

## Section 13121 **FRP BUILDINGS,**

### **Part 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Pre-engineered buildings.
- B. Electrical wiring and devices for pre-engineered structures.
- C. Heating equipment for pre-engineered structures.
- D. Ventilation equipment for pre-engineered structures.

#### **1.2 REFERENCE SECTIONS**

- A. Section 03300 - Cast-in-Place Concrete: Concrete building pad.
- B. Division 16: Electrical connections.

#### **1.3 REFERENCES**

- A. ASTM C 518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- B. ASTM D 256 - Standard Test Method for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
- C. ASTM D 638 - Standard Test Methods for Tensile Properties of Plastics.
- D. ASTM D 732 - Standard Test Method for Shear Strength of Plastics by Punch Tool
- E. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- F. ASTM D 792 - Standard Test Method for Specific Gravity (Relative Density) and Density of Plastics by Displacement.
- G. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- H. ASTM D 2583 - Standard Test Method for Indentation Hardness of Rigid Plastics By means of a Barcol Impressor.
- I. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

#### **1.4 SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. Product Data:
  - 1. Provide manufacturer's standard details and catalog.
  - 2. Data demonstrating compliance with referenced standards.
  - 3. Provide installation instructions.
- C. Shop Drawings: Submit drawings showing layout, dimensions, anchorages and accessories

#### **1.5 SYSTEM DESCRIPTION**

- A. Design factory-fabricated, pre-engineered structures to withstand 125 mile per hour wind load and 30 PSF snow-load.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Store products on flat surface and protect from construction traffic, and damage.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURER**

- A. Provide products manufactured by Warminster Fiberglass Company, P. O. Box 188, Southampton, PA 18966; [www.warminsterfiberglass.com](http://www.warminsterfiberglass.com) 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 10 or more projects in satisfactory service for not less than three years with enclosures 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 MATERIALS

A. Molded composite: Exterior and interior resin-fiberglass laminate with foam core.

1. Laminate: Polyester resin and chopped strand fiberglass; minimum glass content of 25%.

a. Exterior surface: White gel coat with low luster finish, smooth and free from fiber pattern, roughness, or other irregularities.

b. Exterior laminate: 1/8 inch thick, minimum, chemically bonded to gel coat. Interior laminate to be 1/8 inch thick, minimum.

c. Interior laminate: White color, encapsulate core in place.

d. Laminate properties: (Choose flame spread a, b, or c)

1) Tensile strength (ASTM D 638): 11,000 PSI

2) Flexural strength (ASTM D 790): 18,000 PSI

3) Shear strength (ASTM D 732): 12,000 PSI

4) Barcol hardness (ASTM D 2583): 40.

5) Impact (ASTM D 256): 12 ft lbs/per inch.

6) Density/specific gravity (ASTM D 792): 93.6 PCF/1.5.

7) Surface burning characteristics (ASTM E 84):

a) Flame spread, less than 150; smoke density, less than 1000.

b) Surface burning characteristics (ATSM E 84): Class A flame spread 20 25

c) Surface burning characteristics (ATSM E 84): Class B flame spread 70 75

2. Core (Choose Core thickness)

a. Rigid closed cell, self extinguishing, polyisocyanurate foam with a density of 2.0 pounds per cubic foot.

1) 1 inch thick with a minimum insulating value of R 7.

2) 2 inch thick with a minimum insulating value o R 14.

b. Core Properties:

1) Thermal conductivity (ASTM C 518): 0.13 BTU Inch/ Hr.SF F.

2) Density/specific gravity (ASTM D 1622): 2.0 PCF/ .03.

3) Surface burning characteristics (ASTM E 84):

4) Flame spread, 35 smoke density, 240.

B. The manufacturer shall maintain a continuous quality control program and upon request shall furnish to the engineer certified test results of the physical properties.

## 2.3 COMPONENTS

A. Door: One-piece, resin transfer molded (RTM) in matched metal molds to produce an industrial quality door, which exhibits a smooth finished, seamless, monolithic, warp-free composite consisting of a gel-coat, fiberglass reinforcement, polyester resin, insulating core, and internal reinforcements with all mortises, openings, recesses, and pockets molded in place.

1. Mount door with continuous stainless steel hinge.

2. Door gasket: Neoprene sponge rubber bulb type gasket with flexible lock to retain permanent grip.

B. Latch:

1. Provide single-point keyed stainless steel cylindrical latch and cadium plated door stop with chain.

2. Provide the point latch with stainless steel padlock hoop, and cadium plated door stop with chain.

3. Provide doors with panic hardware choose one (Aluminum or stainless steel).

C. Base Mounting Flange Gasket: ? inch thick by 4 inches wide closed cell neoprene sponge rubber to provide weather tight seal around the building perimeter.

D. Louvers: Provide two, 6-inch diameter PVC wall louvers with manually adjustable damper and insect screen.

E. Lifting Eye Bolts:

1. Provide 3/4 inch stainless steel eye bolts in roof.

2. Bolts for attaching walls to fiberglass floor: Stainless steel.

a. 1/2-inch diameter for buildings

## 2.4 PRE-ENGINEERED FIBERGLASS COMPOSITE BUILDINGS

### A. Assembly:

1. Provide factory-assembled buildings.

B. Model: . WFS 1010-14

C. Encapsulated aluminum extrusion 3 inches wide by 1 1/2 inches high by 0.125 inch thick with a 1 inch wide side flange shall be encapsulated into each corner of end panels (full height) and 4 inches wide by 2 1/2 inches high by 0.125 inch thick with a 1 inch wide side flange around the entire roof perimeter to maintain flatness, straightness, and structural integrity. Integral internal flanges on mating panels shall be provided for bolting the sides, ends and roof to the encapsulated aluminum extrusions.

1. Aluminum extrusions: Incorporate threaded inserts on 12-inch centers for internal bolting to mating panel flange during assembly.

2. Assemble panels with 3/8 inch diameter stainless steel bolts on 12-inch centers and a 1/4 inch thick by 3 inches wide urethane foam gasket for a weather tight seal at all joints. Assembly bolts shall not penetrate the exterior wall of the structure.

3. Structurally reinforce wall and roof panels with steel and aluminum extrusions to meet loading conditions.

a) Galvanized steel mounting channel reinforcement: 0.078 inch thick by 1 5/8 inch high by 1 5/8 inches wide.

Mechanically attach to the interior surface with aluminum pop rivets on 12-inch centers, on all walls.

c) Steel reinforcement shall be encapsulated in walls at end and roof perimeter, to form a continuous, one-piece molded composite wall or roof panel

4. Provide wall panels with an integral 4 inches wide internal mounting flange pre-drilled on 12-inch centers with 5/8 inch diameter holes for attaching to concrete pad.

a) Concrete pad specified in Division 3

## 2.6 ACCESSORIES

### A. Anchor bolts for attaching structure to concrete pad:

1. Buildings: 1/2 inch diameter stainless steel expansion anchors.

### B. Exhaust fan with gravity shutter, and PVC shroud with insect screen.

1. 7 inches diameter; 140 CFM

2. 10 inches diameter; 585 CFM

3. 12 inches diameter; 800 CFM

4. \_\_\_\_\_ inches diameter; \_\_\_\_\_ CFM

### C. PVC intake Louver: 12 inches square with fiberglass gravity shutter and insect screen.

### D. Lamp:

1. Incandescent, vapor tight.

2. Fluorescent, 48-inch 2-bulb fixture with acrylic lens.

### E. Fan and Lamp switch

1. Interior or duplex switch.

2. Exterior weatherproof duplex switch.

3. Door actuated switch and selector switch- 3 position (manual/off/automatic)

### F. Heater:

1. 1500 watt with thermostat and tip-over switch and heater mounting including mounting channel, outlet, and brackets.

2. Heater \_\_\_\_\_ watt \_\_\_\_\_ Volt with thermostat.

### G. Duplex outlet.

H. Air Conditioner: \_\_\_\_\_ BTU.

I. Heat pump: \_\_\_\_\_ BTU heating, \_\_\_\_\_ cooling.

J. Duplex fuse box: 30 amp.

### K. Circuit breaker panel:

1. 125 amp, MLO - including 4- 1 pole breakers (total spaces - 12).

2. Other specify.

### L. Electrical wiring in flexible, liquid tight, PVC conduit. Provide for:

1. Fan and switch.

2. Lamp and switch.

3. Duplex outlet.

4. Other appliances indicated.

## **2.7 FINISHES**

A. Color: White

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

A. Verify that concrete is level and true to plane and of correct dimensions to receive structure. Correct any deficiencies before proceeding.

### **3.2 INSTALLATION**

A. Layout anchor bolt pattern according to drawings. Drill holes of depth and diameter required by anchor bolt manufacturer.

B. Install structure in accordance with manufacturer's instructions.

C. Erect structures true to line and plumb, free of twist and warp.

D. Install and test accessories in accordance with manufacturer's instructions

### **3.3 ADJUST AND CLEAN**

A. Adjust components for proper operation.

B. Leave project site clean and free of debris.

## **END OF SECTION**