

## SECTION 07 4243

### COMPOSITE METAL WALL PANELS

This section includes editing notes to assist the user in editing the section to suit project requirements. These notes are included as hidden text, and can be revealed or hidden by one of the following methods:

Microsoft Word 2010: Display the FILE tab on the ribbon, click OPTIONS, then on left menu click on DISPLAY. Under ALWAYS SHOW THESE select or deselect HIDDEN TEXT.

Microsoft Word 2007: Click the OFFICE button, select WORD OPTIONS, select DISPLAY, then select or deselect the HIDDEN TEXT option.

Corel WordPerfect: From the pull-down menus select VIEW, then select or deselect the HIDDEN TEXT option.

This master specification section has been prepared by Alusystems, LLC for use in the preparation of a project specification section covering Series 20 composite metal panel wall systems using the dry seal principle.

Alusystems, LLC also offers the following specification sections covering additional composite metal panel wall systems:

Section 07 4243-10 - Composite Metal Wall Panels (Series 10 Wet Seal, using angle clips for panel attachment)

Section 07 4243-30 - Composite Metal Wall Panels (Series 30 Wet Seal, using channel extrusions for panel attachment)

Section 07 4243-40 - Composite Metal Wall Panels (Series 40 Rainscreen)

The following should be noted in using this specification:

Hypertext links to specific websites are included after manufacturer names and names of organizations whose standards are referenced within the text, to assist in product selection and further research. Hypertext links are contained in parenthesis and shown in blue, e.g.:

([www.astm.com](http://www.astm.com))

Optional text requiring a selection by the user is enclosed within brackets, e.g.: "Section [09 0000.] [\_\_\_\_.]"

Items requiring user input are enclosed within brackets, e.g.: "Section [\_\_\_\_ - \_\_\_\_]."

Optional paragraphs are separated by an "OR" statement, e.g.:

\*\*\*\* OR \*\*\*\*

Sustainable requirements are included for projects requiring LEED certification, and are included as green text. For additional information on LEED, visit the U.S. Green Building Council website at [www.usgbc.org](http://www.usgbc.org).

For assistance on the use of the products in this section, contact Alusystems, LLC by calling 225-772-1717 or visit their website at ([www.alusystems.com](http://www.alusystems.com)).

#### **PART 1 GENERAL**

##### 1.1 SUMMARY

Edit the following paragraphs to include only those items specified in this section.

- A. Section Includes:
  - 1. Aluminum composite panel system.
  - 2. Metal support components.
  - 3. Flashings, trim, and accessories.

Coordinate the following paragraphs with other sections in the project manual.

- B. Related Sections:
  - 1. Division 01: Administrative, procedural, and temporary work requirements.

## 1.2 REFERENCES

In the following paragraphs, retain only those reference standards that are used elsewhere in this section.

- A. American Society of Civil Engineers (ASCE) ([www.asce.org](http://www.asce.org)) 7 - Minimum Design Loads for Buildings and Other Structures.
- B. American Architectural Manufacturers Association (AAMA) ([www.aamanet.org](http://www.aamanet.org)):
  - 1. 501 - Methods of Tests for Exterior Walls.
  - 2. 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 3. 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Architectural Extrusions and Panels.
- C. ASTM International (ASTM) ([www.astm.org](http://www.astm.org)):
  - 1. B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
  - 2. B221 - Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wires, Shapes and Tubes.
  - 3. C297/C297M - Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions.
  - 4. D659 - Method of Evaluating Degree of Chalking of Exterior Paints,
  - 5. D1781 - Standard Test Method for Climbing Drum Peel for Adhesives.
  - 6. D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
  - 7. D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
  - 8. E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 9. E108 - Standard Test Methods for Fire Tests of Roof Coverings.
  - 10. E283 - Standard Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.
  - 11. E331 - Standard Test Method for Water Penetration of Exterior Windows, Doors, and Curtain Walls by Uniform Static Air Pressure Differential.
  - 12. E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Storm Shutters Impacted by Missile(s) and Exposed to Cyclical Pressure Differentials.
  - 13. E1996 - Standard Specification for Performance of Exterior Windows, Glazed Curtain Walls, Doors, and Storm Shutters Impacted by Windborne Debris in Hurricanes.
- D. State of Florida Building Code (FBC) ([www.floridabuilding.org](http://www.floridabuilding.org)) Testing Application Standard (TAS) 202 - Criteria for Testing Impact and Nonimpact Resistant Building Envelope Components Using Uniform Static Air Pressure.
- E. Underwriters Laboratories (UL) ([www.ul.com](http://www.ul.com)) 94 - Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances Testing.

## 1.3 SYSTEM DESCRIPTION

- A. Composite Metal Panel System:
  - 1. Rout-and-return panel system consisting of aluminum composite panels with dry seal panel joints.
  - 2. Include continuous perimeter aluminum extrusions, aluminum corner angles, extruded stiffeners when required, and related flashings and trim.

B. Performance Requirements:

1. Wind loads:
  - a. Design system to resist minimum wind pressures in accordance with [ASCE 7,] [Building Code,] [\_\_\_\_,] with minimum of 40 PSF in field and 50 PSF on parapets and corners.
  - b. Maximum deflection, normal to plane of wall, between supports of secured perimeter framing members: L/175 or 3/4 inch, whichever is less
  - c. Maximum panel deflection, normal to plane of wall: L/60.
  - d. Anchor deflection: Maximum 1/16 inch.
  - e. At 1-1/2 times design pressure, permanent deflections of framing members shall not exceed L/100 of span length and components shall not experience failure or gross permanent distortion.
  - f. At connection points of framing members to anchors, permanent set shall not exceed 1/16 inch.
2. Design system to resist movement caused by an ambient temperature range of [120] [ ] degrees F and a surface temperature range of [160] [ ] degrees F.
3. Air leakage: Maximum 0.01 CFM per square foot of roof area, tested to ASTM E283 at test pressure of 6.2 PSF.
4. Water penetration: None, tested to ASTM E331 at test pressure of 15.00 PSF.
5. Dynamic water penetration: None, tested to AAMA 501.01 at test pressure of 15.00 PSF.

Include the following for projects requiring Florida Building Code approval.

6. Meet requirements of FBC TAS 202.

Include the following for projects requiring Florida Building Code approval or other similar approvals in hurricane zones.

7. Pass ASTM E1886 and E1996 large missile and air pressure cycling requirements for plus or minus 45 PSF design pressure with missile impacts corresponding to Missile Level C and Wind Zone 3.

#### 1.4 SUBMITTALS

Limiting submittals to only those actually required helps to minimize liability arising from the review of submittals. Minimize submittals on smaller, less complex projects.

Include the following for submission of shop drawings, product data, and samples for the Architect's review.

A. Submittals for Review:

1. Shop Drawings:
  - a. Include profiles, thicknesses, and dimensions of panels, details of forming, joint supports, anchorages, trim, flashings, sealants, and accessories.
  - b. Show:
    - 1) Details of weatherproofing at edge terminations.
    - 2) Panel elevations.
    - 3) Layout of work.
2. Samples:
  - a. [3 x 3] [ ] x [ ] inch finish samples [showing available colors.] [in specified color.]
  - b. [After color selection, submit] [8 x 8] [ ] x [ ] inch panel samples in [selected] [specified] color, fabricated into units representative of actual panels.
  - c. [3] [ ] inch long gasket samples [in specified color.] [showing available colors.]
3. Warranty: Sample warranty form.

Include the following for submission of quality control submittals. These submittals are intended for the Owner's record purposes and are not intended to be reviewed by the Architect.

B. Quality Control Submittals:

1. Test reports: Certified test reports from a recognized independent testing laboratory showing compliance with specified performance criteria.

Include the following for submission of sustainable design submittals.

- C. Sustainable Design Submittals:
1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
  2. Regional Materials: Indicate cost of products harvested, extracted, recovered, or manufactured within 500 mile radius of Project site.

## 1.5 QUALITY ASSURANCE

- A. Fabricator:
1. Demonstrate ability to perform work of this Section.
  2. Assume undivided responsibility for all system components
  3. Provide engineering support required for design of system to meet specified requirements.

Include the following for full size mockups for review of construction and coordination of work of several sections, or field testing.

