SECTION 085119 - STAINLESS STEEL WINDOWS

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

MasterSpec includes provisions for LEED 2009, LEED v4, IgCC, and Green Globes. Sustainable design requirements may be inserted in the Section Text using the hypertext links.

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes:

Cold-rolled stainless steel windows.

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 081113 "Hollow Metal Doors and Frames" for borrowed-lite interior steel windows.

Section 085123.13 "Hot-Rolled Steel Windows" for steel windows fabricated from hot-rolled members.

Section 085123.23 "Cold-Rolled Steel Windows" for steel windows fabricated from cold-rolled members.

* + - 1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at Project site.
			1. 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).

Submit Qualification Statements as specified in Quality Control Submittals first.

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

Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions.

Include manufacturer’s installation instructions.

* + - * 1. Shop Drawings:

Plans, elevations, sections, and details.

Detail attachments to other work, and between units, if any.

Hardware and required clearances.

Mullion details, including reinforcement and stiffeners.

Flashing details.

Glazing details.

Accessories.

<**Insert requirements**>.

Retain "Samples for Initial Selection" or "Samples for Verification" paragraph below, or both.

* + - * 1. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors or finishes for each type of exposed finish.

Include available color or finish selections for hardware and accessories.

* + - * 1. Samples for Verification: Actual sample of finished products for each type of cold-rolled stainless steel window including weather stripping, glazing bead, and hardware.

Size: [**Manufacturers' standard size**] <**Insert size**>.

* + - * 1. Product Schedule: For cold-rolled stainless steel windows.[**Use same designations indicated on Drawings.**]

Retain "Sustainable Design Submittals" paragraph below if required to attain sustainability rating or to track sustainability submittals.

* + - * 1. Sustainable Design Submittals:
				2. Quality Control Submittals:

Qualification Statements: For [**Installer**] [**manufacturer**] [**and**] [**testing agency]**.

If inserting additional entities or specialist, add qualifications to "Quality Assurance" Article.

Test and Evaluation Reports:

Product Test Reports: For each cold-rolled stainless steel window, for tests performed by a qualified testing agency.

Field Quality-Control Submittals:

Field quality-control reports

Sample warranties.

* + - * 1. Contract Closeout Submittals:

Operation and Maintenance Data: For cold-rolled stainless steel windows.

Warranty Documentation:

Manufacturers' special warranties.

Installer's special warranties.

* + - 1. QUALITY ASSURANCE
				1. Qualifications:

Manufacturers: A manufacturer capable of fabricating cold-rolled stainless steel windows that meets performance requirements indicated and of documenting performance by labels, test reports, and calculations.

Installers: [**Fabricator of products**] [**Entity that employs installers and supervisors who are trained and approved by manufacturer**] [**Authorized representative who is trained and approved by manufacturer**].

* + - 1. BENCHMARKS

Coordinate this article with air barrier Sections for building and preconstruction testing of integrated wall benchmarks that include windows; insert additional requirements if applicable.

* + - * 1. Build benchmarks [**to verify selections made under Sample submittals**] [**to demonstrate aesthetic effects**] [**and**] [**to set quality standards for fabrication and installation**].

Build benchmark [**as indicated on Drawings**] <**Insert benchmark requirements**>.

Approval of benchmarks does not constitute approval of deviations from the Contract Documents contained in benchmarks unless Director’s Representative specifically approves such deviations by Change Order.

* + - 1. FIELD CONDITIONS

Retain this article if Project includes existing construction that requires custom-fabricated window replacements. Insert requirements for field measurements.

* + - * 1. <**Insert requirements**>.
			1. WARRANTY

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

* + - * 1. Special Warranty: [**Manufacturer agrees**] [**Installer agrees**] [**Manufacturer and Installer agree**] to repair or replace components of cold-rolled stainless steel windows that fail in materials or workmanship within specified warranty period.

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

Structural failures, including <**Insert type of failure**>.

Faulty operation of <**Insert components**>.

Deterioration of metals, metal finishes, and other materials beyond normal [**weathering**] [**use**].

<**Insert conditions relating to specified products**>.

<**Insert failure modes**>.

Verify warranty periods for units and components.

Warranty Period: [**Two**] [**Three**] <**Insert number**> years from date of Substantial Completion.

1. PRODUCTS

Manufacturers and products listed in this Section are neither recommended nor endorsed by the AIA or Deltek. Before selecting manufacturers and products, verify availability, suitability for intended applications, and compliance with minimum performance requirements.

Product options commonly available from manufacturers are included in square brackets throughout the Section Text. Not every manufacturer listed can provide every option offered; verify availability with manufacturers.

* + - 1. MANUFACTURERS
				1. Or equal.
			2. SOURCE LIMITATIONS

Retain this article to limit sources for the entire Section. Source limitations may also be specified in individual articles if desired.

* + - * 1. Obtain cold-rolled stainless steel windows from single source from single manufacturer.
			1. PERFORMANCE REQUIREMENTS

Performance requirements in this article include paragraphs for structural, air-leakage, and water-penetration performance based on ASTM standards. See the Evaluations. If using AAMA standards to specify performance, see Section 085113 "Aluminum Windows" for sample text.

* + - * 1. SWI Standards: Comply with applicable requirements in SWI's "Architect's Guide to Steel Windows and Doors" and "Specifications - Formed Cold Rolled Sections," except where more stringent requirements are indicated.

Usually, indicate on Drawings design loads determined by Project's Structural Engineer. Verify requirements of authorities having jurisdiction. See the Evaluations for additional information.

* + - * 1. Structural Wind Loads: As indicated on Drawings.

Limits indicated in "Deflection Limits" paragraph below are based on IBC requirements for framing members supporting glass.

* + - * 1. Deflection Limits: Design glass framing system to limit deflection of glass edges in a direction perpendicular to glass plane to less than 1/175 of glass-edge length for each individual glazing lite or 3/4 inch, whichever is less, at design pressures.

ASTM E330 test method evaluates structural performance of cold-rolled stainless steel windows and not structural performance of contiguous construction.

* + - * 1. Structural: Test in accordance with ASTM E330 as follows:

When tested at positive and negative wind-load design pressures, cold-rolled stainless steel windows do not evidence deflection exceeding specified limits.

When tested at [**150**] <**Insert number**> percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding [**0.2**] <**Insert number**> percent of span.

Minimum test duration in accordance with ASTM E330 is 10 seconds, which is historically U.S. practice.

Test Durations: As required by design wind velocity, but not less than [**10**] <**Insert number**> seconds.

The ECCNYS requires limits on air leakage for exterior windows that are expressed in a different unit of measure than is used in options in "Air Leakage for Weather-Stripped Sash" paragraph below. Consult cold-rolled stainless steel window manufacturers and verify that products comply with requirements of authorities having jurisdiction. See the Evaluations.

* + - * 1. Air Leakage for Weather-Stripped Sash: Not more than [**0.37 cfm/ft.**] <**Insert value**> of sash crack length at a differential pressure across the windows of [**6.24 lbf/sq. ft.**] <**Insert value**> when tested in accordance with ASTM E283.
				2. Water Penetration for Weather-Stripped Sash: No leakage for 15 minutes when window is subjected to a rate of flow of 5 gal./h/sq. ft. with a differential pressure across the window of [**2.86 lbf/sq. ft.**] <**Insert value**> when tested in accordance with ASTM E331.

First option in "Thermal Transmittance" paragraph below is ECCNYS default value for U-factor for a window with clear insulating glass; default values must be used for code purposes for products without NFRC certification. Consult cold-rolled stainless steel window manufacturers and verify that products comply with requirements of authorities having jurisdiction. See the Evaluations.

* + - * 1. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of [**0.80 Btu/sq. ft. x h x deg F**] [**0.27 Btu/sq. ft. x h x deg F**] [**0.32 Btu/sq. ft. x h x deg F**] [**0.36 Btu/sq. ft. x h x deg F**] [**0.43 Btu/sq. ft. x h x deg F**] <**Insert value**>.

