

SECTION 084113 - ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following types of aluminum entrance and storefront work:
 - 1. Storefront-type framing system, interior and exterior.
 - 2. Aluminum entrances.
- B. Related Sections: The following sections contain requirements that relate to this Section:
 - 1. Division 4 Section "Unit Masonry" for adjacent surfaces.
 - 2. Division 8 Section "Glazing" for glazing inserts.
 - 3. Division 26 Section for electrical connections including conduit and wiring for door controls and operators

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum storefront assemblies that comply with performance characteristics specified, as demonstrated by testing the manufacturer's corresponding stock assemblies according to test methods indicated.
- B. Thermal Movement: Design the aluminum storefront framing systems to provide for expansion and contraction of the component materials.
 - 1. The system shall be capable of withstanding a metal surface temperature range of 180 deg F (100 deg C) without buckling, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, stress on glass, or other detrimental effects.
- C. Design Requirements: Provide aluminum storefront systems that comply with structural performance, air infiltration, and water penetration requirements indicated.
 - 1. Wind Loads: Provide aluminum storefront assemblies capable of withstanding the following wind pressures inward and outward acting normal to the plane of the wall. Design for 30 psf.
- D. Structural Performance: Conduct tests for structural performance in accordance with ASTM E 330. At the conclusion of the tests there shall be no glass breakage or permanent damage to fasteners, anchors, hardware or actuating mechanism. Framing members shall have no permanent deformation in excess of 0.2 percent of their clear span.
 - 1. Deflection Normal to the Plane of the Wall: Test pressure required to measure deflection of framing members normal to the plane of the wall shall be equivalent to the wind load specified

above. Deflection shall not exceed 1/175 of the clear span, when subjected to uniform load deflection test.

2. Deflection Parallel to the Plane of the Wall: Test pressures required to measure deflection parallel to the plane of the wall shall be equal to 1.5 times the wind pressures specified above. Deflection of any member carrying its full dead load shall not exceed an amount that will reduce glass bite below 75 percent of the design dimension and shall not reduce the edge clearance between the member and the fixed panel, glass or other fixed member above to less than 1/8 inch. The clearance between the member and an operable door or window shall be at least 1/16 inch.
- E. Air Infiltration: Provide aluminum entrance and storefront framing system with an air infiltration rate of not more than 0.06 CFM per sq. ft. of fixed area (excluding operable door edges) when tested in accordance with ASTM E 283 at an inward test pressure differential of 1.57 psf.
- F. Water Penetration: Provide framing systems with no uncontrolled water penetration (excluding operable door edges) as defined in the test method when tested in accordance with ASTM E 331 at an inward test pressure differential of 6.24 lbf per sq. ft.
- G. Condensation Resistance: Where framing systems are "thermal-break" construction, provide units tested for thermal performance in accordance with AAMA 1503 showing condensation resistance factor (CRF) of not less than 45.
- H. Thermal Transmittance: Provide framing systems that have an overall U-value of not more than 0.65 BTU/(hr. x sq. ft. x deg. F) at 15 mph exterior wind velocity when tested in accordance with AAMA 1503.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.
1. Product data for each aluminum storefront system required, including:
 - a. Manufacturer's standard details and fabrication methods.
 - b. Data on finishing, hardware and accessories.
 - c. Recommendations for maintenance and cleaning of exterior surfaces.
 - d. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
 2. Shop drawings for each aluminum storefront system required, including:
 - a. Layout and installation details, including relationship to adjacent work.
 - b. Elevations at 1/4-inch scale.
 - c. Detail sections of typical composite members.
 - d. Anchors and reinforcement.
 - e. Hardware mounting heights.
 - f. Provisions for expansion and contraction.
 - g. Glazing details.
 3. Samples for Verification Purposes: The Architect reserves the right to require additional

samples, that show fabrication techniques and workmanship, and design of hardware and accessories.

1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** Engage an experienced Installer who has completed installations of aluminum storefront similar in design and extent to those required for the project and whose work has resulted in construction with a record of successful in-service performance.
- B. **Manufacturer's Qualifications:** Provide aluminum storefront systems produced by a firm experienced in manufacturing systems that are similar to those indicated for this project and that have a record of successful in-service performance.
- C. **Single Source Responsibility:** Obtain aluminum storefront systems from one source and from a single manufacturer.
- D. **Design Criteria:** The drawings indicate the size, profile, and dimensional requirements of aluminum entrance and storefront work required and are based on the specific types and models indicated. Aluminum storefront by other manufacturers may be considered, provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver aluminum entrance and storefront components in the manufacturer's original protective packaging.
- B. Store aluminum components in a clean dry location away from uncured masonry or concrete. Cover components with waterproof paper, tarpaulin or polyethylene sheeting in a manner to permit circulation of air.
 - 1. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.

