

# GUIDE SPECIFICATION

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## DOUBLE HUNG SERIES 3500

AAMA/WDMA/CSA 101/I.S.2/A440-05

AAMA/WDMA/CSA 101/I.S.2/A440-08

Rating:	AW-PG70
Air Infiltration:	0.28 cfm/ft at 6.2 psf
Water Resistance:	No Leakage at 12.00 psf
Structural Performance:	112.50 psf
Thermal Break:	Yes
C.R.F.:	51
Thermal U Value:	.68
Main Frame Depth:	4"
Glazing Thickness:	1 1/4" - Maximum

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Boyd Manufacturing Company has prepared this guide specification in printed and electronic media, as an aid to specifiers in preparing written construction documents for commercial double hung aluminum windows. For specification assistance on specific product applications, please contact our offices. Boyd Aluminum Manufacturing Company reserves the right to modify these specifications and details at any time. Updates to these guide specifications and details will be posted to our web site and/or in printed matter as they occur. Boyd Aluminum Manufacturing Company makes no expressed or implied warranties regarding content, errors, or omissions in the information presented.

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## SECTION 08520 – ALUMINUM WINDOWS

### PART 1 – GENERAL

#### 1.1 RELATED SECTIONS

- A. Glass and glazing – Section 08800
- B. Sealants and caulking – Section 07900

#### 1.2 SUMMARY

- A. Section includes:
  - 1. Operable Architectural Window Grade aluminum windows.
    - a. Double Hung window

#### 1.3 REFERENCES

- A. American Architectural Manufacturers Association (AAMA).
- B. American Society for Testing Materials (ASTM).
- C. American National Standards Institute (ANSI)

#### 1.4 TEST AND PERFORMANCE REQUIREMENTS

- A. Provide aluminum window system designed to accommodate expansion and contraction due to normal thermal movement and wind loading per manufacturer's window test reports. Establish basic dimension of units, sight lines, and profiles of members according to the performance requirements.
  - 1. In order to designate quality of materials and workmanship required, these specifications are based upon products from Boyd Aluminum Manufacturing Co., Inc. Springfield, MO (800) 737-2800.
  - 2. Products of other manufacturers equal to or exceeding those specified herein will be considered upon written authorization by the Architect. Information, including window sample (size and configuration per Architect's requirements) must be submitted for consideration a minimum of 10 days before project bid date.
- B. Test Criteria: Testing shall be performed by an AAMA qualified independent testing agency and be based on the following criteria:
  - 1. Current test reports must be submitted and be AAMA certified to be accepted.

- C. Performance Requirements: Test reports must show compliance with AAMA/WDMA/CSA 101/I.S.2/A440-05 and A440-08 for AW-PG70.
1. Air-Infiltration: Shall not exceed 0.28 cfm/ft of sash crack per ASTM E283 at a differential static pressure of 6.2 psf.
  2. Water Infiltration: No uncontrolled leakage per ASTM E331 at a test pressure of 12.00 psf.
  3. Uniform Load Deflection: No framing member shall deflect more than L/175 and maximum deformation of any member shall not exceed 0.2 percent, per ASTM E 330.
  4. Structural Requirements: Maximum permanent deformation of any component shall not exceed 0.4 percent at a test pressure of 112.50 psf as defined per ASTM E330.
  5. Condensation Resistance Factor (CRF): Provide windows tested for thermal performance according to AAMA 1503.1 showing a minimum condensation resistance factor (CRF) of 51.
  6. Thermal Transmittance: Provide windows with a U-value maximum of .68 when tested according to AAMA 1503.1
  7. Forced-Entry Resistance: Comply with Performance Level 10 requirements when tested according to ASTM F588.

## 1.5 SUBMITTALS

- A. General: Submit in accordance with Division 1.
- B. Product Data: Submit for windows
1. Include information for factory finishes, glass, glazing components, accessories, and other required components.
  2. Include information on hardware and operators.
  3. Submit certified test reports from AAMA accredited laboratories verifying all performance requirements specified herein.
- C. Shop Drawings: Indicate elevations, detailed design, dimensions, member profiles, joint locations, arrangement of units, and member connections.
1. Anchorage system.
  2. Interfacing with building constructions.
  3. Full-size details of special and typical shapes.
  4. Indicate glazing details and sealant requirements.
  5. Show finishes indicating compliance with the specifications.
  6. Indicate recorded field measurements on final drawings as available.
- D. Samples: Indicate quality of finish on alloys used, 12 inches long for extrusions and 6 inches square for sheet materials.
1. Where normal texture or color variations are expected, include additional samples illustrating range of variation.
- E. Samples of Verification: Submit samples of anchors, fasteners, hardware, assembled corner sections, and other materials and components if requested by the architect.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Certified in writing that installer has experience on at least five projects of similar nature in past five years. The installer shall warrant the satisfactory performance of the window installation which includes, but is not limited to, installation accessories (glazing, perimeter sealing), and anchorage as called for by the specifications and approved shop drawings
- B. Single Source Responsibility: Provide window units manufactured by one manufacturer
  - 1. Glass and glazing for window units are required as work of this section for single source responsibility. Factory glaze units.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver units pre-glazed with manufacturer's labels intact on interior side of glass.
- B. Protect glass and glazing to prevent chipping, cracking, and other similar damages.
- C. Store windows in upright position, off ground.
- D. Protect finished surfaces to prevent damage.
- E. Do not use adhesive papers or sprayed coatings which become firmly bonded when exposed to sun.
- F. Do not leave coating residue on surfaces.
- G. Protect the window units from lime, mortar, runoff from concrete and copper, careless handling of tools, weld platter, acids, roofing tar, solvents, abrasive cleaners, and other items that could damage the window units.

