

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 3 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.

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. Section includes Kawneer Architectural Aluminum Windows including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of window units.
 - 1. Types of aluminum windows include:
 - a. Kawneer GLASSvent® Windows (Structural Silicone Glazed)
 - b. Project-Out and Outswing Casement Windows
 - c. 2-11/16" (68.3 mm) system depth (1/4" Infill), 3-7/16" (87.3 mm) system depth (1" Infill)
 - d. AW-PG90-AP/AW-PG90-C

EDITOR NOTE: BELOW RELATED SECTIONS ARE SPECIFIED ELSEWHERE HOWEVER KAWNEER RECOMMENDS SINGLE SOURCE RESPONSIBILITY FOR ALL OF THESE SECTIONS AS INDICATED IN PART 1.6 SOURCE QUALITY ASSURANCE.

- B. Related Sections:
 - 1. 072700 "Air Barriers"
 - 2. 078466 "Fire-Resistant Joint systems"
 - 3. 079200 "Joint Sealants"
 - 4. 083213 "Sliding Aluminum-Framed Glass Doors"
 - 5. 084113 "Aluminum-Framed Entrances and Windows"
 - 6. 084313 "Aluminum-Framed Windows"
 - 7. 084329 "Sliding Windows"
 - 8. 084413 "Glazed Aluminum Curtain Walls"
 - 9. 084433 "Sloped Glazing Assemblies"
 - 10. 086300 "Metal-Framed Skylights"

1.3 Definitions

- A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

1.4 Performance Requirements

- A. General Performance: Aluminum-framed window system shall withstand the effects of the following performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Window Performance Requirements:

EDITOR NOTE: AIR AND WATER PERFORMANCE RESULTS ARE BASED UPON ASTM AND AAMA STANDARDS FOR WINDOW SYSTEMS. CONSULT YOUR LOCAL KAWNEER REPRESENTATIVE CONCERNING SPECIFIC PROJECT PERFORMANCE REQUIREMENTS.

- 1. Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
 - a. Performance Class and Grade: AW-PG90-AP/AW-PG90-C
- 2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E283 at a minimum size of 60" x 36" (1524 mm x 914 mm) Project-Out or 36" x 60" (914 mm x 1524 mm) Casement Outswing. Air infiltration rate shall not exceed 0.10 cfm/ft² at a static air pressure differential of 6.24 psf (300 Pa). The test specimen shall meet the A3 rating of less than 0.55 (m³/h)/m at 1.57 psf (75 Pa) when tested in accordance with CAN/CSA-A440-00 Windows.
- 3. Water Resistance: The test specimen shall be tested in accordance with ASTM E547 and ASTM E331 at a minimum size of 60" x 36" (1524 x 914) Project-Out or 36" x 60" (914 x 1524) Casement Outswing. There shall be no leakage as defined in the test method at a static air pressure differential of 15 psf (720 Pa). The test specimen shall meet the B7 rating with no water leakage at 15 psf (720 Pa) when tested in accordance with CAN/CSA-A440-00 Windows.

4. Uniform Load Deflection: A minimum static air pressure difference of 90 psf (4309 Pa) shall be applied in the positive and negative direction in accordance with ASTM E330. There shall be no deflection in excess of L/175 of the span of any framing member. The test specimen shall meet the C5 rating when tested in accordance with CAN/CSA-A440-00 Windows.
5. Uniform Load Structural: A minimum static air pressure difference of 135 psf (6464 Pa) shall be applied in the positive and negative direction in accordance with ASTM E330. The unit shall be evaluated after each load with permanent set not to exceed 0.2% of span length.
6. Component Testing: Window components shall be tested in accordance with procedures described in AAMA/WDMA/CSA 101/I.S.2/A440 and AAMA 910.

EDITOR NOTE: THIS DOCUMENT CONTAINS TWO THERMAL TRANSMITTANCE TEST SECTIONS. RETAIN THE ONE THAT APPLIES TO YOUR PROJECT AND DELETE THE OTHER.

