

SECTION 08342

FIBERGLASS DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fiberglass Reinforced Plastic Doors.
- B. Fiberglass Reinforced Plastic Frames.
- C. Light Openings.
- D. Louvers.

1.2 RELATED SECTIONS

- A. Section 08700 - Door Hardware: Finish Hardware And Weather Stripping.
- B. Section 08800 - Glazing.

1.3 REFERENCES

- A. ASTM C 365 - Standard Test Method for Flatwise Compressive Strength of Sandwich Cores.
- B. ASTM C 518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- C. ASTM D 256 - Test Methods for Impact Resistance of Plastics and Electrical Insulation Materials.
- D. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.
- E. ASTM D 696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C.
- F. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- G. ASTM D 792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.

- H. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- I. ASTM D 2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
- J. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- K. ASTM E 152 - Standard Methods of Fire Tests of Door Assemblies.
- L. SDI 107 - Hardware on Steel Doors (Reinforcement - Application).
- M. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames.
- N. Certification Listings; Warnock Hersey.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01300.
- B. Product Data:
 - 1. Manufacturer's installation instructions.
 - 2. Manufacturer's care and maintenance instructions.
 - 3. Color charts for selection of door colors.
- C. Shop Drawings:
 - 1. Dimensions, elevations, assembly methods, hardware reinforcement locations and preparations, wall conditions, and opening identification.
- D. Samples: Submit samples representing specific construction of doors and frames required for this project.
 - 1. Doors: Show stiles, core, and fiberglass-encapsulated reinforcements.
 - 2. Frame: Show profile with corner joint, core, and fiberglass-encapsulated reinforcements.
- E. Calculations: Submit calculations for fiberglass composite door, verifying theoretical limits of thermal warpage based upon the exposure temperature differential.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle doors and frames with care to prevent damage and deformation.
- B. Identify doors and frames with the manufacturers name tag, location, door type, color, and weight.
- C. Inspect doors and frames upon delivery for damage. Minor damage may be repaired provided refinished items are equal in all respects to new Work, and are acceptable to the Architect. Otherwise remove and replace damaged items as directed.
- D. Store on pallets in the original carton at the job site.

1.6 WARRANTY

- A. The manufacturer shall warrant the fiberglass reinforced plastic doors and frames:
 - 1. From failure due to workmanship and materials for 5 years from date of installation.
 - 2. Against corrosion failure caused by the environment specified for 10 years from date of installation.
 - 3. From thermal warpage as determined by the theoretical limits for a structurally steel reinforced fiberglass composite door.
- B. This guarantee shall not extend to failure caused by physical abuse and shall not cover costs for dismounting or reinstallation, labor, crating, or freight.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Provide products manufactured by Warminster Fiberglass Company; P.O Box 188, Southampton PA 18966-0188; ASD. Tel. (215) 953-1260, Fax. (215) 357-7893.
- B. Products from other manufacturers will be considered for substitution prior to receipt of bids. Requests for substitution after bids have been received will not be considered. Requests for substitution must include the following information in order to be considered:

1. Formal written request certifying that products to be substituted will match specified products in terms of structural properties, dimensions, physical appearance, quality level, and quantities, and that they will perform the same function in the same manner and will achieve the same end result.
2. Manufacturer's and supplier's material data sheets, specifications, and performance data.
3. A list of three or more projects in satisfactory service for not less than three years that use products identical to those being proposed for substitution. For each project, include name, address, and telephone number of the engineer, the contractor, and the plant manager.

2.2 FIRE RATINGS

- A. Fire-Rated Openings: Provide assemblies tested in accordance with ASTM E 152 and labeled by Warnock Hersey.

2.3 FIBERGLASS DOORS

- A. WFD1000 Series Fiberglass Reinforced Plastic Doors:
 1. Thickness: 1-3/4 inches.
 2. Height, width, and other features as indicated.
 3. Resin transfer molded in matched metal molds to produce industrial quality doors which have a smooth finish.
 4. Mold in one piece creating a seamless monolithic composite consisting of gel-coat, fiberglass reinforcement, polyester resin, insulating core, and internal reinforcements.
- B. Exterior surface:
 1. Gel-coat with a smooth low luster finish free from fiber pattern, roughness, or other irregularities.
 2. Gel-coat thickness: 0.025 inch.
 3. Resistant to moisture and ultraviolet degradation.
 4. Gel coat resistant to _____.
 5. F.D.A. approved Gel coat.
- C. Exterior Laminate: Chemically bonded with gel-coat; minimum 1/8 inch thick.
 1. Composition: Halogenated polyester resin and continuous strand fiberglass reinforcement; minimum glass content of 25%.
 2. Fire retardant rating (ASTM E 84): Class I.

- D. Core:
1. 1-1/2 inch thick; minimum insulating value of R-11.5.
 2. Rigid closed cell, self extinguishing polyisocyanurate foam; density of 1.9 pounds per cubic foot.
 3. Perforated to form resin posts during the molding process which tie the exterior laminates together.
- E. Internal Reinforcements:
1. Provide reinforcements to SDI 107 thickness standards, and block-outs as required by templates for hardware specified in hardware section.
 2. Combination of 1-9/16 inch thick structural end grain Balsa core, 1/8 inch thick steel flats, and 1/8 inch thick fiberglass ribs and 2 pieces of steel tubing, 1-1/2 inch x 1 inch x 14 gage by door height.
 3. Incorporate reinforcements into the doors during the resin transfer molding process.
 4. Provide structural Balsa core on latch side.
 5. Provide structural Balsa core with steel flats where high stress loads are induced by surface applied hardware such as closers and surface bolts.
 6. Provide a continuous steel flat on the hinge side for optimum screw retention for mortised or continuous hinges.
 7. Provide vertical fiberglass rib reinforcements surrounding steel tubing stiles 6 inches from the door sides to structurally rigidize the door and limit thermal warpage to theoretically determined tolerances for specified door size. The vertical reinforcing ribs and tubing will leave an insignificant shrink line the full length on both sides of the door, which is acceptable.
- F. Produce doors seamlessly by molding in place all mortises, openings, recesses, pockets, and steel encapsulated reinforcements to receive finish hardware, including drilling and tapping, in accordance with finish hardware schedule and templates provided by hardware supplier.

2.4 FIBERGLASS FRAMES

- A. WFD1000 series fiberglass reinforced plastic frames:
1. 5-3/4 inch jamb with a 2 inch face, 5/8 inch stop and 5/8 inch return.

2. Resin transfer molded in matched metal molds to produce a knocked down profile with a smooth finish.
 3. Monolithic composite consisting of gel-coat, fiberglass reinforced laminate, structural end grain Balsa core, and internal reinforcement.
 4. Provide mitered corners and molded pockets for corner reinforcement.
 5. Head profile with molded corner tabs for head to jamb alignment during assembly.
 6. During the molding process, mold in place mortises, recesses, and openings to produce a totally seamless profile.
- B. Exterior Gel Coat Surface: Match gel coat of doors.
- C. Exterior laminate: Chemically bonded with gel-coat; minimum 1/8 inch thick.
1. Composition: Halogenated polyester resin and continuous strand fiberglass reinforcement; minimum glass content of 25%.
 2. Fire retardant rating: Class I.
- D. Structural core:
1. 1/2 inch thick end grain Balsa core with a density of 8 pounds per cubic foot.
 2. Core porosity to allow resin to penetrate the surface during molding and to develop a high strength bond between the core and laminate.
- E. Internal reinforcements:
1. Provide reinforcements to SDI 107 gage thickness standards, and block-outs as required by templates for hardware specified in hardware section.
 2. 1/8 inch thick steel flats, totally encapsulated in the fiberglass laminate.
 3. Incorporate steel reinforcement into the frame profile during the resin transfer molding process.
 4. Encapsulate a continuous steel flat in the hinge side jamb profile for optimum screw retention for mortise or continuous hinges.
 5. Reinforce head profile with steel flats located in the face and stop for surface applied hardware.
 6. Corner reinforcement: Steel angle 0.094 inch thick x 1-1/2 inch wide x 3-1/2 inch long which slips into molded corner pockets to ensure accurate location and prevent corner separation.

- F. Produce frame, jambs, and head seamlessly by molding in place all mortises, openings, recesses, pockets, and steel encapsulated reinforcements to receive finish hardware, including drilling and tapping, in accordance with finish hardware schedule and templates provided by hardware supplier.

2.5 TRANSOMS AND LIGHTS

- A. Provide transom panels where indicated.
- B. Provide borrowed lights where indicated.
- C. Provide side lights where indicated.

2.6 FIBERGLASS LIGHT OPENINGS

- A. Provide fiberglass light opening where indicated.
 - 1. Color: As specified for doors.
 - 2. Profile opening: Molded seamless and integral with the door in matched metal molds by the resin transfer molding process. Exterior side of profile to have a smooth architectural appearance.
 - 3. Removable fiberglass stops to allow for glazing replacement.
 - 4. Provide stainless steel screws to retain removable fiberglass stops.
 - 5. Glazing: 1/4 inch thick safety glass.
 - 6. Glazing: 1/4 inch thick polycarbonate sheet.
 - 7. Glazing: Specified in glazing section.

2.7 FIBERGLASS LOUVERS

- A. Provide fiberglass louvers where indicated.
 - 1. Color: As specified for the doors.
 - 2. Removable fiberglass vanes.
 - 3. Vane profile: Inverted "V".
 - 4. Provide fiberglass insect screens.
 - 5. Molded opening: Seamless and integral with door in matched metal molds by the resin transfer molding process. Exterior side of profile to have a smooth architectural appearance.
 - 6. Provide flat head stainless steel screws to retain fiberglass stops.
 - 7. Removable fiberglass stops to allow vane replacement.

2.8 COLOR SELECTION

- A. Color: The selected color shall pigment both the gel-coat and exterior laminate.

1. Standard Gray.
2. Umber.
3. White.
4. Color as selected by the Architect from the manufacturer's color chart containing 35 colors.
5. Match color chip provided by the Architect.

