HOPE'S®

UNIVERSITY SERIES™ FIXED, PROJECTED AND CASEMENT STEEL WINDOWS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included:

1. Hot-rolled steel triple weatherstripped windows with fixed, project-in, project-out, side hung-in or side hung-out configurations.
2. All window anchors, mullions, covers and trim.
3. Stainless steel insect screens for all operating ventilators. (optional)
4. Factory applied Hope's Power of 5 Finishing System.

B. Related work specified elsewhere:

1. Glass, glazing and glazing materials, Section 08810.
2. Perimeter caulking, Section 07915.
3. Miscellaneous structural items, Section 05100.

1.2 QUALITY ASSURANCE

A. Manufacturer shall have not less than 10 years experience in the fabrication of heavy custom steel windows and be a member of The Steel Window Institute (SWI).

B. Installation of windows shall be done by experienced window installers.

C. Allowable tolerances: Size dimensions + 1/16 inch.

D. Source quality control:

1. Air infiltration test
   a. Meets or exceeds ASTM E283.
   b. Maximum air infiltration 0.50 CFM/Ft. of crack length with differential pressure across window unit of 1.57 PSF.
2. Water penetration test
   a. Meets or exceeds ASTM E331.
   b. No water penetration for 15 minutes when window is subjected to a rate of flow of 5 gal./hr./sq. ft. with differential pressure across window unit of 2.86 PSF (50 m.p.h.).
3. Structural test:
   a. Meets or exceeds ASTM E330
4. Field test
   a. Field testing criteria (when applicable) shall be in accordance with AAMA 502-12
5. Quality of Power of 5 finishing process shall meet or exceed the following ASTM designations:
   a. ASTM D714- Paint Blistering Test
   b. ASTM D4585 – Humidity Test
   c. ASTM B117 – Salt Spray (Fog) Test

d. ASTM D1654 – Painted Products in Corrosive Environments

e. ASTM G85 – Cyclic Fog/Dry Test (Prohesion)

f. ASTM D5894 – Salt Fog/UV Painted Metal

g. ASTM D4541 – Pull off Strength of Coating Test

6. Upon request, the window manufacturer shall provide a test report from a qualified independent U.S. testing laboratory regularly engaged in testing windows to verify that products conform to test requirement as outlined.

1.3 SUBMITTALS

A. Samples (as requested by architect):

1. Typical 6" long window profile with glazing beads.

2. Sample of specified muntin, showing welded intersections and glazing beads.

3. Color sample of finish.

4. Hardware.

B. Shop drawings and manufacturer's literature:

1. Submit for approval shop drawings showing window and installation details, including anchorage, fastening and recommended sealing methods.

2. Dimensioned elevations showing window opening and window sizes.

3. The manufacturer shall not commence any work until shop drawings have been approved.

4. Color charts for finishes.

1.4 PRODUCT, STORAGE AND HANDLING

A. The General Contractor shall be responsible for the protection and storage of the windows after delivery to the site.

B. Store in designated areas in an upright position on wood slats or on a dry floor in a manner that will prevent damage. Ventilate canvas or plastic coverings to prevent humidity buildup.

1.5 WARRANTY

A. Provide Hope's 10 year Limited Warranty.

PART 2 - PRODUCT AND FABRICATION

2.1 Manufacturers:

A. Furnish all labor and materials to complete the fabrication of windows as shown on architect's drawings and as specified herein. All windows covered by this specification shall be domestically manufactured in the U.S.A.

B. Manufacturers: Subject to compliance with requirements covered in this specification, provide products by Hope's Windows, Inc. – Jamestown, NY (phone: 716-665-5124, e-mail: sales@hopeswindows.com) whose name and products are used to establish the standard of workmanship.

C. Substitutions: Written approval necessary 10 days prior to bid through submission of the following:

1. Full-size window/door samples matching required scope.

2. Applicable test reports as outlined in Quality Assurance Section 1.2
3. List of (5) recently completed projects of similar size and scope.

2.2 MATERIALS

A. Heavy custom triple weatherstripped windows shall be manufactured from solid hot rolled steel profiles.

1. Profiles made from steel with flanges rolled integrally at the mill.
2. Perimeter frames and ventilator profiles shall have glazing rebates providing an unobstructed glazing surface of at least 5/8".
3. Glazing rebate surfaces must be perpendicular to the web or stem of the profile. Applied glazing rebate extensions and rebate surfaces that are tapered will not be acceptable.
4. The exterior side of the glazing rebate shall have an angle tapered recess integrally rolled in the profile. Applied tapered adapters will not be acceptable.
5. All steel profiles must be a minimum of 1-3/4″ in depth.
6. Combined weight of frame and ventilator profiles shall be a minimum of 3.95 pounds per lineal foot. Frame section alone shall not weigh less than 1.80 pounds per lineal foot.
7. The frame and ventilator profiles shall have integral grooves located in the exterior and interior bedding contacts for the reception of triple weatherstripping.

B. Muntins *(select from items 1 or 2 below)*:

1. *True Divided Lite muntins*:
   a. Muntins shall be manufactured from solid hot-rolled steel, size to be determined by design.
   b. Glazing rebate surfaces must be perpendicular to the stem of this profile. Rebate surfaces that are tapered will not be acceptable.
   c. 1-3/4” tee shall weigh 1.62 pounds per lineal foot, the 1-3/8” tee shall weigh 1.44 pounds per lineal foot and the 7/8” tee shall weigh 1.19 pounds per lineal foot (specify).
   d. All steel muntin profiles must be a minimum of 1-3/4″ in depth.
2. *Simulated Divided Lite muntins (select from items below)*:
   a. Hot-rolled stainless steel muntin - #84H profile shall be solid hot rolled from stainless steel with tapers rolled integral at the mill. #84H muntins shall be solidly welded to perimeter framing and dressed smooth. Opposite side muntin shall be extruded aluminum Alloy 6063-T5 matching the profiles as detailed.
   b. Interior/exterior muntin - Profiles shall be extruded aluminum Alloy 6063-T5 matching the profiles as detailed.

C. Glazing beads shall be extruded aluminum Alloy 6063-T5 with a minimum thickness of .062 inches.

D. Weatherstripping shall be extruded EPDM closed cell sponge, closed cell neoprene, flexible silicone, or polyethylene clad urethane foam.

E. Operable Hardware *(Select from the following)*:

1. *Top Hung-Out Ventilators*:
   a. Fastener: Brass or Bronze cam fastener.

b. Ventilators shall be hung on aluminum-bronze pivot with stainless steel pin.

c. Friction and limit device: Stainless steel with sliding brass shoe and screw adjusted friction.

2. *Project-In Ventilators*:
    a. Fastener: Brass or Bronze cam fastener; or bronze spring catches for ventilators beyond reach.
    b. Ventilators shall be hung on heavy-duty stainless steel four bar hinges with brass friction shoes.
3. *Project-out ventilators with simplex (non-roto) operators*:
    a. Fastener: Brass or bronze cam fastener.
    b. Ventilators shall be hung on heavy-duty stainless steel four bar hinges with brass friction shoes.
4. *Project-out ventilators with roto operators*:
    a. Fastener: Brass or Bronze cam fastener.
    b. Ventilators shall be hung on heavy-duty stainless steel four bar hinges with brass friction shoes.
    c. Dual arm roto operators: Solid brass or bronze housing with stainless steel arms and gears.
5. *Side hung-in ventilators*:
    a. Fastener: Brass or Bronze cam fastener.
    b. Pivots: Aluminum-bronze pivot with stainless steel pin.
    c. Friction and limit device: Stainless steel with sliding brass shoe and screw adjusted friction.
6. *Side hung-out ventilators with simplex (non-roto)*:
    a. Fastener: Brass or Bronze cam fastener.
    b. Pivots: Aluminum-bronze pivot with stainless steel pin.
    c. Friction and limit device: Stainless steel with sliding brass shoe and screw adjusted friction.
    d. Sill pull: Bronze sill pull (when required).
7. *Side hung-out ventilators with roto operators*:
    a. Fastener: Brass or Bronze cam fastener.
    b. Pivots: Aluminum-bronze pivot with stainless steel pin.
    c. Roto Operators: Solid brass or bronze housing with stainless steel arms and gears.

F. All screws that are furnished by Hope's, for hardware, trim, covers, anchoring, weatherbars, water dams, screens, etc. shall be non-ferrous brass or stainless steel. Glazing bead retainer screws are plated steel.

G. Stainless Steel Insect Screens (Optional)
    1. Frames shall be roll-formed 20 gauge stainless steel.
    2. Stainless steel screens shall be .011 diameter wire, woven to 14 x 18 mesh count. Mesh is available in several types of material; see screen section for type of mesh (specify) and further screen specifications.

H. Power of 5 Finishing:
    1. Cleaning
    2. Pretreatment
    3. Epoxy E-Coat primer

4. Epoxy powder primer
5. Ultrathane polyurethane top coat

2.3 FABRICATION

A. Fabricate steel windows in accordance with approved shop drawings.

B. Corners of frame and ventilator shall be mitered or coped then solidly welded. Exposed and contact surfaces shall be finished smooth flush with the adjacent surfaces. All interior and exterior rail bar and muntin joints shall be face welded and ground smooth.

C. Muntins *(select from 1 and 2)*:

1. True Divided Lite muntins shall be coped and welded to the perimeter frame. Muntin intersections shall be slotted, cross notched and welded. All interior and exterior muntin joints shall be face welded and ground smooth.
2. Simulated Divided Lite Grids:
   a. Hot-rolled exterior muntin - #84H profile shall be mitered or coped and fully back welded at all intersections.
   b. Interior/exterior applied muntins - Profile shall be precut to meet perimeter frame. The intersections shall be milled to the extrusion profile. The muntin components shall be applied to the face of the glass with .045" VHB™ double adhesive tape after glazing.

D. Glazing

1. All windows shall be designed for inside glazing.
2. Provide replaceable continuous glazing beads to suit the glass as specified.
3. Glazing beads shall be cut and shop fitted to each glass lite prior to shipment.
4. Manufacturer to provide correct glazing wedge and tape in accordance with the tested assembly.

E. Weatherstrip

1. All ventilators shall receive continuous weatherstripping that shall be applied to the integral weatherstrip grooves in the interior and exterior contact surfaces of the frame and ventilator sections. Weatherstripping that is surface applied or requires additional retainer or requires screws for application shall not be acceptable.

F. Operable Hardware *(Select from the following)*:

1. Top Hung-Out ventilators:
   a. Provide two fasteners per ventilator where sash width exceeds 4'-8".
   b. Ventilators shall be hung on aluminum-bronze pivot with stainless steel pin.
   c. Friction device shall be applied at the jamb(s) of the ventilator.
2. Project-In ventilators:
   a. Provide two fasteners per ventilator where sash width exceeds 4'-8".
   b. Ventilators shall be hung on heavy-duty stainless steel four bar hinges, having friction maintained by a sliding brass shoe with screw adjustment.

3. Project-out ventilators with simplex (non-roto):
    a. Provide two fasteners per ventilator where sash width exceeds 4'-8".
    b. Ventilators shall be hung on heavy-duty stainless steel four bar hinges, having friction maintained by a sliding brass shoe with screw adjustment.
4. Project-out ventilators with roto operators:
    a. Provide two fasteners per ventilator where sash width exceeds 4'-8".
    b. Ventilators shall be hung on heavy-duty stainless steel four bar hinges, having friction maintained by a sliding brass shoe with screw adjustment.
    c. Handles of dual arm roto operators are to be shipped loose for field installation.
5. Side hung-in ventilators:
    a. Casement ventilators shall be hung on pivots.
    b. Provide three pivots when vent height exceeds 5'-6".
    c. Provide double grip fasteners for ventilators over 5'-6" in height.
    d. Friction device shall be applied at the head of the ventilator.
6. Side hung-out ventilators with simplex (non-roto):
    a. Casement ventilators shall be hung on pivots.
    b. Provide three pivots when ventilator height exceeds 5'-6".
    c. Provide double grip fasteners for ventilators over 5'-6" in height.
    d. Friction device shall be applied at the head of the ventilator.
    e. Sill pulls shall be furnished for ventilators if, when opened, the cam fastener is beyond reach.
7. Side hung-out ventilators with roto operators:
    a. Casement ventilator shall be hung on pivots.
    b. Provide three pivots when ventilator height exceeds 5'-6".
    c. Provide double grip fasteners for ventilators over 5'-6" in height.
    d. Handles of roto-operators are shipped loose for field installation.

G. Stainless Steel Insect Screens (Optional)
1. Stainless steel screen frames shall be finished to match the windows.
2. Stainless steel screens shall be rewireable to allow for mesh replacement.
3. Stainless steel screen fastenings shall permit easy attachment and removal from the interior. See screen section for further specifications.

2.4 FACTORY FINISHING

A. Cleaning
1. All hot-rolled steel profiles are acid pickled as defined by SSPC – SP8 to ensure a pristine, white metal substrate prior to fabrication.

