



# ONE-PIECE FIBERGLASS BUILDINGS

## SECTION 13122 PRE-ENGINEERED FIBERGLASS 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.
- E. Air conditioning equipment for pre-engineered structures.

#### 1.2 RELATED 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 618 – Standard Practice for Conditioning Plastics for Testing.
- D. ASTM D 638 – Standard Test Method for Tensile Properties of Plastics.
- E. ASTM D 732 – Standard Test Method for Shear Strength Plastics by Punch Tool.
- 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 Method for Specific Gravity (Relative Density) and 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.

#### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Certified independent test results of representative wall laminate.
- C. Shop Drawings: Show:
  - 1. Critical dimensions, jointing and connections, fasteners and anchors.
  - 2. Materials of construction.
  - 3. Sizes, spacing, and location of structural members, connections, attachments, openings, and fasteners.
  - 4. Color(s).
- D. Calculations: Structural design calculations, sealed by an independent licensed Professional Engineer.



- E. Samples: 8-inch square sample of representative wall construction, upon request.
- F. Manufacturer's installation instructions.

## 1.5 SYSTEM DESCRIPTION

- A. Size: provide one-piece molded construction FRP building(s) of the following type(s):
  - 1. Size: \_\_\_\_\_ W x \_\_\_\_\_ D x \_\_\_\_\_ H.
    - i. Paneled construction shall not be acceptable.
- B. Design factory-fabricated, pre-engineered structure(s) to withstand 135 miles per hour wind load, 40 PSF snow load, Seismic Zone 4.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products indoors or in weather protected area until installation. Protect from construction traffic and damage.

## PART 2 PRODUCTS

### 2.1 MANUFACTURER

- A. The product shall be manufactured by TRACOM, Inc.; 6575-A Industrial Way, Alpharetta, Georgia 30004; Tel. (877) 435-8637, Fax (770) 664-6565, [www.tracomfrp.com](http://www.tracomfrp.com).
- B. Requests for substitution must be made in writing and received by the engineer's office a minimum of ten (10) business days before bid opening. Substitutions shall be made in accordance with the provisions of Section 01600.
- C. Substitutions: Manufacturers not pre-approved shall not be allowed.
- D. Warranty: Buildings shall be warranted to be free of defects in workmanship and materials for a period of two years from date of shipment.

### 2.2 MATERIALS

- A. One-Piece Molded Composite Construction:
  - 1. General Construction: The building shall be provided with a smooth interior and exterior satin finish. The walls and roof shall be integral with smooth radii for all corners. No roof overhang shall be allowed. External flanges shall only be allowed in those instances where the building is oversized.
  - 2. Laminate: Isophthalic polyester resin with high performance, chopped, commercial grade glass strand fiber reinforcement with a suitable coupling agent.
    - i. Minimum glass content: 30%.
    - ii. Exterior surface: 15 mil (minimum) gel coat with U.V. inhibitors and a satin finish lightly textured and free from fiber pattern, roughness, or other irregularities.
    - iii. Exterior laminate: 1/8 inch thick (minimum); chemically bonded to the surface gel coat and encapsulating the foam core.
    - iv. Foam core (2.2.A.2)
    - v. Interior laminate: 1/8 inch thick (minimum); chemically bonded to the interior gel coat and encapsulating the foam core.
    - vi. Interior surface: 15 mil (minimum) gel coat with U.V. inhibitors and a textured finish, free from exposed glass or other irregularities.
    - vii. Laminate properties:
      - 1. Tensile strength (ASTM D 638): 14,000 PSI.



