

SECTION 07 42 13
COMPOSITE METAL WALL PANELS

PART I: GENERAL

I.01 SCOPE

- A. Section Includes
 - 1. MCM - Fire Resistant Composite Metal Panels
 - 2. Panel systems requirements of composite fire resistive panels including exterior and interior installation assemblies, components, and accessories.
- B. Related Sections: Section(s) related to this section include:
 - 1. Division 05 Metal Framing Sections
 - 2. Division 07 Air and Vapor Barrier
 - 3. Division 07 Flashing and Trim Sections
 - 4. Division 07 Joint Treatment Section
 - 5. Division 08 Aluminum Windows Section
 - 6. Division 08 Glass and Glazing Section
 - 7. Division 08 Curtain Wall Sections

I.02 QUALITY ASSURANCE

- A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed have either been identified by the International Building Code (IBC), local building code, or specific requirement for this building construction type.
- B. Aluminum Association (AA)
 - 1. Aluminum Design Manual
 - 2. AA-MI2C22A4I: Anodized - Clear Coating
 - 3. AA-MI2C22A44: Anodized - Color Coating
- C. American Society for Testing and Materials (ASTM) International
 - 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 D635 Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
 - 5. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference
 - 6. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Wall, and Doors By Uniform Static Air Pressure Difference
- D. American Architectural Manufacturers Associations (AAMA)
 - 1. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 - 2. AAMA 509 Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems.
- E. 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

I.03 SYSTEM DESCRIPTION

- A. Performance Requirements:

- I. Provide installed MCM system designed to withstand specified loadings while maintaining allowable deflection, thermal movement performance as defined by the Manufacturer, Fabricator, or Installer required by this section without defects, damage, or failure.
- B. Deflection and Thermal Movement: Provide installed MCM systems that have been designed to resist to wind loading, acting inward and outward.
 - I. Perimeter Framing Deflection: Deflection of panel perimeter framing member shall not exceed $L/175$ normal to plane of the wall where L is the unsupported span of the perimeter framing member.
 2. Panel Deflection: Deflection of the panel face shall not exceed $L/60$ at design load where L is the unsupported span of the panel.
 3. Anchor Deflection: At connection points of framing members to anchors, anchor deflection in any direction shall not exceed 0.0625in (1.6mm).
 4. At 150% pressure, no permanent deformation exceeding $L/1000$ or failure to structural members is permitted.
 5. Thermal Movements: Allow for free and noiseless horizontal and vertical thermal movement due to expansion and contraction of component parts over a temperature range of -20°F (-29°C) to $+180^{\circ}\text{F}$ (82.2°C) at the material surface.
 - a. Buckling, opening of joints, undue stress on fasteners, failure of sealants, or any other detrimental effects of thermal movement will not be permitted.
 - b. Fabrication, assembly and erection procedures shall take into account the ambient temperature range at the time of the respective operation.
- C. Water and Air Leakage - Provide systems that have been tested and certified to conform to the following criteria:
 - I. ASTM E283: Air Leakage - Not more than 0.06cfm per ft² of wall area (0.003L/s m²) when tested at 6.24psf (300Pa)
 2. ASTM E331: Static Water Penetration - When tested under static pressure at 12.0 psf (575 Pa) minimum, for a time period of 15 minutes. MCM systems must have:
 - a. No uncontrolled water leakage to the room side of the assembly when tested as
 3. AAMA 501.1 - Dynamic Water Penetration - When tested with a wall pressure equivalent to 12.0 psf (575 Pa) for a time period of 15 minutes, the MCM system must have:
 - a. No uncontrolled water leakage to the room side of the assembly when tested as defined by the procedure.
 4. ASTM E330 - Structural Performance - MCM system must be engineered to meet the project design loads, however the MCM system must meet or exceed the following criteria when tested to a minimum pressure of 30.0 psf (1436 Pa):
 - a. Deflections do not exceed limitations defined within the section on Deflection and
- D. Fire Performance: Where required by governing code, provide fire retardant MCM that has been evaluated and is in compliance with code requirements specified herein.
 - a. Fire Performance: Wall assemblies containing MCM System shall meet the requirements of the Intermediate Scale Multi-story test, NFPA 285, where required by code based for the design of this project.

