SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 CONTROLLING DOCUMENTS

A. This specification is controlled by Division 08, Section 08 40 00 “Exterior Enclosure System Requirements”. In addition to the requirements of this document, all requirements of Controlling Documents must also be met. The more onerous conditions of this document or the Controlling Document must be met.

1.2 SUMMARY

A. Provide the work of this Section in accordance with requirements of the Contract Documents.

B. This Section includes, but is not limited to the following:

1. Aluminum-framed interior storefront systems **AG-02**.
2. **EWS-03** assembly consisting of existing aluminum-framed exterior storefront system with aluminum bent plate **MTP-07** and thermal insulation behind spandrel panel
3. Aluminum-framed interior entrance door systems.
4. Aluminum-framed exterior entrance door systems.

C. Related Requirements:

1. Division 07, Section 07 62 00 "Sheet Metal Flashing and Trim".
2. Division 07, Section 07 92 00 "Joint Sealants" for sealants and accessories.
3. Division 07, Section 07 42 16 “Metal Plate Wall Panels”.
4. Division 08, Section 08 40 00 "Exterior Enclosure Systems Requirements" for performance requirements.
5. Division 08, Section 08 44 13 "Glazed Aluminum Curtain Walls" for curtain-wall systems that mechanically retain glazing on four sides.
6. Division 08, Section 08 71 00 "Door Hardware"" for swing door hardware.
7. Division 08, Section 08 80 00"Glazing" for additional material and installation requirements for glazing of aluminum framed entrance doors and storefronts.
8. Division 08, Section 08 88 36.19 “Electronically Controlled Switchable Glass” for glazing of aluminum framed entrance doors and storefronts where indicated.

1.3 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."

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site, in accordance with requirements specified in Division 08, Section 08 40 00 "Exterior Enclosure System Requirements".

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Action Submittals:

1. Building Product Disclosure and Optimization - Sourcing of Raw Materials:

a. Leadership Extraction Practices

1) Extended Producer Responsibility (EPR): Submit documentation indicating that manufacturers have a take back or recycling program for the product purchased.
2) Recycled Content: For products having recycled content, indicate percentages by weight of post-consumer and pre-consumer recycled content.

a) Include statement indicating costs for each product having recycled content.

b. Sourcing of Raw Materials: For products that are required to comply with requirements for regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material.

1) Include statement indicating distance to Project, cost for each regional material and the fraction by weight that is considered regional.

2. Indoor Environmental Quality, Low Emitting Materials: Building Products must be tested and compliant with the California Department of Public-Health (CDPH) Standard Method V1.1-2010, using the applicable exposure scenario.

a. Adhesives and Sealants: For wet applied on-site products, submit printed statement showing compliance with the applicable chemical content requirements of SCAQMD Rule 1168, effective July 1, 2005 and rule amendment date of January 7, 2005.
b. Alternative tests for VOC above include ASTM D2369-10; ISO 11890 part 1; ASTM D6886-03; or ISO 11890-2
c. Methylene Chloride and perchloroethylene may not be added to paints, coating, adhesive or sealants.

C. Shop Drawings: For aluminum-framed entrances and storefronts.

1. Include plans, elevations, sections, full-size details, and attachments to other work.
2. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
3. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:

a. Joinery, including concealed welds.
b. Anchorage.
c. Expansion provisions.
d. Glazing.
e. Flashing and drainage.

4. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

a. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations

5. Include point-to-point wiring diagrams showing the following:

a. Power requirements for each electrically operated door hardware.
b. Location and types of switches, signal device, conduit sizes, and number and size of wires.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes except as otherwise specified. Where finishes involve normal color and texture variations, include sample sets showing full range of variations expected.

1. Aluminum Extrusions: Minimum 4 feet length.
2. Aluminum Sheet: Minimum 5 feet length x 1 feet wide.
3. Submit metal finish samples as the same time as metal finish samples submitted for Sections:

a. 07 42 16 Metal Plate Wall Panels.
b. 08 44 13 Glazed Aluminum Curtain Walls.

4. Coil and extrusion material finished by different manufacturers shall match curtain wall framing color and gloss to the satisfaction of the Architect.

F. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, 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.

G. Entrance Door Hardware Schedule: Prepared by or under 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.

H. Fabrication Engineering and Design: For aluminum-framed entrances and storefronts, submit comprehensive engineering analysis for aluminum framed systems, including analysis data signed and sealed by the qualified professional engineer licensed to practice in the State of Texas, responsible for their preparation, indicating compliance with performance requirements specified. Submission shall include:

1. Analysis for applicable loads on framing members
2. Analysis for applicable loads on anchors and support system for the project.
3. Structural calculations and details of anchoring system, including type, size, and spacing of fasteners.

1.6 INFORMATIONAL SUBMITTALS

A. Informational Sustainable Design Submittals:

1. Building Product Disclosure and Optimization - Environmental Product Declarations

a. Submit product specific type III EPDs or Industry wide (generic) EPDs, USGBC approved program declaration or products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.

2. Building Product Disclosure and Optimization - Environmental Product Declarations

a. Submit product specific type III EPDs or Industry wide (generic) EPDs, USGBC approved program declaration or products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.

3. Building Product Disclosure and Optimization - Material Ingredients

a. Material Ingredient Reporting: Submit documentation confirming chemical inventory of products to at least 0.1 % (1000pm) with at least one of the following:

1) Submit published manufacturer inventory of ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)
2) Submit documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
3) Submit Declare product label indicating that all ingredients have been disclosed down to 1000 ppm or designated as Red List Free or Declared
4) Living Product Challenge
5) Product Lens Certification
6) USGBC approved program.

b. Material Ingredient Optimization: Submit documentation confirming chemical inventory of products to at least 0.01 % (100pm) and/or that has a compliant material ingredient optimization report with at least one of the following:

1) Submit GreenScreen V1.2 Benchmark: Third party report prepared by a licensed GreenScreen List Translator, or a full GreenScreen Assessment.
2) Submit third-party verified documentation that product has been certified as Cradle-to-Cradle v3 at the Bronze Level or better
3) Submit third-party verified Cradle to Cradle v3 Material Health certificate at the Bronze Level or better
4) Submit third-party verified Declare product label indicating that all ingredients have been disclosed down to 100 ppm
5) Submit third-party verified documentation that product is Living Product Challenge certified with a Red List Free or LBC Red List Free Declare label.
6) Submit documentation that product has a manufacturer prepared action plan with material inventory to at least 1000 ppm.

B. Qualification Data:

1. For professional engineer's experience with providing fabrication engineering services of the kind indicated, including documentation that engineer is licensed in the state in which Project is located.

C. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.

D. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by a qualified testing agency.

1. Provide lab testing data results (performed within 4 years prior to the date of submission) providing air and water penetrating testing data for each exterior door specified.

E. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C1401. Include periodic quality-control reports.

F. Source quality-control reports.

G. Field quality-control reports.

H. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: Provide aluminum storefront, entrances and associated items by a firm having undivided responsibility for the entire storefront, entrance and glazing installation, except as otherwise specified herein.

1. The Storefront and Entrance Manufacturer's Representatives is required to inspect the storefront and entrance door installation to ensure conformance with this Section and to ensure warrantability of the storefront, doors, hardware, paint finish and their installation
2. Engineering Responsibility: Manufacturer shall have inhouse engineering to prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.

B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project, with not less than five (5) consecutive years of experience installing storefront and entrances similar that required for the project.

C. Testing Agency Qualifications: Qualified according to ASTM E699 for testing indicated and accredited by the International Accreditation Service or the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement as complying with ISO/IEC 17025 and acceptable to Owner and Architect.

D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. 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

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

E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

F. Structural-Sealant Glazing: Comply with ASTM C1401 for design and installation of storefront systems that include structural glazing.

