

SPECIFICATIONS FOR

Metal Design Systems Featuring Aluminum Composite Panels

Section 07430 Aluminum Composite Panels

(Based upon Metal Design Systems Series 70 using PE core aluminum composite material (ACM))

PART 1: GENERAL

1.01 SCOPE

A. SECTION INCLUDES

1. The extent of panel system work is indicated on the drawings and in these specifications.
2. Panel system requirements include the following components:
 - a. Aluminum faced composite panels with mounting system. Panel mounting system including anchorages, shims, furring, fasteners, related flashing adapters, and masking (as required) for a complete rain screen installation.
 - b. Parapet coping, column covers, soffits, sills, border, and filler items indicated as integral components of the panel system or as designed.
 - c. Interior panel system work that basically matches exterior panel system work.

B. RELATED WORK SPECIFIED ELSEWHERE

1. Cold-Formed Metal Framing: Division 5
2. Sheathing: Division 6
3. Insulation: Division 7
4. Weather Barrier: Division 7
5. Sheet Metal Flashing and Trim: Division 7
6. Joint Sealer: Division 7

1.02 REFERENCES

A. AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION

1. AAMA 508-05: Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems.
2. AAMA 509-09: Voluntary Test and Classification Method for Drained Back Ventilated Rain Screen Wall Cladding Systems.
3. AAMA 2605: Specification for High Performance Organic Coatings on Architectural extrusions and panels.

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS

1. ASTM C297 Standard Test Method for Tensile Strength on Flat Sandwich Constructions in Flatwise Plane.
2. ASTM D1781 Standard Test Method for Climbing Drum Peel for Adhesives.
3. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
4. ASTM E108 (Modified) Standard Test Methods for Fire Tests of Roof Coverings.
5. ASTM E283 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
6. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
7. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.

C. UNDERWRITERS LABORATORIES INC. (UL)

1. UL 94 Standard for Flammability of Plastic Materials for Parts in Devices and Appliances.

D. INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

1. ISO 9001-2000 Quality Management Systems – Requirements.

1.03 QUALITY ASSURANCE

1. Composite Panel Manufacturer shall have a minimum of 5 years experience in the manufacturing of this product.
2. Composite Panel Manufacturer shall be solely responsible for panel manufacture and application of the finish.
3. Fabricator shall be acceptable to the composite panel manufacturer and shall have a minimum 5 years experience of metal panel work similar in scope and size to this project.
4. Installer shall be acceptable to the fabricator and shall have a minimum 5 years experience of metal panel work similar in scope and size to this project or shall be certified by the fabricator to have received installer training.
5. Field measurements should be taken prior to the completion of shop fabrication whenever possible. However, coordinate fabrication schedule with construction progress as directed by the Contractor to avoid delay of work. Field fabrication may be allowed to ensure proper fit. However, field fabrication shall be kept to an absolute minimum with the majority of the fabrication being done under controlled shop conditions.
6. Maximum deviation from vertical and horizontal alignment of erected panels: 1/4" in 20' non-accumulative.
7. Panel fabricator/installer shall assume undivided responsibility for all components of the exterior panel system including, but not limited to attachment to sub-construction, panel to panel joinery, panel to dissimilar material joinery, and joint seal associated with the panel system.
8. Composite panel manufacturer shall have an established Certification Program acceptable to the local Code Authorities.
9. Conduct pre-installation meeting to verify project requirements, substrate conditions, installation instructions, and warranty requirements.

10. Field Quality Control: Comply with panel system manufacturer's recommendations and guidelines for installation and field forming panels.

1.04 SYSTEM DESCRIPTION

A. SYSTEM TYPE

1. Provide an open joint **pressure equalized, hook and pin style**, rout and return panel system which has been **pre-tested** to meet the specified performance requirements.

