

SECTION 07420

Exterior Aluminum Cladding System (ACM)

Part 1: General

1.01 SCOPE

- A. The extent of panel system work is indicated on the drawings and in the Architect of Record's specifications. In the event of discrepancy between architectural drawings and specifications, the specifications will dictate.
- B. Panel system requirements include the following components: Aluminum faced composite panels with mounting system. Panel mounting system including an approved vapor permeable air and water barrier, anchorages, shims, furring, fasteners, gaskets and sealants, related flashing adapters, and masking (as required) for a complete installation.

1.02 QUALITY ASSURANCE

- A. Aluminum Composite Material (ACM) Manufacturer shall have a minimum of 10 years' experience in the manufacturing of this product.
- B. ACM Manufacturer must be approved to participate in this program.
- C. ACM Manufacturer shall be solely responsible for panel manufacture and application of the finish.
- D. Fabricator and Installer shall be acceptable to the composite panel manufacturer.
- E. A Project Manager shall be assigned by the Fabricator/Installer to the project and provide continuous management of all submittals, engineering, shop drawings, material procurement, fabrication, jobsite coordination and installation.
- F. Project schedules shall be provided by the Fabricator/Installer at the time the contract is awarded. This schedule is to be updated throughout the construction process.
- G. A jobsite Superintendent shall be assigned by the Fabricator/Installer to the project and will make jobsite visits to ensure General Contractor is installing substrate and sheathing correctly. It is imperative that the substrate is plumb, level and string-line straight. Superintendent shall also verify that the substrate dimensions match the metal wall panel engineered shop drawings.
- H. Field measurements shall be taken prior to the completion of shop fabrication whenever possible. Fabricator/Installer shall coordinate fabrication schedule with construction progress, as directed by the Contractor, to avoid delay of work. Field fabrication may be allowed to ensure proper fit; however, field fabrication shall be kept to an absolute minimum with most of the fabrication being done under controlled shop conditions.
- I. Flatness Criteria of the installed panel system: maximum of 1/4" in 20'-0" on panel in any direction.

- J. Panel fabricator/installer shall assume undivided responsibility for all components of the exterior panel system including, but not limited, to the vapor-permeable air and water barrier, attachment to sub-construction, panel to panel joinery, panel to dissimilar material joinery, and joint seal associated with the panel system.
- K. Prior to installation of panel system, the fabricator/installer shall apply an approved vapor- permeable air and water barrier over the building sheathing, as well as verify the type of sheathing to determine compatibility of panel system fasteners. It is the responsibility of the fabricator/installer to coordinate this with the General Contractor.

1.03 RELATED SECTIONS

Related Sections include the following:

- A. Division 5 Section "Cold-Formed Metal Framing" for secondary support framing supporting metal wall panels.
- B. Division 7 Section "Flashings" for perimeter openings related to metal wall panels.
- C. Division 7 Section "Sealants" for perimeter and non-exposed system sealants.
- D. Division 8 Section "Curtain wall" for perimeter openings related to metal wall panels.

1.04 SUBMITTALS

A. SAMPLES

- 1. Two samples of each color or finish selected, 76mm (3") x 102mm (4") minimum.
- 2. Two samples of vapor-permeable air and water barrier

B. SHOP DRAWINGS

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

C. WARRANTIES—Special warranty specific to this program, see 3.04.

D. TWO COPIES OF THE MANUFACTURER'S LITERATURE FOR PANEL MATERIAL.

E. CODE COMPLIANCE

Submit Florida Product Approval packet.

F. TEST REPORTS: Submit certified test reports which meet or exceed the requirements as described in the Testing Section 2.04. The test report shall include the following,

- 1. Name and location of the certified independent testing laboratory with the contact phone numbers.
- 2. Unit description and system name of the panel system tested. Include the test drawings with elevations with details showing the tested panel joinery.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Protect finish and edges in accordance with panel manufacturer's recommendations.
- B. Store material in accordance with panel manufacturer's recommendations.