I.04 SUBMITTALS

- A. Submit in accordance with Conditions of the Contract and Division 01 Submittal Procedures Sections.
- B. Submit product data, including manufacturer's brochures and Spec-Data Sheets.
- C. 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.

- D. Samples: Submit selection and verification samples for finishes, colors and textures.
 - 1. Selected Samples: Manufacturer's color charts or chips illustrating full range of colors, finishes and patterns available for composite metal panels with factory applied finishes.
 - 2. Verification Samples:
 - a. Panel System Assembly: Two samples of each assembly 12in x 12in (304mm x 304mm)
 - b. Two samples of each color in coil coated, or draw down samples on aluminum substrate, not less than 3in x 4in (76mm x 102mm)
- E. Quality Assurance Submittals - Submit the following:
 - 1. Product Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties, or a third-part listing documenting compliance to a comparable code section.
 - 2. Product Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical requirements.
 - 3. Manufacturer's Product Literature
 - 4. Manufacturer's Field Reports: Manufacturer's field reports.
- F. Closeout Submittals - Submit the following:
 - 1. Warranty: Warranty documents specified.

I.05 QUALITY ASSURANCE

- A. MCM Manufacturer Qualifications
 - 1. MCM Manufacturer Qualifications: Company with a minimum of 10 years of continuous experience manufacturing MCM of the type specified.
 - a. Able to provide specified warranty on finish.
 - b. Able to provide a list of other projects of similar size, including approximate date of installation and name of Architect for each.
 - c. Able to produce the composite material without outsourcing of the fire-resistant core manufacture and compounding, or panel bonding process.
- B. MCM Fabricator Qualifications
 - 1. MCM system fabricator will have at least (3) years of continuous documented experience fabricating the panel material type specified.
 - 2. MCM system fabricator will have been in business under its present name for at least five (5) years prior to the start of this project.
 - 3. MCM system fabricator will be capable of providing field service representation during construction.
 - 4. MCM system fabricator will not have filed for protection from creditors under state or federal insolvency or debtor relief statutes or codes
- C. MCM System Installer Qualification
 - 1. MCM system fabricator will have been in business under its present name for at least five (5) years prior to the start of this project and have experience with similar sized MCM system projects.
 - 2. MCM system fabricator will be capable of providing field service representation during construction.
 - 3. The MCM System Installer must be an approved installer by the MCM Fabricator for the installation of their MCM System and have undergone proper training for the specified system thereof.
- D. Mock-up
 - 1. At location on building and to extent directed by Architect, install areas of specified wall panels, support framing, flashing, trim and accessories to show:
 - a. Substrate preparation
 - b. Support framing, furring, and flashing
 - c. Clearances and gaps between members

- d. Fastening methods
 - e. Trim details
 - f. Joint protection
 - g. Workmanship
- 2. Prepare mock-up for Architect's approval before start of wall panel work. Prepare additional mock-ups, if required by Architect, until approved.
- 3. Maintain approved mock-up during construction to establish required standard of workmanship and basis of comparison for installation of wall panel work. Approved mock-up may remain as part of finished work.
- E. Installation Documents On-Site
 - I. Maintain copies of installation instructions, approved submittal and other execution related documents on-site; make available as needed to confirm proper installation.
- F. [____]

I.06 DELIVERY, STORAGE & HANDLING

- A. Adhere to manufacturer's ordering instructions and lead time requirements to avoid delays.
- B. Deliver materials to fabricator in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Protect finish of panels by applying heavy-duty removable plastic film during production.
- D. After fabrication, package composite wall panels for protection against transportation damage.
- E. Store material in accordance with manufacturer's guidelines.
 - I. Exercise care unloading, storing and installing panels to prevent bending, warping, twisting and surface damage to the factory applied finish.
 - 2. Store materials protected from exposure to harmful weather conditions, out of direct sunlight when unpackaged, and at temperatures not to exceed 120°F.
 - 3. Protect panels from moisture and condensation with tarpaulins or other suitable weather tight covering installed to provide ventilation.
 - 4. Slope panels to ensure positive drainage of any accumulated water.
 - 5. Avoid contact with any other materials that might cause staining, denting or other surface damage to the factory applied finish.

