SECTION 07 42 13 – INSULATED METAL WALL PANELS WITH PIR FOAM

General Specification for Cold Storage and Food Processing Facilities

# 1.GENERAL

## 1.1. SECTION INCLUDES

A. Foamed-in-place insulated metal wall panels having a double tongue and groove side joint engineered for concealed fastening, with related metal trim and accessories.

## 1.2. RELATED SECTIONS

Specifier: Edit list below as necessary to match the project.

A. Division 01 Section "Sustainable Design Requirements" for related LEED general requirements.

B. Division 05 Section "Structural Steel Framing" for steel framing supporting metal panels.

C. Division 05 Section "Cold-Formed Metal Framing" for cold-formed metal framing supporting metal panels.

D. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing items in addition to items specified in this Section.

E. Division 07 Section "Metal Wall and Roof Panels" for factory-formed metal wall, roof, and soffit panels.

F. Division 13 Section "Metal Building Systems" for steel framing supporting metal panels.

## 1.3. REFERENCES

Specifier: Edit list below as necessary to match the project.

A. American Architectural Manufacturer's Association (AAMA)

1. AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.

B. American Society of Civil Engineers (ASCE):

1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

C. ASTM International (ASTM):

1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

2. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Pre-painted by the Coil-Coating Process for Exterior Exposed Building Products.

3. ASTM A 792 - Standard Specification for Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

4. ASTM A 666 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat

5. ASTM C 518 - Standard Test Method for Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

6. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus

7. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.
8. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics.
9. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
10. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
11. ASTM D 6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics
12. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
13. ASTM E 84 - Test Methods for Surface Burning Characteristics of Building Materials.
14. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
15. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
16. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

D. National Fire Protection Association (NFPA)

1. NFPA 285 – Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies.

E. US Green Building Council (USGBC):

1. Leadership in Energy and Environmental Design (LEED) Green Building Rating System

1.4. QUALITY ASSURANCE

A. Manufacturer/Source: Provide insulated metal panel assemblies and accessories from a single manufacturer.

B. Manufacturer Qualifications: Approved manufacturer listed in this Section producing foamed-in-place insulated metal panels on fully automated, continuous in-line process equipment

1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
    a. Product data, including certified independent test data indicating compliance with requirements.
    b. Samples of each component.
    c. Sample submittal from similar projects.
    d. Sample warranty.
2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.

C. Installer Qualifications: Experienced Installer with minimum of five years' experience with successfully completed projects of a similar nature and scope.

Specifier: Keep paragraph below and edit as needed for Federal projects and for public works projects employing Federal funds.

D. Buy American Compliance: Materials provided under work of this Section shall comply with the following requirements:

1. Buy American Act of 1933 BAA-41 U.S.C §§ 10a – 10d.

2. Buy American provisions of Section 1605 of the American Recovery and Reinvestment Act of 2009 (ARRA)

1.5. ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, Architect, metal panel installer, metal panel manufacturer's technical representative, and related trade contractors.

1. Coordinate building framing in relation to metal panel system.

2. Coordinate openings and penetrations of metal panel system.

1.6. SUBMITTALS

A. Product Data: Manufacturer's data sheets for specified products.

Specifier: Edit below to comply with Project requirements for LEED

1. EA Credit 1: Optimize Energy Performance: Provide testing or modeling results demonstrating U-values provided in accordance with this section are in compliance with ASHRAE 90.1, including Appendix G.

2. MR Credit 4: Recycled Content. Provide documentation of the following:

a. Material costs for each product having recycled content.

b. Percentages by weight of post-consumer and pre-consumer recycled content for each item.

c. Total weight and cost of products provided.

3. IEQ Credit 4.1: Low-Emitting Materials - Adhesives and Sealants. Provide documentation of the following:

a. Product data for adhesives and sealants demonstrating compliance with standards of California Department of Public Heath v1.1-2010 and South Coast Air Quality Management District Rule #1113.