2. Flexural strength (ASTM D 790): 27,000 PSI.
  3. Flexural modulus (ASTM D790): 1,000,000 PSI.
  4. Shear strength (ASTM D 732): 12,000 PSI.
  5. Barcol hardness (ASTM D 2583): 40.
  6. Density / specific gravity (ASTM D 792): 93.6 PCF/1.5.
3. Core:
- i. Rigid closed cell, self-extinguishing (Class 1), polyisocyanurate foam with a density of 2.3 pounds per cubic foot. Foam shall be T250 Elfoam without exception.
    1. 1 inch thick with a minimum core insulating value of R~7 (standard).
    2. 2 inch thick with a minimum insulating value of R~14 **(OPTIONAL)**.
    3. 3 inch thick with a minimum insulating value of R~21 **(OPTIONAL)**.
  - ii. Core properties:
    1. Thermal conductivity (ASTM C 518): 0.145 BTU inch/hr./SF/°F.
    2. Density / specific gravity (ASTM D 1622): 2.3 PCF.
    3. Shear Strength (ASTM C 273): 25 lb/in<sup>2</sup>
    4. Tensile Strength (ASTM D 1623): 45 lb/in<sup>2</sup>
    5. Compressive Strength (7% deflection/yield) (ASTM D 1621): 35
4. Coupons prepared in accordance with ASTM D 618.
- 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(s):
- a. Quantity: door(s) of the following quantities:
    - i. \_\_\_\_\_ Single door assemblies.
    - ii. \_\_\_\_\_ Double door assemblies.
  - b. Construction:
    - i. One-piece molded fiberglass construction 78 inches high, 1-3/4 inches thick, and:
      1. 36 inches wide (standard).
      2. 30 inches wide **(OPTIONAL)**.
      3. 40 inches wide **(OPTIONAL)**.
      4. 48 inches wide **(OPTIONAL)**.
    - ii. Mount door with two T-304 stainless steel laminated strap hinges, 5 inches long. Continuous piano hinges or the use of fastening methods other than bolting shall not be acceptable.
    - iii. Rubber bulb gasket with flexible lock to retain permanent grip.
    - iv. One-piece, purpose built, 3 inches deep fiberglass drip cap over doors; drip cap to extend 2 inches each side past door. Cut angle shall not be acceptable.
    - v. Full threshold, heavy duty black vinyl, 4-1/2 inches deep x 1/2 inch high.
      1. T-304 stainless steel, 5 inches deep x 1/2 inch high **(OPTIONAL)**.
    - vi. Schlage stainless steel single-point key locked classroom style ball knob. To facilitate entry and exit from the building, raised door sills shall not be acceptable.
      1. Exterior stainless steel single-point key locked ball knob with interior T-18-8 stainless steel touch-bar exit device (panic hardware) **(OPTIONAL)**.



2. Key locked three-point hardware with drop handle and raised door sill **(OPTIONAL – in lieu of standard ball knob)**.
  3. Drop handle, with accommodation for user-supplied padlock **(OPTIONAL – in lieu of standard ball knob)**.
  - vii. Heavy duty stainless steel, dual compression spring cushioned overhead door stop, designed for BHMA L52231 and ANSI A156.16.
    1. Overhead channel style stainless steel door stop / door holder **(OPTIONAL)**.
    2. Automatic hydraulic door closer / door stop **(OPTIONAL)**.
  - viii. Provide single-flap neoprene insert style door sweep.
    1. Single-flap neoprene insert style T-304 stainless steel door sweep **(OPTIONAL)**.
  - ix. Provide \_\_\_\_\_ inch by \_\_\_\_\_ inch Lexan door window **(OPTIONAL)**.
  - x. Door activated mini-switch (for light or fan operation) **(OPTIONAL- specify operation)**.
- B. Integral Floor: **(OPTIONAL – mounting flange become external (2.3.D.i), door sill is raised (2.3.A.vi), and threshold (2.3.A.b.v) is deleted)**
- a. Load rating: 100 PSF.
  - b. One-piece molded fiberglass floor with grey skid-resistant surface and fully encapsulated reinforcing core:
    - i. 1-1/4 inches thick, uninsulated **(OPTIONAL)**.
    - ii. 3-1/4 inches thick with 1-3/4 inches thick polyisocyanurate foam core **(OPTIONAL)**.
  - c. Provide containment floor construction with a capacity of \_\_\_\_\_ gallons **(OPTIONAL)**.
    - i. Elevated removable FRP grating over containment floor **(OPTIONAL)**.
- C. Lifting Eyes: Provide a minimum of two removable, 3/4 inch – 10 partially threaded, eye bolts with 6 inch shank lengths.
- i. Steel (5,200 lbs. work load limit) (standard).
  - ii. T-304 stainless steel (5,140 lbs. work load limit) **(OPTIONAL)**.
- D. Mounting Flange: 3 inches wide x 1/4 inch thick (minimum) with closed cell neoprene sponge rubber gasket 2 inches wide x 3/8 inch thick to provide a weather tight seal around the building perimeter.
- i. Internal (standard).
  - ii. External **(OPTIONAL)**.
- E. Partition Wall: Provide single-piece, full height, insulated partition wall laminated into building interior to provide separation of the building into two compartments **(OPTIONAL – specify orientation)**.

## 2.4 EQUIPMENT

- A. Electrical
- a. Circuit Breaker Panel: 120 / 240 VAC, 1 phase, surface mount.
    - i. 125 amp, main lug, 8 branch, NEMA 1 metallic body (standard).
    - ii. 125 amp, main lug, 8 branch, NEMA 3R metallic body **(OPTIONAL)**.
    - iii. 125 amp, main lug, 8 branch, NEMA 3R thermoplastic body **(OPTIONAL)**.
    - iv. 125 amp, main breaker, 12 branch, NEMA 1 metallic body **(OPTIONAL)**.
    - v. 125 amp, main breaker, 12 branch, NEMA 3R metallic body **(OPTIONAL)**.
  - b. Electrical Wiring: 12 gauge stranded, color-coded THHN/THWN/MTW electrical wiring in rigid, U.L. listed, corrosion / impact resistant, non-conductive, Schedule 40 PVC conduit. SO cord or other non-encased wiring shall not be acceptable.
  - c. Receptacle: GFCI receptacle 15A 125V, 20 A 125V feed-through, with 5mA +/- 1mA trip threshold.
    - i. Interior (standard).



- ii. Exterior with clear weatherproof cover (*OPTIONAL*).
  - d. Switch: Weatherproof switch box.
    - i. Single toggle, for light / fan (standard).
    - ii. Double toggle switch box for \_\_\_\_\_ (*OPTIONAL - specify*).
    - iii. HOA switch box for \_\_\_\_\_ (*OPTIONAL - specify*).
- B. HVAC
  - a. Air Conditioner: Unit shall have integral electronic controls and thermostat. Unit shall be line powered, require no separate electrical outlet, and shall be provided with a reinforced opening to support/mount it.
    - i. 5,300 BtuH, 115 VAC (*OPTIONAL*).
    - ii. 8,000 BtuH, 115 VAC (*OPTIONAL*).
    - iii. 10,000 BtuH, 115 VAC (*OPTIONAL*).
    - iv. 17,500 BtuH, 240/208 VAC (*OPTIONAL*).
    - v. 22,000 BtuH, 240/208 VAC (*OPTIONAL*).
  - b. Fan: Shutter-mounted exhaust fan with integral gravity shutter, aluminum fan blades, fiberglass canopy, and OSHA compliant polyester-coated wire guard. Exhaust fan to be wired to the weatherproof light / fan switch.
    - i. 140 CFM 7 inch diameter fan (*OPTIONAL*).
    - ii. 585 CFM 10 inch diameter fan (standard).
    - iii. 800 CFM 12 inch diameter fan (*OPTIONAL*).
    - iv. 1,095 CFM 16 inch diameter fan (*OPTIONAL*).
    - v. 1,860 CFM 18 inch diameter fan (*OPTIONAL*).
  - c. Corrosion Resistant Fan: Shutter-mounted exhaust fan with integral fiberglass gravity shutter, fiberglass reinforced polypropylene fan blades, fiberglass canopy, and epoxy coated wire guard. Exhaust fan to be wired to the weatherproof fan / light switch (*OPTIONAL*).
    - i. 524 CFM 10 inch diameter fan (*OPTIONAL*).
    - ii. 1,100 CFM 12 inch diameter fan (*OPTIONAL*).
    - iii. 2,005 CFM 16 inch diameter fan (*OPTIONAL*).
    - iv. 2,790 CFM 18 inch diameter fan (*OPTIONAL*).
  - d. Heater: Line powered wall heater. No separate electrical outlet shall be required.
    - i. 1,500 watt, 5,120 BtuH, white powder coat finish with automatic re-set thermal overload protection with indicator light and built-in thermostat (standard).
    - ii. 2,000 watt, 6,124 BtuH, 240 VAC, white powder coat finish with automatic re-set thermal overload protection with indicator light and built-in thermostat (*OPTIONAL*).
    - iii. 1,500 watt, 5,120 BtuH, T-304 stainless steel with thermal cutout, safety light, and 1-pole thermostat (*OPTIONAL*).
  - e. Shutter: Gravity operated fiberglass intake shutter, with heavy duty fiberglass frame and exterior removable T-316 stainless steel insect screen.
    - i. 10 inches by 10 inches (standard).
    - ii. 12 inches by 12 inches (*OPTIONAL*).
    - iii. 16 inches by 16 inches (*OPTIONAL*).
    - iv. 18 inches by 18 inches (*OPTIONAL*).
    - v. 24 inches by 24 inches (*OPTIONAL*).
    - vi. 30 inches by 30 inches (*OPTIONAL*).
    - vii. 36 inches by 36 inches (*OPTIONAL*).
    - viii. Fiberglass hood over intake shutter (*OPTIONAL*).
    - ix. Shutter motor, vertical mount, wired to exhaust fan (*OPTIONAL*).
  - f. Thermostat: NEMA 4X electric line voltage thermostat for remote operation of heater, fan, or air conditioner, 0-45 C and 30-110° F (*OPTIONAL – specify operation*).
- C. Lighting
  - a. Interior Light: Lamp to be wired to the weatherproof light / fan switch.



