Span Profiles

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Section 07 40 00

Insulated Metal Roof Panels

general specification for commercial/industrial and architectural applications

**Ridgeline Panel**

**Part 1 GENERAL**

**1.1 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.

**1.2 References**

A. AISC

1. Steel Construction Manual – 13th Edition

B. AISI

1. North American Specification for the Design of Cold-Formed Structural

 Members, 2007

C. ASCE 7

1. Minimum Design Loads for Buildings and Other Structures

D. ASTM

1. C518-10 Standard Test Method for Steady-State Thermal Transmission

 Properties by Means of the Heat Flow Meter Apparatus

2. C1363-05 Standard Test Method for Thermal Performance of Building

 Materials and Envelope Assemblies by Means of a Hot Box Apparatus

3. C273-07 Standard Test Method for Shear Properties of Sandwich Core

 Materials

4. D1621-10 Standard Test Method for Compressive Properties of Rigid Cellular

 Plastics

5. D1623-09 Standard Test Method for Tensile and Tensile Adhesion Properties

 of Rigid Cellular Plastics

6. D1622-08 Standard Test Method for Apparent Density of Rigid Cellular Plastics

7. D6226-10 Standard Test Method for Open Cell Content of Rigid Cellular

 Plastics

8. E72-10 Standard Test Methods of Conducting Strength Tests of Panels for

 Building Construction

9. E84-10b Standard Test Method of Surface Burning Characteristics of Building

 Materials

10. E1680-11 Standard Test Method for Rate of Air Leakage through Exterior

 Metal Roof Panel Systems

11. E1646-95(2011) Standard Test Method for Water Penetration of Exterior

 Metal Roof Panel Systems by Uniform Static Air Pressure Difference

12. E1592-05 Standard Test Method for Structural Performance of Sheet Metal

 Roof and Siding Systems by Uniform Static Air Pressure Difference

E. FM Global

1. 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. 4471 Approval Standard for Class 1 Panel Roofs

F. International Building Code, 2012

**1.3 Submittals**

A. Manufacturer’s product literature

B. Shop drawings showing elevations, panel layout and calling out panel profile,

 thickness, gauge, width, finish, and texture. The drawings shall also illustrate

 product components including fasteners, clips, sealants, trims and any other

 necessary accessories.

C. Engineering package illustrating the panels will resist the code stipulated loads.

D. Color chip and/or chart

E. Installation instructions

F. Sample warranties (substrate and finish).

G. Letter of Certification stating that all parts of this specification were satisfied.

**1.4 Quality Assurance**

A. Manufacturer - Shall have a minimum of five (5) years’ experience in the

 production of continuously, foamed-in-place insulated metal panels.

B. Designer – Experienced in the design of insulated metal panels and a registered

 Professional Engineer.

C. Installer - Authorized by the manufacturer and having a minimum of (3) years’

 experience installing insulated metal wall panels.

**1.5 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 Green Span Profiles Insulated Metal Panel Handling & Maintenance

 Guide for more specific information regarding the following; handling, storage,

 strippable film, steel debris, corrosion, cleaning, and field painting.

**1.6 Warranty**

A. The manufacturer warrants the panels as free of defects in material and

 workmanship for 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 manufacturers

 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 manufacturers

 Coating System Limited Warranty.

D. The installer warrants the panels as free of defects in material installation and

 workmanship for period of (2) years from the date of substantial completion.

**1.6 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 Green Span Profiles Insulated Metal Panel Handling & Maintenance

 Guide for more specific information regarding the following; handling, storage,

 strippable film, steel debris, corrosion, cleaning, and field painting.

**Part 2 PRODUCTS**

**2.1 Manufacturer/Supplier**

A. Green Span Profiles

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**2.2 Components**

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.

B. Classification:

1. FM Global 4880 Approved Class 1 Fire Rated Insulated Wall/Ceiling System.

2. FM Global 4471 Approved Class 1 Panel Roofs

3. State of Florida Approved Building Product

4. Miami Dade County Approved

C. Panel Style: RidgeLine

1. Exterior profile: RidgeLine (Standing Seam Roof

2. Interior profile: MesaLine

3. Exterior material gauge: 26, 24 or 22.

4. Interior material gauge: 26.

5. Substrate: Galvalume®, G90 galvanized or stainless steel.

6. Panel thickness: 2.5”, 3”, 4”, 5”, or 6”

7. Panel width: 42-inch

8. Exterior Texture: smooth.

9. Interior Texture: embossed or smooth

D. 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.

E. 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

 4. Sealers

a. Sidelap – factory applied in batten

b. Tube Sealants

c. Non-skinning butyl

d. Polyurethane

e. Tape Sealants – Butyl

**2.3 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 (sq. ft.), ultimate fastener pullout/pullover (lbs.), and appropriate factor of safety.

5. Factor of Safety (panel): 2.0

6. Factor of Safety (fasteners)

7. Two fasteners into steel: 2.25

8. One fastener into steel or two fasteners into wood: 3.00

9. One fastener into wood: 4.00

10. One or two fastener into masonry: 4.00

B. Material Thickness – The delivered material thickness (steel) shall be within

 95% of the design thickness.

C. Impact Resistance

1. Severe hail resistance when tested in accordance with FM Standard 4471.

2. Foot Traffic Resistance when tested in accordance with FM Standard 4471

3. Large Missile Impact tested in accordance with Miami Dade County TAS 201.

D. Water-tightness

1. 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.

2. 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).

E. Air-tightness

1. 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.

F. Metal Facing to Foam Core Bond Strength

1. 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.

2. 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.

G. 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.

H. 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.

I. Energy Efficiency

1. When tested in accordance with ASTM C 518 the panels provide a K-factor of:

 0.139 Btu-in/hr-ft2-F° @ 75° F mean temperature (R-7.20) and 0.129 Btu-

 in/hr-ft2-F° @ 35° F mean temperature (R-7.75).

J. Fire Safety

1. The panels shall be classified for below deck combustibility according to FM Approval Standard 4880.

2. 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).

K. Surface Burning Characteristics

1. Verify the panels have a maximum Flame Spread of 25 and maximum Smoke

 Developed of 450 when tested in accordance with ASTM E84.

L. Material Compatibility

1. 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

 lightening attenuation equipment or indirect contact constituted by water

 runoff from HVAC drain-lines, etc.

M. Finish

1. Humidity

2. Salt Spray

3. Color Retention

4. Chalk Resistance

5. Gloss Retention

6. Dry Adhesion

7. Flexibility

**Part 3 EXECUTION**

**3.1 General**

A. The Erector, 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.

**3.2 Preparation**

A. Erector - Before roof panel installation begins, meticulously review and accept the

 shop drawings as correct.

**3.3 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 erector 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.

**3.4 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. 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.

C. Trim

1. Install the flashing true-to-line and level or plumb and in accordance with the

 manufacture’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 manufacturers

 details and the shop drawings without skips or voids.

E. Manual

1. Refer to the Green Span Profiles 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.

**3.5 Protection**

A. Remove 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.

**3.6 Cleaning**

A. Touch Up – “Touch up” minor damage to factory applied finishes using factory

 approved, matching coatings provided by the manufacturer.

B. Soap - If necessary, clean panel surfaces with a combination of water and a light

 detergent.

**END OF SECTION**

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