B. SYSTEM PERFORMANCE

1. Composite panel system shall be capable of withstanding building movements and weather exposures based on the following test standards required by the Architect and/or national and the local building code. Panel systems which have not been pre-tested prior to bid date will not be acceptable.

a. Wind Load:

- i. Panels shall be designed to withstand the Design Wind Load based upon the local building code, but in no case less than 20 pounds per square foot (psf) and 30 psf on parapet and corner panels. Wind load testing shall be conducted in accordance with ASTM E330 to obtain the following results.
- ii. Normal to the plane of the wall between supports, deflection of the secured perimeter-framing members shall not exceed $L/175$ or $3/4"$, whichever is less.
- iii. Normal to the plane of the wall, the maximum panel deflection shall not exceed $L/60$.
- iv. Maximum anchor deflection shall not exceed $1/16"$.
- v. 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. At connection points of framing members to anchors, permanent set shall not exceed $1/16"$.

b. Air/Water System Test:

- i. Air Infiltration - When tested in accordance with ASTM E283, air infiltration at 1.57 psf must not exceed 0.06 cfm/ft² of wall area.
- ii. Water Penetration - Water Penetration is defined as uncontrolled water leakage through the exterior face of the assembly. Systems not using a construction sealant at the panel joints shall be designed to drain any water leakage occurring at the joints. No water infiltration shall occur in any system under a differential static pressure of 6.24 psf after 15 minutes of exposure in accordance with ASTM E331.
- iii. Dynamic Water Infiltration – System will show compliance with the requirements stated in the AAMA 501 Dynamic Water Infiltration test.

c. Pressure Equalization:

- i. System shall comply with AAMA 508-05 Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems.

d. Thermal Movement:

- i. System shall allow for free horizontal and vertical movement due to the expansion and contraction of component parts for an ambient temperature range from plus 20

degrees F to plus 180 degrees F. Buckling, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement of component parts will not be permitted. Fabrication, assembly and erection procedures shall take into account the ambient temperature at the time of the respective operation.

1.05 SUBMITTALS

A. SUBMITTALS SHALL BE IN CONFORMANCE WITH DIVISION 1 SUBMITTAL PROCEDURES SECTION

B. PRODUCT DATA

Submit material and system manufacturer's product data.

C. SAMPLES

1. Submit manufacturer's color charts or chips illustrating full range of colors, finishes and patterns available for composite metal panels with factory applied finishes.
2. In the case of custom color selections, submit 2 sets of draw down samples on aluminum substrate, not less than 3 inches x 5 inches of each color and finish selected for color approval.

D. SHOP DRAWINGS

Submit shop drawings showing project layout and elevations; fastening and anchoring methods; detail and location of joints, sealants, and gaskets, including joints necessary to accommodate thermal movement; trim; flashing; and accessories.

E. QUALITY ASSURANCE SUBMITTALS

1. Submit certified test reports from a qualified testing agency showing compliance with specified performance requirements.
2. Submit documents showing product compliance with local building codes.

F. SYSTEM MANUFACTURER'S INSTRUCTIONS

Submit system manufacturer's installation instructions.

G. CLOSEOUT SUBMITTALS

Submit manufacturer's warranty documents.

H. ALTERNATE MATERIALS MUST BE APPROVED BY THE ARCHITECT PRIOR TO THE BID DATE

Substitution requests must comply with the requirements of Division 1.

1.06 DELIVERY, STORAGE AND HANDLING

1. Coordinate submittals, approvals, construction schedules and lead time requirements to avoid construction delays.
2. Exercise care in unloading, handling and installing panels to prevent damage.
3. Store panels in well-ventilated space out of direct sunlight.
4. Do not store panels in any enclosed space where ambient temperature can exceed 120 degrees F.

5. Avoid contact with any other materials that might cause staining, denting or other surface damage.

PART 2: PRODUCTS

2.01 PANELS

A. ALUMINUM COMPOSITE MATERIAL (ACM)

1. ALPOLIC material manufactured by Mitsubishi Plastics Composites America, Inc. ALPOLIC Materials Division, 401 Volvo Parkway, Chesapeake, VA 23320
2. REYNOBOND material manufactured by Reynolds Metals Company, Alcoa Architectural Products (USA), 50 Industrial Boulevard, Eastman, Georgia 31023
3. Items of the same function and performance, which have received approval from the architect prior to bid date, shall be allowed for this project. Approval shall be based on documentation submitted showing the adequacy of the material. See Division 1 for substitution requirements.

