SECTION 074243 - COMPOSITE WALL PANELS

ALL LIBRARIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes metal-faced composite wall panels system, including the following:

1. Aluminum-faced composite panels with mounting system. Panel mounting system including anchorages, furring, fasteners, gaskets and sealants, related flashing and adapters and masking for a complete installation.
2. Panel manufacturer recommends that system should include shop-installed aluminum stiffeners on all panels of 20 square feet or larger. Minimum stiffeners recommendation in one per 20 square feet of panel area.
3. Parapet coping, soffits, sills, border and filler items may be indicated as integral components of the panel system or as designed.
4. All flashing metal required shall be provided by the panel manufacturer.
5. System to be fabricated and installed per local code requirements.

B. Related Sections:

1. Section 054000 "Cold-Formed Metal Framing" for cold-formed metal framing supporting metal-faced composite wall panels.
2. Section 074616 "Aluminum Sidings and Soffits" for aluminum wall siding and aluminum soffit and fascia panels.
3. Section 076200 "Sheet Metal Flashing and Trim" for field-formed flashings and other sheet metal work not part of metal-faced composite wall panel assemblies.

1.3 DEFINITION

A. Metal-Faced Composite Wall Panel Assembly: Metal-faced composite wall panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete weathertight wall system.

1.4 REFERENCES

A. Aluminum Association(AA):

1. AA-C22-A41 – Clear Anodized – Class 1.
2. AA-C22-A42 – Anodized Integral Color Coatings – Class II.
3. AA-C22-A44 – Electrolytically deposited color (2 step) – Class I.

B. American Architectural Manufacturers Association (AAMA):

1. AAMA 508 – Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems.
2. AAMA 509 – Voluntary Test and Classification Method for Drained and Back Ventilated Rain Screen Wall Cladding System.
3. AAMA 620 – Voluntary Specification for High Performance Organic Coatings on Coil, Coated Aluminum Architectural Aluminum.
4. AAMA 2605 – Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
5. AAMA "Metal Curtain Wall, Window, Storefront and Entrance Guide Specifications Manual".

C. ASTM International; (ASTM):

1. ASTM B 117 – Method of Salt Spray (Fog) Testing.
2. ASTM D 635 – Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
3. ASTM D 822 – Practice for Operating Light and Water Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products.
4. ASTM D 13808 – Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
5. ASTM D 1781 – Climbing Drum Peel Test for Adhesives.
6. ASTM D 1735 – Method for Water Fog Testing of Organic Coatings.
7. ASTM D 1929 – Standard Test Method for Determining Ignition Temperature of Plastics.
8. ASTM D2247 – Practice for Testing Water Resistance of Coatings in 100 percent Relative Humidity.
9. ASTM D 2794 – Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
10. ASTM D 3359 – Methods for Measuring Adhesion by Tape Test.
11. ASTM D3363 – Method for Film Hardness by Pencil Test.
12. ASTM E 84 – Surface Burning Characteristics of Building Materials.
13. ASTM E 283 – Rate of Leakage through Exterior Windows, Curtain Wall, and Doors.
14. ASTM E330 – Structural Performance of Exterior Windows, Curtain Walls, and Doors Under the Influence of Wind Loads.

D. International Conference of Building Officials (ICBO): National Fire Protection Association (NFPA) 285 – Intermediate Scale Multi Story Test.

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: Metal-faced composite wall panel assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Delegated Design: Design metal-faced composite wall panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) of wall area when tested according to ASTM E 283 at the following test-pressure difference:

1. Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa).

D. Water Penetration Under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

E. Structural Performance: Provide metal-faced composite wall panel assemblies capable of withstanding the effects of the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330:

1. Wind Loads: Determine loads based on the following minimum design wind pressures:

a. Uniform pressure of 20 lbf/sq. ft. (957 Pa) and 30 lbf/sq. ft. (1436 Pa) on parapets and corner panels, acting inward or outward.

2. Deflection Limits: Metal-faced composite wall panel assemblies shall withstand wind loads with horizontal deflections no greater than 1/175 of the span at the perimeter and 1/60 of the span anywhere in the panel.
3. Maximum anchor deflection shall not exceed 1/16 inch.
4. At 1-1/2 times design pressure, permanent deflections of framing members shall not exceed L/100 of span length and components shall not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed 1/16 inch.

F. 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 deg. F (67 deg. C,), ambient; 180 deg. F (100 deg. C), material surfaces.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal-faced composite wall panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of metal-faced composite wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment

system, trim, flashings, closures, and accessories; and special details. Distinguish among factory-, shop-, and field-assembled work.

1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):

   a. Flashing and trim.
   b. Anchorage systems.

C. Samples for Initial Selection: For each type of metal-faced composite wall panel indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.
2. Include manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each sealant exposed to view.

