SECTION 084113: ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

This suggested guide specification has been developed using the current edition of the Construction Specifications Institute (CSI) “Manual of Practice,” including the recommendations for the CSI three-part Section Format and the CSI Page Format. Additionally, the development concept and organizational arrangement of the American Institute of Architects (AIA) MasterSpec® Program has been recognized in the preparation of this guide specification. Neither CSI, AIA, USGBC, nor ILFI endorse specific manufacturers and products. The preparation of the guide specification assumes the use of standard contract documents and forms, including the “Conditions of the Contract,” published by the AIA.

EDITOR NOTE: Instructions to the editor appear in RED. This style does not exist in the standard CSI template.

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section covers Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.

B. Types of Kawneer Aluminum Storefront Systems include:
   1. Trifab® VersaGlaze® 451T Framing System
      a. 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension
      b. Thermal
      c. Front, center, back, multi-plane, structural silicone or weatherseal (type B) glazed
      d. Screw spline, shear block, stick, or punched opening
   2. Trifab® VersaGlaze® 451T Framing System – Impact Resistant and Blast Mitigation
      a. 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension
      b. Thermal
      c. Front, center, back, multi-plane, structural silicone or weatherseal (type B) glazed
      d. Impact resistant, blast mitigation glazing
      e. Screw spline, shear block, stick, or punched opening

C. Related Sections:

EDITOR NOTE: The sections listed below are specified elsewhere. However, Kawneer recommends single-source responsibility for all of these sections as described in the Quality Assurance article below.

1. 072700: Air Barriers
2. 079200: Joint Sealants
3. 083213: Sliding Aluminum-Framed Glass Doors
4. 084113: Aluminum-Framed Entrances and Storefronts

5. 084413: Glazed Aluminum Curtain Walls
6. 085113: Aluminum Windows
7. 088000: Glazing
8. 107113: Exterior Sun Control Devices
9. 122600: Interior Daylighting Devices

1.3 DEFINITIONS

A. For fenestration industry standard terminology and definitions, refer to the Fenestration & Glazing Industry Alliance (FGIA) Glossary (AAMA AG-13).

1.4 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.
   3. Failure includes any of these events:
      a. Thermal stresses transferring to building structure
      b. Glass breakage
      c. Loosening or weakening of fasteners, attachments, and other components
      d. Failure of operating units

B. Delegated Design:
   1. Design aluminum storefront systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Wind Loads:

EDITOR NOTE: Provide wind load design pressures in PSF and include applicable building code and year edition.

   1. The storefront system shall include anchorage that is capable of withstanding the following wind load design pressures:
      a. Inward: (_____) psf or (_____) Pa
      b. Outward: (_____) psf or (_____) Pa
   2. The design pressures are based on the (_____) Building Code, (_____) Edition.

D. Air Leakage:

EDITOR NOTE: Performance results for air infiltration are based upon ASTM and AAMA standards. Consult your local Kawneer representative concerning specific project performance requirements.

   1. The test specimen shall be tested in accordance with ASTM E 283.
   2. With interior seal, air leakage rate shall not exceed 0.06 cfm/ft^2 (0.3 l/s · m^2) at a static air pressure differential of 6.2 psf (300 Pa).

3. Without interior seal, air leakage rate shall not exceed 0.06 cfm/ft^2 (0.3 l/s · m^2) at a static air pressure differential of 1.6 psf (75 Pa).
4. CSA A440 Fixed Rating

E. Water Resistance:

EDITOR NOTE: Performance results for water resistance are based upon ASTM and FGIA/AAMA standards. Consult your local Kawneer representative concerning specific project performance requirements, sill flashing details, and installation instructions.

1. The test specimen shall be tested in accordance with ASTM E 331.
2. There shall be no leakage at a minimum static air pressure differential of:
   a. 8 psf (383 Pa) as defined in AAMA 501.
   b. 10 psf (479 Pa) as defined in AAMA 501 with VersaGlaze® HP Sill Flashing.
   c. 8 psf (383 Pa) as defined in AAMA 501 with optional Air/Vapor Barrier Tie-in.