1.7 PROJECT CONDITIONS

- A. **Field Measurements:** Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the work.
 - 1. Where necessary, proceed with fabrication without field measurements, and coordinate fabrication tolerances to ensure proper fit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering storefront systems that may be incorporated in the work include, but are not limited to, the following:
1. Amarlite Architectural Products.
 2. EFCO Corporation.
 3. Kawneer Company, Inc.
 4. United States Aluminum Corp.
 5. Vistawall Architectural Products.
 6. YKK AP America.
- B. Products utilized as Basis of Design products are Kawneer.

2.2 MATERIALS

- A. Aluminum Members: Alloy and temper recommended by the manufacturer for strength, corrosion resistance, and application of required finish; comply with ASTM B 221 for aluminum extrusions, ASTM B 209 for aluminum sheet or plate, and ASTM B 211 for aluminum bars, rods and wire.
- B. Carbon steel reinforcement of aluminum framing members shall comply with ASTM A 36 for structural shapes, plates and bars, ASTM A 611 for cold rolled sheet and strip, or ASTM A 570 for hot rolled sheet and strip.
- C. Glass and Glazing Materials: Sealed insulating glass units as indicated.
1. See Section 088000 "Glazing" for glass requirements:
- D. Insulated Panel Insets: Laminated metal-faced panels with no deviations on plane exceeding 0.8 percent of panel dimension in width or length.
1. Overall Panel Thickness: 1 inch (25.4 mm).
 2. Interior and Exterior System –
 - a. Finish: Match framing system.
 - b. Texture: Embossed.
 - c. Backing Sheets: 1/8" tempered hardboard.
 3. Thermal Insulation Core: Rigid, Closed-cell, Polyisocyanurate board.
- E. Fasteners: Provide fasteners of aluminum, nonmagnetic stainless steel, or other material warranted by the manufacturer to be noncorrosive and compatible with aluminum components, hardware, anchors and other components.
1. Reinforcement: Where fasteners screw-anchor into aluminum members less than 0.125 inches thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard noncorrosive pressed-in splined grommet nuts.

2. Exposed Fasteners: Do not use exposed fasteners except for application of hardware. For application of hardware, use Phillips flat-head machine screws that match the finish of member or hardware being fastened.
- F. Concealed Flashing: 0.0179-inch (26 gage) minimum dead-soft stainless steel, or 0.026-inch-thick minimum extruded aluminum of alloy and type selected by manufacturer for compatibility with other components.
- G. Brackets and Reinforcements: Provide high-strength aluminum brackets and reinforcements; where use of aluminum is not feasible provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 123.
- H. Concrete and Masonry Inserts: Provide cast iron, malleable iron, or hot-dip galvanized steel inserts complying with ASTM A 123.
- I. Compression Weatherstripping: Manufacturer's standard replaceable compressible weatherstripping gaskets of molded neoprene complying with ASTM D 2000 or molded PVC complying with ASTM D 2287.
- J. Sliding Weatherstripping: Manufacturer's standard replaceable weatherstripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.

2.3 HARDWARE

- A. General: Refer to Division 8 Section "Door Hardware" for hardware supplied under that section but installed by the aluminum entrance manufacturer.
- B. Perimeter and meeting stile gasket by door/frame manufacturer.

2.4 COMPONENTS

- A. Exterior Storefront Framing System: Provide thermally broken storefront framing systems fabricated from extruded aluminum members of size and profile indicated. Include subframes and other reinforcing members of the type indicated. Shop-fabricate and preassemble frame components where possible. Provide storefront frame sections without exposed seams.
 1. Equivalent to Kawneer Trifab VG 451 T framing system with multi-plane capability.
- B. Interior Storefront Framing System: Provide storefront framing systems fabricated from extruded aluminum members of size and profile indicated. Include subframes and other reinforcing members of the type indicated.

Shop-fabricate and preassemble frame components where possible. Provide storefront frame sections without exposed seams.

 1. Equivalent to Kawneer Trifab VG 451 framing system.
- C. Entrances: Equivalent to Kawneer 500 Tuffline series.

1. Design: Provide 2 inch thick doors of design indicated, accepting 1" insulated glazing or 1" insulated aluminum panels.
 - a. Wide Stile: 5" nominal width vertical stiles.
10" nominal width bottom rail.
8" nominal width middle rail.
5" nominal width top rail.

