

SECTION 08 51 13.11
SIDE-HINGED ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Side hinged, in-swing casement type, triple glazed windows with venetian blinds and muntins enclosed between the glazing, complete, with hardware, related components and accessories.
- B. Windows shall be similar in appearance or equal to the 450 Series in-swing casement windows manufactured by EFCO, a Pella Company. Casement in-swing Series 450 Thermal windows with 4 ½" wide aluminum frame, white color. 1 inch interior venetian blinds white in color. Insulated low e glass shall be 1/4" monolithic dual glazed.

1.2 DEFINITIONS

- A. Accessories: Mullions, closures, trim, clips, anchors, fastenings, weather-stripping, and other necessary components required for the fabrication and installation of the window units.
- B. Uncontrolled Water: Water not drained to the exterior or water appearing on the room side of the window.

1.3 RELATED WORK

- A. Glazing: Section 08 80 00, GLAZING.

1.4 PROTECTION

- A. Protect windows from damage from handling, and construction operations before, during and after installation.
- B. Store windows under cover, setting upright. Do not stack windows flat. Do not lay building materials or equipment on windows.

1.5 QUALITY ASSURANCE

- A. Approval by Contracting Officer is required of products or service of proposed manufacturer, suppliers and installers.
- B. Approval will be based upon submission of certification by the Contractor that:
 - 1. Manufacturer regularly and presently manufactures the specified windows as one of its principal products.
 - 2. The manufacturer shall instruct the installer in installation methods and shall certify that the installation is as per manufacturer's installation procedures. Certification is not required if installation is done by a certified installer.
- C. Test Units:
 - 1. All test units to shall be constructed in strict accordance with the drawings and specifications.
 - 2. Minimum test size of specimen to be 1200 mm (four feet) wide by 1800 mm (six feet) high for thermal test and as per AAMA 101-I.S.2 for the window type selected for air, water, structural and life cycle testing.
- D. Performance Requirements:
 - 1. AAMA/WDMA/CAS 101-I.S.2/A440-11 for SHW-AW40/ side Hinged Windows.

2. Condensation Resistance Factor (CRF): CRF Class 55.
3. Thermal Transmittance: U value 0.35
4. Solar Heat Gain Coefficient (SHGC): .25
5. Submit copies of test reports from an independent testing laboratory accredited by AAMA and certificates signed by the window supplier or manufacturer stating that the windows delivered to the site comply with all specified performance requirements, within size and variables.
6. Quality Certified Labels or Certificate:
 - a. Architectural Aluminum Manufacturer Association, "AAMA label" affixed to each window indicating compliance with specification.
 - b. Certificates in lieu of label with copy of recent test report (not more than four years old) from an independent testing laboratory and certificate signed by window manufacturer stating that windows provided comply with specified requirements and AAMA/WDMA/CAS 101/I.S.2 for type of window specified.

1.7 FIELD TESTING

- A. Test Method: AAMA 502.
- B. Test Specimen:
 1. Test specimen shall include the window assembly and construction. The test chamber shall be affixed to the interior side of the test specimen and the test shall be conducted using positive static air pressure (Test method A).
 2. Test specimens shall be selected by the COR after windows have been installed in accordance with the drawings and specification.
 3. Mental Health Windows: Test for 2000 ft-lb simulated human impact in accordance with AAMA 501.8-13
 - a. Test units shall be representative of windows on the project in details, frame connections, glazing, and anchorage.
 - b. Large test units shall be representative of the largest unit on the project (both width and height), or 4'-0" X 6'-0", whichever is greater.
 - c. Small test units shall be less than or equal to the minimum short dimension on the project, either width or height.
 - d. Meeting rails and mullions to be used on the project shall be incorporated in test units, and similarly tested at maximum minimum unsupported span.
 - e. Provide Impact Test Reports in accordance with AAMA 501.8-13.
 - f. Submit structural calculations prepared by a Registered Professional Engineer indicating adequacy of all materials furnished to meet the human impact, uniform and structural load requirements as specified.
- C. Requirements:
 1. Air Infiltration: Not more than 1.5 times the amount specified for the windows only.
 2. Water Infiltration: No uncontrolled water shall be present at the specified test pressure.

D. Retesting:

1. Should any of the specimens fail the field test, the specimens may be modified or repaired, and retested.
2. Should any of the specimens fail the second field test, the specimens may be additionally modified or repaired, and retested.
3. All modifications and repairs made to the specimens shall be recorded, and the same modifications and repairs made to all the windows and adjacent construction on the project.
4. Should the second test fail, the COR may require two additional windows and their adjacent construction to be tested.

G. Rejection: Failure of any of the specimens to meet the test requirements of the third test shall be cause for rejection of all windows and adjacent construction on the project.

1.8 SUMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Samples:

1. Provide two 150 mm (six-inch) length samples of Colored aluminum for each organic color proposed for use on the windows.
2. Variation of more than 50 percent of the maximum shade range approved will not be accepted in a single window or in adjacent windows and mullions on a continuous series.

