SECTION 07 4243

COMPOSITE METAL WALL PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes metal composite material wall panels integrated into construction including, but not limited to:

1. Exterior wall 'belly band', soffits and canopy overhangs.

B. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section. Other Documents and Sections that directly relate to work of this Section include, but are not limited to:

1. General provisions of the Contract, including General and Supplementary Requirements in Division 00, and Division 01 Specification Sections.
2. Section 05 4000 - COLD-FORMED METAL FRAMING.
3. Section 06 1643 - GYPSUM SHEATHING.
4. Section 07 2700 - AIR BARRIER MEMBRANES.
5. Section 07 4210.11 - COMPOSITE FRAMING SUPPORT SYSTEM
6. Section 07 6200 - SHEET METAL FLASHING AND TRIM.

C. Work of this Section is subject to requirements of Section 01 4000 - QUALITY REQUIREMENTS and Section 01 3399 - CONTRACTOR'S ENGINEERING RESPONSIBILITY.

1. Work of this Section subject to gravity, seismic loads, design loads and structural loads, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
    a. Refer to Performance Requirements article herein.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings and Design Computations:

1. Engage the services of a Professional Engineer registered in Connecticut to prepare complete shop drawings and structural design computations for work of this Section. Drawings and shall bear the engineer's professional seal and signature.
    a. Note: Manufacturer's shop drawings stamped by the engineer are acceptable instead of those actually prepared by the engineer.
2. 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.
3. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2 inches per 12 inches (1:10).
4. The structural design computations shall provide a complete structural analysis of all typical and special conditions of construction, and shall certify conformance to the governing laws and building code.

C. Samples: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Metal Composite Material Panels: 3 inches by 5 inches.

1.3 CLOSEOUT SUBMITTALS

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

1.4 QUALITY ASSURANCE

A. Engineering: Provide the services of a Professional Engineer, registered in the jurisdiction of the Project, to design and certify that the work of this section meets or exceeds the performance requirements specified in this section.

B. Delegated Design Conference: Conduct, as per Section 01 3399 - CONTRACTOR'S DESIGN RESPONSIBILITY, a delegated design conference to discuss scope and requirements.

C. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer and acceptable to curtain wall manufacturer.

1. Engineering Responsibility: Preparation of data for wall panel systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.

D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical metal composite material panel assembly integrated into curtain wall framing as shown on Drawings.
2. Testing: Coordinate testing of composite wall panel mockup with curtain wall curtain wall mockup.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Design Professional specifically approves such deviations in writing.
4. Approved mockups may become part of the completed Work if undisturbed at time of Material Completion.

1.5 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 other surface damage.

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

1.6 FIELD CONDITIONS

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

1.7 COORDINATION

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

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form 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 the following:
    a. Structural failures including rupturing, cracking, or puncturing.
    b. Deterioration of metals and other materials beyond normal weathering.
2. Warranty Period: Two years from date of Material Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form 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: Twenty (20) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: The metal panel system including required supports, trim and sealant shall meet all regulatory requirements for wind loading, water penetration, and air leakage and in addition the following criteria.

B. Engineering Criteria: The manufacturer for each curtain wall system shall employ the services of a qualified structural engineer, registered to practice in the State of Connecticut, to prepare all calculations and other performance criteria for the respective systems, and bear all costs therefor. All shop drawings for the metal components of the respective systems shall bear the registration stamp of the engineer.

1. Refer to the Structural Drawings for wind and seismic load requirements.

C. Fire Performance Characteristics: Provide metal composite wall systems with the following fire test characteristics determined by indicated test standard as applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.

1. Surface-Burning Characteristics: Provide metal composite wall system panels with the following characteristics when tested per ASTM E 84:
    a. Flame spread index: 25 or less.

b. Smoke developed index: 450 or less.

2.2 MANUFACTURERS

A. Acceptable Alternative Manufacturers:

1. Sobotec.
2. Carlisle Construction Material.
3. Mitsubishi Kasei America, Inc..
4. 3A Composites.
5. Alcoa Architectural Products.

2.3 COMPOSITE PANELS

A. System Description

1. Composition: Two sheets of aluminum sandwiching a core of extruded thermoplastic, formed in a continuous process without the use of glues or adhesives between dissimilar materials. Bond integrity testing to adhere to ASTM D1781-76.
2. Aluminum face sheets: aluminum alloy 3003, thickness: 0.020” (0.51mm).
3. Panel thickness: 4mm (.157”).
4. Panel weight: 1.12 lbs/sq.ft. (5.5 kg/sq.m.).
5. Surface Texture: Smooth.
6. Bond Integrity: No failure of bond between core and faces and no cohesive failure of core when tested in accordance with ASTM D 1781 at minimum of 22.5 in-lb per inch.
7. Tolerances:
   a. Panel bow: Maximum 0.8% of panel dimension (width or length).
   b. Panel Dimensions: Take site measurements before proceeding with production unless dimensions can be guaranteed by General Contractor.
   c. Panel lines, breaks and angles to be sharp and true; panel surfaces to be free from warp or buckle.

B. Sustainability Requirements:

1. Aluminum Recycled Content: Minimum 10 percent post-consumer recycled content, or minimum 50 percent pre-consumer recycled content at Contractor’s option. Limit use of virgin metal content to the greatest extent possible.

C. Materials:

1. Aluminum Sheet: Smooth surface coil-coated sheet, ASTM B209, 3005 T5 Aluminum alloy.
2. Aluminum Extrusions: ASTM B 221, 6063 T5 Aluminum.
3. Panel Core: Mineral filled fire resistive thermoplastic core material, compliant with requirements for NFPA 285 tested assemblies, and compliant per ASTM E 84, with flame-spread index of 15 or less and smoke-developed index of 30 or less.

2.4 COMPOSITE FRAMING SUPPORT SYSTEM

A. Refer to Section 07 4210.11 - COMPOSITE FRAMING SUPPORT SYSTEM.

2.5 TRACK SYSTEM

A. Aluminum Track System: Extruded aluminum ASTM B221, alloy 6063-T6 or alloy 6061-T6 track system designed for joint width indicated on the Drawings with an extruded aluminum retainer. Metal to metal sliding joints are not permitted.

2.6 FABRICATION

A. General: Do not fabricate materials until all specified submittals have been submitted to, and approved by, the Architect.

B. All panels shall be formed to specified dimension with tolerances to accommodate expansion and contraction between panels and structure members. Maintain indicated reveal depths at all horizontal and vertical joints as indicated on the Drawings.

C. Accessory and trim components shall be factory fabricated and ready for installation.

D. Fabricate panels in a manner that will eliminate condensation on the interior side. Design joints between panels to form weathertight seals.

1. Provide factory-assembled wall panel units fabricated to dimensions and joint configurations indicated on Drawings.
2. Form panel lines, breaks and angles sharp and true with surfaces that are free from warp or buckle.
3. Fabricate from sharply cut edges, with no displacement of aluminum sheet or protrusion of core.
4. Tolerances shall accommodate expansion and contraction between panels and structural members. Maintain the indicated reveal depth for both horizontal and vertical joints as indicated.

E. Panel Tolerances:

1. Flatness: Maximum allowable distortion: 1/32 inch in 24 inches (0.794 mm in 600mm) in any direction.
2. Thickness: ±1/32 inch.
3. Length and Width: +0, - 1/8 inch.
4. Squareness: 1/64 inch per lineal foot.

2.7 ACCESSORIES

A. Provide proprietary aluminum extrusions to manufacturer’s standard profiles for a complete installation.

B. Fasteners: as recommended by the panel manufacturer, concealed and non-corrosive.

C. Extrusions and extrusion clips for attaching panels to the sub-structure: purpose made aluminum. Extrusions shall be full length around panel perimeter for panel reinforcement and alignment. Intermittent clips are unacceptable.

D. Plastic shims, shall be used as thermal separator between extrusions and subgirts.

E. Subgirts: If required, to be manufactured from G-90 galvanized and shall be designed to accommodate expansion and contraction, dynamic movements and design load requirements.

F. Joint filler strip: same material and colour as panels. Use of caulking at joints is not acceptable.

2.8 FINISHES

A. Finish: Custom, shop-applied, fully oven cured Polyvinylidene Flouride (PVDF) resin based, high performance thermoplastic organic coating applied to all exposed surfaces, including all exposed screws, fastenings. Provide two coat system having a nominal total film thickness of 1.25 mils and conforming to AAMA 2605, NAAMM-Metal Finishes Manual, and the following:

1. Resin base of 70 percent PVDF by weight, Atochem North America, Inc., product “Kynar 500” or Ausimont USA. product “Hylar 5000 “.
2. Color: Match Architect's Control Sample.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Inspect all surfaces and verify that they are in proper condition to receive the work of this Section.