F. Uniform Load Structural:

1. A static air design load of 35 psf (1680 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330.
2. There shall be no deflection in excess of L/175 of the span of any framing member.
3. 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.

G. Seismic:

1. When tested to AAMA 501.4, system must meet design displacement (elastic) of 0.010 times the story height and ultimate displacement (inelastic) of 1.5 times the design displacement.

H. Thermal Movements:

1. Allow for thermal movements resulting from the following:
   a. 0°F (-18 C) to 180°F (82 C) maximum change (range) in ambient and surface temperatures
   b. 75°F (24 C) test interior ambient air temperature
2. 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.

I. Thermal Transmittance (U-factor):

1. Thermal transmittance test results are based upon 1" (25.4 mm) clear high-performance insulating glass [1/4" (e=0.035, #2), 1/2" aluminum spacer and argon fill gas, 1/4"].
2. When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than listed here:
   a. Trifab® Versaglaze® 451 Framing System, Center Plane (0.28 COG) 0.47 or project specific (____) Btu/hr/ft^2/°F per AAMA 507 or (____) Btu/hr/ft^2/°F per NFRC 100.
   b. Trifab® Versaglaze® 451T Framing System, Center Plane (0.28 COG) 0.38 or project specific (____) Btu/hr/ft^2/°F per AAMA 507 or (____) Btu/hr/ft^2/°F per NFRC 100.
   c. Trifab® Versaglaze® 451T Framing System, Front Plane (0.28 COG) 0.40 or project specific (____) Btu/hr/ft^2/°F per AAMA 507 or (____) Btu/hr/ft^2/°F per NFRC 100.

3. Thermal transmittance test results are based upon 1" (25.4 mm) clear high-performance insulating glass [1/4" (e=0.035, #2), 1/2" warm edge spacer and argon fill gas, 1/4"].
4. When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than listed here:
   a. Trifab® Versaglaze® 451T Framing System, Center Plane (0.28 COG) 0.36 or project specific (____) Btu/hr/ft^2/°F per AAMA 507 or (____) Btu/hr/ft^2/°F per NFRC 100.
   b. Trifab® Versaglaze® 451T Framing System, Front Plane (0.28 COG) 0.37 or project specific (____) Btu/hr/ft^2/°F per AAMA 507 or (____) Btu/hr/ft^2/°F per NFRC 100.

J. Condensation Resistance Factor (CRF):
1. The glass to exterior CRF, when tested to AAMA Specification 1503, shall not be less than 70_{frame} and 69_{glass} (low-e) or 69_{frame} and 58_{glass} (clear)
2. The glass to center CRF, when tested to AAMA Specification 1503, shall not be less than 62_{frame} and 68_{glass} (low-e) or 63_{frame} and 56_{glass} (clear)
3. The glass to interior CRF, when tested to AAMA Specification 1503, shall not be less than 56_{frame} and 67_{glass} (low-e) or 54_{frame} and 58_{glass} (clear)

K. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC):
1. Sound transmission loss test results in accordance with AAMA 1801 are based upon 1" (25.4 mm) clear double laminated insulating glass with PVB interlayer (1/8", 0.030", 1/8", 1/2" AS, 1/8", 0.030", 1/8").
2. The glass to exterior ratings, when tested to ASTM E1425 and ASTM E90, shall not be less than STC 38 and OITC 31.
3. The glass to center ratings, when tested to ASTM E1425 and ASTM E90, shall not be less than STC 37 and OITC 30.
4. The glass to interior ratings, when tested to ASTM E1425 and ASTM E90, shall not be less than STC 38 and OITC 30.

L. Impact Resistance Performance:

EDITOR NOTE: Choose impact resistance performance if needed to meet project requirements.

