

SECTION 07 42 43 – ALUMINUM COMPOSITE WALL PANELS (Wet Joint System)

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 composite panels fabricated including supports, anchors, fasteners, and sealants required for panel system according to custom design indicated on drawings.
- B. Related Sections:
 - 1. Division 05 Section "Cold-Formed Metal Framing" for cold-formed metal framing supporting metal-faced composite wall panels.
 - 2. Division 07 Section "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 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 Structural Engineer Registered in the state of building location, using performance requirements and design criteria indicated.
- C. 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 30 lbf/sq. ft., 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.
- D. Air Infiltration: When tested in accordance with ASTM E283, air infiltration at 1.57 psf must not exceed 0.06 cfm/ft² of wall area.
- E. Water Infiltration: Water infiltration is defined as uncontrolled water leakage through the exterior face of the assembly. Systems shall be designed to drain any water leakage occurring at the joints. No water infiltration shall occur in any system under a differential static pressure of 6.24 psf after 15 minutes of exposure in accordance with ASTM E331.
- 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, ambient; 180 deg F, material surfaces.

1.5 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.
 - C. Samples for Initial Selection: For each type of metal-faced composite wall panel indicated with factory-applied color finishes.
 1. Include similar samples panel, trim and or 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. Samples for Verification: Minimum 12 x 12 inches. Include fasteners, closures, and other metal-faced composite wall panel accessories.
 1. Composite Panels: Include four-way joint.
 - E. 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 Structural Engineer Registered in the state of the building responsible for their preparation.
 - F. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
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- G. LEED Submittals: Credit MR4.1/MR4.2, Manufacturer's Product Data indicating the following:
 - 1. Percentages by weight of post-consumer and pre-consumer recycled content.
 - 2. Indicate total weight of products provided.
 - 3. Include statement-indicating costs for each product having recycled content.
- H. Product Test Reports: Submit certified product test reports based on tests performed by an accredited laboratory clearly describing in written form, and in shop drawing form, compliance of the composite metal wall panel assembly with requirements indicated based on comprehensive testing.
- I. Warranties: Samples of special warranties.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of metal-faced composite wall panel from single source from single manufacturer.
- B. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of five (5) years experience.
- C. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
- D. Calculations supporting structural performance of the wall panels shall be prepared by a professional structural engineer.
- E. Composite panel manufacturer shall have a minimum of 15 years' architectural experience in the manufacture of this product and be located within the continental USA.

1.7 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.
 - D. Retain strippable protective covering on metal-faced composite wall panel for period of panel installation.
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1.8 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.

1.9 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 AND FABRICATOR

- A. Acceptable Composite Panel Fabricator; COMPOSITEcore – A Division of DORALCO, 5919 W. 118th St., Alsip, IL 60803 Tel: 888.44.DORAL Tel: 708.388.9324. Fax: 708.388.9392. Web: www.doralco.com
 - 1. Basis-of-Design System Type: COMPOSITEcore's CCRWJ - Rout & Return Wet Joint System (1/2" joint)
 - a. System utilizes an extruded horizontal and vertical tongue and groove extrusion system.
 - b. Reveal joint is a wet seal silicone type.
 - B. Raw Composite Manufactures;
 - 1. REYNOBOND Aluminum Composite Material (ACM) as manufactured by Alcoa Architectural Products, 50 Industrial Boulevard, Eastman, Georgia 31023. Contact
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Eastman plant at 1-800-841-7774 or 478-374-4746 or at www.aicoarchitecturalproducts.com.

2. ALPOLIC Composite Metal Panels by Mitsubishi Chemical FP Corporation, 401 Volvo Parkway, Chesapeake, VA 23320; Telephone: (800) 422-7270; Fax: (757) 436-1896; E-mail: info@alpolic.com; website: www.alpolic-usa.com.

C. Substitutions; Not Permitted

D. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 COMPOSITE WALL PANELS

A. Reynobond Composite Panels: Provide factory-formed and -assembled, metal-faced composite wall panels fabricated from two metal facings bonded, using no glues or adhesives, to solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment system components and accessories required for weathertight system.

1. Aluminum Face Sheets
 - a. Thickness: 0.020"
 - b. Aluminum alloy shall be 3000 series or equivalent.
 2. Core:
 - a. Polyethylene Core (PE), flame spread of 15 and a smoke developed rating of 120 a center panel joint. Flame spread of 0, smoke developed of 0 with no joint. Tested in accordance with ASTM E84 'Class A' building material rating.
 3. Panel Thickness:
 - a. 6 mm = 0.236"
 4. Bond integrity
 - a. When tested for bond integrity, in accordance with ASTM D1781 (simulating resistance to panel delamination), there shall not be an adhesive failure of the bond a) between the core and the skin or b) cohesive failure of the core itself below the following values.
 5. Peel Strength:
 - a. (PE Core) 178 N mm/mm (40 in lb./in.) As manufactured, 178 N mm/mm (40 in lb./in.) After 21 days soaking in water at 70°F
 6. Tolerances:
 - a. Panel Bow: Shall not exceed 0.8% of panel overall dimension in width or length.
 - b. 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
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that there will be an allowance for field adjustment and thermal movement.

- c. Panel Lines: Breaks and curves shall be sharp and true, and surfaces free of warps or buckles.
- d. Flatness: Panels shall be visually flat.
- e. Panel Surfaces: Shall be free of scratches or marks caused during fabrication.