1.8 WARRANTY

- A. Warranty: The window manufacturer shall provide a written warranty that window units are free from defective materials or workmanship within a specified period. Failures include the following:
  - 1. Materials defect in manufacture.
  - 2. Faulty operation of sash and hardware.
- B. Warranty Period: 2-year after delivery of product
- C. Warranty Period for Glass: 5-years after delivery of product

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Boyd Aluminum Manufacturing Co. Inc., Springfield, MO (800) 737-2800.
  - 1. Series 3500 Double Hung
- B. Subject to compliance with Section 1.4 manufacturers offering equal products may be incorporated in the work.

### 2.2 MATERIALS

- A. Aluminum extrusions shall comply with ASTM B 221 and tolerances shall be in accordance with the Aluminum Association's "Drafting Standards for Aluminum Extruded and Tubular Products". Extrusions shall not be less than a nominal 0.080 inch thick at any location for main frame and sash members with an exception of main frame sill which shall be no less than a nominal 0.125 inch. Sheet shall comply with ASTM B 209, alloy and temper recommended by manufacturer appropriate for specified finish.
- B. Fasteners: Provide stainless steel fasteners, corrosion resistant and compatible with aluminum.
  - 1. Reinforcement: When fasteners screw into aluminum less than a nominal .062 inch thick, utilize nuts or washers of design having means to reinforce interior aluminum surfaces and prevent disengagement.
  - 2. Exposed Fasteners: Provide concealed fasteners wherever possible.
- C. Shims: Non-staining and non-ferrous type.
- D. Weatherstripping: Material shall be compatible with aluminum, resistant to weather and ultraviolet degradation, and be replaceable.
  - 1. Provide woven pile weatherstripping with wool, a center semi-rigid strip of polypropylene, and a resin impregnated backing strip complying with AAMA 701.2.
- E. Sealants: The color of the sealant exposed with the window in the closed position shall be chosen from the manufacturer's standards. If unspecified, the sealant color shall be compatible with the window framing materials.
  - 1. Non-working joints: Sealant shall comply with AAMA 800.
  - 2. Window Components: Sealant shall be suitable for application specified and approved by the window manufacturer.
  - 3. Perimeter: Sealant shall comply with AAMA 800 and Section 07900.
- F. Insect Screen: Provide 18 by 16 mesh of 0.013 inch diameter, coated aluminum wire, complying with FS RR-W-365.
- G. Glazing tape: Blend of polyisobutylene and butylopolymer complying with AAMA 807.3-92.

- H. Compression Type Gaskets: Provide compressible TPE stripping for glazing and weather stripping comply with ASTM D 1921, ASTM D 792, ASTM D 792, ASTM D 2240, ASTM D 412, ASTM D 590, and ASTM D 3835 molded TPE gaskets.

