

## SECTION 08410

### ALUMINUM ENTRANCES AND STOREFRONTS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general conditions 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. Exterior entrance door.
  - 2. Frames for entrances.
- B. Related Sections: The following sections contain requirements that relate to this Section:
  - 1. Glazing requirements for aluminum entrances and storefronts, including entrances specified to be factory glazed, are included in Division 8 Section "Glass and Glazing".

##### 1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum entrance and 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 entrance and storefront framing systems to provide for expansion and contraction of the component materials. Entrance doors shall function normally over the specified temperature range.
  - 1. The system shall be capable of withstanding a metal surface temperature range of 180 degrees F (100 degrees C) without buckling, failure of joint seals, undue stress on structural elements, damaging loads in fasteners, reduction of performance, stress on glass, or other detrimental effects.
- C. Design Requirements: Provide aluminum entrance and storefront systems that comply with performance, air infiltration, and water penetration requirements indicated.
  - a. Wind Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding wind load design calculated according to requirements of authorities having jurisdiction of the American Society of Civil Engineers' ASCE 7 "Minimum Design Loads for Buildings and Other Structures," 6.4.2, "Analytical Procedure," whichever are more stringent.
  - b. Deflection of framing members in a direction normal to wall plane is limited to 1/175 of clear span or 3/4", whichever is smaller, unless otherwise indicated.
  - c. Static-Pressure Test Performance: Provide entrance and storefront systems that do not evidence material failures, structural distress, failure of operating components to function normally, or permanent deformation of main framing members exceeding 0.2 percent of clear span when tested according to ASTM E 330.

- (1) Test Pressure: 150 percent of inward and outward wind-load design pressures.

- (2) Duration: As required by wind velocity; fastest 1 mile of wind for relevant exposure category.
2. Dead Loads: Provide entrance and storefront system members that do not deflect an amount which will reduce glazing bite below 75% of design dimension when carrying full dead load.
    - a. Provide a minimum 1/8-inch clearance between members and top of glazing or other fixed part immediately below.
    - b. Provide a minimum 1/16-inch clearance between members and operable windows and doors.
  3. Live Loads: Provide entrance and storefront systems, including anchorage, that accommodate the supporting structures' deflection from uniformly distributed and concentrated live loads indicated without failure of materials or permanent deformation.
  4. Air Infiltration: Provide entrance and storefront systems with permanent resistance wot air leakage through fixed glazing and frame areas of not more than 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a static-air pressure difference of 1.57 lbf/sq. ft.
  5. Water Penetration: Provide entrance and storefront systems that do not evidence water leakage through fixed glazing and frame areas when tested according to ASTM E 331 at minimum differential pressure of 10% of inward-acting wind-load design pressure as defined by ASCE 7 "Minimum Design Loads for Buildings and Other Structures," but not less than 6.24 lbf/sq. ft. Water leakage is defined as follows:
    - a. Uncontrolled water infiltrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.
  6. Condensation Resistance: Provide storefront systems with condensation resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.1
  7. Average Thermal Conductance: Provide storefront systems with average U-values of not more than 0.63 BTU/sq. ft. x h x deg F when tested according to AAMA 1503.1

#### 1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of the Contract and Division Specification Sections:
  1. Product data for each aluminum entrance and 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.
  2. Shop drawings for each aluminum entrance and storefront system required.
  3. Hardware Schedule: Submit complete hardware schedule.
  4. Samples for Initial Color Selection: Submit pairs of samples of each specified color and finish.
  5. Test Reports: Provide certified test reports from a qualified independent testing laboratory showing that aluminum entrance and storefront systems have been tested in accordance with specified test procedures and comply with performance characteristics indicated.

## 1.5 QUALITY ASSURANCE

- A. **Installer Qualifications:** Engage an experienced Installer who has completed installations of aluminum storefront and entrances 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 entrances and 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 entrance and 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 entrance and 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.

## 1.7 WARRANTY

- A. Submit a written warranty, executed by the manufacturer, agreeing to repair or replace units that fail in materials or workmanship within the specified warranty period.
- B. **Warranty Period:** 3 years after the date of Substantial Completion.

## **PART 2 - PRODUCTS**

### 2.1 MANUFACTURERS

- A. **Available Manufacturers:** Subject to compliance with requirements, manufacturers offering entrance and storefront systems that may be incorporated into the work include, but are not limited to, the following:
  - 1. Amarlite Architectural Products
  - 2. EFCO Corporation
  - 3. Kawneer Company
  - 4. PPG Industries
  - 5. Tubelite Division of Indal, Inc.
  - 6. United States Aluminum Corp.

### 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: Comply with requirements of "Glass and Glazing" section of these specifications.
- D. Fasteners: Provide fasteners of aluminum, nonmagnetic stainless steel, zinc plated steel, or other material warranted by the manufacturer to be non-corrosive 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 non-corrosive, 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 finish of member or hardware being fastened.
- E. 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 requirements.
- F. 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.
- G. Concrete and Masonry Inserts: Provide cast-iron, malleable iron, or hot-dip galvanized steel inserts complying with ASTM A 123.
- H. 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 "Finish Hardware" for requirements for hardware items other than those indicated to be provided by the aluminum entrance manufacturer.
- B. Provide heavy duty hardware units as indicated, scheduled or required for operation of each door, including the following items of sizes, number, and type recommended by manufacturer for service required; finish to match door.
  - 1. Ball-Bearing Butts: 5-knuckle, 2-bearings, steel ball bearing butts to comply with ANSI A156.1, Grade 1.
  - 2. Surface-Mounted Overhead Closers: Modern type with cover, for hinge side installation. Comply with ANSI A156.4, Grade 1. Comply with manufacturer's recommendations for closer size, depending on door size, exposure to weather and anticipated frequency of use. Include the following:
    - a. Door Stop: Floor- or wall-mounted door stop, as appropriate, with integral rubber bumper; comply with ANSI A156.1, Grade 1.
  - 3. Cylinders are supplied under another Division 8 Section for keying into the building system.
  - 4. Deadlocks: Mortised maximum security deadlock, with minimum 1" long pivoted bolt and stainless steel strike-box; comply with ANSI A156.5, Grade 1.
  - 5. Pull Handles: Aluminum pull handles of style indicated, similar to Kawneer "G3".
  - 6. Push Bars: manufacturer's "Paneline" full door width push panel. Similar to Kawneer "Paneline".
  - 7. Thresholds: Extruded aluminum threshold of size and design indicated in mill finish, complete with anchors and clips, coordinated with pivots and floor-concealed closers.

8. Panic hardware: Kawneer "Paneline" with concealed rods and panic lock cylinder at Door No.'s 1, 9, 12, 14 & 15.

## 2.4 COMPONENTS

- A. Basis of Design: Kawneer tri-fab II 450. Provide manufacturer's standard 1- $\frac{3}{4}$ " thick glazed doors with minimum 0.125" thick, extruded tubular rail and stile members similar to the Basis of Design. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie-rods.
  1. Glazing Stops and Gaskets: Provide manufacturer's standard snap-on extruded-aluminum glazing stops and preformed gaskets.
  2. Stile Design: 500 medium stile.
- B. Brackets and Reinforcements: Provide manufacturer's standard brackets and reinforcements that are compatible with adjacent materials. Provide non-staining, non-ferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.
  1. Reinforce members as required to retain fastener threads.

## 2.5 FABRICATION

- A. General: Fabricate aluminum entrance and 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.
- 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. Storefront: The framing system shall [provide for flush glazing on all sides with no projecting stops. Vertical and horizontal framing members shall have a nominal face dimension of 2". Overall depth shall be 4- $\frac{1}{2}$ ". Entrance framing members shall be compatible with glass framing in appearance. All single acting entrance frames shall include the positive barrier weathering.
  1. Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory-assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

- E. Entrances: Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory assemble door and frame units as required for installing hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.
  - 1. Exterior Doors: Provide compression weatherstripping at fixed stops. At other locations, provide sliding weatherstripping retained in adjustable strip mortised into door edge.
- F. Reinforcing: Install reinforcing as required for hardware and as necessary for performance requirements, sag resistance and rigidity.
- G. 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.
- H. Continuity: Maintain accurate relation of planes and angles with hairline fit of connecting 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.
- I. Fasteners: Conceal fasteners wherever possible.
- J. 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.

## 2.6 FINISHES

- A. General: Comply with NAIMF "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. Finish of aluminum entrance framing shall match aluminum entrance doors. Finish aluminum entrance doors shall be an architectural class 1 color anodic coating conforming with AAM12C22A42/44.

## 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, doors, or panels. Install components in proper alignment and relation to established grades and lines indicated. Provide proper support and anchor securely in place.
- C. 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.
- D. Drill and tap frame and doors and apply surface-mounted hardware items. Comply with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.
- E. Set still members and other members in bed of sealant as indicated, or with joint filler or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 7 for sealants, fillers, and gaskets.

### 3.3 ADJUSTING

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

END OF SECTION