B. COMPOSITION

Two sheets of aluminum sandwiching a solid core of extruded thermoplastic material formed in a continuous process with no glues or adhesives between dissimilar materials. The core material shall be free of voids and/or air spaces and not contain foamed insulation material. Products laminated sheet by sheet in a batch process using glues or adhesives between materials shall not be acceptable.

C. THICKNESS

Standard 4mm (0.157").

D. FACE SHEETS

Aluminum alloy 3105 H14, 0.020" thick.

E. CORE

Thermoplastic material that meets performance characteristics specified when fabricated into composite assembly.

1. Thermally bonded in a continuous process, under tension, to the core material.

F. PRODUCT PERFORMANCE

1. Bond Integrity: Tested for resistance to delamination as follows:
 - a. Bond Strength (ASTM C297): 1500 psi (10.3 MPa) minimum.
 - b. Peel Strength (ASTM D1781): 33.6 in-lb/in (150 N-m/m) minimum.
 - 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 (21 degrees C).
2. Fire Performance
 - a. Flamespread (ASTM E84): 0
 - b. Smoke Developed (ASTM E84): 10
 - c. Surface Flammability (Modified ASTM E108): Pass

- d. V-O Rating: Comply with UL 94.
- 3. Production Tolerances:
 - a. Width: +/- 0.04 inch/3 feet (1mm/m).
 - b. Length: +/- 0.04 inch/3 feet (1mm/m).
 - c. Thickness: +/- 0.008 inch (0.2mm).
 - d. Bow: Maximum 0.5% length or width.
 - e. Square: Maximum 0.2 inch (5.1mm).
 - f. Edges of sheets shall be square and trimmed with no displacement of the aluminum sheets or protrusion of the core material.

G. FINISHES

- 1. Factory Finish:
 - a. Coil coated with a fluoropolymer paint finish that meets or exceeds the values expressed in AAMA 2605 where relevant to coil coatings.
 - b. Spray coated with specified finish where quantities required are less than 2,000 square feet.
 - c. Color:
Standard color as selected by the owner / architect from manufacturer's standard color palette.
- 2. The finish side of the panel shall have a removable plastic film applied prior to fabrication, which shall remain on the panel during fabrication, shipping, and erection to protect the surface from damage.

2.02 ATTACHMENT SYSTEM

A. GENERAL

- 1. Provide Series 70 ACM wall panel assembly as manufactured by:

Metal Design Systems Inc.
4150 C Street SW, Cedar Rapids, Iowa 52404
319-362-7454 or sales@crmdsi.com

B. SYSTEM DESCRIPTION

- 1. Provide a hook and pin style, open joint pressure equalized, rout and return panel system:
 - a. System must consist of ACM panels and a system of custom aluminum extrusions to form a continuous vertical channel which directs water that has entered the panel joints to the bottom of the wall and out to the exterior side.
 - b. System must allow for segmentation of the air space behind the panel face to allow the appropriate pressure difference between cavity compartments.
 - c. System must provide for a +/- 1/2" variation in system depth to accommodate substrate variances without the use of shims or furring.
 - d. System must allow for non-sequential panel installation.

- e. System must allow for removal of any individual panel without removal of adjacent panels.
 - f. System must allow re-installation of the removed panel into original and tested method.
 - g. System must consist of 2" deep reveal vertical joint between the panels which will accommodate a joint width of 0"-1" without modification to the attachment system.
 - h. Overall system depth shall be variable from 4 1/2" to 7 1/2".
 - i. System must not generally have any visible fasteners, telegraphing or fastening on the panel faces or any other compromise of a neat and flat appearance.
 - j. System must provide continuous vertical channels at the vertical panel joints which incorporate vertically adjustable members to receive and retain the vertical edges of the panels.
2. Aluminum Extrusions
- a. Sub-frame members and integrated flashings shall be extruded from 6063 aluminum alloy.
 - b. Extrusions exposed to view shall be factory finished with a coating that meets or exceeds the values expressed in AAMA 2605 where relevant to extrusion coatings.
 - c. Color: Extrusions exposed to view shall be painted "Black".