1. The test specimen shall be tested in accordance with ASTM E 1886, information in ASTM E 1996 and TAS 201/203.
2. Large-Missile Impact: For aluminum-framed systems located within 30 feet (9.1 m) of grade.
3. Small-Missile Impact: For aluminum-framed systems located above 30 feet (9.1 m) of grade.

M. Blast Mitigation Performance:

EDITOR NOTE: Choose blast mitigation performance if required to meet project requirements.

1. The test specimen shall be tested or proven through analysis to meet ASTM F1642, GSA-TS01, and UFC 04-010.01 performance criteria.
2. To meet UFC 04-010.01, B-3.1 Standard 10 for Windows and Skylights, the following options are available:
   a. Section B-3.1.1 Dynamic analysis
   b. Section B-3.1.2 Testing
   c. Section B-3.1.3 ASTM F2248 Design Approach

N. Forced Entry Resistance:

EDITOR NOTE: Choose forced entry resistance performance if needed to meet project requirements.

1. The test specimen shall be tested in accordance with ASTM F3561.
2. The complete glass and aluminum-framing system shall achieve a minimum rating of Level 5, based on performance criteria including resistance to forced entry, impact performance, and structural integrity under simulated attack conditions.

O. Environmental Product Declaration (EPD): Shall have a Type III Product-Specific EPD created from a Product Category Rule.

P. Material Ingredient Reporting:

EDITOR NOTE: Include Material Ingredient Reporting if this section is necessary to meet project requirements or for any project that includes Green Building Certifications such as LEED, Living Building Challenge (LBC), and so on.

EDITOR NOTE: Material Ingredient Reporting applies only for anodized products.

1. Shall have a complete list of chemical ingredients to at least 100 ppm (0.01%) that covers 100% of the product.
2. Acceptable documentation includes:
   a. Manufacturer's inventory with Chemical Abstract Service Registration Number (CASRN or CAS#):
      1) Kawneer's Material Transparency Summary (MTS)
   b. Cradle to Cradle certification; either document listed below is acceptable for this option:
      1) Cradle to Cradle Certified™ with Material Health section Silver or higher
      2) Silver Level or higher Material Health Certificate
   c. Red List Free DECLARE label

1.5 SUBMITTALS

A. Product Data:
1. For each type of aluminum-framed storefront system indicated, include:
   a. Construction details
   b. Material descriptions
   c. Dimensions of individual components and profiles
   d. Hardware
   e. Finishes
   f. Installation instructions
2. Recycled Content:

   EDITOR NOTE: Include these Recycled Content specifications if needed to meet project requirements or for a project that includes Green Building Certifications such as LEED, Living Building Challenge (LBC), etc.

   EDITOR NOTE: If Recycled Content requirements are not specified, prime (zero recycled content) aluminum could be supplied.

a. Provide documentation that aluminum has a minimum of 50% mixed pre- and post-consumer recycled content; and rest of the primary aluminum must be from hydroelectric smelter.
b. Provide a sample document illustrating project-specific information that will be provided after product shipment.
c. After product has shipped, provide project-specific recycled content information:
    1) Indicate recycled content, including the percentage of pre- and post-consumer recycled content per unit of product.
    2) Indicate the relative dollar value of recycled content product to the total dollar value of product included in the project.
    3) Indicate the location for recovery of recycled content.
    4) Indicate the location of the manufacturing facility.

3. Environmental Product Declaration (EPD):
    a. Include a Type III Product-Specific EPD created from a Product Category Rule.
4. Material Ingredient Reporting:

    EDITOR NOTE: Include the Material Ingredient Reporting section only for anodized products.

    a. Include documentation for material reporting that has a complete list of chemical ingredients to at least 100 ppm (0.01%) that covers 100% of the product.

B. Shop Drawings:
1. Plans
2. Elevations
3. Sections
4. Details
5. Hardware
6. Attachments to other work
7. Operational clearances
8. Installation details

C. Samples for Initial Selection:
1. Provide samples for units with factory-applied color finishes.
2. Provide samples of hardware and accessories involving color selection.