I.07 WARRANTY

- A. Manufacturer's Warranties: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.
- B. Warranty Periods:
 - I. Panel Integrity: 10 Years commencing on Date of Substantial Completion.
 - 2. Painted Finish: 30 Years commencing on Date of Substantial Completion.
 - 3. MCM Natural Metals: No finish warranty

PART 2: PRODUCTS

2.01 FIRE RESISTANT METAL COMPOSITE MATERIAL (MCM)

- A. Fire Resistant Metal Composite Material (MCM) Manufacturer
 - I. Alfrex, Inc. 943 Gainesville Hwy. Bldg 100-4000, Buford, GA 30518
Phone - (470) 589-7449
Website - <http://alfrexusa.com>

2.02 BASIS OF DESIGN

- A. Alfrex FR - Metal Composite Material
- B. Description: Two sheets of aluminum sandwiching a solid core of extruded thermoplastic fire-resistant material formed in a continuous process with no glues or liquid adhesives between dissimilar materials. The core material shall be free of voids and/or air spaces and not contain foamed insulation material. Products that are laminated sheet by sheet in a batch process using glues or adhesives between materials shall not be acceptable.
- C. MCM Thickness:
 - 1. 4mm (0.157in)
 - 2. 6mm (0.236in)
- D. MCM Face Sheets:
 - 1. Front Face: 0.5mm (0.020in) nominal
 - 2. Fire Resistant Mineral Core:
 - a. 3.0mm (0.117in) nominal - 4mm FR panel
 - 3. Back Face: 0.5mm (0.020in) nominal
- E. Aluminum Alloy: 3003-H16
- F. Weight:
 - 1. 4mm: 1.51lb/ft² (7.37kg/m²)
 - 2. 6mm: 2.13lb/ft² (10.40kg/m²)
- G. Finishes
 - 1. Coil coated KYNAR® 500 or HYLAR® 5000 based Polyvinylidene Fluoride (PVDF) or Fluoroethylene - Alkyl Vinyl Ether (FEVE) resin in conformance with the following general requirements of AAMA 2605.
 - a. Color: (Select one of the following)
 - 1) Standard color as selected by the owner / architect / engineer from manufacturer's standard, color selection.
 - a) 2 Coat Solid
 - b) 2 Coat Mica
 - c) 3 Coat Metallic
 - d) [____]
 - 2) Custom color to be matched by the panel supplier
 - a) 2 Coat Solid
 - b) 2 Coat Mica
 - c) 3 Coat Metallic
 - d) [____]
 - 3) Clear coat over hairline aluminum substrate.
 - b. Dry Film Thickness:
 - 1) 2 Coat: 1.0mil (±0.2mil)
 - 2) 3 Coat: 1.0mil (±0.2mil) + 0.50mil (±0.05mil)
 - c. Hardness: ASTM D3383; HB minimum using Eagle Turquoise Pencil
 - d. Impact Resistance
 - 1) Test method: ASTM D2794; Gardner Variable Impact Tester with 5/8" mandrel
 - 2) Coating shall withstand reverse impact of 1.5in/lbs per mil substrate thickness
 - 3) Coating shall adhere tightly to metal when subjected to #600 Scotch Tape pick-off test. Slight minute cracking permissible. No removal of film to substrate.
 - e. Adhesion:

- l) Test Method: ASTM D3359: Coating shall not pick-off when subjected to an 11in x 11in x 1/16in grid and taped with #600 Scotch Tape.
- f. Humidity Resistance:
 - l) Test Method: ASTM D2247
 - 2) No formation of blisters when subject to condensing water fog at 100% relative humidity and 100°F for 4000 hours.
- g. Salt Spray Resistance:
 - l) Test Method: ASTM B117; Expose coating system to 4000 hours, using 5% NaCl solution.
 - 2) Corrosion creepage from scribe line: 1/16" max.
 - 3) Minimum blister rating of 8 within the test specimen field.
- h. Weather Exposure:
 - l) Outdoor:
 - a) 10 Year exposure at 45° angle facing south Florida exposure.
 - b) Maximum color change of 5 Delta E units as calculated in accordance with ASTM D2244
 - c) Minimum chalk rating of 8 in accordance with ASTM D4214
 - d) No checking, crazing, adhesion loss
- i. Chemical Resistance:
 - l) ASTM D1308 utilizing 10% Muriatic Acid for an exposure time of 15 minutes. No loss of film adhesion or visual change when viewed by the unaided eye.
 - 2) ASTM D1308 utilizing 20% Sulfuric Acid for an exposure time of 18 hours. No loss of film adhesion or visual change when viewed by they unaided eye.
 - 3) AAMA 2605 utilizing 70% reagent grade Nitric Acid vapor for an exposure time of 30 minutes. Maximum color change of 5 Delta E units as calculated in accordance with ASTM D2244.

2.03 ALTERNATES

- A. Base Bid/Contract Manufacturer: [Specify base bid/contract manufacturer].
 - l. Product: [Specify product base bid/contract brand/trade name with product attributes and characteristics].
- B. Alternate No. [Specify #]: [Specify alternate manufacturer].
 - l. Product: [Specify product alternate brand/trade name with product attributes and characteristics].
- C. Alternate No. [Specify #]: [Specify alternate manufacturer].
 - l. Product: [Specify product alternate brand/trade name with product attributes and characteristics].

2.04 MCM PRODUCT PERFORMANCE

- A. Bond Integrity: Tested for resistance to delamination as follows:
 - l. Peel Strength (ASTM D1781): 22.5in-lb/in (100N-m/m) minimum.
 - 2. No degradation in bond performance after 8 hours of submersion in boiling water at 212°F (100°C).
 - 3. No degradation in bond performance after and 21 days of immersion in water at 70°F (21°C).
 - 4. Thermally bonded to the fire-resistant core material in a continuous process under tension.
- B. Fire Performance:
 - l. Flamespread, ASTM E84: <25.
 - 2. Smoke Developed, ASTM E84: <450.
 - 3. Ignition Temperature:
 - a. Flash, ASTM D1929: 716°F (380°C)
 - b. Ignition: 752°F (400°C)
 - 4. Flammability, Exterior, Non-load-bearing wall assemblies and panels, NFPA 285: Pass.
- C. Production Tolerances:
 - l. Width: ± 0.080in (2.0mm)

2. Length: + 0.197in (5mm)
3. Thickness
 - a. (4mm Panel): ± 0.008 in (0.2mm)
 - b. (6 mm Panel): +/- 0.012 inch (0.3 mm)
4. Bow: Maximum 0.2% length or width.
5. Squareness: Maximum 0.157in (4mm)

2.05 FABRICATION

- A. General: Shop fabricate to sizes and joint configurations indicated on drawings.
 1. Fabricate panels to dimensions indicated on drawings based on an assumed design temperature of 70°F (21°C). Allow for ambient temperature range at time of fabrication.
 2. Formed MCM panel lines, breaks and angles to be sharp and true, with surfaces that are free from warp or buckle.
 3. Fabricate panels with sharply cut edges and no displacement of face sheet or protrusion of core.
- B. Fabrication Tolerances: Shop-fabricate panels to sizes and joint configurations indicated on drawings.
 1. Width: ± 0.079 in [± 2.0 mm] @ 70°F (21°C)
 2. Length: ± 0.079 in [± 2.0 mm] @ 70°F (21°C)
 3. Squareness: ± 0.079 in [± 2.0 mm] @ 70°F (21°C)

PART 3: EXECUTION

3.01 METAL PLANT FABRICATOR AND INSTALLER INSTRUCTIONS

- A. Compliance: Comply with provide product data, including product technical bulletins, product catalog installation instructions and product carton instructions.

