SECTION 07 42 16

METAL COMPOSITE MATERIAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Metal composite material (MCM) wall panels.
2. Metal composite material (MCM) canopy panels.

1.2 ACTION SUBMITTALS

A. Product Data: Technical data including construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:
1. Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 3 inches per 12 inches (1:4).

C. Delegated Design Submittal: Submit for metal composite material wall panel systems indicated to comply with performance requirements and design criteria, analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples: Submit each type of exposed finish required, 12 inches (305 mm) long by actual panel width. Include fasteners, closures, and other metal composite material panel accessories.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: Submit qualifying data for Installer.

B. Test and Evaluation Reports:
1. Product Test Reports: For each MCM system, for tests performed by qualified testing agency.
a. MCM Panel Manufacturer's Material Test Reports: Certified test reports showing compliance with specific performance or third-party listing documenting compliance in accordance with the IBC.
b. Fabricator's MCM System Test Reports: Certified test reports showing system compliance with specific performance or third-party listing documenting compliance in accordance with the IBC.

1) DBVC System: Tested to AAMA 509.

2. Research Reports: For MCM systems, from ICC-ES showing compliance with NFPA 285.

C. Field Quality-Control Submittals:

1. Field quality control reports.

D. Sample Warranties: Submit proposed warranties for review.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: Submit metal composite material panels data to include in maintenance manuals.

B. Warranty Documentation:

1. Manufacturers' special warranties.
2. Installer's special warranties.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Fabricator: Certified MCM fabricator by the Metal Construction Association.
2. Installer: Fabricator of MCM system.

B. Source Limitations: Obtain each type of metal faced composite wall panel from single source from single manufacturer.

C. Mockups: Build mockups of each type of metal panel to verify selections and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical metal composite material panel assembly as shown on Drawings, including corner, soffits, supports, attachments, and accessories. The mockup shall be a minimum of 200 square feet, include all related accessories and incorporate an exterior corner and termination.
2. Water Spray Test: Conduct water-spray test of mockup of metal composite material panel assembly, testing for water penetration according to AAMA 501.2.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.

B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal composite material panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal composite material panels to ensure dryness, with positive slope for drainage of water. Do not store metal composite material panels in contact with other materials that might cause staining, denting, or surface damage.

D. Retain strippable protective covering on metal composite material panels during installation.

1.7 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation when existing and forecasted weather conditions permit assembly of metal composite material panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

A. Coordinate metal composite material panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

B. Coordinate panel types and installation requirements for both wall and canopy conditions. Provide the appropriate air barrier for each type. Refer to Section 07 27 26 Fluid Applied Membrane Air Barriers for wall conditions and self adhering sheet for canopy conditions as contained herein.

1.9 WARRANTY

A. Panel Integrity Warranty: Written warranty signed by Manufacturer and installer in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: 10 years from date of Substantial Completion.

B. Panel Finish: Written warranty signed by Manufacturer in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

C. MCM System Warranty: Fabricator's standard form in which manufacturer agrees to repair or replace components of MCM systems that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer with experience in the design of metal composite wall panels to design and coordinate the cladding assembly using performance requirements and design criteria indicated.

B. Seismic Performance: No failure or deterioration of the system when laterally racked to 3/4 inch in both directions and repeated for three cycles in accordance with AAMA 501.4. System must pass the static water test as described in ASTM E331 following the seismic racking.

C. Structural Performance: MCM systems to withstand the effects of the following loads, based on testing in accordance with ASTM E330/E330M:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.
   3. Deflection Limits: For wind loads, no greater than 1/240 of the span.
   4. Seismic Loads: Indicated on Drawings.
   5. Other Design Loads: Indicated on Drawings.

D. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at specified test-pressure difference:
   1. Test Pressure Difference: 1.57 lbf/sq. ft. (75 Pa) and 6.24 lbf/sq. ft. (300 Pa).

E. Air Infiltration: Panel system shall not have air infiltration rate more than 0.12 cfm per sq. ft. (0.6 L/s per sq. m) of fixed wall area when tested in accordance with ASTM E 283 at static air pressure differential of 1.57 lbf/sq. ft. (75 Pa**)** when tested as part of AAMA 508 test protocol.

F. Water Penetration under Static Pressure: No water penetration when tested in accordance with ASTM E331 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft..

G. Provide DBVC system with V-axis classification number greater than or equal to W-axis classification number in accordance with AAMA 509.

H. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), material surfaces.

I. Fire Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL Fire Resistance Directory or from the listings of another qualified testing agency.