1. Maximum deviation from vertical and horizontal alignment of substrate shall be no more than 1/4 inch in 20'-0".
2. Beginning of installation means acceptance of existing substrate and project conditions.

B. Evaluation and Assessment: At least two weeks prior to commencing the work of this Section, conduct a pre-installation inspection by a representative of the metal wall manufacturer at the Project site. Coordinate time of inspection to occur prior to installation of metal wall panels.

1. Any additional work resulting from pre-installation or completed installation inspections shall be provided at no additional cost to the Owner.

3.2 PREPARATION

A. Protection of In-situ Conditions: During the operation of work of this Section, protect surrounding materials and finishes against undue soilage and damage by the exercise of reasonable care and precautions. Clean, or repair all existing surfaces which are soiled or otherwise damaged by Work of this Section, to match indicated profiles and specified finishes. Materials and finishes which cannot be cleaned, or repaired shall be removed and replaced with new work in conformance with the Contract Documents.

B. Verify that substrate layout complies with shop drawing layout.

C. Report any variations and potential problems to the architect.

D. Do not start work until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. General: Comply with manufacturer's product data including product technical bulletins, product catalog installation instructions, and product carton instructions.

B. Furring and Framing: Accurately align and attach furring and framing in strict compliance with framing manufacturer’s recommendations and approved shop drawings.

1. Frame wall openings with additional framing members at perimeter of openings as needed.
2. Align holes in framing members to facilitate electrical conduit and piping work.
3. Provide all needed connections and accessories provide a complete structural system.
4. Provide all needed members for proper fastening of aluminum track for panel system.

C. Bracing: Provide bridging and bracing as recommended by manufacturer, as necessary, and as indicated on approved shop drawings. Provide kick-back bracing perpendicular to plane of framing system and securely anchored to building structure as needed to comply with specified performance requirements.

D. Install aluminum track system as recommended by manufacturer. Installed track to receive panels

shall be even, smooth, sound, clean, and free from defects detrimental to panel installation.

E. Erect panels plumb, level, and true.

F. Anchor panels securely in place accordance with manufacturer's approved shop drawings.

G. Ensure all penetrations going through air and vapor barrier materials have be sealed. Composite panel supports cannot have a detrimental effect on air and vapor barrier materials. Likewise all materials to carry compatibility requirements defined elsewhere. Installer to record and report penetrations and damage to air and vapor barrier. All patching materials to conform with exterior materials' manufacturer's requirements. Construction Manager to coordinate repair and inspection of same. Testing of air and vapor barrier to occur prior to panel installation.

H. Conform to panel manufacturer's instructions for installation of concealed fasteners.

3.4 TOLERANCES

A. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

B. Erect the composite metal panel systems plumb and level, free of warp or twist.

1. Maximum misalignment of two adjoining members abutting in plane: 1/32 inch
2. Maximum variation from plumb or level: 1/16 inch per 10 feet, non-cumulative
3. Maximum offset from true dimensional alignment: 1/8 inch.

3.5 FIELD QUALITY CONTROL

A. Non-Conforming Work: Damaged and unapproved work shall be removed and replaced.

B. Manufacturer Services: Field inspection of completed installation to be performed by a representative of the composite panel manufacturer and submit a written report.

1. Installer shall correct deficiencies noted in report and additional deficiencies identified by Architect's observations.
2. Replace damaged panels and accessories which cannot be repaired in field.

3.6 CLEANING AND PROTECTION

A. General: Clean work under provisions of Section 01 7000 - EXECUTION.

1. Refer to AAMA 601.1 for cleaning and maintenance of panels.

B. After completion of the work of this Section:

1. Remove equipment rubbish, and debris from the work area.
2. Remove temporary protective films.
3. Clean exposed panel surfaces promptly after completion of installation in accordance with recommendations of panel and coating manufacturer.
4. Clear weep holes and drainage channels of obstructions, dirt, and sealant.
5. Leave immediate site area in rake-clean condition.
6. Protect and maintain wall system in clean condition during construction.

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

END OF SECTION