

**SECTION 085113
ALUMINUM WINDOWS**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Material: aluminum windows as on the drawings and specified in this section.
- B. Installation: labor, tools, and material needed to install aluminum windows.
- C. Glass and glazing.

1.02 RELATED SECTIONS

- A. Section 079200 – Joint Sealants

1.03 REFERENCES

- A. AAMA - American Architectural Manufacturers Association – *www.aamanet.org*
 - 1. AAMA/WDMA/CSA 101/I.S.2/A440-05 "Standard/Specification for Windows, Doors, and Unit Skylights"
 - 2. AAMA 502-08 "Voluntary Specification for Field Testing of Newly Installed Fenestration Products"
 - 3. AAMA 611-98 "Voluntary Specification for Anodized Architectural Aluminum"
 - 4. AAMA 800-07 "Voluntary Specifications and Test Methods for Sealants"
 - 5. AAMA 1503-98 "Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections"
 - 6. AAMA 2603-02 "Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels"
 - 7. AAMA 2604-05 "Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels"
 - 8. AAMA 2605-05 "Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels"
 - 9. AAMA CW-10-04 "Care and Handling of Architectural Aluminum from Shop to Site"
- B. ASTM - American Society for Testing and Materials – *www.astm.org*
 - 1. ASTM E 90-04 "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements"

2. ASTM E 283-04 "Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen"
 3. ASTM E 330-02 "Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference"
 4. ASTM E 331-00 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference"
 5. ASTM E 547-00 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference"
 6. ASTM E 2190-02 "Standard Specification for Insulating Glass Unit Performance and Evaluation"
- C. NFRC – National Fenestration Rating Council – www.nfrc.org: NFRC 100-04 "Procedure for Determining Fenestration Product U Factors"
- D. IGCC – Insulating Glass Certification Council – www.igcc.org
- E. SGCC – Safety Glazing Certification Council – www.sgcc.org
1. ANSI Z97.1-04 "American National Standard for Safety Glazing Materials used in Buildings – Safety Performance Specifications and Methods of Test"
 2. 16 CFR 1201 "Consumer Product Safety Commission Safety Standard for Architectural Glazing Materials – codified at Title 16, Part 1201 of the Code of Federal Regulations"

1.04 SYSTEM DESCRIPTION

- A. AAMA Designation: FW-AW80.
- B. Windows: 3-1/4" frame depth; extruded aluminum with integral structural polyurethane thermal break installed by the window manufacturer in the frame members; flange frame; finish applied by the window manufacturer; frames assembled by the window manufacturer.
- C. Configuration: fixed; glazing beads on interior; all glass in the same exterior plane.
- D. Glazing: exterior EPDM gasket; 1" insulating glass; silicone heel bead; interior wedge EPDM gasket; aluminum glazing bead; glass description in paragraph 2.04; glazed by the window manufacturer.

1.05 PERFORMANCE REQUIREMENTS

- A. Conformance to FW-AW80 specifications in AAMA/WDMA/CSA 101/I.S.2/A440-05 when tests are performed on the prescribed 60" x 99" minimum test size with the following test results:
 - 1. Air Infiltration: meet AAMA 101 standard of maximum .1 cfm/square foot when tested per ASTM E 283-04 at a static air pressure difference of 6.24 psf.
 - 2. Water Penetration: no uncontrolled water leakage when tested per ASTM E 331-00 and ASTM E 547-00 at a static air pressure difference of 15 psf.
 - 3. Uniform Deflection: no more than L/175 when tested per ASTM E 330-02 at a static air pressure difference of 80 psf.
 - 4. Uniform Structural Load: no glass breakage or permanent damage to fasteners, and maximum .2% permanent deformation of the span of any frame member when tested per ASTM E 330-02 at a static air pressure difference of 120 psf.
- B. Thermal test: per AAMA 1503-98, at the prescribed 48" x 72" test size glazed with 1" insulating glass made with 1/8" clear glass, argon gas, and 1/8" hard coat low E glass, with the following test results:
 - 1. Condensation Resistance Factor: minimum 60 frame and 69 glass CRF.
 - 2. Thermal Transmittance: maximum .42 BTU/HR/SQ.FT/°F U value.
- C. U value test: per NFRC 100-04 at the prescribed 48" x 72" test size glazed with 1" insulating glass made with 1/8" clear glass, argon gas, and 1/8" hard coat low E glass: Standardized Thermal Transmittance to be maximum .42 BTU/HR/SQ.FT/°F U value.
- D. U value simulation: per NFRC 100-04, at the prescribed 48" x 72" Non-Residential Size, glazed with 1" insulating glass made with 1/8" clear glass, argon gas, and 1/8" soft coat low E glass: Thermal Transmittance to be maximum .38 BTU/HR/SQ.FT/°F U value.

1.06 SUBMITTALS

- A. Shop drawings: window location chart; typical window elevations; details of assemblies and glazing details for factory-glazed units.
- B. Product data: manufacturer's specifications and test reports from an AAMA-accredited laboratory.
- C. Samples: each specified finish for aluminum; other samples as requested.

1.07 QUALITY ASSURANCE

- A. Submit for prebid approval ten days prior to bid opening a sample window representing the bid window except for color and valid test reports from an AAMA-accredited laboratory conforming to test results in Paragraph 1.07.

- B. Acceptance will be by addendum only as no verbal approvals will be allowed.
- C. Submit bid on prequalified products in prebid written addendum. Bidder must identify manufacturer and model of product on which the bid is based.
- D. Furnish a valid AAMA "Authorization for Product Certification" indicating that the windows for the project conform to AAMA/WDMA/CSA 101/I.S.2/A440-05.
- E. Furnish visible, permanent IGCC certification labels indicating conformance to ASTM E 2190-02 on insulating glass units.
- F. Furnish visible, permanent SGCC certification labels indicating conformance to ANSI Z97.1-04 and/or 16 CFR 1201 on tempered glass lites, if included on the project, and laminated glass lites, if included on the project.
- G. Manufacturer's warranties:
 - 1. Windows: warrant for ten year against defects in material or workmanship under normal use.
 - 2. Insulating glass units: warrant seal for 10 years against visual obstruction from film formation or moisture collection between internal glass surfaces, excluding that caused by glass breakage or abuse.
 - 3. Paint finish: PPG Duranar™ organic finish conforming to AAMA 2605-05: warrant for fifteen years against chipping, peeling, cracking, chalking, or fading.

1.08 DELIVERY, STORAGE, AND HANDLING

A- Handle and protect windows and accessories in accordance with AAMA CW-10-04 until project completion.

PART 2 - PRODUCTS

2.01 MATERIALS - Aluminum extrusions: extruded by the window manufacturer from commercial quality 6063-T5 alloy; free from defects impairing strength and durability.

2.02 FABRICATION

- A. Frame: head and sill coped and fastened to jambs with three stainless steel screws per frame corner; corners sealed by window manufacturer with sealant conforming to AAMA 800-07.
- B. Water control: frame sill with two weep slots per frame; exterior weep covers with flaps to allow water to drain by gravity and resist wind-driven water.

- C. Glass support: glass dead load supported on frame interior to prevent stress on sill structural thermal break.

2.03 INSULATING GLASS UNITS

A. Materials

1. Spacer: extruded thermoplastic butyl with integrated desiccant.
2. Spacer color: black.
3. Secondary seal: silicone.
4. Airspace fill: plain air

B. Performance

1. Seal durability: conformance to ASTM E 2190-02; visible, permanent IGCC certification label.
2. U-value: .60
3. SHGC: .25

C. Exterior glass lite

1. Thickness: 3/16"
2. Tint: clear
3. Type: tempered

D. Interior glass lite

1. Thickness: 3/16"
2. Tint: clear
3. Type: tempered
4. Coating: Low E on #3 surface to meet performance requirements above

2.04 FINISH ON ALUMINUM EXTRUSIONS

- A. Application: on clean extrusions free from serious surface blemishes; on exposed surfaces visible after product is installed.
- B. Coating: PPG Duranar™ with resin containing 70% fluoropolymer; thermosetting; alternative finishes will not be acceptable.

- C. Quality standard: conforming to AAMA 2605-05, including 10 years Florida exposure and 4000 hours humidity tests.
- D. Pretreatment: five-stage; zinc chromate conversion coating.
- E. Application: electrostatic spray and oven bake by approved applicator.
- F. Coating quantity: minimum one primer coat and one color coat.
- G. Dry film thickness: minimum 1.2 mils on exposed surfaces, except inside corners and channels.
- H. Color: chosen from manufacturer's standards.

2.05 MUNTINS

- A. Material: extruded aluminum or roll-formed aluminum; with exposed surfaces finished to match window color; concealed fasteners; designed for unrestricted expansion and contraction.
- B. Design: muntin bar cross-section profile and material chosen from manufacturer's standards.
- C. Patterns: grid patterns to be designated by architect.
- D. Location: internal: encapsulated between the two glass lites in the insulating glass unit to protect them from damage and dirt buildup

2.06 INSTALLATION ACCESSORIES

- A. Material: extruded aluminum; nominal .062" wall; with exposed surfaces finished to match window color and finish performance; concealed fasteners; required weatherseals; designed for unrestricted expansion and contraction.
- B. Exterior: wrap around panning, two-piece mullion cover, slip-on expanders.
- C. Interior: two-piece snap trim
- D. Mullions: with thermal break; stack, offset stack, three-piece

PART 3 – EXECUTION

3.01 PREPARATION - Prepare openings to be in tolerance, plumb, level, provide for secure anchoring, and in accordance with approved shop drawings.

3.02 INSTALLATION

- A. Install windows in accordance with manufacturer's recommendations and approved shop drawings with skilled craftspeople who have demonstrated a successful history of installing windows for 10 years.

- B. Provide required support and securely fasten and set windows plumb, square, and level without twist or bow.
- C. Apply sealant per sealant manufacturer's recommendations at joints, wipe off excess, and leave exposed sealant surfaces clean and smooth.

3.03 ADJUSTING AND CLEANING - Adjust windows as necessary for weathertightness, and leave windows clean and free of construction debris.

END OF SECTION