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. GLASSvent® UT (Ultra Thermal) Windows (Structural Silicone Glazed):
   a. Project-Out Windows
      1) 3-1/8" (79.4 mm); 3-7/8" (98.4 mm) Overall System Depth
         a) CW-PG40-AP (with 2-Cam Handles)
         b) CW-PG60-AP (with 3-Cam Handles)
         c) CW-PG70-AP (with Roto Operator and Hook Lock)
      2) 4-3/8" (111.1 mm); 5-1/8" (130.2 mm) Overall System Depth
         a) AW-PG80-AP (with Roto Operator and Hook Lock)
         b) AW-PG90-AP (with 3-Cam Handles)
   b. Outswing Casement Windows
      1) 3-1/8" (79.4 mm); 3-7/8" (98.4 mm) Overall System Depth
         a) CW-PG40-C (with 2-Cam Handles)
         b) CW-PG70-C (with 3-Cam Handles)

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2) 4-3/8" (111.1 mm); 5-1/8" (130.2 mm) Overall System Depth
   a) AW-PG80-C (with Roto Operator and Hook Lock)
   b) AW-PG90-C (with 3-Cam Handles)
   c) AW-PG50-C (with 3 Cam Handles) -Oversized

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. Project-Out Windows:
      a. 3-1/8" (79.4 mm); 3-7/8" (98.4 mm) Overall System Depth
         1) CW-PG40-AP (with 2-Cam Handles)
         2) CW-PG60-AP (with 3-Cam Handles)
         3) CW-PG70-AP (with Roto Operator and Hook Lock)
      b. 4-3/8" (111.1 mm); 5-1/8" (130.2 mm) Overall System Depth
         1) AW-PG80-AP (with Roto Operator and Hook Lock)
         2) AW-PG90-AP (with 3-Cam Handles)

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2. Outswing Casement Windows:
    a. 3-1/8" (79.4 mm); 3-7/8" (98.4 mm) Overall System Depth
        1) CW-PG40-C (with 2-Cam Handles)
        2) CW-PG70-C (with 3-Cam Handles)
    b. 4-3/8" (111.1 mm); 5-1/8" (130.2 mm) Overall System Depth
        1) AW-PG80-C (with Roto Operator and Hook Lock)
        2) AW-PG90-C (with 3-Cam Handles)
        3) AW-PG50-C (with 3 Cam Handles) -Oversized

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. Air infiltration rate shall not exceed 0.10 cfm/ft^2 (0.1 l/s · m^2) at a static air pressure differential of 6.2 psf (300 Pa).
3. Air infiltration rate shall meet the A3 rating of less than 0.55 (m^3/h)m at 1.6 psf (75 Pa) when tested in accordance with CAN/CSA-A440-00 Windows.

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. There shall be no leakage at a minimum static air pressure differential of 15 psf (720 Pa).

E. Uniform Load Deflection:
1. Project-Out Windows:
    a. 3-1/8" (79.4 mm); 3-7/8" (98.4 mm) Overall System Depth
        1) CW-PG40-AP (with 2-Cam Handles); 40 psf (1915 Pa)
        2) CW-PG60-AP (with 3-Cam Handles); 60 psf (2873 Pa)
        3) CW-PG70-AP (with Roto Operator and Hook Lock); 70 psf (3552 Pa)
    b. 4-3/8" (111.1 mm); 5-1/8" (130.2 mm) Overall System Depth
        1) AW-PG80-AP (with Roto Operator and Hook Lock); 80 psf (3830 Pa)
        2) AW-PG90-AP (with 3-Cam Handles); 90 psf (4309 Pa)
2. Outswing Casement Windows:
    a. 3-1/8" (79.4 mm); 3-7/8" (98.4 mm) Overall System Depth
        1) CW-PG40-C (with 2-Cam Handles); 40 psf (1915 Pa)
        2) CW-PG70-C (with 3-Cam Handles); 70 psf (3552 Pa)
    b. 4-3/8" (111.1 mm); 5-1/8" (130.2 mm) Overall System Depth
        1) AW-PG80-C (with Roto Operator and Hook Lock); 80 psf (3830 Pa)
        2) AW-PG90-C (with 3-Cam Handles); 90 psf (4309 Pa)
        3) AW-PG50-C (with 3 Cam Handles) -Oversized; 50 psf (2394 Pa)

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F. Uniform Load Structural:
   1. No glass breakage or permanent damage to fasteners, and maximum .3% permanent deformation of the span of any frame member when tested per ASTM E 330.
   2. Project-Out Windows:
      a. 3-1/8" (79.4 mm); 3-7/8" (98.4 mm) Overall System Depth
         1) CW-PG40-AP (with 2-Cam Handles); 60 psf (2873 Pa)
         2) CW-PG60-AP (with 3-Cam Handles); 90 psf (4309 Pa)
         3) CW-PG70-AP (with Roto Operator and Hook Lock); 105 psf (5027 Pa)
   3. Outswing Casement Windows:
      a. 3-1/8" (79.4 mm); 3-7/8" (98.4 mm) Overall System Depth
         1) CW-PG40-C (with 2-Cam Handles); 60 psf (2873 Pa)
         2) CW-PG70-C (with 3-Cam Handles); 105 psf (5027 Pa)

G. 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.
   2. Project-Out Windows:
      a. 4-3/8" (111.1 mm); 5-1/8" (130.2 mm) Overall System Depth
         1) AW-PG80-AP (with Roto Operator and Hook Lock); 120 psf (5746 Pa)
         2) AW-PG90-AP (with 3-Cam Handles); 135 psf (6464 Pa)
   3. Outswing Casement Windows:
      a. 4-3/8" (111.1 mm); 5-1/8" (130.2 mm) Overall System Depth
         1) AW-PG80-C (with Roto Operator and Hook Lock); 120 (5746 Pa)
         2) AW-PG90-C (with 3-Cam Handles); 135 psf (6464 Pa)
         3) AW-PG50-C (with 3 Cam Handles) -Oversized; 75 psf (3591 Pa)

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

I. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC):
   1. When tested to ASTM E90, the sound transmission shall not be less than.
      a. 1" (25.4 mm) insulating glass made with exterior 3/16" (4.8 mm) clear glass, 3/8" (9.5 mm) aluminum spacer, and interior 7/16" (11.1 mm) laminated clear glass:
         1) Project-Out: STC not less than 37; OITC not less than 30.
      b. 1-3/4" (44.5 mm) insulating glass made with exterior 9/16" (14.3 mm) clear laminated glass, 7/8" (22.2 mm) aluminum spacer, and interior 5/16" (7.9 mm) clear laminated glass:
         1) Outswing Casement: STC not less than 41; OITC not less than 34.

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J. 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.

K. 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

L. Forced Entry:

1. All windows shall conform to ASTM F588, Grade 10.

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

N. 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

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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

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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.

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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.

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: (_____)

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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 0.062" (1.57 mm) wall thickness at any location for the main frame and sash members.
   3. 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.

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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. 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 four-sided structural silicone glazed in accordance with manufacturer’s standards.

2.5 HARDWARE

A. General Hardware Requirements:
1. Provide manufacturer's standard hardware.
2. Hardware shall be fabricated from aluminum, stainless steel, or other corrosion-resistant material that is compatible with aluminum.
3. Hardware shall be designed to smoothly operate, tightly close, and securely lock hinged aluminum-framed glass windows.

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B. Standard Operating Hardware:
   1. Project-Out / Outswing Casement Windows: Provide the following operating hardware:
      a. Stainless Steel 4-Bar Hinges
      b. Cast White Bronze Cam Locking Handles
      c. (Optional) Cast white Bronze Cam Handle with Pole Ring
      d. (Optional) Cast White Bronze Access Control (Custodial) Locks with Removable Handle
      e. (Optional) Multipoint lock Handle

2.6 ACCESSORY MATERIALS

A. Interior Accessory Components List
   1. Two-piece snap trim
   2. Stool cover

B. 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.

C. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint types.

D. 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.

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

F. Insect Screens:
   1. (Half Screen) Held in exterior applied PVC rigid tracks with two stainless steel leaf springs.
   2. 7/16" x 1-1/4" x .045 extruded tubular aluminum frame with window finish.
   3. Corners: mitered, gusset reinforced, and crimped.
   4. 18 x 16 dark fiberglass [optional aluminum screen] mesh secured with extruded vinyl spline.

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. Physical and thermal isolation of glazing from framing members

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4. Accommodations for thermal and mechanical movements of glazing and framing that maintain required glazing edge clearances
5. Fasteners, anchors, and connection devices that are concealed from view to the greatest extent possible

C. Window Frame Joinery:
1. Mitered and mechanically clipped and/or staked
2. Factory sealed frame and corner joints

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.
3. The thermal barrier shall consist of integral structural polyurethane thermal break installed by the window manufacturer in the frame members.

H. 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).

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 _____)

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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.

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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.

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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

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