B. Pretreatment

1. Following welding and all machining operations, hot-rolled products and accessories are subjected to the following pretreatments geared specific to projects proximity to corrosive environment. Cold-rolled, formed sheet steel components are manufactured from A60 galvannealed sheet and subjected to applicable processes outlined below. *(Select from items 1 or 2 below)*
2. Inland locations (12-stage process) – Greater than one (1) mile from salt water and/or similar corrosive environments.
    a. Alkaline cleaning spray
    b. Alkaline cleaning – submersion
    c. Water immersion rinse combo
    d. Water immersion rinse clean
    e. Acid immersion
    f. Neutralizing rinse
    g. Water immersion rinse clean
    h. Conditioner immersion
    i. Zinc phosphate immersion
    j. Rinse immersion
    k. Sealer immersion
    l. Water reverse osmosis rinse immersion
3. Ocean Front/Coastal locations (13-stage process) – Within one (1) mile of salt water and similar corrosive environment.
    a. Zinc metal deposition (Electroplate and/or hot-dip, consult Hope's)
    b. Alkaline cleaning spray
    c. Alkaline cleaning – submersion
    d. Water immersion rinse combo
    e. Water immersion rinse clean
    f. Acid immersion
    g. Neutralizing rinse
    h. Water immersion rinse clean
    i. Conditioner immersion
    j. Zinc phosphate immersion
    k. Rinse immersion
    l. Sealer immersion
    m. Water reverse osmosis rinse immersion

C. Epoxy E-coat Primer

All pickled and pretreated frames and accessories are immersed into an electrostatic (E-coat) bath of PPG epoxy primer to ensure all substrates are encapsulated evenly and completely. Use of spray primers only will not be an acceptable alternative to this process due to benefits from additional cleaning and frame submersion.

1. Permeate spray
2. Permeate rinse
3. Epoxy primer immersion and electrostatic encapsulation
4. Water reverse osmosis rinse
5. Oven-cure, 45 minutes @ 350° F

D. Epoxy Powder Primer

Following pre-treatments and E-coat system, all frames and accessories shall receive an abrasion resistant powder coating prior to final top-coat.

1. Powder is applied electrostatically over cured E-coat to a dry film thickness (DFT) of 2.0-3.0 mils.
2. Parts oven baked at 325° F to completely cure prior to final top coat.
3. Powder coat is intended as an intermediate finish applied prior to the final finish top coat.

E. Ultrathane Polyurethane Top Coat

Following all pre-treatments, e-coat and powder abrasion layer, all products shall receive Hope's ultrathane polyurethane finish with touch-up capability, low chalking and fading characteristics, unlimited color matching, and 70,000+ standard colors, including metallics.

F. *POWER OF 5* OVERVIEW

1. Combined overall dry film thickness shall be a minimum of 4.6 mils (inland locations) and 7.1 mils (coastal locations).
2. Overall process shall provide full documented compliance with the following criteria:
    a. SSPC-SP8 for acid pickling
    b. ASTM D714-02 Paint Blistering Test
    c. ASTM D4585 Humidity
    d. ASTM D1654-05 Painted Products in Corrosive Environment
    e. ASTM B117-03 Salt Spray (Fog) Test
    f. ASTM G85 Cyclic Fog/ Dry Test (Prohesion)
    g. ASTM D5894-96 Salt Fog/ UV Painted Metal
    h. ASTM D4541 Pull Off Strength of Coating Test

PART 3 - EXECUTION

3.1 INSPECTION

A. Window openings shall conform to details, dimensions and tolerances shown on the window manufacturers approved shop drawings.

B. Conditions which may adversely affect the window installation must be corrected before installation commences.

C. The wash down of the adjacent masonry and surrounding substrate must be completed before erection commences to prevent damage to the finish by the cleaning materials.

3.2 INSTALLATION

A. Windows specified under this section shall be installed by experienced personnel.

B. Install windows in openings in strict accordance with approved shop drawings.

1. Set units plumb, level and true to line, without warp or rack of frames.

2. Anchor units securely to surrounding construction with approved fasteners.

3. The exterior joints between the windows, trim and mullions shall be properly sealed water-tight with an approved sealant and neatly pointed.

C. Attach ventilator hardware, as required, and adjust ventilators to operate smoothly free from twist and to be weather-tight when closed.

D. Attach loose muntin grids per approved shop drawings, if applicable.

E. Repair any abraded areas of the factory finish.

3.3 CLEANING

A. Window installer shall leave window surfaces clean after installation and ready to receive glass and glazing. The window installer will not be responsible for final cleaning.