Manufacturer:

**Oldcastle BuildingEnvelope®**

5005 Lyndon B Johnson Fwy

Dallas, Texas 75244

Voice 866-653-2278

SECTION: ALUMINUM TERRACE DOORS (TERRA SWING™ ACCESS)

This guide specification has been prepared by **Oldcastle BuildingEnvelope®** in printed and electronic media as an aid to specifiers in preparing written construction documents for ALUMINUM TERRACE DOORS.

Edit entire master to suit project requirements. Modify or add items as necessary. Delete items which are not applicable. This section may include performance, proprietary, and descriptive type specifications. Edit to avoid conflicting requirements.

This section uses the term “Architect.” Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Editor notes are included as green boxes within the text of this section to assist the specifier in knowledgeable decision-making. Editor notes should be removed as you complete the document specific to your project needs.

1. **GENERAL**
   * + 1. **SUMMARY**
          1. Related Documents:

Conditions of the Contract, Division 1 – General Requirements, and Drawings apply to Work of this Section

* + - * 1. Section Includes:

Aluminum Terrace Doors.

Type: Outswing Terrace Door

Category: Architectural (AW)

Designation: ATD-AW65

* + - * 1. Related Requirements:

Editor Note: Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Editor Note: Retain first subparagraph below if preconstruction laboratory mockup testing is required and specified in Section 014339 instead of this Section.

Drawings, General and Supplementary Conditions of the Contract, Division 1 and the following Specification Sections, apply to this Section

Section 01 41 00 – Regulatory Requirements

Section 01 43 00 – Quality Assurance

Section 07 92 00 – Joint Sealants

Section 08 41 13 – Aluminum-Framed Entrances and Storefronts

Section 08 51 13 – Aluminum Windows

Section 08 80 00 – Glazing

* + - 1. **ALLOWANCES**

Editor Note: Retain paragraph below if testing is paid for by Contractor under an allowance.

* + - * 1. [**Preconstruction laboratory mockup**] [**source quality control**] [**and**] [**field quality control**] is part of testing and inspecting allowance.
      1. **PREINSTALLATION MEETINGS**

Editor Note: Retain "Preinstallation Conference" Paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at [**Project site**].
      1. **ACTION SUBMITTALS**
         1. Product Data: For each type of aluminum terrace door.

Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

* + - * 1. Shop Drawings: For aluminum terrace doors. Include plans, elevations, sections, hardware, accessories, operational clearances, and details of installation including: anchoring, flashing, and sealant work.

Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.

Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

Editor Note: Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs below for two-stage Samples.

* + - * 1. Samples: For each exposed product and for each color specified, 2 by 4 inches (50 by 100 mm) in size.
        2. Samples for Initial Selection: For each type of aluminum terrace door.

Include Samples of hardware and accessories involving color selection.

Editor Note: Retain "Fabrication Sample" Paragraph below to verify details of assembly.

* + - * 1. Samples for Verification: For aluminum terrace doors and components required, prepared on Samples of size indicated below:

Main Framing Member: 12-inch (300-mm) lengths of weather stripping, glazing bead and factory-applied color finish.

Hardware: Full-size units with factory-applied finish.

<Insert component>: <Insert description>.

* + - * 1. Aluminum Terrace Door Hardware Schedule: Use same designations indicated on Drawings.

Editor Note: Retain "Delegated Design Submittal" Paragraph below if design services have been delegated to Contractor. See Section 014000 "Quality Requirements" for additional requirements.

* + - * 1. Delegated Design Submittal: For aluminum terrace doors including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
      1. **INFORMATIONAL SUBMITTALS**

Editor Note: Coordinate "Qualification Data" Paragraph below with qualification requirements in Section 014000 "Quality Requirements" and as may be supplemented in "Quality Assurance" Article.

* + - * 1. Qualification Data: For Installer and manufacturer.

Editor Note: Retain "Product Test Reports" Paragraph below if manufacturers verify and their product literature indicates that aluminum terrace doors were tested in accordance with AAMA/WDMA/CSA procedures.

* + - * 1. Product Test Reports: For each aluminum terrace door, for tests performed by a qualified testing agency; and for each class and performance grade indicated, tested at AAMA gateway size.
        2. Energy Performance Certificates: For aluminum terrace doors, accessories, and components, from manufacturer.

Basis for Certification: NFRC-certified energy performance values for each aluminum terrace door.

Editor Note: Retain "Field quality-control reports" Paragraph below if Contractor is responsible for field quality-control testing and inspecting.

* + - * 1. Field quality-control reports.
        2. Sample Warranty: For manufacturer's special warranty.
      1. **CLOSEOUT SUBMITTALS**
         1. Maintenance Data: For aluminum terrace doors to include in maintenance manuals.
      2. **QUALITY ASSURANCE**
         1. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum terrace doors that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.

Editor Note: If retaining "Installer Qualifications" Paragraph below, verify, with prospective installers, that they can comply with certification requirements referenced.

* + - * 1. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer and that employs a qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M) contractors[**and that employs glazing technicians certified under the Architectural Glass and Metal Technician (AGMT) certification program**].

Editor Note: Retain "Laboratory Mockup Testing Agency Qualifications" Paragraph below if Project-specific preconstruction mockup testing is specified in "Preconstruction Testing" Article. Delete if specifying preconstruction laboratory mockup testing in Section 014339 "Mockups."

* + - * 1. Laboratory Mockup Testing Agency Qualifications: Qualified in accordance with ASTM E699 for testing indicated [**and accredited by the International Accreditation Service or the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement as complying with ISO/IEC 17025**].

Editor Note: Retain "Testing Agency Qualifications" Paragraph below if Contractor selects testing agency or if Contractor is required to provide services of a qualified testing agency in "Field Quality Control" Article. Qualification requirements are in addition to those specified in Section 014000 "Quality Requirements."

* + - * 1. Testing Agency Qualifications: Qualified in accordance with ASTM E699 for testing indicated [**and accredited by the International Accreditation Service or the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement as complying with ISO/IEC 17025**] and acceptable to Owner and Architect.
      1. **MOCKUPS**
         1. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

Editor Note: Retain first subparagraph below for large-scale mockup. Indicate portion of wall represented by mockup on Drawings or draw mockup as separate element. Coordinate requirements with those in other Sections, specifying glazing and cladding materials installed with aluminum terrace doors.

Build mockup of aluminum terrace doors, as indicated on Drawings.

Editor Note: Retain first subparagraph below if subjecting mockup to field testing.

Testing to be performed on mockups in accordance with requirements in "Field Quality Control" Article.

Editor Note: Retain first subparagraph below if mockups are not only for establishing appearance factors.

Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.

Editor Note: Retain subparagraph below if the intention is to make an exception to the default requirement in Section 014000 "Quality Requirements" for demolishing and removing mockups.

Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

* + - 1. **DELIVERY, STORAGE, AND HANDLING**
         1. Protect finished surfaces to prevent damage.

Editor Note: When adhesive papers and sprayed coatings are exposed to direct sun, they become firmly bonded.

* + - * 1. Use of adhesive papers or sprayed coatings is unacceptable. Remove if present.

Editor Note: Retain both subparagraphs below if glazing is included in this Section.

* + - * 1. Deliver glass units with manufacturer's labels intact on interior side of glass. Verify labels indicate glass thickness, unit location, glass strength, and orientation of units in vertical position.
        2. Protect glass edges and corners to prevent chipping, cracking, and other damages.
      1. **WARRANTY**

Editor Note: When warranties are required, verify with Owner's counsel that special warranties stated in this article are not less than remedies available to Owner under prevailing local laws.

* + - * 1. Special Material Warranty: Installer agrees to repair or replace components of aluminum terrace doors that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

Failures include, but are not limited to, the following:

Failure to meet performance requirements.

Structural failures including excessive deflection, water leakage, and air infiltration.

Faulty operation of movable panels and hardware.

Editor Note: Delete option in first subparagraph below if retaining "Special Finish Warranty" Paragraph.

Deterioration of metals [**, metal finishes,**] and other materials beyond normal weathering.

Failure of insulating glass[ and laminated glass].

Standard Warranty Period: [**Two**] years from date of manufacture and transferred to Owner on date of Substantial Completion; **[One]** year from date of Substantial Completion for manufacturer’s hardware

Extended Warranty period available upon request.

* + - * 1. Special Finish Warranty, Factory-Applied Finishes: Manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

Editor Note: Retain first subparagraph below for factory-painted finishes. Coordinate color fading and chalking limits with finishes retained in Part 2.

Deterioration includes, but is not limited to, the following:

Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.

Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.

Cracking, checking, peeling, or failure of paint to adhere to bare metal.

Standard Warranty Period: [**Two**] years from date of manufacture and transferred to Owner on date of Substantial Completion.

Extended Warranty period available upon request.

* + - * 1. Special Finish Warranty, Anodized Finishes: Manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

Editor Note: Retain first subparagraph below for anodized finishes. Coordinate color fading and chalking limits with finishes retained in Part 2.

Deterioration includes, but is not limited to, the following:

Color fading more than 5 Delta E units when tested in accordance with ASTM D 2244.

Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.

Cracking, peeling, or chipping.

Standard Warranty Period: [**Two**] years from date of manufacture and transferred to Owner on date of Substantial Completion.

Extended Warranty period available upon request.

1. **PRODUCTS**
   * + 1. **PERFORMANCE REQUIREMENTS**

Editor Note: See the Evaluations for discussions of performance requirements. Coordinate performance requirements with types of terrace door operation (for example, swinging or sliding), glass type, and other variables. If performance requirements vary among types of doors, insert language to differentiate requirements among door types or indicate requirements in a schedule on Drawings.

* + - * 1. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

Editor Note: Coordinate performance class and grade with available options and features. Some options affect door performance or may not be available for doors meeting selected performance class and grade.

* + - * 1. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

Minimum Performance Class: Class AW.

Editor Note: AAMA/WDMA/CSA 101/I.S.2/A440 establishes a gateway Performance Grade for aluminum terrace doors to qualify for each Performance Class. The gateway Performance Grade is 15 for Class R, 25 for Class LC, 30 for Class CW, and 40 for Class AW. For a particular project, the minimum Performance Grade for aluminum terrace doors is typically based on the design pressure.

Minimum Performance Grade: [Grade 65] [As indicated on Drawings].

* + - * 1. Air Leakage: Air leakage of not more than **0.1 cfm/ft²** **(0.5 L/s per m²)** at a static-air-pressure differential of **6.27 lbf/ft²** **(300 Pa)** when tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.

Editor Note: Retain "Water Penetration under Static Pressure" Paragraph below for static-pressure method, which is most frequently specified. For water-penetration tests, AAMA 501 states that a static-air-pressure differential of 20 percent of wind-load design pressure provides satisfactory performance in most parts of the United States. Locations where high winds and heavy rains occur simultaneously require higher test-pressure differences. Both static and dynamic testing may be required or desired for certain designs, particularly those incorporating special water-drainage features, such as rain screen walls.

* + - * 1. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:

No evidence of water penetration through fixed glazing and framing areas, excluding entrance doors, when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than [**10 lbf/sq. ft. (480 Pa)**] [**12 lbf/sq. ft. (580 Pa)**] [**15 lbf/sq. ft. (720 Pa)**].

Editor Note: Retain "Water Penetration under Dynamic Pressure" Paragraph below if required for preconstruction laboratory mockup testing; most manufacturers do not include test data in product literature for dynamic-pressure testing. This test may be available in some areas for field quality-control testing; verify with qualified testing agency.

* + - * 1. Water Penetration under Dynamic Pressure: Test in accordance with AAMA 501.1 as follows:

No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than [**10 lbf/sq. ft. (480 Pa)**] [**12 lbf/sq. ft. (580 Pa)**] [**15 lbf/sq. ft. (720 Pa)**].

Editor Note: AAMA 501.1's definition of water leakage allows up to 1/2 oz. (15 mL) of water to accumulate on an interior stop or stool integral to assembly in a 15-minute period.

Maximum Water Leakage: [**In accordance with AAMA 501.1**] [**No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation**]. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

Editor Note: ASTM E330/E330M test method evaluates structural performance of aluminum-framed entrances and not structural performance of contiguous construction.

* + - * 1. Structural: Test in accordance with ASTM E330/E330M as follows:

When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.

When tested at **[150]** percent of positive and negative wind-load design pressures, assemblies, including anchorage, terrace door systems do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding **[0.2]** percent of span.

Editor Note: Minimum test duration in accordance with ASTM E330/E330M is 10 seconds, which is historically U.S. practice.

Test Durations: As required by design wind velocity, but not less than **[10]** seconds.

* + - * 1. Life Cycle Testing: Test in accordance with AAMA 910.

No damage to fasteners, hardware parts, supports arms, activating mechanisms or other damage shall result in inoperable terrace doors at testing conclusion.

Terrace doors to comply with performance requirements after completion of air leakage and water penetration testing.

* + - * 1. Operation Cycle Testing: Test in accordance with AAMA 920.

No damage to fasteners, hardware parts, supports arms, activating mechanisms or other damage shall result in inoperable terrace doors at testing conclusion.

* + - * 1. Forces and Motions in Accessible Spaces: Test in accordance with AAMA 513 as follows:

Operating Force: The maximum force to operate the terrace door through the normal range of operation including unlatching, opening, closing and relatching shall not exceed **5 lbf** **(22N)**.

Air Leakage: Air leakage of not more than **0.1 cfm/ft²** **(0.5 L/s per m²)** at a static-air-pressure differential of **6.27 lbf/ft²** **(300 Pa)** when tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 after completion of operational force testing.

Water Leakage: No evidence of water penetration when tested in accordance with a minimum static-air-of **15 lbf/ft²** **(720 Pa)** after completion of operational force testing.

Uniform Load Deflection: When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits after completion of operational force testing.

Uniform Load Structural: When tested at **[150]** percent of positive and negative wind-load design pressures, assemblies, including anchorage, terrace door systems do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding **[0.2]** percent of span after completion of operational force testing.

Editor Note: The IECC and ASHRAE/IES 90.1 require that all fenestration be certified and labeled by manufacturer for energy performance for thermal transmittance (U-factor), Solar Heat-Gain Coefficient (SHGC), air leakage, and visible transmittance (VT). Energy performance for fenestration products is typically determined for the whole fenestration product or system, which includes the framing, glazing, and the spacer. Coordinate the values selected for energy performance with the glazing selections in Section 088000 "Glazing," and confirm that manufacturer can meet the specified energy performance and can provide certification and labeling. Verify requirements of authorities having jurisdiction.

* + - * 1. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:

Editor Note: Options in subparagraphs below are examples only; revise values to suit climate zone of building envelope as defined by the IECC. Testing for visible light transmittance (VT) is specified in Section 088000 "Glazing."

Thermal Transmittance (U-factor):

Low-E glazing of **[0.39 Btu/sq. ft. x h x deg F (2.21 W/sq. m x K)] [0.56 Btu/sq. ft. x h x deg F (3.18 W/sq. m x K)]**.

Clear glazing of **[0.53 Btu/sq. ft. x h x deg F (3.01 W/sq. m x K)] [0.70 Btu/sq. ft. x h x deg F (3.97 W/sq. m x K)]**.

Solar Heat-Gain Coefficient (SHGC):

Operable Glazing and Framing Areas: SHGC for the system of not more than [**0.27**] [**0.30**] [**0.40**] as determined in accordance with NFRC 200.

Condensation Resistance Factor (CRF):

Fixed Glazing and Framing Areas: CRF for the system of not less than [**35**] [**55**] as determined in accordance with AAMA 1503.

Thermal Movements: Provide aluminum terrace doors, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

* + - * 1. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

Editor Note: Differential values in "Temperature Change" Subparagraph below (for aluminum in particular) are suitable for most of the United States.

Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

Editor Note: Retain "Sound Transmission Class (STC)" or "Outside-Inside Transmission Class (OITC)" Paragraph below after verifying availability of test data. STC evaluates construction subject to interior, spoken-voice frequencies, while OITC evaluates using a sound-frequency range with lower frequencies more representative of transportation noise, which building envelopes are more likely to experience. OITC is generally a better evaluation method for exterior fenestration, but fewer manufacturers have OITC test data available.

* + - * 1. Sound Transmission Class (STC): Rated for not less than **[28] [31] [35]** STC when tested for laboratory sound transmission loss in accordance with ASTM E90 and determined by ASTM E413.
        2. Outside-Inside Transmission Class (OITC): Rated for not less than **[25] [28] [31]** OITC when tested for laboratory sound transmission loss in accordance with ASTM E90 and determined by ASTM E1332.

Editor Note: Retain “Basis-of-Design Product” Paragraph below for proprietary method specification. Add product attributes, performance characteristics, material standards, and descriptions as applicable. Do not use the phrase “or equal” or “approved equal”, or similar phrases. The use of such phrases will cause ambiguity in the specifications because of the different various interpretations among the different parties of the construction process and readers of the specifications. Such phrases require comprehensive and complete requirements (legal, procedural, regulatory, and responsibility) for determining “or equal.”

* + - 1. **Manufacturers**
         1. Basis-of-Design Product:

Subject to compliance with requirements, provide **Oldcastle BuildingEnvelope®**, a CRH Company

**Terra Swing™ Access**

Side-Hinged Terrace Door: Outswing

Editor Note: Retain Paragraph below for alternate manufacturers/products as specified in the contract documents. Coordinate below with bid documents, if any, and Division 1 alternates section. Consult with **Oldcastle BuildingEnvelope®** for recommendations on alternate manufacturers and products that meet the design criteria and project requirements. **Oldcastle BuildingEnvelope®** recommends that other manufacturers requesting approval to bid their product as an equal, must submit their request in writing 10 days prior to close of bidding.

* + - * 1. Subject to compliance with requirements, provide a comparable product by the following:

Manufacturer: (\_\_\_\_\_\_\_\_\_\_\_\_\_)

Series: (\_\_\_\_\_\_\_\_\_\_\_\_)

Frame Profile: (\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

* + - * 1. Substitutions: Refer to Substitutions Section for procedures and submission requirements.

Pre-Contract (Bidding Period) Substitutions: Submit written requests 10 days prior to bid date.

Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid curtain wall installation and construction delays.

Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.

Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for curtain wall system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum curtain walls for a period of not less than 10 years. (Company Name).

Test Reports: Submit test reports verifying compliance with each test requirement required by the project.

Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.

* + - * 1. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.
        2. Types: Provide the following types in locations indicated on Drawings:

Side-Hinged Terrace Door: Outswing.

* + - * 1. Frame and Sash Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

Construction: Thermally Broken.

Frame Depth: **3-1/4 inches (82.6 mm)**.

Leaf Depth: **2-1/4-inches (57.2 mm)**.

Leaf Design: Flush.

Exterior Glazing System: **[3/4-inch (19-mm)] [1-inch (25-mm)] [1-1/8-inch (29-mm)] [1-1/4-inch (32-mm)] [1-3/8-inch (35-mm)] [1-1/2-inch (38-mm)] [1-3/4-inch (45-mm)]** IGU.

Finish: [**Clear anodic**] [**Color anodic**] [**High-performance organic**] [**Superior-performance organic**].

Fabrication Method: Shop.

Aluminum: ASTM B221, Alloy 6063-T5 extrusions for framing members; ASTM B209, Alloy 5005-H16 for sheets; or other alloys and temper recommended by manufacturer for type of use and finish indicated.

Framing Member Thickness: Minimum **0.125 inch (3.2 mm)**.

Leaf Member Thickness: Minimum **0.125 inch (3.2 mm)**.

Steel Reinforcement: As required by manufacturer.

Shapes and sizes to suit installation.

Editor Note: AAMA/WDMA/CSA 101/I.S.2/A440 includes requirements for aluminum, thermal breaks, and other materials and door components. If more stringent requirements apply, insert them in this article.

* + - * 1. Frames and Leaves: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

Thermally Broken Construction: Fabricate frames, leaves, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and door members exposed on interior side in a manner that eliminates direct metal-to-metal contact.

Nylon Thermal Barrier: Crimped-in-place glass reinforced polyamide 6/6 nylon struts.

Editor Note: "Glazing System" Paragraph below refers to the method by which the glazing unit (glass) is retained within the door leaf or frame.

* + - * 1. Glazing System: **[Manufacturer's standard factory-glazing system that produces weathertight seal].**

Editor Note: Nonmagnetic stainless steel, Series 300, or superior corrosion-resistant-coated metal hardware may be required to meet specific customer or regional needs and for protection against corrosive environments, such as in urban, coastal, or industrial areas.

* + - * 1. General: Provide manufacturer's standard hardware, fabricated from Series 300 stainless steel, a corrosion-resistant material compatible with aluminum complying with AAMA 907, and designed to smoothly operate, tightly close, and securely lock aluminum terrace doors.

Editor Note: Revise "Lock" Paragraph below to suit Project's locking requirements or insert others. Include key-operated cylinders here or in Section 087100 "Door Hardware."

* + - * 1. Lock: Install manufacturer's standard keyed multipoint locking device on each operable panel, lockable from the inside [**only**] [**and outside**].

Design: [**Keyed-cylinder lock**] [**Thumb-turn cylinder**] [**As selected from manufacturer's full range**].

Handle/Escutcheon Plate(s): [**As selected by Architect from manufacturer's full range of types and styles**].

Editor Note: Finishes indicated in "Finish" Subparagraph below are examples only; confirm availability with manufacturers.

Finish: [**As selected from manufacturer's full range of finishes**].

Keying System: [**All cylinders keyed alike**] [**Keyed to match other building entrances**].

Exposed Hardware Color and Finish: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**] <**Insert color and finish**>.

* + - * 1. Strikes: Provide strike for each latch or lock bolt; fabricated for aluminum framing.
        2. Butt Hinges: [**Adjustable** **Non-friction type, not less than two per sash**].
        3. Door Stops: concealed with adjustable stop and integral rubber bumper.

Editor Note: Most manufacturers use high-leg, high-performance thresholds to attain better performance levels for air infiltration and water penetration.

OBE's low-profile, high-performance thresholds are covered by United States patents 8276320 and 10745961.

"Threshold" Paragraph below is based on ADA Accessibility Guidelines requirements for egress doors.

* + - * 1. Threshold: Provide extruded-aluminum threshold of thickness, dimensions, and profile indicated; designed to comply with performance requirements indicated and to drain to the exterior; with manufacturer's standard finish. Raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (12.7 mm).

Low-Profile Threshold: ADA compliant.

* + - * 1. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
        2. Fasteners: Noncorrosive and compatible with door members, trim, hardware, anchors, and other components.

Editor Note: Retain "Exposed Fasteners" Subparagraph below. Revise if exposed fasteners are permitted.

* + - * 1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.
      1. **MATERIALS**
         1. Sheet and Plate: ASTM B209 (ASTM B209M).
         2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221 (ASTM B221M).
         3. Extruded Structural Pipe and Tubes: ASTM B429 (ASTM B429M).
         4. Structural Profiles: ASTM B308/B308M.

Editor Note: Retain "Steel Reinforcement" and "Steel Reinforcement Primer" paragraphs below for internal steel reinforcement of aluminum framing members; revise to suit Project.

* + - * 1. Steel Reinforcement:

Structural Shapes, Plates, and Bars: ASTM A36/A36M.

Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.

Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

* + - * 1. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM and prepare surfaces in accordance with applicable SSPC standard.

Editor Note: Retain "Recycled Content of Aluminum Components" Paragraph below to specify recycled content if required. An alternative method of requiring recycled content is to retain requirement in Project's Division 01 sustainable design requirements Section that gives Contractor the option and responsibility to determine how recycled content requirements will be met.

* + - * 1. Recycled Content of Aluminum Components: Postconsumer recycled content plus one-half of preconsumer recycled content not less than [**25**] [**50**] percent.
      1. **ACCESSORIES**
         1. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

Editor Note: Retain subparagraph below for exposed fasteners if any.

Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

* + - * 1. Anchors, Clips, and Accessories: Provide anchors, clips, and accessories of aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron for aluminum terrace doors, complying with ASTM B456 or ASTM B633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

Windborne-Debris Resistance: Provide anchors of same design used in windborne-debris resistance testing.

* + - 1. **FABRICATION**
         1. Fabricate aluminum terrace doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
         2. Fabricate aluminum terrace doors that are reglazable without dismantling panel framing.
         3. Weather Stripping: Provide full-perimeter weather stripping for each door panel.
         4. Weep Holes: Provide weep holes and internal drainage passages to conduct infiltrating water to exterior.
         5. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

Editor Note: Retain "Factory-Glazed Fabrication" Paragraph below if doors are factory glazed. Verify size limitations of factory glazing with manufacturers.

* + - * 1. Factory-Glazed Fabrication: Glaze aluminum terrace doors in the factory where practical and possible for applications indicated. Comply with requirements in Section 088000 "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440.
      1. **ALUMINUM FINISHES**

Editor Note: Retain finishes in paragraphs below to suit Project. If retaining more than one, indicate location of each on Drawings or by inserts. Aluminum-framing systems are available with dual finishes, allowing different interior and exterior color finishes. See "Aluminum Finishes" Article in the Evaluations for additional information.

Retain one of two options in "Clear Anodic Finish" Paragraph below. Verify availability with manufacturers.

* + - * 1. Clear Anodic Finish: AAMA 611, [**AA-M12C22A41, Class I, 0.018 mm**] [**AA-M12C22A31, Class II, 0.010 mm**] or thicker.

Editor Note: Retain one of two options in "Color Anodic Finish" Paragraph below. Verify availability with manufacturers.

* + - * 1. Color Anodic Finish: AAMA 611, [**AA-M12C22A42/A44, Class I, 0.018 mm**] [**AA-M12C22A32/A34, Class II, 0.010 mm**] or thicker.

Editor Note: Options in "Color" Subparagraph below are examples only and may vary in color range and availability among manufacturers.

Color: [**Light bronze**] [**Medium bronze**] [**Dark bronze**] [**Black**] [**Match Architect's sample**] [**As selected by Architect from full range of industry colors and color densities**].

Editor Note: Retain "High-Performance Organic Finish, Two-Coat PVDF"; "Superior-Performance Organic Finish, Three-Coat PVDF"; or "Superior-Performance Organic Finish, Four-Coat PVDF" Paragraph below. If more than one is required, indicate location of each system on Drawings, in schedules, or by inserts. Coordinate finish system selected with special finish warranty period specified in "Warranty" Article.

Editor Note: In "High-Performance Organic Finish, Two-Coat PVDF" Paragraph below, retain AAMA 2604 with 50 percent resin content by weight in color coat or AAMA 2605 with 70 percent resin content by weight in color coat for high-performance organic coatings on extrusions and panels. If specific products are required, name coating manufacturers and products.

* + - * 1. High-Performance Organic Finish, Two-Coat PVDF: Fluoropolymer finish complying with [**AAMA 2604**] [**AAMA 2605**] and containing not less than [**50**] [**70**] percent PVDF resin by weight in color coat.

Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions [**for seacoast and severe environments**].

Color and Gloss: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**].

* + - * 1. Superior-Performance Organic Finish, Three-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.

Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions [**for seacoast and severe environments**].

Color and Gloss: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**].

* + - * 1. Superior-Performance Organic Finish, Four-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.

Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions [**for seacoast and severe environments**].

Color and Gloss: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**].

* + - 1. **SOURCE QUALITY CONTROL**

Editor Note: Retain this article if Project includes two-sided structural glazing.

* + - * 1. Structural Sealant: Perform quality-control procedures complying with ASTM C1401 recommendations, including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

1. **EXECUTION**
   * + 1. **EXAMINATION**
          1. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of Work.
          2. Verify rough opening dimensions, levelness of threshold substrate, and operational clearances.
          3. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight aluminum terrace door installation.
          4. Proceed with installation only after unsatisfactory conditions have been corrected.
       2. **INSTALLATION, GENERAL**
          1. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing doors, hardware, accessories, and other components.
          2. Install aluminum terrace doors level, plumb, square, true to line; without distortion, warp, or rack of frames and panels and without impeding thermal movement; anchored securely in place to structural support; and in proper relation to wall flashing, vapor retarders, air barriers, water/weather barriers, and other adjacent construction.
          3. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
          4. Install aluminum terrace doors and components to drain condensation, water-penetrating joints, and moisture migrating within doors to the exterior.
          5. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
       3. **ERECTION TOLERANCES**
          1. Install aluminum terrace doors to comply with the following maximum tolerances:

Editor Note: Erection tolerances in subparagraphs below are examples only that are based on various AAMA references. Coordinate with tolerances for support systems and revise to suit Project.

Plumb: 1/8 inch in 10 ft. (3.2 mm in 3 m); 1/4 inch in 40 ft. (6.35 mm in 12.2 m).

Level: 1/8 inch in 20 ft. (3.2 mm in 6 m); 1/4 inch in 40 ft. (6.35 mm in 12.2 m).

Alignment:

Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).

Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).

Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).

Location: Limit variation from plane to 1/8 inch in 12 ft. (3.2 mm in 3.6 m); 1/2 inch (12.7 mm) over total length.

* + - 1. **FIELD QUALITY CONTROL**

Editor Note: Retain this article if field tests are required. If retaining, indicate number of doors to be tested. Field tests for air and water leakage should be specified for significant projects.

Retain "Testing Agency" Paragraph below to identify who shall perform tests and inspections. If retaining second option in "Testing Agency" Paragraph, retain "Field quality-control reports" Paragraph in "Informational Submittals" Article.

* + - * 1. Testing Agency: [**Owner will engage**] [**Engage**] a qualified testing agency to perform tests and inspections.

Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

Editor Note: Revise "Testing Services" Paragraph below if more stringent testing is required. AAMA 502 Test Method A is default unless otherwise indicated.

* + - * 1. Testing Services: Test and inspect installed aluminum terrace doors as follows:

Testing Methodology: Test aluminum terrace doors for air infiltration and water resistance in accordance with AAMA 502.

Air-Infiltration Testing:

Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.

Allowable Air-Leakage Rate: [**1.5**] times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.

Editor Note: When specifying test pressure note that AAMA allows a one-third reduction in test pressures for field tests. 6.24 lbf/sq. ft. (300 Pa) is industry standard minimum; however, AAMA 503 allows minimum test pressure of 4.18 lbf/sq. ft. (200 Pa). Alternatively, AAMA 502 allows a prescribed test pressure for water penetration, depending on the location and wind exposure of Project. Revise "Water Penetration" Subparagraph below to use a prescribed test pressure.

Water-Resistance Testing:

Test Pressure: [**Two-thirds**] times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.

Allowable Water Infiltration: No water penetration.

Testing Extent: [**Three**] [**Three mockup**] aluminum terrace doors of each type as selected by Architect and a qualified independent testing and inspecting agency. Conduct tests after perimeter sealants have cured.

Test Reports: Prepared in accordance with AAMA 502.

Editor Note: See Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

* + - * 1. Aluminum terrace door will be considered defective if it does not pass tests and inspections.
      1. **ADJUSTING, CLEANING, AND PROTECTION**
         1. Lubricate hardware and moving parts.
         2. Adjust operating panels to provide a tight fit at contact points and weather stripping for smooth operation, without binding, and a weathertight closure. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.
         3. Clean exposed surfaces immediately after installing aluminum terrace doors. Avoid damaging protective coatings and finishes. Remove nonpermanent labels, excess sealants, glazing materials, dirt, and other substances.
         4. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
         5. Protect aluminum terrace door surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances contact aluminum terrace door surfaces, remove contaminants immediately in accordance with manufacturer's written instructions.

Retain first paragraph below if doors are factory finished.

* + - * 1. Refinish or replace aluminum terrace doors with damaged finishes.
        2. Replace damaged components.

**END OF SECTION 084113**