7. Thermal Transmittance (U-factor), Physical Test:
 - a. Thermal transmittance test results in accordance with AAMA 1503 or CSA A440 are based upon GLASSvent® Windows for Curtain Wall, at the prescribed 59" x 24" (1500 mm x 600 mm) test size glazed using a single lite of 1" insulating glass composed of 1/4" clear low-emissivity (.035) #2, 1/2" air space with warm edge spacer, 1/4" clear.
 - b. When tested using AAMA 1503, the thermal transmittance (U-Factor) shall not be more than 0.72 Btu/(hr·ft²·°F).
8. Thermal Transmittance (U-factor), Simulated:
 - a. Thermal transmittance simulation results using NFRC 100 or AAMA 507 are based upon a Center of Glass (COG) U-factor of 0.24 Btu/(hr·ft²·°F) and a warm-edge spacer.
 - b. Project-Out Windows: When simulated using NFRC 100 or AAMA 507, the U-factor shall not be more than: 0.48 Btu/(hr·ft²·°F) or project specific (____) Btu/(hr·ft²·°F) per AAMA 507 or (____) Btu/(hr·ft²·°F) per NFRC 100
 - c. Outswing Casement Windows: When simulated using NFRC 100 or AAMA 507, the U-factor shall not be more than: 0.49 Btu/(hr·ft²·°F) or project specific (____) Btu/(hr·ft²·°F) per AAMA 507 or (____) Btu/(hr·ft²·°F) per NFRC 100
9. Condensation Resistance (CRF):
 - a. Condensation resistance test results in accordance with AAMA 1503 or CSA A440 are based upon GLASSvent® Windows for Curtain Wall, at the prescribed 59" x 24" (1500 mm x 600 mm) test size glazed using a single lite of 1" insulating glass composed of 1/4" clear low-emissivity (.035) #2, 1/2" air space with warm edge spacer, 1/4" clear.
 - b. When tested using AAMA 1503, the CRF_{frame} and CRF_{glass} shall not be less than 51 and 63 respectively.
10. Sound: Testing per ASTM E 90 glazed with 1" insulating glass made with exterior 1/4" laminated glass x 1/2" air space x interior 1/4" laminated glass: Minimum (31 STC) and (26 OITC).
11. Forced Entry Resistance: All windows shall conform to ASTM F588, Grade 10.
12. Blast Mitigation performance: Tested per ASTM F 1642, GSA-TS01, and UFC 04-010-01 at a peak pressure of 6 psi and a 41 psi-msec impulse. The system shall achieve a minimum "Low Hazard" rating per ASTM F1642-04, a "Performance Condition 3b" per GSA and a "Low Level of Protection" per UFC 4-010-01 (Project-Out only).

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

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

EDITOR NOTE: MATERIAL INGREDIENT REPORTING IF REQUIRED TO MEET PROJECT REQUIREMENTS AND ON ANY GREEN BUILDING CERTIFICATIONS SUCH AS LEED OR LBC.

EDITOR NOTE: MATERIAL INGREDIENT REPORTING ONLY FOR ANODIZED PRODUCTS.

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

1.5 Submittals

EDITOR NOTE: ADD RECYCLED CONTENT SECTION IF REQUIRED TO MEET PROJECT REQUIREMENTS AND/OR GREEN BUILDING CERTIFICATIONS SUCH AS LEED, LIVING BUILDING CHALLENGE (LBC), ETC. ARE REQUIRED.

** IF RECYCLED CONTENT REQUIREMENTS ARE NOT SPECIFIED - PRIME (ZERO RECYCLED CONTENT) ALUMINUM COULD BE SUPPLIED.*

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.
 - 1. Recycled Content:
 - a. Provide documentation that aluminum has a minimum of 50% mixed pre- and post-consumer recycled content with a sample document illustrating project specific information that will be provided after product shipment.
 - b. Once product has shipped, provide project specific recycled content information, including:
 - 1) Indicate recycled content; indicate percentage of pre- and post-consumer recycled content per unit of product.
 - 2) Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - 3) Indicate location recovery of recycled content.
 - a. Indicate location of manufacturing facility.
 - 2. Environmental Product Declaration (EPD):
 - a. Include a Type III Product-Specific EPD created from a Product Category Rule.

EDITOR NOTE: MATERIAL INGREDIENT REPORTING ONLY FOR ANODIZED PRODUCTS.

- 3. Material Ingredient Reporting:
 - a. Include documentation for material reporting that has a complete list of chemical ingredients to at least 100ppm (0.01%) that covers 100% of the product.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances and installation details.
- C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
- D. Samples for Verification: For aluminum windows and components required.
- E. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, class, grade, and size of aluminum window. Test results based on use of downsized test units will not be accepted.

1.6 Quality Assurance

- A. Installer Qualifications: An installer which has had successful experiences with installation of the same or similar units required for this project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
 - 1. 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: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup for type(s) of window(s) indicated, in location(s) shown on Drawings.
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 Project Conditions

- A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 Warranty

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
 - 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

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.

Kawneer reserves the right to change configuration without prior notice when deemed necessary for product improvement.
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PART 2 - PRODUCTS**2.1 Manufacturers**

- A. Basis-of-Design Product:
1. Kawneer Company Inc.
 2. GLASSvent® Windows (Project-Out or Outswing Casement) (**Specifier to Choose**)
 3. 2-11/16" (68.3 mm) system depth (1/4" Infill), 3-7/16" (87.3 mm) system depth (1" Infill)
 4. AW-PG90-AP/AW-PG90-C

EDITOR NOTE: PROVIDE INFORMATION BELOW INDICATING APPROVED ALTERNATIVES TO THE BASIS-OF-DESIGN PRODUCT.

- B. Subject to compliance with requirements, provide a comparable product by the following:
1. Manufacturer: (_____)
 2. Series: (_____)
 3. Profile dimension: (_____)
 4. Performance Grade: (_____)
- C. Substitutions: Refer to Substitutions Section for procedures and submission requirements.
1. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
 2. Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid window installation and construction delays.
 3. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
 4. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for window system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum windows for a period of not less than ten (10) years. (Company Name)
 5. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
 6. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.
- D. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

2.2 Materials

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.090" (2.3) wall thickness at any location for the main frame and sash members.

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*** IF RECYCLED CONTENT REQUIREMENTS ARE NOT SPECIFIED - PRIME (ZERO RECYCLED CONTENT) ALUMINUM COULD BE SUPPLIED.**

1. Recycled Content: Shall have a minimum of 50% mixed pre- and post-consumer recycled content.
 - a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - c. Indicate location recovery of recycled content.
 - d. Indicate location of manufacturing facility.
- B. Thermal Barrier: The thermal barrier shall be Kawneer consisting of low conductive polymer full depth of infill.
- C. Fasteners: Nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.
- D. Anchors: Nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- E. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

EDITOR NOTE: RED LIST FREE ONLY FOR ANODIZED PRODUCTS.

- F. Red List Free: All parts and materials comply with the Living Building Challenge/DECLARE Red List and the Cradle-to-Cradle (C2C) Banned List.
1. PVC free.
 2. Neoprene free.
- OR
- G. Red List Free: Product does not contain PVC or Neoprene.

2.3 Window System

- A. GLASSvent® Windows - Project-Out or Outswing Casement.

2.4 Glazing

- A. Glass and Glazing Materials: Refer to Division 08 Section "Glazing" for glass units and glazing requirements applicable for four sided structural silicone glazed aluminum window units.
- B. Glazing System: Glazing method shall be four sided structural silicone glazed in accordance with manufacturer's standards.

2.5 Hardware

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows, and sized to accommodate sash weight and dimensions.
- B. Project-Out / Outswing Casement Windows: Provide the following operating hardware:
 - 1. 4-Bar Hinges
 - 2. Cast White Bronze Cam Locking Handles

EDITOR NOTE: INCLUDE OPTIONAL HARDWARE BASED ON PROJECT REQUIREMENTS.

- 3. Stainless Steel 4-Bar Hinges
- 4. Cast white Bronze Cam Handle with Pole Ring
- 5. Cast White Bronze Access Control (Custodial) Locks with Removable Handle
- 6. Cast White Bronze Concealed Lock and Key

2.6 Accessories

- A. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Manufacturer's standard permanent, non-migrating types in hardness recommended by manufacturer, compatible with sealants, and suitable for system performance requirements.
- B. Framing system gaskets, sealants, and joint fillers as recommended by manufacturer for joint type.
- C. Sealants and joint fillers for joints at perimeter of window system as specified in Division 7 Section "Joint Sealants".
- D. Optional Insect Screens: Extruded aluminum frames, 6063-T6 alloy and temper, joined at corners: 18 x 16 mesh fiberglass screen cloth; frames finished to match aluminum windows; splines shall be extruded vinyl, removable to permit rescreening.

2.7 Fabrication

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fit joints; make joints 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 to maintain required glazing edge clearances.
 - 6. Provisions for field replacement of glazing.
 - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Window Vent and/or Vent Frame Joinery: Mitered and Mechanically clipped and/or staked. Factory sealed vent and /or vent frame and corner joints.
- C. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

2.8 Aluminum Finishes

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

EDITOR NOTE: CHOOSE THE APPROPRIATE FINISH BELOW BASED ON PROJECT REQUIREMENTS.

- 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 Permادize® (50% PVDF), AAMA 2604, Fluoropolymer Coating (Color _____).
 - 6. Kawneer Permacoat™ AAMA 2604, Powder Coating (Color _____).
 - 7. Other: Manufacturer _____ Type _____ Color _____.

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.

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PART 3 - EXECUTION**3.1 Examination**

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight window installation.
 - 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
 - 2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76.2 mm) of opening.
 - 3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

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 level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and 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 from dissimilar materials to prevent corrosion or electrolytic action at points of contact.

3.3 Field Quality Control

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing Standard shall be per AAMA 502 including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 for Water Penetration Test.
 - a. Air Infiltration Test: Conduct test in accordance with ASTM E 783 at a minimum uniform static test pressure of 6.24 psf (300 Pa) for AW. The maximum allowable rates of air leakage for field testing shall not exceed 1.5 times the project specifications.
 - b. Water Infiltration Test: Water penetration resistance tests shall be conducted in accordance with ASTM E 1105 at a static test pressure equal to 2/3 the specified water test pressure.
 - 2. Testing Extent: 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. Conduct tests for air infiltration and water penetration with manufacturer's representative present.
 - 3. Test Reports: Shall be prepared according to AAMA 502.

3.4 Adjusting, Cleaning, and Protection

- A. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and moving parts.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

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.

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