G. Exterior Wall System(s) Testing Mockups: Prior to installing exterior wall systems, construct aluminum entrances and storefronts as part of composite testing mockup indicated on Mockup Elevation sheets and specified in Division 08, Section 08 40 00 "Exterior Enclosure Systems". Incorporate each type of exterior wall construction and finish to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Coordinate with Exterior wall Contractor and each of the Contractors listed in Summary Paragraph of "Exterior Enclosure System Requirements". Provide materials in this section to create the composite mockup indicated.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum framed entrances and storefront glass, decorative metalwork, and other exposed elements in padded blankets or other approved protective wrapping.

B. Protect finish surfaces from damage during handling and installation.

1.10 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. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.11 WARRANTY

A. Special Warranty: Manufacturer and Installer agrees to repair or replace components of aluminum-framed entrances and storefronts 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 created by wind and thermal and structural movements.
   c. Deterioration of metals and other materials beyond normal weathering.
   d. Water penetration through fixed glazing and framing areas.
   e. Failure of operating components.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty, Factory-Applied Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace metal that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

   a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.

b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: Minimum 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations:

1. Obtain all components of interior aluminum-framed door and interior storefront system, including framing and accessories, from single manufacturer.
2. Obtain all components of exterior doors as same manufacturer as glazed aluminum curtain wall specified in Section 08 44 13 “Glazed Aluminum Curtain Walls”.

2.2 PERFORMANCE REQUIREMENTS

A. Fabrication Engineering and Design: Engage a qualified Texas Licensed professional engineer to engineer aluminum-framed entrances and storefronts using structural performance requirements specified in Division 08 Section 08 40 00 "Exterior Enclosure Systems Requirements". Be responsible for engineering of aluminum entrances and storefront components and materials, fabrication and installation.

B. System Description: The entrance and storefront system described in this Section is an integral portion of the facade that comprises materials, components and assemblies between the internal and the external surfaces at the entrance level. Provide aluminum entrances and storefronts as a complete system, with high quality, watertight, airtight and structurally sound entrance and storefront enclosure fabricated and installed according to specified standards. The work of this Section includes, but is not limited to, the following:

1. Aluminum entrance doors and storefront components including finish coatings.
2. Metal trim as may be necessary to join adjoining materials to the metal and glass assemblies including finish coatings.
3. Metal panels in designated portions of the entrance and storefront assemblies including finish coatings.
4. Reinforcing (stiffeners, brackets, etc.) required to strengthen or reinforce members, not specifically called out as structural steel or miscellaneous metal fabrications.
5. Sealants, joint fillers, gaskets, etc. necessary to produce a watertight installation including sealants and joint fillers at the junction of the entrance and storefront metal and glass elements and contiguous facade components.
6. Weeps, baffles, thermal breaks, flashings, etc. necessary to meet performance requirements.
7. Anchors, inserts, embedded devices, etc. necessary to support the entrance and storefront system. This shall include but not be limited to design, engineering, coordination, manufacture, supply, layout, field checking, installation and any necessary repair of the fixing anchors and their attachment to the embedded anchorage and the anchorage embeds.
8. Coordination with other trade Contractors that have components of their work installed on or within the entrance and storefront system.

9. Shop drawings, structural calculations, manufacturer's data, certifications of compliance and selected samples of materials and warranties pertaining to the entrance and storefront enclosure.
10. Field measurements of adjacent and/or supporting construction and verification of existing conditions.
11. Field testing of assemblies for water penetration.
12. Protection and cleaning of finished work.
13. Participation in coordination meetings throughout the course of the Work.
14. Preparation of "as-built" shop drawings reflecting changes (from original "approved" shop drawings) that may have occurred during the course of the work.

C. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, indicated in Division 08, Section 08 40 00 "Exterior Enclosure System Requirements", including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure also includes the following:

    a. Deflection exceeding specified limits.
    b. Lateral Wind movement stresses transferring to building structure
    c. Thermal stresses transferring to building structure.
    d. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
    e. Glass breakage.
    f. Glazing to glazing contact.
    g. Noise or vibration created by wind and thermal and structural movements.
    h. Loosening or weakening of fasteners, attachments, and other components.
    i. Sealant Failure.
    j. Failure of operating units.

D. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

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

E. Reference Standards: Comply with published recommendations of product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for terms not otherwise defined in this Section or in referenced standards.

1. Glass Association of North America (GANA) Publications: "Laminated Glazing Reference Manual", "Glazing Manual" and "Sealant Manual".
2. Consumer Product Safety Commission (CPSC): Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of CPSC 16 CFR Part 1201 for category II materials.

    a. Subject to compliance with requirements and California State Building Code, provide safety glass with a removable certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to local Building Department.

3. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
4. NAAMM "Metal Finishes Manual".

F. Low-Emitting Materials:

1. Adhesives and Sealants wet-applied inside the weather-proofing system must meet the VOC general emissions testing criteria of CDPH Standard Method v1.2.
2. All adhesives and sealants wet-applied inside the weather-proofing system must have VOC content in compliance with the applicable VOC limits (g/L) found in tables in Division 01 Section 01 81 13.14 "Sustainable Design Requirements - LEED v4 BD+C."

2.3 MATERIALS, GENERAL

A. Recycled Content of Products:

1. Provide products with an average recycled content of aluminum products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 12.5 percent.
2. Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Regional Materials: Provide a minimum of 20 percent of building materials (by cost) that are regionally extracted, processed and manufactured materials within a radius of 100 miles.

2.4 INTERIOR STOREFRONT SYSTEMS

A. Basis-of-Design Product: Subject to compliance with requirements, provide YKK AP America Inc; YES ~~40 FS~~60 FI Commercial Strorefront System or a comparable product by one of the following: *{Revised by Revision 1}*

1. EFCO Corporation.
2. Oldcastle BuildingEnvelope (OBE); CRH Americas.
3. Tubelite Inc.
4. U.S. Aluminum; a brand of C.R. Laurence.
5. Kawneer

B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Nonthermal.
2. Glazing System: Retained mechanically with gaskets.
3. Glazing Plane: Front.
4. Finish: High-performance organic finish.
5. Fabrication Method: Field-fabricated stick system.
6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
7. Steel Reinforcement: As required by manufacturer.

C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.5 EXISTING EXTERIOR STOREFRONT SYSTEMS

A. Aluminum Bent Plate Spandrel Panes Detail Componts **MTP-07**

1. Aluminum plate panels with no deviation in plane exceeding 0.8 percent of panel dimension in width or length.

    a. Overall Spandrel Detail: Refer to Drawings.
    b. Exterior Skin: Aluminum

        1) Thickness: Minimum 1/8 inch.
        2) Finish: Match framing system. Exposed fasteners are not permitted.
        3) Texture: Smooth.

    c. Interior Skin: Galvanized steel sheet, minimum 20 gauges with reinforcement to maintain flat surface.

        1) Thickness: Manufacturer’s standard for finish and texture indicated.
        2) Finish: Match framing system. Exposed fasteners are not permitted.
        3) Texture: Smooth.

    d. Thermal Insulation Core: Manufacturer’s standard rock mineral insulation board, 2 inches thick complying with ASTM C612, Type III or Type IVB, nominal density of 5.93 lb/ft^3.
    e. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

        1) Frame-Spread Index: 25 or less.
        2) Smoke-Developed Index: 50 or less.

2.6 ALUMINUM ENTRANCE DOOR SYSTEMS

A. Subject to compliance with requirements, provide product by one of the following:

1. EFCO Corporation.
2. Oldcastle BuildingEnvelope (OBE); CRH Americas.
3. Tubelite Inc.
4. U.S. Aluminum; a brand of C.R. Laurence.
5. Kawneer

B. Aluminum Exterior Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

1. Door Construction: 2-inch or 2-1/4 inch overall thickness, with minimum 0.188-inch-overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated, and fillet welded or that incorporate concealed tie rods.

    a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.

