

## 07430: ALUMINUM COMPOSITE CLADDING PRODUCTS

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### PART 1: GENERAL

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#### 1.01 SCOPE

##### A. SECTION INCLUDES:

1. The extent of panel system work is indicated on the drawings and in these specifications.
2. Panel system requirements include the following components:
  - a. Aluminum faced composite panels with mounting system. Panel mounting system including anchorages, shims, furring, fasteners, gaskets and sealants, related flashing adapters, and protective film (as required) for a complete installation.
  - b. Wall cladding, parapet coping, column covers, soffit, sills, border, and filler items indicated as integral components of the panel system or as designed.

##### B. RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections, and Technical Specification Divisions 2 through 16 apply to this Section.

##### C. RELATED WORK SPECIFIED ELSEWHERE:

1. Section 05100: Structural Steel
2. Section 05400: Cold Formed Metal Framing
3. Section 06100: Back Up Walls
4. Section 07200: Insulation
5. Section 07270: Air Water Barriers
6. Section 07480: Exterior Sheathing
7. Section 07600: Metal Flashing and Counter Flashing
8. Section 07920: Caulking and Sealants

#### 1.02 QUALITY ASSURANCE

1. Composite Panel System Fabricator shall have a minimum of 10 years experience in the manufacturing of this product.
2. Installer shall have experience installing metal cladding system similar to that required for a period of not less than 10 documented years.
3. Maximum deviation from vertical and horizontal alignment of erected panels: 1/4" in 20' non-accumulative.
4. Panel fabricator/installer shall assume undivided responsibility for all components of the exterior panel system including, but not limited to attachment to sub-construction, panel to panel joinery, panel to dissimilar material joinery, and joint seal associated with the panel system.
5. Shop Drawings shall be prepared by the Fabricator of the Cladding systems.
6. Systems shall have been previously tested for Performance criteria specified herein.
7. Panels will be back-cut for bends and the perimeters pattern cut to within .040" plus or minus tolerances through the use of CNC programmable router table or equivalent.
8. To assure a high quality wall system the appropriate air and water barrier should be installed on the substrate behind the metal wall panels.

#### 1.03 REFERENCES

##### A. AMERICAN SOCIETY FOR TESTING AND MATERIALS

1. E 331: Structural Performance of Exterior Windows, Curtain Walls, and Doors Under the Influence of Wind Loads
2. E 238: Rate of Leakage through Exterior Windows, Curtain Walls, and Doors
3. D 1781: Climbing Drum Peel Test for Adhesives

4. E 84: Surface Burning Characteristics of Building Materials
5. E 162: Surface Flammability of Materials Using a Radiant Heat Energy Source
6. D 3363: Method for Film Hardness by Pencil Test
7. D 2794: Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
8. D 3359: Methods for Measuring Adhesion by Tape Test
9. D 2247: Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
10. B 117: Method of Salt Spray (Fog) Testing
11. D 2244: Calculation of Color Differences from Instrumentally Measured Color Coordinates
12. D 4214: Evaluating the Degree of Chalking of Exterior Paint Films
13. D 822: Practice for Operating Light and Water Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products
14. D 1308: Effect of Household Chemicals on Clear and Pigmented Organic Finishes

#### **1.04 SUBMITTALS**

##### **A. SUBMITTALS:**

1. Submittals shall be in conformance with this section and with the general conditions.

##### **B. SAMPLES:**

1. Panel System Assembly: Two samples of typical assembly, 12" x 12" minimum.
2. Two samples of each color or finish selected, 3" x 4" minimum.

##### **C. SHOP DRAWINGS:**

Submit shop drawings showing project layout and elevations, fastening and anchoring methods, detail and location of joints, sealants including joints necessary to accommodate thermal movement, trim, flashing, and accessories.

##### **D. CALCULATIONS:**

Provide calculations or wind load charts prepared by a professional engineer certifying the system's compliance with design pressures for panel deflection and fastener loads.

##### **E. SECONDARY SUPPORTS DESIGN:**

Design, fabricate, and install secondary structural components of the metal cladding system (which may be required in conditions of beam or column enclosures, cornices or other three dimensional shapes) with a factor of safety not less than 1.5 (basis for design calculations shall be 1.5 times the maximum design wind pressure), such that failure of any panel component shall not occur at less than 1.5 times the maximum design wind pressure. Failure is defined as breakage, component disengagement, or permanent distortion.

#### **1.05 WARRANTY**

##### **A. SUBMIT IN ACCORDANCE WITH DIVISION 1 – CLOSEOUT SUBMITTALS.**

##### **B. WORKMANSHIP WARRANTY:**

1. Written warranty signed by manufacturer and installer warranting that portions of the work involving metal panels are of good quality, free from defects, and in conformance with the requirements of the Contract Documents. Further guarantee to repair or replace defective work during a one year period following Substantial Completion of the work.
2. Defective is defined to include failure of the system to meet structural performance requirements and/or permanent deformation resulting from pressures within the design criteria.

##### **C. FINISH WARRANTY:**

1. The Aluminum Composite Material manufacturer shall warrant the finish in accordance with AAMA 2605 for 20 years against Max 5 fade based on ASTM D2244 and Max 8 chalk based on ASTM D4212 and delamination of the paint finish. Upon notification of defects within the warranty period, make necessary repairs or replacement at the convenience of the owner.
2. The Aluminum Composite material manufacturer shall warrant for a period of 5 years the bond integrity of the sheet material.

- D. WARRANTY SHALL SPECIFICALLY INCLUDE THE APPLICABLE WORK OF THE FOLLOWING SECTIONS OF THE SPECIFICATIONS.
1. Section 07600 - Flashing and Sheet Metal.
  2. Section 07900 - Joint Sealants.

**1.06 DELIVERY, STORAGE AND HANDLING:**

- A. Deliver units and other components so they will not be subject to damage or deformation. Deliver panel units in crates designated for specific locations on the building as coordinated between GC and installer. Crates shall be able to withstand hoisting loads relevant to the project.
- B. Storage: Stack components off the ground/floor on suitable skids in fully enclosed space. Protect against warpage, scratches, damage from moisture, exposure to direct sunlight and other surface contamination.
- C. Handling: Exercise care in loading, unloading, storing, and installing units so as to preclude bending, warping, twisting, and surface damage.

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**PART 2: PRODUCTS**

**2.01 PANELS**

- A. COMPOSITE PANELS SYSTEM:
1. Fabricators offering products which may be incorporated in the work, but are not limited to, the following:
    - a. Basis of Design is **Metalwërks® Arcwall-ACM** by Metal Sales & Service Inc. of Kennett Square, Pa 19348 ( 800-321-7816 or website: www.metalwerksusa.com)
    - b. Substitutions will be considered in accordance with Division 1- Product Substitution Procedures.
  2. Continuous Panel Frame:
    - a. Extruded aluminum frames are continuous 6063-T6 profiles which are factory assembled with the face skins to make up a panel unit.
    - b. Panel frames are mechanically corner keyed to form a monolithic assembly.
    - c. Systems relying on ACM sheet material with intermittent attachment clips alone will not be considered.
  3. Intermediate Panel stiffeners, where required by design loads applied to the panels, 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.
  4. Panel fasteners: Stainless Steel or Cadmium plated fasteners for panel attachment in size and spacing as dictated by structural requirements.
  5. Anchorage system: Shall be designed so that panels are secure yet free floating to accommodate thermal expansion and contraction. Attachment clips will be designed to slide into and mate with continuous panel frame members. Clips are pre-punched and spaced to accommodate structural design requirements.
  6. Panel joints will be sealed in the field with a nominal 5/8" joint sealer consisting of backer rod and caulking as recommended by the panel system supplier to meet system performance requirements.
  7. Panel facing: Panel face skins will be mechanically pattern cut and bend lines back-routed using CNC programmable equipment which will replicate tolerances down to .040" max.

**2.02 MATERIALS**

- A. GENERAL:
1. Facing Material shall be selected from one of the following (**Select one thickness only**):
    - a. 4mm thick (.158") Polyethylene core aluminum composite material made up of an interior and exterior skin of .020" thick coated aluminum sheets chemically bonded to a polyethylene core as supplied by:
      - 1) Reynobond® as manufactured by Alcoa Cladding Systems.
      - 2) Alucobond® as manufactured by Alcan Composites USA.

- b. 6mm thick (.237") Polyethylene core aluminum composite material made up of an interior and exterior skin of .020" thick coated aluminum sheets chemically bonded to a polyethylene core.
- 2. Physical characteristics of the facing material are as follows:
  - a. Bond Integrity: When tested for bond integrity, in accordance with ASTM D 1781 (simulating resistance to panel de-lamination), 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:
    - Peel Strength:
      - 100 N·mm/mm (22.5 in-lb/in) as manufactured
      - 100 N·mm/mm (22.5 in-lb/in) after 8 hours in water at 200°F (93°C)
      - 100 N·mm/mm (22.5 in-lb/in) after 21 days soaking in water at 70°F (21°C)
  - b. Fire Performance:
    - 1) ASTM E 84: Flame spread 0, Smoke developed 0
    - 2) ASTM E 162: No surface flaming
    - 3) UBC 17-5: No flame spread along interior face or penetration through the wall assembly.

**B. COMPOSITION:**

Two sheets of aluminum sandwiching a solid core of extruded thermoplastic material formed in a continuous process with no glues or adhesives between dissimilar materials. The core material shall be free of voids and/or air spaces and not contain foamed insulation material. Products laminated sheet by sheet in a batch process using glues or adhesives between materials shall not be acceptable.

**C. ALUMINUM FACE SHEETS:**

Thickness: 0.5mm (0.019") nominal  
 Alloy: AA3105 H25 Series (Painted material)

**D. PANEL WEIGHT:**

- 1. 4mm (0.158"): 5.47 kg/m<sup>2</sup> (1.12 lb/ft<sup>2</sup>)
- 2. 6mm (0.236"): 7.28 kg/m<sup>2</sup> (1.49 lb/ft<sup>2</sup>)

**E. TOLERANCES:**

- 1. Panel Bow: Maximum 0.8% of any 1828mm (72") panel dimension.
- 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.
- 3. Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.
- 4. Maximum deviation from panel flatness shall be 1/8" (3.2mm) in 5'0" (1.52m) on panel in any direction for assembled units. (Non-accumulative - No Oil Canning)

**2.03 FINISHES**

- A. Fluoropolymer Two or Three Coat Coating System: Manufacturer's standard two or three coat, thermo-cured system composed of specially formulated inhibitive primer, fluorocarbon color coat, and a clear fluorocarbon topcoat (applicable with three coat system). Both color coat and clear topcoat shall contain not less than 70% polyvinylidene resin by weight in compliance with AAMA 2605 for testing, performance, and application procedures.
  - 1. Coil coated Kynar® 500 or Hylar® 5000 based Polyvinylidene Fluoride (PVDF) or Fluoro Ethylene – Alkyl Ether (FEVE) resin in conformance with the general requirements of AAMA 2605.
  - 2. Standard colors as selected by the Architect/Engineer from manufacturer's standard color charts.
  - 3. Custom colors are available and are subject to minimum quantities. Consult Sales Dept.

**2.04 DESIGN CRITERIA**

- A. Composite panels shall be capable of withstanding building movements and weather exposures based on the following test standards required by the Architect and/or the local building code.
  - a. Wind Load

Panels shall be designed to withstand the Design Wind Load specified herein as Positive \_\_\_\_ PSF & Negative \_\_\_\_ PSF at typical zones and Positive \_\_\_\_ PSF & Negative \_\_\_\_ PSF at corner zones. Wind load testing shall be conducted in accordance with ASTM E 330 to obtain the following results.