- B. Mockup:
1. Size: Minimum [4 x 8] [\_\_ x \_\_] feet.
  2. Show metal panels, supports, flashings, and trim. Include [one panel joint] [and] [one external corner.] [\_\_\_\_.]
  3. Locate [where directed.] [\_\_\_\_.]
  4. Approved mockup may [not] remain as part of the Work.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Provide coverings and spacers to prevent panel-to-panel contact.

## 1.7 WARRANTIES

- A. Provide manufacturer's warranties providing coverage against:
1. Panel delamination: 10 years.
  2. Cracking, peeling, fading, or chalking of panel finish: 20 years.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Metal Composite Material Sheet:
1. Alpolic by Mitsubishi Chemical FP America, Inc. ([www.alpolic-usa.com](http://www.alpolic-usa.com))
  2. Alucobond by 3A Composites USA, Inc. ([www.3acomposites.com](http://www.3acomposites.com))
- B. Wall Panel System:
1. Series 20 Dry Seal by Alusystems LLC. ([www.alusystems.com](http://www.alusystems.com))
  2. Formabond II by Centria. ([www.centria.com](http://www.centria.com))
  3. Series 1500 by Firestone Building Products. ([www.firestonemetal.com](http://www.firestonemetal.com))

Edit the following to indicate whether or not substitutions will be permitted for the products in this section.

- C. Substitutions: [Under provisions of Division 01.] [Not permitted.]

### 2.2 MATERIALS

- A. Aluminum Composite Material (ACM):
1. Extruded thermoplastic core between two sheets of aluminum, formed in continuous process without glues or adhesives between dissimilar materials.

In the following paragraph, retain Alloy 3003 for coil-coated finishes and Alloy 5005 for anodized.

2. Face sheets: Aluminum, 0.020 inch thick, Alloy [3003.] [5005.]
3. Thickness: 4 mm.

Include the following for a coil-coated finish.

4. Finish for exterior faces:
  - a. Coil coated with FEVE or PVDF-based resin meeting or exceeding AAMA 2605 testing for durability.
  - b. Performance requirements:
    - 1) Humidity resistance: No formation of blisters when subjected to condensing water fog at 100 percent relative humidity and 100 degree Fahrenheit for 3000 hours, tested to D2247.
    - 2) Salt spray resistance: Expose of coating system to 3000 hours, using 5 percent NaCl solution:
      - a) Corrosion creepage from scribe line: Maximum 1/8 inch.
      - b) Minimum blister rating: 8 within test specimen field.
    - 3) Outdoor weather exposure:
      - a) Ten year exposure at 45 degree angle facing south Florida exposure.
      - b) Maximum color change: 5 Delta E units, calculated in accordance with ASTM D2244.
      - c) Maximum chalk rating: 8, in accordance with ASTM D659.
      - d) No checking, crazing, or adhesion loss.
5. Bond integrity:
  - a. Peel strength: Minimum 22.5 in-lb/in, tested to ASTM D1781.
  - b. Bond strength Minimum 1500 PSI, tested to ASTM C297/297M.
  - c. No degradation in bond performance after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
6. Fire hazard characteristics:
  - a. Flame spread/smoke developed rating: Maximum 25/450, tested to ASTM E84.
  - b. Surface flammability: Pass modified ASTM E108.
  - c. V-0 rating: Comply with UL94.

Edit the following to indicate desired panel color.

7. Color: [\_\_\_\_.] [Custom color.] [Color to be selected from manufacturer's full color range.]

\*\*\*\* OR \*\*\*\*

Include the following for an anodized finish.

8. Finish for exterior faces:
  - a. AAMA 611, Architectural Class I anodized to 0.0007 inch minimum thickness.

Edit the following to indicate desired panel color.

- b. Color: [Clear.] [Light bronze.] [Medium bronze.] [Dark bronze.] [Black.]
- B. Aluminum Extrusions: ASTM B221, 6063-T5 or T6 alloy and temper, mill finish.

Include the following for LEED projects and other projects requiring recycled content in aluminum. Contact Alusystems LLC for current recycled content.

- C. Recycled Content: Minimum [ ] percent recycled aluminum, with minimum [ ] percent classified as post consumer.

