

**GUIDE SPECIFICATIONS - SECTION 08520**  
**ALUMINUM WINDOWS**  
**Manko Window Systems Inc. 3100i Series "Steel Sash" Replicate**  
**(Fixed, Projected and Casement)**

**SECTION 08520 ALUMINUM WINDOWS (Fixed, Projected and Casement)**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
1. All exterior windows furnished and installed as shown on drawings, specified in this section and designated in AAMA 101/I.S.2.
  2. All labor, materials, tools, equipment and services needed to furnish and install Architectural Performance Class windows.
  3. Components furnished with installed windows.
  4. Installation accessories furnished and installed.

**1.02 SYSTEM PERFORMANCE REQUIREMENTS**

- A. Design Wind Loads
1. The design wind pressure for the project will be: *(Specify)*
    - a. \_\_\_ psf positive and negative; \_\_\_ psf negative at corner zones
    - b. Per wind pressure diagram
    - c. Per local building codes
  2. All structural components, including meeting rails, mullions and anchors shall be designed accordingly, complying with deflection and stress requirements of Paragraph 1.02 B.  
*[Determination of design load(s) is the sole responsibility of the building's Engineer of Record, considering code interpretation issues and/or prescriptive requirements not included in contract documents. Manko Window Systems, Inc. strongly recommends that design loads (in psf or Pa) specific to all relevant areas of the building be provided by the specifier.]*

- B. Air, Water and Structural Performance Requirements
1. When tested in accordance with cited test procedures, windows shall meet or exceed the following performance criteria, as well as those indicated in AAMA 101/I.S.2 for Architectural (AW) Performance Class windows, Performance Grade 80 (AW80) unless otherwise noted herein.
  2. Air Test Performance Requirements
    - a. Air infiltration maximum 0.1 cfm per square foot at 6.24 psf pressure differential when tested in accordance with ASTM E283.
  3. Water Test Performance Requirements
    - a. No uncontrolled water leakage at 12.00 psf static pressure differential, with water application rate of 5 gallons/hr/sq ft when tested in accordance with ASTM E331.
  4. Structural Test Performance Requirements
    - a. Uniform Load Deflection Test
      - i. No deflection of any unsupported span L of test unit (framing rails, muntins, mullions, etc.) in excess of L/175 at both a positive and negative load of 80 psf (design test pressure) when tested in accordance with ASTM E330.
      - ii. Structural reinforcing that is not standard on units being furnished is not allowed.
    - b. Uniform Load Structural Test
      - i. Unit to be tested at 1.5 x design test pressure (120 psf), both positive and negative, acting normal to plane of wall in accordance with ASTM E330.
      - ii. No glass breakage; permanent damage to fasteners, hardware parts, or anchors; damage to make windows inoperable; or permanent deformation of any main frame or ventilator member in excess of 0.2% of its clear span.

- C. Life Cycle Testing:
1. When tested in accordance with AAMA 910-93, there is to be no damage to fasteners, hardware parts, support arms, activating mechanisms or any other damage that would cause the window to be inoperable at the conclusion of testing. Air infiltration and water resistance tests shall meet the primary performance requirements specified.

- D. Thermal Transmittance (U-Value):
1. Whole window U-Value based on NFRC 100 test sizes and calculated by using NFRC approved versions of Windows and Therm software. Thermal transmittance (U-Value) shall not exceed 0.41 BTU/hr/sf/degF for projected vents and casements, or 0.29 BTU/hr/sf/degF for fixed windows when calculated using a COG glass U-value of .24 BTU/hr/sf/degF. Glazing must be supported by Manko Window Systems, Inc. using EdgeTech "TriSeal

Windows and Therm software. Thermal transmittance (U-Value) shall not exceed 0.41 BTU/hr/sf/degF for projected vents and casements, or 0.29 BTU/hr/sf/degF for fixed windows when calculated using a COG glass U-value of .24 BTU/hr/sf/degF. Glazing must be supported by Manko Window Systems, Inc. using EdgeTech "TriSeal Superspacer" to meet these requirements.

E. Solar Heat Gain (SHGC):

1. Whole window SHGC Value based on NFRC 200 test sizes and calculated by using NFRC approved versions of Windows and Therm software. SHGC shall not exceed 0.24 for projected vents and casements, or 0.20 for fixed windows when calculated using a Center of Glass (COG) SHGC of .26.

