

**SECTION 084113 ALUMINUM ENTRANCES AND STOREFRONTS**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the aluminum entrances and storefronts as indicated on the drawings and/or specified herein, including the following:
  - 1. Exterior entrance systems.
  - 2. Interior entrance systems.
  - 3. Exterior storefront systems.
  - 4. Interior storefront systems.

1.3 RELATED SECTIONS

- A. Joint Sealers - Section 079200.
- B. Glazed Aluminum Curtain Walls - Section 084413.
- C. Aluminum Windows - Section 085113.
- D. Door Hardware - Section 087100.
- E. Glass and Glazing - Section 088000.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements.
- B. Shop Drawings: Provide large scale shop drawings for fabrication, installation and erection of all parts of work. Provide plans, elevations, and details of anchorages, connections and accessory items. Provide installation templates for work installed by others. Show interfaces and relationships to work of other trades.
- C. Field Measurements: Take necessary field measurements before preparation of shop drawings and fabrication. Do not delay progress of job. If field measurements are not possible prior to fabrication, allow for field cutting and fitting.
- D. Initial Selection Samples: Submit samples showing complete range of colors, textures, and finishes available for each material used.

- E. Verification Samples: Submit representative samples of each material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide samples having minimum size of 144 sq. in.
- F. Calculations: Provide professionally prepared calculations and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied; refer to Article 1.5, para. D for further description.
- G. Test Reports: Provide certified test reports for specified tests.

#### 1.5 QUALITY ASSURANCE

- A. Source: For each material type required for work of this Section, provide primary materials which are products of one manufacturer. Provide secondary or accessory materials which are acceptable to manufacturers of primary materials.
- B. Installer: A firm with a minimum of three years' experience in type of work required by this Section and which is acceptable to manufacturers of primary materials.
- C. Design Criteria: Drawings indicate sizes, member spacings, profiles, and dimensional requirements of work of this Section. Minor deviations will be accepted in order to utilize manufacturer's standard products when, in the Architect's sole judgment, such deviations do not materially detract from the design concept or intended performances.
- D. Engineering: Provide services of a Professional Engineer registered in the State of New Jersey to design and certify that work of this Section meets or exceeds performance requirements specified.

#### 1.6 TESTS AND PERFORMANCE REQUIREMENTS

- A. Manufacturer's Standard Tests: Provide manufacturer's standard test data showing compliance with specified requirements.
- B. Testing and performance data apply to exterior assemblies.
- C. Test Sequence: Test sequence is optional, except that air infiltration tests shall precede water resistance tests.
- D. Air Infiltration Test: Test unit in accordance with ASTM E 283, as follows:
  - 1. Static Air Pressure Difference: 6.24 psf for fixed storefront units, and 1.567 psf for doors.
  - 2. Performance: Maximum air leakage shall not exceed the following:
    - a. Fixed Storefront Units: 0.06 cfm per sq. ft. of window area.
    - b. Door Units: 0.50 cfm per sq. ft. of single doors, 1.00 cfm per sq. ft. for doors hinged in pairs.
- E. Water Leakage Test: Test fixed framing system in accordance with ASTM E 331.
  - 1. Test Pressure: 6.24 psf.
  - 2. Performance: No leakage as defined in test method at specified test pressure.

- F. Uniform Load Deflection Test: Test units in accordance with ASTM E 330, at following static air pressure difference (Design Wind Pressure), or loads prescribed by code for this project site, whichever is greater. Apply pressure first to exterior side (positive) and then interior side (negative).
    - 1. Design Wind Pressure: Per Section 084413
    - 2. Test Procedure: Procedure A as specified in ASTM E 330.
    - 3. Performance: Deflection in each member measured at locations of greatest deflection shall not exceed L/175 at specified Design Wind Pressure.
  - G. Uniform Load Structural Test: Test units in accordance with ASTM E 330 at following static air pressure difference. Apply high pressure load first on one side and then on other side. At conclusion of test there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or activating mechanisms.
    - 1. Static Air Pressure: Minimum 1.5 times the Design Wind Pressure.
    - 2. Permanent Deformation in Any Member: Not to exceed 0.2% of member span.
  - H. Condensation Resistance Factor (unless more stringent required by Code): See EN drawings.
  - I. Thermal Movement: Provide storefront systems that allow for expansion and contraction of members throughout an ambient temperature range of 120 degrees F.
  - J. Seismic Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of authorities having jurisdiction or ASCE 7, "Minimum Design Loads for Buildings and Other Structures," Section 9, "Earthquake Loads," whichever are more stringent.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Store under cover and protect from weather damage.
  - B. Sequence deliveries to avoid delays, but minimize on-site storage.
- 1.8 WARRANTIES
- A. Provide written warranty, signed by manufacturer, agreeing to repair or replace work that exhibits defects in materials or workmanship. "Defects" is defined to include, but not be limited to, leakage of water, abnormal aging or deterioration, abnormal deterioration or fading of finishes, and failure to perform as required. Include requirement for removal and replacement of covering and connected adjacent work.
    - 1. Warranty Period: Three (3) years from date of Substantial Completion; except finish shall be warranted for a period of fifteen (15) years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS/PRODUCTS**

- A. Provide storefronts and entrance systems of one of the following manufacturers that meet or exceed requirements of these specifications:
  - 1. Basis of Design: EFCO Corporation.
  - 2. Kawneer North America.
  - 3. Oldcastle Building Envelope.
  - 4. YKK AP America, Inc.
  - 5. Or approved equal.

### **2.2 MATERIALS AND ACCESSORIES**

- A. Aluminum Members: Provide 6063-T5 alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application of required finish. Comply with ASTM B 221 for extrusions, and ASTM B 209 for sheet/plate. Provide 0.125" thick extrusions for door stiles and storefront framing. Provide 0.050" thick aluminum for glazing moldings.
- B. Fasteners: Provide non-magnetic stainless steel fasteners, warranted by manufacturer to be non-corrosive and compatible with aluminum components.
- C. Concealed Flashing: Dead-soft stainless steel, 26 gauge minimum, or extruded aluminum 0.062" minimum, of an alloy and type selected by manufacturer for compatibility with other components.
- D. Brackets and Reinforcements: Non-magnetic stainless steel or hot-dip galvanized steel complying with ASTM A 123.
- E. Concrete/Masonry Inserts: Cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM A 123.
- F. Bituminous Coatings: Cold-applied asphalt mastic compounded for 30-mil thickness per coat.
- G. Compression Weatherstripping: Manufacturer's standard replaceable stripping of molded neoprene or PVC gaskets complying with ASTM D 2287.
- H. Sliding Weatherstripping: Manufacturer's standard replaceable stripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing.

### **2.3 HARDWARE**

- A. Provide hardware units as indicated, scheduled, or required for operation of each door. Refer to Section 087100, Finish Hardware for hardware description.

### **2.4 FABRICATION**

- A. Sizes and Profiles: Required sizes for door and frame units, including profile requirements, are indicated on Drawings. Any variable dimensions are indicated, together with maximum and minimum dimensions required to achieve design requirements and coordination with other work.

- B. Prefabrication: To greatest extent possible, complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site. Disassemble components only as necessary for shipment and installation.
1. Preglaze door and frame units to greatest extent possible, in coordination with installation and hardware requirements.
  2. Do not drill and tap for surface-mounted hardware items until time of installation at project site.
  3. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work in manner which prevents damage to exposed finish surfaces. For hardware, perform these operations prior to application of finishes.
- C. Welding: Comply with recommendations of American Welding Society to avoid discoloration; grind exposed welds smooth and restore mechanical finish.
- D. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator to prevent corrosion.
- E. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.
- F. Fasteners: Conceal fasteners.
- G. Provide EPDM/vinyl blade gasket weatherstripping in bottom exterior door rail, adjustable for contact with threshold.
- H. At interior doors and other locations without weatherstripping, provide neoprene silencers on stops to prevent metal-to-metal contact.
- I. Provisions shall be made in the framing for minimum edge clearance, nominal edge cover, and nominal pocket width for the thickness and type of glazing installed, and shall be in accordance with the FGMA Glazing Manual.
- J. Pocket glazed framing shall provide:

	Single Glass	Insulating Glass
1. Nominal edge cover (or bite) framing only	5/16"	1/2"
2. Min. nominal edge clearance	1/8"	1/4"
3. Min. face clearance	1/8"	5/32"

## 2.5 STOREFRONT FRAMING

- A. General: Provide inside-outside matched resilient flush glazed system with provisions for glass replacement. Shop fabricate and preassemble frame components where possible.
- B. Thermal-Break Construction: Fabricate exterior aluminum storefront framing system with integrally concealed, low conductance thermal barrier, located between exterior materials and exposed interior members, in manner which eliminates direct metal-to-metal contact. Provide manufacturer's standard construction which has been in use for similar projects for at least three years.
- C. For glass and glazing, refer to Section 088000.

**2.6 ALUMINUM DOORS**

- A. Aluminum entrance doors shall be narrow-stile, factory-glazed aluminum doors manufactured by same manufacturer as storefront framing.
- B. Aluminum entrance doors shall be stile and rail type swing doors. Aluminum shall be extruded aluminum conforming to ASTM B 221, 0.125" thick for door stiles and 0.050" thick for glazing molding.
  - 1. Sections shall be of sizes and profiles indicated; shall present straight, sharply defined lines and arrises; and shall be free from defects impairing strength, durability, and appearance.
  - 2. Fasteners where exposed shall be aluminum, stainless steel, or plated steel conforming to ASTM B 633.
- C. Each door shall be factory glazed set in neoprene glazing gasket, refer to Section 088000 for glass.
- D. Doors shall meet the following resistance to corner racking when tested by the Dual Moment Load Test.
  - 1. Test section shall consist of a standard top door corner assembly. Side rail section shall be 24" long and top rail section shall be 12" long.
  - 2. Anchor top rail positively to test bench so that corner protrudes 3" beyond bench edge.
  - 3. Anchor a lever arm positively to side rail at a point 19" from inside edge of top rail. Attach weight support pad at a point 19" from inner edge of side rail.
  - 4. Test section shall withstand a load of 235 lbs. on the lever arm before reaching the point of failure, which shall be considered a rotation of the lever arm in excess of 45 deg.
- E. Air Infiltration (applies only to single acting offset pivot or butt hung entrances): Air infiltration shall be tested in accordance with ASTM E 283, at a pressure differential of 1.567 psf. A single 3'-0" x 7'-0" entrance door and frame shall not exceed 0.50 cfm per linear foot of perimeter crack. A pair of 6'-0" x 7'-0" entrance doors and frame shall not exceed 1.0 cfm per linear foot of perimeter crack.
- F. For door hardware, refer to Section 087100.
- G. Door bottom rail of exterior doors shall have an EPDM blade gasket sweep strip applied with concealed fasteners.
- H. Corner construction shall consist of mechanical clip fastening, SIGMA deep penetration and fillet welds. Glazing stops shall be hook-in type with EPDM glazing gaskets.
- I. The door weatherstripping on a single acting offset pivot or butt hung exterior door and frame (single or pairs) shall be thermoplastic elastomer weatherstripping on a tubular shape with a semi-rigid polymeric backing.
- J. The door weatherstripping on a double acting, center pivoted door and frame (single or pairs) shall be pile cloth. The door bottom rail shall be weatherstripped with an EPDM blade gasket sweep strip applied with concealed fasteners.
- K. The meeting stiles on pairs of doors shall be equipped with an adjustable astragal.

**2.7 FINISH**

- A. Class I, Clear Anodic Finish (MTL-01): AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

**PART 3 - EXECUTION**

**3.1 INSPECTION**

- A. Examine the areas and conditions where aluminum entrances and storefronts are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

**3.2 INSTALLATION**

- A. Install aluminum entrance doors and storefront framing in openings prepared under other Sections plumb, square, level, in exact alignment with surrounding work, with proper clearances, and securely and positively anchored to building structure, to meet performance requirements specified herein, in accordance with manufacturer's published instructions and approved submittals.
- B. Use only skilled mechanics for erection, under supervision of manufacturer's representative.
- C. Provide protection against galvanic action. Isolate dissimilar materials with bituminous coating or non-absorptive dielectric tape.
- D. Install aluminum entrance doors, storefront frame, and finish hardware. Carefully fit and adjust doors and hardware to frames and weatherstripping. After erection check and adjust operating hardware for smooth and proper operation.
- E. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Section 079200.
- F. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances.
  - 1. Variation from Plane: Limit variation from plane or location shown to 1/8" in 12 feet; 1/4" over total length.
  - 2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16". Where surfaces meet at corners, limit offset from true alignment to 1/32".
  - 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8".

**3.3 FIELD QUALITY CONTROL**

- A. Testing Agency: Contractor shall engage a qualified independent testing agency to perform testing indicated for storefronts.
- B. Test fixed frames for water infiltration per AAMA 501.2 "Hose Nozzle Water Spray Testing," latest edition. Test within the first 10% of work complete, area to be a minimum of 100 SF of wall and including a perimeter where frames adjoin adjacent construction. Interior finishes must

not interfere with observation of test area or be removed from test area. Not appropriate for operable doors.

1. This test (AAMA 501.2) shall be performed infield on new construction.

- C. Repair or remove Work that does not meet requirements or that is damaged by testing; replace to conform to specified requirements.

### 3.4 PROTECTION AND CLEANING

- A. Protect finished metal surfaces from damage during fabrication, shipping, storage, and erection, and from then until acceptance by Owner.
- B. Clean metal surfaces promptly after installation, exercising care to avoid damage. Remove excess sealant, dirt, and other substances. Lubricate hardware and other moving parts.
- C. Replace glass that is broken, cracked or chipped prior to time of final acceptance of Project by Owner.
- D. Clean glass surfaces promptly after installation, exercising care to avoid damage to same.

END OF SECTION 084113