ARCHITECTURAL SPECIFICATIONS

Section 08580 or 08593
2004 Master Format Section 08 51 69 or 08 56 73

Mon-Ray 500 & 600 Series
High Performance Aluminum Storm Windows

PART 1 GENERAL

1.00 SCOPE

A. This is a high performance acoustical storm window Specification. The Specification provides the Bidders with rigid standards for product materials, workmanship and performance that must be complied with in every respect.

B. It is the intent of this Specification to provide the Owner with proper product materials, workmanship, design, application, performance, installation and warranty coverage. The Specification describes specific test requirements, system performance, quality assurance tests, and product material requirements required to meet the Owner's desired acoustical performance level.

1.01 WORK INCLUDED

A. Furnish and install high performance acoustical aluminum storm windows, complete with hardware, and related components as shown in drawings and specified in this Section.

B. All storm windows are to be Mon-Ray Series 500 or 600 as manufactured by Mon-Ray, Inc. Other manufacturers requesting approval to bid their product will be viewed as alternate bids and must submit a request for approval 10 days prior to bid for consideration.

1.02 REFERENCES

A. ANSI/AAMA 1002.10-93 "Voluntary Specifications for Insulating Storm Products for Windows and Sliding Glass Doors
B. ASTM E 283 "Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors"
C. ASTM E 330 "Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference"
D. ASTM E 331 "Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Air Pressure Difference"
E. AAMA 502 "Voluntary Specification for Field Testing of Windows and Sliding Glass Doors"
F. ASTM E 90 "Laboratory Measurement of Airborne Sound Transmission of Building Partitions"
G. ASTM E 413 "Determination of Sound Transmission Class (STC)"

1.03 SYSTEM PERFORMANCE

A. Test Unit Size: Test units shall be the sizes listed below. Sill of the test buck shall have a 13 degree slope to the exterior. (See Appendix "A" for test buck details)

1. Fixed panel and removable panel storm windows: 4"0" wide x 4"0" high
2. Horizontal sliding storm windows: 6'0" wide x 4'0" high
3. Vertical sliding storm windows: 3' 8" wide x 5' 2" high

B. Air Leakage Test: The storm window shall be subjected to an air leakage test in accordance with ASTM-E 283. Window units tested by an Independent Laboratory shall be glazed with 1/8" clear annealed glass. Air leakage shall meet the following performance requirements. **Revised 2/2/07**

1. Air leakage for fixed panel storm windows shall not exceed 0.15 CFM per square foot of window area at both a positive (infiltration) and negative (exfiltration) static pressure of 1.56 PSF at 25 mph wind. Weep holes shall not be sealed during the air leakage test.

2. With the storm sash in the closed position, air leakage in removable panel, horizontal and vertical sliding windows shall not exceed 0.50 CFM per lineal foot of sash crack at both positive and negative static pressure 1.56 PSF at 25 mph wind . Weep holes shall not be sealed during the air leakage test.

C. Uniform Structural Load Test: With storm sash closed position, the window shall be tested in accordance with ASTM E 330. Apply a minimum exterior positive and negative load of:

30.0 PSF at 108 mph wind = Class 20
37.5 PSF at 121 mph wind = Class 25
45.0 PSF at 132 mph wind = Class 30
52.5 PSF at 143 mph wind = Class 35

for fixed panel, removable panel, horizontal and vertical sliding storm windows. Each load shall be maintained for 10 seconds. At the conclusion of the test, there shall be no glass breakage, damage to fasteners, hardware or any other damage causing the storm window to be inoperable.

D. Water Resistance Test: With storm sash in the closed position, the window shall be subjected to a water resistance test in accordance with ASTM E 331. When a positive static pressure of:

2.0 PSF at 28 mph wind = Class 20
2.5 PSF at 31 mph wind = Class 25
3.0 PSF at 34 mph wind = Class 30
3.5 PSF at 37 mph wind = Class 35

has been stabilized, 5 gallons of water per hour per square foot of window area shall be applied to the exterior face of the window, for a continuous period of 3 minutes. No water shall run over the interior edge of the sloped test buck sill.

