SECTION 085123 - STEEL WINDOWS

See information at end of this section.

1. GENERAL
   * + 1. RELATED WORK SPECIFIED ELSEWHERE
          1. Joint Sealers: Section 079200.
          2. Steel Detention Windows: Section 085663.
          3. Glass and Glazing: Section 0880100.

Delete paragraph above if factory finish is specified.

* + - * 1. Field Painting: Section 099101.
      1. REFERENCES
         1. Except as shown or specified otherwise, the Work of this Section shall conform to the requirements of the "Steel Window Specifications" of the Steel Window Institute (SWI).
      2. DESCRIPTION
         1. Window Classification and Weight:

Select classification required; delete others. Below classes are most commonly used. Insert other class if necessary and available.

Standard Intermediate.

Heavy Intermediate.

Combined weight of outside frame and ventilator sections shall be a minimum of 3.7 lbs per lin ft and frame depth from front to back shall be minimum 1-7/16 inches.

Heavy Custom.

Architectural Projected.

Commercial Projected.

Note: most windows manufactured now are heavy intermediate. (only one or two manufacturers still make standard intermediate windows.) Commercial projected windows are also referred to as industrial or factory sash.

* + - 1. PERFORMANCE REQUIREMENTS

Modify paragraph below (including subparagraphs) as necessary.

* + - * 1. Heavy Intermediate and Heavy Custom Windows:

Air Infiltration for Weatherstripped Ventilators (ASTM E 283): Maximum air leakage 1/2 cfm per lin ft of crack length when subjected to an exterior to interior static test pressure difference of 1.57 psf across window unit.

Water Penetration for Weatherstripped Windows (ASTM E 331): No water leakage for 15 minutes when window is subjected to a rate of flow of 5 gal/sq ft/hr with test pressure difference across window unit of 2.86 psf.

Structural Performance (ASTM E 330): No failure of locks, operating hardware, or other parts when subjected to an exterior to interior, and interior to exterior, static test pressure difference of 60 psf across window unit.

* + - 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 and tabbed (for combined submittals).
         4. Shop Drawings: Show fabrication details and connections to adjacent construction.
         5. Product Data: Catalog sheets, specifications, and installation instructions for each type of window unit.

Delete paragraph below for small jobs. Can change to complete window unit for major projects if desired.

* + - * 1. Samples:

Delete screen from subparagraph below if none required.

Corner sample of frame, ventilator, and screen showing materials and construction.

Hardware: Each item required.

Color Samples for Factory Prefinished Windows: Manufacturer's standard colors for specified finish.

* + - * 1. Quality Control Submittals:

Test Reports: Certified air infiltration, water penetration, and structural performance test reports for each type of window unit required.

* + - * 1. Contract Closeout Submittals:

Operation and Maintenance Data: Deliver 2 copies, covering the installed products, including instructions for cleaning and touching-up finish, to the Director's Representative.

* + - 1. QUALITY ASSURANCE
         1. Testing Agency:

Air infiltration, water penetration, and structural performance tests shall be performed by a qualified independent testing laboratory.

Fire rated windows shall be labeled by Factory Mutual System, Underwriters Laboratories Inc., or other nationally recognized testing laboratory.

* + - 1. DELIVERY, STORAGE, AND HANDLING
         1. Deliver windows in sturdy, protective crates, or containers.
         2. Store and handle windows in a manner that will not cause damage to the finish.

Delete article below if no factory finish.

* + - 1. MAINTENANCE
         1. Extra Materials: For every 20 windows installed (and fraction thereof), furnish window manufacturer's standard factory finish touch-up kit for the factory finish on windows.

1. PRODUCTS
   * + 1. MATERIALS
          1. Windows and Frames: Solid steel shapes made from new billet steel.

Mullions: Solid steel shapes or plates with sheet steel covers, unless otherwise shown.

For mental hygiene and correctional services projects, change "snap-on type" in paragraph below to read "screw-on type with torx tamper resistant truss head cadmium plated steel screws finished to match windows". Spring wire glazing clips are available in lieu of glazing beads; modify paragraph below if face glazing (exposed compound) is required.

* + - * 1. Glazing Beads: Unless otherwise shown or specified, extruded aluminum, 6063 alloy T5 temper, with a minimum thickness of 0.06 inch; continuous snap-on type.

Fire-Rated Windows: Formed steel glazing beads, screw-on type.

Finish: Finish shall match windows.

Paragraph below is known as red bronze. White bronze and other materials and finishes are available.

* + - * 1. Hardware: Unless otherwise shown or specified, exposed hardware shall be solid bronze, tumbled and oxidized to match US20 finish, and lacquered.

