



SECTION 08 51 13

ALUMINUM WINDOWS

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum Project Out Windows.
- B. Aluminum Project In Windows.
- C. Aluminum Casement Windows.
- D. Aluminum Fixed Windows.

1.2 RELATED SECTIONS

- A. Section 07 27 26 - Fluid-Applied Membrane Air Barriers .
- B. Section 07 90 00 - Joint Protection.
- C. Section 08 83 13 - Mirrored Glass Glazing.

1.3 REFERENCES

- A. AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC), and Wood Windows and Glass Doors.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
- C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- D. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
- E. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
- F. AAMA 2605 - Voluntary Specification Performance Requirements for Superior Performance Organic Coatings on Aluminum Extrusions and Panels.

- G. ASTM 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- H. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- I. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- J. ASTM E 331 - Standard test method for water penetration of exterior windows, skylights, doors, and curtain walls by uniform static air pressure difference.
- K. ASTM F 588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Test Units
 - 1. Air, water and structural test unit shall conform to size and configuration requirements specified by AAMA/NWWDA 101/I.S. 2-97.
- B. Test Procedures and Performance (i65 Series)
 - 1. Standards: Windows shall conform to AAMA/NWWDA 101/I.S. 2-11 requirements for Class AP-AW100 or C-AW100.
 - 2. Air Infiltration Test: Test unit in accordance with ASTM E 283 with an air pressure difference of 6.24 psf. Air infiltration shall not exceed .10 cfm per foot of perimeter crack length.
 - 3. Water Resistance Test: Test unit in accordance with ASTM E 331 at static pressure difference of 15.00 psf with no water leakage.
 - 4. Uniform Load Deflection Test: Test unit in accordance with ASTM E 330 at 100 psf.
 - 5. Condensation Resistance Test (CRF): Test unit for thermal performance in accordance with AAMA 1503- 98 with condensation resistance factor of at least 60.
 - 6. Thermal Transmittance Test (Conductive U-Value): Test unit in accordance with AAMA 1503-98 with U- value of 0.43 or less.
 - 7. Forced Entry Resistance Test: Unit tested in accordance with ASTM F 588 for Type B Grade 40.
- C. Test Procedures and Performance (i85 Series)
 - 1. Standards: Windows shall conform to AAMA/NWWDA 101/I.S. 2-11 requirements for Class AP-AW100 or C-AW100.
 - 2. Air Infiltration Test: Test unit in accordance with ASTM E 283 with an air pressure difference of 6.24 psf. Air infiltration shall not exceed .10 cfm per foot of perimeter crack length.
 - 3. Water Resistance Test: Test unit in accordance with ASTM E 331 at static pressure difference of 15.00 psf with no water leakage.
 - 4. Uniform Load Deflection Test: Test unit in accordance with ASTM E 330 at 100 psf.
 - 5. Condensation Resistance Test (CRF): Test unit for thermal performance in accordance with AAMA 1503- 98 with condensation resistance factor of at least 60.
 - 6. Thermal Transmittance Test (Conductive U-Value): Test unit in accordance with AAMA 1503-98 with U- value of 0.43 or less.
 - 7. Forced Entry Resistance Test: Unit tested in accordance with ASTM F 588 for Type B Grade 10.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Show dimensions of aluminum windows, elevations, details of all window sections, anchorage and installation details, hardware, and interface with other products.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning and maintenance of all components.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum ten years experience producing aluminum windows of the type specified.
- B. Installer Qualifications: Use installers that are experienced and skilled in the installation of aluminum windows of the type specified.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and handle windows and other components in strict compliance with manufacturer's instructions.
- C. Protect units against damage from the elements, construction activities and other hazards before, during, and after installation.

1.8 SEQUENCING

- A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
- B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 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.

1.10 WARRANTY

- A. Provide manufacturer's limited 5 year warranty against defects in workmanship and materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: DeSCo Architectural Inc., which is located at: 716 3rd St. S. E.; De Smet, SD 57231; Toll Free Tel: 800-952-5534; Tel: 605-854-9126; Fax: 605-854-9127; Email: [request info \(sales@descoarc.com\)](mailto:request_info@descoarc.com); Web: www.descoarc.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MATERIALS

- A. Aluminum Extrusions: 6063 T-5 alloy with minimum ultimate tensile strength of 22,000 PSI.
- B. Sheet Aluminum: ASTM B 209; 5005 alloy, H15 or H34 temper.
- C. Fasteners: Aluminum, stainless steel or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors and other components of the window units.
- D. Glazing: Coordinate with glass and glazing materials as follows:
 - 1. Insulated and sheet glass as specified in Section 08 83 13 - Mirrored Glass Glazing.

2.3 ALUMINUM WINDOWS

- A. i65 Series
 - 1. General:
 - a. Frame Depth: 2-9/16 inches (65 mm).
 - b. Typical Material Thickness: .094 inch.
 - c. Frame Construction: Tubular.
 - 1) Frame corners mitered, crimped and epoxy welded. Mullions mortise and tenon.
 - 2) Corners weather sealed with sealant.
 - 3) Units are re-glazable from the interior with re-useable snap in stops.
 - d. Sash Construction:
 - 1) Sash corners mitered, crimped and epoxy welded.
 - 2) Corners weather sealed with sealant.
 - 3) Dual weather strip with closed cell foam.
 - 4) Units are re-glazable from the interior with re-useable snap in stops.
 - e. Thermal Break: Thermal break provided by a continuously extruded,

multi-directional 25 percent glass fiber reinforced 6/6 polyamide nylon (Strip). Aluminum window framing members separated with a locking mechanical connection to the Thermal Strip(s) by properly knurling the aluminum cavity and crimping the strip(s) into place to create a composite thermal barrier assembly. Structural performance values of the Thermal Barrier assembly to meet specific product/project design criteria or at a minimum certified testing criteria and procedures as described by the AAMA TIR-A8 performance standards. Other thermal barrier assemblies such as rolled-in PVC, single or bi directional glass fiber-reinforced polyamides, or pour-and-debridged polyurethane systems will not be accepted.

- f. Glazing Thickness: 1/4 inch, 1 inch and 1-3/4 inches (6 mm, 25 mm and 44 mm)
 - g. Weatherstrip: Closed cell Santoprene foam encapsulated by a seamless Santoprene elastomeric skin.
2. Project-Out:
- a. Specs:
 - 1) AAMA Designation: P-HC100; P-AW100
 - 2) ASTM F 588 (Forced Entry) Grade 10
 - 3) U-Value-0.43
 - 4) Water Resistance: 15 PSF
 - b. Size Limitations:
 - 1) With cam handles - Minimum Size 14 inches wide by 14 inches high. Maximum Size 60 inches wide by 36 inches high.
 - 2) With roto operators - Minimum Size 24 inches wide by 16 inches high. Maximum Size 60 inches wide by 36 inches high.
 - c. Screens: Frame shall be constructed of 6063 T-5 alloy extruded aluminum.
 - 1) Fiberglass 18x16 Mesh
 - 2) Aluminum 18x16 Mesh
 - d. Hardware:
 - 1) Standard: Cam handles and 4-bar stainless steel balanced arms.
 - 2) Optional: Custodial locks, locking handles, pivot shoe roto operators, push bars, friction adjusters, limited opening device, limit stops, ADA hardware or screens as specified.
3. Project-In:
- a. Specs:
 - 1) AAMA Designation: P-HC100; P-AW100
 - 2) ASTM F 588 (Forced Entry) Grade 10
 - 3) U-Value 0.41
 - 4) Water Resistance: 15 PSF
 - b. Size Limitations:
 - 1) With cam handles - Minimum Size 14 inches wide by 14 inches high. Maximum Size 60 inches wide by 36 inches high.
 - c. Flat Screens: Frame shall be constructed of 6063 T-5 alloy extruded aluminum.
 - 1) Fiberglass 18x16 Mesh
 - 2) Aluminum 18x16 Mesh
 - d. Hardware:
 - 1) Standard: Cam handles with concealed 4-bar stainless steel balanced arms.
 - 2) Optional: Custodial locks, locking handles, pivot shoe roto operators, push bars, friction adjusters, limited opening device, limit stops, ADA hardware or screens as specified.
4. Casement
- a. Specs:

- 1) AAMA Designation: C-HC100; C-AW100
 - 2) ASTM F 588 (Forced Entry) Grade 10
 - 3) U-Value 0.43
 - 4) Water Resistance: 15 PSF
 - b. Size Limitations:
 - 1) With roto operators - Minimum Size 16 inches wide by 24 inches high. Maximum Size 36 inches wide by 60 inches high.
 - c. Flat Screens: Frame shall be constructed of 6063 T-5 alloy extruded aluminum.
 - 1) Fiberglass 18x16 Mesh
 - 2) Aluminum 18x16 Mesh
 - d. Hardware:
 - 1) Standard: Cam handles and 4-bar stainless steel balanced arms.
 - 2) Optional: Concealed 4-bar stainless steel balanced arms or egress hinges, cam handles, custodial locks, friction adjustors, limited opening devices, limit stops or screens as specified.
 - 5. Fixed:
 - a. Specs:
 - 1) AAMA Designation: F-HC100; F-AW100
 - 2) ASTM F 588 (Forced Entry) Grade 10
 - 3) U-Value: 0.29
 - 4) Water Resistance: 15 PSF
 - b. Size Limitations:
 - 1) Minimum Size 14 inches wide by 14 inches tall. Maximum Size (Contact DeSCo Architectural, Inc.)
 - 6. Accessories:
 - a. Extruded Aluminum Sill:
 - 1) 5 inches deep
 - 2) 3-1/2 inches deep
 - b. Two Piece Mullion Cover: Aluminum
 - c. Snap Trim:
 - 1) 1-3/4 inches by 3/4 inch
 - 2) 1-1/2 inch by 1-1/2 inch
 - 3) 3-1/2 inch by 1 inch
- B. i85 Series
- 1. General:
 - a. Frame Depth: 3-3/8 inches (85 mm).
 - b. Typical Material Thickness: .094 inch.
 - c. Frame Construction: Tubular.
 - 1) Frame corners mitered, crimped and epoxy welded. Mullions mortise and tenon.
 - 2) Corners weather sealed with sealant.
 - 3) Units are re-glazable from the interior with re-useable snap in stops.
 - d. Sash Construction:
 - 1) Sash corners mitered, crimped and epoxy welded.
 - 2) Corners weather sealed with sealant.
 - 3) Dual weather strip with closed cell foam.
 - 4) Units are re-glazable from the interior with re-useable snap in stops.
 - e. Thermal Break: Thermal break provided by a continuously extruded, multi-directional 25 percent glass fiber reinforced 6/6 polyamide nylon (Strip). Aluminum window framing members separated with a locking mechanical connection to the Thermal Strip(s) by properly knurling the aluminum cavity and crimping the strip(s) into place to create a

composite thermal barrier assembly. Structural performance values of the Thermal Barrier assembly to meet specific product/project design criteria or at a minimum certified testing criteria and procedures as described by the AAMA TIR-A8 performance standards. Other thermal barrier assemblies such as rolled-in PVC, single or bi directional glass fiber-reinforced polyamides, or pour-and-debridged polyurethane systems will not be accepted.

- f. Glazing Thickness: 1 inch and 1-3/4 inches (25 mm and 44 mm)
 - g. Weatherstrip: Closed cell Santoprene foam encapsulated by a seamless Santoprene elastomeric skin.
2. Project-Out:
- a. Specs:
 - 1) AAMA Designation: P-HC100; P-AW100
 - 2) ASTM F 588 (Forced Entry) Grade 10
 - 3) U-Value 0.29
 - 4) Water Resistance: 15 PSF
 - b. Size Limitations:
 - 1) With cam handles - Minimum Size 14 inches wide by 14 inches high. Maximum Size 60 inches wide by 36 inches high.
 - 2) With roto operators - Minimum Size 24 inches wide by 18 inches high. Maximum Size 60 inches wide by 36 inches high.
 - c. Wicket Screens: Frame shall be constructed of 6063 T-5 alloy extruded aluminum.
 - 1) Fiberglass 18x16 Mesh
 - 2) Aluminum 18x16 Mesh
 - d. Hardware:
 - 1) Standard: Cam handles with concealed 4-bar stainless steel balanced arms.
 - 2) Optional: Custodial locks, spring latch, pole ring handles, locking handles, friction adjusters, limited opening device, limit stops, ADA hardware or screens as specified.
3. Project-In:
- a. Specs:
 - 1) AAMA Designation: P-HC 100, P-AW100
 - 2) ASTM F 588 (Forced Entry) Grade 10
 - 3) U-Value 0.38
 - 4) Water Resistance: 15 PSF
 - b. Size Limitations:
 - 1) With cam handles - Minimum Size 14 inches wide by 14 inches high. Maximum Size 60 inches wide by 36 inches high.
 - c. Flat Screens: Frame shall be constructed of 6063 T-5 alloy extruded aluminum.
 - 1) Fiberglass 18x16 Mesh
 - 2) Aluminum 18x16 Mesh
 - d. Hardware:
 - 1) Standard: Cam handles with concealed 4-bar stainless steel balanced arms.
 - 2) Optional: Custodial locks, spring latch, pole ring handles, locking handles, friction adjusters, limited opening device, limit stops, ADA hardware or screens as specified.
4. Casement
- a. Specs:
 - 1) AAMA Designation: C-HC100; C-AW100
 - 2) ASTM F 588 (Forced Entry) Grade 10
 - 3) U-Value 0.39
 - 4) Water Resistance: 15 PSF

- b. Size Limitations:
 - 1) With roto operators - Minimum Size 16 inches wide by 24 inches high. Maximum Size 36 inches wide by 60 inches high.
 - c. Flat Screens: Frame shall be constructed of 6063 T-5 alloy extruded aluminum.
 - 1) Fiberglass 18x16 Mesh
 - 2) Aluminum 18x16 Mesh
 - d. Hardware:
 - 1) Standard: Cam handles with concealed 4-bar stainless steel balanced arms.
 - 2) Optional: Custodial locks, spring latch, pole ring handles, locking handles, friction adjusters, limited opening device, limit stops, ADA hardware or screens as specified.
5. Fixed:
- a. Specs:
 - 1) AAMA Designation: F-HC100; F-AW100
 - 2) ASTM F 588 (Forced Entry) Grade 10
 - 3) U-Value: 0.29
 - 4) Water Resistance: 15 PSF
 - b. Size Limitations:
 - 1) Minimum Size 14 inches wide by 14 inches tall. (Maximum Size - Contact DeSCo Architectural, Inc.)
6. Accessories:
- a. Extruded Aluminum Sill:
 - 1) 5 inches deep
 - 2) 3-1/2 inches deep
 - b. Two Piece Mullion Cover: Aluminum
 - c. Snap Trim:
 - 1) 1-3/4 inches by 3/4 inch
 - 2) 1-1/2 inch by 1-1/2 inch
 - 3) 3-1/2 inch by 1 inch

2.4 FABRICATION

- A. Shop Assembly: Fabricate and assemble units with joints only at intersection of aluminum members with uniform hairline joints; rigidly secure, and seal in accordance with manufacturer's written recommendations.
- B. Hardware shall be installed in accordance with the manufacture's written instructions.
- C. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- D. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof where required.
- E. Prepare components to receive anchor devices. Fabricate anchors.
- F. Arrange fasteners and attachments to ensure concealment from view.
- G. Prepare components with internal reinforcement for operating hardware.
- H. Permit internal drainage weep holes and channels to migrate moisture to exterior. Furnish internal drainage of glazing spaces to exterior through weep holes.
- I. Assemble insect screen frame, miter and reinforce frame corners. Fit mesh taut into

frame and secure. Fit frame with four spring loaded steel pin retainers.

- J. Weatherstrip all operable units.
- K. Factory glaze window units. Install glass in accordance with Section 08 83 13 - Mirrored Glass Glazing, to glazing method required to achieve performance criteria.

2.5 FINISHES

- A. Shop finish aluminum window components as follows"
 - 1. Architectural Class II Anodic (204-R1) AA M12-C22-A31 Thickness to be .4 mil and shall conform to AAMA 611.
 - a. Color: Clear Anodized (Standard)
 - 2. Architectural Class I Anodic (215-R1) AA M12-C22-A41 Thickness to be .7 mil and shall conform to AAMA 611.
 - a. Color: Clear Anodized.
 - 3. Architectural Class I Anodic with electrostatically deposited color AA-M12-C22-A44. Thickness to be .7 mil and shall conform to AAMA 611.
 - a. Color: Dark Bronze Anodized.
 - b. Color: Medium Bronze Anodized.
 - c. Color: Black Anodized.
 - d. Color: As selected by Architect from manufacturer's standard colors.
 - 4. Baked acrylic enamel organic finish electrostatically applied over pretreated aluminum. Finish shall be a one coat, one bake paint system with a .8 mil minimum overall dry film thickness and shall conform to AAMA 2603-98.
 - a. Color: Bronze Paint.
 - b. Color: White Paint.
 - c. Color: As selected by Architect from manufacturer's standard colors.
 - 5. High performance organic finish electrostatically applied over pretreated aluminum. Finish shall be based on 50 percent fluoropolymer resin and be applied as a two coat, two bake paint system with a 1.2 mil minimum thickness and shall conform to AAMA 2604. (Some colors may require a clear protective topcoat to protect the pigmented coating).
 - a. Color: As selected by Architect from manufacturer's custom colors.
 - 6. High performance organic finish electrostatically applied over pretreated aluminum. Finish shall be based on 70 percent fluoropolymer resin and be applied as a two coat, two bake paint system with a 1.2 mil minimum thickness and shall conform to AAMA 2605. (Some colors may require a clear protective topcoat to protect the pigmented coating).
 - a. Color: As selected by Architect from manufacturer's custom colors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that openings are dimensionally correct and within allowable tolerances.
- C. Openings must be plumb, level, and clean.
- D. Verify that anchoring surface is in accordance with approved shop drawings.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory 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.
- B. Plumb and align window faces in a single plane for each wall plane.
- C. Erect windows and materials square and true adequately anchored to maintain positions permanently when subjected to normal thermal and building movement and specified wind loads.
- D. Furnish and apply sealants to provide a weathertight installation at all joints and intersections and at opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.
- E. Glass and glazing shall conform to and be set in accordance with the specifications and drawings to provide a satisfactory, fully leak free installation.
- F. Install vapor barrier materials and insulation between window perimeter and adjoining collateral materials and/or existing wall barriers to assure continuity (optional).
- G. Aluminum shall be insulated from direct contact with steel, masonry concrete or non-compatible materials by bituminous paint, zinc chromate primer or other suitable insulating material.
- H. Adjust units for proper operation.
- I. Set members to provide a weather tight construction.
- J. After completion of window installation, windows shall be inspected, put into working order and left clean, free of labels, dirt or other substances.

3.4 CLEANING

- A. Protect installed products until completion of project.
- B. After installation, remove all sealants, caulking, and other materials from all surfaces, including adjacent work.
- C. Thoroughly clean window frames, casings, and glass using materials and methods recommended by the window and glass manufacturer that do not cause defacement of work.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 SCHEDULES

- A. :
- B. :

END OF SECTION