E. Concentrated Load and Glass Adherence Tests: A concentrated load equal to the weight of the sash, but not less than 15 pounds, acting parallel to the plane of the glass in a direction tending to pull the sash rails off the glass and applied alternately for three minutes at the center of all sash rails of the glazed sash shall not cause the sash rails to deflect more than 1/8" each.

F. Safety Drop Test: When the glazed lower sash of a vertical sliding storm window is allowed to "free fall" the maximum distance provided for by the latch positions, it shall automatically stop every two inches in the next lower latch position.

G. Glass and Screen Insert Squareness Test: Take a measurement of the distance between diagonally opposite pairs of corners of an insert with a steel rule. The difference between these measurements shall not be more than 1/4".

H. Acoustical Performance: An acoustical test report shall state that the secondary glazing window to be furnished has been tested by it self in accordance with ASTM E90-90. The STC rating of the storm window shall tested as either "solo", the storm window alone or "tandem", with a prime window and a storm window.

1.04 SUBMITTALS

A. Shop Drawings: Submit drawings under provisions of Section 01300. Include dimensions, relationships to construction of adjacent work, component anchorage, type of caulking, window locations, installation methods and installation materials. Dimensions of all windows and components will be the responsibility of the successful Bidder.

B. Samples: Submit appropriate color Samples for Architects review and approval.

C. Test Reports: Submit Independent Laboratory Test Reports verifying windows meet the specified requirements for sound transmission, air leakage, water resistance, uniform structural load, and deglazing.

D. Certificates: Furnish an affidavit in triplicate from the Window Manufacturer, certifying that materials used on this Project conform to these Specifications and are identical in all appropriate respects to the storm windows identified in the Independent Laboratory Test Reports.

1.05 QUALITY ASSURANCE

A. Qualifications: Fabrication shall be by a Window Manufacturer who can furnish evidence to the Owner that it is, and has been for not less than five (5) consecutive years, regularly engaged in the manufacturing of aluminum window units similar in design and performance to those specified for this Project.

B. Pre-award Installation:

1. Provide a complete installation of one (1) window as specified and selected by the Owner. Window mock-up to be completed within seven (7) days of the bid opening date. This window and installation shall be for the review of the product and installation. The Owner at his discretion may have the window tested by an Independent Test laboratory to verify compliance of the product with these Specifications.

   The cost for pre-award testing, by the Independent Laboratory shall be paid by Owner. Any deficiencies discovered on the window by the testing and the Bidder at no cost to the Owner will correct deficiencies in any similar models used in the project.

C. Post Installation Field Testing:

1. Window field-testing will be in accordance with AAMA 502-90 using Test Method B. After installation and before final payment, up to two percent (2%), but not less than two (2) window units may be randomly selected by the Owner and subjected to an air leakage and water resistance tests. Air leakage and water resistance test results shall meet the specified requirements per AAMA 502-90. If any randomly tested window fails, the Successful Bidder shall make necessary corrections until satisfactory results are achieved and make corrections to all other window units installed as part of this Project.

   All costs associated with the Post Installation Field Testing and required repairs or replacements shall be borne by the Successful Bidder. These tests may be performed by either the Window Manufacturer's technical service personnel using accurately calibrated and approved air leakage testing equipment, or by an approved Independent Test Laboratory. All tests shall be conducted in the presence of the Owner, or the Owner's Representative.

D. Reference List:

1. The Bidder shall furnish with its bid a Reference List from the Window Manufacturer containing not less than ten (10) completed projects with window units of similar to the window units specified for this Project. At least five (5) of the referenced projects shall be at least three (3) years old. As part of the bid evaluation to determine life cycle cost and best value for the Owner, consideration will be given as to age, longevity, performance and extended product life of these installations. The Reference List shall include the name, address and phone number of the project, and the date the project was completed.

2. If an installation sub-contractor is used, the subcontractor must furnish a list of at least five (5) projects similar in scope to this project with the base bid.

3. The Owner or Owners Representative has the right to deem the bidder as "non-responsible" or "non-qualified", based upon inspection of any projects performed by the bidder as a contractor, sub-contractor or manufacturer, if the products or workmanship is determined to be unacceptable by the Owner or Owners Representative.

1.06 WARRANTY

A. Product Warranty: The successful Bidder shall furnish a positively written, non-prorated and fully transferable warranty from the Window Manufacturer against defects in materials and workmanship of the storm window units, under normal use, for a period of ten (10) years from the date of acceptance of the installed storm window units by the Owner. The warranty shall state that the Window Manufacturer shall provide all materials required to repair or replace defective materials or workmanship. The warranty shall further state that parts used to manufacture the storm window units, or suitable replacements, shall be available throughout the warranty period.

B. Installation Warranty: The Successful Bidder shall furnish a written warranty against defects in the installation workmanship and materials for a period of three (3) years from the date of acceptance by the Owner. Installation warranty work will be performed at no cost to the Owner.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Mon-Ray, Inc. (Manufacturer of Mon-Ray 500 or 600 Series Acoustical Storm Windows)
801 Boone Ave. No
Minneapolis, MN 55427-4432
Phone: (800) 544-3646 Fax: (763)-546-8977 Website: www.monray.com

B. Alternates: Under provisions of Section 01030.

2.02 MATERIALS

A. Aluminum: All frame, sash and screen members shall be accurately extruded aluminum prime alloy 6063-T6. The minimum nominal wall thickness of all frame, sash, expanders and panning members shall not be less than 0.050".

B. Glazing: Standard glazing for fixed panel, removable panel, horizontal and vertical sliding storm windows shall be 1/8" clear annealed float glass. The area per lite of glass shall not exceed 20 Square feet for 1/8" glass. Safety glazing shall be used as required by code and correctly labeled on glass. The glass shall be glazed into the sash with a one-piece wrap-around, flexible vinyl glazing channel. All corners shall be secured and neatly tucked. All glass shall be factory washed.

C. Weather-Strip: All weather-strip shall be silicone treated, UV stabilized polypropylene pile with an integral polypropylene fin running through the center. Weather-stripping shall be bonded to a non-shrinking backing, which shall slide into extruded ports in the aluminum storm frame.

D. Vinyl Track: All operating windows shall incorporate a vinyl track to eliminate metal to metal contact and reduce operating force. All horizontal sliding sashes shall operate smoothly in a weather tight vinyl track. All vertical sliding sashes shall operate in a vinyl track with predetermined processed ventilating positions. The vinyl tracks will be secured into the storm frame through the use of extruded ports.

E. Screens: All horizontal and vertical sliding storm window shall have a half screen mounted in the sash track of the storm frame. The screen shall be pre-bowed, extruded 6063-T6 tubular aluminum with a nominal wall thickness of 0.055". Mitered corners shall be joined neatly by means of solid T6 tempered aluminum corner gussets, securely peened within the screen frame extrusion. The screen cloth shall be fiberglass 18 x 14 mesh in a charcoal color and secured into screen frame with a vinyl spline. The screen inserts if removed will not affect the operation, efficiency or performance requirements of the storm window. NOTE: Fiberglass 18 x 16 mesh shall not be acceptable.

2.03 WINDOW TYPE AND OPERATION

A. Type: All windows shall be fixed panel, removable panel, horizontal sliding or vertical sliding aluminum acoustical storm windows with a frame depth of 7/8" for standard Mon-Ray products.

1. The 500 Series window shall have an frame expander design and mount cleanly into the existing storm window pocket against the blind stop or on the interior of the prime sash using a F channel frame expander.

2. The 600 Series window shall have a blind stop frame design to mount on the blind stop or casing.

All glass sash and screen inserts shall be easily removable to the interior for cleaning. The entire storm window shall be designed and constructed in a manner that allows for easy replacement of all parts, hardware and weather-stripping.

B. Non-operating Sash: All removable panels shall be held in place by an extruded aluminum turn button. Non-operating sash of horizontal and vertical sliding storm windows shall slide into an extruded weather-stripped sash pocket. Vertical non-operating sash shall be securely supported by two high impact nylon support blocks anchored into the storm window frame by non-magnetic stainless steel screws.

C. Operation: Operating sash and frame shall have a two-track, self storing sash and screen design. Operating surfaces to be completely separated from metal-to-metal contact. All horizontal sliding sash shall operate smoothly in a weather tight vinyl track. All vertical sliding sash shall operate in a vinyl track with predetermined processed ventilating positions. The vinyl tracks will be secured into the storm frame through the use of extruded ports. The vinyl track and spring loaded pin-locks shall provide a "ratchet action" design with automatic ventilation settings every two (2) inches. In the closed and fully open positions the operating sash shall lock in non-ratcheted, secure holes. The pin-locks shall engage automatically into predetermined ventilating positions processed into each of the side storm frames.

2.04 HARDWARE

A. All assembly and installation fasteners and screws incorporated in the storm window units and exterior panning shall be non-magnetic, stainless steel. All hardware parts shall be of aluminum, stainless steel, nylon, or other non-corrosive materials compatible with aluminum. NOTE: Wrought metal or plastic parts will not be acceptable.

B. All removable panel storm sash shall incorporate an extruded aluminum turn button installed with non magnetic stainless steel screws.

C. All horizontal sliding windows shall slide in extruded vinyl tracks, which shall be set in extruded ports in the master frame.

D. All vertical sliding sashes shall be equipped with two spring loaded stainless steel pin-lock assemblies. The pin-lock assemblies shall be located at the lower corners of the operating sash and automatically engage at each ventilation setting. Each pin-lock assembly shall consist of: One stainless steel plunger with a diameter of 3/16". One stainless steel knurl knob threaded into the plunger and extending 1/2" to the interior of the sash rail to allow for a firm and easy finger grip. One stainless steel compression spring. The spring and the plunger shall be concealed in an extruded channel within the sash rails to prevent moisture, dirt and debris from affecting the operation of the pin-lock assembly.

2.05 FABRICATION

A. Frame and Sash Construction:

1. Frame: All aluminum head, jamb and sill members for the master frame and all frame expanders shall have a minimum wall thickness of 0.050 ". All members to be extruded 6063-T6 aluminum assembled in a secure and workman like manner to assure lasting weather resistant construction. Frame joints shall be butt-type, neatly joined and secured by means of non-magnetic stainless steel screws anchored into integral screw ports. Vinyl weather-stripping and tracks shall be shaded from direct sunlight by the frame and sash members. The storm window shall be mounted by using four adjustable expanders, which securely slide over the master frame. All installation holes shall be pre-drilled the manufacturer.

2. Sash: All sash members shall be extruded 6063-T6 aluminum with a minimum wall thickness of 0.055 ". Mitered corners shall be joined by non-magnetic stainless steel corner keys, securely peened on the inside of the sash insert. All sharp corners of the sash shall be deburred and smoothed. Sash meeting rails shall interlock in the closed position. All removable panels and operating sash shall have a full-length extruded lift handle as part of the sash rail. The lift handle shall project 7/16" to the interior to allow adequate area to maintain a sure finger grip. Note: Weather-stripping applied to or installed on the operating sash will not be permitted.

B. Weep System: The sill expander shall have a minimum of two weep holes, uniformly positioned to allow for water to weep to the exterior of the storm window unit.

2.06 FINISHES

A. Organic (Painted Finish)

1. Finish all exposed areas of aluminum storm windows and components with a factory applied spray coating in accordance with Aluminum Association Designation:

*Description	AA Designation	AAMA Guide Specification
Siliconized polyester baked enamel	AA-M12-C41-RX1	AAMA 2603

2. Standard colors shall be one of the manufacturer's three standard Poly-Cron III painted finished: White, Bronze or Tan. The head of all assembly and installation screws shall be painted the same color as the master frame of the storm window.
3. Optional colors: Available in polyester enamel or Kynar paints to conform to AAMA 2603 or 2605. Computer matching capability. Color samples available upon request.

B. Anodic (Anodized Finish)

1. Finish all areas of aluminum storm windows and components with electrolitically deposited color in accordance with the following Aluminum Association Designation:

*AA Designations	Architectural Class	Description	AAMA Guide Specification
AA-M10-C22-A31/41	II/I	Clear Anodized	AAMA 607.1-77

2. Standard anodized color is 202 R1. Optional anodized finishes conform to AAMA 608.1, in the following colors: Clear 204 R1 and 215 R1, Champagne, Gold, Light Bronze, Medium Bronze, Dark Bronze, Deep Bronze and Black. Other custom anodized colors available upon request at an additional charge.

2.07 ACCESSORIES

A. Exterior panning: (Optional) - 500 Series Only All existing exterior wood brick-molding around the window openings as shown in the Project drawings shall be covered with 6063-T6 extruded panning. Head and jamb panning shall interlock into the storm window frame and be pre-assembled by the manufacturer. A sill expander panning shall be provided to accommodate sill variations. The panning corners shall be butt-joined, secured with stainless steel alignment clips and be back-sealed by the window manufacturer.

B. F-channel Expanders: (Optional) - 500 Series Only - Where project conditions warrant or thermal separation is desired, an F-channel expander is available. This expander installs on the same fashion as the U-channel expander, but has a 1/2" leg for anchorage.

C. H-mulls: (Optional) - 500 Series Only - This accessory allows two or more storm windows or panels to be installed either horizontally or vertically in a single opening.

D. Mullions and Transoms: (Optional) - 500 Series Only - Where two or more storm window frames adjoin each other horizontally or vertically, mullion or transom panning covers shall be used. Mull and transom covers shall incorporate a port for weather-sealing at the exterior.

PART 3 EXECUTION

3.01 EXAMINATION

A. Bidders are expected to visit the job-site and make a complete survey of the Project prior to bid. All storm window openings will be measured by the Bidder for proper sizing of the new storm windows. Failure to do so will not relieve the Successful Bidder from the need to furnish any and all materials, which may be required, in accordance with the Specifications, without any additional cost to the Owner.

B. Inspect openings before installation to assure surfaces are clean and dry. Verify that Storm opening and masonry openings are correct and the sill is level.

3.02 PREPARATION

A. Remove new storm window units from crating and packaging material. Verify that all parts and accessories are included. All storm window units and accessories shall be securely stored, upright and protected from the weather.

B. Remove old storm windows and accessories from the window opening. Scrape and remove existing sealant from the opening, which will interfere with the installation of new storm windows.

C. Install only aluminum tubing or preservative treated lumber, as required, for all blocking. All blocking shall be the full length of the head, jambs and sill.

3.03 INSTALLATION

A. Storm windows shall be installed in strict accordance with the Manufacturer's instructions and Shop Drawings.

B. Plumb and align storm window faces in a single plane with the existing window. Erect storm windows and accessories square and true, using blocking and anchors to maintain a permanent position.

C. Anchors should be not less than #8 non-magnetic, stainless steel screws. The length of the installation screws shall allow a minimum of one half (1/2) inch to penetrate into the window frame or blocking. Anchors must be adequate to handle thermal and building movement, and specified uniform load requirements.

D. Provide single-component or multi-component, low-modulus, non-sag sealant; comply with ASTM C920, Type S or M, Grade NS, Class 25

3.04 ADJUST AND CLEAN

A. Operate installed storm windows to assure a proper installation has occurred. Make any appropriate adjustments.

B. Remove excess sealant, dirt, window labels and wipe dust off frame and glass.