

SWI Steel Window Specifications

**STEEL WINDOWS & DOORS
SECTION 08510**

Steel Window Institute, Inc.
1300 Sumner Ave.
Cleveland, OH 44115-2851
Phone: 216-241-7333
Fax: 216-241-0105
E-Mail: swi@steelwindows.com
URL: www.steelwindows.com

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**SWI Members Engaged in Design and
Manufacture of Windows and Doors**

A&S WINDOW ASSOCIATES, INC.

88-19 76th Avenue
Glendale, NY 11385
718-275-7900
URL: www.aswindowassociates.com

ARCADIA, INC.

2301 Vernon Avenue
Vernon, CA 90277
323-269-7300
URL: www.arcadiainc.com

**BLISS NOR AM STEEL WINDOWS &
DOORS**

6679 Palladino Road
Jamesville, NY 13078
315-469-3314
URL: www.blissnoram.com

HOPE'S WINDOWS, INC.

P. O. Box 580
Jamestown, NY 14702-0580
716-665-5124
URL: www.hopeswindows.com

**OPTIMUM WINDOW MANUFACTURING
CORP.**

28 Canal Street
Ellenville, NY 12428
845-647-1900
URL: www.optimumwindow.com

TORRANCE STEEL WINDOW CO., INC.

1819 Abalone Avenue
Torrance, CA 90501
310-328-9181
URL: www.torrancesteelwindow.com

**STEEL WINDOWS - HOT ROLLED
(FIXED, PROJECT-IN, PROJECT-OUT,
SIDE HUNG-OUT AND SIDE HUNG-IN)
SECTION 08510 2/01 – 2012 Reaffirmed**

PART 1 - GENERAL

Work Included

Furnish and install hot rolled steel windows as shown in the contract drawings. Work shall include but not be limited to steel windows (fixed, project-in, project-out, side hung-out or side hung-in), closures, trim, anchors and factory applied finishes (if required).

Related Work

- A. Glass, glazing, and glazing materials:
Section 08800
- B. Perimeter caulking and sealing:
Section 07900
- C. Miscellaneous structural items:
Section 05500

Quality Assurance, Performance Requirements

Weather-stripped windows shall meet or exceed the following standards:

Air Infiltration Test

ASTM E283-04(2012) - Maximum air infiltration 0.37 CFM/FT. of crack length with a pressure differential across the windows of 6.24 PSF (50 MPH).

Water Penetration Test

ASTM E331-00(2009) - No water penetration for 15 minutes when the window is subjected to a rate of flow of 5 Gal./Hr./Sq.Ft. with a pressure differential of 2.86 PSF (33 MPH).

Submittals

Submit shop drawings showing window and installation details, including anchorage, fastening, and recommended sealing methods. Show dimensioned elevations with opening and window sizes. Upon request, provide test reports for all pertinent standards.

PART 2 – PRODUCTS

Approved Manufacturers

Windows shall be provided by a manufacturer and/or distributor of steel windows whose products meet the Steel Window Institute's performance specifications, as set forth herein or in effect from time to time.

Materials

- A. The frame and ventilator sections shall be hot rolled steel.
- B. Windows shall be defined by minimum combined weight of the outside frame and ventilator members in lbs. per lineal ft.

Delete listings below, not required:

- 1. Light Intermediate 2.0
 - 2. Standard Intermediate: 3.0
 - 3. Heavy Intermediate: 3.5
 - 4. Heavy Custom: 4.2
- C. The frame or ventilator sections shall have a minimum front to back depth dimension as follows:
- Delete listings below, not required:**
- 1. Light Intermediate 1"
 - 2. Standard Intermediate: 1-1/4"
 - 3. Heavy Intermediate: 1-5/16"
 - 4. Heavy Custom: 1-1/2"
- D. Muntin bars shall be hot rolled steel.
- E. Glazing beads shall be extruded aluminum or steel.
- F. Weather-stripping shall be extruded vinyl.
- G. Hardware shall be as follows:
- Delete listings below, not required:**
- 1. Project-In:
 - a. Ventilators shall be hung on either steel balance arms or heavy duty steel or stainless steel four-bar hinges located at each jamb.
 - b. Bronze cam fastener or spring catches located at the centerline of the top rail of the ventilator.
 - 2. Project-Out
 - a. Ventilators shall be hung on either steel balance arms or heavy duty steel or stainless steel four-bar hinges located at each jamb.
 - b. Bronze cam fastener located at the centerline of the bottom rail of the ventilator.
 - 3. Side Hung-Out Casement
 - a. Ventilators shall be hung on either steel, malleable iron or aluminum-bronze hinge with non-ferrous pins and bushings. Hinges shall be close or extension type.
 - b. Bronze cam fastener located at the centerline of the jamb.
 - c. Optional bronze or die cast roto operator shall be located on the sill.
 - 4. Side Hung-In Casement
 - a. Ventilators shall be hung on either steel, malleable iron or aluminum-bronze hinges with non-ferrous pins and bushings. Hinges shall be close or extension type.
 - b. Bronze cam fastener located at the centerline of the jamb.

- H. Insect Screens
 - 1. Insect screen frames shall be formed electro-galvanized steel having a minimum thickness of 0.032", or of formed or extruded aluminum having a minimum thickness of 0.040".
 - 2. Screens shall be rewireable with 18 x 16 mesh cloth of aluminum or fiberglass. The nominal diameter of the cloth shall not be less than 0.011" for aluminum.

- 4. Side Hung-In Casement
 - a. Two hinges per ventilator shall be furnished, except that, for ventilators exceeding 5'-6" in height, three hinges shall be furnished.
 - b. One cam fastener per ventilator shall be furnished, except that, for ventilators exceeding 5'-6" in height, two-point cam fasteners shall be furnished.

Fabrication

- A. Fabricate windows in accordance with the approved shop drawings.
- B. Frame and ventilator sections shall be solid one-piece sections and corners shall be welded and dressed.
- C. Flanges forming the weathering contacts shall be rolled integral with sections to provide close contact with both inside and outside points of contact.
- D. Muntin bars shall be interlocked and continuous from head to sill and jamb to jamb except that bars in one direction may be discontinued if they are securely welded at the intersection.
- E. All windows shall be designed for inside (or outside) glazing.
- F. Hardware shall be as follows:
Delete listings below, not required:
 - 1. Project-In:
 - a. Furnish two cam fasteners or spring catches for vents exceeding 4'-8" in width.
 - 2. Project-Out
 - a. Furnish two cam fasteners for vents exceeding 4'-8" in width.
 - b. If the cam fastener of the ventilator is more than 6'-6" above floor level, hardware designed for pole operation shall be furnished.
 - 3. Side Hung-Out Casement
 - a. Two hinges per ventilator shall be furnished, except that, for ventilators exceeding 5'-6" in height, three hinges shall be furnished.
 - b. One cam fastener per ventilator shall be furnished, except that, for ventilators exceeding 5'-6" in height, two-point cam fasteners shall be furnished.

- G. Insect Screens
 - 1. Screens with hinged or sliding wickets shall be provided as required.
 - 2. The wire cloth shall be held taut with removable spline.
 - 3. Screens shall be removable from the window, held in place by clips.
- H. After assembly, windows shall be pretreated, epoxy or zinc coated, followed by manufacturer's standard finish.

PART 3 - EXECUTION

Inspection

- A. Window openings shall conform to details and dimensions shown on the approved shop drawings.
- B. Conditions which may adversely affect the window installation must be corrected by the General Contractor prior to installation.

Installation

- A. Windows specified under this section shall be installed by experienced personnel.
- B. Install windows in strict accordance with the approved shop drawings.
- C. Set windows plumb, level and true to line, without warp or rack of frames or ventilators.
- D. Anchor units securely to surrounding construction with approved fasteners.
- E. The exterior joints between the windows, trim and mullions shall be properly sealed watertight with an approved sealant and neatly pointed.
- F. Attach ventilator hardware, as required, and adjust ventilators to operate smoothly free from twist and to be weather tight when closed and latched.
- G. Any abraded surface of the window finish shall be cleaned and touched up with air dry paint, as approved and furnished by the window manufacturer, in a color to match factory applied finish.

Cleaning

- A. The General Contractor shall be responsible for protecting the windows and related materials during storage on the job and during and after installation.
- B. Window installer shall leave the window surfaces clean after installation.
- C. Any protection necessary due to the cleaning of materials adjacent to the windows shall be the responsibility of the General Contractor.

**STEEL WINDOWS - HOT ROLLED FIRE RATED
(FIXED, PROJECT-IN, PROJECT-OUT,
SIDE HUNG-OUT AND SIDE HUNG-IN)
SECTION 08510 2/01 – 2012 Reaffirmed**

PART 1 - GENERAL

Work Included

Furnish and install hot rolled steel fire rated windows as shown in the contract drawings. Work shall include but not be limited to steel windows (fixed, project-in, project-out, side hung-out or side hung-in), closures, trim, anchors and factory applied finishes (if required).

Related Work

- A. Glass, glazing, and glazing materials:
Section 08800
- B. Perimeter caulking and sealing:
Section 07900
- C. Miscellaneous structural items:
Section 05500

Quality Assurance, Performance Requirements

Weather-stripped windows shall meet or exceed the following standards:

Air Infiltration Test

ASTM E283-04(2012) - Maximum air infiltration 0.37 CFM/FT. of crack length with a pressure differential across the windows of 6.24 PSF (50 MPH).

Water Penetration Test

ASTM E331-00(2009) - No water penetration for 15 minutes when the window is subjected to a rate of flow of 5 Gal./Hr./Sq.Ft. with a pressure differential of 2.86 PSF (33 MPH).

Labeled fire rating

- A. NFPA 257-12 - Standard on Fire Test for Window and Glass Block Assemblies 45-minute rating.
- B. NFPA 80-10 - Standard for Fire Doors and Fire Windows.
 - 1. Maximum size opening 84 square feet with neither dimension exceeding 12 feet unless otherwise tested. When multiple units are installed, the distance between unprotected vertical steel mullions shall not exceed 6 feet unless otherwise tested.
 - 2. Maximum exposed glass area for 1/4" labeled wire glass is 1,296 square inches with no dimension exceeding 54 inches unless otherwise tested.

- 3. Each ventilator must be equipped with a self-closing device, which will permit the ventilator to close in case of fire.

- C. Each window must bear a 3/4 hour fire rating label.

Submittals

Submit shop drawings showing window and installation details, including anchorage, fastening, and recommended sealing methods. Show dimensioned elevations with opening and window sizes. Upon request, provide test reports for all pertinent standards.

