

# **SECTION 085000 - WINDOWS**

## **PART 1 – GENERAL**

### **1.1 RELATED SECTIONS:**

Refer to Section 081000 for requirements regarding doors and frames.

Refer to Section 087000 for requirements regarding hardware.

### **1.2 SCOPE OF SECTION:**

This section contains the requirements regarding individual and multiple, fixed and operable windows, anchors and all accessories, sealant around perimeters of windows and window glazing.

## **PART 2 – PRODUCTS**

### **2.1 GENERAL:**

All certified windows shall bear the “AAMA Certification Program” Gold label indicating conformation to ANSI/AAMA 101-93, “Heavy Commercial” grade as specified herein. Products manufactured by TRACO, EFCO or Graham Architectural Products have been reviewed by ECU and are considered acceptable manufacturers. Other manufacturers may only be considered if reviewed and approved by ECU prior to start of Construction Documents of any project. All window unit manufacturers must be capable of providing custom commercial grade windows, and shall meet the performance and finish specifications contained herein. Written documentation shall be provided with submittals to indicate conformance with AAMA 101-93.

### **2.2 PREFERRED TYPE:**

The preferred window is a fixed single-hung, one (1) inch sealed, insulating low-e type glazing, with a minimum 3-1/4” deep, thermally broken frame, with applied mullions to match existing or as appropriate based on architectural style (see below). Window unit shall be factory-finished aluminum; steel or wood sash shall not be used. Non-operable windows are preferred in all areas except in Residence Halls.

### **2.3 PERFORMANCE:**

A. Windows shall conform to H-AW40 specifications in AAMA/NWWDA 101/I.S.2-97 when tests are performed on the prescribed 5'0" x 8'0" minimum test size with the following test results:

1. Air Infiltration: After the AAMA 910-93 life cycle test, air infiltration shall not exceed 0.10 cfm per linear foot of sash perimeter when tested per ASTM E 283-91 at a static air pressure difference of 6.24 psf.

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2. Water Penetration: After the AAMA 910-93 life cycle test, there shall be no uncontrolled water leakage when tested per ASTM E 331-96 at a static air pressure difference of 10 psf.
3. Uniform Deflection: There shall be no more than L/175 deflection when tested per ASTM E 330-96 at a static air pressure difference of 40 psf.
4. Uniform Structural: The window shall be operable, and maximum .2% permanent deformation per member when tested per ASTM E 330-96 at a static air pressure difference of 60 psf.
5. Life Cycle Testing: Tested in accordance with AAMA 910-93, there shall be no damage to fasteners, hardware parts, support arms, activating mechanisms, or any other damage which would cause the window to be inoperable. After such test, air infiltration and water resistance tests shall not exceed specified requirements.
6. Condensation Resistance Test (CRF): With window sash closed and locked, test unit in accordance with AAMA 1503-98, with a minimum CRF of 46.
7. Thermal Transmittance Test (Conductive U-Value): shall not exceed 0.60 BTU/hr/sf/degrees F.

### **2.4 CONSTRUCTION:**

- A. Aluminum Extrusions: All frame and sash sections shall be extruded aluminum shapes produced from commercial quality 6063-T5 alloy and shall be free from defects impairing strength and/or durability. All frame and sash structural members shall have an integral, polyurethane thermal break.
- B. Frame: members fastened with two stainless steel screws per joint; factory-sealed with sealant conforming to AAMA 800-92.
- C. Sash: tubular horizontal sash rails coped and fastened to vertical sash stiles with a telescope-design joint secured with two stainless steel screws per sash corner; corners factory-sealed with sealant conforming to AAMA 800-92.
- D. Sash design: continuous extruded lift rail on the bottom sash interior; mechanical interlock; weep holes for drainage.
- E. Hardware: Lower sash shall have two aluminum sill snap locks to insure sash locking in the closed position.

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- F. Weather-strip: Sash shall be double weather-stripped using silicone-treated pile conforming to AAMA 701-92 with a polypropylene center fin, and rigid PVC weather seal on interior of stiles.
- G. Balances: Sash shall have heavy duty block and tackle balances conforming to AAMA 902-98 with extruded aluminum housings and of sufficient capacity to hold the sash stationary and permit it to operate freely. Sash weight shall not exceed 70 lb.
- H. Panning: Exterior panning where used, shall be of extruded aluminum, commercial quality 6063-T5 or 6063-T6 alloy, tempered in wall thicknesses of 0.078", to completely cover exterior window frame. Where panning depth, as measured from exterior face of window frame, is less than 1", wall thickness can be 0.062". Sections shall be one-piece, designed to lock around full perimeter of window frame, and be completely water-tight, yet allow unrestricted expansion and contraction of panning members and window frame. The panning section shall be secured at the corners with screws in integral ports and back sealed. All fasteners for the exterior panning system shall be concealed. The jamb, head, and sill are to be sealed with a premium grade sealant meeting AAMA 800-92.

