

SECTION 07 40 00
ROOFING AND SIDING PANELS

PART 1 - GENERAL

1.1 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 masking (as required) for a complete watertight installation.

B. Related documents

Drawings and general provisions of the Contract, including General Requirements, Division 1 Specification Sections, and Technical Specification Divisions 02 through 09 apply to this Section.

1.2 QUALITY ASSURANCE

- A. Composite Panel Manufacturer shall have a minimum of 10 years experience in the manufacturing of this product.
- B. Composite Panel Manufacturer shall be solely responsible for panel manufacture and application of the finish.
- C. Fabricator/installer shall be acceptable to the composite panel manufacturer.
- D. Fabricator/Installer shall have a minimum 5 years experience of metal panel work similar in scope and size to this project.
- E. Field measurements should be taken prior to the completion of shop fabrication whenever possible. However, 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 the majority of the fabrication being done under controlled shop conditions.
- F. Shop drawings shall show the preferred joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on the inside face of the panel system as determined by ASTM E 331. Systems not utilizing a construction sealant at the panel joints (i.e. Rout and Return Dry) shall provide a means of concealed drainage with baffles and weeps for water which may accumulate in members of the system.
- G. Maximum deviation from vertical and horizontal alignment of erected panels: 6mm (1/4") in 6m (20') non-accumulative.
- H. 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.

- J. Composite panel manufacturer shall have established a Certification Program acceptable to the local Code Authorities.

1.3 REFERENCES

A. Aluminum Association

- A. AA-C22-A41: Anodized - Clear Coatings.

B. American Architectural Manufacturers Association

- A. AAMA 508-05: Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems

C. American Society For Testing And Materials

- A. E 330 Structural Performance of Exterior Windows, Curtain Walls, and Doors Under the Influence of Wind Loads
B. E 283 Rate of Leakage through Exterior Windows, Curtain Walls, and Doors
C. D 1781 Climbing Drum Peel Test for Adhesives
D. E 84 Surface Burning Characteristics of Building Materials
E. D 3363 Method for Film Hardness by Pencil Test
F. D 2794 Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
G. D 3359 Methods for Measuring Adhesion by Tape Test
H. D 2247 Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
I. B 117 Method of Salt Spray (Fog) Testing
J. D 822 Practice for Operating Light and Water Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products
K. D 1308 Effect of Household Chemicals on Clear and Pigmented Organic Finishes
L. D 1735 Method for Water Fog Testing of Organic Coatings.
M. D 1929 Standard Test Method for Determining Ignition Temperature of Plastics
N. D 635 Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position

1.4 SUBMITTALS

- A. Submittals shall be in conformance with section 01 33 23, SHOP DRAWINGS, PRODUCT DATA & SAMPLES.
- B. Samples
 - A. Panel System Assembly: Two samples of each type of assembly. 304mm (12") x 304mm (12") minimum.
 - B. Two samples of each color or finish selected, 76mm (3") x 102mm (4") minimum.
- C. 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.
- D. Affidavit certifying material meets requirements specified.
- E. Two copies of manufacturer's literature for panel material.
- F. Code compliance
Documents showing product compliance with the national and local building code shall be submitted prior to the bid. These documents shall include, but not be limited to, appropriate Evaluation Reports and/or test reports supporting the use of the product.

1.5 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

2.1 COMPOSITE PANELS

- A. THICKNESS: 6MM (0.236")
- B. PRODUCT PERFORMANCE
 - 1. 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:

Peel Strength: 115 N mm/mm (22.5 in lb/in) as manufactured

115 N mm/mm (22.5 in lb/in) after 21 days soaking in water at 70°F

2. Fire Performance

ASTM E 84 Flame Spread Index must be less than 25, Smoke Developed Index must be less than 450.

ASTM D 1929 A self ignition temperature of 650°F or greater

ASTM D-635 Requires a CCl classification

C. FINISHES

1. Coil coated KYNAR® 500 or HYLAR® 5000 based Polyvinylidene Fluoride (PVDF) or Fluoro Ethylene - Alkyl Vinyl Ether (FEVE) resin in conformance with the following general requirements of AAMA 2605.

- a. Color: Clear coat over pretreated natural and brushed aluminum substrates.

- b. Coating Thickness: 0.50 mil (± 0.05 mil).

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

- d. Impact:

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

- 2) Coating shall withstand reverse impact of 1.5"/pounds per mil substrate thickness.

- 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.

- e. Adhesion:

- 1) Test Method: ASTM D-3359.

- 2) Coating shall not pick off when subjected to an 11" x 11" x 1/16" grid and taped with #600 Scotch Tape.

- f. Humidity Resistance

- 1) Test Method: ASTM D-2247.

- 2) No formation of blisters when subject to condensing water fog at 100% relative humidity and 100°F for 4000 hours.

