

SECTION 08 51 00

METAL WINDOWS

PART 1 GENERAL

1.01 SUBMITTALS

- A. Shop drawings and product data:
 - 1. Submit complete catalog data on all materials as described in Part Two below for windows including all test data for proposed units. Include proposed method of isolating aluminum from dissimilar metals. Catalog data shall be clearly marked to denote the items that are being submitted.
 - 2. Submit installers certification, signed by an officer of the company, certifying that the installer has a minimum of five years experience installing commercial windows. The installer shall submit the names and points of contact for at least three successfully completed school projects.
 - 3. Submit complete shop drawings including:
 - a) Frame sections including head, jamb and sill details that show the building structure and where in the opening the window is located. Show all attachment detail. Show limits device details and mounting details.
 - b) Window dimensions: window unit sizes and required rough opening dimensions.
 - c) Operating hardware information.
 - d) Name of the balance manufacturer and catalog numbers of each type of balance used.
 - e) Blind manufacturer catalog data.
- B. Samples: One sample of each required aluminum finish, on 6" long sections of extrusion shapes and aluminum sheets as required for window units.
- C. Test Reports: In addition to providing proof of AAMA rating, provide AAMA 910-10 Life Cycle Test results from an independent laboratory. Submit results of life cycle tests for actual live load testing. Test reports shall be no older than four years old from the date of the award of the Contract.
- D. Product Certification: To prove energy compliance, window manufacturer shall submit certification that their proposed window system meets the AW criteria and AAMA certification. Submit a NFRC Bid Report at time of bid. Submit a NFRC Label Certificates as a submittal item.
- E. Operation and maintenance data:
 - 1. The window manufacturer shall provide complete maintenance information including part numbers and instructions on assembling and disassembling the window unit components.
 - 2. The window manufacturer shall provide on-site instruction and an operation training session to include:
 - a) Removal and replacement of glazing, blinds and hardware.
 - b) Cleaning of windows.
 - c) Operation and adjustments possible.
 - 3. Window manufacturer shall provide documentation of the training session to DPS prior to final acceptance. Documentation shall include date of training, sign-up sheet of people being instructed and outline of training provided.
- F. Warranty: The window manufacturer shall provide a warranty statement. Warranty shall be for five years past final acceptance of the project on materials, including all hardware, and ten years on insulated glass units, when insulated glass units are provided. The finish warranty is to be for ten years from the date of final acceptance. This warranty shall include all labor and materials. Acts of vandalism are not covered by this warranty after final acceptance of the project. The installation warranty will be for two years from the date of final acceptance with warranty walk-throughs every six months during the installation warranty period.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide windows as manufactured by one of the following: **EFCO, Graham Architectural Products, Kawneer, Manko Window Systems, Inc., Peerless, Wausau Windows, and Winco Window Company,**

2.02 MATERIALS

- A. All windows shall be triple glazed aluminum frame windows with internal storm sash and blinds and exterior insulated unit.
- B. Finishes: Window finishes to be clear anodized aluminum unless otherwise approved in writing by DPS.

2.03 FABRICATION

- A. Basic Construction:
1. Hopper and Fixed Windows: Interior storm sash shall be hinged on one side or at the top to prevent removal of the sash. Hinge shall be full-length piano hinge or concealed hinge. Windows over four (4) feet in width shall be hinged at the top.
 2. Interior storm sash shall be fastened to the frame with allen-head fasteners. These devices shall be equipped with “keepers” or clips to prevent the complete removal of the devices from the sash frame.
 3. Frames shall be thermal break aluminum. Frames shall have minimum wall thickness of 0.125 inches. Sills and hardware attachment locations shall have a minimum wall thickness of 0.125 inches.
 4. Frame: Double tubular head, sill, and jambs miter cut and fastened with two zamac corner gussets per corner; double tubular integral mullion, if required, fastened with two zamac gussets per frame member without penetrating the frame member with fasteners; corners sealed by the window manufacturer with sealant conforming to AAMA 800-10.
 5. Aluminum extrusions: Extruded by the window manufacturer from commercial quality 6063-T5 alloy; free from defects impairing strength and durability.
 6. All vent windows shall have an ANSI/AAMA 101-97 minimum “AW70 rating.
 7. Vents: Double tubular horizontal and vertical vent rails and stiles miter cut and fastened with two zamac corner gussets per corner; corners sealed by window manufacturer with sealant conforming to AAMA 800-10.
 8. Where permitted by DPS, single and double hung replacement windows in buildings with historic designations shall have an ANSI/AMA 101-97 minimum “AW55 rating”.
 9. All aluminum components shall be isolated from dissimilar metals as recommended by the window manufacturer and as approved by the Architect.
 10. In-swinging hopper windows are required for operable sections.
 11. Preferred window operation for replacement double hung windows is a sash-balanced operation where the lower sash is counterbalanced by the upper sash through a pulley and cable system. When the lower sash is raised, the upper sash shall lower. The sash-balanced system cannot be used when the upper and lower sash sizes do not match.
 12. All operable windows shall have limit devices that shall be metal that are firmly attached to the jambs. Method of attachment of the limit devices shall be approved by DPS in writing. Plastic limit devices shall not be used. Openings shall be limited to 24” for single and double hung windows and 9” for projected-type vent windows.
 13. Water Control: Continuous compression gasket to utilize pressure equalization and to allow water to drain by gravity.
- B. Windows in buildings with historic designations shall have an ANSI/AAMA 101-97 minimum “AW55 rating.
- C. Glazing:
1. Window components shall be factory-glazed.