C. Shop Drawings:

1. Identifying all window parts by name, kind of metal and material, and showing details of construction, installation and anchorage.
2. Details of metal trim, including anchorages.

D. Test Reports and Manufacturer's Certificates:

1. Manufacturers and Installers qualifications as specified.
2. Certified labels or certificate as specified under Performance Requirements.
3. Certification of the type and thickness of finish.

1.9 WARRANTY

Windows including thermal barrier shall be warranted against malfunctions due to defects in materials and workmanship for a period of one (1) year, in accordance with "Warranty of Construction", FAR clause 52.246-21.

1.10 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to by the basic designation only.

B. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE):

189.1-09Design of High-Performance Green Buildings

C. American Society of Testing and Materials (ASTM):

A653/A653M-11Steel Sheet, Zinc-Coated (Galvanized), Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

- D. American Society of Civil Engineers (ASCE):
 - 7-10 Minimum Design Loads for Buildings and Other Structures
- E. American Architectural Manufacturers Association/Window and Door Manufacturers Canadian Standards Association (AAMA/WDMA/CAS Association (AAMA/NWWDA):
 - 101/I.S.2/A440-11 Windows, Doors and Skylights
- F. American Architectural Manufacturers Association (AAMA):
 - TIR-A8-08..... Structural Performance of Composite Thermal Barrier Framing Systems
 - 501.8-13 Determination of Resistance to Human Impact for Window Systems Intended for use in Psychiatric Applications
 - 502-12 Field Testing of Newly Installed Fenestration Products.
 - 505-09 Dry Shrinkage and Composite Performance thermal Cycling Test Procedures
- G. National Association of Architectural Metal Manufacturers (NAAMM):
 - AMP 500 Series Metal Finishes Manual

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Extrusions: AAMA/WDMA/CAS 101-I.S.2/A440-11
- B. Sheet Steel, Galvanized: ASTM A653; G90 galvanized coating.
- C. Fastenings: Screws, bolts, nuts, rivets and other fastening devices to be non-magnetic stainless steel:
 - 1. Fasteners to be concealed when window is closed. Where wall thickness is less than 3 mm (0.125-inch) thick, provide backup plates or similar reinforcements for fasteners.
 - 2. Stainless steel self tapping screws may be used to secure venetian blind hanger clips, vent guide blocks, friction adjuster, and limit opening device.
 - 3. Attach locking and hold-open devices to windows with concealed fasteners. Provide reinforcing plates where wall thickness is less than 3 mm (0.125-inch) thick.
- D. Weather-strips: AAMA/WDMA/CAS 101-I.S.2.

2.2 VENETIAN BLINDS

- A. Slats shall be tempered aluminum with baked-on acrylic finish. For color, Slats shall be maximum one inch wide. Weave cords and tapes of polyester-dacron fiber. Mount blinds in the sash head so that they may be removed for maintenance without tools.
- B. Angle of slat tilt shall be adjustable from the room side by means of a nonremovable control knob, having cable or gear drive with slip mechanism. Control raising and lowering of blinds by cords or other arrangement, accessible only when the inner sash is opened.
- C. Special Security Requirements: For windows in Psychiatric Security Nursing Units and Security Bedrooms in all Nursing Units, provide removable tool or wand operator to tilt blinds.

2.3 GLAZING

- A. Glaze in accordance with Section 08 80 00, GLAZING.
- B. Install removable glazing beads on the venetian blind side of the sash so as to be inaccessible to patients.
- C. Glaze in accordance with window system tested per AAMA 501.8-13 for 2000lb impact in Mental Health Units .

2.4 HARDWARE

- A. Locks: Two position locking bolts or cam type tamperproof custodial locks with a single point control located not higher than 1500 mm (five feet) from floor level. Locate locking devices in the vent side rail. Fastenings for locks and keepers shall be concealed or nonremovable.
- B. Locking Device Strikes: Locate strikes in frame jamb. Strikes shall be adjustable for locking tension. Fabricate strikes from Type 304 stainless steel or white bronze.
- C. Fabricate hinges of noncorrosive metal. Hinges may be either fully concealed when window is closed or semi-concealed with exposed knuckles. All exposed knuckle hinges shall have hospital tips, at both ends. Surface mounted hinges will not be accepted.
- D. Guide Blocks: Fabricate guide blocks of injection molded nylon. Install guide block fully concealed in vent/frame sill.
- E. Hardware for Emergency Ventilation of Windows:
 - 1. Provide windows with a hold open linkage for emergency ventilation.
 - 2. Hold open hardware shall provide for maximum 150 mm (6 inch) of window opening and shall include an adjustable friction shoe to provide resistance when closing the window.
 - 3. Handles shall be removable.
- F. Hardware for Maintenance Opening of Windows: Opening beyond the 150 mm (6 inch) position shall be accomplished with a window washers key. The release device shall capture the key when window is in the open position.
- G. Provide 50 loose window handles and 50 window washers keys.
- H. Design operating device to prevent opening with standard tools, coins or bent wire devices.
- I. Hardware for Mental Health Windows
 - 1. Concealed Hinges at Sash Ventilator and Fixed Lite Access Panels:
 - a. Provide two concealed extruded aluminum "walk-around" butt hinges with stainless steel pins. Provide three hinges on in-swing casement units over 4'-0" in height.
 - 2. Locks:
 - a. Die cast or stainless steel cam locks, strikes and/or keepers for custodial or supervisory operation shall secure sash in closed position.
 - b. Provide tamper-resistant locks for ventilators at maximum 40" spacing. Keys shall not be removable in the unlocked position.
 - c. Provide a supplemental keyed lock for interior sash ventilators and access panels.
 - 3. Limited Opening Device:

- a. Provide concealed device to limit initial sash operation to 6". Operation limited past this point to be by use of a tool or removable key.
- 4. Dual or Triple Glazed Access Panel at Sash Ventilators:
 - a. Access panel to have a custodial hook latch.

2.5 FABRICATION

- A. Meet or exceed performance requirements of AAMA/WDMA/CAS 101-I.S.2 for SHW-AW40 windows, and additional requirements as specified.
- B. Sizes and Profiles: Required sizes and profile requirements are shown on the drawings.
- C. Sash of window shall be side hinged for casement operation. Sash shall be provided with access to blinds and inner surfaces of glass.
- D. Thermal-Break Construction:
 - 1. Manufacturer's Standard.
 - 2. Low conductance thermal barrier.
 - 3. Capable of structurally holding sash in position and together.
 - 4. All Thermal Break Assemblies (Pour & Debridge, Insulbar or others) shall be tested as per AAMA TIR A8 and AAMA 505 for Dry Shrinkage & Composite Performance.
 - 5. Location of thermal barrier and design of window shall be such that, in closed position, outside air shall not come in direct contact with interior frame of the window.
- E. Provide baffled weep holes and internal water passages to conduct infiltrating water to the exterior.
- F. Weather-stripping: Provide primary weather-stripping around exterior perimeter of the sash. Provide secondary weather-stripping located at the thermal barrier between the two frames to seal against the perimeter of the inner vent. Weather-stripping to be in compression when the sash is in a locked closed position.
- G. Miter all corners, internally heat weld or mechanically crimp to reinforcing bar and cement with epoxy adhesive to develop full strength of section, with airtight and watertight joints.

2.6 CLOSURES, TRIM, MULLIONS AND SUBSILLS, GENERAL

Closures, stools and trim shall be 2 mm (0.080-inch) thick zinc-coated seal.

2.7 CLOSURES

Closures shall have external corners mitered and internal corners coped, fitted with hairline, tightly closed joints. Secure closures to window frames with machine screws or expansion rivets, and to masonry with anchor bolts, power actuated drive pins, or expansion rivets.

2.8 TRIM

- A. Fit heads, jambs (including reveals of opening) and stools, with hairline mitered corners, dressed flush and smooth. Trim shall have flanges expanded or perforated for plaster keying and attachments for anchorage. Slightly round exposed edges.
- B. Secure trim to concrete or 100 percent solid masonry with expansion bolts, expansion rivets, split shank drive bolts, or power actuated drive pins; strap-anchored or toggle bolted to hollow masonry units, screwed to wood or metal. Except for strap anchors, fastenings shall occur near

the ends and corners of the trim, and at a spacing of not more than 300 mm (12 inches) in between.

2.9 MULLIONS

AAMA/WDMA/CAS 101-I.S.2

2.10 SUBSILLS

Extruded aluminum, minimum 2 mm (0.080-inch) thick.

2.11 FINISH

- A. In accordance with NAAMM AMP 500 series.
- B. Anodized Aluminum: White
 - 1. AA-C22A44 Chemically etched medium matte with electrolytically deposited metallic compound, integrally colored coating Class I Architectural, 0.7-mil thick finish. Dyes will not be accepted.
- C. Hardware: Finish hardware exposed when window is in the closed position shall match the window color.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set, windows in masonry walls during progress of the work. If windows are not delivered to job in time for installation in prepared openings, make provision for later installation. Set windows in cast-in-place concrete in prepared openings.
- B. Provide necessary anchorage when installed in prepared openings. Set windows plumb, true and in alignment. Anchor windows on four sides with anchor clips or fin trim. Make connections to allow for thermal and other movements. No load shall be allowed to bear on windows.

3.2 MATERIAL ISOLATION

- A. Isolate aluminum surfaces (including anchorages) that will come in contact with steel, steel sub-frames or concrete, by giving steel or concrete a heavy coat of alkali resisting bituminous paint.
- B. Isolate the aluminum from plaster and masonry by coating aluminum with bituminous paint.
- C. Anchorage for Mental Health Windows: Masonry anchors and connections in concrete shall be designed for failure of anchors prior to failure of concrete in spalling or splitting. In case of non-ductile failure mode use design values allowed by code.

3.3 ADJUSTING

Adjust movable sash, hardware, and equipment to operate easily and properly, and be free of defects before acceptance of the work.

3.4 PROTECTION

Except when a window is being adjusted or tested, lock all windows set in place in the closed position during the progress of the work. Protect interior and exterior faces of windows.

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