2. Door Design: Medium stile; 3-1/2-inch nominal width at vertical stiles.

3. Glazing Stops and Gaskets Square, snap-on, extruded-aluminum stops and preformed gaskets.

    a. Provide nonremovable glazing stops on outside of door.

4. Basis of Design: Kawneer; 350 IR Entrances, Medium Stile
5. Finish: Match adjacent storefront framing finish.

C. Aluminum Interior Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

1. Door Construction: 2 in (50 mm) overall thickness, with minimum 0.188 in (4.7 mm) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets, fillet welded.
2. Door Design: Medium stile; 3-1/2 in (87 mm) nominal width at vertical stiles.
3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
4. Basis of Design: 35D Standard Commercial Entrances by YKK AP America Inc.
5. Finish: Match adjacent storefront framing finish.

2.7 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Division 08 Section 08 71 00 "Door Hardware."

B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule entrance door hardware sets indicated in "Entrance Door Hardware Sets" Article for each entrance door, to comply with requirements in this Section.

1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products complying with BHMA standard referenced.

    a. Door Hardware as Specified in Section 08 71 00 “Door Hardware”.

2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
3. Opening-Force Requirements:

    a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion and not more than 15 lbf to open the door to its minimum required width.
    b. Accessible Interior Doors: Not more than 5 lbf to fully open door.

C. Designations: Requirements for design, grade, function, finish, quantity, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

D. Removable Mullions: BHMA A156.3 extruded aluminum.

1. When used with panic exit devices, provide keyed removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.

E. Weather Stripping: Manufacturer's standard replaceable components.

1. Compression Type: Made of ASTM D2000 molded neoprene or ASTM D2287 molded PVC.
2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

F. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

G. Silencers: BHMA A156.16, Grade 1.

H. Thresholds: BHMA A156.21 raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch. All thresholds to be extra heavy duty to allow for carts.

I. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

2.8 GLAZING

A. Glazing: Comply with Division 08 Section 08 80 00 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

D. Pocket Reducer: Manufacturer’s standard pocket reducer for monolithic glazing installation. *{Added by Revision 1}*

~~D.~~E. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

~~E.~~F. Glazing Sealants: As recommended by manufacturer.

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, selected and roofing/waterproofing system under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Verify sealant has a VOC content of 250 g/L or less.
4. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
5. Colors of Exposed Glazing Sealants: As selected by Architect from Manufacturers’ full range.

~~F.~~G. Weatherseal Sealants: ASTM C920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed storefront manufacturers for this use.

1. Color: Match structural sealant.

2.9 MATERIALS

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

1. Sheet and Plate: ASTM B209.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
3. Structural Profiles: ASTM B308/B308M.

B. Stainless-Steel: Type 304 for interior and type 316L for exterior.

1. Plate and Sheet: ASTM A666, stretcher level sheets.
2. Bar Stock: ASTM A276.
3. Tubing: ASTM A269.

C. Steel Reinforcement:

1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

D. Steel Reinforcement Primer: 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 according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

E. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

F. Recycled Content of Aluminum Components: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

G. Regional Materials: Manufacture products within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.

2.10 ACCESSORIES

A. 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. Tighten torques as required to achieve maximum torque tension relationship required by fasteners.
2. Reinforce the interior surface with aluminum or non-magnetic type stainless steel to receive screw threw threads or provide manufacturer's standard non-corrosive pressed-in splined grommet nuts to receive fastener heads. Drill screwed connections.

3. Where exposed in finish surfaces, use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer. Use only stainless-steel anchors outside the air barrier.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.

C. Concealed Flashing: Dead-soft, 0.018-inch-thick stainless steel, complying with ASTM A240/A240M, of type recommended by manufacturer.

D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

E. Rigid PVC Filler.

2.11 FABRICATION

A. General: Factory fabricate aluminum framed entrances and storefronts to designs, sizes, and thicknesses indicated and to comply with indicated standards.

1. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Storefront Framing: Fabricate components for assembly using manufacturer's standard system.

F. Entrance Door Frames: Fabricate door framing in profiles indicated. Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At interior and exterior doors, provide compression weather stripping at fixed stops.

G. Entrance Doors: Reinforce doors as required for installing entrance door hardware. Factory assemble door and frame units and factory install hardware to greatest extent possible.

Reinforce frame units at hinge jamb with continuous minimum 1-1/4 x 1-1/4 x 3/16-inch steel angle full height of door for installing hardware. Cut, drill, and tap for factory-installed hardware before finishing components.

1. At exterior doors, provide compression weather stripping at fixed stops. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.
3. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.12 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" 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. Finishes Application: Apply high performance organic coatings to exposed exterior surfaces of exterior enclosure system components. Apply thermosetting acrylic enamel coatings to exposed and concealed interior surfaces of exterior enclosure system components.

1. During production, maintain large size color range samples for use in comparing against production material.
2. Adhesion and Compatibility Testing: Test samples of high-performance coatings on aluminum shall be provided for compatibility and adhesion testing of joint sealants proposed for use on exterior enclosure system components prior to installations. Refer to Division 07, Section 07 92 00 "Joint Sealants.'

D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

E. High-Performance Finish:

1. Two-coat fluoropolymer finish system consisting of corrosion inhibitive primer and fluoropolymer color coat complying with AAMA 2604, with suspended mica flakes for mica colors, containing not less than 70 percent PVDF resin by weight in color coat in not less than 1.2 mils dry thickness. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Color and Gloss:
    a. Exterior Exposed Aluminum Frames and Doors and Exterior Spandrel Panels: To match Permadize Sterling Gray by Kawneer Company.

b. Interior Aluminum Frames, Doors,and Interior Spandrel Panel Skin: #UC43350 Bone White by PPG Duranar.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION, GENERAL

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

E. Install glazing as specified in Division 08, Section 08 80 00 “Glazing.”

F. Set continuous sill members and flashing in full sealant bed, as specified in Division 07, Section 07 92 00 "Joint Sealants," to produce weathertight installation.

G. Install joint filler behind sealant as recommended by sealant manufacturer.

H. Install components plumb and true in alignment with established lines and grades.

3.4 INSTALLATION OF GLAZING

A. Install glazing as specified in Division 08, Section 08 80 00 "Glazing."

3.5 INSTALLATION OF WEATHERSEAL SEALANT

A. Install weatherseal sealant to completely fill cavity, according to sealant manufacturer's written instructions, to produce weatherproof joints.

3.6 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

A. Entrance Doors: Install entrance doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

B. Install thermal batt insulation solid between storefront members and adjacent construction and in voids within the system and where shown on the Drawings. Compress fiberglass to 50 percent or less of original thickness.

C. Install perimeter joint sealants as specified in Division 07, Section 07 92 00 “Joint Sealants” to produce weathertight installation.

3.7 ERECTION TOLERANCES

A. Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; ¼ inch in 40 feet.
2. Level: 1/8 inch in 20 feet; ¼ inch in 40 feet.
3. Alignment:
    a. Where surfaces abut in line or are separated by reveal or protruding element up to ½ inch wide, limit offset from true alignment to 1/16 inch.
    b. Where surfaces are separated by reveal or protruding element from ½ to 1 inch wide, limit offset from true alignment to 1/8 inch.
    c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to ¼ inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; ½ inch over total length.

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Contractor's Responsibility: Furnish the Testing Agency with access to the Work, materials and facilities as required by the Agency.

1. Provide adequate notice of construction activities to allow timely inspections and observation of testing.
2. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect and test completed aluminum framed entrances and storefront installation, including accessories.
3. Notify the Owner, the Commissioning Agent, the Contractor, the Architect, the Manufacturer's field Representative so that each entity may have adequate representation at the testing.

C. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive phases as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.

1. Field Testing: As specified in Division 08, Section 08 40 00 "Exterior Enclosure System Requirements".

3.9 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

END OF SECTION