Normal to the plane of the wall between supports, deflection of the secured perimeter framing members shall not exceed  $L/175$  or  $\frac{3}{4}$ " whichever is less.

Normal to the plane of the wall, the maximum panel deflection shall not exceed  $L/60$  of the full span. Permanent deformation of the panel system shall not exceed 0.2% of the clear span.

b. Air and Water Infiltration Tests

If system tests are not available, mock-ups shall be constructed and tests performed under the direction of an independent third party laboratory, which show compliance to the following minimum standards:

Static Pressure Air Infiltration: ASTM E 283, the air infiltration test will be conducted at a 6.24 psf pressure differential. Allowable air leakage shall not exceed 0.06 cfm/ft<sup>2</sup> of the fixed wall area. A chamber tare calibration will be performed immediately prior to the air infiltration test.

Static Pressure Water Resistance: ASTM E 331, a 15 minute water penetration test will be conducted on the wall system with a water application rate of 5 gal/hr/ft<sup>2</sup> at a pressure differential of 15.0 psf. No uncontrolled water penetration is allowed.

Dynamic Pressure Water Resistance: AAMA 501.1, a 15 minute water penetration test will be conducted on the system with a water application rate of 5 gal/hr/ft<sup>2</sup> and dynamic air stream equivalent to static pressure of 15.0 psf. No uncontrolled water penetration is allowed.

## 2.05 ACCESSORIES

1. Sealants within the panel system shall be as per manufacturer's standards to meet performance requirements.
2. Internal Flashing: sheet metal flashing which may be required at base or penetration conditions will be produced in the same material finish as the adjacent panels but will be provided in minimum .040" thickness or 24 ga 304 2B Stainless Steel.
3. Coping: Wall copings will be produced with the same material as the wall panel system unless otherwise noted. Sheet Metal Flashing extensions will be acceptable in non-viewing areas in accordance with Manufacturer's recommended details.
4. Furring/Supports: Wall panels will be attached to minimum 16 ga. g-90 steel studs or furring.
5. Fasteners: Stainless Steel or Cadmium plated as recommended for specific application.
6. Shims: High impact plastic shims will be used to maintain planar surfaces.

## PART 3: EXECUTION

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### 3.01 INSPECTION

1. Surfaces to receive panels shall be even, smooth, sound, clean, dry and free from defects detrimental to work. Notify contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with erection until unsatisfactory conditions have been corrected.
2. Surfaces to receive panels shall be structurally sound as designed by the project Architect/Engineer.

### 3.02 INSTALLATION

1. Erect panels plumb, level, and true.
2. Attachment system shall allow for the free vertical and horizontal thermal movement due to expansion and contraction for a material temperature range of -20°F to +180°F (-29°C to +82°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.
3. Panels shall be erected in accordance with an approved set of shop drawings.
4. Anchor panels securely and in accordance with approved shop drawings to allow for necessary thermal movement and structural support.
5. Conform to panel fabricator's instructions and/or approved shop drawings for installation of concealed fasteners.
6. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded, and broken members.

7. Do not cut, trim, weld, or braze component parts during erection in a manner which would damage the finish, decrease strength, or result in visual imperfection or a failure in performance. Return component parts which require alteration to shop for re-fabrication, if possible, or for replacement with new parts.
8. Separate dissimilar metals where needed to eliminate the possibility of corrosive or electrolytic action between materials.
9. Installation Tolerances: Shim and align panel units within installed tolerances of 1/4 inch in 20 feet, non-cumulative, on level/plumb/slope and location/line as indicated, and within 1/16 inch offset of adjoining faces and of alignment of matching profiles.

**3.03 ADJUSTING AND CLEANING**

1. Remove and replace panels damaged beyond repair as a direct result of the panel installation. After installation, panel repair and replacement shall become the responsibility of the General Contractor.
2. Repair panels with minor damage.
3. Remove protective film as soon as possible after installation.
4. Any additional protection, after installation, shall be the responsibility of the General Contractor.
5. Final cleaning shall not be part of the work of this section.