Operating Arms: Solid bronze or steel.

Poles (For Ventilators Out of Reach from the Floor): Window manufacturer's standard.

Weatherstripping should be specified for all ventilators. Extruded vinyl weatherstripping is also available. A factory finish is recommended to prevent damage to weatherstripping during field painting.

* + - * 1. Weatherstripping: Q-Lon Weather Seal by Schlegel or closed cell sponge neoprene.
        2. Insect Screens:

Frame: Electro-galvanized steel or 6063-T5 aluminum alloy, finished to match windows.

Retainer Splines: Vinyl plastic.

Modify subparagraph below if a particular metal is required.

Screen Cloth: Any of the following:

Aluminum wire, 0.011 inch diameter, 18 x 16 mesh, with bronze or charcoal color finish.

Bronze wire, 0.0113 inch diameter, 18 x 14 mesh.

Stainless steel wire, AISI Type 316, 0.009 inch diameter, 18 x 18 mesh.

* + - * 1. Accessories:

Anchors: Anchors, clips, fittings, and related fasteners shall be galvanized or cadmium plated steel, unless otherwise approved.

Window Cleaning Anchors: Non-magnetic stainless steel or nickel-copper alloy; ANSI A39.1.

* + - * 1. Sealing Mastic: Non-staining sealant material recommended by window manufacturer.
      1. FABRICATION
         1. Ventilator sections shall be hot rolled with integral flanges providing parallel double contact surfaces around perimeter of each ventilator.

Subparagraph below is only for heavy intermediate windows.

Ventilator sections shall have a continuous integral dove tail groove located on the interior contact surface for the reception of weatherstripping.

* + - * 1. Corners of frames and ventilators shall be mitered or coped and solidly welded. Exposed and contact surfaces shall be finished smooth flush with adjacent surfaces.

Check paragraph below; modify as necessary.

* + - * 1. Glazing: Windows shall be fabricated for inside glazing with glazing beads. Glazing beads shall be sized to suit the glass specified.

Paragraph below is only for heavy intermediate windows; modify if surface applied weatherstripping is required.

* + - * 1. Weatherstripping: Continuous weatherstripping shall be inserted in an integral dovetail groove located in the same plane in the interior contact surface of ventilator sections around the entire perimeter of ventilator. Surface applied weatherstripping is not acceptable.
        2. Tolerance for Window Size (height and width) Dimensions: + 1/16 inch.

Delete paragraph below if not required.

* + - * 1. Mullions: Fabricate to the design and profile shown on the Drawings. Finish mullions and covers to match windows.
        2. Anchor Accessories: Fabricate to shape and size, and furnish in quantity, as required to securely install, and connect the Work of this Section to the construction shown.
        3. Hardware: Unless otherwise shown or specified, window manufacturer's standard hardware series produced for use with the particular type of window, location, and screen condition.

Poles: Furnish one pole for each room or space in which a window is required with a ventilator locking rail over 6'-6" above the floor.

* + - * 1. Insect Screens: Removable and rewireable units, designed not to interfere with ventilator operation. Ventilators requiring screens shall be prepared for screens.
        2. Fixed Window Units: Non-operable units of design and profile shown.

Delete types of units not required. Add additional type and/or special additional hardware if required.

* + - * 1. Projected Window Units: Heavy balance arms with spring loaded friction shoes.

Stops to limit opening, such as to maximum of 50 degrees, are available; recommended for large and/or heavy vents.

Removable locking handle is available for subparagraph below.

Ventilators Within Reach from the Floor: Cam type locking handle with strike (project-out) or concealed keeper (project-in), except project-out ventilators with fixed screen shall have an underscreen push bar.

Ventilators Out of Reach from the Floor: Cam type locking handle with pole ring for project-out ventilators not screened; spring catch with pole ring for project-in ventilators.

Fixed units and projected and casement vents are often used in various combinations.

* + - * 1. Casement Window Units: Non-friction extension type hinges, thru-rail locking handle, and roto-type sill operator.

Paragraph above written for outswing casement vents with screens; below, without screens. Removable key type locking handle is available for casement vents.

* + - * 1. Casement Window Units: Friction extension type hinges, cam type locking handle, and simplex friction stay bar.

Removable crank handle can be provided for below. Awning units require voids in wall at sill at both jambs for rack arm travel; pipe sleeves can be used to create voids in masonry walls.

* + - * 1. Awning Window Units: Ventilators balanced on concealed heavy supporting arms equipped with pivot type shoes, concealed roto-type undersill gang operator, adjusting mechanism, and steel casings and covers.
        2. Combination Window Units: Combination of casement and projected ventilators as shown.

