SECTION 08412

ALUMINUM-FRAMED STOREFRONTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for furnishing and installing the following:

1. Entrance doors.
2. Exterior fixed storefront framing system.

B. Related Sections:

1. Joint sealants are specified in Section 07920.
2. Interior aluminum doors and frames are specified in Section 08121.
3. Aluminum windows in punched openings are specified in Section 08520.
4. Door hardware is specified in Section 08710.
5. Automatic door operators are specified in Section 08730.
6. Glazing requirements are specified in Section 08810.

1.02 REFERENCE STANDARDS

A. Leadership in Energy and Environmental Design (LEED), www.usgbc.org/LEED (United States Green Building Council (USGBC).

1. LEED – NC v2.2 Reference Guide, first edition, dated December 2006.

1.03 EXTERIOR STOREFRONT PERFORMANCE REQUIREMENTS

A. General: Provide exterior aluminum entrances and storefront assemblies that comply with performance characteristics specified, as demonstrated by testing the manufacturer's corresponding stock assemblies according to specified test methods.

B. Thermal Movement: Design the aluminum entrance and storefront framing systems to provide for expansion and contraction of the component materials resulting from a surface temperature range of 180-deg. F. 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. Entrance doors shall function normally over the specified temperature range.

C. Wind Loads: Provide aluminum entrance and storefront framing system, including anchorage, capable of withstanding wind-load design pressures calculated according to the requirements of CBC.

D. Structural Performance: Conduct tests for structural performance in accordance with ASTM E330. 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 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 specified wind load. 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 specified wind pressure. 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-framed entrances and storefronts 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 E283 at an inward test pressure differential of 6.24-psf.

F. Water Penetration: Provide storefront framing systems with no uncontrolled water penetration, excluding operable door edges, as defined in the test method when tested in accordance with ASTM E331 at an inward test pressure differential of 8-psf as defined in AAMA 501.

1.04 SUBMITTALS

A. Refer to Section 01352 – LEED Requirements for LEED related submittal requirements.

B. Product Data: Furnish product data for each system showing manufacturer's standard details and fabrication methods, data on finishing, hardware, and accessories, and recommendations for maintenance and cleaning.

1. Regional Materials: Furnish product data or letter stating the location (closest city, state) where product was manufactured (final processing or assembly) and, if available, the location where raw materials were harvested, extracted or recovered (mine, quarry, plantation, forest, recycling recovery center, etc.).

C. Shop Drawings: Furnish shop drawings for each system showing layout and installation details, including relationship to adjacent work, elevations at 1/4-inch scale, detail sections of typical composite members, anchors and reinforcement, hardware mounting heights, provisions for expansion and contraction, and glazing details. Show layout and motorized window operating components.

D. Samples for Verification: Furnish samples of each type and color of aluminum finish selected, on 12-inch long sections of extrusions or formed shapes and 6-inch square sheets.

E. Test Reports: Furnish certified test reports from a qualified independent testing laboratory showing that aluminum entrance and storefront framing systems have been tested in accordance with specified test procedures and comply with specified performance characteristics.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications: A minimum of 5-years experience in the manufacture of aluminum entrances and storefronts of the types specified.

B. Installer's Qualifications: Minimum 5-years experience in the installation of systems similar to those required.

1.06 ENVIRONMENTAL QUALITY ASSURANCE

A. Applicable LEED Credits – Refer to Section 01352:

1. Credit MRc5 – Regional Materials.

2. Credit EQc4.1 – Adhesives and Sealants.

1.07 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.

1.08 PROJECT CONDITIONS

A. Field Measurements: Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication with construction progress to avoid delay of the work.

1. When necessary, proceed with fabrication without field measurements, and coordinate fabrication tolerances to ensure proper fit.

1.09 WARRANTY

A. Furnish written warranty covering aluminum entrances and storefronts that fail in materials or workmanship within 3-years from date of Substantial Completion. Failures include, but are not limited to structural failures including excessive deflection, excessive leakage or air infiltration, faulty operation, and deterioration of metals, metal finishes, and other materials beyond normal weathering.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

A. Storefront Framing System: Kawneer Tri-Fab 451 VG Shearblock (Back – Outside Glazed) or approved equal.

B. Entrance Doors: Kawneer 500 Series with 10-inch bottom rail or approved equal.

2.02 MATERIALS

A. Aluminum Members: 6063-T5 alloy and temper.

B. Fasteners: Aluminum or Series 300 nonmagnetic stainless steel.

1. 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 item being fastened.

C. Concealed Flashing: Dead-soft stainless steel or extruded aluminum as selected by manufacturer for compatibility with other components.

D. Brackets and Reinforcements: Aluminum or nonmagnetic stainless steel. Provide non-staining, non-ferrous shims for installation and alignment as required.

E. Weatherstripping: Manufacturer's standard replaceable type. Provide weatherstripping on meeting stiles of pairs of doors and at bottom rail of each door leaf.

F. Glazing Gaskets: Compression type design, replaceable, molded or extruded santoprene, PVC or EPDM. Provide type that locks securely into the glazing reglet to prevent glazing gaskets from disengaging.

2.03 COMPONENTS

A. Fixed Storefront Framing System:

1. Continuous sub-sill and diverters shall be provided to collect water infiltration and divert from the interior of the system.

2. Framing members shall be internally reinforced and secured at head and sill as required for structural performance requirements, for hardware attachment, and as indicated.

3. Fasteners shall be located to ensure concealment from view in the final assembly.

4. Mullion Size: 2 x 4-1/2 shear block system.

B. Stile-and-Rail Type Entrance Doors: Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration and fillet welds.

1. Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of stiles and rails. Provide snap-on extruded aluminum glazing stops, with exterior stops anchored for non-removal.

2. Design: 1-3/4-inch thick, wide stile design.

3. Each door leaf shall be equipped with an adjusting mechanism located in the top rail near the lock stile, which provides for minor clearance adjustments after installation.

2.04 FABRICATION

A. General: Fabricate aluminum entrance and storefront components to designs, sizes and thickness indicated, and to comply with specified standards. Sizes and profile requirements are indicated on the drawings.

B. Prefabrication: Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site. Disassemble components only where 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.

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 to minimize distortion and discoloration on the finished surface.

D. Reinforcing: Install reinforcing as required for hardware, performance requirements, sag resistance and rigidity.

E. Dissimilar Metals: Separate dissimilar metals with bituminous paint, suitable sealant, elastomeric tape, or 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.

G. 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.

2.05 FINISHES

A. Comply with requirements of AAMA 2605.

B. Finish exposed areas of aluminum and components with an Architectural Class I bronze anodic coating conforming to AA-M12C22A42, color range as approved by the Architect from industry standards.

PART 3 - EXECUTION

3.01 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 lines. Provide proper support and anchor securely in place

C. Installation 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. Paint dissimilar metals where drainage from them passes over aluminum.

2. Paint aluminum surfaces in contact with mortar, concrete or other masonry with alkali-resistant coating.

3. Paint wood and similar absorptive material in contact with aluminum and exposed to the elements or otherwise subjected to wetting, with 2-coats of aluminum house paint. Seal joints between the materials with sealant.

E. Drill and tap frames and doors and apply surface-mounted hardware in compliance with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

F. Set sill members and other members in bed of sealant, or use joint fillers or gaskets to provide weathertight construction. Comply with requirements of Section 07920.

G. Where flashings are indicated adjacent to work specified in this Section, provide flashings in 0.040-inch aluminum, finished to match entrances and storefronts.

3.02 ADJUSTING

A. Adjust operating hardware to function properly for smooth operation without binding, and to prevent tight fit at contact points and weatherstripping.

3.03 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, complying with the requirements specified in Section 08810. Remove excess glazing and sealant compounds, dirt and other substances from aluminum surfaces.

3.04 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.

3.05 FIELD QUALITY CONTROL

A. Storefront Framing: Architect will select storefront units to be tested as soon as a representative portion of the Project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected at no additional cost to the Owner.

1. Testing shall be performed by a qualified independent testing agency retained and paid for by the Contractor. Testing Standard per AAMA 503, including reference to ASTM E783 for air infiltration test and ASTM E1105 water infiltration test.

a. Air Infiltration Tests: Conduct tests in accordance with ASTM E783. Allowable air infiltration shall not exceed 1.5 times the amount specified in the performance requirements of 0.09-cfm/sq. ft., whichever is greater.

b. Water Infiltration Tests: Conduct tests in accordance with ASTM E1105. No uncontrolled water leakage is permitted when tested at a static test pressure of 2/3 the specified water penetration pressure but not less than 6.24-psf.

B. Manufacturer's Field Services: Upon Architect's or Owner's request, provide manufacturer's field service consisting of periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

END OF SECTION