## 2.3 ACCESSORIES

- A. Attachment: Continuous aluminum extrusions.
- B. Moldings: As required for panel system design by panel system manufacturer.
- C. Fasteners: Type suited to application, stainless or corrosion-resistant coated steel.

Edit the following to indicate desired gasket color.

- D. Gaskets: Resilient polyvinyl chloride or silicone, extruded shape to suit panels and retaining slot; [color to match panel color.] [\_\_\_\_\_] color.]
- E. Flashings: Aluminum sheet in color to match panels where exposed to view.

## 2.4 FABRICATION

- A. Panel System:
  - 1. Perimeter edge trim: Continuous interlocking aluminum extrusions, providing following features:
    - a. Rout and return of panels on all perimeters.
    - b. Return leg of panels supported by extrusions on all four sides.
    - c. Maximum overall system thickness variable as required by design, with minimum of 1-1/4 inches.
    - d. Panels held in place by minimum No. 10 fasteners at maximum 24 inches on center.
  - 2. Stiffeners, when required by system design:
    - a. Aluminum sections secured to perimeter extrusion of panel and bonded to rear face of panels using silicone adhesive.
    - b. Sufficient size and strength to maintain flatness of panel within specified tolerances.
  - 3. Panel reveals:
    - a. Width: Nominally 1/2 inch.
    - b. Joints recessed nominally 1 inch.
- B. Fabricate panel units to dimensions indicated based on assumed design temperature of 70 degrees F.
- C. Fabricate panels in sizes indicated using composite aluminum panel material and perimeter extrusion so that panel thickness at joinery is as required by design.
  - 1. Completed panels fabricated so that no restraints are placed on panels that could result in compressive skin stresses.
  - 2. Installed panels to remain flat under temperature changes. Oil canning of panel surface not acceptable.
- D. Shop fabricate units as much as possible, ready for field erection. If not shop assembled, prefabricate components at shop as required for proper field assembly.

Include the following for curved panels; special considerations for design are required.

- E. Factory curved panels to required radius.
- F. When required based on system design, provide stiffeners spaced as required and adhered to rear face of panels and mechanically fastened to perimeter extrusion members.
- G. Fabricate system to route condensation to exterior of system.
- H. Provide flashings and trim of same material and finish as exterior panel faces.
- I. Provide lap strip under flashings at butted conditions; with lapped surfaces sealed with full bed of non-hardening sealant.
- J. Fabrication Tolerances:

1. Panel flatness: Maximum 1/8 inch in 15 feet measured in any direction on panels.
2. Dimension of openings within panels: 1/4 inch.
3. Panel width and length: Plus or minus 1/4 inch.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine supporting structure and conditions under which system is to be erected. Do not begin installation until conditions are acceptable.
- B. Verify that weather resistive membrane has been properly installed to prevent air infiltration and water penetration.

### **3.2 INSTALLATION**

- A. Install system in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Perform cutting, trimming, welding, and brazing in manner to prevent damage to finishes, decrease strength, or result in visual imperfections or failure in performance.
- C. Dissimilar Metals:
  1. Separated dissimilar metals from contact with concealed coat of bituminous paint.
  2. Use gasketed fasteners to prevent corrosion and electrolytic action between metals.
- D. Anchor component parts securely in place, allowing for necessary thermal and structural movement. Conform to panel manufacturer's instructions for attachment systems.
- E. Erect panels plumb, level, and true to plane.
- F. Attach panels to supports using concealed angle clips. Stagger clips at abutting panels.
- G. Install flashings and trim to maintain visual continuity of system.
- H. Allowable Tolerances:
  1. Maximum deviation from vertical and horizontal alignment of panels: 1/4 inch in 20'-0".
  2. Maximum deviation in panel flatness: 0.6 percent of assembled units.

### **3.3 CLEANING**

- A. Remove temporary coverings and protection applied to adjacent surfaces.
- B. Clean surfaces in accordance with manufacturer's instructions.
- C. Remove construction debris from site.

### **3.4 ADJUSTING**

- A. Repair or replace damaged products.
- B. Touch up minor scratches and abrasions on panels and trim as directed by manufacturer.

END OF SECTION