2. All windows shall be glazed with tempered glass in all panes.
 3. The interior surface of the exterior pane of all windows shall have Low E coating with the following minimum properties:
 - a) Coating type: Pyrolytic (hard coat/sputter).
 - b) Visible light transmission: 73 percent maximum.
 - c) Maximum SHGC is .40.
 - d) Meet 2015 IECC and IBC.
- D. Blinds:
1. Blinds shall be installed between the interior storm sash and the exterior insulated unit.
 2. Blinds shall be capable of being raised when the storm sash is open.
 3. Blind tilt shall be operated through a flush thumb operator located in the window frame.
 4. The size of blinds shall be uniform for all sashes (fixed and operable). If operable sashes require thinner blinds than fixed sashes, the thinner blind shall be used in all locations.
 5. Blind color is to be selected by Architect from manufacturer's full range.
 6. Do not install blinds in windows with obscure glass.
- E. Operable Sashes:
1. All operable exterior windows shall be in-swing hopper type.
 2. Vent sashes shall have interior storm sashes and internal blinds as required for fixed sashes.
 3. Operable sashes shall be fitted with limiters to restrict the opening degrees of the window.
 4. Operable sashes shall be equipped with positive latches which secure the window against entry from the exterior of the window.
- F. Screens: Screens shall be fastened to frames with allen head screws (cams or other hand operable restrained devices are prohibited). Screen frame shall be of extruded aluminum and screen mesh of dark charcoal aluminum wire. Provide screens at operable sashes only in the following locations:
1. Cafeterias
 2. Kitchens
- G. Hardware: Projected windows-stainless steel 4-bar hinges for operations and white bronze cam latches to lock vents. Restroom windows shall require vandal resistant or custodial lock controls. Class V balances shall be used on all sashes. Vent sashes weighing over 110 pounds shall not be used.
- H. Weatherstripping: Provide full perimeter weatherstripping for each operable sash unless otherwise indicated. Secured in extruded ports; Santoprene bulb seal conforming to AAMA 702-11: single row on the vent bottom rail and double rows on the vent top rail and vent stiles.
- I. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
- J. Dividers (False Muntins): Provide extruded-aluminum divider grilles in designs indicated for each sash lite.
1. Type: Permanently located at exterior lite.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Verify that window openings are dimensionally correct and within allowable manufacturer's installation tolerances. Openings shall be plumb, level, and clean. A solid anchoring system shall be provided in accordance with approved shop drawings.

- B. Windows shall be installed with protection against air-infiltration around frames or between mullied units. Fill frames with batt insulation, backer rod and caulk all perimeters (inside and outside). As an alternative, expandable foam type insulation shall be used. Specify type and minimum – maximum expansion.
- C. Use only skilled craftsmen for all work in accordance with approved shop drawings, specifications and manufacturer’s written instructions. Installers shall have a minimum of five (5) years experience installing commercial windows. The installer shall provide the names and points of contact for at least three (3) successfully completed projects.
- D. Comply with manufacturer’s written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer’s written instructions, comply with installation requirements in ASTM E 2112.
- E. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- F. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- G. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- H. Adjust operating sashes and hardware for a tight fit at contact points and weatherstripping for smooth operation and weathertight closure.
- I. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- J. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

3.02 SPARE PARTS AND TOOLS

- A. Tools: Provide a minimum of six (6) sets of tools needed to maintain the windows. (Screwdrivers, etc. need not be provided.) Provide allen-head screw drivers for operation of interior sash fasteners.
- B. Provide six (6) replacement latches for operable window sections and six (6) replacement storm sash fasteners.
- C. Provide six (6) limit devices for 20% of installed windows.
- D. Provide six (6) of each type of balance if double or single-hung windows are used and six 4-bar hinges for projected windows.
- E. Provide six (6) additional blind operator knobs or wrenches.

END OF SECTION 08 51 00