D. Delegated-Design Submittal: For metal-faced composite wall panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Exterior elevations, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Wall panels and attachments.
2. Stud framing.
3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.
4. Penetrations of wall by pipes and utilities.

B. Qualification Data: For Installer and Manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

D. Field quality-control reports.

E. Warranties: Samples of special warranties.

1.8 CLOSEOUT SUBMITTALS

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

1.9 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

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

C. Preconstruction Compatibility and Adhesion Testing: Submit samples of materials that will contact joint sealants to joint-sealant manufacturers for testing.

D. Fire-Resistance Ratings: Where indicated, provide metal-faced composite wall panels identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

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

E. 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 wall and corner panel, including soffit, as shown on Drawings; approximately one bay wide by one story high by full thickness, including supports, attachments, and accessories.

a. Include four-way joint for metal-faced composite wall panels.

2. Conduct water-spray test of mockup of metal-faced composite wall 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. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, metal-faced composite wall panel Installer, metal-faced composite wall panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal-faced composite wall panels including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal-faced composite wall panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal-faced composite wall panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal-faced composite wall panel assembly during and after installation.
8. Review wall panel observation and repair procedures after metal-faced composite wall panel installation.

1.10 DELIVERY, STORAGE, AND HANDLING

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

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

C. Store metal-faced composite wall panels vertically, covered with suitable weathertight and ventilated covering. Store metal-faced composite wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal-faced composite wall panels in contact with other materials that might cause staining, denting, or other surface damage. Do not allow storage space to exceed 120 deg. F (49 deg. C).

D. Retain strippable protective covering on metal-faced composite wall panel for period of panel installation.

1.11 PROJECT CONDITIONS

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

B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal-faced composite wall panel fabrication and indicate measurements on Shop Drawings.

1.12 COORDINATION

A. Coordinate metal-faced composite wall panel assemblies with rain drainage work, flashing, trim, and construction of studs, soffits, and other adjoining work to provide a leak proof, secure, and noncorrosive installation.

1.13 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal-faced composite wall panel assemblies 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: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal-faced composite wall 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of Design: Subject to compliance with requirements, provide the following products:

1. Zinc Composite Wall Panel System.

a. Material (ZCM) as manufactured by Alcoa Architectural Products, 50 Industrial Boulevard, Eastman Georgia 31023, Phone 1-(800)-841-7774, www.alcoaarchitecturalproducts.com.
b. Others manufacturers are acceptable as long as their product meets the same criteria as listed above in thickness, panel weight, bond integrity, fire rating and finish. Material must be manufactured in the USA.

2.2 PANEL MATERIALS

A. Zinc Alloy Plate: Alloy and temper as recommended by manufacturer for application, Architectural Rolled Zinc, in accordance with ASTM B 69 and manufacturers performance requirements.

1. Fire Resistance Core: Zinc resistant product.
2. Panel Thickness: RB160ZCM (4 mm) = 0.157 inch.
3. Panel Weight: RB160ZCM (4 mm) = 2.81 lbs/sft with 0.7 mm.
4. Product Performance:

a. Bond Integrity: When tested for bond integrity, in accordance with ASTM D1781 (simulating resistance to panel delamination), there shall not be a) an adhesive failure of the bond between core and the skin or, b) cohesive failure of the core itself below the following values.
b. Peel Strength:

1) 100 N mm/mm (22.5 in. lb./in.) as manufactured.
2) 100 N mm/mm (22.5 in. lb./in.) after 21 days soaking in water at 70 degrees F.

c. Fire Performance:

1) ASTM E84 – Passed Class A.
2) NFPA 285 – Met Acceptable Criteria.

2.3 PANEL FINISHES

A. Custom Color: Match Architect's sample.

2.4 PANEL FABRICATION

A. Composition: ZCM is comprised of two sheets of zinc alloy sandwiching a solid core of extruded thermoplastic material formed in a continuous process with no glues or adhesives between dissimilar materials. The core shall be free of voids and/or air spaces and not contain foamed insulation materials. The bond between the cores and the skins shall be chemical bond. Products laminated sheet by sheet in a batch process using glues or adhesives between materials shall not be acceptable.

B. Zinc Face and Backer Sheets:

1. Thickness: 0.028 inch / 0.7 mm / 22 gauge.
2. Alloy shall be zinc (Ti not greater than 1%, Zn not less than 99%, Cu not greater than 1%).

C. Tolerances:

1. Panel Bow: Shall not exceed 0.8% of panel overall dimension in width or length.
2. Panel Dimensions: Field fabrication shall be allowed where necessary, but shall be kept to an absolute minimum. All fabrication shall be done under controlled shop conditions when possible. Panel dimensions shall be such that there will be an allowance for field adjustment and thermal movement.
3. Panel Lines: Breaks and curves shall be sharp and true and surfaces free of warps or buckles.
4. Flatness: Panels shall be visually flat.
5. Panel Surfaces: Shall be free of scratches or marks caused during fabrication.