2.03 ACCESSORIES

A. FASTENERS

- 1. Provide fasteners approved by the system manufacturer.
- 2. Provide fasteners of the appropriate type according to the substrate to which the system is to be attached.
- 3. Space fasteners per the system manufacturer's recommendations or sufficiently to meet the specified performance requirements.
- 4. Provide fasteners of sufficient diameter to meet the specified performance requirements.
- 5. Provide fasteners of sufficient length to properly engage in the structural members.

B. AIR/MOISTURE BARRIER

- 1. Provide an air/moisture barrier appropriate for the application behind a rain screen cladding system specified in the applicable section.

C. FLASHING

- 1. Provide flashing fabricated from 0.030" thick aluminum sheet.
- 2. Where exposed to view, finish shall match the adjacent panels.
- 3. Provide a lap strip under flashings at abutted conditions with lapped surfaces sealed with a full-bed of non-hardening sealant.

D. MISCELANEOUS MATERIALS

1. Provide sealants within the panel system according to the system manufacturer's recommendations.

2.04 PANEL FABRICATION

A. TOLERANCES

1. Fabricated panel tolerances:
 - a. Width: +/- 0.04 inch/3 feet (1mm/m).
 - b. Length: +/- 0.04 inch/3 feet (1mm/m).
 - c. Bow: Maximum 0.5% length or width.
 - d. Square: Maximum 0.2 inch (5.1mm).
2. Panel Dimensions: Field fabrication shall be allowed where necessary, but shall be kept to an absolute minimum. All fabrication shall be done under controlled shop conditions when possible.
3. Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.
4. Fabricate panels with sharply cut edges, with no displacement of the aluminum sheets or protrusion of the core material.
5. Fabricate panel system to dimension, size, and profile indicated on the drawings based on a design temperature of 70°F.
6. Fabricate panel system so that no restraints can be placed on the panel, which might result in compressive skin stresses. The installation detailing shall be such that the panels remain flat regardless of temperature change.

PART 3: EXECUTION

3.01 PANEL DELIVERY, STORAGE AND HANDLING

1. Exercise care in unloading, handling and installing panels to prevent damage.
2. Inspect crates and contents for damage upon delivery. Report any damage to the freight carrier within 24 hours of receipt.
3. Store panels in well-ventilated space out of direct sunlight.
4. Do not store panels in any enclosed space where ambient temperature can exceed 120 degrees F.
5. Avoid contact with any other materials that might cause staining, denting or other surface damage.

3.02 INSPECTION

1. Surfaces to receive panels shall be even, smooth, sound, clean, dry and free from defects detrimental to work. Notify contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with erection until unsatisfactory conditions have been corrected.

2. Surfaces to receive panels shall be structurally sound as determined by a registered Architect/Engineer.
3. Prior to installation of the wall panel system, verify air/moisture barrier has been installed according to the manufacturer's instructions.

3.03 INSTALLATION

1. Erect panels plumb, level, and true to line.
2. Install panels according to the panel system manufacturer's installation guidelines.
3. Panels shall be erected in accordance with an approved set of shop drawings.
4. Anchor panels securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary thermal movement and structural support.
5. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded, and broken members.
6. Do not cut, trim, weld, or braze component parts during erection in a manner which would damage the finish, decrease strength, or result in visual imperfection or a failure in performance. Return component parts which require alteration to shop for refabrication, if possible, or for replacement with new parts.
7. Separate dissimilar metals and use gasketed fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.
8. All panel penetrations shall be field cut by the trade requiring the penetration or shall be coordinated by such trade with the panel installation contractor at the time of installation.
9. Installation Tolerances:
 - a. Maximum deviation from horizontal and vertical of installed panels: $\frac{1}{4}$ " in 20', non-accumulative.
 - b. Maximum deviation from panel edge and face alignment: 1/16".

3.04 ADJUSTING AND CLEANING

1. Remove and replace panels damaged beyond repair as a direct result of the panel installation.
2. Repair panels with minor damage such that repairs are not discernable from a distance of 10 feet.
3. Remove masking as soon as possible after installation.
4. Protection from damage by other trades after installation, shall be the responsibility of the General Contractor.
5. Make sure drainage channels are unobstructed and free of dirt and sealants.
6. Final cleaning shall not be part of the work of this section.

END OF SECTION