PermaCore-HF & PermaCore-CS Gen-4 PolyIso Panel with PermaShield Technology

SECTION 07435

INSULATED METAL WALL PANELS

Part 1: General

General: Construct panel system to provide for expansion and contraction of component materials without causing buckling, failure of joint seals, undue stress on fasteners, other detrimental effects to the panel system or adjacent building systems, or warping of faces of panel system.

1.1 SECTION INCLUDES

A. Insulated Metal Wall and Ceiling Panels and Related Accessories.

1.2 RELATED SECTIONS

A. Section 03300 – Concrete: Foundations

B. Section 05120 – Structural Steel: Primary structure.

C. Section 05500 – Steel Fabrication: Supporting structure.

D. Section 07431- Insulated Metal Roof Panels

C. Section 07620 - Sheet Metal Flashing and Trim.

D. Section 07900 - Joint Sealers

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM) C578: Standard Test Methods for Characteristics of Poly Iso.

B. ASTM D1622 - 08 Standard Test Method for Apparent Density of Rigid Poly Iso Plastics.

C. ASTM C518 - 10 Standard Test Method for Steady State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

D. ASTM D1621 - 10 Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.

E. ASTM C203 - 05a(2012) Standard Test Methods for Breaking Load and Flexural Properties of Block Type Thermal Insulation.

F. ASTM D1623 - 09 Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

G. ASTM E96 / E96M - 10 Standard Test Methods for Water Vapor Transmission of Materials.

H. ASTM C272 / C272M - 12 Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions.

I. ASTM D696 - 08 Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics.

J. ASTM D2863 - 12 Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle like Combustion of Plastics (Oxygen Index).

L. ASTM E84 - 12b Standard Test Method for Surface Burning Characteristics of Building Materials

M. ASTM A653 / A653M - 11 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

N. ASTM A924 / A924M - 10a Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

O. ASTM E18 - 11 Standard Test Methods for Rockwell Hardness of Metallic Materials.

P. ASTM E72 - 10 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

Q. ASTM E1996 - 12 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

R. ASTM E330 - 02(2010) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

S. Florida Products Approval Number FL28892.1, 3”, 4”,6"& 8” poly Iso Panels. Approved Certification for Structural Insulated Panels for Roof Deck or Floor @ 2.25-pound density.
Category: Structural Components.
Subcategory: Roof Deck.

T. Florida Products Approval Number FL28893.1, 3”, 4”,6 & 8” Poly Iso Wall Panel. Approved Certification for Structural Insulated panels for Wall panels @ 2.25-pound density.
Category: Structural Components.
Subcategory: Structural Wall.

U. Factory Mutual Research Corporation FM 4471 test leakage and moisture penetration test procedure for class 1 panel roof.

V. Metal paint testing requirements:

1. Metal film thickness. ASTM D 5796.
2. Metal Color: ASTM D 1729.
3. Specular Gloss ASTM D 523 at a gloss meter angle of 60^{o}.
4. Minimum pencil hardness of Metal per ASTM D 3363 is “F”
5. Solvent Resistance of Metal Passes ASTM D 5402
6. Cross hatch Adhesion passes Per ASTM D 3359
7. Impact resistance per ASTM D 2794
8. Humidity Resistance No blistering, cracking, peeling, loss of gloss or softening of finish per ASTM D 2247
9. Cleveland Condensing no blistering, rusting or loss of adhesion of finish per ASTM D 4585
10. Water immersion Test per ASTM D 870 with no loss of gloss, blistering, cracking, color change or softening
11. Salt Spray resistance Per ASTM B 117 no loss of adhesion and scribe creep no greater than 1/8”
12. Chemical resistance per ASTM D 1308 7.2 spot test
13. Kestermich Test no color change after 10 cycles per ASTM G 87

14. Accelerated weathering per ASTM G 87

15. Exterior weathering ASTM D 2244 at least #8 chalk rating per ASTM D4214

16. Abrasion Resistance per ASTM D 968 Method A “Pass”

17. Flame Spread rating per ASTM E 84 Class A or 1

1.4 Performance Requirements: Design and construct panels to meet requirements as indicated.

A. Structural and Wind load Tests:

1. Design panel composition to resist wind load mandated by code, with deflection limit of L/240.

2. No permanent damage to panels or connections when subjected to 1.5 times the design wind pressures for both inward and outward.

B. Thermal Performance:

1. Panels shall produce no post manufacturing off gassing which could result in loss of future thermal resistance and must have a Long Term R- Value (LTR).

C. Fire:

1. Surface Burning Characteristics: Insulated core shall have been tested in accordance with ASTM E 84 and UL 723, NFPA 255 for surface burning characteristics. The core shall have a maximum flame spread of 25 and a smoke developed rating of less than 450.

2. Surface Burning Characteristics: Exterior panel skin shall have been tested in accordance with ASTM E 84 and UL723, NFPA 255 for surface burning characteristics. The exterior shall have a maximum flame spread of 25 and a smoke developed rating of less than 450.

3. NFPA 286 Corner testing with a passing grade

D. Vapor Barrier:

1. Water Spray Leakage test shall show no evidence of penetration through the panels or panel joints when subjected to a preload air pressure of 30 psi and a water spray rate of 5 gallons/ psf/ per hour for 15 minutes, per Factory Mutual Research Corporation FM 4471 test procedures for class 1 roof panels.

2. Static Water Penetration must exhibit no sign of leakage for a period of 7 days with ponded water at a 6 inch continuous water depth for the duration of the test, per Factory Mutual Research corporation FM4471 test procedures for class 1 roof panels.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Material type, metal thickness and finish

4. Installation methods

C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, including specific requirements indicated.

1. Profile and gauge of both exterior and interior sheet.

2. Metal finish

3. Relationship to other work

4. Fully show details and connections to and locations of supporting steel indicating control points.

D. Color Samples: For each finish product specified, one color chart representing manufacturer's full range of available colors.

E. Verification Samples: For each finish product specified, two color submission samples representing actual product color.

F. Quality Control Submittals:

1. Statement of qualifications

2. Design data

3. Test reports

G. LEED Submittals: Provide documentation of how the requirements of Credit will be met:

1. EA - Energy and Atmosphere:

a. EA Credit 1: Optimize Energy Performance: Demonstrate percentage of performance improvement that meets or surpasses ASHRAE/IESNA Standard 90.1-2004.

b. EA Credit 2: Minimum Energy Performance: Roof panels contribute to higher energy efficiency of a building that must comply with a 10 percent improvement in the performance compared to benchmark rating based on ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda) in EA Prerequisite 2.

2. MR - Material and Resource:

a. MR Credit 1.1 & 1.2: Building Reuse:

(1) Maintain Existing Walls, Floors and Roof.

(2) Maintain Interior Non-Structural Elements.

b. MR Credit 3: Materials Reuse

c. MR Credit 4: Recycled Content:

(1) Percentage weight of post-consumer and pre-consumer recycled content using materials with recycled content.

(2) Recycled content value of product assembly by weight.

(3) Indicate total value (cost) of each product used.

d. MR Credit 6: Rapidly Renewable Materials: Foam core in panels using rapidly renewable buildings materials and products for 2.5 percent of the total value of all building materials and products used in the project (based on cost.)

3. IEQ - Indoor Environmental Quality:

a. IEQ Credit 4.1: Low-Emitting Materials, Adhesives and Sealants: Product data on adhesives and sealants to comply with standards of South Coast Air Quality Management District Rule #1168.

b. Product data for paint and coatings have no VOC's.

4. Buy American Act Certification: Submit documentation certifying that products comply with provisions of the Buy American Act 41 U.S.C 10a-10d.

5. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

6. Paint certificate Ceram-A-Star 1050 U Meets low and steep-sloped Roof requirements for LEED-NC version 2.2 SS Credit 7.2, Heat Island effect: Roof.

1.6 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: Company specializing in manufacturing of all required aspects of insulated metal panel production.

1. No less than 10 years’ experience in the actual production of specified products.

2. Third party certification of Quality Control program and materials utilized, in compliance with rigid factory guidelines, which includes quarterly unannounced inspections by independent testing laboratories, capable of providing reports directly to code authority.

3. Successfully completed not less than 100 comparable scale projects using this system.

4. Company specializing in manufacturing factory continuous insulated metal panels with a minimum documented experience of ten years.

5. Company specializing in on site manufacturing rigid foam insulation for the purpose of insulated metal panels with a minimum documented experience of ten years.

B. Installer's Qualifications: Experienced in installation of system similar in complexity for specific requirements.

1. Installer shall be responsible for installation of panel and support framing as specified in this section to comply with the following:

a. Wind load engineering to comply with code requirements.

2. Acceptable to or licensed by manufacturer.

3. Not less than 3 years experience with systems.

4. Successfully completed not less than 5 comparable scale projects using this system.

C. Product Requirements:

1. Metal members (prone to rust) and wood or wood by-products (prone to moisture absorption and rot), shall not be permitted within the panel connection system.

2. Insulated panels, related accessories, and construction details shall be in accordance with the following regulatory agency, where required:

a. United States Department of Agriculture (USDA)

b. Canadian Food Inspection Agency (CFIA)

3. Wall and Ceiling panel should meet the standards per (ASTM) C578.

4. Panel manufacturer shall have third party inspection of panel manufacturing process on a quarterly basis.

D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by architect.

2. Do not proceed with remaining work until workmanship, color and sheen are approved by architect.

3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in per manufacturer's recommendation until ready for installation.

