

SECTION 07 42 13

EVOLVE Architectural Panel System
ALUMINUM COMPOSITE MATERIAL (ACM) WALL PANEL SPECIFICATION

SPEC NOTE: Optional test is indicated by square brackets “[]”. Delete unwanted items and square brackets in final specification.

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Aluminum Composite Material (ACM) [pressure equalized rainscreen] [dry-seal] [wet-seal] panels.
- B. [Supply only] [Supply and install]

SPEC NOTE: Re 1.01C. Items listed are available at an extra cost, and not included with the basic panel package.

- C. Accessories including Sub-Framing/Z-girts, parapet flashing, drip flashing, jamb flashing, thru-wall flashing, and all other architectural trims, installation fasteners and air/vapor barriers.

1.02 RELATED REQUIREMENTS BY OTHERS

- [A. Section 06 10 00 – Rough Carpentry]
- [B. Section 07 21 00 – Thermal Insulation]
- [C. Section 07 27 00 – Air Barrier]
- [D. Section 07 62 00 – Sheet Metal Flashing & Trim]
- [E. Section 07 92 00 – Joint Sealants]

1.03 REFERENCE STANDARDS

- A. ACM Panels
 - a. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

- b. ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

1.04 PRE-INSTALLATION MEETINGS

- A. Coordinate products, techniques and sequencing of related work with Section [01 31 19 – Project Meeting] [and] [01 31 19.33 – Pre-Installation Meetings].

1.05 SUBMITTALS

- A. See Section [_____], Administrative Requirements, for Submittal Procedures
- B. LEED Credits: Conform to [Section 01 81 13 “Sustainable Design Requirements”] for documentation of LEED Credits re: Certification of Project under LEED [USGBC] 2012 Rating System.
- C. Product Data
 - a. Aluminum Composite Metal Wall Panel
 - b. Fasteners
- D. Submittal Drawings: Submit dimensioned drawings for coordination and approval of Aluminum Composite Metal panels.
 - a. Include the following:
 - i. Exterior Elevations to show the Aluminum Composite Wall panels and Wall Sections drawn to scale.
 - ii. Exterior Elevations to show sub-farming girts required for ACM panel attachment drawn to scale.
 - iii. Include common construction datum, such as column lines, radial grids, elevations, and others to assist with coordination. Ensure dimensions to panels and work points are locked datum lines.
 - iv. Wall-mounted items, such as windows, doors, louvers, and light fixtures.
 - v. Wall penetrations.
 - vi. Details shall be drawn at no less than 6” = 1’-0” scale for joints, edge and perimeter conditions, corners, trims, flashings, closures, accessories, special details, anchorages and attachment system.
- E. Installation Drawings: Drawings shall include exterior elevations with metal panels identification numbers to facilitate installation. Markings shall ensure a system that assigns a panel to a specific wall exterior and location.
 - a. Elevations shall include panel grid and work point dimensions originating from strategic datum indicated in the submittal drawings
 - b. Include a bill-of-materials for quantities.

- F. Product Samples: 3” x 3” min. showing specified finish for each location.
- G. Test and Evaluation Reports: Submit test reports, or manufacturer’s letter certifying the metal wall panel will be designed by an independent structural engineer to meet the structural performance requirements.
- H. Maintenance Data: Submit maintenance data for Aluminum Composite panels.
- I. Warranty: Submit warranties and ensure forms have been completed in the owner’s name and registered with the manufacturer
 - a. Sample warranties for factory workmanship and material/finish to be submitted in advance of submittal drawings.

1.06 QUALITY ASSURANCE

- A. Metal Wall Panel Manufacturer Qualifications: Minimum 5 years experience in metal fabrication and supplying metal wall panel systems.
- B. Metal Wall Panel Installer Qualifications: Minimum 5 years experience installing commercial metal wall panel systems.

1.07 DESIGN & PERFORMANCE REQUIREMENTS

- A. Design, fabricate and install Aluminum Composite Metal (ACM) pressure equalized rainscreen panels system in [polyethylene (PE)] [fire-rated (FR)] core, to the following standards & requirements:
 - a. The ACM panel design MUST be 100% free of all fasteners in both the panel face and panel perimeter. All mounting hardware must also be fully concealed with color-matched splines utilizing the same Kynar/PvDF paint technology as the coil coated ACM. Provided by the manufacturer.
 - b. Only a Progressive System (independent panel, one-from-another), using sliding male-female clip components, which are held to the panels perimeter extrusion without the use of rivets or screws, meets the description of an engineered EVOLVE panel design. This design must enable a single panel to be independently removed and re-installed.
 - c. Any ACM panel not meeting the standards & requirements outlined above (1.07.A.a.; 1.07.A.b.), or any panel system utilizing a track or grid layout, or one that includes a “picture-frame” style post-painted extrusion incorporating a face panel, or one that utilizes adhesives in place of mechanical fasteners in the panel design, are NOT considered as equal or comparable in design or performance to the EVOLVE Architectural Panel System.
- B. Structural Performance: EVOLVE ACM panel system is capable of withstanding the effects of the following wind loads, based on testing in accordance to **ASTM E 330-14**:

Note: The default deflection of the support framing was restricted to L/180 referencing AAMA 508 Section 5.1.2

- a. Wind Load: Maximum Pressure achieved = **13,325 Pa¹ (278 lbs/ft²)**;
(equivalent to 330 mph / 531 km/h based on Ensewiler formula)
 - b. Specified Design Load: 3,591 Pa (75.0 lbs/ft²)
 - c. Positive Loading Net Deflection: (+3,591 Pa; 75.0 lbs/ft²) = 0.204 inches (5.2mm)
 - d. Negative Loading Net Deflection: (-3,591 Pa; -75.0 lbs/ft²) = 0.258 inches (6.6mm)
(¹ Cladding system did not disengage from the wall assembly. The EVOLVE Architectural Panel System did not fail at 13,325 Pa., whereas, the vertical supporting steel buckled in the center)
- C. Air Infiltration: Air leakage of not more than 0.06 cfm/ lbs/ft² (0.3 L/s per sq. m) when tested according to **ASTM E 283-04** at the following test-pressure difference:
- a. EVOLVE panel systems Test-Pressure Differential: Infiltration:
 - 75 Pa @ 1.57 lbs/ft²: 0.05 L/s m² (0.01 CFM/ft²)
 - 300 Pa @ 6.24 lbs/ft²: 0.05 L/s m² (0.01 CFM/ft²)
- D. Water Penetration under Static Air Pressure: No uncontrolled water penetration when tested according to **ASTM E 331-02** at the following test-pressure difference over a period of 15 continuous minutes:
- a. Test-Pressure Differential: Maximum Pressure achieved = **20 lbs/ft² @ 957 Pa**
Note: No water penetration observed or droplets present on simulated exterior sheathing.
- E. Thermal Movements: EVOLVE ACM panel system has been designed to accommodate vertical and horizontal thermal movement of components, preventing buckling, opening of joints and other detrimental effects when subjected to seasonal temperature cycles. Systems that incorporate enlarged holes or loose-fitting attachments to accommodate for thermal fluctuations, are NOT considered as equal or comparable in design or performance, to the EVOLVE architectural panel system.
- a. Temperature Change (Range): [120 deg F] [67 deg C] ambient; [180 deg F] [100 deg C] material surfaces.
- F. Fire Propagation Characteristics: Aluminum Composite Material wall panel system NFPA 285 testing.
- a. EVOLVE ACM panel system has been passed and approved by a qualified testing agency, certified to conduct the **NFPA 285 Fire Test Method** on wall panels assembly systems.

1.08 TECHNICAL DATA

- A. Applicable standards for the ACM component of the EVOLVE Architectural Panel System

- a. Rainscreen Testing
 - i. AAMA 508-07 Compliant
- b. Air/Water/Wind Performance
 - i. AAMA 501.1-05 (Dynamic)
 - ii. ASTM E 1233 (Modified)
 - iii. ASTM E 283 (Static)
 - iv. ASTM E 330 (Static)
 - v. ASTM E 331 (Static)
- c. Fire Test Method
 - i. NFPA 285: Standard Fire Test Method For Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies Containing Combustible Components.

1.09 MOCK-UP

SPEC NOTE: Mock-up is only specified for special or large projects and only upon request

- A. Provide mock-up on building consisting of complete cladding systems, including, but not limited to, metal furring, panels, securement devices, sealants, and mouldings for approval. Cladding finish and mouldings to be of finish and color as designated by [Architect].
- B. Location of mock-up to be as directed by [Architect]. Size to be four panels minimum in a 2-over-2 configuration. Alternate pattern can be requested by [Architect].
- C. Modify mock-up as necessary for [Architect] approval. Mock-up [may] [may not] remain in place as part of work completed. Mock-up to represent standard for completed work.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
 - a. Protect panels during transportation, handling, and installation from weather, excessive temperatures and construction operations.
 - b. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

- c. Deliver panels, components, and other manufactured items with damage or deformation.
- d. Include semi-transparent panel markings on a non-exposed surface.
- B. Storage:
 - a. Store materials indoors if possible.
 - b. Cover materials with suitable weathertight and ventilated covering when storing outdoors.
 - c. Provide storage of panels to ensure dryness, with positive slopes for drainage of moisture.
 - d. Do not stack panels horizontally, store panels vertically, with panel edge down.
 - e. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.
- C. Handling:
 - a. Handle panels in a manner to prevent bending, warping, twisting, and surface damage.

1.11 PACKAGING AND WASTE MANAGEMENT

- A. Return undamaged pallets and crates to manufacturer of systems employed. All other plastics, packaging foam, banding and fasteners are to be disposed of, by panel installer.

1.12 SITE CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of this Work to be performed according to manufacturer's instruction and warranty requirements.
- B. Coordination of Trades: Contractor shall coordinate all trades that interfere with the aluminum composite panels to ensure locations of structural elements, windows, louvers, doors, and other elements are installed per contract drawings and within tolerance prior to field measurements.
- C. Field Measurements: Contractor shall verify locations of structural members and wall opening dimensions by field measurements of high-resolution 3D point-cloud scanning.
 - a. Contractor and installer to coordinate with construction schedule
 - b. Contractor may instruct the factory to fabricate all panels to the dimensions shown on the approved submittal drawings if field verification is not possible. This would be noted on the returned, approved submittal drawings.

- c. Contractor may instruct the factory to fabricate all standard panels within the grid to the dimensions on the approved submittal drawings and withhold production of the perimeter panels for field dimensioning.
- d. Record field measurements on approved submittal drawings and submit to panel manufacturer before panel fabrication. Manufacturer to submit to the Installer elevations identifying panels and a corresponding panel list noting panel dimensions for approval before fabrication.

1.13 WARRANTY

- A. ACM Panels: Provide manufacturer's standard [5 year] [10 year] warranty against panel integrity.
- B. Finish Coating Performance: Provide manufacturer's standard [10, 20, 30 year] warranty against fading, color change, chalking, peeling, cracking, or delaminating of the coating system.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Aluminum composite metal panels to be obtained as single source from approved manufacturer.
 - a. NexGen Metal Design Systems, Inc.
Address: 22 Rutgers Road, Suite 201, Pittsburgh, PA 15205
Phone: 412-458-3832
Email: info@NexGenDesignSystems.com
Website: www.NexGenDesignSystems.com
- B. Composite Plank Manufacturers
 - a. larsen® by Alucoil®
 - b. Alucobond® by 3A Composites®
 - c. Alpolic® by Mitsubishi Chemical®
 - d. Reynobond® by Arconic®
 - e. Elval Colour S.A.®
 - f. Citadel Architectural Products
- C. Aluminum Face Sheets
 - a. Aluminum Face Sheets:
 - b. Thickness: 0.50mm (0.020") (nominal)
 - c. Alloy: AA3000 or AA5000 Series (Painted material)
- D. Panel Thickness, Weight and Composition:
 - a. [4mm (0.157"): 1.12 lbs./ft²] [6mm (0.236"): 1.50 lbs./ft²]