Other types of window units available: 90 degrees horizontal or vertical pivoted, 360 degrees reversible, and top-hinged inswing (cleaning vents).

* + - * 1. Fire Rated Windows: Heavy intermediate units labeled for 3/4 hour fire rating (ASTM E 163), and complying with NFPA Standard No. 80.

Consult hope's catalog for detailed information. Rated windows must be glazed with minimum 1/4" thick labeled (fire rated) wire glass. Can get with acrylic enamel, pvc, or polyurethane factory finish.

Glazing: Fabricated for inside glazing with continuous steel glazing beads.

Delete subparagraph below if not required. Vents can be used for normal ventilation.

Ventilators: Projected ventilators with fire activated, self-closing hardware.

* + - 1. SHOP FINISHES
         1. Galvanizing: Steel window surfaces, except ventilators, shall be cleaned, pickled, fluxed, and hot-dip galvanized in accordance with ASTM A 123.

Ventilator surfaces shall be cleaned, pickled and electro-galvanized in accordance with ASTM B 633, Classification Fe/Zn 25.

Galvanizing is optional, except with poly-vinylidene- fluoride factory finish. Delete subparagraph below when not required.

Windows receiving poly-vinylidene-fluoride factory finish may be electro-galvanized in accordance with ASTM B 633, Classification Fe/Zn 25.

* + - * 1. Prime Coat Finish: Steel window surfaces shall receive zinc phosphate treatment in a 5 stage process and one coat of baked-on epoxy primer with a minimum 1 mil dry film thickness.

Paragraph below is the basic, lowest cost, factory finish; good durability, touches up well.

* + - * 1. Acrylic/Polyester Enamel Factory Finish: Steel window surfaces shall receive zinc phosphate treatment in a 5 stage process, one coat of baked-on epoxy primer, followed by an oven baked coat of acrylic or polyester enamel.

Color: Selected from window manufacturer's standard colors.

Paragraph below is very corrosion resistant and does not get brittle with age or cold weather, but not recommended in areas likely to receive abuse - hard to touch up; improves thermal performance of window; second lowest cost factory finish.

* + - * 1. Poly-vinyl-chloride (PVC) Factory Finish: Steel window surfaces shall receive zinc phosphate treatment in a 5 stage process, one coat of baked-on PVC primer, followed by an oven cured coat of polyvinyl chloride with a minimum dry film thickness of 6 mils at webs and 10 mils at flanges.

Color: Selected from window manufacturer's standard colors.

Note: hope's windows can also be provided with a very durable, high cost, aliphatic polyurethane factory finish, which is easier to touch up than pvc.b. below requires galvanizing; this finish is not in all window manufacturer's specifications; retains color well, high cost, difficult to touch up.

* + - * 1. Poly-vinylidene-fluoride (PVF2) Factory Finish: Steel window surfaces shall receive zinc phosphate treatment in a 5 stage process, one coat of baked-on epoxy primer, followed by an oven baked coat of "Kynar 500 Resin" enamel.

Color: Selected from window manufacturer's standard colors.

If mechanical operators for simultaneous operation of multiple windows (such as commercial projected windows) is required, consult window manufacturer's literature.

1. EXECUTION
   * + 1. EXAMINATION
          1. Examine surfaces to receive steel windows for defects that will adversely affect the execution and quality of the Work. Do not proceed until unsatisfactory conditions are corrected.
       2. INSTALLATION
          1. Install the Work of this Section in accordance with the manufacturer's printed instructions, except as shown or specified otherwise.
          2. Anchor window units securely in place, plumb, level, aligned, without warp.
          3. Seal metal to metal joints, screw heads, and unneeded fastener holes with sealing mastic.

Check paragraph below; delete if not required.

* + - * 1. Install one window cleaning anchor at each side edge of each window unit.
      1. ADJUSTING AND CLEANING
         1. Adjust ventilators and hardware for smooth operation and weathertight closure. Lubricate hardware and other moving parts.
         2. Clean window units promptly after completion of installation.

END OF SECTION 085123

The remainder of this document is for information only; not to be included in project specifications.

There are only a few manufacturers of steel windows, however, this section has been prepared to allow as much competition as possible for steel windows with the basic quality and features we generally require.

Steel windows should be considered for security and high abuse situations since they are 3 times stronger than aluminum windows.

Thermal performance of steel windows is close to that of thermally-broken aluminum windows. Thermal expansion of steel windows is half that of aluminum windows, which reduces sealant failure and vent operation problems.

Development of new durable factory finishes has substantially reduced the maintenance problem.

When steel windows are used for a project, weatherstripped factory prefinished windows are recommended.

END OF INFORMATION - 085123