### **2.5 GLAZING:**

- A. Preferred glazing shall be insulated, Low-e.
- B. Care should be taken to minimize solar heat gain through exposed glazing, especially south and west facing glass. Tinting and reflective treatments shall be utilized when approved or directed by Project Manager.
- C. Sash shall be factory glazed with 1" insulating glass (optional 1/8" single glass) held in place with exterior foam tape and interior EPDM gaskets and extruded aluminum glazing beads. Annealed glass installed in windows shall meet ASTM C 1036. The sealed insulating glass shall have a one-piece continuous aluminum spacer with no corner gussets. The glass shall be sealed with dual perimeter sealant. The inner sealant to be polyisobutylene and the outer sealant to be silicone. The sealed insulating glass shall conform to ASTM E 774, level CBA, and be certified and labeled as such.
- D. Spandrel Panels-Color selections for spandrel panels must be approved by the University Architect.

### **2.6 FINISHES:**

All aluminum extrusions shall be finished per AAMA 2604-98 and warranted for 10 years.

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- A. Finish coating shall be a high grade, organic acrylic paint applied over a five-stage zinc chromate conversion.
- B. Quality shall conform to AAMA 2604-98, including 5 years Florida exposure and 3000 hours humidity tests.
- C. Application: electrostatic spray and oven bake by approved applicator.
- D. Coating quantity: minimum one primer coat and one color coat.
- E. Dry film thickness: minimum 1.4 mils on exposed surfaces, except inside corners and channels.
- F. Color: chosen from manufacturer's standards.

### **2.7 SCREENS:**

All Residence Halls shall be screened. Basement, Ground and/or First Floor levels shall be provided with extra-heavy duty, stainless steel mesh, rigidly mounted security screens. Consult with Facilities Services Engineer - Residence Halls for specific requirements. Screening requirements at other facilities shall be as directed by Project Manager.

### **2.8 ARCHITECTURAL COMPATIBILITY:**

When historic buildings are to be renovated, the Designer shall ensure that replacement windows are in character with the building architecture, while still meeting the above requirements as fully as possible.

### **2.9 WARRANTIES:**

- A. Windows Unit: The responsible contractor shall assume full responsibility and warrant for one (1) year the satisfactory performance of the total window installation. This includes, as a minimum, the windows, hardware, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water and structural adequacy as called for in the specifications and approved shop drawings.
- B. Finish: All exposed aluminum surfaces shall be warranted for ten (10) years against chipping, peeling cracking or blistering.
- C. Insulating Glass: Insulated glass units shall be warranted for five (5) years against visual obstruction resulting from formation of moisture between the internal glass surfaces, excluding damages due to glass breakage.

## **PART 3 – EXECUTION**

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- 3.1** Windows are to be installed by a factory authorized installer, per manufacturers written installation instruction, with a minimum of three (3) years experience in installing windows equal to or better than those specified herein.
- 3.2** Provide required support and securely fasten and set windows plumb, square, and level without twist or bow.
- 3.3** Window exteriors shall be sealed weather-tight with a urethane caulk meeting Federal Spec TT-S-00230C, Type II, Class II. Apply sealant per sealant manufacturer's recommendations at joints, wipe off excess, and leave exposed sealant surfaces clean and tooled smooth.
- 3.4** In occupied renovation projects, all demolition work and new window installation shall not begin until such time as new windows are on job site with all applicable hardware, sealant, etc.
- 3.5** Installation is to include all necessary exterior panning and interior snap trim as appropriate for replacement jobs.
- 3.6** Frames, sash vents and balances shall be adjusted as required to provide a smooth and weather-tight operation.
- 3.7** In occupied renovation projects, great care must be taken to protect existing wall finishes and furnishings. Contractor shall be responsible for all damages to like new or pre-construction conditions, as determined by Owner.
- 3.8** In renovation projects, all work within each room shall be completed, including all clean up, prior to continuing to next room/area. All rooms shall be left clean/neat, as if no construction activities took place. All areas are to be cleaned up on a daily basis, regardless of current construction activity.
- 3.9** Any furniture that has to be relocated during installation shall be done by Contractor and shall be cleaned and returned to its original position.
- 3.10** Any wall repairs, painting or other work, not specifically mentioned or indicated deemed necessary to provide a fully functional, professional, installation, shall be done by the Contractor at no additional expense to the Owner.

END OF SECTION

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