First option in "Solar Heat-Gain Coefficient (SHGC)" paragraph below is based on ECCNYS default value for SHGC for a window with clear insulating glass; default values must be used for code purposes for products without NFRC certification. Second option is based on ENERGY STAR requirements for North-Central Climate Zone. Third option is based on ENERGY STAR requirements for South-Central and Southern Climate zones. Consult cold-rolled stainless steel window manufacturers and verify that products comply with requirements of authorities having jurisdiction. See the Evaluations.

* + - * 1. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of [**0.70**] [**0.40**] [**0.25**] [**0.19**] [**0.15**] <**Insert value**>.

Retain "Condensation Resistance" paragraph below for projects where required. "CR" is the designation used by NFRC 500 to rate "condensation resistance." See the Evaluations.

* + - * 1. Condensation Resistance: Provide cold-rolled stainless steel windows with a CR of [**33**] [**34**] [**35**] <**Insert number**> minimum, determined in accordance with NFRC 500.
				2. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

Differential values in "Temperature Change" subparagraph below are suitable for most of the United States.

Temperature Change: [**120 deg F, ambient; 180 deg F material surfaces**] <**Insert temperature change**>.

If forced-entry resistance is required, verify availability of tested products with manufacturers and retain "Forced-Entry Resistance" paragraph below. Not all manufacturers of cold-rolled stainless steel windows have products tested for forced-entry resistance. Grade 10 is lowest level of measured performance.

* + - * 1. Forced-Entry Resistance: Comply with Performance [**Grade 10**] <**Insert grade**> requirements when tested in accordance with ASTM F588.

The BCNYS establishes criteria for buildings in hurricane-prone locations. If windborne-debris impact resistance is required, verify availability of tested products with manufacturers and retain "Windborne-Debris Impact Resistance" paragraph below. Not all manufacturers of cold-rolled stainless steel windows have products tested for windborne-debris impact resistance. In paragraph, "enhanced" option applies to essential facilities and has additional requirements. Verify requirements of authorities having jurisdiction.

* + - * 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.

Large-Missile Test: For glazing located within [**30 ft.**] <**Insert dimension**> of grade.

Small-Missile Test: For glazing located between 30 ft. and [**60 ft.**] <**Insert dimension**> above grade.

* + - 1. COLD-ROLLED STAINLESS STEEL 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.

"Types" paragraph below may not be needed if window type is indicated by a product name or designation. Verify availability of window types with manufacturers.

* + - * 1. Types: Provide the following window types in locations indicated on Drawings:

Casement: [**Outswing**] [**Inswing**].

Hung: [**Double**] [**Single**].

Horizontal sliding.

Projected: [**Awning**] [**Hopper**].

Fixed.

"Cold-Formed Stainless Steel Windows" paragraph below specifies SWI's weight and depth requirements for cold-formed stainless steel windows. SWI uses the term "ventilator" instead of "sash." Type 304 stainless steel is most commonly used stainless steel alloy; Type 316 provides greater corrosion resistance; verify availability with manufacturers.

* + - * 1. Cold-Formed Stainless Steel Windows: Provide frame and sash members mechanically formed from cold-rolled, ASTM A240, austenitic stainless steel sheet, [**Type 304**] [**Type 316**] <**Insert type**>. Comply with SWI specifications for combined weight of frame and sash members and front-to-back depth of frame or sash members.

Retain "Thermally (Improved) (or) (Broken) Design" subparagraph below for cold-rolled stainless steel windows that use thermal spacers or struts to improve the window's U-factor. Designs may differ between manufacturers. Consult manufacturers to determine availability and type of isolation used.

Thermally [**Improved**] [**or**] [**Broken**] Design: Provide frame and sash members designed to isolate interior and exterior surfaces for improved thermal performance.

Confirm, with manufacturers, availability of finishes in "Window Finish" paragraph below. Retain fourth option for mill finish.