2.3 FINISHES

- A. Panel Finish Type: Reynobond Coil-coated Kynar 500® or Hylar 5000® based polyvinylidene fluoride (PVDF). Alcoa Architectural Products shall be Colorweld® 300 a fluoropolymer coating utilizing 70% Kynar 500® resins.
 - 1. Coats / Color: Two (2) Coat, Solid Opaque Finish (Series 1)
- B. Finish Performance
 - 1. Gloss: ASTM D523 standard at 60° shall be 25–30.
 - 2. Pencil hardness: ASTM D3363 shall be HB-H minimum (eagle turquoise).
 - 3. Flexibility T-Bend: ASTM D4145 shall be 1 T-Bend; no pick-off.
 - 4. Adhesion: ASTM D3359 reverse impact 1/16" crosshatch shall show no cracking or adhesion loss.
 - 5. Reverse Impact: ASTM D2794 1500 x metal thickness aluminum shall show no cracking or adhesion loss.
 - 6. Acid Resistance: ASTM D1308, 10% muriatic acid, 24 hrs., shall show no effect. 20% sulfuric acid, 18 hrs, shall show no effect.
 - 7. Acid Rain Test: Kesternich SO2, DIN 500180, 10 cycles min. No objectionable color change.
 - 8. Alkali Resistance: ASTM D1308, 10%, 25% NaOH, 1 hr., shall show no effect.
 - 9. Salt Spray Resistance: ASTM B117, 5% salt fog at 95°F. Pass 4,000 hrs. less than 1/16" average creep from scribe; up to a few #8 blisters.
 - 10. Humidity Resistance: ASTM D714 & ASTM D2247 100% relative humidity at 95°F, shall pass 4,000 hrs., # 8 blisters.
 - 11. Exterior Exposure: 10 years at 45°, South Florida. ASTM D2244 shall be Max. 5 fade and ASTM D4214 shall be Max. 8 chalk.
 - 12. Paint system shall meet the requirements of AAMA 620 specifications.
 - 13. Paint system shall have more than 20 years of architectural field use.

2.4 MATERIALS AND ACCESSORIES

- A. Aluminum Extrusions: ASTM B 221, alloy 6063-T6 and / or 6061-T6.
 - B. Panel stiffeners 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. Stiffener material and/or finish shall be compatible with the silicone.
 - C. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.
 - D. Formed Members, Sheet, and Plate: Aluminum, ASTM B 209, and as recommended by panel manufacturer.
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- E. Flashings: 0.063 inch (1.6 mm) minimum thickness aluminum sheet; where exposed, painted to match adjacent metal framing or panel system.
- F. Sealants: ASTM C 920; elastomeric polyurethane or silicone sealant; Dow Corning 795
- G. Sealants and Gaskets Within Panel System: Comply with panel manufacturer's requirements.
- H. Fasteners:
 - 1. Exposed Fasteners: Stainless steel, or as recommended by panel manufacturer.
 - 2. Concealed Fasteners: Climaseal coated, stainless steel, or as recommended by panel manufacturer.

2.5 FABRICATION

- A. General: Fabricate and finish metal-faced composite wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
 - B. Fabricate metal-faced composite wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.
 - C. Metal-Faced Composite Wall Panels: Factory form panels in a continuous process with no glues or adhesives or batch process by laminating each sheet using glues or adhesives between dissimilar materials. Trim and square edges of sheets with no displacement of face sheets or protrusion of core material.
 - 1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
 - 2. Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material.
 - 3. Fabricate panels with panel stiffeners, as required to comply with deflection limits, attached to back of panels with structural silicone sealant or bond tape.
 - D. Take field measurements prior to commencement of shop fabrication.
 - 1. Field fabrication is allowed to ensure proper fit but keep field fabrication to minimum with majority of fabrication being done under controlled shop conditions.
 - 2. Where final panel dimensions cannot be established by field measurement before commencement of panel manufacturing, make allowance for field adjustments and thermal movement as recommended by panel manufacturer.
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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. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorage according to ASTM C 754 and metal-faced composite wall panel manufacturer's written instructions.

3.3 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. Install panels perpendicular to girts and subgirts unless otherwise indicated. Anchor 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-faced composite wall panels.
 - B. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
 - C. Anchor panels securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary thermal movement and structural support.
 - D. Where panels are designed for field applied sealant joints, seal joints completely with specified sealant.
 - E. Conform to panel fabricator's instructions for installation of concealed fasteners.
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- 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 braze component parts during erection in manner which would damage finish, decrease strength, or result in visual imperfection or failure in performance. Return component parts, which require alteration to shop for re-fabrication, if possible, or for replacement with new parts.
- H. At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.
- I. Separate dissimilar metals and use gasketed fasteners, isolation shim, or isolation tape where needed to eliminate possibility of corrosive or electrolytic action between metals.

3.4 ERECTION TOLERANCES

- A. Maximum variation from plane or location shown on shop drawings: 1/2 inch in 30 feet (10 mm in 10 m) of length and up to 3/4 inch in 300 feet (20 mm in 100 m).
- B. Maximum deviation for vertical member: 0.1 inch in 25 feet (3 mm in 9 m) run.
- C. Maximum deviation for a horizontal member: 0.1 inch in 25 feet (3 mm in 9 m) run.
- D. Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.03 inch (0.75 mm).

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. Masking intentionally left in place after panel installation on an elevation shall become the responsibility of the general contractor.
- B. After metal-faced composite wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal-faced composite wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- D. Any additional protection, after installation, shall be the responsibility of the general contractor to remove.
- E. Final cleaning shall not be part of the work of this section.

END OF SECTION 07 42 43