3.02 EXAMINATION AND PREPARATION

- A. Verify that conditions of substrates previously installed under other sections or divisions are acceptable for metal plate panel rainscreen system installation. Documentation should be provided indicating any conditions detrimental to the performance or installation of the metal plate wall panel rainscreen system.
 1. Notify [Architect] of unacceptable conditions once discovered.
 2. Proceed with preparation and installation only after unacceptable conditions have been corrected.
- B. Field Measurements
 1. If required per project conditions, field measurements of the site condition are to be taken prior to beginning fabrication work and notification of any material modifications and resulting schedule adjustment shall be formally documented.
 2. Field measurements are to be made once all substrate and adjacent materials are installed, verifying the locations of wall framing members and wall opening dimensions before commencement of installation. Indicate measurements on the "As Build Shop Drawings".
- C. Project Schedule: Provisions in the project schedule must accommodate the time interval between field measurements and fabrication/installation.
- D. Miscellaneous Framing: Install miscellaneous MCM system support members and anchorage according to MCM System written instructions and drawings supplied by the MCM System Fabricator.

3.03 INSTALLATION

- A. General:
 1. Install panels plumb, level and true in compliance with fabricator's recommendations.
 2. Anchor panels securely in place in accordance with fabricator's approved shop drawings.
 3. Comply with fabricator's instructions for installation of concealed fasteners and with provisions of

Section 07 90 00 for installation of joint sealers.

4. Installation Tolerances: Maximum deviation from horizontal and vertical alignment of installed panels: 0.25in in 20ft (6.4mm in 6.1m), noncumulative.
5. Separate contact of dissimilar metals with bituminous paint, approved plastic shims, or other approved methods as defined within the Aluminum Design Manual (ASD). Use gasketed or approved coated fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.

B. Related Products

- I. General: Refer to other related sections in Related Sections paragraph specified herein for related materials, including cold-form metal framing, flashing and trim, joint sealants, aluminum windows, glass and glazing and curtain walls.

3.04 FIELD QUALITY REQUIREMENTS

- A. Field Quality Control: Comply with panel system fabricator's recommendations and guidelines for field forming of panels.
- B. Field Quality Control: When required by contract, mock-up shall be constructed and tested at the expense of the Architect/Owner/General Contractor.
- C. Testing Agency: If required, the Owner shall engage a qualified testing agency to perform tests and inspections.
- D. Fabricator's Field Services: Upon Owner's request, provide fabricator's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with fabricator's instructions.

3.05 ADJUSTING AND CLEANING

A. Adjusting

1. Remove and replace panels damaged beyond repair as a direct result of the panel installation. After installation, panel repair and replacement are the responsibility of the General Contractor.
2. Removal of panels damaged by other trades is the responsibility of the General Contractor.
3. Repair components of the MCM system that present with minor damage provided said repairs are not visibly apparent at a distance of 10ft (3m) from the surface at a 90° angle per AAMA 2605.
4. Remove and replace components of the MCM system damage beyond repair.
5. Remove protective film immediately after installation of MCM and immediately prior to completion of the MCM system work. Protective film intentionally left in place after panel installation on any elevation at the direction of the General Contractor, is the responsibility of the General Contractor.
6. Any additional protection, after installation, is the responsibility of the General Contractor.
7. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
8. Promptly remove from the job site any damaged MCM panels, protective film, and other debris attributable to MCM system and installation, and legally dispose of said materials.

B. Cleaning

- I. After MCM system installation remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.

3.06 PROTECTION

- A. Protect installed products from damage during subsequent construction work until final inspection and acceptance by Owner
- B. [____]

END OF SECTION