* + - * 1. Window Finish: [**Directional Satin Finish: ASTM A480, No. 4**] [**Dull Satin Finish: ASTM A480, No. 6**] [**Mirror Finish: ASTM A480, No. 8**] [**Cold-Rolled, Bright Finish: ASTM A480, No. 2B**].
				2. Mullions: Formed of cold-rolled stainless steel matching window units; with anchors for support to structure and for installation of window units and having sufficient strength to withstand design pressure indicated. Provide mullions of profile indicated and with cover plates. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections.

Retain "Muntins" paragraph below to suit Project. Use of muntins may affect energy performance of window. If retaining, verify that energy performance requirements can still be met.

* + - * 1. Muntins: Cold-rolled steel T-shaped sections mechanically fastened to perimeter frame with cross-notched intersections.

Retain "Sill Cap/Track" paragraph below for horizontal-sliding windows.

* + - * 1. Sill Cap/Track: Designed to comply with performance requirements indicated and to drain to the exterior.
				2. Glazing Stops: Provide [**screw-applied**] [**snap-on**] glazing stops; coordinate with Section 088000 "Glazing" and with glazing system indicated. Provide glazing stops to match panel frames. Finish glazing stops to match window units if fabricated of steel; otherwise, provide manufacturer's standard finish.
				3. Weather Stripping: Manufacturer's standard compressible weather stripping, complying with AAMA 701/702, ASTM C509, or ASTM C864 and designed for permanently resilient sealing under compression and for complete concealment when sash is closed.
			1. GLAZING

Cold-rolled stainless steel windows are typically manufactured for field glazing, although some manufacturers may offer factory glazing. Cold-rolled stainless steel windows are typically glazed using conventional glazing tapes and gaskets. Coordinate requirements with glass and glazing specified in Section 088000 "Glazing." If specifying factory-glazed cold-rolled stainless steel windows, retain "Glass and Glazing System" paragraph below or add glazing requirements to this article.

* + - * 1. Glass and Glazing System: See Section 088000 "Glazing" for glass units and glazing requirements for cold-rolled stainless steel windows.
			1. HARDWARE
				1. General: Provide manufacturer's standard [**nonremovable**], [**solid-bronze**] [**malleable-iron**] [**die-cast-metal**] hardware, with operating components of stainless steel, carbon steel complying with AAMA 907, brass, bronze, or other corrosion-resistant material designed to smoothly operate, tightly close, and securely lock cold-rolled stainless steel window sash; and sized to accommodate sash weight and dimensions.

Verify hardware requirements and availability with manufacturer.

* + - * 1. Casement Window Hardware:

Operation:

Retain "Gear-Type Rotary Operator" or "Manually operated push/pull" subparagraph below. Gear-type rotary operator is used for outswing casement windows only and may be used with or without screens.

Gear-Type Rotary Operator: Complying with AAMA 901 when tested in accordance with ASTM E405, Test Method A; located on jamb at sill.

Retain first subparagraph below if simultaneous operation of sash pairs is desired.

Provide operating device that opens and closes sashes simultaneously, securely closing them at both jambs without use of additional manually controlled locking devices.

Roto Operator Handle Type and Style: [**As selected by Director’s Representative from manufacturer's full range of types and styles**] <**Insert type and style**>.

Manually operated push/pull.

Hinges:

Retain "Friction Hinges," "Friction Hinges for Emergency Escape and Rescue," "Butt Hinges," or "Extension Hinges or Pivots" subparagraph below. Friction hinges are required for use with manually operated sash.

Friction Hinges: Concealed, four-bar friction hinges with adjustable slide shoes complying with AAMA 904; two per sash.

Retain "Friction Hinges for Emergency Escape and Rescue" subparagraph below if sashes are intended for emergency-escape and rescue use. If only certain sashes are intended for egress, indicate locations on Drawings. Revise subparagraph if heavy-duty hinges are required.

