

SECTION 084113 – ALUMINUM- FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included: The Work of this Section shall include:
1. Storefront framing.
 2. Manual swing entrance doors and door frame units.
 3. Door hardware preparation.

1.2 DEFINITIONS

- A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.
- B. Shop Drawings: For aluminum-framed systems as follows:
1. Indicate fabrication and installation of system for frames, connections and panels including plans, elevations, sections, details of components, and attachments to other units of Work.
 2. Coordinate with surrounding work.
 3. Indicate details of support system, method of attachment to building structure, anchorage details, reinforcement, and interface with adjacent work. Show location and detail of each anchorage.
 4. Indicate provisions for expansion and contraction. Include method of accommodating wind, seismic, dead load, and live load induced interstory differential vertical and horizontal movement. Include how system accommodates construction and slab tolerances.
 5. Identify materials, including metal alloys, glass types, fasteners, sealant, and glazing materials, sizes, shapes, thickness and finishes.
 6. Shop drawings shall be in addition to manufacturer's standard printed literature or test reports.
- C. Delegated Design Submittal: Submit shop drawings and calculations which have been signed and sealed by a Professional Engineer responsible for their preparation.
1. Include structural calculations and engineering calculations to show that maximum deflections, including deflection of cantilevered elements, do not exceed the limitations specified herein.
 2. Indicate provisions for structural movement such as vertical inter story live load, horizontal inter story differential movement, vertical superimposed dead loads, creep and column shortening. Submit calculations of expansion and contraction for all elements.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

- E. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12-inch lengths of full-size components and showing details of the following:
 - 1. Joinery, including concealed welds.
 - 2. Anchorage.
 - 3. Expansion provisions.
 - 4. Glazing.
 - 5. Flashing and drainage.
 - F. Other Action Submittals:
 - 1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.
 - B. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility, non-staining, and non-migration with glass and other glazing materials.
 - C. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.
 - D. Warranties: Sample of special warranties.
- 1.5 QUALITY ASSURANCE
- A. Professional Engineer Qualifications: A Professional Engineer who is legally qualified to practice in New Jersey State and who is experienced in providing engineering services of the kind indicated.
 - B. Engineering Responsibility: Engage a qualified Professional Engineer to prepare or supervise the preparation of data for storefront systems, including drawings, testing program development, test-result interpretation, and comprehensive engineering analysis that shows systems' compliance with specified requirements.
 - C. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing storefront systems similar to those required for this Project and who is acceptable to manufacturer. Installer shall have minimum 10 years' experience performing work of this section.
 - D. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics.
 - 1. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

2. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

- E. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ANSI 117.1.
- F. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.
- G. Welding Qualifications: Qualify procedures and personnel per AWS D1.2, "Structural Welding Code - Aluminum."
- H. Adhesives, sealants, paints and coatings required for interior use in this section shall meet requirements of Division 07 Section – "Joint Sealants."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water leakage through fixed glazing and framing areas.
 - e. Failure of operating components.

2. Warranty Period: Ten (10) years from date of Substantial Completion.

- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

- A. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified Professional Engineer licensed in the State of New Jersey to design composite wall panel assembly including supports.
- B. Provide entrance and storefront assembly systems, designed and fabricated for the application indicated, that complies with performance requirements specified as demonstrated by testing the system per test methods indicated.
- C. Testing shall demonstrate compliance with requirements indicated in AAMA 101 for air infiltration, water penetration, and structural performance for type, grade, and performance class of assemblies required.
 1. Structural Performance: A static air design load shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection more than L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2 percent of their clear spans shall occur.
 - a. Wind load: As per ASCE-7 or Building Code, whichever is more stringent.
 - b. Deflection limits due to differential movement of slabs, live load and creep as indicated on the structural drawings.
 2. Air-Infiltration Rate: Not more than 0.06 cfm/ft. of area for an inward test pressure of 6.24 lbf/sq. ft. for storefront glazing.
 3. Water Infiltration: No uncontrolled leakage when tested in accordance with ASTM E331 at test pressure of 12 psf as defined in AAMA 501.
 4. Deflection of Framing Members:
 - a. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 - b. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
 5. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:
 - a. Glass to Exterior – 0.38 (low-e) BTU/hr./ft²/°F.
 - a. Glass doors: Not more than 0.77 BTU/hr./ft²/Degree F.
 6. Solar Heat Gain Coefficient (SHGC): Vision glazing and glass in doors shall have a solar heat gain coefficient of 0.40 as determined per NFRC 200.

7. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:

a. Glass to Exterior – 60 for frame and 63 for glass (low-e).

D. Thermal Movements: Provide assemblies that allow thermal movement resulting from the following maximum change (range) in ambient temperature when engineering, fabricating, and installing aluminum assemblies to prevent buckling, opening of joints, and overstressing of components, connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide the following:

1. Thermal **Storefront Systems** ~~Entrance doors and door frame units, inclusive of sidelights and transoms:~~

a. Kawneer, an Arconic Company; Trifab VG 451UT or approved equal.

2. **Thermal Entrance Doors and Door Frame Units, inclusive of sidelights and transoms where used:**

a. **Kawneer, an Arconic Company; 560 Insulclad™.**

2.3 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308.
5. Welding Rods and Bare Electrodes: AWS A5.10.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods per recommendations in SSPC-SP COM and prepare surfaces per applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36.
2. Cold-Rolled Sheet and Strip: ASTM A 1008.
3. Hot-Rolled Sheet and Strip: ASTM A 1011.

2.4 FRAMING SYSTEMS

- A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 - 1. Framing:
 - a. Construction: Thermally- improved.
 - b. Glazing System: As indicated by selected product designation.
 - c. Glazing Plane: As indicated.
 - 2. Glass, sealants and interior finishes shall not be assumed to contribute to framing member strength, stiffness or lateral stability.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
 - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- D. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.
- E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

2.5 GLAZING SYSTEMS

- A. Glazing: As specified in Division 08 Section "Glass and Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Glazing Sealants: As recommended by manufacturer for joint type, and as follows:
 - 1. Structural Sealant: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtain-wall assembly indicated.
 - a. Color: As selected by Architect from manufacturer's full range of colors.

2. Weatherseal Sealant: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed curtain-wall manufacturers for this use.
 - a. Color: Matching structural sealant.

2.6 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: ~~Manufacturer's standard~~ **Single-acting** glazed entrance doors for manual-swing operation.
 1. Door Construction: **2- 1/4-3/4-inch** overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members, **unless otherwise indicated by manufacturers product designation. Include dual moment welded corner construction and extruded PVC thermal break.** ~~Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.~~
 2. Door Design: **5- 9/16-inch vertical stile, 5-9/16-inch top and** ~~Wide stile with~~ 10-inch bottom rail.
 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 4. Continuous geared hinges, **unless otherwise indicated in Division 08 Section "Door Hardware."**
 5. Weather Stripping for Airtight Applications: **Polymeric** Bulb gasketing at frame head and jambs.
 6. Door Sweeps, **where indicated and required:** Manufacturers standard,
- B. Entrance Door Hardware: Refer to Division 08 Section "Door Hardware."
 1. General: Unless otherwise indicated, provide heavy-duty hardware units in sizes, number, and type recommended by manufacturer for entrances indicated. Finish exposed parts to match door finish, unless otherwise indicated.

2.7 ACCESSORY MATERIALS

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 7 Section - "Joint Sealants."
- B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

2.8 FABRICATION

- A. General: Form components to required shapes and sizes, with true curves, lines and angles. Provide components in sizes and profiles indicated, but not less than required to comply with performance requirements.
 1. Thermal-Break Construction: Fabricate framing system with a concealed, low-conductance thermal barrier, located between exterior materials and interior members. Use manufacturer's standard construction that has been in use for not less than 3 years.

- B. Allow for movement resulting from an air temperature change of 120 deg. F in the design of storefront assemblies, to prevent buckling, opening of joints and overstressing of welds and fasteners.
- C. Comply with AWS for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded joints of all welding flux, grind smooth and flush, restore mechanical finish.
- D. Mill joints to a tight, hairline fit, unless otherwise shown. Cope or miter corner joints. Form joints exposed to weather to exclude water.
- E. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping, handling and installation.
- F. Reinforcing: Install reinforcing as required for hardware and necessary for performance requirements, sag resistance and rigidity.
- G. Dissimilar Metals: Separate dissimilar metals with zinc chromate primer, bituminous paint, or other separator to prevent corrosion.
- H. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.

2.9 COMPONENTS

- A. Storefront Framing System: Provide inside-outside matched framing system of channel and tubular aluminum extrusions as shown, with provisions for glass replacement. Shop fabricate and preassemble frame components where possible. Provide fully welded or mechanical jointed assemblies, unless otherwise indicated. Reinforce as necessary to support required loads.
- B. Doors: Provide manufacturer's aluminum door systems designed and fabricated of size and profile requirements with fittings and hardware as indicated on Drawings and as shown on shop drawings.
 - 1. Fabricate work to accommodate required fittings, hardware, anchors, reinforcement, and accessory items. Provide tubular stile members, fabricated with welded or watertight mechanical joints.
 - 2. Prefabrication: Complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible before shipment to the Project site. Disassemble component only as necessary for shipment and installation.
 - 3. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.
 - 4. Glass and Glazing Materials: Glass and glazing materials shall comply with requirements of Division 8 Section - "Glass and Glazing" of these Specifications. Provide fully tempered safety glass where indicated.
 - a. Provide insulating glazing units for exterior applications, and tempered single glazed units for interior applications.

2.10 ALUMINUM FINISHES

- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designating 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: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat.
 - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Provide clear topcoat where required by coating manufacturer for color selected.
- D. Color and Gloss: As selected by the Architect from manufacturers full color range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the structure for location tolerances and material conditions that affect proper installation of components. Notify the Contractor and Architect in writing of conditions unsatisfactory for installation.
- B. Do not commence Work of this Section in affected areas until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions for protecting, handling, and installing fabricated components, with care and attention to preservation of edges and sealants. Discard or remove and replace damaged members.
- B. Install assemblies in accordance with approved Shop Drawings, using workers specifically trained in the installation of this type of work.
- C. 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.
- D. Anchor components securely in place as indicated on Shop Drawings. Shim and allow for movement resulting from changes in thermal conditions. Provide separators and isolators and coatings to prevent corrosion, and electrolytic deterioration between dissimilar materials and other materials.
- E. 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.
- F. Glazing: Inspect glass and framing for compliance with manufacturing and installation tolerances, including size, squareness, and offsets at corners; for existence of minimum face or edge clearances; for manufacturing imperfections; for edge conditions; and for effective sealing of joinery.
 - 1. Avoid point loading of glass.
 - 2. Do not proceed with glazing work until unsatisfactory conditions have been corrected.
 - 3. Do not field cut glass.
 - 4. Comply with requirements of Division 08 Section - "Glass and Glazing."

3.3 TOLERANCES

- A. Install storefront system to comply with the following, unless tighter tolerances are required for proper operation and performance:
 - 1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
 - 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
 - 3. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch; where a reveal or protruding element separates aligned surfaces by less than 2 inches, limit offset to 1/4 inch.
 - 4. Location: Limit variation from plane or location shown on Shop Drawings to 1/8 inch in 12 feet; 1/4 inch over total length.
 - 5. Amount or total deviation or misalignment in any direction for vertical members; 1/8-inch maximum in 24 foot run.
 - 6. Maximum offset from true alignment between 2 abutting members will be 1/32 inch. No edge projection will be permitted.
- B. Maximum joint gap or opening between removable glazing stop, filler or closure and its adjacent member will be 1/32 inch or a maximum 1/32-inch cumulative opening at both ends of removable members (1/64 inch each end).

3.4 ADJUSTING

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

3.5 CLEANING

- A. Clean completed system, inside and out, promptly after erection and installation of glass and sealants, allowing for curing of sealants.
- B. Installer shall advise the Contractor of proper and adequate procedures for protection and cleaning during the remainder of the construction period so that the system will be without damage and deterioration at time of acceptance.

3.6 PROTECTION

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

END OF SECTION 084113