

DIVISION 8 – DOORS AND WINDOWS

SECTION 08411

ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Related Documents: Conditions of the Contract, Division 1 - General Requirements, and Drawings apply to Work of this Section.
- B. Section Includes:
 - 1. Entrance and storefront systems, complete with reinforcing, fasteners, anchors and attachment devices.
 - 2. Aluminum doors complete with hardware.
 - 3. Accessories necessary to complete work.
- C. Related Sections:
 - 1. Section 01001 - Basic Requirements.
 - 2. Section 05500 - Metal Fabrications.
 - 3. Section 06100 - Rough Carpentry.
 - 4. Section 07920 - Joint Sealants.
 - 5. Section 08710 - Door Hardware.
 - 6. Section 08800 - Glass & Glazing.

1.02 REFERENCES

- A. Aluminum Association (AA):
 - 1. DAF-45 Designation System for Aluminum Finishes.
- B. American Architectural Manufacturers Association (AAMA):
 - 1. 503.1 Test Method for Condensation Resistance of Windows, Doors and Glazed Wall Systems.
 - 2. 605.2-92 Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
 - 3. 607.1 Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
 - 4. 608.1 Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.
 - 5. 701.2 Specifications for Pile Weatherstripping.
 - 6. Manual #10 Care and Handling of Architectural Aluminum From Shop to Site.
 - 7. SFM-1 Aluminum Storefront and Entrance Manual.
- C. American National Standards Institute (ANSI):
 - 1. A117.1 Safety Standards for the Handicapped.
- D. American Society for Testing and Materials (ASTM):
 - 1. A36 Structural Steel.
 - 2. B209 Aluminum and Aluminum - Alloy Sheet and Plate.
 - 3. B221 Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
 - 4. B308 Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded.
 - 5. C509 Cellular Elastomeric Pre-formed Gasket and Sealing Material.
 - 6. C864 Dense Elastomeric Compression Seal Gaskets, Setting Blocks and Spacers.
 - 7. E283 Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.
 - 8. E330 Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
 - 9. E331 Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
- E. Federal Specifications (FS):
 - 1. TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type.

- F. Steel Structures Painting Council (SSPC):
 - 1. Paint 12 Cold-Applied Asphalt Mastic (Extra Thick Film).

1.03 SYSTEM REQUIREMENTS

- A. Design Requirements:
 - 1. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage or moisture disposal.
 - 2. Requirements shown by details are intended to establish basic dimension of units, sight lines and profiles of members.
 - 3. Provide concealed fastening.
 - 4. Provide entrance and storefront systems, including necessary modifications, to meet specified requirements and maintaining visual design concepts.
 - 5. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
 - 6. Anchors, fasteners and braces shall be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
 - 7. Provide for expansion and contraction without detriment to appearance or performance.
 - 8. Assemblies shall be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.
 - 9. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.
- B. Performance Requirements:
 - 1. Air infiltration: Air leakage through fixed light areas of storefront shall not exceed 0.06 cfm per square foot (0.0003 m³/sm²) of surface area when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf (300 Pa).
 - 2. Water infiltration: No uncontrolled water penetration when tested in accordance with ASTM E 331 at test pressure of 8.0 psf 380 Pa.
- C. Thermal Requirements:
 - 1. Framing systems shall accommodate expansion and contraction movement due to surface temperature differentials of 180 degrees Fahrenheit (82 degrees Celsius) without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance, or other detrimental effects.
 - 2. Ensure doors function normally within limits of specified temperature range.
- D. Structural Requirements, as measured in accordance with ANSI/ASTM E330:
 - 1. Wind loads for exterior assemblies:
 - a. Basic loading:
 - 1) Use minimum Design Loads according to applicable codes for project site psf acting inward.
 - 2) Use minimum Design Loads according to applicable codes for project site psf acting outward.
 - 2. Deflection: Maximum calculated deflection of any framing member in direction normal to plane of wall when subjected to specified design pressures shall not exceed 1/175 of its clear span.
- E. Testing Requirements: Provide components that have been previously tested by an independent testing laboratory.

1.04 SUBMITTALS

- A. General: Submit in accordance with Section 01001.
- B. Product Data:
 - 1. Submit manufacturer's descriptive literature and product specifications.

2. Include information for factory finishes, hardware, accessories and other required components.
 3. Include color charts for finish indicating manufacturer's standard colors available for selection.
- C. Shop Drawings:
1. Submit shop drawings covering fabrication, installation and finish of specified systems.
 2. Include following:
 - a. Fully dimensioned plans and elevations with detail coordination keys.
 - b. Locations of exposed fasteners and joints.
 3. Provide detailed drawings of:
 - a. Composite members.
 - b. Joint connections for framing systems and for entrance doors.
 - c. Anchorage.
 - d. System reinforcements.
 1. The extent and placement of structural steel reinforcements/stiffeners in window horizontal and vertical mullions shall be determined by the manufacturer at the time of submittal of shop drawings and shall be based on the requirements of the manufacturer's system used determined by window opening size and material used and wind load requirements for the project site for basic exterior assemblies.
 - e. Expansion and contraction provisions.
 - f. Hardware, including locations, mounting heights, reinforcements and special installation provisions.
 - g. Glazing methods and accessories.
 - h. Internal sealant requirements as recommended by sealant manufacturer.
 4. Schedule of finishes.
- D. Samples:
1. Submit samples indicating quality of finish, in required colors, on alloys used for work, in sizes as standard with manufacturer.
 2. Where normal texture or color variations are expected, include additional samples illustrating range of variation.
- E. Test Reports:
1. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of re-testing. Include other supportive data as necessary.
- F. Certificates:
1. Submit manufacturer's certification stating that systems are in compliance with specified requirements.
- G. Qualification Data:
1. Submit installer qualifications verifying years of experience.
 2. Include list of projects having similar scope of work identified by name, location, date, reference name and phone number.
- H. Manufacturer's Instructions: Submit manufacturer's printed installation instructions.

1.05 QUALITY ASSURANCE

- A. Single Source Responsibility:
1. To ensure quality of appearance and performance, obtain materials for each system from either a single manufacturer or from manufacturer approved by each system manufacturer.
- B. Installer Qualifications: Certified in writing by Contractor as qualified for installation of specified systems.
- C. Perform Work in accordance with AAMA SFM-1 and manufacturer's written instructions.
- D. Conform to requirements of ANSI A117.1 and local amendments.

1.06 MOCK-UPS (Not required)

- A. Visual Mock-up: Provide mock-up to demonstrate visual features and workmanship; refer to Section 01400 for

requirements.

- B. Test Mock-up: Provide mock-up for laboratory testing; refer to Section 01001 for requirements. Visual mock-up must be approved by Architect prior to construction of test mock-up.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Comply with requirements of Section 01001.
- B. Protect finished surfaces as necessary to prevent damage.
- C. Do not use adhesive papers or sprayed coatings that become firmly bonded when exposed to sun.
- D. Do not leave coating residue on any surfaces.
- E. Replace damaged units.

1.08 WARRANTY

- A. Provide warranties in accordance with Section 01001.
- B. Provide written manufacturer's warranty, executed by company official, warranting against defects in materials and products for 2 years from date of Substantial Completion. Warrant door corner construction for the life of the project.
- C. Provide written installer's warranty, warranting work to be watertight, free from defective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail within 2 years from date of Substantial Completion.
 - 1. Warranty shall cover following:
 - a. Complete watertight and airtight system installation within specified tolerances.
 - b. Completed installation will remain free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.
 - c. System is structurally sound and free from distortion.
 - d. Glass and glazing gaskets will not break or "pop" from frames due to design wind, expansion or contraction movement.
 - e. Glazing sealants and gaskets will remain free from abnormal deterioration or dislocation due to sunlight, weather or oxidation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS AND PRODUCTS

- A. For the purposes of these specifications products manufactured by Kawneer Co., Inc. are being used. The following manufacturers are acceptable:
 - 1. Kawneer Co., Inc.
 - 2. Vistawall
 - 3. EFCO
 - 4. CRL US Aluminum
 - 5. YKK AP America, Inc.
 - 6. MANKO Window Systems.
- B. Substitutions: Submit under provisions of Section 01001, a minimum of 14 days prior to bid date.
- C. Acceptable Entrance Doors:
 - 1. Standard Duty Doors: Series 500 with Paneline Mid-Panel panic device system if not called out in Door Hardware Section 08710. Use 5 inch Wide stile, 5 inch top rail, with 10 -inch ADA bottom rail and 0.125 inch wall thickness.
 - 2. Semicircular Door Pulls for all Aluminum Entrance Exterior and Interior Conditions: RM4422 x Clear

Aluminum Mill Finish to match system finish.

D. Acceptable Storefront Framing Systems:

1. For Center Glaze Double Glaze windows. Use system equal to Kawneer Trifab 451VG, 2-inch face and 4 ½ inch section.

2.02 FRAMING MATERIALS AND ACCESSORIES

A. Aluminum:

1. ASTM B221, alloy 6063-T5 for extrusions; ASTM B209, alloy 5005-H34 for sheets; or other alloys and temper recommended by manufacturer appropriate for specified finish.

B. Internal Reinforcing:

1. ASTM A36 for carbon steel; or ASTM B308 for structural aluminum.
2. Shapes and sizes to suit installation.
3. Shop coat steel components after fabrication with alkylid type zinc chromate primer complying with FS TT-P-645.

C. Anchorage Devices:

1. Manufacturer's standard formed or fabricated steel or aluminum assemblies of shapes, plates, bars or tubes.

D. Fasteners:

1. Aluminum, non-magnetic stainless steel or other materials warranted by manufacturer to be non-corrosive and compatible with components being fastened.
2. Do not use exposed fasteners, except where unavoidable for application of hardware.
3. For exposed locations, provide countersunk Phillips head screws with finish matching items fastened.
4. For concealed locations, provide manufacturer's standard fasteners.
5. Provide nuts or washers of a design having means to prevent disengagement; deforming of fastener threads is unacceptable.

E. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled-in, expansion bolt anchors.

F. Protective Coatings: Cold-applied asphalt mastic complying with SSPC-Paint 12, compounded for 30 mil (0.77 mm) thickness for each coat; or alkylid type zinc chromate primer complying with FS TT-P-645.

G. Glazing Gaskets:

1. Compression type design, replaceable, molded or extruded, of neoprene, or ethylene propylene diene monomer (EPDM).
2. Conform to ASTM C509 or C864.
3. Profile and hardness as required to maintain uniform pressure for watertight seal.
4. Provide in manufacturer's standard black color.

H. Weather-stripping:

1. Wool pile conforming to AAMA 701.2; or extruded EPDM elastomeric conforming to ASTM C509 or C864.
2. Provide EPDM or vinyl-blade gasket weather-stripping in bottom door rail, adjustable for contact with threshold.

I. Internal Sealants: Types recommended by sealant manufacturer.

J. "Anti-Walk" Edge Blocking: "W" shaped EPDM blocks for use in keeping glazing material stationary under vibration or seismic loading.

K. Baffles (at weep holes): Type as recommended by system manufacturer and shown in published installation instructions.

2.03 GLASS AND GLAZING ACCESSORIES

- A. Refer to Section 08800.

2.04 DOOR HARDWARE

- A. Hardware Items:
 - 1. Pivot hinges: Manufacturer's standard.
 - 2. Coordinators: Top and Bottom, provide int @ doors over 7'-6".
 - 3. Thresholds: Manufacturer's standard for each condition to meet all ADA requirements.
 - 4. Weather-stripping: Manufacturer's standard.
 - 5. Meeting Stile: Manufacturer's standard, including adjustable BTM Rail Sweep.
 - 6. Semicircular Door Pulls: RM4422 Clear Anodic Finish.
- B. Hardware Supplier to provide all other door items listed in Door Hardware Section 08710 if not called out in this section.

2.05 FABRICATION

- A. Coordination of Fabrication:
 - 1. Check actual frame or door openings required in construction work by accurate field measurements before fabrication.
 - 2. Fabricate units to withstand loads that will be applied when system is in place.
- B. General:
 - 1. Conceal fasteners wherever possible.
 - 2. Reinforce work as necessary for performance requirements and for support to structure.
 - 3. Separate dissimilar metals and aluminum in contact with concrete utilizing protective coating or pre-formed separators that will prevent contact and corrosion.
 - 4. Comply with Section 08810 for glazing requirements.
- C. Aluminum Framing:
 - 1. Provide members of size, shape and profile indicated, designed to provide for glazing from exterior or interior.
 - 2. Fabricate frame assemblies with joints straight and tight fitting.
 - 3. Reinforce internally with structural members as necessary to support design loads.
 - 4. Maintain accurate relation of planes and angles, with hairline fit of contacting members.
 - 5. Seal horizontals and direct moisture accumulation to exterior.
 - 6. Provide flashings and other materials used internally or externally that are corrosive resistant, non-staining, non-bleeding and compatible with adjoining materials.
 - 7. Provide manufacturer's extrusions and accessories to accommodate expansion and contraction due to temperature changes without being detrimental to appearance or performance.
 - 8. Make provisions in framing for minimum edge clearance, nominal edge cover and nominal pocket width for thickness and type of glazing or infill used in accordance with recommendations of manufacturer an FGMA Glazing Manual.
 - 9. Provide tight fitting, injection molded plastic water deflectors at all intermediate horizontals.
- D. Entrance Doors:
 - 1. Fabricate with mechanical joints using internal reinforcing plates and shear blocks attached with fasteners and by welding.
 - 2. Provide extruded aluminum glazing stops of square (for single glazing only) design, permanently anchored on the security side and removable on opposite side.
- E. Hardware:
 - 1. Receive hardware supplied in accordance with Section 08710 and install in accordance with requirements of this Section if not called out in this section.
 - 2. Cut, reinforce, drill and tap frames and doors as required to receive hardware.
 - 3. Comply with hardware manufacturer's templates and instructions.
 - 4. Use concealed fasteners wherever possible.
- F. Welding:

1. Comply with recommendations of the American Welding Society.
 2. Use recommended electrodes and methods to avoid distortion and discoloration.
 3. Grind exposed welds smooth and flush with adjacent surfaces; restore mechanical finish.
- G. Flashings: Form from sheet aluminum with same finish as extruded sections. Apply finish after fabrication. Material thickness as required to suit condition without deflection or "oil-canning".

2.06 FINISH

- A. Terra Cotta Permadized:
1. Conforming to AAM12C22A44.
 2. Architectural Class I, etched, medium matte, Anodic coating, 0.7 mil (0.010 mm) minimum thickness.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions and proceed with Work in accordance with Section 01001.
- B. Verify dimensions, tolerances and method of attachment with other Work.

3.02 INSTALLATION

- A. Erection Tolerances:
1. Limit variations from plumb and level:
 - a. 1/8 inch (3 mm) in 10 feet (3 M) vertically.
 - b. 1/8 inch (3 mm) in 20 feet (6 M) horizontally.
 2. Limit variations from theoretical locations: 1/4 inch (6 mm) for any member at any location.
 3. Limit offsets in theoretical end-to-end and edge-to-edge alignment: 1/16 inch (2 mm) from flush surfaces not more than 2 inches (51 mm) apart or out-of-flush by more than 1/4 inch (6 mm).
- B. Install doors and hardware in accordance with manufacturer's printed instructions.
- C. Set units plumb, level and true to line, without warp or rack of frame.
- D. Anchor securely in place, allowing for required movement, including expansion and contraction.
- E. Separate dissimilar materials at contact points, including metal in contact with masonry or concrete surfaces, with bituminous paint or pre-formed separators to prevent contact and corrosion.
- F. Seal perimeter members as shown on manufacturer's installation instructions or as required for unique job conditions. Set other members with internal sealants and baffles as called for in manufacturer's installation instructions. Use sealants as recommended by sealant manufacturer.
- G. Coordinate installation of perimeter sealant and backing materials between assemblies and adjacent construction in accordance with requirements of Section 07920.
- H. Glazing: Refer to requirements of Section 08810. Utilize "anti-walk" edge blocking on all vertical edges of glazing.

3.03 ADJUSTING

- A. Test door operating functions. Adjust closing and latching speeds and other hardware in accordance with manufacturer's instructions to ensure smooth operation.

3.04 CLEANING

- A. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears, foreign materials and other unsightly marks.

- B. Clean metal surfaces exercising care to avoid damage.

END OF SECTION 08411