D. Samples for Verification:
1. Provide a verification sample for aluminum-framed storefront system and required components.

E. Product Test Reports:
1. Provide test reports for each type of aluminum-framed storefront used in the project.
2. Test reports must be based on evaluation of comprehensive tests performed by a qualified preconstruction testing agency.
3. Test reports must indicate compliance with performance requirements.

F. Fabrication Sample:

1. Provide a fabrication sample of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
    a. Joinery, including concealed welds
    b. Anchorage
    c. Expansion provisions
    d. Glazing
    e. Flashing and drainage

G. Supply Chain Sustainability Documentation:
1. Provide EcoVadis certification or equivalent.
2. Provide policy document in place to prevent modern slavery, forced labor, human trafficking, and other forms of labor exploitation in supply chain.

H. Entrance Door Hardware Schedule:
1. Schedule shall be prepared by or under the supervision of supplier.
2. Schedule shall detail fabrication and assembly of entrance door hardware, including procedures and diagrams.
3. 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.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
1. Installer must have successfully installed the same or similar units required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications:
1. Manufacturer must be capable of providing aluminum-framed storefront systems that meet or exceed performance the stated performance requirements.
2. Manufacturer must document this performance by the inclusion of test reports and calculations.

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

D. Product Options:
1. Drawings indicate size, profiles, and dimensional requirements of aluminum-framed storefront system and are based on the specific system indicated. Refer to Division 01 Product Requirements Section. Do not modify size and dimensional requirements.
2. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Mockups:
1. Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

2. Build mockups for the type(s) of storefront elevation(s) indicated, in location(s) shown on drawings.

F. Pre-installation Conference:
1. Conduct conference at project site to comply with requirements in Division 01 Project Management and Coordination Section.

G. Structural-Sealant Glazing must comply with ASTM C 1401, “Guide for Structural Sealant Glazing” for design and installation of structural-sealant-glazed systems.

H. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

1.7 PROJECT CONDITIONS

A. Field Measurements:
1. Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication.
2. Indicate measurements on shop drawings.

1.8 WARRANTY

A. Submit manufacturer's standard warranty for owner's acceptance.

B. Warranty Period:
1. Two years from Date of Substantial Completion of the project provided however that in no event shall the Limited Warranty begin later than six months from date of shipment by manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product:
1. Kawneer Company, Inc.
2. Trifab® VersaGlaze® 451T Framing System
   a. 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension
   b. Thermal
   c. Front, center, back, multi-plane, structural silicone or weatherseal (type B) glazed
   d. Screw spline, shear block, stick, or punched opening
3. Trifab® VersaGlaze® 451T Framing System – Impact Resistant and Blast Mitigation
   a. 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension
   b. Thermal
   c. Front, center, back, multi-plane, structural silicone or weatherseal (type B) glazed
   d. Impact resistant, blast mitigation glazing
   e. Screw spline, shear block, stick, or punched opening

B. Subject to compliance with requirements, provide a comparable product by the following:

EDITOR NOTE: Provide information below indicating approved alternatives to the basis-of-design product.

1. Manufacturer: (_____)
2. Series: (_____)
3. Profile Dimension: (_____)

C. Substitutions:
1. Refer to Division 01 Substitutions Section for procedures and submission requirements.
2. Pre-Contract (Bidding Period) Substitutions:
   a. Submit written requests ten (10) days prior to bid date.
3. Post-Contract (Construction Period) Substitutions:
   a. Submit written request in order to avoid installation and construction delays.
4. Product Literature and Drawings:
   a. Submit product literature and drawings modified to suit specific project requirements and job conditions.
5. Certificates:
   a. Submit certificate(s) certifying that the substitute manufacturer (1) attests to adherence to specification requirements for storefront system performance criteria, and (2) has been engaged in the design, manufacture, and fabrication of aluminum storefronts for a period of not less than ten (10) years. (*Company Name*)
6. Test Reports:
   a. Submit test reports verifying compliance with each test requirement required by the project.
7. Samples:
   a. Provide samples of typical product sections and finish samples in manufacturer's standard sizes.

D. Substitution Acceptance:
1. Acceptance will be in written form, either as an addendum or modification.
2. Acceptance will be documented by a formal change order signed by the owner and contractor.

2.2 MATERIALS

A. Aluminum Extrusions:
1. Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish.
2. Not less than 0.070" (1.8 mm) wall thickness at any location for the main frame
3. Complying with ASTM B221: 6063-T6 alloy and temper
4. Recycled Content:

   EDITOR NOTE: Include these Recycled Content specifications if needed to meet project requirements or for a project that includes Green Building Certifications such as LEED, Living Building Challenge (LBC), etc.

   EDITOR NOTE: If Recycled Content requirements are not specified, prime (zero recycled content) aluminum could be supplied.

a. Shall have a minimum of 50% mixed pre- and post-consumer recycled content.
b. Indicate recycled content, including the percentage of pre- and post-consumer recycled content per unit of product.
c. Indicate the relative dollar value of recycled content product to the total dollar value of product included in the project.
d. Indicate the location for recovery of recycled content.
e. Indicate the location of the manufacturing facility.

B. Fasteners:
1. Nonmagnetic stainless steel or other materials must be non-corrosive and compatible with aluminum members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories:
1. Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating.
2. Anchors, clips, and accessories shall provide sufficient strength to withstand the design pressure indicated.

D. Reinforcing Members:
1. Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating.

E. Sealant:
1. For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

F. Tolerances:
1. References to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

G. Red List Free:

EDITOR NOTE: Red List Free applies only for anodized products.

EDITOR NOTE: Retain the appropriate paragraph below; delete the other paragraph (and its sub-paragraphs, if applicable).

1. All parts and materials (for anodized finished products) comply with the Living Building Challenge/DECLARE Red List and the Cradle-to-Cradle (C2C) Banned List:
a. PVC-free
b. Neoprene-free
2. Product does not contain PVC or Neoprene.

2.3 STOREFRONT FRAMING SYSTEM

A. Thermal Barrier:

1. Kawneer IsoLock® Thermal Break with dual nominal 1/4" (6.4 mm) separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections.
2. Thermal break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

B. Brackets and Reinforcements:
1. Manufacturer's standard high-strength aluminum with non-staining, non-ferrous shims for aligning system components.

C. Fasteners and Accessories:
1. Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories must be compatible with adjacent materials.
2. Where exposed, fasteners and accessories shall be stainless steel.

D. Perimeter Anchors:
1. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

E. Packing, Shipping, Handling, and Unloading:
1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

F. Storage and Protection:
1. Store materials so that they are protected from exposure to harmful weather conditions.
2. Handle material and components to avoid damage.
3. Protect material against damage from elements, construction activities, and other hazards before, during, and after installation.

2.4 GLAZING SYSTEMS

A. Glazing to meet requirements in Division 08 Glazing Section.

B. Glazing Gaskets:
1. Manufacturer's standard compression types
2. Replaceable, extruded EPDM rubber

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

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

E. Glazing Sealants for structural-sealant-glazed systems as recommended by manufacturer for joint type, and as follows:
1. Structural Sealant:

a. ASTM C 1184
b. Single-component neutral-curing silicone formulation that is compatible with the system components with which it comes in contact
c. Specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in the aluminum-framed systems indicated
d. Color: Black

2. Weatherseal sealant:
a. ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O
b. Single-component neutral-curing formulation that is compatible with the structural sealant and other system components with which it comes in contact
c. Recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use
d. Color: Matching structural sealant

2.5 ENTRANCE DOOR SYSTEMS

EDITOR NOTE: If Entrances are not used in your project, remove this section.

A. Refer to Entrance Doors as specified in Division 084113 Aluminum-Framed Entrances and Storefronts Section.

B. Refer to Entrance Door Hardware as specified in Division 084113 Door Hardware Section.

2.6 ACCESSORY MATERIALS

A. Versoleil® SunShade:
1. Anchors shall be painted:
a. Select from Kawneer's standard paints and colors. Custom colors are available upon request.
2. Louvers and fascia shall be painted or anodized:
a. Painted: Select from Kawneer's standard paints and colors. Custom colors are available upon request.
b. Anodized: Select from Kawneer's anodized finishes.

B. InLighten® Light Shelf:
1. Aluminum light shelf system that consists of anchor channels, support beams, fascia trims, and Aluminum Composite Material (ACM) panels.
2. Anchored directly to the curtain wall intermediate horizontal members.
3. Interior-mounted to reflect daylight deeper into interior space.
4. Light Shelf system consists of:
a. Aluminum Composite Material (ACM) panel, 4 mm thick.
b. Translucent polycarbonate panel, 4 mm or 16 mm thick.
c. ACM finish on upper and lower surface selected from Kawneer standard finishes.
d. Extruded aluminum outriggers and fascia.
e. Extruded aluminum anchor designed to secure to compatible verticals of framing system.

f. Anchor shall be designed to engage shelf so as to allow the shelf to rotate down and safely hang on its own for cleaning.
g. Extruded aluminum shear blocks designed to hinge on the anchors to allow rotating individual shelves for cleaning.
h. Panel/shelf projection not exceeding 30" (762 mm).
i. Mullion spacing of framing system shall not exceed 6’ (1.83 m) on center.
j. Panel/shelf deflection shall not exceed 1/120 of horizontal span length.

5. Framing system to support Light Shelf (select one from list):

EDITOR NOTE: Delete from the list below the framing system that does not apply to this project.

a. Curtain wall framing system
b. Storefront framing system

6. Submittals for Light Shelf:
a. Manufacturer's installation instructions
b. Samples for verification:
1) Factory-applied finish as selected by architect
2) Functioning Light Shelf sample demonstrating operation
c. Shop drawing, including plans, elevations, sections, fabrication, and installation details
d. Validation from manufacturer of single-source for light shelf and framing system and compatibility between the systems

C. Joint Sealants:
1. For installation at perimeter of aluminum-framed systems, as specified in Division 07 Joint Sealants Section.

D. Bituminous Paint:
1. Cold-applied asphalt-mastic paint
2. Complies with SSPC-Paint 12 requirements except containing no asbestos
3. Formulated for 30-mil (0.762 mm) thickness per coat

2.7 FABRICATION

A. Fabricate framing member components that, when assembled, have the following characteristics:
1. Profiles that are sharp, straight, and free of defects or deformations
2. Accurately fitted joints that are flush, hairline, and weatherproof
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 that maintain required glazing edge clearances
6. Provisions for field replacement of glazing
7. Fasteners, anchors, and connection devices that are concealed from view to the greatest extent possible

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

C. Structural-Sealant-Glazed Framing Members:
   1. Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

D. Storefront Framing:
   1. Fabricate components for assembly using manufacturer's standard installation instructions.

E. After fabrication, clearly mark components to identify their locations in project according to shop drawings.

2.8 ALUMINUM FINISHES

A. Finish designations that are prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:
   1. Kawneer Permanodic® AA-M10C21A44, AAMA 611, Architectural Class I Color Anodic Coating (Color _____)
   2. Kawneer Permanodic® AA-M10C21A41, AAMA 611, Architectural Class I Clear Anodic Coating (Color #14 Clear) (Optional)
   3. Kawneer Permanodic® AA-M10C21A31, AAMA 611, Architectural Class II Clear Anodic Coating (Color #17 Clear) (Standard)
   4. Kawneer Permafluor™ (70% PVDF), AAMA 2605, Fluoropolymer Coating (Color _____)
   5. Kawneer Permadize® (50% PVDF), AAMA 2604, Fluoropolymer Coating (Color _____)
   6. Kawneer Permacoat™ AAMA 2604, Powder Coating (Color _____)
   7. Other: Manufacturer_____ Type _____ (Color _____)