Friction Hinges for Emergency Escape and Rescue: Standard-duty, concealed, four-bar friction egress hinges with adjustable slide shoes; two per sash where indicated. Provide hinge designed to achieve 90-degree sash opening.

Hinge types in "Butt Hinges" and "Extension Hinges or Pivots" subparagraphs below are suitable for use only with rotary operators. Revise if sash size requires more than two hinges.

Butt Hinges: Heavy-duty, three-knuckle butt hinges with nylon bushings; two per sash.

Extension Hinges or Pivots: Nonfriction type; two per sash.

Locks:

Revise "Type" subparagraph below if sash size requires two or more locks. If outswing casement windows are equipped with insect screens, screen wickets may be required; coordinate with lock type. Concealed multipoint lock with captive locking strike and head in last option below is used in blast or windborne-debris impact applications.

Type: [**Cam handle with keeper**] [**Lift-type, locking handle with keeper**] [**Custodial cam-action lock with keeper**] [**Linear operator with standard concealed multipoint lock**] [**Linear operator with concealed multipoint lock with captive locking strike and head**] <**Insert type**>.

Style: [**As selected by Director’s Representative from manufacturer's full range of styles**] <**Insert style**>.

Control Devices:

Retain "Limit Device" subparagraph below for outswing casement windows unless window units are operated only for cleaning. Limit devices should always be used if using butt hinges or extension hinges or pivots. They are optional for inswing casement windows. Limit devices are designed to restrict sash opening and are desirable for low sills, child safety, buffering wind, high-rise applications where high winds and safety are important considerations, and windows used for emergency ventilation only.

Limit Device: Adjustable, concealed [**friction adjustor/stay-bar**] [**friction adjustor/stay-bar with release key or tool**].

* + - * 1. Hung Window Hardware:

Balances:

Retain "Counterbalancing Mechanism" or "Counterbalance and Pulley" subparagraph below.

Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.

Verify availability of counterbalance and pulley with manufacturer.

Counterbalance and Pulley: Two per sash to operate in unison with stainless steel cable sash cord.

Single-Hung Upper Sash Retainer: Manufacturer's standard.

Locks and Latches:

Type: [**Cam-action sweep lock and keeper on meeting rail; one per sash**] [**Cam-action sweep lock and keeper on meeting rail; two per sash**] <**Insert type**>.

Style: [**Manufacturer's standard**] [**As selected by Director’s Representative from manufacturer's full range of styles**] <**Insert style**>.

Handles:

Type: [**Lift**] [**Pull-down**] handle; [**one**] [**two**] per sash.

Style: Manufacturer's standard.

* + - * 1. Horizontal-Sliding Window Hardware:

Rollers: Steel, lubricated, ball-bearing rollers.

Lock:

Type: [**Manufacturer's standard, designed to allow unobstructed movement of the sash across adjacent sash in direction indicated and to operate from the inside only**] <**Insert type**>.

Control Device:

Limit Device: Manufacturer's standard.

Handle:

Pull Handle: Manufacturer's standard.

Retain "Projected Window Hardware" paragraph below for projected windows, which include awning windows that project out and hopper windows that project in.

* + - * 1. Projected Window Hardware:

Operation:

Retain "Operating Device" subparagraph below if required. Operating device is necessary for screened awning windows unless the screen contains a wicket for access to open.

Operating Device: [**Gear-type rotary complying with AAMA 901 when tested in accordance with ASTM E405, Test Method A**] [**Push-bar-type**] [**, underscreen**] sash operator located at sill.

Style: [**As selected by Director’s Representative from manufacturer's full range of styles**] <**Insert style**>.

Manually operated push/pull.

Hinges:

Retain one of first three subparagraphs below. Welded butt hinges may be used on hopper windows if used in conjunction with a stay bar; insert if required.

Concealed, four-bar friction hinges with adjustable slide shoes complying with AAMA 904; two per sash.

Balance arms with adjustable, nonabrasive friction pivots; two per sash.

Balance arms with adjustable, nonabrasive friction shoes; two per sash.