F. Condensation Resistance (CR)

1. Condensation resistance (CR) based on NFRC 500 test sizes and calculated by using NFRC approved Windows and Therm software, shall not be less than 43 for project out vents and casements, or 57 for fixed windows when calculated using a COG glass U-value of .24 BTU/hr/sf/degF.  
*[DISCLAIMER: Condensation on interior surfaces of installed windows is affected by many variables, including component thermal performance, thermal mass of surrounding materials, interior trim coverage and air flow conditions, weather, and mechanical system design. Since many of these variables are outside of Manko Window Systems, Inc., we can make no representations or warranties against the formation of condensation, except on pre-defined configurations under controlled and steady-state laboratory conditions, as specified above.]*

### 1.03 SUBMITTALS

A. General Requirements

1. Provide all submittals in a timely manner to meet the required construction completion schedule.

B. Shop Drawings

1. Shop drawings must be prepared wholly by the window manufacturer, or a qualified engineering services firm under the direction of the manufacturer. Shop drawings for pre-engineered configurations may be prepared by installers authorized per 1.04 QUALITY ASSURANCE.
2. Provide design details along with bid proposals to define system aesthetic and functional characteristics.
3. Provide three photocopied sets of shop drawings, including half size details of all necessary conditions.

C. Samples

1. Components: Submit samples of anchors, fasteners, hardware, assembled corner sections and other materials and components as requested by Architect.
2. Finish: Submit color samples for Architect's approval as requested.

D. Test Reports and Calculations

1. Submit certified independent laboratory test reports verifying compliance with all test requirements of 1.02 SYSTEM PERFORMANCE REQUIREMENTS as requested by Architect.

### 1.04 QUALITY ASSURANCE

A. Qualifications

1. Upon request, the window manufacturer will provide written confirmation that the installer is authorized to install window products to be used on this project.

### 1.05 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading

1. Materials will be packed, loaded, shipped, unloaded, stored and protected in accordance with AAMA CW-10.

### 1.06 WARRANTY

A. Aluminum Window Warranty

1. Products: Submit a written warranty, executed by the window manufacturer, for a period of 2 years (10 years for insulated glass seal failure) from the date of manufacture, against defective materials or workmanship, including substantial non-compliance with applicable specification requirements and industry standards, which results in premature failure of the windows, finish, factory-glazed glass, or parts, outside of normal wear.
  - a. In the event that windows or components are found defective, manufacturer will repair or provide replacements without charge at manufacturer's option.
  - b. Warranty for all components must be direct from the manufacturer (non-pass through) and non-prorated for the entire term. Warranty must be assignable to the non-residential owner, and transferable to subsequent owners through its length.
2. Installation: Submit a written warranty, executed by the window installer, for a period of 2 years from the date of substantial completion, against defective materials or workmanship, including substantial non-compliance with applicable specification requirements, which result in premature failure.
  - a. In the event that installation of windows or components is found to be defective, installer will repair or provide replacements without charge at the installer's option.

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## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Acceptable Manufacturer
  - 1. Drawings and specifications are based on:
    - a. Manko Window Systems, Inc. 3100i Series Historical Replication Fixed, Project-Out Vent and/or Out-Swing Casement Windows.
    - i. Base bid will be Manko Window Systems, Inc.
- B. Substitutions
  - 1. Other manufacturers' products that meet or exceed specified design requirements may be considered. Submit the following information with request for substitutions at least ten (10) working days prior to bid date.
    - a. Test reports specified in 1.02 SYSTEM PERFORMANCE REQUIREMENTS
    - b. Full proposal details and samples specified in 1.03 SUBMITTALS
    - c. Copy of manufacturer's warranty specified in 1.06 WARRANTY
    - d. Other information as requested for evaluation
  - 2. Substitute products not pre-approved by the Architect via addenda will not be considered.

### 2.02 MATERIALS

- A. Aluminum Members
  - 1. Extruded aluminum prime billet 6063-T5 or 6063-T6 alloy for primary components; 6063-T5, 6063-T6, or 6061-T6 for structural components; all meeting the requirements of ASTM B221.
  - 2. Aluminum sheet alloy 5005 H 32 (for anodic finish), meeting the requirements of ASTM B209 or alloy 3003 H 14 (for painted or unfinished sheet).

### 2.03 MANUFACTURED UNITS

- A. Materials
  - 1. Principal window frame members will be a minimum 0.094" in thickness at all structural areas, hardware mounting webs, and section flanges.
  - 2. Extruded or formed trim components will be a minimum 0.062" in thickness.
- B. Fabrication
  - 1. Frame and operable sash depth shall be 3 1/4" minimum.
  - 2. Sash ventilator sections must be tubular.

### 2.04 COMPONENTS

- A. All steel components including attachment fasteners to be 300 series stainless steel except as noted.
- B. Extruded aluminum components 6063-T5 or 6063-T6.
- C. Locking handles, cases and strikes to be die cast or stainless steel.
- D. Thermoplastic or thermo-set plastic caps, housings and other components to be injection-molded nylon, extruded PVC, or other suitable compound.
- E. Hardware: (select from options 1, 2, 3, or 4 per operational requirements)
  - 1. Project-Out Vent
    - a. Hinges are to be two stainless steel concealed four-bar adjustable friction hinges per vent meeting AAMA 904.1.
    - b. Locks are to be standard die cast white bronze cam locks and strikes. Provide two locks for ventilators over 40". (Specify one of the following for cam locks)
      - i. Standard project-out cam handle lock
      - ii. Removable project-out cam handle lock
      - iii. Pole operated project-out cam lock
    - c. Optional -- Limited opening device/friction adjuster to limit initial sash operation to 6". Operation past this point to be by use of a tool or removable key.
  - 2. Out-Swing Casement Vent with Butt Hinges
    - a. Hinges are to be two five-knuckle aluminum nylon-bushed hinges with coated stainless steel pins. Provide three hinges on units over 4" high. Finish of aluminum housing shall match window finish.
    - b. Locks are to be a single arm roto operator with lift lock OR standard die cast white bronze cam locks and strikes. Provide two-point locking for ventilators over 40". (Specify one of the following cam locks)

- Provide three hinges on units over 4" high. Finish of aluminum housing shall match window finish.
- b. Locks are to be a single arm roto operator with lift lock **OR** standard die cast white bronze cam locks and strikes. Provide two-point locking for ventilators over 40". (Specify one of the following cam locks)
    - i. Standard project-out cam handle lock
    - ii. Removable project-out cam handle lock
  - c. **Optional -- Limited opening device/friction adjuster to limit initial sash operation to 6". Operation past this point to be by use of a tool or removable key.**
3. Out-Swing Casement Vent with Four-Bar Hinges
- a. Hinges are to be two stainless steel concealed four-bar adjustable friction hinges per vent meeting AAMA 904.1.
  - b. Locks are to be standard die cast white bronze cam locks and strikes. Provide two-point locking for ventilators over 40". (Specify one of the following for cam locks)
    - i. Standard project-out cam handle lock
    - ii. Removable project-out cam handle lock
  - c. **Optional -- Limited opening device/friction adjuster to limit initial sash operation to 6". Operation past this point to be by use of a tool or removable key.**
4. Fixed -- No Hardware Required
- F. Sealants
1. All sealants shall comply with applicable provisions of AAMA 800 and/or Federal Specifications FS-TT-001 and 002 Series.
  2. Frame joinery sealants shall be suitable for application specified and as tested and approved by window manufacturer.
- G. Glass
1. Provide in accordance with Section 08800.
  2. Sealed insulated glass shall meet ASTM E774 Class A.
- H. Glazing
1. Provide in general accordance with Section 08800.
  2. Glazing method shall be in general accordance with the FGMA Glazing Manual for specified glass type, or as approved by the glass fabricator.
- I. Glazing Materials
1. Setting Blocks/Edge Blocking: Provide in sizes and locations recommended by FGMA Glazing Manual.
  2. Back-bedding tapes, expanded cellular glazing tapes, toe beads, heel beads and cap beads shall meet the requirements of applicable specifications cited in AAMA 800.
  3. Glazing gaskets shall be non-shrinking, weather-resistant, and compatible with all materials in contact.
  4. Structural silicone sealant where used shall meet the requirements of ASTM C 1184.
  5. Spacer tape in continuous contact with structural silicone shall be tested for compatibility and approved by the sealant manufacturer for the intended application. Gaskets in continuous contact with structural silicone shall be extruded silicone or compatible material.
- J. Steel Components
1. Provide steel reinforcements as necessary to meet the system performance requirements of 1.02.
  2. Concealed steel anchors and reinforcing shall be factory painted after fabrication with rust-inhibitive primer complying with Federal Specification TT-P-645.
- K. Thermal Break Construction:
1. Structural Thermal Barrier
    - a. Structural thermal barriers shall consist of polyamide (nylon 6.6) struts reinforced with glass fibers oriented in all three (3) axis.
      - i. Frame and sash members must include a thermal break applied in the manufacturer's facility, using a low conductance material consisting of twin polyamide struts not less than 24mm in length.
- L. Weather Stripping:
1. Dual durometer PVC, neoprene, EPDM or other suitable material as tested and approved by the window manufacturer.
  2. Bulb type at exterior vent members.
  3. Securely stake and join at corners. Provide drainage to exterior as necessary.
  4. Weather-stripping shall provide an effective pressure-equalization seal at the interior face of the sash ventilator.
- M. Muntins: (Optional)
1. Provide muntin grids in configurations as shown on architectural drawings.
  2. Exterior muntin grids shall be applied to main frame in a manner that allows for thermal expansion without compromising grid appearance or glass replacement.
  3. Exterior Muntin grids that are adhered to glass surface are not acceptable.
  4. Interior applied flat bar muntin grids that are adhere to glass surface are acceptable.

