

**SECTION 08 51 13  
ALUMINUM WINDOWS**

SPEC WRITER NOTES:

1. Use this section only for NCA Projects.
2. Delete between // \_\_\_// if not applicable to project.
3. Delete other item or paragraph not applicable in section and renumber the paragraphs.
4. Use of pivoted windows is not acceptable.
5. Do not allow sub-sills or anchor clips to span thermal breaks and connect the separated components.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Aluminum windows of type and size shown, complete with hardware, related components and accessories.
- B. Types:
  1. Projected.
  2. Fixed.

**1.2 DEFINITIONS**

- A. Accessories: Mullions, staff beads, casings, closures, trim, moldings, panning systems, sub-sills, clips anchors, fasteners, weather-stripping, insect screens // mechanical operators, // and other necessary components required for fabrication and installation of 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. Steel Sub-frames: Section 05 50 00, METAL FABRICATIONS.
- B. Storefront: Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.
- C. Storm Windows: Section 08 51 69.11, ALUMINUM STORM WINDOWS.
- D. Glazing: Section 08 80 00, GLAZING.
- E. Color of finish: Section 09 06 00, SCHEDULE FOR FINISHES.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Protect windows from damage during handling and construction operations before, during and after installation.
- B. Store windows under cover, setting upright.
- C. Do not stack windows flat.

D. 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 manufacturers and installers.

B. Approval will be based on submission of certification by Contractor that:

1. Manufacturer regularly and presently manufactures the specified windows as one of its principal products.

2. Installer has technical qualifications, experience, trained personnel and facilities to install specified items.

C. Provide each type of window produced from one source of manufacture.

D. Quality Certified Labels or Certificate:

1. Architectural Aluminum Manufacturers Association, "AAMA label" affixed to each window indicating that identical windows have been tested and meet the requirements specified herein for conformance to AAMA/WDMA/CSA 101/I.S.2/A440 including test size, // and // minimum condensation resistance factor (CRF) // , and resistance to forced entry //.

2. Certificates instead of label with copy of recent test report (not more than 4 years old) from an independent testing laboratory and certificate signed by window manufacturer stating that windows provided comply with specified requirements and AAMA 101/I.S.2 for type of window specified.

#### SPEC WRITER NOTES:

1. AAMA 1503, ASTM E1423, and NFRC 100 provide test procedures for thermal transmittance. However, only NFRC ratings are recognized by DOE and the Energy Star Windows program.
2. All Energy Star qualified window products also bear a label from the National Fenestration Rating Council (NFRC).
3. A NFRC label should include values for U-Factor, Solar Heat Gain Coefficient, and Visible Light Transmittance. It should also indicate the specific product descriptions such as "Model xxx Casement, low-e, argon filled.

E. Energy Efficiency:

1. Thermal Transmittance: Provide windows and curtain walls with a U-factor maximum in accordance with NFRC 100.

2. U-Value: // \_\_\_\_\_ // Btu/sq. ft. x h x degree F (W/sq. m x K).

3. Solar Heat-Gain Coefficient: Provide windows with a whole-window SHGC maximum of // \_\_\_\_ // determined according to NFRC 200 procedures.
  4. Visible Light Transmittance: // \_\_\_\_ // percent.
  5. Exterior Reflectivity: // \_\_\_\_ // percent.
  6. Color of Tint: // \_\_\_\_ //.
- F. Energy Efficiency: Provide ENERGY STAR labeled products as appropriate to climate zone.
- G. Pre-Installation Conference: Convene a meeting on site, after submittals are received and approved but before any work, to review drawings and specifications, submittals, schedule, manufacturer instructions, site logistics and pertinent matters of coordination, temporary protection, governing regulations, tests and inspections; participants to include RE/COR and all parties whose work is effected or related to the work of this section.

#### **1.6 SUSTAINABILITY REQUIREMENTS**

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIRMENTS, for project // local/regional materials, // low-emitting materials, // recycled content, // \_\_\_\_// requirements.

#### **1.7 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
1. Provide drawings that indicate elevations of windows, full-size sections, thickness and gages of metal, fastenings, proposed method of anchoring, size and spacing of anchors, details of construction, method of glazing, details of operating hardware, // mullion details, // method and materials for weatherstripping, // method of attaching screens, // material and method of attaching sub-frames, // stools, // casings, // sills, // trim, // installation details, and other related items.
  2. Include glazing details and standards for factory glazed units.
- C. Manufacturer's Literature and Data:
1. Window.
  2. Sash locks, keepers, and key.
- D. Certificates:
1. Provide certificates as specified in paragraph QUALITY ASSURANCE.