- g. 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.

- 3) Minimum blister rating of 8 within the test specimen field.

- h. Weather Exposure

- 1) Outdoor:

1. Ten-year exposure at 45° angle facing south exposure.

2. Maximum color change of 5 Delta E units as calculated in accordance with ASTM D-2244.
 3. Maximum chalk rating of 8 in accordance with ASTM D-4214.
 4. No checking, crazing, adhesion loss.
- i. Chemical Resistance:
- 1) ASTM D-1308 utilizing 10% Muriatic Acid for an exposure time of 15 minutes. No loss of film adhesion or visual change when viewed by the unaided eye.
 - 2) ASTM D-1308 utilizing 20% Sulfuric Acid for an exposure time of 18 hours. No loss of film adhesion or visual change when viewed by the unaided eye.
 - 3) AAMA 2605 utilizing 70% reagent grade Nitric Acid vapor for an exposure time of 30 minutes. Maximum color change of 5 Delta E units as calculated in accordance with ASTM D-2244.
- j. Anodized:
- 1) Color (Clear): AA-C22-A41 Architectural Class I Urethane Coating.

D. PANEL FABRICATION

1. 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.

2. ALUMINUM FACE SHEETS:

Thickness: 0.50mm (0.0197") (nominal)
Alloy: AA5000 Series (Anodized material)

3. PANEL WEIGHT: 6MM (0.236"): 1.59 LBS./FT²

4. TOLERANCES

- a. Panel Bow: Maximum 0.8% of any 1828mm (72") panel dimension.
- 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.
- c. Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.

- d. Maximum deviation from panel flatness shall be 1/8" in 5'0" on panel in any direction for assembled units. (Non-accumulative - No Oil Canning)

5. SYSTEM CHARACTERISTICS

- a. 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.
- b. 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.
- c. System shall comply with the applicable provisions of the "Metal Curtain Wall, Window, Storefront, and Entrance Guide Specifications Manual" by AAMA and ANSI/AAMA 302.9 requirements for aluminum windows.
- d. Fabricate panel system to dimension, size, and profile indicated on the drawings based on a design temperature of 70°F.
- e. Fabricate panel system so that no restraints can be placed on the panel, which might result in compressive skin stresses. The installation detailing shall be such that the panels remain flat regardless of temperature change and at all times remain air and water tight.
- f. 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.

6. SYSTEM TYPE

- a. Rout and Return Dry: System must provide a perimeter aluminum extrusion with integral weather-stripping as detailed on shop drawings. Provide moisture barrier as shown on shop drawings.

7. SYSTEM PERFORMANCE

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

1) Wind Load

Panels shall be designed to withstand the Design Wind Load based upon the local building code, but in no case less than 20 pounds per square foot (psf) and 30 psf on parapet and corner panels. Wind load testing shall be conducted in accordance with ASTM E330.

2) Air/Water System Test

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.

Water Infiltration - Water infiltration is defined as uncontrolled water leakage through the exterior face of the assembly. Systems not using a construction sealant at the panel joints (i.e. Rout and Return Dry) 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.

8. 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. Stiffener material and/or finish shall be compatible with the silicone.
- c. Sealants and gaskets within the panel system shall be as per manufacturer's standards to meet performance requirements.
- d. Fabricate flashing materials from 0.030" minimum thickness aluminum sheet painted to match the adjacent curtain wall / panel system where exposed. Provide a lap strap under the flashing at abutted conditions and seal lapped surfaces with a full bed of non-hardening sealant.
- e. Fasteners (concealed/non-corrosive): Fasteners as recommended by panel manufacturer. Do not expose fasteners except where unavoidable and then match finish of adjoining metal.

PART 3 - EXECUTION

3.1 INSPECTION

- A. 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.

3.2 INSTALLATION

- A. Erect panels plumb, level, and true.
- B. Attachment system shall allow for the free and noiseless vertical and horizontal thermal movement due to expansion and contraction for a material temperature range of -20°F to +180°F. 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.

- C. Fabrication, assembly, and erection procedure shall account for the ambient temperature at the time of the respective operation.
- D. Panels shall be erected in accordance with an approved set of shop drawings.
- E. Anchor panels securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary thermal movement and structural support.
- F. Conform to panel fabricator's instructions for installation of concealed fasteners.
- G. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded, and broken members.
- H. 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 parts.
- I. Separate dissimilar metals and use gasketed fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.

3.3 ADJUSTING AND CLEANING

- A. 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.
- B. Repair panels with minor damage.
- C. Remove masking (if used) as soon as possible after installation. Masking intentionally left in place after panel installation on an elevation, shall become the responsibility of the General Contractor.
- D. Any additional protection, after installation, shall be the responsibility of the General Contractor.
- E. Make sure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- G. Final cleaning shall not be part of the work of this section.

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