PART 2 - PRODUCTS

Approved Manufacturers

Windows shall be provided by a manufacturer and/or distributor of steel windows whose products meet the Steel Window Institute's performance specifications, as set forth herein or in effect from time to time.

Materials

- A. The frame and ventilator sections shall be hot rolled steel.
- B. Windows shall be defined by minimum combined weight of the outside frame and ventilator members in lbs. per lineal ft.
Delete listings below, not required:
 - 1. Light Intermediate: 2.0
 - 2. Standard Intermediate: 3.0
 - 3. Heavy Intermediate: 3.5
 - 4. Heavy Custom: 4.2
- C. The frame or ventilator sections shall have a minimum front to back depth dimension as follows:
Delete listings below, not required:
 - 1. Light Intermediate: 1"
 - 2. Standard Intermediate: 1-1/4"
 - 3. Heavy Intermediate: 1-5/16"
 - 4. Heavy Custom: 1-1/2"
- D. Muntin bars shall be hot rolled steel.
- E. Glazing beads shall be cold formed or hot rolled steel.
- F. Weather-stripping shall be extruded vinyl.
- G. Hardware for self-closing ventilators.
Delete listings below, not required:
 - 1. Projected ventilators shall be hung on heavy-duty steel side arms equipped with brass friction shoes and fusible link releases.
 - 2. Casement ventilators shall be hung on two listed spring hinges and fitted with a stainless steel friction adjuster with a fusible link release.
 - 3. Ventilators shall be fitted with steel expansion lugs.

4. Provide bronze spring catches attached with corrosion-resistant steel screws for all ventilators.
- H. Insect Screens
1. Insect screen frames shall be formed electro-galvanized steel having a minimum thickness of 0.032", or of formed or extruded aluminum having a minimum thickness of 0.040".
 2. Screens shall be rewireable with 18 x 16 mesh cloth of aluminum or fiberglass. The nominal diameter of the cloth shall not be less than 0.011" for aluminum.

Fabrication

- A. Fabricate windows in accordance with the approved shop drawings.
- B. Frame and ventilator sections shall be solid one-piece sections and corners shall be welded and dressed.
- C. Flanges forming the weathering contacts shall be rolled integral with sections to provide close contact with both inside and outside points of contact.
- D. Muntin bars shall be interlocked and continuous from head to sill and jamb to jamb except that bars in one direction may be discontinued if they are securely welded at the intersection.
- E. All windows shall be designed for inside (or outside) glazing.
- F. Operable Hardware
Delete listings below, not required:
 1. Projected ventilators shall be balanced on heavy steel side arms securely pivoted to the vent and frame at each jamb. Friction shall be maintained by means of two brass shoes sliding in the channel of the frame section controlled by compression springs enclosed in tubular housings. This housing is fitted with fusible link release which will release the friction and permit the ventilator to close in the event of fire.
 2. Casement ventilators shall be hung on two UL listed spring hinges securely fastened to the vent and frame. Friction shall be maintained by means of a friction adjuster or other hold open device located at the head of the ventilator. This friction adjuster shall be equipped with a fusible link release, which will release the friction and permit the ventilator to close in the event of fire. The opening of each vent shall be limited to 70 degrees maximum.

3. Provide one bronze spring catch at the centerline of ventilator fastener bar.
4. Provide two sets of fire lock lugs on ventilator fastener bar and one set on opposite bar.

- G. Insect Screens
1. Screens with hinged or sliding wickets shall be provided as required.
 2. The wire cloth shall be held taut with removable spline.
 3. Screens shall be removable from the window, held in place by clips.
- H. After assembly, windows shall be pretreated, epoxy or zinc coated, followed by manufacturer's standard finish.

PART 3 - EXECUTION

Inspection

- A. Window openings shall conform to details and dimensions shown on the approved shop drawings.
- B. Conditions which may adversely affect the window installation must be corrected by the General Contractor prior to installation.

Installation

- A. Windows specified under this section shall be installed by experienced personnel.
- B. Install windows in strict accordance with the approved shop drawings.
- C. Set windows plumb, level and true to line, without warp or rack of frames or ventilators.
- D. Anchor units securely to surrounding construction with approved fasteners.
- E. The exterior joints between the windows, trim and mullions shall be properly sealed watertight with an approved sealant and neatly pointed.
- F. Attach ventilator hardware, as required, and adjust ventilators to operate smoothly free from twist and to be weather tight when closed and latched.
- G. Any abraded surface of the window finish shall be cleaned and touched up with air dry paint, as approved and furnished by the window manufacturer, in a color to match factory applied finish.

Cleaning

- A. The General Contractor shall be responsible for protecting the windows and related materials during storage on the job and during and after installation.
- B. Window installer shall leave the window surfaces clean after installation.
- C. Any protection necessary due to the cleaning of materials adjacent to the windows shall be the responsibility of the General Contractor.

**STEEL DOORS - HOT ROLLED
(SWING-OUT AND SWING-IN)
SECTION 08510 2/01 – 2012 Reaffirmed**

PART 1 - GENERAL

Work Included

Furnish and install hot rolled steel doors as shown in the contract drawings. Work shall include but not be limited to steel doors (swing-out and swing-in), closures, trim, anchors and factory applied finishes (if required).

