



SERIES 1450 Class AW-PG75 ATD, Architectural Terrace Door

SECTION 08 11 16 ALUMINUM DOORS & FRAMES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Furnish factory glazed thermally broken, aluminum terrace doors complete with necessary operating hardware as shown in bid drawings and as per specifications stipulated in this section.
- B. Factory-installed glass & glazing

1.2 ITEMS FURNISHED BUT NOT INSTALLED (Enter description and quantity of items such as extra sash, screens, glass units, hardware, etc. for attic stock)

1.3 ITEMS INSTALLED BUT NOT FURNISHED (Enter description and quantity of items such as air conditioners, louvers, duct work to be installed in locations as directed by Architect)

1.4 RELATED SECTIONS

- A. Section 07 90 00 - Joint Protection.
- B. Section 08 41 00 - Entrances and Storefronts.
- C. Section 08 70 00 - Hardware.

1.5 REFERENCES

- A. AAMA - American Architectural Manufacturers Association:
 - i. AAMA/WDMA/CSA 101/I.S.2/A440-08 "NAFS North American Fenestration Standard/Specification for Windows, Doors, and Unit Skylights"
 - ii. AAMA 502-08 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
 - iii. AAMA 701/702-04 - Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals.
 - iv. AAMA 800-05 - Voluntary Specifications and Test Methods for Sealants.
 - v. AAMA 910-93 - Voluntary Life Cycle' Specifications and Test Methods for Architectural Grade Windows and Sliding Glass Doors.
 - vi. AAMA 2603-02 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - vii. AAMA 2604-05 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM – American Society for Testing and Materials:- www.astm.org
 - i. ASTM C 1036-06 - Standard Specification for Flat glass.
 - ii. ASTM C 1048-04 - Standard Specification for Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass Flat glass.
 - iii. ASTM C 1172-03 - Standard Specification for Laminated Architectural Flat glass.
 - iv. 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.
 - v. ASTM E 330-02 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference.
 - vi. ASTM E 331-00 - Standard Test Method for Water Penetration of Exterior Windows,



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- vii. Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference. ASTM E 547-00 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential..
 - viii. ASTM F 588-07 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact
 - ix. ASTM E 2190-02 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
- C. NAMI – National Accreditation Management Institute, Inc.- www.namicertification.com
- D. NFRC - National Fenestration Rating Council.- www.nfrc.org.
- i. NFRC 100-2017 - Procedure for Determining Fenestration Product U Factors.
 - ii. NFRC 102-2017 - Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.
 - iii. NFRC 200-2017 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence
 - iv. NFRC 500-2017 - Procedure for Determining Fenestration Product Condensation Resistance Values.
- E. SGCC - Safety Glazing Certification Council.-www.sgcc.org
- i. ANSI Z97.1-2004 American National Standard for Safety Glazing Materials used in Buildings - Safety Performance Specifications and Methods of Test.
- F. U.S. Consumer Product Safety Commission (CPSC) Publications
- i. 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
- G. LEED: The Leadership in Energy & Environmental Design; U.S. Green Building Council (USGBC).
- 1.6 SUBMITTALS
- A. Submit administrative requirements under provisions of Section 01 30 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
- i. Preparation instructions and recommendations.
 - ii. Storage and handling requirements and recommendations.
 - iii. Installation methods.
- C. Shop Drawings:
- i. Elevations for each door opening specified indicating its size, glazing type, muntin type and design.
 - ii. Manufacturer's head, jamb and sill details and section views for door opening type specified.
- D. Schedules:
- i. Provide a terrace door schedule indicating the type, size, color, and operation of each unit specified. Coordinate with terrace door types found in the Contract Drawings.
- E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each finish product specified, samples may be subsequently installed on the project.
- G. Test Reports: Submit certified independent testing agency reports indicating door units meet or exceed specified performance requirements.



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1.7 SYSTEM DESCRIPTION

- A. Operation: Provide door units complying with requirements of AAMA Classification "AW" type windows. Architectural Terrace Door
- B. AAMA Rating: Class AW-PG75 when tested according to AAMA/WDMA/CSA 101/I.S.2/A440-08 at the gateway size of 48" x 96" -ATD
- C. Construction: 3 1/4 inch frame depth. Wall thickness: 0.100"/0.125" frame/sill; 0.100" sash.
 - a. Standard wall thickness tolerance: In accordance with the Aluminum Association.
 - b. Factory finished extruded aluminum frame and sash members with integral structural thermal barriers installed by door manufacturer in the frame and panel members.
 - c. Thermal Barrier: Provide continuous dual glass fiber reinforced 6/6 polyamide nylon struts around the entire perimeter of the sash and head/jamb frame members.
- D. Typical Insulated Glass: Overall thickness of 1" inch with two lites of 1/8 inch or 3/16 inch or 1/4 inch as size and loading requirement. Back bedded with dual-sided structural glazing tape (SGT) on the operating sash from the interior, and secured with snap-in glazing bead and wedge gaskets.

1.8 HARDWARE:

- A. Handle: Lever handle shall activate a multi-point locking mechanism dependant upon unit size requirements and design loads.
- B. Hinges: Heavy duty aluminum hinges with stainless steel pin, adjustable in three directions to ensure constant and perfect alignment.
- C. Locks: Thumb turn interior locking mechanism in addition to spring-load latch.

1.9 WEATHERSTRIPPING:

- A. Frame: EPDM "gooseneck" type gasket with integral grooves fitted into the frame extrusion to provide a continuous primary seal between frame and sash. One additional row of compression type bulb gasket on the interior.
- B. Sash: One row of compression type bulb gasket on the exterior.

1.10 PERFORMANCE REQUIREMENTS

- A. Certify that doors have been tested in accordance with American Architectural Manufacturers Association (AAMA/WDMA) Specification for Performance Class specified complying with the following performance standards:
 - 1. AAMA/WDMA/CSA 101/I.S.2/A440-08 Performance Requirements: Provide Architectural Terrace Door of the performance class and grade indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440-08.
 - a. Performance Class: AW
 - b. Performance Grade: 75



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2. Air Infiltration after the AAMA 910 life cycle and AAMA 920-03 operating cycle tests not to exceed the standard of maximum 0.10 CFM per sq./ft. of total exterior surface area, when tested per ASTM E283 at a static air pressure differential of 6.24 psf.
3. Water Resistance with standard non-ADA sill after the AAMA 910 life cycles and AAMA 920-03 operating cycle tests, no uncontrolled water leakage when tested per ASTM E331 and ASTM E547 at a static air pressure indicated.
 - a. Class AW-PG75: 12.00 PSF
4. Uniform Structural Properties (ASTM E330): Pressure acting inward and outward. Architectural Terrace Door to be operable with permanent deformation at a maximum of 1/175 of its span, when tested at a static air pressure difference of the following:
 - a. Class AW-PG75: 112.5 PSF
5. 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 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, 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 doors inoperable; or permanent deformation of any main frame or ventilator member in excess of 0.2% of its clear span.
 - c. Forced Entry Resistance Test: ASTM F 588, Type and Grade as indicated for each Product.
 - d. Life Cycle Test: Per AAMA 910, provide proof that the product meets the criteria including passing air and water tests at the conclusion of the cycle tests.
 - e. Operation Cycling Performance: No damage after 25,000 cycles when tested in accordance with AAMA 920
6. Thermal Performance Requirements
 - a. Perform thermal computer simulation in accordance with the configuration specified in NFRC 100.
 - b. Computed Thermal Transmittance (U-Value) shall not exceed (value determined based on glazing element) BTU/hr/sq.ft./°F for the whole door assembly.
 - c. Computed Solar Heat Gain Coefficient (SHGC) shall not exceed (value determined based on glazing element) for the door assembly.

1.2 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** All Architectural Terrace Doors specified in this section shall be supplied by a manufacturer which has been fabricating/manufacturing commercial grade aluminum fenestration products of similar quality and performance for a minimum of ten (10) years.
- B. **Installer Qualifications:** All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing doors of the same type and scope as specified, preferably AAMA certified installers.



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- C. Provide test reports from AAMA accredited laboratory certifying that door units are found to be in compliance with AAMA/WDMA/CSA 101/I.S.2/A440-08 and performance standards listed above.
 - i. Test reports shall be accompanied by verified "Notice of Product Certification" to assure product is active and currently listed at third party validation (NAMI) accredited by the American National Standards Institute (ANSI)
 - ii. All testing shall be conducted using AAMA/WDMA/CSA 101/I.S.2/A440-08 Gateway Performance minimum specified test sizes.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation in accordance with manufacturer's recommendations.
- B. Protect units against damage from the elements, construction activities and other hazards before, during, and after installation.

1.4 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.5 WARRANTY

- A. *Refer to Crystal Window & Door Systems, Ltd. standard warranty.*
- B. *Optional Extended Warranty (contact your Crystal sales representative).*

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: **Crystal Window & Door Systems, Ltd.**, which is located at: 31-10 Whitestone Expressway, Flushing, NY 11354; Tel: 718. 961.7300; Tel: 800. 472.9988; Fax: 718.460.4594; Web: www.crystalwindows.com
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 Aluminum:

- A. 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.
- B. 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).

2.3 Thermal Barrier:

- A. Structural Thermal Barrier:
 - i. Structural thermal barriers shall consist of polyamide nylon 6.6 struts reinforced with glass fibers oriented in all three axis. Main frame (Jambs/Head) and sash members shall use twin polyamide struts not less than 14mm in length.
 - ii. Polyamide struts shall be mechanically crimped into aluminum profiles using integral

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extruded races. Aluminum races shall be mechanically knurled as per polyamide strut manufacturer's recommendations. Shear strength of finished assembly shall be per AAMA TIR-A8-04.

- iii. Non-Structural Thermal Barriers: Non-structural thermal barriers are used only in conjunction with structural thermal barriers. The purpose of non structural thermal barriers is to enhance thermal performance of the primary structural thermal barriers by inhibiting heat transfer through thermal radiation and convection. Non structural thermal barriers shall not be used as primary load carrying members.
- iv. Rigid non structural thermal barriers shall be constructed of extruded polyvinylchloride (PVC).

2.4 GLASS

A. Glazing Materials:

- i. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical. Design glass to resist design wind pressure based on glass type factors for short-duration load.
- ii. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
- iii. Strength: Where float glass is indicated, provide annealed float glass. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
- iv. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated.
 - a. U-Factors: Total-glazing values, according to NFRC 100 and based on LBL's WINDOW 7.4 computer program, expressed as BTU/sq.ft x h x deg F (W/sq. m x K).
 - b. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 7.4 computer program.
 - c. Visible Reflectance: Center-of-glazing values, according to NFRC 300.
- v. Float Glass: ASTM C 1036, Type 1, Quality-Q3, Class 1 (clear) unless otherwise indicated.
- vi. Coated Glass: ASTM C 1376, Type 1, Quality-Q3, Class 1 (clear) unless otherwise indicated, of kind and condition indicated.
- vii. Laminated Glass: ASTM C 1172, Type 1, Quality-Q3, Class 1 (clear) unless otherwise indicated, of kind and condition indicated.

B. Insulating Glass Units:

- i. Insulating glass units shall be sealed with an integral desiccant matrix and a butyl sealant extruded around the entire perimeter of the spacer to achieve a seal. The sealant applied is to be Dual Seal Equivalent (DSE). Interspace to be filled with air or argon gas as required by thermal computer simulation.
- ii. Insulating Glass Types: Low-E coated, insulating glass units.
 - a. Overall Unit Thickness: 1", 1-1/4"
 - b. Thickness of Each Glass Lite: 1/8", 3/16" or 1/4"
 - c. Outdoor Lite: Class 1 (Clear) float glass, fully tempered float glass, or laminated glass
 - d. Interspace Content: Air or Argon Gas.
 - e. Indoor Lite: Class 1 (Clear) float glass, fully tempered float glass, or laminated glass
 - f. Low-E Coating: Sputtered on second or third surface, pyrolytic on fourth surface
 - g. Provide safety glazing labeling, if necessary.

2.5 DOOR INSTALLATION ACCESSORIES



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Provide the following accessories as specified in the contract drawings. Finish matching door frames or as selected by the Architect:

- A. Wrap Around Panning
- B. Preset Panning
- C. Snap Trim/Clips
- D. Expanders
- E. Receptors
- F. Mullions and Mullion Covers
- G. Exterior Sills
- H. Interior Stools
- I. Muntins

2.6 FINISHES

- A. Conforming to AAMA 2604-05 specification, finish on all extruded aluminum shall consist of zero or near-zero VOC, organic POWDER COAT with a baked on super-durable thermosetting polyester resin, electro-statically applied on five-stage pre-treated aluminum surface. Powder coat material to be as manufactured by Sherwin Williams or PPG Powder Coatings.
- B. Color to be selected from Manufacturer's Standard Color Chart (or custom-matched as required by project Architect/Owner).

2.7 Insect Screens:

- A. Screen frames shall consist of tubular extruded aluminum profiles with finish to match door frames.
- B. Fiberglass mesh (18 X 16) with PVC spline.

2.8 Steel components including attachment fasteners shall be 300 series stainless steel except as noted.

2.9 Thermoplastic or thermo-set plastic caps, housings and other components shall be injection-molded nylon, extruded PVC, or other suitable compound.

2.10 Sealants:

- i. Sealants shall comply with applicable provisions of AAMA 800 and/or Federal Specifications FS-TT-001 and 002 Series.
- ii. Frame joinery sealants shall be suitable for application specified and as tested and approved by window manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory



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preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.4 ANCHORAGE

- A. Anchor door units and/or assemblies sufficiently to maintain permanent positions when subjected to normal thermal movement, specified building movement and specified wind loads.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Final operating adjustment shall be made after glazing work is complete. Operating sash and ventilator shall operate smoothly and shall be weathertight when in locked position
- C. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 DISPOSAL OF DEBRIS

- A. Remove all garbage off site and legally dispose of existing doors and debris generated from the installation of the new doors.

3.7 OPTIONAL FIELD TESTING

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspection
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
 - 1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AMA 502.
 - 2. Air-Infiltration Testing:
 - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/1.S.2/A440 performance class indicated.
 - b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/1.S.2/A440 rate for product type and performance class rounded down to one decimal place.
 - 3. Water-Resistance Testing:
 - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/1.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.



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4. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.
5. Test Reports: Prepared according to AAMA 502.
- C. Windows will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.8 ADJUSTMENT AND CLEAN UP

- A. Adjust all products, sash, vents, and hardware after installation, as necessary to provide proper operation and a weather tight installation
- B. Remove any labels and dirt from the door.

END OF SECTION