PART 3 EXECUTION

3.1 EXAMINATION

A. With installer present, examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work:
   1. Verify rough opening dimensions.
   2. Verify levelness of sill plate.
   3. Verify operational clearances.
   4. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components for proper water management.
   5. Masonry Surfaces:
      a. Masonry surfaces must be visibly dry and free of excess mortar, sand, and other construction debris.
   6. Wood Frame Walls:

a. Wood frame walls must be dry, clean, sound, well nailed, free of voids, and without offsets at joints.
b. Ensure that nail heads are driven flush with surfaces in opening and within 3" (76.2 mm) of opening.

7. Metal Surfaces:
   a. Metal surfaces must be dry and clean (free of grease, oil, dirt, rust, corrosion, and welding slag).
   b. Ensure that metal surfaces are without sharp edges or offsets at joints.

B. Proceed with installation only after correcting unsatisfactory conditions.

3.2 INSTALLATION

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

B. Install aluminum-framed storefront system so that components:
   1. Are level, plumb, square, and true to line
   2. Are without distortion and do not impede thermal movement
   3. Are anchored securely in place to structural support
   4. Are in proper relation to wall flashing and other adjacent construction

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

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

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

3.3 FIELD QUALITY CONTROL

A. Field Tests:
   1. Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured.
   2. Conduct tests for air infiltration and water penetration with manufacturer’s representative present.
   3. Tests that do not meet the specified performance requirements and units that have deficiencies shall be corrected as part of the contract amount.
   4. Testing shall be performed per AAMA 503 by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements.
   5. Air Infiltration Tests:
      a. Conduct tests in accordance with ASTM E 783.
      b. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft^2, whichever is greater.
   6. Water Infiltration Tests:
      a. Conduct tests in accordance with ASTM E 1105.

b. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.2 psf (300 Pa).

B. Manufacturer's Field Services:
1. Upon owner’s written request, provide periodic site visit by manufacturer’s field service representative.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjusting: Not applicable.

B. Protection:
1. Protect installed product’s finish surfaces from damage during construction.

C. Cleaning:
1. Clean glass immediately after installation.
a. Comply with glass manufacturer's written recommendations for final cleaning and maintenance.
b. Remove non-permanent labels and clean surfaces.
2. Clean aluminum surfaces.
3. Avoid damaging protective coatings and finishes.
4. Remove excess sealants, glazing materials, dirt, and other substances.
5. Repair or replace damaged installed products.

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

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

END OF SECTION 084113

NOTES AND DISCLAIMERS

Laws and building and safety codes governing the design and use of Kawneer products, such as glazed entrance, window, and curtain wall products, vary widely. Kawneer does not control the selection of product configurations, operating hardware, or glazing materials, and assumes no responsibility therefor. It is the responsibility of the owner, the specifier, the architect, the general contractor, and the installer and the fabricator/transformer, consistent with their roles, to determine the appropriate materials for a project in strict conformity to all applicable national, regional and local building codes and regulations.

Kawneer reserves the right to change configuration without prior notice when deemed necessary for product improvement.

Information contained herein or related hereto is intended only for evaluation by technically skilled persons, with any use thereof to be at their independent discretion and risk. Such information is believed to be reliable, but Kawneer shall have no responsibility or liability for results obtained or damages resulting from such use.

This guide specification is intended to be used by a qualified construction specifier. The guide specification is not intended to be used verbatim as a project specification without appropriate modifications for the specific use intended. The guide specification must be used and coordinated with the procedures of each design firm and the particular requirements of a specific construction project.

Kawneer grants no license under, and shall have no responsibility or liability for infringement of, any patent or other proprietary right. Nothing in this document should be construed as a warranty or guarantee by Kawneer, and the only applicable warranties will be those set forth in Kawneer acknowledgment or in any printed warranty documents issued by Kawneer. The foregoing may be waived or modified only in writing by a Kawneer officer.

KAWNEER