E. Core: (PE) or (FR)

F. Product Performance:

- a. Bond Integrity: When tested for bond integrity, in accordance with ASTM D1781 (simulating resistance to panel delamination), there shall be no adhesive failure of the bond a) between the core and the skin, nor b) cohesive failure of the core itself below the following values.
- b. Peel Strength:
 - i. Greater than 100 N-mm/mm (22.5 in-lb/in) as manufactured
 - ii. Greater than 100 N-mm/mm (22.5 in-lb/in) after 21 days soaking in water at 70°F
- c. Fire Performance
 - i. ASTM E 84: Flame Spread = "Passed Class A"
 - ii. Smoke Developed = "Passed Class A"
 - iii. NFPA 285 Tested
 1. EVOLVE/larson® Assembly: FR Core Only
 2. EVolve/Eval® Assembly: FR Core Only

2.02 MATERIAL

SPEC NOTE: Delete items not required

A. ACM Wall Panel Systems

- a. EVOLVE Architectural Panels by NexGen Metal Design Systems. [Pressure Equalized Rainscreen] [wet-seal] [dry-seal] wall cladding.
- b. Thickness: [4 mm (0.157")] [6 mm (0.250")].
- c. Panel Depth: (1.75") from face of panel to substrate.
- d. Core: [Polyethylene (PE)] [Fire Rated (FR)].
- e. Aluminum Composite Material: [Larson aluminum faced composite panel by Alucoil] or approved alternate.
- f. Manufacturer's standard, as shown on drawings, and as follows:
 - i. Z-girts: [18 ga.; 16 ga.] steel galvanized to ASTM A653 G90.
 - ii. Aluminum Extrusions: EVOLVE extrusions, mill finish (6061-T6).

2.03 FABRICATION

A. ACM Wall Panels

- a. [PE ACM Pan Formed Panel: Comprised of a polyethylene extruded core sandwiched between two nominal 0.020" coil coated 3000 or 5000 series aluminum skins.]

- b. [FR ACM Pan Formed Panel: Comprised of a one-hour fire retardant, mineral-filled, fire-resistant extruded core sandwiched between two nominal 0.020" coil coated 3000 or 5000 series aluminum skins.]
- B. Fabrication Method:
 - a. Rout and return system utilizing a CNC cutting technology to control cutting depth and vacuum bed for sheet support.
 - b. Prepare EVOLVE extrusions for securing to ACM panel in accordance with manufacturer's written instructions and in accordance with AAMA 508-07.
- C. Fabricated Panel Tolerances:
 - a. Length: Plus 1.6 mm (0.062 inch).
 - b. Width: Plus 1.6 mm (0.062 inch).
 - c. Depth: Plus or minus 0.2 mm (0.008 inch).
 - d. Panel Bow: 0.8 percent maximum of panel length or width.
 - e. Squareness: 5 mm (0.2 inch) maximum.
- D. Rainscreen Panels: Provide for positive drainage of condensation and water entering at joints to exterior face of wall in accordance with "Rain Screen Principles". Panels to have drainage holes in bottom of each panel measuring 3/8" (10mm) diameter on 24" (610mm) centers, to AAMA 508-07.

SPEC NOTE: Finishes below are shown as example only. Specify actual finish(es) as per ACM coil manufacturer; (see 2.01.B Manufacturers above)

- E. Finishes:
 - a. (PVdF) fluoropolymer containing 70% Kynar 500/Hylar 5000 resins to AAMA 620, select from color offerings [1. Coat solid, 2. Coat mica, 3. Coat metallic] color. [Full Range of Manufacturers Standard] [Custom] [Standard]
 - b. Custom: Colors to match samples specified within the contract documents.
 - c. Natural: MCM natural metals [Zinc, Stainless Steel, Copper, Brass, Brushed Aluminum].