2. Indicate manufacturers and installers qualifications.
3. Include Manufacturer's Certification that windows delivered to project are identical to windows tested.

E. Test Reports:

1. Copies of test reports as specified in paragraph QUALITY ASSURANCE.

SPEC WRITER NOTES:

1. Samples are not required for clear anodizing.

F. Samples: Provide 150 mm (six-inch) length samples showing finishes, specified.

G. Submit documentation for Energy Star qualifications for products provided under work of this Section.

### 1.8 WARRANTY

A. Warrant windows against malfunctions due to defects in thermal breaks, hardware, materials and workmanship, subject to the terms of Article "WARRANTY OF CONSTRUCTION", FAR clause 52.246-21, except provide 10 year warranty period.

### 1.9 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

C. American Architectural Manufacturers Association (AAMA):

101/I.S.2/A440-08	Windows, Doors, and Unit Skylights
505-09	Dry Shrinkage and Composite Performance Thermal Cycling Test Procedures
2605-05	Superior Performing Organic Coatings on Architectural Aluminum Extrusions and Panels

D. American Society for Testing and Materials (ASTM):

A653/A653M-11	Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-dip Process
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- E. National Association of Architectural Metal Manufacturers (NAAMM):  
AMP 500 Series                      Metal Finishes Manual
- F. National Fenestration Rating Council (NFRC):  
NFRC 100-10                      Determining Fenestration Product U-Factors  
NFRC 200-10                      Determining Fenestration Product Solar Heat  
Gain Coefficient and Visible Transmittance at  
Normal Incidence
- G. U.S. Department of Energy (DoE): [www.energystar.gov](http://www.energystar.gov)

## **PART 2- PRODUCTS**

### **SPEC WRITER NOTES:**

1. Make material requirements agree with applicable requirements specified in the referenced Applicable Publications.
2. Update and specify only that which applied to the project.

## **2.1 MATERIALS**

- A. Aluminum Extrusions; Sheet and Plate: AAMA 101/I.S.2.
- B. Sheet Steel, Galvanized: ASTM A653; G90 galvanized coating.
- C. Weather-strips: AAMA 101/I.S.2; except leaf type weather-stripping is not permitted.
- D. Fasteners: AAMA 101/I.S.2.; provide non-magnetic stainless steel screws, bolts, nuts, rivets and other fastening devices.
- E. Weatherstrips: AAMA 101/I.S.2.
- F. Hardware:
  1. Locks: Two position locking bolts or cam type tamperproof custodial locks with a single point control located not higher than five feet from floor level. Locate locking devices in the vent side rail. Fastenings for locks and keepers must be concealed or non-removable.
  2. Locking Device Strikes: Locate strikes in frame jamb. Strikes must be adjustable for locking tension. Fabricate strikes from Type 304 stainless steel or white bronze.
  3. Fabricate hinges of noncorrosive metal. Hinges may be fully concealed when window is closed or semi-concealed with exposed knuckles. Surface mounted hinges will not be accepted.
  4. Guide Blocks: Fabricate guide blocks of injection molded nylon. Install guide block fully concealed in vent/frame sill.

## **2.2 FABRICATION**

- A. Fabrication to exceed or meet requirements of Physical Load Tests, Air Infiltration Test, and Water Resistance Test of AAMA 101/I.S.2.

## B. Thermal-Break Construction:

1. Manufacturer's Standard.

## C. Mullions: AAMA 101.

## D. Sub-sills and Stools:

1. Fabricate to shapes shown of not less than 2 mm (0.080 inch) thick extruded aluminum.
2. One piece full length of opening with concealed anchors.
3. Sills turned up back edge not less than 6 mm (1/4 inch). Front edge provide with drip.
4. Sill back edge behind face of window frame. Do not extend to interior surface or bridge thermal breaks.
5. Do not perforate for anchorage, clip screws, or other requirements.

**2.3 PROJECTED WINDOWS**

## A. AAMA 101/I.S.2; Type // AP-CW65 // AP-AW65//.

## B. AAMA certified product to the AAMA 101/I.S.2. standard.

## C. Operation:

1. Upper Ventilators: Project-out and slide down from top.
2. Hopper Vents: Project-in from top and slide up from bottom.

## SPEC WRITER NOTES:

1. Use at ground level only where accessible, for spandrel glass, or on interior.
2. Coordinate with Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS to clearly identify windows applicable to each section.
3. Do not use for fixed sash with other type of windows when a uniform matching appearance is desired.

