SECTION 086100 - ROOF WINDOWS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section Includes:

A roof window is an outward opening that is incorporated as part of the design of roof. A roof window tends to be larger than a skylight. Roof windows must be installed in the same orientation and plane as the surrounding roof at a minimum 15 degree pitch.

Roof windows.

* + - * 1. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Refer to sections listed below for cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections. Sections listed below are for spec editor’s and design team coordination and are to remain as Editor’s Notes. Remove referenced specification sections within the body of the specification if not applicable to the project.

Section 086200 "Unit Skylights" for unit skylights and tubular daylighting devices installed in overhead ceiling areas.

Section 086300 "Metal-Framed Skylights" for glass-glazed, site-erected, metal-framed monumental units.

* + - 1. ACTION SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified, except as noted below, and tabbed (for combined submittals).
				4. Quality Control Submittals:

Retain "Product Test Reports" Paragraphparagraph below if labeling in accordance with AAMA/WDMA/CSA 101/1.S.2/A440 is insufficient or if authorities having jurisdiction will accept test reports instead of labeling.

Product Test Reports: For each type and size of roof windows, for tests performed by a qualified testing agency on specimens equal to or greater than sizes required for Project.

Retain "Evaluation Reports" Paragraphparagraph below if reports from ICCUniform Code-ES are required, or if compliance with requirements of authorities having jurisdiction in high-wind locations, such as Florida's Miami-Dade County, are needed.

Evaluation Reports**: [Indicating product compliance with code requirements of authorities having jurisdiction] <Insert requirements>.**

Sample Warranty: For special warranty.

Design Consultant to review code references and verify that the referenced sections/tables are current. Note that code references shall be based on the current version of the Uniform Code.

* + - * 1. Product Data: For each type of product.

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

Include manufacturer’s installation instructions.

Retain subparagraph below for roof windows with motorized operation.

Include power requirements, ratings, characteristics, and mounting requirements for electrical components.

USE PARAGRAPH BELOW WITH EPD REQUIREMENT WHEN PROJECT ESTIMATE IS $1M OR MORE.

* + - * 1. Submit an Environmental Product Declaration (EPD) from the manufacturer for glass within this specification section, if available. A statement of the contractor’s good faith effort to obtain the EPD shall be provided if not available.

Manufacturer-provided EPDs must be Product Specific Type III (Third-Party Reviewed), in adherence with ISO 14025 *Environmental labels and declarations*, ISO 14044 *Environmental management – Life cycle assessment*, and ISO 21930 *Core rules for environmental product declarations of construction products and services.*

* + - * 1. Shop Drawings: For roof windows.

Include plans, elevations, sections, and installation details.

Retain subparagraph below for motorized operation.

Include diagrams for power, signal, and control wiring for motorized operation.

Retain "Samples" Paragraphparagraph below for single-stage Samples, with a subordinate list if applicable. Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs for two-stage Samples.

* + - * 1. Samples: For each exposed product and for each color and finish specified.
				2. Samples for Initial Selection: For units with factory-applied finishes.

Include Samples of hardware and accessories involving color selection.

* + - * 1. Samples for Verification: For each type of roof window, as follows:

Glazing: [**In manufacturer's standard size**] [**12 inches (305 mm) square**] <**Insert requirement**s> and of same thickness indicated for the final Work.

Finishes: For each type and color of factory-applied exposed finish required, in manufacturer's standard size.

Hardware and Accessories: [**Full-size**] <**Insert requirements**> Samples of hardware and accessories involving color selection.

Retain "Product Schedule" Paragraphparagraph below if required.

* + - * 1. Product Schedule: For roof windows.[**Use same designations indicated on Drawings.**]
				2. Contract INFORMATIONAL SUBMITTALS
				3. Retain "Product Test Reports" Paragraph below if labeling in accordance with AAMA/WDMA/CSA 101/1.S.2/A440 is insufficient or if authorities having jurisdiction will accept test reports instead of labeling.
				4. Product Test Reports: For each type and size of roof windows, for tests performed by a qualified testing agency on specimens equal to or greater than sizes required for Project.
				5. Retain "Evaluation Reports" Paragraph below if reports from ICC-ES are required, or if compliance with requirements of authorities having jurisdiction in high-wind locations, such as Florida's Miami-Dade County, are needed.
				6. Evaluation Reports: [Indicating product compliance with code requirements of authorities having jurisdiction] <Insert requirements>.
				7. Sample Warranty: For special warranty.
				8. Closeout Submittals:

Maintenance Data: For roof windows and accessories to include in maintenance manuals.

* + - 1. QUALITY ASSURANCE
			2. DELIVERY, STORAGE, AND HANDLING
				1. Protect roof windows during transit, storage, and handling to prevent damage, soiling, and deterioration. Store off ground and covered in a clean, dry, well-ventilated, protected space. Comply with manufacturer's written instructions.
			3. WARRANTY

When warranties are required, verify with Owner's Director’s counsel Representative that warranties stated in this article are not less than remedies available to Owner the Facility under prevailing local laws.

* + - * 1. Special Warranty: Manufacturer agrees to repair or replace roof windows that fail in materials or workmanship within specified warranty period.

Failures include, but are not limited to, the following:

Failure to meet performance requirements.

Structural failures including excessive deflection.

Water leakage not controlled by drainage features.

Faulty operation of sashes and hardware.

Deterioration of materials and finishes beyond normal weathering.

Deterioration of insulating-glass units including failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating-glass units contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

Deterioration of laminated-glass lites including defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation and delamination that materially obstructs vision through glass.

<**Insert requirements**>.

Warranty Period:

Verify available warranties for units and components.

Roof Window: [**Five**] [**10**] <**Insert number**> years from date of Substantial Completion.

Insulating-Glass Units: [**10**] [**20**] <**Insert number**> years from date of Substantial Completion.

[**Accessories**] [**and**] [**Electronic Controls**]: [**Five**] <**Insert number**> years from date of Substantial Completion.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

* + - 1. PERFORMANCE REQUIREMENTS

"Performance Standard" Paragraphparagraph below is based on the International Building Code (IBC)BCNYS and the International Residential Code (IRC)RCNYS requirements for testing roof windows in accordance with AAMA/WDMA/CSA 101/1.S.2/A440.

* + - * 1. Performance Standard: Comply with AAMA/WDMA/CSA 101/1.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

Revise "Minimum Performance Grade" Subparagraphsubparagraph below to suit Project. AAMA/WDMA/CSA 101/1.S.2/A440 establishes a gateway performance grade (PG) for roof windows of 30. The performance grade is the minimum design pressure and establishes test pressures for structural-performance and water-resistance tests.

Minimum Performance Grade: PG [**30**] [**35**] [**40**] [**45**] <**Insert requirements**>.

"Label Requirements" Subparagraphsubparagraph below is based on the IBC BCNYS and the IRC RCNYS requirements for product labels indicating compliance with AAMA/WDMA/CSA 101/1.S.2/A440.

Label Requirements: Label each product with names of manufacturer and labeling agency and AAMA/WDMA/CSA 101/1.S.2/A440 product designation, performance grade, and test specimen size equal to or greater than the size of the product.

Retain "Certification Requirements" Subparagraphsubparagraph below if WDMA or other certification is required. Manufacturers that test products in accordance with AAMA/WDMA/CSA 101/1.S.2/A440 requirements do not necessarily participate in WDMA third-party certification program.

Certification Requirements: Provide [**WDMA**] <**Insert requirements**> certified products, with label attached to each roof window.

Retain "Thermal Transmittance" Paragraphparagraph below if required to comply with requirements of authorities having jurisdiction. Options are based on ENERGY STAR and ICCECCNYS/ASHRAE 700 requirements. Requirements vary by climate zone.

* + - * 1. Thermal Transmittance: NFRC 100 maximum U-factor of [**0.42 Btu/sq. ft. x h x deg F (2.38 W/sq. m x K)**] [**0.45 Btu/sq. ft. x h x deg F (2.56 W/sq. m x K)**] [**0.46 Btu/sq. ft. x h x deg F (2.61 W/sq. m x K)**] [**0.48 Btu/sq. ft. x h x deg F (2.73 W/sq. m x K)**] [**0.50 Btu/sq. ft. x h x deg F F (2.84 W/sq. m x K)**] [**0.53 Btu/sq. ft. x h x deg F (3.01 W/sq. m x K)**] [**0.55 Btu/sq. ft. x h x deg F (3.12 W/sq. m x K)**] [**0.60 Btu/sq. ft. x h x deg F (3.41 W/sq. m x K)**] <Insert value>.

Options in "Solar Heat-Gain Coefficient (SHGC)" Paragraphparagraph below are based on ENERGY STAR and ICCUniform Code/ASHRAE 700 requirements. Requirements vary by climate zone.

Design Consultant to review code references and verify that the referenced sections/tables are current. Note that code references shall be based on the current version of the Uniform Code.

* + - * 1. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum SHGC of [**0.40**] [**0.35**] [**0.28**] <**Insert value**>.

Retain "Sound Transmission Class (STC)" and "Outside-Inside Transmission Class (OITC)" paragraphs below after verifying availability of test data for specified products. STC evaluates construction subject to interior sound frequencies, while OITC evaluates an expanded sound-frequency range more representative of conditions to which the building envelope is subject, such as road, rail, and airplane traffic noise. OITC is generally the preferred evaluation method for exterior fenestration.

* + - * 1. Sound Transmission Class (STC): Rated for not less than [**33**] <**Insert rating**> STC when tested for laboratory sound transmission loss in accordance with ASTM E90 and determined by ASTM E413.
				2. Outside-Inside Transmission Class (OITC): Rated for not less than [**28**] <**Insert rating**> OITC when tested for laboratory sound transmission loss in accordance with ASTM E90 and determined by ASTM E1332.

Retain "Windborne-Debris Impact Resistance" Paragraphparagraph below to suit Project. The IBC BCNYS and the IRC RCNYS establish criteria for buildings in hurricane-prone locations. In paragraph, "enhanced" option applies to essential facilities and has additional requirements. Verify requirements of authorities having jurisdiction. Verify which manufacturers have tested products and can demonstrate compliance.

* + - * 1. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for Wind Zone [**1**] [**2**] [**3**] [**4**] for [**basic**] [**enhanced**] protection.

Insert increased heights if different from those in "Large-Missile Test" and "Small-Missile Test" subparagraphs below. See "Windborne-Debris Impact-Resistance Testing" Article in the Evaluations for further information.

Large-Missile Test: For glazing located within [**30 feet (9.1 m)**] <**Insert dimension**> of grade.

Small-Missile Test: For glazing located between 30 feet (9.1 m) and [**60 feet (18.3 m)**] <**Insert dimension**> above grade.

Retain "Exterior Fire-Test Exposure" Paragraphparagraph below for roof windows installed in Class B roof assemblies. Verify requirements of authorities having jurisdiction.

* + - * 1. Exterior Fire-Test Exposure: Provide roof windows identical to those of assemblies tested for Class B fire resistance in accordance with ASTM E108 or UL 790 by Underwriters Laboratories or another testing and inspecting agency acceptable to authorities having jurisdiction.

Retain "Electrical Components, Devices, and Accessories" Paragraphparagraph below for products with electronic components.

* + - * 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
			1. ROOF WINDOWS

<Insert drawing designation>

Copy this article and re-edit for each product.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. Curb/Frame: [**Manufacturer's standard**] [**Wood**] [**Aluminum**] [**Thermally broken aluminum**] [**Aluminum-clad wood**] [**Copper-clad wood**] [**Vinyl**] [**Molded polyurethane over wood**] <**Insert requirements**>.

Flashing: [**Self-flashing frame**] [**Manufacturer's standard aluminum**] [**Manufacturer's standard copper**] <**Insert requirements**>.

* + - * 1. Sash: [**Fixed (nonoperable)**] [**venting (operable)**].

Material: [**Manufacturer's standard**] [**Wood**] [**Aluminum**] [**Aluminum and wood**] [**Copper and wood**] [**Aluminum and vinyl**] [**Vinyl**] [**Molded polyurethane over wood**] <**Insert requirements**>.

* + - * 1. Insulating-Glass Units: ASTM E2190, manufacturer's standard.

Exterior Lite: [**Fully tempered glass with Low-E coating**] <**Insert requirements**>.

Interior Lite: [**Laminated glass; heat-strengthened glass and 0.03-inch- (0.76-mm-) thick polyvinyl butyral interlayer**] [**Fully tempered glass**] [**Laminated glass; heat-strengthened glass with 0.090-inch (2.29-mm) polyvinyl butyral interlayer**] [**Laminated glass; fully tempered glass with 0.03-inch- (0.76-mm-) thick polyvinyl butyral interlayer**] <**Insert requirements**>.

Interspace Content: [**Air**] [**Argon**].

* + - * 1. Glazing System: [**Manufacturer's standard factory-glazing system that produces weathertight seal**] <**Insert glazing requirements**>.

Retain "Operating Hardware" Paragraphparagraph below for operable units.

* + - * 1. Operating Hardware:

Hardware Finish: [**Manufacturer's standard**] [**Match cladding appearance**] <**Insert finish**>.

Operators and Controls: Gear-type rotary operator with [**manufacturer's standard**] [**cable**] [**arm**] control device with latching/locking mechanism.

Crank-Handle Operator: Manufacturer's standard for manually operating venting units that are less than 72 inches (1829 mm) above floor.

Pole Operator: Manufacturer's standard [**manual**] [**motorized**] pole for operating venting units that are more than 72 inches (1829 mm) above floor.

Remote-Control Motor Operator: Manufacturer's standard for operating venting units that are more than 72 inches (1829 mm) above floor.

[**Electric**] [**Solar-powered battery**] motor.

[**Wireless remote**] [**Keypad**] [**Building automation system**] <**Insert requirements**> control.

Provide rain sensor that automatically closes venting unit when water is detected.

Hinges: [**Continuous**] [**Pivots, two per sash**] [**Manufacturer's standard**] <**Insert requirements**>.

* + - * 1. Exposed Finishes:

Exposed Wood: [**Unfinished**] [**Manufacturer's standard transparent finish in color selected by ArchitectDirector’s Representative from manufacturer's full range**] [**Manufacturer's standard prime-painted finish**] [**Manufacturer's standard opaque finish in color selected by ArchitectDirector’s Representative from manufacturer's full range**] <**Insert requirements**>.

Aluminum: [**Manufacturer's standard**] [**Match ArchitectDirector’s Representative's sample**] [**As selected by ArchitectDirector’s Representative from manufacturer's full range**] <**Insert requirements**>.

Copper: [**Manufacturer's standard**] [**Match ArchitectDirector’s Representative's sample**] [**As selected by ArchitectDirector’s Representative from manufacturer's full range**] <**Insert requirements**>.

Vinyl: [**Manufacturer's standard color**] [**In color selected by ArchitectDirector’s Representative from manufacturer's full range**] <**Insert requirements**>.

Molded Polyurethane: [**Manufacturer's standard color**] [**In color selected by ArchitectDirector’s Representative from manufacturer's full range**] <**Insert requirements**>.

* + - * 1. Fabrication:

Fabricate roof windows that are reglazable without dismantling sash framing.

Provide full-perimeter weather stripping for each operable sash.

Provide condensation gutter or other means to hold condensed moisture or drain it to exterior.

Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

* + - 1. ACCESSORIES
				1. Insect Screens: Manufacturer's standard removable screen; aluminum or vinyl frame with mitered or coped joints and with ASTM D3656/D3656M mesh of plastic-coated glass-fiber threads. Provide frame in manufacturer's standard finish and mesh in manufacturer's standard color.
				2. Blinds: In color and pattern selected by Architect Director’s Representative from manufacturer's full range.

Type: [**Pleated**] [**Roll up, light filtering**] [**Roll up, blackout**] [**Venetian**] [**Manufacturer's standard**] <**Insert requirements**>.

Pole Operation: Provide [**manual**] [**motorized**] pole for operating blinds that are more than 72 inches (1829 mm) above floor.

Motor Operator: Manufacturer's standard for blinds that are more than 72 inches (1829 mm) above floor.

[**Electric**] [**Solar-powered battery**] motor.

[**Wireless remote**] [**Keypad**] <**Insert requirements**> control.

* + - * 1. Mull Kit: Manufacturer's standard for installing two units side by side or inline; finished to match roof window units.

Insert other accessories, such as adapters for specific roof materials, if required.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates and conditions, with Installer present, for compliance with requirements, rough opening dimensions, and other conditions affecting performance of the Work.
				2. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. INSTALLATION
				1. Comply with manufacturer's written installation instructions for installing roof windows and accessories.
				2. Install roof windows square, true, and without distortion, warp, or rack of frames and sash. Securely anchor windows to structural support without impeding thermal movement.
				3. Install flashing to provide a watertight and weathertight seal.
				4. Separate aluminum, copper, and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials in accordance with recommendations in ASTM E2112.
			3. ADJUSTING, CLEANING, AND PROTECTION
				1. Adjust operating sash, screens, and accessories for a tight fit at contact points and for smooth operation and weathertight closure.
				2. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.
				3. Adjust blinds to hang true to line without rack. Provide unencumbered operation.
				4. Clean frame surfaces immediately after installing roof windows. Comply with manufacturer's written instructions for final cleaning and maintenance. Avoid damaging protective coatings and finishes.
				5. Inspect drainage holes for blockage. Clean and free holes of any obstructions to allow drainage.
				6. Clean glass immediately after installing roof windows. Comply with manufacturer's written instructions for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.
				7. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
				8. Protect roof window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances contact roof window surfaces, remove contaminants immediately in accordance with manufacturer's written instructions.
				9. Refinish or replace roof windows that have damaged finishes.
				10. Replace damaged components.

Consider using a schedule if Project includes more than one size of each type of roof window specified. A schedule or other method of identifying different sizes can be shown on Drawings or inserted below.

* + - 1. <**INSERT PRODUCT SCHEDULE**>

END OF SECTION 086100