

SECTION 07 42 13
COMPOSITE METAL WALL PANELS

PART 1: GENERAL

1.01 SCOPE

- A. Section Includes
 - 1. MCM - Fire resistant composite metal panels.
 - 2. Panel system 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

1.02 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-M12C22A41: Anodized - Clear Coating
 - 3. AA-M12C22A44: 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 Association (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

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Provide installed MCM system designed to withstand specified loadings while maintaining allowable deflection, thermal movement performance as defined by the Manufacturer.
- B. Deflection and Thermal Movement: Provide installed MCM systems that have been designed to resist to the wind loading, acting inward and outward.
 - 1. 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 0.0625 inch (1.6 mm).
 - 4. 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:
 - 1. Air Leakage, ASTM E283: Not more than 0.06 cfm per ft^2 of wall area (0.003 (L/s m^2)) when tested at 1.57 psf (0.075 kPa).
 - 2. Water Penetration: No water infiltration under static pressure when tested in accordance with ASTM E331 at a differential of 10% of inward acting design load, 6.24 psf (0.299 kPa) minimum, after 15 minutes.
 - a. Water penetration is defined as the appearance of uncontrolled water in the wall.
 - b. Wall design shall feature provisions to drain to the exterior face of the wall any leakage of water at joints and any condensation that may occur within the construction.
- D. Structural: Provide systems that have been tested in accordance with ASTM E330 at a design pressure of [specify design pressure in psf (kPa)] and have been certified to be without permanent deformation or failures of structural members.
- E. Fire Performance: Provide composite fire rated panels that have been evaluated and are in compliance with regulatory code agency requirements specified herein.

1.04 SUBMITTALS

- A. Submit in accordance with Conditions of the Contract and Division 01 Submittal Procedures Section.
- B. Submit product data, including manufacturer's brochures and Spec-Data Sheets 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 12 inch \times 12 inch (304 \times 304 mm) 4

- b. Two samples of each color in coil coated, or drawdown samples on aluminum substrate, not less than 3 inches × 4 inches (76 mm × 102 mm).
- 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-party 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.

1.05 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.
 - c. Able to provide specified warranty on finish.
 - d. Able to provide a list of other projects of similar size, including approximate date of installation and name of Architect for each.
 - e. 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 statues or codes
- C. MCM System Installer Qualifications
 - 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
 - f. Support framing, furring, and flashing
 - g. Clearances and gaps between members
 - h. Fastening methods
 - i. Trim details
 - j. Joint protection

k. 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

1. Maintain copies of installation instructions, approved submittals and other execution related documents on-site; make available as needed to confirm proper installation.

F. [___]

1.06 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.
 1. 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 degrees 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.

1.07 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:
 1. 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
 4. Anodized Finish: 5 years commencing on Date of Substantial Completion.

PART 2: PRODUCTS

2.01 FIRE RESISTANT METAL COMPOSITE MATERIAL (MCM)

- A. Fire Resistant Metal Composite Material (MCM) Manufacturer
 - 1. Alfrex, LLC, 943 Gainesville Hwy, Building 100- 4000, Buford, GA 30518; Phone (470) 589-7449; Website: <http://alfrexusa.com/>; Email: alfrex@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 (0.157 inch)
 - 2. 6mm (0.236 inch)
- D. MCM Face Sheets:
 - 1. Front Face: 0.5mm (0.020") nominal
 - 2. Fire Resistant Mineral Core:
 - a. 3.0 mm (0.117 inch) nominal – 4mm FR panel
 - b. 5.0 mm (0.197 inch) nominal – 6mm FR panel
 - 3. Back Face: 0.5mm (0.020") nominal
- E. Aluminum Alloy: 3003-H14
- F. Weight:
 - 1. 4mm: 1.51 lb/ft² (7.37 kg/m²)
 - 2. 6mm: 2.13 lb/ft² (10.40 kg/m²)
- G. Finishes
 - 1. Coil coated KYNAR® 500 or HYLAR® 5000 based Polyvinylidene Fluoride (PVDF) or Fluoro Ethylene - 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
 - a) 2-Coat Mica
 - b) 3-Coat Metallic
 - c) [___]
 - 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) + 0.50 mil (± 0.05 mil).