**2.4 FIXED WINDOWS**

## A. AMMA 101/I.S.2; Type // F-AW65//.

## B. AAMA certified product to the AAMA 101/I.S.2. standard.

## SPEC WRITER NOTES:

1. Coordinate with Section 09 06 00, SCHEDULE FOR FINISHES.
2. Clearly designate which windows receive different finishes and colors when more than one occur.

**2.5 FORCED ENTRY RESISTANCE WINDOWS**

- A. In addition to meeting the requirements of AAMA/WDMA/CSA 101/I.S.2/A440, windows designated for resistance to forced entry must conform to the requirements of AAMA 1302.5.

**2.6 FINISH**

- A. In accordance with NAAMM AMP 500 series.
- B. Finish exposed aluminum surfaces as follows:
  - 1. Anodized Aluminum:
    - a. Finish in accordance with AMP 501 letters and numbers.
    - b. Clear anodized Finish: AA-C22A41 Medium matte, clear anodic coating, Class 1 Architectural, 0.7 mils thick.
    - c. Colored anodized Finish: AA-C22A42 (anodized) or AA-C22A44 (electrolytically deposited metallic compound) medium matte, integrally colored coating, Class 1 Architectural, 0.7 mils thick.
      - 1) Dyes not accepted.
  - 2. Coated Aluminum:
    - a. Variation of more than 50 percent of maximum shade range approved will not be accepted in a single window or in adjacent windows and mullions on a continuous series.
    - b. AMP 501 and 505.
    - c. Fluorocarbon Finish: AAMA 2605, superior performing organic coating.
  - 3. Steel: AMP 504.
  - 4. Stainless steel: AMP 503.
    - a. Concealed: 2B or 2D.
    - b. Exposed: No. 4 unless specified otherwise.
- C. Hardware: Finish hardware exposed when window is in the closed position; match window color.

**PART 3 - EXECUTION****3.1 PROTECTION (DISSIMILAR MATERIALS)**

- A. AAMA 101/I.S.2.

**3.2 INSTALLATION, GENERAL**

- A. Install window units in accordance with manufacturer's specifications and recommendations for installation of window units, hardware, operators and other components of work.
- B. Set windows plumb, level, true, and in alignment; without warp or rack of frames or sash.
- C. Anchor windows on four sides with anchor clips or fin trim.
  - 1. Do not allow anchor clips to bridge thermal breaks.
  - 2. Use separate clips for each side of thermal breaks.
  - 3. Make connections to allow for thermal and other movements.

4. Do not allow building load to bear on windows.
5. Use manufacturer's standard clips at corners and not over 600 mm (24 inches) on center.
6. Where fin trim anchorage is shown build into adjacent construction, anchoring at corners and not over 600 mm (24 inches) on center.

//D. Sills and Stools:

1. Set in bed of mortar or other compound to fully support, true to line shown.
2. Do not extend sill to inside window surface or past thermal break.
3. Leave space for sealants at ends and to window frame unless shown otherwise. //

SPEC WRITER NOTES:

1. Coordinate with demolition for replacement window projects for removal.

//E. Replacement Windows:

1. Do not remove existing windows until new replacement is available, ready for immediate installation.
2. Remove existing work carefully; avoid damage to existing work to remain.
3. Perform all other operations as necessary to prepare openings for proper installation and operation of new units.
4. Do not leave openings uncovered at end of working day, during precipitation or temperatures below 16 degrees C (60 degrees F.). //

### **3.3 MULLIONS CLOSURES, TRIM, AND PANNING**

- A. Cut mullion full height of opening and anchor directly to window frame on each side.
- B. Closures, Trim, and Panning: Provide external corners mitered and internal corners coped, fitted with hairline, tightly-closed joints.
- C. Secure to concrete or solid masonry with expansion bolts, expansion rivets, split shank drive bolts, or powder actuated drive pins.
- D. Toggle bolt to hollow masonry units; screw to wood or metal.
- E. Fasten except for strap anchors, near ends and corners and at intervals not more than 300 mm (12 inches) between.
- F. Seal units following installation to provide weathertight system.

### **3.4 ADJUST AND CLEAN**

- A. Clean aluminum surfaces promptly after installation of windows, exercising care to avoid damage to protective coatings and finishes.



- B. Remove excess glazing and sealant compounds, dirt, and other substances.
- C. Lubricate hardware and moving parts.
- D. Clean glass promptly after installation of windows. Remove glazing and sealant compound, dirt and other substances.
- E. Except when a window is being adjusted or tested, keep locked in the closed position during the progress of work on the project.

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