Tiger Door FRP Heavy Duty Doors and Frames Specification

SECTION 08 16 13

FIBERGLASS DOORS & FRAMES

PART 1 - GENERAL

1.01 SCOPE AND DEFINITIONS

A. Furnish and install doors, frames of FRP composite construction in accordance with details and schedule shown on the project drawings and as specified herein. Door and frame products of aluminum, steel or wood constructions that use FRP face sheets are strictly excluded.

B. FRP is defined as “Fiberglass Reinforced Polyester”

1.2. RELATED SECTIONS

A. Section 04 00 00: Masonry mortar

B. Section 05 50 00: Steel lintels

C. Section 06 20 00: Finish Carpentry

D. Section 08 14 00: Wood Doors

E. Section 08 70 00: Hardware

F. Section 08 80 00: Glazing

1.03 QUALITY ASSURANCE

A. Referenced Standards
1. American Society for Testing and Materials (ASTM)
2. Society of Automotive Engineers (SAE)
3. International Building Code, Plastics (Chapter 26)
4. UL Standards for Safety UL10B / UL10C, UBC 7-2
5. ANSI A250.4 1,000,000 cycle test

B. Experience: Manufacturer shall be engaged in the manufacture of FRP door and frame systems for a minimum of twenty five (25) years documented experience prior to the start of this work, and who has a history of successful production acceptable to the Architect.

C. Referenced Standard: Where labeled fire doors are required, Fiberglass Doors and frames shall be UL listed and shall be tested successfully to UL10B / UL10C, UBC 7-2 standards.

D. Process: Certify that FRP doors are manufactured via press-molding technology.

E. Warranty: Provide written limited guarantee for FRP doors and frames as follows:
1. Heavy Duty doors are guaranteed for the life of the product against delamination and failure due to corrosion from the specific chemical environment named at the time of purchase. Furthermore, all

products are inspected prior to shipment and guaranteed against defective workmanship for a period of ten (10) calendar years after the date of purchase.

1.04 SUBMITTALS

A. Product Data: Provide catalog cut of FRP door detailing internal construction and reinforcements, materials used and description of molding process.

B. Shop Drawings: To include the following specific information:

1. Specifications relating to FRP door thickness, resin type, core material, method of construction, finish color, type of glass and glazing, anchor systems, joint construction and complete warranty information.
2. Complete schedules or drawings of FRP doors and frames (and associated Builders Hardware) showing identifying mark numbers, door and frame types, typical elevations, nominal sizes, handing, actual dimensions and clearances, and required hardware preps and reinforcements.
3. Supporting reference drawings pertaining to frame mounting details, door lite or louver installation, hardware locations, and factory hardware cutouts and reinforcements.

C. Color Samples: Provide a complete set of available finish colors from the manufacturer for color selection upon request.

D. Installation instructions: Include manufacturer's specific information describing procedures, sequence and required fasteners for frame and door installation.

E. Production of FRP doors and frames shall not proceed until final approval of submittals and all necessary manufacturing information is received from customer.

1.05 DELIVERY, STORAGE AND HANDLING

A. FRP doors and frames are to be delivered to jobsite in adequate crating with foam sheet separations between all components.

B. Upon receipt of shipment, remove and inspect the doors and frames for damage. Note any damage on the shipping papers prior to accepting. If there is any noted (visible or concealed) damage, notify Tiger Door at 1-888-891-4416, immediately.

C. Handling and storage of the doors and frames after receipt is the responsibility/liability of the customer. It is recommended that the doors be stored indoors in a vertical position, clear of the floor, with blocking between the doors to permit air circulation between the doors and prevent damage to the door faces. Rain/water or condensation must not be allowed to collect or lay between stored doors. Do not wrap in plastic sheeting as it will promote condensation formation within. Permanent discoloration can result. Failure to comply with the receiving and reporting instructions shall void the Tiger Door warranty.

D. Use care in handling FRP doors and frames to prevent damage to factory finishes. Wear protective gloves and do not slide or drag doors or frames against one another.

PART 2 - PRODUCTS

2.01 Manufacturer

A. FRP Doors and Frames shall be as manufactured by Tiger Door, 5224 Ruben M Toress Blvd Brownsville, TX 78526. ph 888-891-4416, www.tigerdoor.com.

2.02 FRP DOORS

A. Heavy Duty FRP Doors

1. Design: FRP doors shall be of seamless press-molded construction. Laminated FRP face sheets shall be applied while wet and uncured to an internal door stile and rail subframe/core assembly and then press-molded under heat and pressure. The composite door panel must be integrally fused over its entire surface area, not just adhesive-bonded at perimeter stiles and rails. Doors shall remain under pressure during curing for flat, warp-free surfaces.
2. Stiles & Rails: A high-modulus pultruded FRP square or rectangular tube subframe is to be provided within the door. Tubes are to be mitered and joined internally at the corners with solid polymer blocks to yield a one-piece unit that does not require any secondary external sealing. Provide a tubular midrail across width of door at lock height, and additional horizontal rails where specific design conditions dictate. Doors shall incorporate molded-in FRP edge strips, chemically bonded to the subframe stiles, for machining of hardware mortises so as not to cut or otherwise compromise the integrity of the pultruded stiles, nor allow moisture to penetrate into the core of the door. All connections shall be chemically welded. No mechanical fasteners will be allowed. The use or inclusion of aluminum, steel, gypsum or wood into stile and rail construction is not permitted.
3. Core: For maximum rigidity and compressive strength a triangular shaped 3/8" cell phenolic resin impregnated kraft paper honeycomb core shall be used. Molding pressure and resin gel time shall be sufficient to allow for penetration of resin into the cellular structure of the core to maximize shear and peel strengths at the skin/core interface and eliminate the possibility of delamination. The honeycomb is to be completely enclosed within the stile and rail subframe. Use of balsa wood is not permitted.
4. Internal Reinforcement: High-modulous pultruded tubular FRP, high-density polymer compression blocks, or plastic compression blocking at all hardware locations, and corner locations. No wood blocking, steel or aluminum reinforcing plates, ribs or fittings shall be used. A minimum of 900 lbs of pullout strength is required for each factory supplied hinge screw.
5. Faces: Door facings shall utilize a chemical resistant thermosetting polyester resin system with fiber reinforcing layers. Supplier shall furnish door faces as shown on the drawings and in the door elevations. Chopped strand mat layers shall be used to provide bond integrity between gelcoat, laminated facings and the internal door structure. Structural reinforcement shall be in the form of a knitted multi-layer material with layers of uni-directional glass fiber oriented in both the vertical and horizontal directions for high stiffness, impact resistance and resistance to warping. Gelcoat surface integrally molded to be 25/30 mils thick (wet) ultra-violet light stabilized marine grade NPG-isophthalic polyester gelcoat.
6. Finish: The exposed FRP door faces shall have a 3-4 mils (wet) factory applied two-part aliphatic polyurethane fully cured coating of industrial urethane. Coating shall have a minimum hardness of H to 2H. Finish shall be a slightly textured semi-gloss to minimize the visual effects of wear and tear.
7. Astragals: All pairs of doors shall be furnished with an astragal from door manufacturer made of same pultruded FRP material as door stile, rail and edge as required. Astragal shall be located on the meeting stile edge of each inactive leaf of double door pairs. Architect shall advise active leaf of door, and astragal shall be installed to cover meeting stile gap to effect seal and security.
8. Lites: Glass per job specification shall be factory furnished, glazed and installed. Standard glass thickness is ¼". Centered glazing shall be installed between 45 degree pultruded FRP glazing stops and vinyl foam tape with concealed compression retainers for ¼" glazing. No exposed fasteners or exposed silicone will be allowed for securing ¼" glazing. Stainless steel screws may be allowed for other glazing thicknesses. All glazing stop material shall be pultrued FRP with a minimum fiberglass content of 50%. Metal, pvc, or vinyl "Glass Kit" type lites are not acceptable for non-fire rated openings.
9. Louvers: Fiberglass inverted V blade privacy or flat blade louvers shall be factory furnished and installed. All louvers and louver trim shall be manufactured exclusively from putruded FRP profiles with a minimum fiberglass content of 50%. All louvers shall be coated to match door in color and sheen. Inverted V blade minimum thickness shall be 3/32" thick, flat blade louver minimum thickness shall be 3/16" thick. Adhesives for louver assembly shall meet or exceed all requirements set forth in section

2.05.1 Mechanical Properties and test performance. Metal, pvc, vinyl or other non-fiberglass louvers are not acceptable for non-fire rated openings.

10. Raised panels and plants: All doors shown in elevation to have raised panels or plants shall be equipped with plants in configuration as shown on plans and in door schedule. Plants shall be applied by the door manufacturer as an integral part of the door face. Plants shall be bonded to the door skin; no mechanical fasters shall be permitted. All applied moldings shall be of resin material, and shall be installed by the manufacturer to resemble a raised panel door. Field applied plants or moldings shall not be acceptable.
11. Provisions for lites and louvers shall be performed during manufacture and shall not be attempted in the field. Cutouts are to be totally enclosed by pultruded FRP stiles and rails incorporated into the door structure. Lite and louver cutouts that expose core material are not acceptable.

2.03 FRP FRAMES

A. FRP Frames:
   1. Design: FRP Door frames furnished under this specification shall utilize a high-modulus pultruded structural FRP shape. The frame section shall be standard double rabbeted 5-3/4" deep x 2" face, 3/16" thick, with integral 5/8" doorstop, to match typical hollow metal configurations. Additional jamb profiles and widths are available.
   2. Corner Joints: Frame jambs and header shall be joined at corners via miter connections with hidden FRP angle clips and associated fasteners. Post and beam corners will not be acceptable.
   3. Hardware Reinforcements: FRP reinforcing shall be chemically welded to door frame material at required locations. Minimum screw pullout strength of 1100 lb per #12 x 1-1/4" sheet metal screw is required. Mechanically fastened reinforcements are not permitted.
   4. Anchors:
      a. BOLT-IN: Provide manufacturer's required number of 3/8" diameter x 4" long flat head stainless steel sleeve anchors for masonry openings, 3/8" diameter x 4" machine screw with nut and washers for structural steel openings, #14 x 4" stainless steel flat head sheet metal screws for wood or steel stud openings. Include extra anchors for additional frame height in two foot increments above 8'-0". Provide single bolt anchor at center of all headers over four feet in nominal width. Stainless Steel fasteners shall be furnished by the factory.
      b. GROUT-IN: Provide manufacturer's required number of wire or strap type masonry anchors for installation into block wall. Fill frame cavity with grout.
   5. Finish: Frames shall have a 3-4 mils (wet) factory applied two-part aliphatic polyurethane fully cured coating of industrial urethane. Industrial urethane chemical coating color topcoat, to match the color and sheen of the doors, for superior weatherability. Gelcoat may not be sprayed onto the frame as a secondary coating.

2.04 MECHANICAL PROPERTIES AND TEST PERFORMANCE

A. Pultruded structural shapes for stiles; rails, frames, and astragals shall exhibit the following minimum longitudinal coupon properties (per ASTM):
   1. Tensile strength (D638) 30,000 psi
   2. Comprehensive strength (D695) 30,000 psi
   3. Flexural strength (D790) 30,000 psi
   4. Flexural modulus (D790) 1,600,000 psi
   5. Shear strength (D2846) 4,500 psi
   6. Impact, notched (D256) 25 ft-lb/in
   7. Barcol hardness (D2853) 50

B. Core material shall exhibit the following minimum coupon properties (per ASTM):
   1. Shear strength, longitudinal direction (C273) 68.2 psi
   2. Shear strength, transverse direction (C273) 25.8 psi
   3. Shear modulus, longitudinal direction (C273) 6940 psi
   4. Shear modulus, transverse direction (C273) 1878 psi

6. Shear elongation, longitudinal direction (C393 short beam) 1.79%
7. Shear elongation, transverse direction (C393 short beam) 2.72%
8. Maximum facing stress, longitudinal direction (C393 short beam) 735 psi
9. Maximum facing stress, transverse direction (C393 short beam) 289 psi
10. Maximum core shear stress, longitudinal direction (C393 short beam) 63.8 psi
11. Maximum core shear stress, transverse direction (C393 short beam) 24.9 psi
12. Modulus of elasticity (EI) per 1" width, longitudinal direction (C393 short beam) 4.92E+04 psi
13. Modulus of elasticity (EI) per 1" width, transverse direction (C393 short beam) 1.97E+04 psi
14. Maximum facing stress, longitudinal direction (C393 long beam) 9011 psi
15. Maximum facing stress, transverse direction (C393 long beam) 4727 psi
16. Maximum core shear stress, longitudinal direction (C393 long beam) 48.3 psi
17. Maximum core shear stress, transverse direction (C393 long beam) 23.5psi
18. Modulus of elasticity (EI) per 1" width, longitudinal direction (C393 long beam) 1.14E+05 psi
19. Modulus of elasticity (EI) per 1" width, transverse direction (C393 long beam) 7.23E+05 psi
20. Stiffness "D", longitudinal direction (C393 long beam) 379,270 psi
21. Stiffness "D", longitudinal direction (C393 long beam) 260,608 psi
22. Compressive strength (C365) 53 psi
23. Compressive modulus (C365) 2110 psi
24. Density (C271) 2.42 lb/ft^3

C. Adhesive shall exhibit the following minimum coupon properties (per SAE)
1. Tensile Strength (D882-83A modified) minimum 2000 psi
2. 8 day 25º C at 100% humidity Cross Peel (SAE J1553) minimum 330 psi
3. 7 day immersion in seawater Cross Peel (SAE J1553) minimum 330 psi
4. 30 day immersion in saltwater Cross Peel (SAE J1553) minimum 330 psi
5. 72 hour immersion in gasoline Cross Peel (SAE J1553) minimum 330 psi
6. 72 hour immersion in 20% sulfuric acid Cross Peel (SAE J1553) minimum 300 psi

CI. ANSI A250.4 1,000,000 cycle test
1. 4’ x 8’ door (up to a full lite) and frame successfully tested in excess of 1,000,000 cycles with no failure of any of the design features of the door or frame.

2.04.1 FASTENERS

A. All fasteners for all hardware shall be type 304 CRSS (18-8 series corrosion resistant stainless steel) with no exception. No carbon steel or aluminum components shall be used.

2.04.2 HARDWARE

A. Doors shall be factory mortised and drilled for mortise template butt hinges, with #12 x 3” long stainless steel screw for hinge attachment. Provide 161 cylindrical lock bore, rim deadbolt, ANSI 86 mortise lock edge prep and pocket, or flushbolt cutouts as required.

B. Frames shall be factory machined and drilled for all hardware requiring mortises, with #12 x 1-1/4” long stainless steel screws for hinge attachment.

C. Hardware shall be furnished as listed in section 08 70 00 or as so designated in appropriate section, and shall be coordinated by GC and installed by experienced mechanics.

D. Supplier shall furnish manufacturer’s standard templates, installation instructions, or full size approved door and frame preparation instructions as approved by the architect and as required by door and frame manufacturer prior to door and frame factory initiated manufacture. Standard factory lead-time for production

of FRP doors and frames shall commence only and when all distributor required preparation information is received and acknowledged by the door and frame manufacturer.

PART 3 - EXECUTION

3.01 IDENTIFICATION

A. Factory mark all doors and frames using a chemical resistant plastic tag or indelible marker with identifying number, keyed to shop drawings, prior to shipment.

3.02 INSTALLATION

A. Frames: Install in strict accordance with manufacturer's printed instructions. Set plumb and square, using shims for bolt-in of existing openings, or wood bracing prior to grouting of jambs. Use at least two 2x6 wood spreaders inside frame to maintain critical opening dimensions during grouting.

B. Doors: Hang per manufacturer's printed instructions using special screws provided for hinge attachment. Install doors to swing freely and to stand open at any angle. After installation make final adjustments to hardware to allow for proper door operation and latching. All surface applied hardware shall be thru bolted.

3.03 CLEANING

A. Clean exposed surfaces of FRP doors and frames with a mild, non-abrasive cleaner and water.

END OF SECTION