PART 3 – EXECUTION

3.01 EXAMINATION

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

- B. Examine wall framing to verify that girts, angles, channels, studs, and other structural wall panel support members and anchorage have been installed within alignment tolerances required by wall panel manufacturer.
- C. Verify that weather barrier has been installed over sheathing or substrate to prevent air infiltration or water penetration.
- D. Examine rough-in for components and systems penetrating wall panels to coordinate actual penetration locations relative to wall panel joint locations prior to installation.
- E. Installer is to submit a written inspection report of wall substrate conditions to Architect, Contractor, and wall panel manufacturer prior to installation.
 - a. Identify dimensions in conflict with the approved submittal drawings.
- F. Proceed with wall panel production and installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protect Adjacent work areas and finished surfaces from damage by this Section of Work.

3.03 INSTALLATION

- A. Install wall panels in accordance with manufacturer's submittal drawings and installation instructions as provided.
 - a. Install panels plumb, level, and true, in accordance with manufacturer's approved submittal drawings and/or written instructions.
 - b. Allow for secondary drainage flashing, brackets, joint sealants or gaskets to manage the drainage of wall when called for by the manufacturer's approved drawings.
 - c. Anchor panels securely in place in accordance with ACM system fabricator's approved submittal drawings.
- B. Install wall panels for orientation, sizes, and locations as indicated on Drawings.
- C. Install wall panels with proper anchorage and other components for this Work securely in place.
- D. Install wall panels with provisions for thermal and structural movement.
- E. Install shims to plumb substrates as necessary for installation of wall panels.
- F. Install weather tight seals at perimeter of wall panel openings.
 - a. Test for proper adhesion on small unexposed area of solid surfacing prior to use.
 - b. Refer to Section [_____].

- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions.
 - a. Provide concealed fasteners where possible and set units true to line and level as indicated.
 - b. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - c. Install flashing and trim as wall panel Work proceeds.
- H. Install weather tight escutcheons for pipe and conduit penetrating exterior walls.
 - a. Use of sealants, gaskets, butyl tape at penetrations as detailed in the final approved submittal drawings is allowed.
- I. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by wall panel manufacturer.
- J. Install attachment system to support wall panels and with provisions to provide a complete weather tight wall system, including sub girts, extrusions, flashings and trim.
 - a. Include attachment to supports and trims at locations using dissimilar materials.
 - b. Do not apply sealants to joints, unless noted otherwise on Drawings or Shop Drawings.
 - c. Install starter at wall base and areas where cut panels are shown.
- K. Install accessories with positive anchorage to building and weather tight mounting and provisions for thermal expansion, and coordinate installation with flashings and other components.
 - a. Install components required for a complete wall panel assembly including trim, copings, flashings and other accessory items.
- L. Weather Barrier: Install weather barrier behind wall panels and over substrate in accordance with requirements of Section [_____].
- M. Provide written certification from installer that all work was completed per the approved drawings.

3.04 TOLERANCES

- A. Shim and align wall panel units with installed tolerances of 1/4 inch in 20 feet, non-cumulative, on level, plumb, and location lines as indicated.

3.05 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Upon owner's request, engage a aluminum composite manufacturer's service representative to assist with the initial wall panel installation, and to include accessories and inspect completed metal wall panel installation.
 - a. Provide service on the mock-up and on the initial 300 SF of actual work.
 - b. Provide written field report within ten (5) working days of the last day of site work.
- B. Installer shall remove and replace metal wall panels where inspections indicate that they do not comply with specified requirements.
- C. Perform additional inspections, at Contractor's expense, to verify compliance of replaced wall panels or necessary additional work with specified requirements.
- D. Installer shall prepare and submit progress reports weekly to the Contractor and Manufacturer until completion. Include total panels installed, crew size, and areas covered.

3.06 CLEANING

- A. Upon completion of wall panel installation, clean finished surfaces as recommended by panel manufacturer.
- B. Upon completion of wall panel installation, clear any weep holes and drainage channels of obstructions and dirt.

3.07 PROTECTION

- A. Protect installed products from damage during subsequent construction work by other trades.
- B. Replace wall panels damaged or deteriorated beyond successful repair by finish touch-up or similar minor repair procedures.

END OF SECTION