D. System Characteristics:

1. Plans, elevations, details, characteristics and other requirements indicated are based upon standards by one manufacturer. It is intended that other manufacturers, receiving prior approval, may be acceptable, provided their details and characteristics comply with size and profile requirements, and material/performance standards.
2. System must not generally have any visible fasteners, telegraphing or fastening on the panel faces or any other compromise of a neat and flat appearance.
3. Fabricate panel system to dimension, size, and profile indicated on the Drawings based on a design temperature of 68 degrees F (20 degrees C).
4. Fabricate panel system to avoid compressive skin stresses. The installation detailing shall be such that the panels remain flat regardless of temperature changes and at all times remain air- and watertight.

5. The finish side of the panel shall have a removable plastic film applied prior to fabrication, which shall remain on the panel during fabrication, shipping and erection to protect the surface from damage.

E. System Type:

1. Rout-and-Return Dry System: Fabricator and Installer must provide an engineered pressure relief system including extruded perimeter frame; drainage gutter; all extrusions, clips fasteners, anchors, spacers, trim, flashings, gaskets, sealant, etc.

2.5 ACCESSORIES

A. Extrusions, formed members, sheet and plate shall conform with ASTM B209 and the recommendations of the Manufacturer.

B. Panel stiffeners, if required, shall be structurally fastened or restrained at the ends and shall be secured to the rear face of the composite panel with silicone of sufficient size and strength to maintain panel flatness.

C. Sealants and gaskets within the panel system shall be as per manufacturer's standards to meet performance requirements.

D. Fabricate flashing materials from 0.028 inch minimum thickness zinc sheet provided by panel manufacturer to match the adjacent panel system where exposed. Post-painted spray-applied flashings are not acceptable. Provide a lap strap under the flashing at abutted conditions and seal lapped surfaces with a full bead of non-hardening sealant.

E. Fasteners (concealed/non-corrosive): Fasteners as recommended by panel fabricator and installer.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

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

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal-faced composite wall panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal-faced composite 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-faced composite wall panel manufacturer.
3. Verify that weather-resistant sheathing paper has been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal-faced composite wall panels to verify actual locations of penetrations relative to seam locations of panels before panel installation.

C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 METAL-FACED COMPOSITE WALL PANEL INSTALLATION

A. General: Install metal-faced composite wall panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Erect panels plumb and level. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.

B. Attachment system shall allow for the free vertical and horizontal thermal movement due to expansion and contraction for a material temperature range of -20 degrees F (-29 degrees C) to +180 degrees F (+82 degrees C). Buckling of panels, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement will not be permitted. Fabrication, assembly and erection procedure shall account for the ambient temperature at the time of the respective operation.

C. Panels shall be erected in accordance with an approved set of shop drawings.

D. Anchor panels securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary thermal movement and structural support.

E. Fasteners:

1. Conform to panel fabricator’s instructions for installation of concealed fasteners.

F. Do not install component parts that are observed to be defective, including warped, bowed, dented, scraped and broken members.

G. Do not cut, trim, weld or scrape component parts during erection in a manner that would damage the finish, decrease strength or result in a visual imperfection or a failure in performance. Return component parts that require alteration to shop for refabrication, or for replacement with a new part.

H. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by metal-faced composite wall panel manufacturer.

I. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weathertight performance of metal-faced composite wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by panel manufacturer.

J. Attachment System Installation, General: Install attachment system required to support metal-faced composite 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.
2. Do not begin installation until weather barrier and flashings that will be concealed by composite panels are installed.

3.3 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal-faced composite 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.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Water Penetration: Test areas of installed system indicated on Drawings for compliance with system performance requirements according to ASTM E 1105 at minimum differential pressure of 20 percent of inward-acting, wind-load design pressure as defined by SEI/ASCE 7, but not less than 6.24 lbf/sq. ft. (300 Pa).

C. Water-Spray Test: After completing the installation of 75-foot- (23-m-) by-2-story minimum area of metal-faced composite wall panel assembly, test assembly for water penetration according to AAMA 501.2 in a 2-bay area directed by Architect.

D. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust completed metal-faced composite wall panel installation, including accessories.

E. Metal-faced composite wall panels will be considered defective if they do not pass tests and inspections.

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

G. Prepare test and inspection reports.

3.5 CLEANING

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

B. Repair panels with minor damage.

C. After metal-faced composite wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

D. Any additional protection, after installation, shall be the responsibility of the General Contractor.

E. Replace metal-faced composite wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074243