### 2.3 ACCESSORIES

- A. Insect Screens: Provide insect screens for each operable sash. Insect screens may be provided at the request of the architect to cover both the operable and fixed sash. Screens shall be exterior mounted. Screens shall be tight-fitting, removable and have no exposed fasteners.
1. Screen Frames: Frames shall be of extruded tubular shaped aluminum, with a minimum wall thickness of .050 inch, have mitered joints, and corners secured by concealed corner keys. Finish frames to match windows.
  2. Screen frames must rest into integral extruded channels on main frame, at both jambs and sill. Screens attached by means of exposed fasteners are not acceptable.
    - a. Provide removable extruded vinyl spline at edge of screening.
- B. Muntins: Provide muntins in each designated sash to replicate the desired divided lite configuration. Muntins shall be of extruded or roll-formed aluminum. Muntins shall be rectangular or contour in shape, per architect's request.
1. True divided lite muntins: Provide an extruded aluminum muntin with a minimum nominal wall thickness of 0.080 inch. Finish to match windows.
  2. Simulated Muntins:
    - a) Roll Form Muntins: Provide simulated muntins suspended within the insulated glass units.
    - b) Applied Muntins: Provide extruded tubular shaped aluminum muntins with a minimum wall thickness of .050 inch. Applied muntins shall be mechanically fastened to a surrounding extruded tubular shaped aluminum applied muntin frame with a minimum wall thickness of .050 inch. The applied muntin/frame system shall allow replacement of the glazing without removing or replacing the applied muntins. No exposed fasteners will be allowed. Finish to match windows.
- C. Nailing fins: Nailing fins shall snap into main frame, be of extruded aluminum with a minimum wall thickness of .062 inch, be continuous with hair line joints at corners, and protrude a maximum of 2 1/2 inch past the window equal leg dimension. Nailing fins attached by means of fasteners or welding are not acceptable.
- D. Leg Extender: Leg extenders shall snap into main frame, be of extruded aluminum with a minimum wall thickness of .062 inch, and be continuous with hair line joints at corners. Leg extenders shall allow the interior leg and/or exterior leg of main frame to lengthen by a dimension up to 2 1/2 inch. Leg extenders shall be finished to match windows. Attachment by means of fasteners or welding is not acceptable.
- E. Mullions: Provide extruded aluminum mullions with a minimum nominal wall thickness of .062 inch and cover plates, where required, to complete window to window connections.

- F. Receptors: Provide two piece extruded aluminum receptors for the head and/or jambs of the window openings with a minimum nominal wall thickness of .062 inch. Provide one row of TPE gasket placed into extruded grooves in each receptor piece to ensure no window unit to receptor metal contact. Provide receptors with integral nailing fin, if required by the architect. Finish receptors to match windows.
- G. Subsills: Provide subsills with a minimum nominal wall thickness of .062 inch. Provide subsills with means to weep water to the exterior. Finish subsills to match windows.
- H. Panning: Provide extruded aluminum panning of the type and configuration required by the architect with a minimum nominal wall thickness of .062 inches. Provide one row of vinyl gasket placed into extruded grooves in each panning member to ensure no window unit to panning members. Clips shall be attached with stainless steel fasteners. Space stainless steel clips appropriately to allow the window units to secure themselves tightly to the panning. Window units shall lip over the panning sill member allowing water to weep to the exterior. Finish panning to match window units.
- I. Trims: Provide extruded aluminum trim of the type and configuration required by the architect with a minimum nominal wall thickness of .050 inches. Provide extruded aluminum trim clips, with a minimum nominal wall thickness of .050 inch, to allow attachment of the trim to the window units and/or openings. Finish trim to match window units.
- J. Dual glazed window shall have 1/4" exterior glazing, see section (08800) for specific glass types. Interior light shall be removable for maintenance and cleaning and be glazed with 1/4" glass; see section (08800) for details.
- K. Internal Blinds: Blinds shall be 5/8" and be installed in the removable interior frame for ease of maintenance. Blinds must be operable from the interior of the building by means of a knob or custodial type hardware without removing the interior glazing panel.

## 2.4 DOUBLE HUNG WINDOWS

- A. Window Grade and Class: Comply with requirements of AAMA Grade and Performance Class for AW-PG70. Window units shall successfully pass operating force test performance requirements specified in AAMA 101.
  1. Provide window units with operable sash that can be removed from inside for cleaning without deglazing.
  2. Provide window units with a 4" maximum main frame depth.
  3. Provide lower sash with a continuous integral lift bar on bottom rail.
  4. Provide window units with take-out feature permitting both sides of sash to be cleaned from interior.
  5. Provide 1 1/4" maximum overall glazing thickness. See Section 08800 glass and glazing.

- B. Hardware: Provide the following operating hardware packages:
1. Sash Balances: Manufacturer's standard type block and tackle or Ultra-Lift (Class-5) balance capable of supporting sash weight.
  2. Lock: Locking hardware shall be sweep type, lock into mounted keeper, and be located at the operating sash meeting rail. Locking hardware and keeper to be cast white bronze allowing the window to pas ANSI.ASTM F588-85 Forced Entry Resistance.
- C. Weatherstripping: Provide sliding-type weatherstripping at sash rails and main frame head only.
1. Provide weatherstripping placed into extruded groove.
    - a. Provide two rows of weatherstripping at all vertical sash rails.
    - b. Provide one row of weatherstripping at horizontal sash rails, with the exception of the bottom rail of the lower sash to have two rows of weatherstripping.
    - c. Provide one row of weatherstripping at main frame head.
- D. Glazing: Fixed and operable sash shall be interior glazed with snap in aluminum stops. Aluminum stops extrusions shall not be less than a nominal 0.080 inch thick. Wrap around or marine glazing is not acceptable.

## 2.5 FABRICATION

- A. Fabricate components in accordance with manufacturer's tested assemblies. Remove burrs and ease edges. Shop fabricate to greatest extent practicable to minimum field assembly. Disassemble only to the extent necessary for shipping and handling limitations.
- B. Thermal Break: Manufacturer's standard integral urethane thermal barrier, located between exterior and interior members to provide thermal separation. Provide thermal break that has been tested for thermal conductance and has been in use a minimum of 5 y ears.
- C. Weep System: Provide drain system to evacuate water entering joints occurring within windows.

## 2.6 FINISHES

- A. Clear Anodized, Class I: Etched, medium matte, clear anodic coating, 0.7 mil thickness. Meeting AAMA 611-98 and AA-M12C22A41.
- B. Color Anodized Class I: Etched, medium matte, colored anodic coating, 0.7 mil thicknesses. Meeting AAMA 611-98 and AA-M12C22A44.
1. Standard Color: Color as selected by architect from window manufacturer's full range of standard colors.
    - a. Dark Bronze



2. Custom Colors: Color selected by architect from window manufacturer's full range of custom colors.
  - a. Light Bronze
  - b. Medium Bronze
  - c. Black
- C. Fluorocarbon, High Performance Paint Coating: Color as selected from manufacturer's full range of colors by architect. Fluorocarbon spray coating shall be applied by a licensed applicator and shall meet AAMA 2605-98 specifications.
  1. Fluorocarbon 2-Coat System: Inhibitive primer and fluoropolymer color top coating of not less than 70 percent polyvinylidene fluoride complying with AAMA 2605-98. Prepare and pre-treat metal surfaces to comply with paint manufacturer's instructions.
  2. Fluorocarbon 3-coat System: Inhibitive primer, fluoropolymer color coating, and clear fluoropolymer top coating complying with AAMA 2605-98. Fluoropolymer color and clear coats shall not have less than 70 percent polyvinylidene fluoride. Prepare and pre-treat metal surfaces to comply with paint manufacturer's instructions.
- D. High Solids Paint Coating: A high solids coating shall be applied by a licensed applicator and shall meet AAMA 2603-98 specifications.
  1. Standard Colors: Color as selected by architect from window manufacturer's full range of standard colors. Prepare and pre-treat metal surfaces to comply with paint manufacturer's instructions.
  2. Custom Colors: Color as selected by architect from paint manufacturer's full range of colors. Prepare and pre-treat metal surfaces to comply with paint manufacturer's instructions.

## PART 3 – EXECUTION

### 3.1 INSPECTION

- A. Remove and properly dispose of existing windows in accordance with Section 02070. Verify that openings are dimensionally within allowable tolerances, plumb, level, and clean. Provide solid anchoring surfaces that are in accordance with approved shop drawings.
- B. Verify that the opening into which the windows will be installed is the correct size to permit installation of the new windows according to the manufacturer's installation instructions.
- C. Do not install windows until unsatisfactory conditions are corrected.

### 3.2 INSTALLATION

- A. Install windows with skilled tradesperson in exact accordance with approved shop drawings.
- B. Aluminum that is not organically coated shall be insulated from direct contact with steel, masonry concrete or noncompatible materials by bituminous paint, zinc chromate primer, or other suitable insulating material.

- C. Install vapor retardant tape between window perimeter and adjoining collateral materials and existing wall barriers to insure continuity.
- D. Plumb and align window faces in a single plane for each wall plane. Erect square and true. Anchor to maintain position when subjected to normal thermal and building movement (seismic forces), and specified wind loads.
- E. Install glass and glazing in accordance with approved shop drawings to provide satisfactory, leak-free installation.
- F. Perimeter Sealing: Seal joints at the perimeters in accordance with approved shop drawings to provide watertight installation.
  - 1. Joints and surfaces to receive sealants shall be clean, free from loose material, free of effervescence or mortar leaking, and dry. Sealants shall not be applied when the temperature is below the sealant manufacturer's instructions.
  - 2. Clean the joints and surfaces before sealing or priming. Then prime the joints in accordance with the sealant manufacturer's instructions.
  - 3. Provide joint backing in all joints where a suitable backer to receive sealant is otherwise not available. Joint depth shall be equal to  $\frac{1}{2}$  of the width.
  - 4. Caulk joint width shall not be less than  $\frac{1}{4}$  inch not more than  $\frac{1}{2}$  inches unless otherwise recommended by the sealant manufacturer. Wipe off the excess material and leave the exposed surfaces and joints clean and smooth.

### 3.3 ADJUSTING

- A. After installation, windows and glazing shall be inspected and adjusted to provide smooth operation and a weathertight window system.

### 3.4 CLEANING

- A. After installation, leave windows clean and free of temporary labels and dirt. Protect finished installation against damage.
- B. Final cleaning of the anodized finish shall be in accordance with AAMA 690.1.
- C. Final cleaning of the painted finish shall be in accordance with AAMA 610.1.

END OF SECTION 08520