

**SECTION 07 42 13
COMPOSITE METAL WALL PANELS**

PART I: GENERAL

I.01 SCOPE

- A. Section Includes
 - 1. MCM – Fire-Resistant Zinc Composite Material Wall panels with Zinc-Alloy skins.
 - 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

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. American Society for Testing and Materials (ASTM) International
 - 1. ASTM B69 Standard Specification for Rolled Zinc
 - 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 E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
 - 5. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Wall, and Doors by Uniform Static Air Pressure Difference
 - 6. ASTM E283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

- C. 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.

- D. 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:
 - 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 ft² of wall area (0.003 (L/s m²) 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. Provide a pressure equalized rain screen system tested and passed to AAMA 508 and AAMA 509 with MCM, and tested in accordance with ASTM E330 at a design pressure of [specify design pressure in psf (kPa)] and 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.

I.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 x 12 inch (304 x 304 mm)

- b. Two samples of sample Zinc MCM sheets, or single-skin zinc sheet used in the manufacture thereof, not less than 3 inches x 4 inches (76 mm x 102 mm).
- E. Quality Assurance Submittals:
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.

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 bond integrity.
 - 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 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
 - 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
1. Maintain copies of installation instructions, approved submittals 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.
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.

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:
1. Panel Integrity: 10 years commencing on Date of Substantial Completion.
 2. Zinc-Alloy Natural Metal: No finish warranty.

PART 2: PRODUCTS

2.01 FIRE RESISTANT METAL COMPOSITE MATERIAL (MCM)

- A. Fire Resistant Metal Composite Material (MCM) Manufacturer:
 - 1. Alfrex, Inc. 943 Gainesville HWY, Building 100, Suite 4000, Buford, GA 30518; Phone (470) 589-7449; Website: <http://alfrexusa.com/>; Email: alfrex@alfrexusa.com

2.02 BASIS OF DESIGN

- A. Alfrex FR Zinc | Zinc Composite Material (ZCM)
- B. Description: Two sheets of pre-weathered zinc 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)
- D. Zinc-Alloy: > 99.995% Zinc
- E. Zinc-Alloy Face Sheets:
 - 1. Front Face: 0.7mm (0.028") nominal, 0.5mm (0.020") nominal
 - 2. Fire Resistant Mineral Core:
 - a. 2.6mm(0.102inch),3.0mm(0.118inch)
 - 3. Back Face: 0.7mm (0.028") nominal, 0.5mm (0.020") nominal
- F. Finishes
 - 1. Pre-Weathered Finishes
 - a. elZinc® Crystal
 - b. elZinc® Slate
 - c. elZinc® Graphite
 - d. elZinc® Oliva
 - e. elZinc® Lava
 - f. RHEINZINK-pre-PATINA Graphite Gray (JY-Z100)
 - g. RHEINZINK-pre-PATINA Blue Gray (JY-Z110)

2.03 ALTERNATES

- A. Product Substitutions: No substitutions permitted

2.04 MCM PRODUCT PERFORMANCE

- A. Bond Integrity: Tested for resistance to delamination as follows:
 - 1. Peel Strength (ASTM D1781): 22.5 in-lb/in (100 N-m/m) minimum.
 - 2. No degradation in bond performance after 8 hours of submersion in boiling water at 212 degrees Fahrenheit, (100 degrees Celsius).
 - 3. No degradation in bond performance after and 21 days of immersion in water at 70 degrees Fahrenheit, (21 degrees Celsius).
 - 4. Thermally bonded to the fire-resistant core material in a continuous process under tension.
- B. Fire Performance of Core Material
 - 1. Flame spread Index: ASTM E84 <25
 - 2. Smoke Developed: ASTM E84 <450
- C. Fire Performance of Assembly
 - 1. Exterior, non-load-bearing wall assembly must meet the requirements of NFPA 285 with standard 4mm thick Alfrex FR MCM
- D. Production Tolerances:
 - 1. Width: +/- 0.080 inch (2.0 mm)
 - 2. Length: + 0.197 inch (5 mm)
 - 3. Thickness (4 mm Panel): +/- 0.008 inch (0.2 mm)
 - 4. Bow: Maximum 0.2% length or width.
 - 5. Squareness: Maximum 0.157 inch (4 mm)

2.05 COMPOSITE METAL PANEL SYSTEM

- A. Rear Ventilated Pressure Equalized Rain Screen / Dry Joint System
 - 1. Rainscreen panel system to have a nominal two-inch depth with shop applied, concealed continuous perimeter extrusions employing clips with sliding capability for exact location over supports, and configured to allow for thermal movement in all four directions. Fixed attachment systems that do not allow free movement are not permissible.
 - 2. Vertical and horizontal rainscreen panel system joints to be 1/2" wide with no exposed sealants permitted in the panel to panel joinery. Caulking is allowed only for non-exposed areas (e.g. top of roof coping).
 - 3. Panel joints to utilize an integral spline of Alfrex 4mm FR ZCM. Splines to be held in place by slots in the perimeter panel extrusions. Bonding of metal material within the joinery to simulate an encapsulated spline is not permissible.
 - 4. All fasteners used to attach the ZCM sheet to the extrusions to be 300 series stainless steel or comparable, and countersunk.
 - 5. All internal weeps baffled and aligned vertically
 - 6. All panel corners reinforced with aluminum angles with routed folds at panel perimeters reinforced by the continuous extrusion system.
 - 7. Panel system assembly to be provided in panel modules dimensioned as indicated on the contract drawings (up to 46" in the short direction and up to 144" in the long direction). Weather sealants and underlayment to be applied per manufacturer's standards and published guidelines to meet performance standards.
 - 8. Panel system to be applied over properly installed Vaproshield Revealsheld SA vapor barrier as indicated.

2.06 ACCESSORIES

- A. Flashing and Trim
 - 1. Shop or field fabricated zinc-alloy sheets from the same manufacturer as the ZCM material to match the surface appearance of adjacent metal wall panels.
 - 2. Minimum thickness: 0.7mm (24 ga)
 - 3. Weather sealants and underlayment to be applied per manufacturer's standards and published guidelines to meet performance standards.
- B. Clips and Fasteners: Provide 300 series stainless steel concealed clips and stainless-steel fasteners; or other suitable fasteners designed to meet the load requirements as specified by architect and confirmed by engineering calculations.
- C. Solder: Lead solder containing 50% tin and 50% lead in accordance with ASTM B32 – 08 (or latest edition) or lead-free solder. Flux: Felder ZD-Pro or equal.

2.07 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 inch [+/- 2 mm] @ 70°F (21°C)
 - 2. Length: +/- 0.079 inch [+/- 2 mm] @ 70°F (21°C)
 - 3. 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 (ASD). 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.

3.07 PROTECTION

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

END OF SECTION