2.9 FIBERGLASS THRESHOLD

- A. Provide fiberglass threshold unless otherwise specified in hardware section.
 1. 1/2 inch high x 6 inch deep x opening width.
 2. Skid resistant surface.

2.10 ANCHORS

- A. Provide jamb anchors within 18 inches of top and bottom each frame and at 24 inches on center in between, unless otherwise required for fire-rated frames.
- B. New Masonry: Butt mounting jamb anchors, 18 gauge flat "T" anchors to suit frame size with legs a minimum of 1 inch x 6 inch.
- C. Existing Masonry: Butt mounting jamb anchors, 3/8 inch diameter flat head stainless steel sleeve anchor and plastic "T" spacer.
- D. Wood Studs: Strap anchors; 18 gage x 3/4 inch high x stud width.
- E. Wood Studs: Screw through-frame anchors with stainless steel lag screws 3/8 inch in diameter.

2.11 SOURCE QUALITY CONTROL

- A. The manufacturer shall maintain a continuous quality control program, and upon request shall furnish to the Architect certified test results of physical properties.
- B. Minimum physical properties of the laminate:
 1. Tensile Strength (ASTM D 638): 9,000 PSI.
 2. Flexural Strength (ASTM D 790): 20,000 PSI.
 3. Barcol Hardness (ASTM D 2583): 40 Min. Average.
 4. Impact Resistance (ASTM D 256): 12 ft-lbs/inch.
 5. Heat Distortion Point (ASTM D 384): 175 F.
 6. Density/Specific Gravity (ASTM D 792): 93.6 PCF/1.5.

7. Burning Characteristics (ASTM E 84): Flame Spread, less than 25; Smoke Density, less than 200.
 8. Thermal Expansion (ASTM D 696): 8×10^{-6} in/in degree F.
- C. Minimum physical properties of the urethane foam core:
1. Thermal Conductivity (ASTM C 518): 0.13.
 2. Density/Specific Gravity (ASTM D 1622): 1.9 PCF/.03.
 3. Burning Characteristics (ASTM E 84): Flame spread, less than 35; smoke density, less than 240.
- D. Minimum physical properties of end grain Balsa core:
1. Thermal Conductivity (ASTM C 518): 0.45.
 2. Density/Specific Gravity (ASTM D 1622): 9-1/2 PCF/.128.
 3. Compressive Strength (ASTM C 365): 1870 PSI.
- E. Prepare tests in accordance with ASTM D 618.

PART 3 EXECUTION

3.1 FRAME INSTALLATION

- A. Install frames plumb, level, square, and rigidly secured in the opening.
- B. Use field applied bottom and center spreader to maintain opening dimensions.
 1. Fabricate spreader from lumber at least 1 inch thick and approximately as wide as frame depth.
 2. Cut clearance notches for frame stops.
- C. Install anchors in appropriate positions; type as indicated by construction.
- D. After frame is installed and secure, remove spreaders, leaving surfaces smooth and undamaged.

3.2 DOOR INSTALLATION

- A. Install doors plum, level, and square.
- B. Apply hardware and adjust to achieve quiet and smooth operation.

- C. Adjust doors to fit snugly and close without sticking or binding.
- D. Maximum clearances:
 - 1. 1/8 inch at jambs and heads.
 - 2. 1/4 inch at meeting stiles of pairs of doors.
 - 3. 1/4 inch between door bottom and finished floor or threshold.

3.3 CLEANING AND PROTECTION

- A. Wrap doors and frames after installation and keep free of paint, plaster, cement, scratches, etc.
- B. Leave Project site clean and free of debris.

3.4 SCHEDULE

- A. Door height, unless otherwise indicated:
 - 1. 6'-8".
 - 2. 6'-10".
 - 3. 7'-0".
 - 4. 7'-2".
 - 5. 7'-4".
 - 6. 7'-6".
 - 7. 7'-10".
 - 8. 8'-0".
- B. Door leaf width, unless otherwise indicated:
 - 1. 2'-6".
 - 2. 2'-8".
 - 3. 2'-10".
 - 4. 3'-0".
 - 5. 3'-2".
 - 6. 3'-4".
 - 7. 3'-6".
 - 8. 3'-8".
 - 9. 3'-10".
 - 10. 4'-0".
- C. Elevations:
 - 1. Provide Elevation F unless otherwise indicated.
 - 2. Provide Elevation V in the following locations:
 - _____.
 - 3. Provide Elevation N in the following locations:
 - _____.
 - 4. Provide Elevation FN in the following locations:
 - _____.

5. Provide Elevation HG in the following locations:
_____.
6. Provide Elevation FG in the following locations:
_____.
7. Provide Elevation L in the following locations:
_____.
8. Provide Elevation TL in the following locations:
_____.
9. Provide Elevation LL in the following locations:
_____.
10. Provide Elevation FL in the following locations:
_____.
11. Provide Elevation VL in the following locations:
_____.
12. Provide Elevation NL in the following locations:
_____.
13. Provide Elevation GL in the following locations:
_____.
14. Provide Elevation DD in the following locations:
_____.

END OF SECTION