4. IEQ Credit 4.2: Low-Emitting Materials – Paints and Coatings. Provide documentation of the following:

A. a. Product data for paint and coatings demonstrating compliance with the VOC limits as established in Green Seal Standard GS-11

B. Shop Drawings: Show insulated metal panel layouts. Include details of each condition of installation, panel profile, and attachment to building. Provide details of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Indicate factory versus field assembled work.

1. Include data indicating compliance with performance requirements.

2. Indicate points of supporting structure that must coordinate with metal panel system installation.

3. Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.

C. Samples for Initial Selection: For each product specified including sealants. Provide representative color charts of manufacturer's full range of colors.

D. Samples for Verification:

1. Provide 12-inch (305 mm) long section of metal panel profile.

2. Provide color chip verifying color selection.

E. Product Test Results: Indicating the submitted products comply with project requirements.

F. Buy American Certification: Manufacturers' letters of compliance acceptable to authorities having jurisdiction, indicating products comply with requirements.

G. Warranty:

1. Submit manufacturer's written two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.

2. The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

## 1.7. CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

## 1.8. DELIVERY, STORAGE, AND HANDLING

A. Protect metal panel system during shipping, handling and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping. Protect painted surfaces with a protective covering before shipping.

1. Deliver, unload, store, and erect metal panels and accessory items without deforming panels or exposing panels to surface damage from weather or construction operations.

2. Store in accordance with Manufacturer's written instructions.

3. Protect foam insulated metal panels from direct sunlight until all components are installed.

## 1.9. WARRANTY

A. Manufacturer's Warranty: Submit Manufacturer's two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.

B. The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

C. Panel Finish Warranty: Submit Manufacturer's limited warranty on the exterior paint finish for adhesion to the metal substrate and limited warranty on the exterior paint finish for chalk and fade.

Specifier: Keep finish warranty paragraph matching selected metal panel finish system. Include chalk and fade performance with applicable TrueCore finish and color.

No warranty is offered for the interior painted surface of the panel.

1. Fluoropolymer Two-Coat System:
   a. Color fade in excess of [5] Delta E Hunter units at 20 years per ASTM D 2244.
   b. Chalking in excess of [8] rating at 20 years per ASTM D 4214.
   c. Failure of adhesion, peeling, checking, or cracking.
2. Modified Silicone-Polyester Two-Coat System:
   a. Color fading in excess of [5] Delta E Hunter units at 90º vertical angle at 20 years per ASTM D 2244.
   b. Chalking in excess of [8] rating at 90º angle at 20 years per ASTM D 4214.
   c. Failure of adhesion, peeling, checking, or cracking.
3. Thick Mil Coatings with a Fluoropolymer top coat are also offered. Additional Information is available at truecorepanels.com.
4. PVC Plastisol Two-Coat System: nominal 4 mil thickness.

## 2.PRODUCTS

### 2.1. MANUFACTURER

A. Basis of Design Manufacturer: TrueCore, Laurens, SC Tel: 386-405-6946; Email: sales@truecorepanels.com; Web: truecorepanels.com.

B. Provide basis of design product [or comparable product approved by Architect prior to bid].

### 2.2. PERFORMANCE REQUIREMENTS

A. General: Provide metal panel system meeting performance requirements of specified tests by a qualified testing facility on manufacturer's standard assemblies.

B. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E 72 or ASTM E 1592 applied in accordance with ICC AC 04, Section 4, Panel Load Test Option or Section 5, Panel Analysis Option:

1. Wind Loads: Determine loads based on applicable building code, wind speed, importance factor, exposure category, and internal pressure coefficient indicated on drawings.
2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of [1/120] [1/180] [1/240] of the span with no evidence of failure.

C. Fire Performance Characteristics: Provide metal composite wall systems that comply with the performance requirements of Chapter 26 Plastic of the International Building Code.

