

SECTION 08220

FIBERGLASS REINFORCED PLASTIC (FRP) DOORS AND FRAMES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Fiberglass Reinforced Plastic (FRP) Doors
- B. Fiberglass Reinforced Plastic (FRP) Frames

1.2 RELATED SECTIONS

- A. Division 1 - General Conditions, Supplementary Conditions
- B. Division 4 - Unit Masonry
- C. Division 8 - Finish Hardware
- D. Division 8 - Glass and Glazing

1.3 QUALITY ASSURANCE

A. General Qualifications:

1. Manufacturer Qualifications: A company that specializes in manufacturing FRP doors and frames with a minimum of 30 years experience.
2. Quality Assurance: Obtain all FRP doors and FRP frames from a single manufacturer to ensure consistent quality.
3. Quality Assurance: Hardware and accessories for all FRP doors and FRP frames shall exactly adhere to the Architect's specification.
4. Quality Assurance: Glass for windows in doors shall be furnished per the Architect's instructions and specifications.

B. Regulatory Requirements:

1. Fire-rated door, panel and frame construction conforms to products tested under ASTM E152, UL10C & NFPA 252.
2. Install doors, panels and frames conforming to NFPA 80 for fire-rated class, ANSI A117.1 specifications for handicap accessibility, ADA requirements, ANSI A250.4-2011 cycle swing in excess of 1,000,000 cycles with no failure of any design features of the door.
3. Flame Spread: All rated FRP component parts, including the finish, shall have a flame spread classification of 25 or less per ASTM E84 and shall be self extinguishing per ASTM D635, unless operating conditions dictate otherwise.
4. Resins and coatings to meet with USDA standards for incidental food contact, if applicable to this project.
5. Products manufactured—if so specified—that have passed the Florida Building Code (FBC), including Miami-Dade High Velocity Hurricane Zone (HVHZ).

C. Warranty:

To include ten (10) years free from defects in material and workmanship from date of shipment, and lifetime from corrosion from date of shipment, provided that the structural integrity of the doors and frames have not been violated or compromised.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 0 1300.
- B. Shop Drawings – Include the following:
 - 1. Elevation of each door type including door size, handing and finish
 - 2. Cutout locations for lites and hardware
 - 3. Internal reinforcement
 - 4. Frame configuration, anchor types and spacing
- C. Product data including manufacturer's literature, fabrication descriptions and installation instructions.
- D. Construction and/or color samples as requested.

1.5 DELIVERY, STORAGE AND PROTECTION

- A. Doors and frames will be individually packaged in cardboard cartons. Cartons will be clearly labeled with project information and will include fasteners and installation instructions, if required. Only remove cartons upon arrival if cartons are wet or damaged.
- B. Deliver and store doors and frames at the job site in such a manner as to prevent damage; out of weather and/or extreme temperatures. The doors shall be stored in a vertical position on blocking, clear of the floor and with blocking between the doors to permit air circulation between the doors.
- C. All damaged or otherwise unsuitable doors and frames, when so ascertained, shall be immediately removed from job site.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Products manufactured by the following companies complying with these specifications will be acceptable: CORRIM Company, Oshkosh, Wisconsin 54901. Phone: 920-231-2000
Fax: 920-231-2238 www.corrim.com
- B. Substitutions may be considered provided the manufacturer can comply with the specifications as written and the products are manufactured in the United States of America. Requests for substitutions must be submitted in writing no less than ten (10) business days prior to the bid date. Substitution requests shall include a physical sample and written documentation that the product meets the specific manufacturing methods as stated herein.

2.2 FRP DOORS

A. Door Fabrication:

- 1. Total door thickness to be a nominal 1-3/4 inches thick.
- 2. Lock stiles on non-rated and rated active leaves shall be factory beveled 1/8" in 2".
- 3. Provide doors with completely seamless construction on all six (6) surfaces.

B. Face Sheets:

FRP face sheets shall be manufactured using a corrosion resistant resin system with light stabilizing additives. The resin shall be reinforced with fiberglass, 50% average by weight for enhanced strength. Face sheets shall be a minimum of 0.125 inch thick fiberglass. Face sheets will be Architect's choice of smooth or pebble seamless finish.

C. Stiles and Rails:

Stiles and rails shall be 1-1/2 inch square pultruded fiberglass tubes. Pultrusion is a fiberglass fabrication process that results in a much stronger, more durable product. Non-rated and 20 minute doors will have a full width horizontal 1-1/2 inch square pultruded fiberglass tube every 24 inches in height for internal reinforcement. A 1-1/2 inch square solid fiberglass block shall be used at all hardware reinforcements and corner intersections. A minimum of 1,000 pounds screw withdrawal force shall be required per screw. The bottom rail shall allow for 1-1/4 inches of height alterability without loss of the panel's integrity. Absolutely no metal or wood reinforcements, including #2 SPF (Spruce Pine Fir), will be allowed in any part of the stile and rail configuration.

D. Core Options:

1. Polyurethane Foam Core: A 1-1/2 inch thick rigid block of polyurethane shall be laminated to the interior of the panels. The "R" factor shall be 12. The polyurethane insulation shall be Class A and CFC free. Foam properties comply with ASTM E-84 and The International Building Code (IBC).
2. Balsa Core: 1-1/2 inches thick Balsa core, of end grain construction for enhanced strength, shall be laminated to the interior of the panels. The balsa shall have a density of 8.5 – 9.0 lbs cu. Ft. Compressive strength, perpendicular to the door panel surface shall be 1400 p si.
3. Honeycomb Core: Phenolic impregnated resin paper honeycomb.
4. Mineral Core: for 30 minute to 90 minute fire rated FRP doors.

E. Hardware Preparations:

Doors shall be reinforced and mortised for hardware with 1-1/2 inches x 1-1/2 inches of solid fiberglass to allow application of hinges and locks, in accordance with the hardware schedule, hardware manufacturer's instructions and templates.

1. Reinforcement Blocking: Non-swelling polymer or firestop blocking will be used for all lockset, surface mounted hardware and through bolted hardware blocking.
2. Pilot holes for full mortise butt hinges will be pre-drilled by factory.
3. All hardware shall be attached / installed by using pilot hole and stainless steel wood screws.

F. Door Accessories

1. Glazing: Glazing support structures shall ensure that the glass area is weather sealed as not to permit moisture from entering the core of the door. This is to be accomplished by utilizing pultruded 1-1/2 inch square FRP tubes to fabricate the window opening. Glazing must allow for ready access for repair in the event of damage or replacement, without affecting the sealed integrity of the cutout in the door panel itself. Openings cut directly into the core material will not be allowed.
2. Louvers: Louvers shall be fabricated with pultruded FRP material of an inverted "V" design, and shall be subject to the same performance guarantee as the door panel. The louver opening will be fabricated in the same method as for glazing above.
3. Fasteners: Provide countersunk stainless steel fasteners as required for glazing openings and louvers.
4. Transoms: All transom panels will be identical to the doors in construction, materials, thickness, color and reinforcement.
5. Astragals: Astragals for pairs of doors to be fabricated with FRP material of manufacturer's standard flat design.

2.3 FRP FRAMES

A. Fabrication:

FRP frames shall be rigid, neat in appearance, free from defects and the finish shall match the doors. Fabricate FRP doors and frames as shown on the drawings and in accordance with best shop practices. Field measurements shall be taken as required for coordinating with adjoining work.

1. Provide frames for doors, transoms, sidelites and borrowed lites, as required.
2. All frames shall be 100% pultruded fiberglass with an average 50% glass content by weight which results in an industrial fiberglass frame as strong as a 14 gauge hollow metal frame.
3. Non-rated and 20 minute UL labeled: Standard one piece FRP profile with integral stop: 5-3/4" x 2" equal rabbet
(optional: 4 inch header, modified depth with equal rabbet, modified depth with un-equal rabbet, single rabbet design)
4. 30 – 90 minute UL labeled FRP Frames: Standard one piece FRP profile with integral stop: 5-3/4" x 2" equal rabbet. Frames that must be grouted solid with mortar in the field to achieve label are not acceptable.
5. Head and jamb members shall be standard 45 degree miter, providing a neatly mitered corner connection, fabricated for Knocked Down (KD) field assembly. (optional: one piece frame, resin bonded and assembled at factory, available on non-rated frames only)

B. Reinforcements and Braces / Supports

1. Frames shall be reinforced and mortised for hardware in accordance with the hardware schedule,} manufacturer's instructions and templates. Absolutely no metal reinforcements will be allowed in any part of the FRP frame configuration.
2. Corner Reinforcement: 4 inches x 4 inches x 5-3/8 inches x 1/4 inch thick pultruded fiberglass angle. Attached to head bar at factory using stainless steel screws.
3. Mortise Hinge Reinforcement: 3 inches x 7 inches x 9/16 inch (or 3/8 inch) thick FRP material attached to frame by means of bonding and stainless steel countersunk screws.
4. Closer Reinforcement: 1-1/2 inches x 19 inches x 3/16 inch thick FRP material attached to frame by means of bonding.
5. Strike Reinforcement: 1-1/2 inches x 9 inches x 3/4 inch thick FRP material attached to frame by means of bonding and stainless steel countersunk screws.
6. Anchoring Systems: Furnish at least three (3) anchors in each jamb of frames up to 90 inches high and one (1) additional anchor for each 30 inches in height above 90 inches, in shapes, sizes and spacing shown or required for anchorage into adjoining wall construction.
 - a. New Masonry: T-Strap or Wire Anchor (optional: stainless steel T-Strap)
 - b. New Stud (before sheathing): New Stud Anchor
 - c. Butt Existing Wall: Existing Opening Anchor; Masonry, Steel or Wood (optional: concealed)
 - d. Wrap Existing Wall: Compression Anchor
 - e. Consult factory for additional anchoring options.

2.4 FINISH

A. Polyurethane finish, high solids polyurethane topcoat that exhibits excellent chemical resistance, outstanding toughness, flexibility, abrasion resistance and excellent outside durability.

1. Flat; smooth face sheets only.
2. Semi-Gloss; all face sheet options.
3. Gloss; smooth or pebble face sheets only.

B. Gelcoat Matte Finish, 25 mil (smooth face sheets only), from manufactures full range of colors.

C. Prime; finish for field painting, all face sheet options .

1. Acceptable top coatings
 - a. Enamel
 - b. Alkyd
 - c. Polyurethane
 - d. Latex
 - e. Epoxy

D. Finish on door and frame units will match

PART 3 – EXECUTION

3.1 INSPECTION

Installer shall examine the substrate and conditions under which fiberglass reinforced plastic work is to be installed and notify the General Contractor in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 INSTALLATION

- A. Doors and frames will be delivered in individual cartons with the identifying mark number listed on each carton.
- B. Install FRP doors, frames and accessories in accordance with manufacturers printed instructions, final shop drawings, NFPA 80 standards at fire rated openings and / or HVHZ standards for FBC labeled openings.
- C. Provide clearance for doors of 1/8 inch at jambs and heads; 1/4 inch clearance above threshold.
- D. Fire labeled doors, frames and accessories must be installed by qualified, licensed installers adhering to the latest version of NFPA 80.

3.3 ADJUSTING

At substantial completion, adjust all operable components to ensure proper installation. Doors shall function smoothly and swing freely without binding. Doors shall remain open at any angle without being affected by gravitational influence.

3.5 CLEANING

Remove dirt and excess sealant from exposed surfaces. Follow the manufacturer's recommended cleaning techniques and procedures for cleaning all surfaces. Only use cleaning products that will not scratch or damage the surfaces and are recommended by the manufacturer.

PART 4 – MATERIAL PROPERTIES OF FIBER REINFORCED PLASTIC (FRP) PROFILES

4.1 DOOR PROPERTIES

ASTM D-256:	Notched Izod Impact
ASTM D-638:	Tensile Strength Properties of Plastic
ASTM D-695:	Compressive Strength
ASTM D-732:	Shear Strength
ASTM D-790:	Flexural Strength / Flexural Modulus
ASTM D-2583:	Barcol Hardness
ASTM E-283:	Air Infiltration Test
ASTM E-330:	Static Load Test
ASTM E-331:	Water Infiltration
ASTM E-1886:	Impact by Missiles & Exposed to Cyclic Pressure Differentials
ASTM E-1996:	Impact by Wind Borne Debris
TAS 201:	Large Missile Impact
TAS 202:	Static Load Test
TAS 203:	Cyclic Load Test
SFBC 3603.2:	Forced Entry

4.2 FOAM CORE PROPERTIES

ASTM C-203:	Flexural Modulus
ASTM C-272:	Water Absorption
ASTM C-273:	Shear Strength
ASTM C-518:	K-Factor / R-Factor
ASTM D-1621:	Compressive Modulus
ASTM D-1622:	Density
ASTM D-1623:	Tensile Strength
ASTM D-2126:	Dimensional Stability
ASTM D-2856:	Closed Cell Content
ASTM E-84:	Surface Burning Characteristics
ASTM E-96:	Water Vapor Permeability

4.3 Balsa CORE PROPERTIES

ASTM C-271:	Apparent Normal Density
ASTM C-273:	Shear Strength
ASTM C-297:	Tensile Strength
ASTM C-365:	Compressive Strength
ASTM D-177:	Thermal Conductivity
BSS-7238:	Smoke Density & Toxic Gas Generation
CMVSS/FMVSS 302:	Motor Vehicle Flammability Safety Test
MIL-STD-907B:	Fire Resistance Test

4.4 ADHESIVE PROPERTIES: URETHANE ADHESIVE SYSTEM

ASTM D-570:	Water Absorption
ASTM D-638:	Elongation Percent
ASTM D-638:	Tensile Strength
ASTM D-638:	Young's Modulus
ASTM D-2240:	Shore Hardness, D
ASTM D-3163:	Bond Configuration Lap Shear
ASTM E-132:	Poisson Ratio
ASTM E-1640:	Glass Transition Temperature
ISO MAT-2208:	CLTE@ -30 to 0 deg. C
ISO MAT-2208:	CLTE@ 50 to 100 deg. C
SAE J-1525:	Crosshead Speed

4.5 RESIN PROPERTIES

ASTM D-256:	Notched Izod Impact
ASTM D-570:	Water Absorption
ASTM D-638:	Tensile Strength Properties of Plastics
ASTM D-638:	Tensile Modulus
ASTM D-638:	Tensile Elongation @ Yield
ASTM D-648:	Heat Deflection Temperature
ASTM D-695:	Compressive Strength / Compressive Modulus
ASTM D-790:	Flexural Strength / Flexural Modulus
ASTM D-2566:	Linear Shrinkage
ASTM D-2583:	Barcol Hardness