- c. Hardness: ASTM D-3383; HB minimum using Eagle Turquoise Pencil.
- d. Impact Resistance
 - 1) Test method: ASTM D_2794; Gardner Variable Impact Tester with 5/8" mandrel.
 - 2) Coating shall withstand reverse impact of 1.5"/pounds 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:
 - 1) Test Method: ASTM D-3359: Coating shall not pick off when subjected to an 11" x 11" x 1/16" grid and taped with #600 Scotch Tape.
- f. Humidity Resistance:
 - 1) Test Method: ASTM D-2247.
 - 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:
 - 1) Test Method: ASTM B-117; 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:
 - 1) Outdoor:
 - a) Ten-year exposure at 45° angle facing south Florida exposure.
 - b) Maximum color change of 5 Delta E units as calculated in accordance with ASTM D-2244.
 - c) Minimum chalk rating of 8 in accordance with ASTM D-4214.
 - d) No checking, crazing, adhesion loss.
- i. Chemical Resistance:
 - 1) ASTM D-1308 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 D-1308 utilizing 20% Sulfuric Acid for an exposure time of 18 hours. No loss of film adhesion or visual change when viewed by the 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 D-2244.

2.03 ALTERNATES

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

2.04 MCM 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 at 212 degrees Fahrenheit, (100 degrees Celsius).
 - c. No degradation in bond performance after and 21 days of immersion in water at 70 degrees Fahrenheit, (21 degrees Celsius).
 - d. Thermally bonded to the fire-resistant core material in a continuous process under tension.
2. Fire Performance:
 - a. Flamespread, ASTM E84: <25.
 - b. Smoke Developed, ASTM E84: <450.
 - c. Surface Flammability, Modified ASTM E108: Pass.
 - d. Ignition Temperature:
 - 1) Flash, ASTM D1929: 716 degrees F (380 degrees C).
 - 2) 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: +/- 0.080 inch (2.0 mm)
 - b. Length: + 0.197 inch (5 mm)
 - c. Thickness (4 mm Panel): +/- 0.008 inch (0.2 mm)
 - d. Thickness (6 mm Panel): +/- 0.012 inch (0.3 mm)
 - e. Bow: Maximum 0.2% length or width.
 - f. Squareness: Maximum 0.157 inch (4 mm)

2.05 FABRICATION

- A. General: Shop fabricate to sizes and joint configurations indicated on drawings.
 1. Fabricate panels too 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.
 4. Width: +/- 0.079 inch [+/- 2 mm] @ 70°F (21°C)
 5. Length: +/- 0.079 inch [+/- 2 mm] @ 70°F (21°C)
 6. Squareness: +/- 0.079 inch [+/- 2 mm] @ 70°F (21°C)

PART 3: EXECUTION

3.01 MCM FABRICATOR/INSTALLER INSTRUCTIONS

- A. Compliance: Comply with manufacturer's 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 MCM system installation. Documentation should be provided indicating any conditions detrimental to the performance or installation of the MCM 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 Built 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.

3.04 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: 0.25 inch in 20 feet (6.4 mm in 6.1 m), noncumulative.
 - 5. Separate contact of dissimilar metals with bituminous paint, approved plastic shims, or other approved methods as defined within the Aluminum Design Manual (ADM). Use gasketed or approved coated fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.
- B. Related Products
 - 1. 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.

3.05 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.

3.06 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 10 feet (3m) from the surface at a 90° angle per AAMA 2605.
4. Remove and replace components of the MCM system damaged 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 jobsite any damaged MCM panels, protective film, and other debris attributable to MCM system and installation, and legally dispose of said materials.

B. CLEANING

1. 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