D. Air Infiltration, ASTM E 283:

1. Maximum 0.01 cfm/sq. ft. (0.0047 L/s per sq. m) at static air pressure difference of 1.57 lbf/sq. ft. (75 Pa).

E. Water Penetration Static Pressure:

1. ASTM E 331: No uncontrolled water penetration at a static pressure of 20 lbf/sq. ft. (958 Pa).
2. ASTM E 331 Modified (2-hour duration): No uncontrolled water penetration at a static pressure of 6.24 lbf/sq. ft. (300 Pa).

F. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

G. Thermal Performance: When tested in accordance with ASTM C 518, the panels shall provide a k-factor of 0.125 BTU-in/ft$^2$-h-°F at a 35° F mean temperature.

## 2.3. INSULATED METAL WALL PANELS

A. Concealed Fastener, Insulated Metal Wall Panels having a factory foamed-in-place polyisocyanurate core, and double tongue and groove side joint designed for concealed fastening:

1. Basis of Design: TrueCore TC Series Mesa
2. G-90 galvanized coated steel conforming to ASTM A 653 or AZ-50 aluminum-zinc alloy coated steel, conforming to ASTM A 792/A 792M, minimum grade 33, prepainted by the coil-coating process per ASTM A 755/A 755M.
    a. Exterior Face Sheet: [26 gauge] [24 gauge] [22 gauge] thickness, with [stucco embossed] [smooth unembossed] surface.
    b. Finish: [Modified silicone-polyester two-coat system [Fluoropolymer two-coat system].
    c. Color: [As indicated] [As selected by Architect from manufacturer's standard colors].
    d. Interior Face Sheet: [26 gauge] [24 gauge] [22 gauge] thickness, with [stucco embossed] [smooth unembossed].
    e. Finish: [Polyester two-coat system] [Modified silicone-polyester two-coat system] [Fluoropolymer two-coat system] [PVC plastisol two-coat system] [304L Stainless Steel] [316L Stainless Steel].
    f. Color: [As indicated] [As selected by Architect from manufacturer's standard colors] [Match Architect's custom color].
3. Panel Width: [44inches (1117.6mm)] [42inches (1067mm)] [36inches (914mm)]
4. Panel Thickness: [2 inch (51 mm)] [3 inch (76 mm)] [4 inch (102 mm)] [5 inch (127 mm)] [6 inch (152 mm)].
5. Insulating Core: Polyisocyanurate core utilizing a blowing agent with zero ozone depletion potential (ODP) and global warming potential (GWP) <25. Closed Cell Content: 90% minimum as determined by ASTM D 6226
    a. Compressive Strength: >20 lb/sq.in. (138 kPa)
    b. Shear Strength: >20 lb/sq.in. (138 kPa)
    c. Tensile Strength: >20 lb/sq.in. (138 kPa)
    d. Minimum Density: 2.0 pcf (32 kg/m3) as determined by ASTM D 1622

B. Concealed Fastener, Insulated Metal Wall Panels having a factory foamed-in-place polyisocyanurate core, and double tongue and groove side joint designed for concealed fastening. Consists of exterior metal sheet and interior metal sheet with matching 4 by 1/16 inch (102 by 1.5 mm) o.c. profile:

1. Basis of Design: TrueCore TC Series Light Mesa
2. G-90 galvanized coated steel conforming to ASTM A 653 or AZ-50 aluminum-zinc alloy coated steel, conforming to ASTM A 792/A 792M, minimum grade 33, prepainted by the coil-coating process per ASTM A 755/A 755M.
    a. Exterior Face Sheet: [26 gauge] [24 gauge] [22 gauge] thickness, with [stucco embossed] [smooth unembossed] surface.
    b. Finish: [Modified silicone-polyester two-coat system [Fluoropolymer two-coat system].
    c. Color: [As indicated] [As selected by Architect from manufacturer's standard colors].
    d. Interior Face Sheet: [26 gauge] [24 gauge] [22 gauge] thickness, with [stucco embossed] [smooth unembossed].
    e. Finish: [Polyester two-coat system] [Modified silicone-polyester two-coat system] [Fluoropolymer two-coat system] [PVC plastisol two-coat system] [304L Stainless Steel] [316L Stainless Steel].
    f. Color: [As indicated] [As selected by Architect from manufacturer's standard colors] [Match Architect's custom color].
3. Panel Width: [44inches (1117.6mm)] [42inches (1067mm)] [36inches (914mm)]
4. Panel Thickness: [2 inch (51 mm)] [3 inch (76 mm)] [4 inch (102 mm)] [5 inch (127 mm)] [6 inch (152 mm)].
5. Insulating Core: Polyisocyanurate core utilizing a blowing agent with zero ozone depletion potential (ODP) and global warming potential (GWP) <25. Closed Cell Content: 90% minimum as determined by ASTM D 6226
    a. Compressive Strength: >20 lb/sq.in. (138 kPa)
    b. Shear Strength: >20 lb/sq.in. (138 kPa)
    c. Tensile Strength: >20 lb/sq.in. (138 kPa)
    d. Minimum Density: 2.0 pcf (32 kg/m3) as determined by ASTM D 1622

## 2.4. FABRICATION

A. General: Provide factory foamed-in-place insulated metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.

B. Fabricate metal panel joints configured to accept sealant providing weathertight seal.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

## 2.5. FINISHES

A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

B. Exterior Face Sheet Coil-Coated Finish System

1. Silicone-Polyester Two-Coat System: 0.20 – 0.25 mil primer with 0.7 mil color coat, [meeting solar reflectance index requirements].

2. Fluoropolymer Two-Coat System: 0.2 – 0.25 mil primer with 0.7 mil 70 percent PVDF fluoropolymer color coat, AAMA 621, [meeting solar reflectance index requirements].

C. Interior Face Sheet USDA Accepted Coil-Coated Finish System

1. Polyester Two-Coat System: 0.20 – 0.25 mil primer with 0.7 mil color coat

2. Silicone-Polyester Two-Coat System: 0.20 – 0.25 mil primer with 0.7 mil color coat

3. Fluoropolymer Two-Coat System: 0.2-mil primer with 0.7 mil 70 percent PVDF fluoropolymer color coat

4. PVC Plastisol Two-Coat System: 0.2 mil primer with nominal 4 mil high solids plastisol finished with PVC technology.

5. 304Land 316L Stainless Steel with 2B finish.

6. Flurothane II and Flurothane IV. Additional information is available at truecorepanels.com

3.EXECUTION

3.1. EXAMINATION

A. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.

1. Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.

2. Panel Support Tolerances: Confirm that metal panel supports are within tolerances acceptable to metal panel manufacturer but not greater than the following:

a. 1/4 inch (6 mm) in 20 foot (6100 mm) in any direction.

b. 3/8 inch (9 mm) over any single wall plane.

c. Girt Spacing 8 feet (2438 mm) or more: 1/4 inch (6 mm) out only.

d. Girt Spacing Less Than 8 feet (2438 mm): 1/8 inch (3 mm) out only.

B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

3.2. METAL PANEL INSTALLATION

A. Foamed-in-place Insulated Metal Panels with double tongue and groove side joint for concealed fastening: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.

B. Attach panels to metal framing using screws, fasteners, sealants, and adhesives recommended for application by metal panel manufacturer.

1. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer.

2. Cut panels in field where required using manufacturer's recommended methods.

3. Provide weatherproof seals for pipe and conduit penetrating metal panels.

4. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer

C. Attach panel flashing trim pieces to supports using recommended fasteners and joint sealers

D. Joint Sealers: Install sealants where indicated and where required for weatherproof performance of metal panel assemblies

1. Seal panel base assembly, openings, panel head joints, and perimeter joints using sealants indicated in manufacturer's instructions

2. Seal wall panel joints; apply continuously without gaps in accordance with manufacturer's written instructions, approved shop drawings, and project drawing

3.3. ACCESSORY INSTALLATION

A. General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.

2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.

3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant

3.4. CLEANING AND PROTECTION

A. Remove temporary protective films immediately in accordance with metal panel manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.

B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION