SECTION 08 43 13
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing: Steel attachment members.

B. Section 05 50 00 - Metal Fabrications: Steel attachment devices.

C. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.

D. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA 501.4 - Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts; 2018.

B. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.

C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).

D. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2017a.

E. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

F. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

I. ASTM C1184 - Standard Specification for Structural Silicone Sealants; 2018, with Editorial Revision.

J. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

K. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 PERFORMANCE REQUIREMENTS

A. General Performance:

1. Product to comply with the specified performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction, as determined by testing of aluminum storefront systems representing those indicated for this project.
2. Aluminum storefront systems shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners[], glass and infill, and internal drainage details.

C. Shop Drawings: Indicate system dimensions, plans, elevations, sections, details, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

D. Samples: Submit two samples 12 inches in size illustrating finished aluminum surface, glass, glazing materials.

E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

F. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

G. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

D. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.09 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Kawneer North America: www.kawneer.com.

B. Other Acceptable - Aluminum-Framed Storefronts Manufacturers:

1. EFCO Corporation: www.efcocorp.com.
2. Oldcastle BuildingEnvelope: www.oldcastlebe.com.
3. YKK AP America Inc.: www.ykkap.com.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices. Including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.
   1. Product: Kawneer; Trifab VersaGlaze 451T Thermal Framing System.
   2. Glazing Position: Centered (front to back).
   3. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
   4. Front, center, back, multi-plane, structural silicone or weatherseal.
   5. Screw spline.
   6. Finish Color: As selected by Architect from manufacturer's standard line.
   7. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   8. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   9. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   10. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   11. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   12. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements
   1. Wind Load: Static air design load of 35 psf shall be applied in the positive and negative direction in accordance with ASTM E330. There shall be no deflection in excess of L/175 of the span of any framing member. 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% of their clear spans shall occur.
      a. Design Wind Loads: Comply with requirements of ASCE 7.
   2. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf as defined in AAMA 501.
   3. Air Infiltration: Air leakage rate shall not exceed 0.06 cfm/ft2 at a static air pressure differential of 6.2 psf with interior seal, or, rate shall not exceed 0.06 cfm/ft2 at a static air pressure differential of 1.6 psf without interior seal, when tested in accordance with ASTM E 283.
   4. System Internal Drainage: Drain to the exterior by means of a weep drainage network using subsill, any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   5. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   6. Uniform Load: A static air design load of 35 psf shall be applied in the positive and negative direction in accordance with ASTM E 330.

a. There shall be no deflection in excess of L/175 of the span of any framing member.
b. 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% of their clear spans shall occur.

7. Seismic:
   a. When tested to AAMA 501.4, system must meet design displacement (elastic) of 0.010 x the story height and ultimate displacement (inelastic) of 1.5 x the design displacement.
8. Thermal Movements:
   a. Allow for thermal movements resulting from the following:
      1) 0°F (-18 C) to 180°F (82 C) maximum change (range) in ambient and surface temperatures
      2) 75°F (24 C) test interior ambient air temperature
   b. Test performance shows no buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5 for a minimum 3 cycles.

2.03 COMPONENTS

A. Aluminum Framing System: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Thermal Barrier: Thermal break with dual nominal 1/4 inch (6.4 mm) separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections.
      a. Thermal break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

B. Glazing System: See Section 08 80 00.
   1. Glazing Gaskets:
      a. Manufacturer's standard compression types.
      b. Replaceable, extruded EPDM rubber.
   2. Spacers and Setting Blocks:
      a. Manufacturer's standard elastomeric type.
   3. Bond-Breaker Tape:
      a. Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
   4. Glazing Sealants: For structural-sealant-glazed systems as recommended by manufacturer for joint type, and as follows:
      a. Structural Sealant per ASTM C1184:
         1) Single-component neutral-curing silicone formulation that is compatible with the system components with which it comes in contact.
         2) Specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in the aluminum-framed systems indicated.
         3) Color: Black
      b. Weatherseal Sealant: ASTM C920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O.
         1) Single-component neutral-curing formulation that is compatible with the structural sealant and other system components with which it comes in contact
         2) Recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
         3) Color: Matching structural sealant.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M) 6063-T6 alloy and temper; not less than 0.070 inch (1.8 mm) wall thickness at any location for the main frame.

B. Fasteners: Stainless steel.

2.05 FINISHES

A. Class II Natural Anodized Finish: AAMA 611 AA-M12C22A31 Clear anodic coating not less than 0.4 mils thick.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Comply with drawings and manufacturer's written instructions for installing aluminum-framed storefront system, accessories, and other components

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Set sill members in bed of sealant or with gaskets, as indicated, for weather-tight construction.

G. Install aluminum-framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within aluminum-framed storefront system to the exterior.

H. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

I. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

J. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

K. Coordinate attachment and seal of perimeter air and vapor barrier materials.

L. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 FIELD QUALITY CONTROL

3.04 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Clean glass immediately after installation.
   1. Comply with glass manufacturer's written recommendations for final cleaning and maintenance.
   2. Remove non-permanent labels and clean surfaces.

C. Clean aluminum surfaces.

D. Avoid damaging protective coatings and finishes.

E. Remove excess sealants, glazing materials, dirt, and other substances.

F. Repair or replace damaged installed products.

G. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during the construction period.

H. Remove construction debris from project site and legally dispose of debris.

I. Remove excess sealant by method acceptable to sealant manufacturer.

3.05 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION