

SECTION 085113: ALUMINUM WINDOWS

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 Windows, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of window units.
- B. Types of Kawneer Architectural Aluminum Windows include:

EDITOR NOTE: Choose Window type based on project requirements. Delete Window types that do not apply to this project.

- 1. OptiQ® Offset Fixed/Projected Series Window Replica:
 - a. Fixed window
 - b. Frame depth: 4-5/8" (117.5 mm)
 - c. AW-PG65-AP

- 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. 084313: Aluminum-Framed Storefronts
- 6. 084329: Sliding Storefronts
- 7. 084413: Glazed Aluminum Curtain Walls
- 8. 084433: Sloped Glazing Assemblies
- 9. 086300: Metal-Framed Skylights

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-framed window system representing those indicated for this project.

B. Performance Class and Grade:

1. AW-PG65-FW

C. 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. After the AAMA 910 life cycle test, air infiltration rate shall not exceed 0.10 cfm/ft² (0.1 l/s · m²) at a static air pressure differential of 6.2 psf (300 Pa).

D. 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. After the AAMA 910 life cycle test, there shall be no leakage at a minimum static air pressure differential of 15 psf (720 Pa).

E. Uniform Load Deflection:

1. There shall be no deflection more than L/175 when tested per ASTM E 330 at a static air pressure difference of 65 psf (3112 Pa).

F. Uniform Load Structural:

1. No glass breakage or permanent damage to fasteners, and maximum .2% permanent deformation of the span of any frame member when tested per ASTM E 330 at a static air pressure difference 97.5 psf (4668 Pa).

G. Component Testing:

1. Window components shall be tested in accordance with procedures described in AAMA/WDMA/CSA 101/I.S. 2/AA440 (NAFS).

H. Thermal Transmittance (U-factor), Physical Test:

1. When tested using AAMA 1503, the thermal transmittance (U-factor) shall not be more than 0.36 Btu/(hr·ft²·°F) with 1" (25.4 mm) glass insulating unit [3/16" (soft coat low-emissivity) glass, warm-edge spacer and argon fill gas, 3/16" (soft coat low-emissivity) glass].

- I. Thermal Transmittance (U-factor), Simulation:
 - 1. When simulated using NFRC 100 or AAMA 507, the U-factor shall not be more than (____) Btu/(hr·ft²·°F) when using project-specified glass.
- J. Condensation Resistance Factor (CRF) or Temperature Index (TI):
 - 1. Condensation resistance test results in accordance with AAMA 1503 or CSA A440 are based upon 1" (25.4 mm) insulating glass [1/4" soft coat low-e, 1/2" warm-edge spacer and argon fill gas, 1/4" clear].
 - 2. If using CRF: When tested using AAMA 1503, the CRF_{frame} and CRF_{glass} shall not be less than 74 and 71 respectively.
 - 3. If using TI, when tested to CSA A440-00, the TI_{frame} and TI_{glass} shall not be less than 61 and 51 respectively.
- K. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC):
 - 1. When tested to ASTM E90 and ASTM E1425, the Sound Transmission Class (STC) and Outdoor/Indoor Transmission Class (OITC) shall not be less than STC 38 or OITC 31 based on 1" (25.4 mm) insulating glass (3/16", 1/2" air space, 5/16" laminated).
- L. Forced Entry:
 - 1. All windows shall conform to ASTM F588, Grade 10.
- M. Thermal Barrier Test:
 - 1. Thermal break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.
- N. Environmental Product Declaration (EPD): Shall have a Type III Product-Specific EPD created from a Product Category Rule.

1.5 SUBMITTALS

- A. Product Data:
 - 1. For each type of aluminum window indicated, include:
 - a. Construction details
 - b. Material descriptions
 - c. Fabrication methods
 - d. Dimensions of individual components and profiles
 - e. Hardware
 - f. Finishes
 - g. Operating 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.

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 windows and required components.

E. Product Schedule:

1. Provide a product schedule for aluminum windows. Use the same designations indicated on Drawings.

F. Product Test Reports:

1. Provide test reports for each type, class, grade, and size of aluminum window used in the project. Test results based on use of downsized test units will not be accepted.
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.

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.

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 fabricating aluminum windows that meet or exceed the stated performance requirements.
2. Manufacturer must document this performance by the inclusion of test reports and calculations.

C. Source Limitations:

1. Obtain aluminum windows through one source from a single manufacturer.

D. Product Options:

1. Drawings indicate size, profiles, and dimensional requirements of aluminum windows 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 window(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.

1.7 PROJECT CONDITIONS

A. Field Measurements:

1. Verify aluminum window 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. Windows: Warrant for two years against defects in material or workmanship under normal use.
2. Insulating glass units: Warrant seal for five years against visual obstruction from film formation or moisture collection between internal glass surfaces, excluding that caused by glass breakage or abuse.

EDITOR NOTE: Contact Kawneer for other time frames.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product:

1. Kawneer Company, Inc.
 - a. OptiQ® Offset Fixed/Projected Series Window Replica:
 - 1) Frame depth: 4-5/8" (117.5 mm)
 - 2) AW-PG65-FW

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: (_____)
4. Performance Grade: (_____)

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 window system performance criteria, and (2) has been engaged in the design, manufacture, and fabrication of aluminum windows 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 window 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 and sash members.
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.
2. Reinforcing members must provide sufficient strength to withstand the design pressure indicated.

2.3 WINDOW SYSTEM

A. OptiQ® Offset Fixed/Projected Series Window Replica

B. Windows comply with Division 08 Aluminum Windows Section.

2.4 GLAZING

A. Glazing shall comply with requirements in Division 08 Glazing Section.

B. Glazing System:

1. Glazing method shall be a wet/dry type in accordance with manufacturer's standards.
2. Exterior glazing shall be silicone back bedding sealant.
3. Interior glazing shall be snap-in type glazing beads with an interior gasket in accordance with AAMA 702 or ASTM C 864.

2.5 HARDWARE

A. General Hardware Requirements:

1. None required.

2.6 ACCESSORY MATERIALS

EDITOR NOTE: Retain "optional" items below to suit project requirements; delete word "optional" for each retained.

A. Spacers, Setting Blocks, Gaskets, and Bond Breakers:

1. Manufacturer's standard permanent, non-migrating types in hardness recommended by manufacturer.
2. Shall be compatible with sealants, and suitable for system performance requirements.

- B. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint types.
- C. Sealants and joint fillers for joints at perimeter of window system as specified in Division 7 Section "Joint Sealants."
 - 1. For sealants required within fabricated windows, provide manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- D. Optional Muntin Grids:
EDITOR NOTE: Between the glass muntin finishes shall match the window unless specified otherwise.
 - 1. Shall be extruded aluminum profiles, 6063-T6 alloy and temper and as follows:
 - a. True muntins.
 - b. Between the glass muntins.
 - c. Applied muntins.
- E. Exterior Panning and Trims:
 - 1. Panning profiles shall be a minimum thickness of 0.062" (1.57 mm) to match the profiles as shown the drawings.
 - 2. Any profile variations shall be submitted to the architect and/or owner for approval 10 days prior to bid date.
 - 3. Panning shall be factory fabricated for field assembly.
 - 4. Corner joinery shall be factory cut.
 - 5. Joinery at the sill shall be coped and butt type construction.
 - 6. Preparations for assembly shall be completed by the window manufacturer.
 - 7. Upon assembly, panning frame joints shall be back-sealed to prevent moisture penetration.
- F. Interior Trims:
 - 1. Interior face trim minimum wall thickness shall be 0.062" (1.57 mm).
 - 2. Face trim shall snap-fit onto concealed mounting clip.
 - 3. Exposed fasteners shall not be accepted.
 - 4. Mounting clip shall be extruded aluminum of 6063-T6 alloy and temper.
 - 5. Trim clips shall be provided in 3" (76.2 mm) lengths and spaced a maximum of 18" (457.2 mm) center to center.

2.7 FABRICATION

- A. Extrude or form aluminum shapes before finishing.
- B. 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 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. Fasteners, anchors, and connection devices that are concealed from view to the greatest extent possible
- C. Window Frame Joinery:
1. Members single and double tubular
 2. Corners coped and screw splined
 3. Factory-sealed with sealant conforming to AAMA 800
- D. Vent:
1. All members double tubular
 2. Corners mitered, double gusset reinforced, and crimped
 3. Factory-sealed with sealant conforming to AAMA 800
- E. Fabricate aluminum windows in sizes indicated.
1. Include a complete system for assembling components and anchoring windows.
- F. Fabricate aluminum windows that are re-glazable without dismantling sash or framing.
- G. Thermally Broken Construction:
1. Fabricate aluminum windows with an integral, concealed, low-conductance thermal barrier; in a manner that eliminates direct metal-to-metal contact.
 2. Thermal barriers shall be designed in accordance with AAMA TIR A8.
- H. Mullions:
1. Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units.
 2. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated.
 3. Provide mullions and cover plates capable of withstanding design loads of window units.
- I. Sub Frames:
1. Provide sub frames with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093" (2.4 mm) thick extruded aluminum.
 2. Miter or cope corners and join with concealed mechanical joint fasteners.
 3. Finish to match window units.
 4. Provide sub frames capable of withstanding design loads of window units.

- J. Factory-Glazed Fabrication:
 - 1. Glaze aluminum windows in the factory where practical and possible for applications indicated.
 - 2. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
- K. Glazing Stops:
 - 1. Provide Snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated.
 - 2. Provide glazing stops to match frame.

2.8 ALUMINUM FINISHES

EDITOR NOTE: Choose the appropriate finish below based on project requirements.

- 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 windows, hardware, accessories, and other components.
- B. Install aluminum-framed window 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 window system and components to drain condensation, water penetrating joints, and moisture migrating within 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 window 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 502 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. AW rating: Test shall be conducted at a minimum uniform static pressure of 6.2 psf (300 Pa). The maximum allowable rates of air infiltration for field testing shall not exceed 1.5 times the project specifications
6. Water Infiltration Tests:
 - a. Conduct tests in accordance with ASTM E 1105.
 - b. No uncontrolled water infiltration is permitted when tested at a static test pressure equal to two-thirds of the tested laboratory performance test pressure.

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:

1. Adjust operating sashes, screens, hardware, and accessories for tight fit at contact points and weather stripping for smooth operation and weather tight closure.
2. Lubricate hardware and moving parts.

B. Cleaning:

1. Avoid damaging protective coatings and finishes.
2. Clean glass and aluminum surfaces of product immediately after installation.
3. Comply with glass manufacturer's written recommendations for final cleaning and maintenance.
4. Remove non-permanent labels and clean surfaces.
5. Remove excess sealants, glazing materials, dirt, and other substances.
6. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during the construction period.
7. Remove construction debris from project site and legally dispose of debris.

C. Protection

1. Protect installed product's finish surfaces from damage during construction.

END OF SECTION 085113

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.

© 2025, Kawneer Company, Inc.