J. Fire Propagation Characteristics: Metal composite material wall panel system passes NFPA 285 testing.

K. Surface Burning Characteristics: Provide wall panels with a flame-spread index of 25 or less and a smoke developed index of 450 or less, per ASTM E 84.

L. Bond Integrity: When tested for bond integrity, ASTM D 1781 (simulating resistance to panel delamination), there shall be no adhesive failure of bond between core and skin nor cohesive failure within core, based on following values:

1. Bond Strength: 214 lbs./sq. in. (Vertical Pull)
2. Peel Strength:
   a. 22.5 inch pound/inch dry.
   b. 22.5 inch pound/inch after 8 hours in water at 200 degrees F.
   c. 22.5 inch pound/inch after 21 days soaking in water at 70 degrees F.

2.2 METAL COMPOSITE MATERIAL WALL PANELS

A. Metal Composite Material (MCM) Wall Panel Systems: Provide factory formed and assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories required for weathertight system.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. ALPOLIC Materials; Mitsubishi Chemical Composites; ALPOLIC/fr.
   b. ALUCOBOND; 3A Composites USA, Inc; ALUCOBOND Plus.
   c. Alucoil North America; larson FR.
   d. Arconic; Reynobond FR.

B. Aluminum Faced Composite Wall Panels: Formed with 0.020 inch (0.50 mm) thick, coil coated aluminum sheet facings.

1. Panel Thickness: 0.157 inch (4 mm).
2. Core: Fire retardant (FR).
3. Bond Strength: 22.5 in-lb/in. when tested for bond integrity in accordance with ASTM D1781.
4. Fire Performance: Flame-spread index less than 25 and smoke-developed index less than 450, in accordance with ASTM E84 or UL 723.
5. Exterior Finish: Three coat fluoropolymer.
   a. Color: Selected by Architect [from manufacturer’s full range].

C. Attachment Assembly Components: Formed from extruded aluminum.

D. Attachment Assembly: Rainscreen principle system.

E. Air Barriers:

1. Air barriers for wall conditions: Refer to Section 07 27 26 Fluid Applied Membrane Air Barriers.
2. Air barriers for canopy conditions: Self Adhering, High Temperature Sheet; Minimum 30 mils thick, consisting of a slip resistant polyethylene or polypropylene film top surface laminated to a layer of butyl or SBS modified asphalt adhesive, with release paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1) Carlisle Coatings & Waterproofing Inc.
        2) Carlisle Residential; a division of Carlisle Construction Materials.
        3) GCP Applied Technologies Inc.
        4) Henry Company.
        5) Owens Corning.
        6) Polyguard Products, Inc.
        7) Protecto Wrap Company.

F. Miscellaneous Materials:

1. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide sections required for support and alignment of metal composite material panel system.
2. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.
3. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.
4. Panel Fasteners: Self tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
5. Panel Sealants: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal composite material panels and remain weathertight; and as recommended in writing by metal composite material panel manufacturer.

2.3 FABRICATION

A. Fabricators: Subject to compliance with requirements, provide products fabricated by one of the following:
   1. Advanced Exterior Systems.
   2. East Coast Metal Systems, Inc.
   3. Metal Design Systems.
   4. NOW Specialties Inc.
   5. Sobotec Ltd.
   6. Universe Corporation.

B. Fabricate and finish metal composite material panels and accessories at the factory, using procedures and processes necessary to comply indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

C. Fabricate metal composite material panel joints with factory installed captive gaskets or separator strips that provide a weathertight seal and prevent metal to metal contact, and that minimize noise from movements.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA Architectural Sheet Metal Manual that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Seams for Aluminum: Fabricate nonmoving seams with flat lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
   3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat lock seams. Tin edges to be seamed, form seams, and solder.
   4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
      a. Size: As recommended by SMACNA Architectural Sheet Metal Manual or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.4 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Aluminum Panels and Accessories:

1. Three Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with requirements for installation tolerances, metal composite material panel supports, and conditions affecting performance of the work.

1. Examine wall framing to verify that girts, angles, channels, studs, and structural panel support members and anchorage have been installed within alignment tolerances required by metal composite material wall panel manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal composite material wall panel manufacturer.
    a. Verify that air or water resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing in for components and assemblies penetrating metal composite material panels to verify actual locations of penetrations relative to seam locations of metal composite material panels before installation.

C. Proceed with installation after correcting unsatisfactory conditions.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal composite material panel manufacturer's written recommendations.

B. Canopy Underlayment: Apply primer to substrate in accordance with manufacturer recommendations. Comply with temperature restrictions for underlayment.

1. Apply where indicated on Drawings, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Extend underlayment into gutter trough. Roll laps with roller. Cover underlayment within 14 days.
    a. Apply over canopy surface.

b. Slip Sheet: Apply slip sheet over underlayment before installing metal composite material panels.

3.3 METAL COMPOSITE MATERIAL PANEL INSTALLATION

A. Wall Panels: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other components of the work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal composite material panels.
2. Flash and seal metal composite material panels at perimeter of all openings. Fasten with self tapping screws. Do not begin installation until air or water resistive barriers and flashings concealed by metal composite material panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal composite material panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four panel lap splice condition.
7. Align bottoms of metal composite material panels and fasten with blind rivets, bolts, or self tapping screws. Fasten flashings and trim around openings and similar elements with self tapping screws.
8. Provide weathertight escutcheons for pipe and conduit penetrating panels.

B. Canopy Panels:

1. Wet Seal Systems: Where Wet Seal horizontal and vertical joints between panels is indicated, seal adjacent metal composite material wall panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Section 07 92 00. Confirm all wet seal locations with Architect and document in submittals.

C. Fasteners, Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized steel fasteners for surfaces exposed to the interior.

D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal composite material panel manufacturer.

E. Attachment Assembly: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.

1. Include attachment to supports, panel to panel joinery, panel to dissimilar material joinery, and panel system joint seals.

F. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.

1. Wet Seal Systems: Seal horizontal and vertical joints between adjacent metal composite material wall panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Section 07 92 00.
2. Dry Seal Systems: Seal horizontal and vertical joints between adjacent metal composite material wall panels with gasket system.
3. Rainscreen Systems: Do not apply sealants to joints unless otherwise indicated.

G. Clip Installation: Attach panel clips to supports at locations, spacings, and with fasteners recommended by manufacturer. Attach routed and returned flanges of wall panels to panel clips with recommended fasteners.

1. Seal horizontal and vertical joints between adjacent panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Section 07 92 00.
2. Seal horizontal and vertical joints between adjacent metal composite material wall panels with gaskets.

H. Subgirt and Spline Installation: Install support assembly at locations, spacings, and with fasteners recommended by manufacturer. Use subgirts and splines that provide support and complete secondary drainage assembly, draining to the exterior at horizontal joints. Attach metal composite material wall panels by interlocking perimeter extrusions attached to panels with subgirts and splines. Fully engage integral subgirt and spline gaskets and leave horizontal and vertical joints with open reveal. Terminate edge of panels flush with perimeter extrusions.

1. Install wall panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.
2. Do not apply sealants to joints unless otherwise indicated.

I. Track Support Installation: Install support assembly at locations, spacings, and with fasteners recommended by manufacturer. Use horizontal tracks and vertical tracks drain channels that provide support and secondary drainage assembly, draining to the exterior at horizontal joints through drain tube. Attach metal composite material wall panels to tracks by interlocking panel edges with recommended T clips.

1. Attach routed and returned flanges of wall panels to perimeter extrusions with recommended fasteners.
2. Attach flush wall panels to perimeter extrusions by engaging panel edges and by attaching with structural silicone adhesive.
3. Install wall panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.
4. Do not apply sealants to joints unless otherwise indicated.

J. Rainscreen Principle Installation: Install using manufacturer recommended assembly with vertical channel that provides support and secondary drainage assembly, draining at base of wall. Notch vertical channel to receive support pins. Install vertical channels supported by channel brackets or adjuster angles and at locations, spacings, and with

fasteners recommended by manufacturer. Attach metal composite material wall panels by inserting horizontal support pins into notches in vertical channels and into flanges of panels. Leave horizontal and vertical joints with open reveal.

1. Install wall panels to allow individual panels to be installed and removed without disturbing adjacent panels.
2. Do not apply sealants to joints unless otherwise indicated.

K. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal composite material panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal composite material panel manufacturer; if not indicated, provide types recommended in writing by metal composite material panel manufacturer.

L. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA Architectural Sheet Metal Manual. Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (605 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal composite material wall panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m), nonaccumulative, on level, plumb, and location lines as indicated, and within 1/8 inch (3 mm) offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing agency to perform field tests and inspections. Contractor shall cooperate fully with all indicated tests and schedule testing with the identified Testing Agency. Refer to the General Requirements for additional information.

B. Water Spray Test: After installation, test area of assembly once every 10,000 sq. ft. of wall area, or fraction thereof, for water penetration according to AAMA 501.2.

C. Manufacturer's Field Service: Engage a factory authorized service representative to witness water spray test and inspect completed metal composite material wall panel installation, including accessories.

D. Metal composite material wall panels will be considered defective if they do not pass test and inspections.

E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.

B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION