**SECTION 08 17 43 -- FIBERGLASS REINFORCED POLYESTER (FRP) DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

A. 4900 FRP (Fiberglass Reinforced Polyester) Heavy Duty Aluminum Door

**1.02 RELATED SECTIONS**

A. Section 081613 - Aluminum Doors

B. Section 084113 - Aluminum Framed Storefronts

C. Section 085113 - Aluminum Windows

D. Section 087100 - Door Hardware

E. Section 084413 - Aluminum Curtain Walls

F. Section 088000 - Glazing

**1.03 REFERENCES**

A. Aluminum Association, Inc. (AA)

 1. AA 6063-T5 – Aluminum Alloy Architectural Extrusions

B: American Architectural Manufacturers Association (AAMA)

1. AAMA 2605-98 – Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels

2. AAMA 609 & 610-02 – Cleaning and Maintenance Guide for Architecturally Finished Aluminum

3. AAMA 611-98 – Voluntary Specification for Anodized Architectural Aluminum

4. AAMA 2605-20 – Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminum extrusions and panels

C. American Society for Testing Materials (ASTM)

1. ASTM B221-21 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

2. ASTM C518-21 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

3. ASTM C591 – Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation

4. ASTM D256 – Standard Test Methods for Determining the Pendulum Impact Resistance of Plastics.

5. ASTM D570 – Standard Test Method for Water Absorption of Plastics.

6. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.

7. ASTM D696 – Coefficient of Linear Thermal Expansion

8. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

9. ASTM D1621-16 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics

10. ASTM D1622-20 - Standard Test Method for Apparent Density of Rigid Cellular Plastics

11. ASTM D1623-17 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular

Plastics

12. ASTM D2126-99 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid

Aging

13. ASTM D2583 – Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

14. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

15. ASTM E283 – Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

16. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

**1.04 TESTING AND PERFORMANCE REQUIREMENTS**

A. Door Assembly

1. Provide door assemblies that have been designed and fabricated to comply with specified performance requirements as demonstrated by testing manufacture’s corresponding standard systems.

a. Air Infiltration, ASTM E283-04: 0.20 cfm/ft @ 6.24 psf

b. Uniform Load Deflection, ASTM E330-02: 80 psf (positive and negative), Deflection < L/175

c. Uniform Load Structural, ASTM E330-02: 120 psf (positive and negative), Permanent set < 0.2% of span

B. Face Sheet

1. Standard interior and exterior Class A 0.120” thick, pebble texture, through color FRP sheet.

a. Flexural Strength, ASTM D790: 13.3 x 10³ psi

b. Flexural Modulus, ASTM D790: 14.0 x 10⁵ psi

c. Tensile Strength, ASTM D638: 6.3 x 10³ psi

d. Tensile Modulus, ASTM D638: 7.7 x 10⁵ psi

e. Barcol Hardness, ASTM D2583: 50

f. Izod Impact, ASTM-D256: 12

g. Water Absorption, ASTM-D570: 0.5

h. Surface Burning, ASTM-E84: Flame Spread ≤ 25, Smoke Developed ≤ 450.

i. Taber Abrasion Resistance, Taber Test: 0.04% ( cs-17 wheels, 1000g. Wt., 25 cycles).

C. Door Core

1. Density, ASTM-D1622: 6.0 lb/ft³.

2. Compressive Strength / Modulus, ASTM-D1621: 142 / 4,770 lb/in².

3. Tensile Strength / Modulus, ASTM-D1623: 135 / 3,940 lb/in²

4. Thermal and Humid Aging, ASTM-D2126:

a. Volume Change at +158 °F, 100% relative humidity, 14 days: +0.6 / 1.7%

b. Volume Change at -40 °F, ambient relative humidity, 14 days: +0.1 / -0.4%

c. Volume Change at +212 °F, ambient relative humidity, 14 days: -0.2 / +0.5%

5. Surface Burning, ASTM-E84: Flame Spread ≤ 25, Smoke Developed ≤ 450.

6. Thermal Conductivity, R-Value per inch, ASTM-C518, 5.5 (hr/ft²°F)/BTU.

7. Polyisocyanurate Insulation Requirements, C591: Grade 2, Type VI compliant

**1.05 SUBMITTALS**

A. General: Submit in accordance with the Section 01 33 00 for Submittal Procedures.

B. Action and Informational Submittals, provide the following:

1. Product Data:

a. Manufacturer's product literature, standard factory finishes, accessories, components, and installation instructions.

2. Shop Drawings:

a. Manufacturer’s shop drawings, including elevations, design details, dimensions, member profiles, joint locations, unit arrangements, door type, frame type (if applicable), infill schedule, hardware schedule, and finish.

b. Include where applicable, special shape details, reinforcing, anchor system, interfacing with building construction, expansion and contraction provisions.

 c. Typical glazing details, glass types and thicknesses, and sealant requirements.

 d. Fastener and joint locations.

 3. Verification Samples:

 a. One (1) manufacturers FRP aluminum door sample showing corner construction.

 b. Two (2) full sets of manufacturers’ standard FRP face sheet and aluminum frame color samples.

4. Product Testing and Quality Assurance:

a. Performance testing and evaluations reports provided by manufacturer conducted by an accredited independent testing agency certifying doors and frames comply with specified performance requirements listed in Specification Section 1.4.

5. Qualification Data:

a. Installer qualifications, including experience. List of similar projects with names, locations, dates, and references.

C. Closeout Submittals, provide the following:

 1. Operations and Maintenance (O&M) Manual:

a. Manual with procedures for operations, maintenance, care, and cleaning of specified products.

 2. Warranty Documentation:

a. Sample manufacturers’ product warranty, as specified.

b. Sample installers’ labor warranty, as specified.

**1.06 QUALITY ASSURANCE**

A. Qualifications:

1. Manufacturer: Company specializing in the manufacture of aluminum FRP door systems of the type specified, with minimum ten years documented experience. Manufacturer shall be capable of providing field service, approving installers, and approving application methods.

2. Product: Tested in accordance with the specified test requirements listed in this specification.

3. Installer: Skilled professionals experienced in performing similar installations and acceptable to manufacturer.

4. Access Control Wiring: Coordinate with licensed electrical installer.

5. Pre-Installation Meeting: To verify project requirements, substrate conditions, installation instructions, and warranty requirements.

**1.07 DELIVERY, STORAGE, AND HANDLING**

A. Ordering: Comply with manufacturer's ordering and lead time requirements.

B. Packing, Shipping, and Unloading: Deliver in original, unopened, undamaged containers with labels.

C. Storage and Protection: Store materials protected from weather. Handle materials to avoid damage.

**1.08 SCHEDULING**

A. Submittal Approvals: Coordinate approval of shop drawings and submittals with the manufacturer to avoid delays in the construction schedule.

B. Hardware Provision: Provide all necessary hardware templates or actual hardware to the manufacturer in a timely manner to prevent fabrication delays.

C. Size Confirmation: Ensure final opening sizes are confirmed and provided to the manufacturer to facilitate accurate fabrication and prevent re-work.

**1.09 WARRANTY**

A. Manufacturer's Product Warranty: Five (5) years from the last date of shipment by Capitol Aluminum and Glass.

B. Installers’ Labor Warranty: One (1) year from the date of substantial completion by Installing Contractor.

**PART 2 -- PRODUCTS**

**2.01 FIBERGLASS REINFORCED POLYESTER (FRP) DOORS**

A. Manufacturer:

1. Capitol Aluminum & Glass Corporation, 1276 W. Main Street, Bellevue, OH 44811, (419) 483-7050, [www.capitol-windows.com](http://www.capitol-windows.com) [email a project specialist today: sales@capitol-windows.com]

a. Model 4900 FRP (Fiberglass Reinforced Polyester) Heavy Duty Aluminum Door

**2.02 MATERIALS**

A. Aluminum (Doors and Components):

1. Material Standard: Extruded Aluminum, ASTM B 221, 6063-T5 alloy and temper.

2. Door Face Sheets: Pebbled texture fiberglass reinforced polyester (FRP), 0.120" thick, Class A sheet.

a. FRP sheet color: [specify: light gray #132, dark bronze #109, black #115, white #114].

3. Core: Class 1 (6.0 LB/FT) polyisocyanurate foam. Core-liner assembled per code.

4. Vision Lites: [specify: (HL) Half Lite, (HSL) Half Strip Lite, (VL) Vision Lite, (FSL) Full Strip Lite, (L) Louver].

5. Glass for Vision Lites: [specify: 1/4" glass or 1" IGU]. Refer to Section 088000 – Glazing.

6. Weather Seal: Ultra Fin; adjustable bullnose astragals with Ultra Fin on meeting stiles of paired doors.

7. Tolerances: In compliance with AA Aluminum Standards and Data.

8. Trim Metal: Extruded aluminum sections, 0.060" wall thickness minimum. Brake metal or formed aluminum sheet is not acceptable.

B. Accessories:

1. Fasteners: Aluminum, stainless steel, or dull chrome plate brass where exposed.

2. Perimeter Anchors: Aluminum. Insulate steel anchors from aluminum to prevent galvanic action.

**2.03 SYSTEM FABRICATION**

A. Doors:

1. Door stiles and rails: Full extruded tubular frame, 0.125" wall thickness minimum, 4-1/2" face dimension minimum, 1-3/4" overall depth.

2. Mechanical joints: Extruded aluminum gussets with concealed 5/16" tie-rods.

3. Perimeter caps: Extruded aluminum, bottom cap with dual integral grooves for nylon brush door sweep.

4. Reinforcing plates: Installed to accept specified hardware.

5. Paired Doors: One leaf with astragal, the other with adjustable bullnose and two Ultra Fin weather strips (where no center post is provided).

6. Core Liner: 0.040” aluminum sheet located between the core and interior FRP face sheet. In accordance with IBC Section 2603.4.1.7, doors designated for interior use shall be designated to receive an additional core liner located between the core and exterior FRP face sheet.

**2.04 RELATED MATERIALS**

A. Sealants: Refer to Section 07 92 00.

B. Door Hardware: Refer to Section 08 71 00.

C. Glazing: Refer to Section 08 80 00.

**2.05 ALUMINUM FINISH**

A. Standard Door Cap and Frame Finishes:

1. Clear Anodized, 60-Minute Velo Class I, AA-M12-C22-A41

2. Dark Bronze Anodized, 2-step Class I, AA-M12-C22-A44

3. Black Anodized, 2-step Class I, AA-M12-C22-A44

4. Bone White Kynar, 2-coat 70%, AAMA 2605

**2.06 QUALITY CONTROL**

A. Source Quality: Provide aluminum doors from a single source.

1. Building Enclosure System: When doors are part of a system including windows, storefront framing, etc., provide all products from a single source manufacturer.

B. Fabrication Tolerances: In accordance with door manufacturer's tolerances.

**PART 3 -- EXECUTION**

**3.01 EXAMINATION**

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturers’ instructions. Verify openings are sized to receive new entrance system and sill plate is level in accordance with manufacturer’s acceptable tolerances.

1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays. Reference to 1.8 Scheduling.

**3.02 INSTALLATION**

A. General: Install doors in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.

1. Attached to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

2. Provide alignment attachments and shims to permanently fasten system to building structure.

3. Align assembly plumb and level, and in proper alignment with adjacent work.

4. Set thresholds in bed of sealant and secure.

5. Adjust operating hardware for smooth operation.

6. Dissimilar materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action at contact points.

B. Related Products Installation Requirements:

1. Sealants (Perimeter): Refer to Section 07 92 00.

2. Door Hardware: Refer to Section 08 71 00.

3. Glass: Refer to Section 08 80 00.Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual.

**3.03 PROTECTION AND CLEANING**

A. Protection: Protect installed entrance systems finish surfaces from damage during construction. (i.e. grinding, polishing compounds, plaster, lime, acid, cement, or other harmful contaminants).

B. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer’s instructions prior to owner’s acceptance. Remove construction debris from project site and legally dispose of debris.

**DISCLAIMER STATEMENT**

This guide specification is intended to be used by a qualified construction specifier. The guide specification is not intended to be verbatim as a project specification without appropriate modifications for the specific use intended. The guide specification must be used and coordinated with the procedures of each design firm, and the particular requirements of a specific construction project.

**END OF SECTION 08 17 43**