Provide sash operation that permits cleaning of the outside glass face from the interior.

Provide jamb-mounted, sliding, brass friction shoes with screw adjusters.

Locks:

Revise "Type" subparagraph below if two locks are needed on wide units. Concealed multipoint lock with captive locking strike and head in fourth option below is used in blast or windborne-debris impact applications. "Pole-operated spring catch lock" and "Pole-operated ring cam handle with keeper" options are used for window units with sash more than 72 inches above the floor.

Type: [**Cam handle with keeper**] [**Custodial cam-action lock with keeper**] [**Linear operator with standard concealed multipoint lock**] [**Linear operator with concealed multipoint lock with captive locking strike and head**] [**Pole-operated spring catch lock**] [**Pole-operated ring cam handle with keeper**] <**Insert type**>.

Style: [**As selected by Director’s Representative from manufacturer's full range of styles**] <**Insert style**>.

Retain "Pole Operators" subparagraph below if retaining one of two options for pole-operated lock types in "Type" subparagraph above.

Pole Operators: Tubular-shaped, anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches above floor; one pole operator and pole hanger per room that has operable windows more than 72 inches above floor.

Control Device:

Retain "Limit Device" subparagraph below if limit devices are required on awning windows. These are optional items designed to restrict sash opening and are desirable for low sills, child safety, buffering wind, high-rise applications where high winds and safety are important considerations, and windows used for emergency ventilation only.

Limit Device: Adjustable, concealed [**friction adjustor/stay-bar**] [**friction adjustor/stay-bar with release key or tool**] [**support arms with adjustable, limited hold-open**].

* + - 1. INSECT SCREENS

Retain this article if insect screens are needed. Copy and revise article if other types of screens, such as safety protection screens, are required for Project. Coordinate location of screen in first paragraph below with operation of sash.

* + - * 1. Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, fully integrated with window. Locate screens on [**inside**] [**outside**] of window and provide for each operable exterior sash. Comply with SMA 1201.
				2. Stainless Steel Screen Frames: Fabricate frames of tubular-shaped, nonmagnetic stainless steel members of 0.02-inch minimum wall thickness; in [**ASTM A480, No. 2B cold-rolled, bright finish**] [**finish to match cold-rolled stainless steel window**].

Retain "Glass-Fiber Mesh Fabric," "Aluminum Wire Fabric," or "Stainless Steel Wire Fabric" paragraph below.

Usually, retain first option in "Glass-Fiber Mesh Fabric" paragraph below. Second option is suitable for areas plagued by small insects, such as no-see-ums. Second option is also suitable for use as a solar screen that blocks up to 65 percent of incident solar heat and glare. Some manufacturers offer a screen that uses a finer mesh that transmits more light; confirm availability and revise paragraph if required.

* + - * 1. Glass-Fiber Mesh Fabric: Complies with ASTM D3656, [**18-by-14 or 18-by-16**] [**20-by-20 or 20-by-30**] count per sq. in. mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration.

Mesh Color: [**Gray**] <**Insert color**>.

* + - * 1. Aluminum Wire Fabric: 18-by-16 count per sq. in. mesh of 0.011-inch-diameter, coated aluminum wire.

Wire-Fabric Finish: [**Natural bright**] [**Charcoal gray**] [**Black**].

* + - * 1. Stainless Steel Wire Fabric: [**18-by-16**] [**18-by-18**] count per sq. in. mesh of 0.009-inch-minimum diameter, nonmagnetic stainless steel wire, Type 304 or 316.

Retain "Wickets" paragraph below for screened-window units with outward-opening sash if wickets are necessary for sash operation.

* + - * 1. Wickets: Provide [**sliding**] [**or**] [**hinged**] wickets, framed and trimmed for a tight fit and durability during handling.
			1. ACCESSORIES

Retain items in this article that are needed for fabrication or installation of selected units.

* + - * 1. Fasteners: Provide fasteners of bronze, brass, stainless steel, or other metal that are warranted by manufacturer to be noncorrosive and compatible with trim, hardware, anchors, and other components of cold-rolled stainless steel windows.

Generally, retain "Exposed Fasteners" subparagraph below. Revise if exposed fasteners are permitted.

Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

* + - * 1. Anchors, Clips, and Window Accessories: Provide units of stainless steel, hot-dip zinc-coated steel, bronze, brass, or iron complying with ASTM A123. Provide units with sufficient strength to withstand design pressure indicated.

Windborne-Debris-Impact Resistance: Provide anchors and clips of same design used to pass windborne-debris-impact-resistance testing.

* + - * 1. Sealant: For sealants required within fabricated windows, provide manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.
			1. FABRICATION
				1. Fabricate cold-rolled stainless steel windows of type and in sizes indicated to comply with SWI standards. Include a complete system for assembly of components and anchorage of window units.
				2. Provide units that are reglazable without dismantling framing.

Cold-rolled stainless steel windows are usually field glazed. Revise first paragraph below if manufacturer offers factory-glazed windows.

* + - * 1. Prepare windows for site glazing.

Confirm method of fabrication with manufacturers; most manufacturers offer only one method.

* + - * 1. Subframes and Operable Sash: Formed of cold-formed stainless steel of profile indicated. Miter or cope corners, and [**mechanically fasten and seal joints**] [**or**] [**weld and dress joints smooth**].
				2. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
				3. Provide weep holes and internal water passages to conduct infiltrating water to the exterior.
				4. Provide water-shed members above [**casement**] [**horizontal-sliding**] sash.
			1. STAINLESS STEEL SHEET FINISHES
				1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
				2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

Retain first subparagraph below for directional finishes.

When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
				2. Verify rough-opening dimensions, levelness of sill plate, and clearances.
				3. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.
				4. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. INSTALLATION OF STAINLESS STEEL WINDOWS
				1. SWI Publication: Comply with applicable requirements in SWI's "Guidelines on How to Install Steel Windows," except where more stringent requirements are indicated.
				2. Comply with manufacturer's written instructions for installing windows, hardware, operators, accessories, and other components.

Retain "Windborne-Debris-Impact Resistance" paragraph below for installations requiring windborne-debris resistance. Proper anchorage of units is necessary to maintain performance as tested.

* + - * 1. Windborne-Debris-Impact Resistance: Anchor cold-rolled stainless steel windows required to have windborne-debris resistance to structure using method, anchor type, and anchor spacing identical to that used in windborne-debris-impact-resistance testing.
				2. Install windows level, plumb, square, true to line, without distortion or impediment to thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
				3. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
				4. Install windows and components to drain condensation, water-penetrating joints, and moisture migrating within windows to the exterior.
			1. FIELD QUALITY CONTROL

Retain this article if field tests are required. If retaining, indicate number of windows to be tested. Specify field tests for air leakage and water penetration for significant projects.

* + - * 1. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
				2. Tests and Inspections:

Revise first subparagraph below if more stringent field testing is required for Project. AAMA 502, Test Method A is default unless otherwise indicated.

Test windows for air leakage and water penetration in accordance with AAMA 502, Test Method [**A**] [**B**], by applying same test pressures required for performance.

Testing Extent: [**Three**] [**Three benchmark**] <**Insert number or description**> windows as selected by Director’s Representative and a qualified independent testing and inspecting agency. Test windows immediately after installation.

Window will be considered defective if it does not pass tests and inspections.

* + - * 1. Prepare test and inspection reports.
			1. ADJUSTING, CLEANING, AND PROTECTION
				1. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts as recommended in writing by manufacturer.
				2. Clean factory-finished stainless steel surfaces immediately after installing windows. Comply with manufacturer's written instructions for final cleaning and maintenance. Avoid damaging protective coatings and finishes.
				3. Protect window surfaces from contact with contaminating substances resulting from construction operations. Remove contaminants immediately in accordance with manufacturer's written instructions.

END OF SECTION 085119