Related Work

- A. Glass, glazing, and glazing materials:
Section 08800
- B. Perimeter caulking and sealing:
Section 07900
- C. Miscellaneous structural items:
Section 05500

Submittals

Submit shop drawings showing door and installation details, including anchorage, fastening, and recommended sealing methods. Show dimensioned elevations with opening and door sizes. Upon request, provide test reports for all pertinent standards.

PART 2 – PRODUCTS

Approved Manufacturers

Doors shall be provided by a manufacturer and/or distributor of steel doors whose products meet the Steel Window Institute's performance specifications, as set forth herein or in effect from time to time.

Materials

- A. The door frame and ventilator sections shall be hot rolled steel.
- B. Doors shall be defined by minimum combined weight of the outside door frame and ventilator members in lbs. per lineal ft.
Delete listings below, not required:
 - 1. Standard Intermediate: 3.0
 - 2. Heavy Intermediate: 3.5
 - 3. Heavy Custom: 4.2
- C. The door frame or ventilator sections shall have a minimum front to back depth dimension as follows:
Delete listings below, not required:
 - 1. Standard Intermediate: 1-1/4"
 - 2. Heavy Intermediate: 1-5/16"
 - 3. Heavy Custom: 1-1/2"
- D. Muntin bars shall be hot rolled steel.
- E. Glazing beads shall be extruded aluminum or steel.
- F. Weather-stripping shall be extruded vinyl or EPDM.

Fabrication

- A. Fabricate doors in accordance with the approved shop drawings.
- B. Door frame and ventilator sections shall be solid one-piece sections and corners shall be welded and dressed.
- C. Flanges forming the weathering contacts shall be rolled integral with sections to provide close contact with both inside and outside points of contact.
- D. Muntin bars shall be interlocked and continuous from head to sill and jamb to jamb except that bars in one direction may be discontinued if they are securely welded at the intersection.
- E. All doors shall be designed for inside (or outside) glazing.
- F. After assembly, doors shall be pretreated, epoxy or zinc coated, followed by manufacturer's standard finish.

Hardware

- A. Each leaf shall be hung on three or four close type pivots or butt hinges or the manufacturer's standard design.
- B. Provide a latch with operable lever handles or knobs from both the inside and outside. Exterior key cylinder with interior thumb turn can be provided when specified.
- C. Furnish top and bottom bolts on the inactive leaf of a double-folding door.
- D. Furnish kick panels of at least 12 gauge steel at the bottom of each leaf.
- E. Locking handles, lever handles, knobs and exposed top and bottom bolts shall be the manufacturer's standard design. They shall be attached with brass or other corrosive-resistant screws.

PART 3 - EXECUTION

Inspection

- A. Door openings shall conform with details and dimensions shown on the approved shop drawings.
- B. Conditions which may adversely affect the door installation must be corrected by the General Contractor prior to installation.

Installation

- A. Doors specified under this section shall be installed by experienced personnel.
- B. Install doors in strict accordance with the approved shop drawings.
- C. Set doors plumb, level and true to line, without warp or rack of door frames or ventilators.
- D. Anchor units securely to surrounding construction with approved fasteners.

- E. The exterior joints between the doors, trim and mullions shall be properly sealed watertight with an approved sealant and neatly pointed.
- F. Attach ventilator hardware, as required, and adjust ventilators to operate smoothly free from twist and to be weathertight when closed and latched.
- G. Any abraded surface of the door finish shall be cleaned and touched up with air dry paint, as approved and furnished by the window manufacturer, in a color to match factory applied finish.

Cleaning

- A. The General Contractor shall be responsible for protecting the doors and related materials during storage on the job and during and after installation.
- B. Door installer shall leave the door surfaces clean after installation.
- C. Any protection necessary due to the cleaning of materials adjacent to the doors shall be the responsibility of the General Contractor.

**STEEL WINDOWS - COLD FORMED
(FIXED, PROJECT-IN, PROJECT-OUT, SIDE
HUNG-IN, SIDE HUNG-OUT, VERTICAL
SLIDER, HORIZONTAL SLIDER)
SECTION 08510 2/01 – 2012 Reaffirmed**

PART 1 - GENERAL

Work included

Furnish & install fixed cold-formed steel windows as shown in the contract drawings. Work shall include but not be limited to steel windows (fixed, project-in, project-out, side hung-in, side hung-out, vertical slider, horizontal slider), trim, anchors, and factory applied finishes (if required).

Related Work

- A. Glass, glazing, and glazing materials:
Section 08800
- B. Perimeter caulking and sealing:
Section 07900
- C. Miscellaneous structural items:
Section 05500

Quality Assurance, Performance Requirements

When tested in the closed and latched position, weather stripped windows shall meet or exceed the following standards:

Air Infiltration Test

ASTM E283-04(2012) - Maximum air infiltration 0.37 CFM/FT of crack length with a pressure differential of 6.24 PSF (50 MPH)

Water Penetration Test

ASTM E331-00(2009) - No water penetration for 15 minutes when the window is subjected to a rate of flow of 5 Gal./Hr./Sq. Ft. with a pressure differential of 2.86 PSF.

Submittals

Submit shop drawings showing window and installation details, including anchorage, fastening and recommended sealing methods. Show dimensioned elevations with opening and window sizes. Upon request, provide test reports for all pertinent standards.

PART 2 - PRODUCTS

Approved Manufacturers

Windows shall be provided by a manufacturer and/or distributor of steel windows whose products meet the Steel Window Institute's performance specifications as set forth herein or in effect from time to time.