B. Store products off the ground, with panels sloped for drainage and covered to protect factory finishes from damage.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

A. Provide manufacturer's one year limited warranty that panels are free from defects in materials and workmanship, beginning from the date of shipment of panels, but excluding coil coatings (paint finishes) covered under a separate warranty. Warranty does not include interior painted surface of panels.

B. Provide coil coater's written warranty on paint finish for adhesion to the substrate.

C. Provide exterior paint manufacturers written limited 25 year warranty for chalking and color fade of exterior paint finishes only.

Part 2: Products & Materials

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Permatherm Inc., which is located at: 269 Industrial Park Road Monticello, GA. 31064 Office (706) 468-7500, Fax (706)-468-7510 Email: info@permatherm.net

B. Substitutions: Not permitted.

2.2 Insulated Metal Wall Panels

A. Panel General Requirements: Roll-formed exterior and interior steel sheet faces laminated to poly Iso foam core. Poly Iso foam core shall not contain CFC's, HCFC's or HFC's. Insulated wall and ceiling panels shall be supplied in widths of 45.5 inches (+/- 1/8") or 42" (+/-1/8") Panel lengths shall be factory cut to meet required site dimensions.

1. Panel Thicknesses:

a. 2 inches (50 mm)

b. 3 inches (75 mm)

c. 4 inches (100 mm)

d. 5 inches (125mm)

e. 6 inches (150 mm)

f. 8 inches (200 mm)

2.3 Materials

A. Interior Face

1. Interior wall and ceiling panels shall be clad on all exposed areas with 26 gauge (0.455 mm) pre-painted G90 galvanized steel or AZ-50 Galvalume (USDA accepted).

B. Exterior Face

1. Exterior insulated panels shall be clad on the weather-exposed side with 26 gauge (0.455 mm) pre-painted G90 galvanized steel or AZ-50 Galvalume (USDA accepted).

C. Lamination and Joint fabrication

1. Metal skins shall be continuous line Poly Iso insulation. Insulated panels shall be manufactured individually laminated, insuring uniform size and composition.

2. Panel edges shall be fabricated with a tongue-in groove type Cold storage panel connection system or Hidden fastener system.

3. Slip joints shall be sealed internally by running continuous beads of FSI-96 butyl caulking (or approved alternate) along the warm inside edge of the female side of the panel joints.

4. Slip joints shall be externally caulked for USDA inspected areas only, or as specified, with white silicone (or approved alternate).

D. Foam Core:

1. Wall panels and ceiling panels shall consist of poly Iso 2.25 lbs insulation.

2. Finished panels shall have an approximate R-Value of 8 per inch at 40° F (4.44° C) Insulation thickness of panels shall be adjusted in accordance with design R-value requirements.

3. Insulation shall not contain CFC's or HCFC's, or other expanding agents, resulting in zero ODP and zero VOC production.

E. Exterior finish: USDA approved Siliconized polyester paint System

F. Interior finish: USDA approved Siliconized polyester paint System

G. Flashing and Trim: Brake-formed sheet metal in the same thickness and finish to match the panels.

H. Fasteners: Clips, anchoring devices, fasteners, and accessories for installation of panel system as recommended by panel manufacturer for the system specified.

I. Sealant: Sealant as recommended by panel manufacturer.

PART 3: INSTALLATION AND EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Panel installer to verify that structural steel supports for wall panels are within tolerances in the AISC Code of Standard Practice, Section 7 and supplement modification controlling Section 7.11.3, adjustable items. Limit maximum deviation of steel alignment to plus or minus 3/16 inch (4mm) from the control with a 1/8 inch (3 mm) maximum change in deviation for any member for any 10 feet (3 m) length of panel.

2. Do not proceed until unsatisfactory conditions have been corrected.

B. If support system preparation is the responsibility of another installer, notify architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions and industry standards.

B. Fasteners according to manufacturer's recommendations and verified as suitable by project engineer or installer.

C. Field fabrication of corner panel connections shall be butted or mitered, flashed, and finished by installation crew on-site.

D. Form panel shape as indicated on Drawings, accurate in size, square, and free from distortion or defects.

E. Install flashing and trim true and in proper alignment.

F. Install sealants where indicated to clean dry surfaces only without skips or voids, to ensure weather tightness and integrity of the vapor barrier.

3.3 FIELD QUALITY CONTROL

A. Installer shall make periodic inspections and issue report to architect regarding compliance with manufacturer's installation recommendations developed for the project.

3.4 ADJUSTING AND CLEANING

A. Repair damage caused during construction.

1. Touch-up mars, scratches, and cut edges to match original finish.

2. If repairs cannot be made to comply with architect's requirements, remove damage and install new materials.

B. Replace damaged panels and other components of work, which cannot be repaired by finish touch-up or similar minor repair.

C. Wipe finished surfaces clean of any filings caused by drilling or cutting to prevent rust staining.

END OF SECTION