PART 2: PRODUCTS

2.01 PANELS

A. 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.

Approved Program Manufacturers – NO SUBSTITUTIONS:

3A Composites – Alucobond (800-626-3365)

Mitsubishi Chemical Composites, Inc.– Alpolic (800-622-1066)

B. THICKNESS:4MM (0.157")

C. PRODUCT PERFORMANCE

1. Bond Integrity

When tested for bond integrity, in accordance with ASTM D 1781 (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 minimum 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)

D. FINISHES

ACM 1: Alpolic Color, CPW White (Cadillac White) / 4 MM / 4CPW8
Alucobond Color, Cadillac White III / 2002186 / BN5W11B

ACM 2: Alpolic Color, Mica MNC (Mica Silver) / 4MM / 4MNC8
Alucobond Color, Anodic Clear Mica / PVDF 2

ACM 3: Alpolic Color, CNC Charcoal (Charcoal) / 4MM / 4CNC8
Alucobond Color, Dusty Charcoal / PVDF 2

a. Coating Thickness:

2 coat finish: .2-.4 primer, .7-.9 color, total 1.0 mil (± 0.1 mil), 25.4 µm (± 2.5 µm)

3 coat finish: .2-.4 primer, .7-.9 color, .5 clear, total 1.5 mil (± 0.15 mil), 38.1 µm (± 3.8 µm)

b. Hardness: ASTM D 3363; HB minimum using Eagle Turquoise Pencil.

c. Impact:

1) Test method: ASTM D 2794; Gardner Variable Impact Tester with 5/8" (15.9mm) mandrel.

2) Coating shall withstand reverse impact of 1.5 in·lb per mil substrate thickness (0.681 m·kg per mm substrate).

- 3) Coating shall adhere tightly to metal when subjected to #600 Scotch Tape pick-off test. Slight minute cracking permissible. No removal of film to substrate.
- d. Adhesion:
 - 1) Test Method: ASTM D 3359.
 - 2) Coating shall not pick off when subjected to a grid of 11 cuts x 11 cuts, 1/16" apart, and taped with #600 Scotch Tape.
- e. Humidity Resistance:
 - 1) Test Method: Expose the sample in a controlled heat and humidity cabinet for 4000 hours at 38 degrees C (100 degrees F) and 100% RH with the cabinet operated in accordance with ASTM D 2247.
 - 2) No formation of blisters to extent greater than "Few" blisters Size No.8 as shown in Figure 4, ASTM D 714.
- f. Salt Spray Resistance:
 - 1) Test Method: ASTM B 117; Expose coating system to 4000 hours, using 5% NaCl solution.
 - 2) Corrosion creepage from scribe line: 1/16" max. (1.6mm).
 - 3) Minimum blister rating of 8 within the test specimen field.
- g. Weather Exposure:
 - 1) Outdoor:
 - a. In accordance with the parameters of the South Florida Testing, ten-year exposure at 45° angle facing south Florida exposure.
 - b. Maximum color change of 5 Delta E units as calculated in accordance with ASTM D 2244.
 - c. Maximum chalk rating of 8 in accordance with ASTM D 4214.

2.02 SYSTEM DESCRIPTION

- A. Provide a Rout and Return Dry Joint panel system, as detailed on the Architect of Record's drawings. Any panel system utilizing a continuous field applied joint sealant is unacceptable. Exposed sealant in the 4-way joints is unacceptable.
- B. The panel system, as detailed, shall consist of perimeter extrusions, extruded stiffeners, fasteners and may consist of related flashings (where architectural drawings indicate they are to be furnished under this specification section), sealants between jamb panels and previously installed adjacent construction, and other miscellaneous accessories required for a complete watertight installation. Assembly shall meet the air and water infiltration requirements in section 2.04 of this specification.
- C. Commercial grade vapor-permeable air and water barrier shall be installed by the General Contractor per manufacture specification. All edges must be sealed to adjacent perimeter conditions for an airtight fit.
Approved Program Manufacturers
 1. TYVEK Commercial Wrap
 2. VAPRO SHIELD
 3. W.R Grace Peel n' Stick

2.03 COMPOSITE PANEL SYSTEM

- A. Fabricator/Installers; AGI
Contact: Jerry Cronley, Architectural Graphics Incorporated Phone (865) 323-3560
Email: jcronley@agisign.com
- B. Panel System: The panel system shall consist of ACM provided by one of the approved program vendors and a system of custom aluminum extrusions of size and shape indicated on the Architect

of Record's drawings and as specified herein. The panel system shall conform to all of the following,

