

SPECIFICATIONS FOR

Metal Design Systems Featuring

Section 07 42 13.23 Metal Composite Material Wall Panels

(Based upon Metal Design Systems Series 20 attachment system and metal composite material (MCM))

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. Provide a reveal joint pressure equalized rainscreen system as detailed on the drawings. The panel system must consist of an MCM panel with matching or contrasting color joint filler strip.
3. The panel system as detailed, shall consist of extruded continuous perimeter extrusions, extruded stiffeners (if required) and related flashings.
4. Panel system requirements include the following components:
 - a. Aluminum / metal faced composite panels with mounting system. Panel mounting system including anchorages, shims, furring, fasteners, related flashing adapters and masking (as required) for a complete rainscreen 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 501.1: Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure
2. AAMA 508: Voluntary Test Method and Specifications for Pressure Equalized 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 D1781 Standard Test Method for Climbing Drum Peel for Adhesives

2. ASTM D1929 Standard Test Method for Determining Ignition Temperature of Plastics
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 E119 Standard Test Method for Surface Burning Characteristics of Building Materials
6. 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
7. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference
8. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference
9. ASTM E 1233 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Cyclic Air Pressure Differential

C. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1. NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies Containing Combustible Components

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 established a 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 a reveal joint **pressure equalized rainscreen**, 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 tested prior to bid date will not be acceptable.

- a. AAMA 508-14
 - i. Panel system shall comply with the minimum standards as specified according to AAMA 508-14 for pressure equalized rainscreen systems.
- b. 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 40 pounds per square foot (psf). 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 $1/16"$.
- c. Air/Water System Test per AAMA 508-14:
 - i. Air Infiltration – Using ASTM E28 confirm air/water barrier leakage is 0.12 cfm/ft^2 +/- 10% at 1.57 psf
 - ii. Pressure cycling – Using ASTM E1233 conduct pressure cycle loading from 5psf to 25psf to 5psf at three second cycle duration for 100 cycles.
 - a. Maximum dwell time between pressure peaks shall not exceed 0.08 seconds.
 - b. Pressure differential in the panel cavity shall not 50% of max pressure.
 - iii. Water Penetration by static pressure – Using ASTM E 331 for 15 min at 6.24psf.
 - a. Water mist or droplets may not exceed 5% of the air/water barrier surface area.
 - b. No continuous streaming of water on the air/water barrier surface.
 - iv. Water Penetration by dynamic pressure – Using AAMA 501.1 for 15 min at 6.24psf.
 - a. Water mist or droplets may not exceed 5% of the air/water barrier surface area.
 - b. No continuous streaming of water on the air/water barrier surface.
- b. Fire Performance: Where required by governing code, provide fire retardant MCM material and attachment system that has been evaluated and is in compliance with NFPA 285 code requirements.

1.05 SUBMITTALS

- A. SUBMITTALS SHALL BE IN CONFORMANCE WITH DIVISION 1 SUBMITTAL PROCEDURES SECTION
 - 1. Coordinate submittals, approvals, construction schedules and lead time requirements to avoid construction delays.
- B. PRODUCT DATA
 - 1. 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.
 - 3. Submit 8" x 8" sample of panel system in specified finish, if available, fabricated into units representative of the actual calculations.
- D. SHOP DRAWINGS
 - 1. 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
 - 1. Submit system manufacturer's installation instructions.
- G. CLOSEOUT SUBMITTALS
 - 1. Submit manufacturer's warranty documents.
- H. ALTERNATE MATERIALS MUST BE APPROVED BY THE ARCHITECT PRIOR TO THE BID DATE
 - 1. Substitution requests must comply with the requirements of Division 1.

PART 2: PRODUCTS

2.01 PANELS

- A. METAL COMPOSITE MATERIAL (MCM)
 - 1. ALPOLIC material manufactured by Mitsubishi Chemical Composites America, Inc. ALPOLIC Materials Division, 401 Volvo Parkway, Chesapeake, VA 23320
 - 2. REYNOBOND material manufactured by Arconic Architectural Products LLC (USA), 50 Industrial Boulevard, Eastman, Georgia 31023
 - 3. ALUCOBOND material manufactured by 3A Composites, 208 West Fifth St., Benton, KY 42025

4. ALFLEX material manufactured by Alflex, 943 Gainesville Hwy, Building 100, Suite 4000, Buford, GA 30518
5. LARSON material manufactured by Alucoil, 1976 Joe Rogers Jr. Blvd, Manning, SC 29102

B. COMPOSITION

1. Two sheets of aluminum / metal 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

1. Standard 4mm (0.157").

D. FACE SHEETS

1. Aluminum alloy 3105 H14, 0.020" thick.

E. CORE

1. Thermoplastic core material with inorganic fillers that meets performance characteristics specified.

F. PRODUCT PERFORMANCE

1. Bond Integrity: Tested for resistance to delamination as follows:
 - a. Peel Strength (ASTM D1781): 22.5 in-lb/in (100 N-m/m) minimum.
 - b. 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).
 - c. Thermally bonded to the core material in a continuous process under tension.
2. Fire Performance
 - a. Flame spread (ASTM E84): <25.
 - b. Smoke Developed (ASTM E84): <450.
 - c. Surface Flammability (Modified ASTM E108): Pass.
 - d. Ignition Temperature:
 - i. Flash, ASTM D1929: 716 degrees F (380 degrees C).
 - ii. Ignition: 752 degrees F (400 degrees C).
 - e. Flammability, Exterior, Non-load-bearing wall assemblies and panels, NFPA 285: Pass.
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. Color:
 - i. Standard color as selected by the owner / architect from manufacturer's standard color palette.
 - ii. Custom colors shall be spray coated with specified finish where quantities required are less than 2,000 square feet.
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 20 MCM 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 reveal joint **pressure equalized rainscreen**, rout and return panel system providing the following features:
 - a. System must consist of MCM panels and a system of custom aluminum extrusions forming a continuous perimeter frame fastened to the panel return legs with stainless steel rivets.
 - b. System shall incorporate a series of H & J extrusion clips which interlock with the perimeter extrusions for the purpose of anchoring the panel to the structural framing members.
 - c. Panel joints shall be ½” wide x 1” deep open reveal.
 - d. System shall utilize a reveal filler strip at the panel joints fabricated from the same material and color as the panels. Provide accent color strips if noted as such on the plans.
 - e. Overall system depth shall be a minimum of 2” using 2 ¼” as design depth to allow for +/- shim tolerance.
 - f. 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.
2. Aluminum Extrusions
 - a. Sub-frame members shall be extruded from 6063 aluminum alloy.

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. WEATHER RESISTIVE BARRIER (WRB)

1. Install the system over a WRB appropriate for the application behind a rain screen cladding system specified elsewhere.
2. Treat system penetrations (fasteners, etc.) through the WRB according to barrier manufacturer's recommendations.
3. Provide tape, flashing or other products which are approved by the barrier manufacturer as required to properly drain the wall panel system.

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.
4. Fabricate and install flashing in accordance with SMACNA standards.

D. MISCELANEOUS MATERIALS

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

2.04 PANEL FABRICATION

A. TOLERANCES

1. 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.
2. Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.
3. Fabricate panels with sharply cut edges, with no displacement of the aluminum sheets or protrusion of the core material.
4. Fabricate panel system to dimension, size, and profile indicated on the drawings based on a design temperature of 70°F.
5. 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 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 re-fabrication, 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: ¼" 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.

Part 4: END OF SECTION