



## 2727i Series 2 3/4" Architectural Fixed, Projected & Casement Window

### GUIDE SPECIFICATIONS - SECTION 08520 ALUMINUM WINDOWS Manko Window Systems Inc. 2727i Series (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.
  5. Single Source Requirement
    - a. All products listed in Section 08400; 08500; 08800; and 08900 shall be by the same manufacturer.

##### 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 0.2 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 NFRC Certified U-Value Rating based on NFRC 100, and calculated by using NFRC approved versions of Windows and Therm software. Thermal transmittance (U-Value) shall not exceed \_\_\_\_\_ specify BTU/hr/sf/degF for projected vents and casements, or \_\_\_\_\_ specify BTU/hr/sf/degF for fixed windows when using the glazing configuration specified for this project.
- E. Solar Heat Gain (SHGC):
1. Whole Window NFRC Certified SHGC Rating based on NFRC 200, and calculated by using NFRC approved versions of Windows and Therm software. SHGC shall not exceed \_\_\_\_\_ specify for projected vents and casements, or \_\_\_\_\_ specify for fixed windows when using the glazing configuration specified for this project.
- F. Condensation Resistance (CR)
1. Whole Window Condensation Resistance (CR) Rating based on NFRC 500, and calculated by using NFRC approved Windows and Therm software, shall not be less than \_\_\_\_\_ specify for project in/out vents and casements, or \_\_\_\_\_ specify for fixed windows when using the glazing configuration specified for this project.

*[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 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) (5) (10) specify 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. In non-residential occupancies, this Warranty may be extended directly to the owner in its entirety and passed on to the first subsequent owner(s) only through its length. In residential occupancies, this Warranty applies only to the original purchaser, and is not assignable or transferable.
  2. Installation: Submit a written warranty, executed by the window installer, for a period of \_\_\_\_\_ specify 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.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Acceptable Manufacturer
  - 1. Drawings and specifications are based on:
    - a. Manko Window Systems, Inc. 2727I Series Fixed, Projected Vent and/or Casement Windows.
- 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 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 depth 2 3/4" minimum.
  - 2. Sash depth 2 3/4" minimum.
  - 3. Sash ventilator sections must be tubular.

### 2.04 COMPONENTS

- A. All steel components including attachment fasteners to be 300 series stainless steel (or other corrosion resistant material compatible with aluminum) 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, 4, 5, 6, or 7 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 OR a dual arm roto operator with lift lock. Provide two locks for operable sash 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 4". Operation past this point to be by use of a tool or removable key.
  - 2. Project-In 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 stainless steel keepers. Provide two locks for operable sash over 40". (Specify one of the following)
      - i. Standard project-in cam handle lock
      - ii. Removable project-in cam handle lock
      - iii. Pole operated project-in cam lock
      - iv. Custodial lock
    - c. Optional -- Limited opening device/friction adjuster to limit initial sash operation to 4". Operation past this point to be by use of a tool or removable key.
  - 3. 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 48" high. Finish of aluminum housing shall be Black or Clear anodized.

- 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 operable sash 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 4". Operation past this point to be by use of a tool or removable key.**
4. 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 operable sash 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 4". Operation past this point to be by use of a tool or removable key.**
5. In-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 stainless steel keepers. Provide two-point locking for operable sash over 40". **(Specify one of the following cam locks)**
    - i. Standard project-in cam handle lock
    - ii. Removable project-in cam handle lock
    - iii. Custodial lock
  - c. **Optional -- Limited opening device/friction adjuster to limit initial sash operation to 4". Operation past this point to be by use of a tool or removable key.**
6. 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. **(Specify Section 08800 accordingly)**
  - 2. Sealed insulated glass shall meet ASTM E 2190.
- 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 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 operable sash.
- M. Muntins: (Optional)
  - 1. Provide muntin grids as shown on architectural drawings.
  - 2. 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.
- Q. Access Panels: (Optional - Hinged or lift out)
  - 1. Miter all corners and mechanically stake over a solid aluminum corner block, leaving hairline joinery, then sealed weather tight.
  - 2. Access panel joinery shall not be exposed to the exterior.
  - 3. Access panels (when hinged) will be side-hinged and in-swing type.
  - 4. Hinged access panels will be hinged on the interior left jamb with the lock located on interior right jamb.
  - 5. Two locks will be provided at the interior right jamb of hinged access panels that exceed 40" in height.
- R. Integral Venetian Blinds: (Optional)
  - 1. 5/8" wide aluminum slat blinds. Blind color shall be \_\_\_\_\_ (Select from manufacturer standard).
  - 2. Blind to be integrally mounted between the dual glazing.
  - 3. Tilt-control knob will be located on the interior face of access panel at the bottom of the right jamb. Raise and lower pull cords will be located between glass for access only when access panel is opened.
  - 4. Tilt-control knob will incorporate a "slip clutch" feature.

## 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 Operable Sash
  - 1. Miter all corners and mechanically stake over a solid 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
AAM12C21A41	Clear - Class I	AAMA 611	Clear
AAM12C21A44	Electrolytically Deposited – Class I	AAMA 611	Champagne, Light Bronze, Medium Bronze, Dark Bronze, Black
AAM12C1RX	Organic Paint	AAMA 2603	As selected by Architect from manufacturer's standard colors - Suitable for INTERIOR Finishes
AAM12C1RX	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.]*