1. Perimeter Extrusions: Mill extruded aluminum, as detailed on drawings, so as to provide the following essential features,
 - a. Rout and return the ACM panels on all perimeters. "Continuous Edge Grip" (CEG) is not acceptable.
 - b. Maximum overall panel thickness, including the attachment shim space, shall not exceed 2 1/2".
 2. Stiffeners: Extruded aluminum sections secured to edge trim and bonded to rear face of ACM panels with silicone, and of sufficient size and strength to maintain flatness of the panel within the specified tolerances.
 3. Reveals at Panel: Joint size between the faces of the perimeter extrusions shall be 3/4" nominal, painted to match adjoining panels.
 4. Flatness Criteria: Maximum 1/8" in 5'-0" on panel in any direction for assembled units (non-accumulative) and 1/4" in 20'-0" (accumulative).
- C. Code Performance Requirements: Work of the section shall conform to all applicable codes and regulations.
1. Thermal Design Criteria:
 - a. Make allowances for free and noiseless vertical and horizontal thermal movement due to the contraction and expansion of component parts, for an ambient temperature range from -20 degrees F to +180 degrees F. Buckling of panels, separation/opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement of component parts will not be permitted. Fabrication, assembly, and erection procedure shall take into account the ambient temperature range at the time of the respective operation.
 2. Wind Loads: See structural drawings for components and cladding. Product to surpass requirements of the worst case shown.
 3. Material Stress and Deflection:
 - a. Normal to the plane of the wall between structural supports, deflection of the attached perimeter-framing members shall not exceed L/175 of span length or 3/4", whichever is less.
 - b. At connection points of framing members to anchors, anchor deflection in any direction shall not exceed 1/16". Where connection points are not clearly defined, maximum anchor deflection shall not exceed 1/16".
 - c. Stresses must take into account interaction and in no case shall allowable values exceed the yield stress.
 - d. At 1.5 times design pressure, permanent deflections of framing members must not exceed L/100 of the span length, and components must not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed 1/16".

2.04 TESTING

- A. Wall System Performance: Panel system furnished under this section shall have been tested. If comparable tests are not available, mockups shall be constructed, and tests performed. In either case, an independent laboratory approved by the Architect of Record shall conduct the tests. Test results shall meet or exceed the following.
1. Air Infiltration:
 - a. When tested in accordance with ASTM E283, the air infiltration at 6.24 psf must not exceed 0.06 cfm per square foot of wall area.
 2. Static Water Infiltration:
 - a. When tested at a differential static pressure of 12.0 psf for 15 minutes, in accordance with ASTM E331, any uncontrolled water passing into the room-side beyond the interior barrier of the wall system shall not be permitted. The panel system shall be designed to provide

controlled drainage to the exterior face of the wall for any leakage of water occurring at joints and/or condensation taking place within the wall system.

3. Structural Performance:
 - a. Shall be tested in accordance with ASTM E330 at design pressure. Deflection limitations are listed previously. After initial test, test at 150% of design pressure; no permanent deformation exceeding L/100 or failure to structural members allowed.

- B. Bond Integrity Test for ACM: In accordance with ASTM D 1781-76 for bond integrity, simulating resistance to delaminating (No other test procedure is acceptable):
 1. Peel strength: 22.5 in lb/in (min)

2.05 PRODUCT HANDLING

After acceptance of panels on a given elevation, protection shall be the responsibility of the General Contractor.

3.0 INSTALLERS' EXAMINATION—Fabricator/Installer

- A. Examine substrates, areas and conditions for compliance with requirements for installation tolerances, metal wall panel supports, approved vapor-permeable air and water barrier and other conditions affecting performance of work.
 1. Examine solid wall sheathing to verify that sheathing joints are supported by framing or blocking, and that installation is within flatness tolerances required by metal wall panel manufacturer.
 2. Verify approved vapor-permeable air and water barrier is installed correctly prior to installation of ACM system.
 3. For the record, prepare a written report, endorsed by Fabricator/Installer, listing conditions detrimental to performance of work.
- B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal wall panel installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of installation indicates that the substrate is 100% satisfactory to the installer.

3.01 METAL –FACED COMPOSITE WALL PANEL INSTALLATION

- A. General: Install attachment system required to support wall panels and to provide a complete weather tight wall system, including approved vapor-permeable air and water barrier, 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 approved vapor-permeable air and water barrier and flashings that will be concealed by composite panels are installed.
 3. Panels shall be erected in accordance with an approved set of shop drawings.
 4. Anchor panels, securely per engineering recommendations and in accordance with approved shop drawings to all for necessary thermal movement and structural support.
 5. Conform to panel fabricator's instruction 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 refabrication, if possible, or for replacement with new part.

3.02 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal wall panel assembly including approved vapor-permeable air and water barrier, trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions and SMACNA's "Architectural Sheet Metal Manual". Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints and seams that will be permanently watertight and weather resistant.
 - 1. Install exposed flashing and trim that is without excessive oil canning, bucking and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 - 2. Fabricate flashing materials from .040 minimum thickness aluminum sheet painted to match the adjacent curtain wall/panel system where exposed.
 - 3. Expansion Provisions: provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3meters) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant or waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.03 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in, manufacturer's written installation instructions. On the completion of metal wall panel installation, clean finished surfaces as recommended by metal wall panel manufacturer. Maintain a clean condition during construction.
- B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07420