2.5 FABRICATION

- A. General: Fabricate aluminum storefront components to designs, sizes and thicknesses indicated and to comply with indicated standards. Sizes and profile requirements are indicated on the drawings. Variable dimensions are indicated, with maximum and minimum dimensions required, to achieve design requirements and coordination with other work.
 1. Thermal-Break Construction: Fabricate storefront framing system with an integrally concealed, low-conductance thermal barrier, located between exterior materials and exposed interior members to eliminate direct metal-to-metal contact. Use manufacturer's standard construction that has been in use for similar projects for period of not less than 3 years.
- B. Prefabrication: Complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible before shipment to the Project site. Disassemble components only as necessary for shipment and installation.
 1. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces. Complete these operations for hardware prior to application of finishes.
 2. Do not drill and tap for surface-mounted hardware items until time of installation at project site.
 3. Preglaze door and frame units to greatest extent possible.
- C. Welding: Comply with AWS recommendations. Grind exposed welds smooth to remove weld spatter and welding oxides. Restore mechanical finish.
 1. Welding behind finished surfaces shall be performed in such a manner as to minimize distortion and discoloration on the finished surface.
- D. Reinforcing: Install reinforcing as required for hardware and as necessary for performance requirements, sag resistance and rigidity.
- E. Dissimilar Metals: Separate dissimilar metals with bituminous paint, or a suitable sealant, or a nonabsorptive plastic or elastomeric tape, or a gasket between the surfaces. Do not use coatings containing lead.
- F. Continuity: Maintain accurate relation of planes and angles with hairline fit of contacting members.
 1. Uniformity of Metal Finish: Abutting extruded aluminum members shall not have an integral color or texture variation greater than half the range indicated in the sample pair submittal.
- G. Fasteners: Conceal fasteners wherever possible.

- H. Weatherstripping: For exterior doors, provide compression weatherstripping against fixed stops. At other edges, provide sliding weatherstripping retained in adjustable strip mortised into door edge.
1. Provide EPDM or vinyl-blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.
 2. At interior doors and other locations without weatherstripping, provide neoprene silencers on stops to prevent metal-to-metal contact.

2.6 FINISHES

- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
- B. Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.
- C. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 50 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and supports, with the Installer present, for compliance with requirements indicated, installation tolerances, and other conditions that affect installation of aluminum entrances and storefronts.
Correct unsatisfactory conditions before proceeding with the installation.
1. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation.
- B. Set units plumb, level, and true to line, without warp or rack of framing members. Install components in proper alignment and relation to established lines and grades indicated. Provide proper support and anchor securely in place.
- C. Construction Tolerances: Install aluminum storefront to comply with the following tolerances:
1. Variation from Plane: Do not exceed 1/8 inch in 12 feet of length or 1/4 inch in any total length.
 2. Offset from Alignment: The maximum offset from true alignment between two identical members abutting end to end in line shall not exceed 1/16 inch.
 3. Diagonal Measurements: The maximum difference in diagonal measurements shall not exceed 1/8 inch.

4. Offset at Corners: The maximum out-of-plane offset of framing at corners shall not exceed 1/32 inch.
- D. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
 1. Zinc or cadmium plate steel anchors and other unexposed fasteners after fabrication.
 2. Paint dissimilar metals where drainage from them passes over aluminum.
 3. Paint aluminum surfaces in contact with mortar, concrete or other masonry with alkali resistant coating.
 4. Paint wood and similar absorptive material in contact with aluminum and exposed to the elements or otherwise subject to wetting, with two coats of aluminum house paint. Seal joints between the materials with sealant.
 - E. Drill and tap frames and doors and apply surface-mounted hardware items. Comply with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.
 - F. Set sill members and other members in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 7 for sealants, fillers, and gaskets.
 - G. Refer to "Glazing" Section of Division 8 for installation of glass and other panels indicated to be glazed into doors and framing, and not preglazed by manufacturer.

3.3 ADJUSTING

- A. Adjust operating hardware to function properly, for smooth operation without binding, and for weather tight closure.

3.4 CLEANING

- A. Clean the completed system, inside and out, promptly after installation, exercising care to avoid damage to coatings.
- B. Clean glass surfaces after installation. Remove excess glazing and sealant compounds, dirt and other substances from aluminum surfaces.

3.5 PROTECTION

- A. Institute protective measures required throughout the remainder of the construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION 084113