- 3. Exterior Muntin grids that are adhered to glass surface are not acceptable.
- 4. Interior applied flat bar muntin grids that are adhere to glass surface are acceptable.
- 5. Muntin grid finish to match window frames.

N. Panning: (Optional)

- 1. Provide extruded aluminum panning to receive replacement windows as shown on architectural drawings.
- 2. Finish to match window frames.

O. Receptors/Sill Starter: (Optional)

- 1. Provide extruded aluminum receptors to receive windows, as shown on architectural drawings.
- 2. Finish to match window frames.

P. Insect Screens: (Optional)

- 1. Tubular extruded aluminum frames shall meet the requirements of ANSI/SMA 1004. Finish to match window frames.
- 2. Aluminum cloth shall comply with GSA-FS-RR-W-365 and USDC-CS-138 with 18 X 16 mesh. Cloth color shall be (Select one) charcoal grey or brite aluminum.

**2.05 FABRICATION**

A. General:

- 1. Finish, fabricate and shop assemble frame and sash members into complete windows under the responsibility of one manufacturer.
- 2. No bolts, screws or fastenings to bridge thermal barrier or impair independent frame movement.
- 3. Fabricate to allow for thermal movement of materials when subjected to a temperature differential from -30 degrees F to +180 degrees F.

B. Frames:

- 1. Cope and mechanically fasten each corner, or miter all corners and mechanically stake over a solid extruded aluminum corner key leaving only hairline joinery, then seal weather tight.

C. Main Sash Ventilator

- 1. Miter all corners and mechanically stake over a solid extruded aluminum corner key, leaving only hairline joinery, then seal weather tight.

D. Glass Drainage: (field glazed units only)

- 1. Provision shall be made to insure that water will not accumulate and remain in contact with the perimeter area of sealed insulated glass.

**2.06 FINISHES**

A. Finish of Aluminum Components

- 1. Finish of all exposed areas of aluminum windows and components shall be done in accordance with the appropriate AAMA Voluntary Guide Specification shown (select from below).

Designation	Description	Standard	Color
AAM12C21A31	Clear - Class II	AAMA 611	Clear
AAM12C21A41	Clear - Class I	AAMA 611	Clear
AAM12C21A44	Electrolytically Deposited – Class I	AAMA 611	Champagne, Light Bronze, Medium Bronze, Dark Bronze, Black
	Organic Paint	AAMA 2603	As selected by Architect from manufacturer's standard colors - Suitable for INTERIOR Finishes

Organic Paint

AAMA 2605

As selected by Architect from  
manufacturer's standard colors -  
suitable for INTERIOR or  
EXTERIOR finishes

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

A. Site Verification of Conditions

1. Verify that building substrates permit installation of windows according to the manufacturer's instructions, approved shop drawings, calculations and contract documents.
2. Do not install windows until unsatisfactory conditions are corrected.

#### **3.02 INSTALLATION**

A. Erection of Aluminum Windows

1. Install windows with skilled tradesman in exact accordance with approved shop drawings, installation instructions, specifications, and AAMA 101/I.S.2.
2. Windows must be installed **plumb, square and level** for proper weathering and operation. Jambs must not be "sprung", bowed or warped during installation.
3. Aluminum that is not organically coated shall be insulated from direct contact with steel, masonry, concrete or other dissimilar metals by bituminous paint, zinc chromate primer, nonconductive shims or other suitable insulating material.

*[DISCLAIMER: Manko Window Systems, Inc. takes no responsibility for product selection or application, including, but not limited to, compliance with building codes, safety codes, laws, merchantability or fitness for a particular purpose, and further disclaims all liability for the use, in whole or in part, of these guide specifications in preparation of project specifications and/or other documents. Guide specifications are subject to change at any time, without notice, and at Manko Window Systems, Inc. sole discretion.]*