Materials

- A. The frame and ventilator shall be composed of ASTM A653M-11 low carbon cold rolled formed steel sections with a minimum thickness of 20 gauge.

- B. Windows shall be defined and categorized as commercial and industrial windows with a minimum combined weight of frame and ventilator of 2.75 lbs. per linear foot and capable of passing a structural load test of 30 lbs. per square foot.
- C. The frame and ventilator sections shall have a minimum front to back depth dimension of 1-7/8". Maximum recommended ventilator sizes are as follows (W x H):
Delete listings below, not required:
Casement (in or out): 2.5 ft X 6.0 ft.
Projected (in or out): 5.0 ft X 3.0 ft.
Vertical Slider: 4.6 ft X 4.0 ft.
Horizontal Slider 3.0 ft X 6.0 ft.
- D. Muntin bars shall have a tee shaped face min. of 1-1/4".
- E. Glazing beads shall be cold rolled steel with a minimum thickness of 20 gauge.
- F. Weather stripping shall be extruded vinyl or EPDM.
- G. Hardware shall be as follows:
Delete listings below, not required:
 1. Project-In:
 - a. Ventilators shall be hung on either steel balance arms or heavy-duty steel or stainless steel three or four-bar hinges located at each jamb.
 - b. Bronze or steel cam latch or spring catches located at the head of the ventilator.
 2. Project-Out:
 - a. Ventilators shall be hung on either steel balance arms or heavy-duty steel or stainless steel three or four-bar hinges located at each jamb.
 - b. Bronze or steel cam latch located at the top rail of the ventilator.
 3. Side Hung/Swing-Out Casement:
 - a. Ventilators shall be hung on either steel, malleable iron or aluminum-bronze hinges with non-ferrous or galvanized pins and bushings. Hinges shall be close or extension type.
 - b. Bronze or steel cam latch located at the jamb of the ventilator.
 4. Side Hung/Swing-In Casement:
 - a. Ventilators shall be hung on either steel, malleable iron or aluminum-bronze hinges with non-ferrous or galvanized pins and bushings. Hinges shall be close or extension type.

- b. Bronze or steel cam latch or spring catch located at the jamb of the ventilator.
- 5. Vertical Slider:
 - a. Single and double hung ventilators shall be fully counter-balanced at any desired position by means of adjustable balance mechanisms.
 - b. Bronze or steel lift handle located at the sill of the ventilator. Bronze or steel sweep catch located at the ventilator meeting rails.
- 6. Horizontal Slider: Ventilator supported by stainless steel or bronze rollers that are guided by a track either in the frame head or sill. Bronze or steel lift handle located at the jamb of the ventilator. Bronze or steel sweep catch located at the ventilator meeting rails.
- H. Insect Screens
 - 1. Insect screen frames shall be formed electro-galvanized steel having a minimum thickness of 0.032", or of formed or extruded aluminum having a minimum thickness of 0.040".
 - 2. Screens shall be rewirable with 18 x 16 mesh wire cloth of aluminum or fiberglass. The nominal diameter of the cloth shall not be less than 0.011" for aluminum.

Fabrication

- A. Fabricate windows in accordance with the approved shop drawings.
- B. Frame and ventilator sections shall be cold formed and members shall be mitered and key cornered. A butyl sealant shall be applied and corners shall be mechanically fastened so as to create a close fit.
- C. Muntin bars shall be true muntins and be continuous from head to sill and jamb to jamb except that bars in one direction may be discontinuous if they are notched and securely fastened at the intersection. Muntins shall be mechanically fastened to the frame or ventilator sections.
- D. All windows shall be designed for either inside or outside glazing.
- E. Hardware shall be as follows:

Delete listings below, not required:

- 1. Project-In:
 - a. Furnish two cam latches or spring catches for ventilators exceeding 4'-8" in width.
 - b. If the cam latch or spring latch is more than 6'-6" above the floor level, hardware designed for pole

- operation should be furnished.
- 2. Project-Out:
 - a. Furnish two cam latches for vents exceeding 4'-8" in width.
 - b. If the cam latch is more than 6'-6" above the floor level, hardware designed for pole operation should be furnished.
- 3. Casement Swing-In:
 - a. Two hinges per ventilator shall be furnished. For ventilators exceeding 5'-6" in height, three hinges shall be furnished.
 - b. One cam latch per ventilator shall be furnished. For ventilators exceeding 5'-6" in height, two cam latches shall be furnished.
- 4. Casement Swing-Out:
 - a. Two hinges per ventilator shall be furnished. For ventilators exceeding 5'-6" in height, three hinges shall be furnished.
 - b. One cam latch per ventilator shall be furnished. For ventilators exceeding 5'-6" in height, two cam latches shall be furnished.
- 5. Vertical Slider:
 - a. One lift handle for lower ventilator shall be furnished. For ventilators exceeding 48" in width, two lift handles shall be furnished.
 - b. One sweep catch per window shall be furnished. For ventilators exceeding 48" in width, two sweep catches shall be furnished.
- 6. Horizontal Slider:
 - a. Each ventilator to be provided with two roller mechanisms.
 - b. One lift handle for each moveable ventilator shall be furnished.
 - c. One sweep catch per window shall be furnished. For ventilators exceeding 48" in height, two sweep catches shall be furnished.

F. Insect Screens

- 1. Screens with hinged or sliding wickets shall be provided.
- 2. The wire cloth shall be held taut with removable spline.
- 3. Screens shall be removable from the window, held in place by clips.

- G. Finish:
All cold rolled sections shall be pretreated, epoxy or zinc coated, followed by manufacturer's standard finish.

PART 3 - EXECUTION

Inspection

- A. Window openings shall conform to details and dimensions shown on the approved shop drawings.
- B. Conditions that may adversely affect the window installation must be corrected by the General Contractor prior to installation.

Installation

- A. Windows specified under this section shall be installed by experienced personnel.
- B. Install windows in strict accordance with the approved shop drawings and all local, state, and national laws and building codes.
- C. Set windows plumb, level, and true to line, without warp or rack of frames or ventilators.
- D. Anchor windows securely to surrounding construction with approved fasteners.
- E. The exterior joints between the windows, trim and mullions shall be properly sealed watertight with an approved sealant and be neatly pointed.
- F. Adjust ventilators to operate smoothly, free from twist, and to be watertight when closed and locked.
- G. Any abraded surface of the window finish shall be cleaned and touched up with air dry paint, as approved and furnished by the window manufacturer, in a color to match the factory applied finish.

Cleaning

- A. The General Contractor shall be responsible for protecting the windows and related materials during storage on the job and during and after installation.
- B. Window installer shall leave the window surfaces clean after installation, exercising care to avoid damage to protective coatings and finishes.
- C. Any protection necessary due to the cleaning of materials adjacent to the windows shall be the responsibility of the General Contractor.

**STEEL WINDOWS - COLD FORMED FIRE RATED (FIXED, PROJECT-IN, PROJECT-OUT, SIDE HUNG-IN, SIDE HUNG-OUT, VERTICAL SLIDER, HORIZONTAL SLIDER)
SECTION 08510 2/01 – 2012 Reaffirmed**

PART 1 - GENERAL

Work Included

Furnish & install fixed cold formed fire rated steel windows as shown in the contract drawings. Work shall include but not be limited to steel windows (fixed, project-in, project-out, side hung-in, side hung-out, vertical slider, horizontal slider), trim, anchors, and factory applied finishes (if required).

General

Fire rated or labeled windows are used in window openings where it is necessary to restrict the spread of fire and smoke within buildings, whether from interior fire or external fire. The determination as to where a fire rated window is required is governed by the building code and federal and state laws. The architect should follow these codes. Individual manufacturers should be contacted to determine which of their windows meet the fire rated window requirements.

Only labeled windows shall be used in Window openings requiring fire rated windows. The label on 3/4 hour fire windows for wall openings will stipulate testing laboratory. Fire rated windows shall conform to applicable specification of NFPA 257-12 and NFPA 80-10.

Maximum size opening

Heavy intermediate, heavy custom, cold rolled, and industrial windows will be used for openings not exceeding 84 sq. ft. in area with neither dimension exceeding 12 ft. unless otherwise tested. When multiple windows are installed, the distance between unprotected vertical steel mullions shall not exceed 7 ft.

Standard intermediate types may be used for openings not exceeding 60 sq. ft. in area with neither dimension exceeding 10ft. unless otherwise tested. When multiple units are installed, the distance between unprotected steel mullions shall not exceed 6 ft.

Related Work

- A. Glass, glazing, and glazing materials:
Section 08800
- B. Perimeter caulking and sealing:
Section 07900
- C. Miscellaneous structural items:
Section 05500

Quality Assurance, Performance Requirements

When tested in the closed and latched position, weather stripped windows shall meet or exceed the following standards:

Air Infiltration Test

ASTM E283-84(2008) - Maximum air infiltration 0.37 CFM/FT of crack length with a pressure differential of 6.24 PSF (50 MPH)

Water Penetration Test ASTM E331-00(2009) -

No water penetration for 15 minutes when the window is subjected to a rate of flow of 5 Gal./Hr./Sq. Ft. with a pressure differential of 2.86 PSF.

Submittals

Submit shop drawings showing window and installation details, including anchorage, fastening and recommended sealing methods. Show dimensioned elevations with opening and window sizes. Upon request, provide test reports for all pertinent standards.

Construction

Operable fire rated windows shall be provided with a mechanism that will allow the ventilator to self close and remain closed at a specified temperature (typically 165° F).

PART 2 - PRODUCTS

Approved Manufacturers

Windows shall be provided by a manufacturer and/or distributor of steel fire rated windows whose products meet the Steel Window Institute's performance specifications, as set forth herein or in effect from time to time.

Materials

- A. The frame and ventilator shall be composed of ASTM A653M-11 low carbon cold rolled formed steel sections with a minimum thickness of 20 gauge.
- B. Windows shall be defined and categorized as commercial and industrial windows with a minimum combined weight of frame and ventilator of 2.75 lbs. per linear foot and capable of passing a structural load test of 30 lbs. per square foot.
- C. The frame and ventilator sections shall have a minimum front to back depth dimension of 1- 7/8". Maximum recommended ventilator sizes are as follows (W x H):

Delete listings below, not required:

Casement (in or out): 2.5 ft X 6.0 ft.
Projected (in or out): 5.0 ft X 3.0 ft.
Vertical Slider: 4.6 ft X 4.0 ft.
Horizontal Slider 3.0 ft X 6.0 ft.

- D. Glass:
Only labeled fire protection rated glazing material shall be used in fire rated windows. The individual glazing material exposed area shall not exceed 1296 sq. in. with no dimension exceeding 54 in. unless otherwise tested. Consult window manufacturer. When continuous glazing angles or channels are used to hold glass in a window, these continuous members must be steel.
- E. Muntin bars shall have a tee shaped face min. of 1-1/4".
- F. Glazing beads shall be cold rolled steel with a minimum thickness of 20 gauge.
- G. Weather stripping shall be extruded vinyl or EPDM.
- H. Hardware shall be as follows:
Delete listings below, not required:
1. Project-In:
 - a. Ventilators shall be hung on either steel balance arms or heavy-duty steel or stainless steel three or four-bar hinges located at each jamb.
 - b. Bronze or steel cam latch or spring catches located at the head of the ventilator.
 2. Project-Out:
 - a. Ventilators shall be hung on either steel balance arms or heavy-duty steel or stainless steel three or four-bar hinges located at each jamb.
 - b. Bronze or steel cam latch located at the top rail of the ventilator.
 3. Side Hung/Swing-Out Casement:
 - a. Ventilators shall be hung on either steel, malleable iron or aluminum-bronze hinges with non-ferrous or galvanized pins and bushings. Hinges shall be close or extension type.
 - b. Bronze or steel cam latch located at the jamb of the ventilator.
 4. Side Hung/Swing-In Casement:
 - a. Ventilators shall be hung on either steel, malleable iron or aluminum-bronze hinges with non-ferrous or galvanized pins and bushings. Hinges shall be close or extension type.
 - b. Bronze or steel cam latch or spring catch located at the jamb of the ventilator.

5. Vertical Slider:
 - a. Single and double hung ventilators shall be fully counter-balanced at any desired position by means of adjustable balance mechanisms.
 - b. Bronze or steel lift handle located at the sill of the ventilator. Bronze or steel sweep catch located at the ventilator meeting rails.
6. Horizontal Slider:
Ventilator supported by stainless steel or bronze rollers that are guided by a track either in the frame head or sill. Bronze or steel lift handle located at the jamb of the ventilator. Bronze or steel sweep catch located at the ventilator meeting rails.
- I. Insect Screens
 1. Insect screen frames shall be formed electro-galvanized steel having a minimum thickness of 0.032", or of formed or extruded aluminum having a minimum thickness of 0.040".
 2. Screens shall be rewirable with 18 x 16 mesh wire cloth of aluminum or fiberglass. The nominal diameter of the cloth shall not be less than 0.011" for aluminum.

Fabrication

- A. Fabricate windows in accordance with the approved shop drawings.
- B. Frame and ventilator sections shall be cold formed and members shall be mitered and key cornered. A butyl sealant shall be applied and corners shall be mechanically fastened so as to create a close fit.
- C. Muntin bars shall be true muntins and be continuous from head to sill and jamb to jamb except that bars in one direction may be discontinuous if they are notched and securely fastened at the intersection. Muntins shall be mechanically fastened to the frame or ventilator sections.
- D. All windows shall be designed for either inside or outside glazing.
- E. Operable fire rated windows shall have manufacturer's standard approved hardware.
- F. Insect Screens
 1. Screens with hinged or sliding wickets shall be provided.
 2. The wire cloth shall be held taut with removable spline
 3. Screens shall be removable from the window, held in place by clips.

- G. Finish:
All cold rolled sections shall be pretreated and coated using manufacturer's standard finish.

PART 3 - EXECUTION

Inspection

- A. Fire rated windows must be securely fastened to the wall opening and be capable of resisting all wind and other stresses for which the window was designed. Window manufacturer is not responsible for fire rating of adjacent walls.
- B. Window openings shall conform to details and dimensions shown on the approved shop drawings.
- C. Conditions that may adversely affect the window installation must be corrected by the General Contractor prior to installation.

Installation

- A. Windows specified under this section shall be installed by experienced personnel.
- B. Install windows in strict accordance with the approved shop drawings and all local, state, and national laws and building codes.
- C. Set windows plumb, level, and true to line, without warp or rack of frames or ventilators.
- D. Anchor windows securely to surrounding construction with approved fasteners.
- E. The exterior joints between the windows, trim and mullions shall be properly sealed watertight with an approved sealant and be neatly pointed.
- F. Adjust ventilators to operate smoothly, free from twist, and to be watertight when closed and locked.
- G. Any abraded surface of the window finish shall be cleaned and touched up with air dry paint, as approved and furnished by the window manufacturer, in a color to match the factory applied finish.

Cleaning

- A. The General Contractor shall be responsible for protecting the windows and related materials during storage on the job and during and after installation.
- B. Window installer shall leave the window surfaces clean after installation, exercising care to avoid damage to protective coatings and finishes.
- C. Any protection necessary due to the cleaning of materials adjacent to the windows shall be the responsibility of the General Contractor.

**INDUSTRIAL STEEL WINDOWS - HOT ROLLED
(FIXED, PROJECT-IN, PROJECT-OUT,
SIDE HUNG-OUT AND SIDE HUNG-IN)
SECTION 08510 2/01 – 2012 Reaffirmed**

PART 1 - GENERAL

Work Included

Furnish and install hot rolled steel windows as shown in the contract drawings. Work shall include but not be limited to steel windows (fixed, project-in, project-out, side hung-out, side hung-in or horizontally pivoted), closures, trim, anchors and factory applied finishes (if required).

Related Work

- A. Glass, glazing, and glazing materials:
Section 08800
- B. Perimeter caulking and sealing:
Section 07900
- C. Miscellaneous structural items:
Section 05500

Quality Assurance, Performance Requirements

Unweather-stripped windows shall meet or exceed the following standard:

Air Infiltration Test

ASTM E283-04(2012) - Maximum air infiltration 1.00 CFM/FT. of crack length with a pressure differential across the windows of 1.56 PSF (25 MPH).

Submittals

Submit shop drawings showing window and installation details, including anchorage, fastening, and recommended sealing methods. Show dimensioned elevations with opening and window sizes. Upon request, provide test reports for all pertinent standards.

PART 2 - PRODUCTS

Approved Manufacturers

Windows shall be provided by a manufacturer and/or distributor of steel windows whose products meet the Steel Window Institute's performance specifications, as set forth herein or in effect from time to time.

Materials

- A. The frame and ventilator sections shall be hot rolled steel.
- B. The frame or ventilator sections shall have a minimum thickness of 1/8" and a front to back depth dimension of 1-3/8".
- C. Muntin bars shall be hot rolled steel.

D. Hardware shall be as follows:
Delete listings below, not required:

- 1. Project-In:
 - a. Ventilators shall be hung on heavy-duty steel balance arms located at each jamb. Brass or nylon friction shoes shall be connected to a compression spring assembly to provide proper hold open positions.
 - b. Steel or malleable spring catches located at the centerline of the top rail of the ventilator.
- 2. Project-Out
 - a. Ventilators shall be hung on heavy-duty steel balance arms located at each jamb. Brass or nylon friction shoes shall be connected to a compression spring assembly to provide proper hold open positions.
 - b. Steel cam fasteners located at the centerline of the top rail of the ventilator.
- 3. Side Hung-Out Casement
 - a. Ventilators shall be hung on steel ball bearing hinges.
 - b. Bronze cam fastener located at the centerline of the jamb.
 - c. Die cast roto operator shall be located on the sill.
- 4. Side Hung-In Casement
 - a. Ventilators shall be hung on steel ball bearing hinges.
 - b. Bronze cam fastener located at the centerline of the jamb.
 - c. Stainless steel friction adjuster shall be located on the head.

E. Insect Screens

- 1. Insect screen frames shall be extruded aluminum.
- 2. Screens shall be rewirable with 14 x 18 mesh cloth of fiberglass. The nominal diameter of the cloth shall not be less than 0.011".

Fabrication

- A. Fabricate windows in accordance with the approved shop drawings.
- B. Frame and ventilator sections shall be solid one-piece sections and corners shall be either solidly welded and dressed or mortised and tenoned and riveted.

- C. Flanges forming the weathering contacts shall be rolled integral with sections to provide close contact with both inside and outside points of contact.
- D. Muntin bars shall be interlocked and continuous from head to sill and jamb to jamb and securely welded at the intersection.
- E. All windows shall be designed for inside putty glazing. Outside putty glazing is optional.
- F. Hardware shall be as follows:
Delete listings below, not required:
 - 1. Project-In:
 - a. Furnish two spring catches for vents exceeding 4'-8" in width.
 - 2. Project-Out
 - a. Furnish two cam fasteners for vents exceeding 4'-8" in width.
 - 3. Side Hung-Out Casement
 - a. Two hinges per ventilator shall be furnished, except that, for ventilators exceeding 5'-6" in height, three hinges shall be furnished.
 - b. One cam fastener per ventilator shall be furnished, except that, for ventilators exceeding 4'-0" in height, two-point cam fasteners shall be furnished.
 - 4. Side Hung-In Casement
 - a. Two hinges per ventilator shall be furnished, except that, for ventilators exceeding 5'-6" in height, three hinges shall be furnished.
 - b. One cam fastener per ventilator shall be furnished, except that, for ventilators exceeding 4'-0" in height, two-point cam fasteners shall be furnished.
- G. Insect Screens
 - 1. Screens with hinged or sliding wickets shall be provided as required.
 - 2. The wire cloth shall be held taut with removable spline.
 - 3. Screens shall be removable from the window, held in place by clips.
- H. After assembly, windows shall receive a primer finish. Hot-dipped galvanizing or the manufacturer's standard paint finish is optional.

PART 3 - EXECUTION

Inspection

- A. Window openings shall conform to details and dimensions shown on the approved shop drawings.
- B. Conditions which may adversely affect the window installation must be corrected by the General Contractor prior to installation.

Installation

- A. Windows specified under this section shall be installed by experienced personnel.
- B. Install windows in strict accordance with the approved shop drawings.
- C. Set windows plumb, level and true to line, without warp or rack of frames or ventilators.
- D. Anchor units securely to surrounding construction with approved fasteners.
- E. The exterior joints between the windows, trim and mullions shall be properly sealed watertight with an approved sealant and neatly pointed.
- F. Attach ventilator hardware, as required, and adjust ventilators to operate smoothly free from twist and to be weather tight when closed and latched.
- G. Any abraded surface of the window finish shall be cleaned and touched up with air dry paint, as approved and furnished by the window manufacturer, in a color to match factory applied finish.

Cleaning

- A. The General Contractor shall be responsible for protecting the windows and related materials during storage on the job and during and after installation.
- B. Window installer shall leave the window surfaces clean after installation.
- C. Any protection necessary due to the cleaning of materials adjacent to the windows shall be the responsibility of the General Contractor.