- i. 100 watt, vapor-tight incandescent light (standard).
    - ii. 100 watt, NEMA 4X non-metallic incandescent light (**OPTIONAL – in lieu of metallic incandescent light**).
    - iii. 64 watt, 2-bulb, 48-inch fluorescent vapor-tight fixture with acrylic lens for damp locations (**OPTIONAL – in lieu incandescent light**).
    - iv. 64 watt, 2-bulb, 48-inch NEMA 4X fluorescent fixture with acrylic lens (**OPTIONAL**).
    - v. Emergency light NiCad battery back-up (**OPTIONAL – for fluorescent lights only**).
  - b. Exterior Lamp:
    - i. 70 watt, high pressure sodium, exterior light with acrylic lens, bulb, and integral photocell (**OPTIONAL**).
    - ii. 100 watt, NEMA 4X non-metallic incandescent wall mount light, controlled by (**OPTIONAL – specify control**):
      - 1. Standard weatherproof single toggle building fan / light switch.
      - 2. Separate weatherproof single toggle switch.
      - 3. Shielded photocell.
    - iii. 32 watt, rough service wall mount compact fluorescent wall mount light, controlled by (**OPTIONAL – specify control below**):
      - 1. Standard weatherproof single toggle building fan / light switch.
      - 2. Separate weatherproof single toggle switch.
      - 3. Shielded photocell.
- D. Mounting
  - a. Equipment mounting panel: 3/4 inches thick marine grade plywood equipment mounting panel laminated into wall.
    - i. 42 inches wide x 48 inches high (standard).
    - ii. \_\_\_\_\_ inches wide x \_\_\_\_\_ inches high (**OPTIONAL**).
  - b. Equipment mounting strut: (\_\_\_\_) sections of 12 gauge T-304 stainless steel slotted mounted strut, 48 inches long x 1-5/8 inches deep.
- E. Safety Equipment
  - a. Cylinder bracket: wall mounted, epoxy powder coated steel cylinder bracket with vinyl guards and polypropylene strap(s) and cinch buckle(s) – to accommodate cylinders (**SELECT – one, two, three, four or six**) 4-12 inches in diameter (**OPTIONAL**).
  - b. Cylinder floor stand: epoxy powder coated steel cylinder floor stand with vinyl guards and polypropylene strap(s) and cinch buckle(s) – to accommodate (**SELECT – one, two, three, four or six**) cylinders 4-12 inches in diameter (**OPTIONAL**).
  - c. Emergency exit sign: polycarbonate body, long-life red LED exit sign with integral Ni-Cad battery back-up (**OPTIONAL**).
  - d. Warning horn: single tone, general duty horn in weatherproof box (not wired) (**OPTIONAL**).
  - e. Warning light: flashing, general duty light with T-304 stainless steel base and polycarbonate dome (not wired) (**OPTIONAL**).
  - f. Warning bell with revolving light: 93 decibel bell with flashing, 1000 candle power revolving light with polycarbonate dome and aluminum base (not wired) (**OPTIONAL**).

## 2.5 FINISHES

- A. Exterior Color: #2445 Gray Cloud.
- B. Interior Color: #2445 Gray Cloud.
- C. Exterior Color: \_\_\_\_\_ (**OPTIONAL**).
- D. Interior Color: \_\_\_\_\_ (**OPTIONAL**).



## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that the concrete slab is level, true to plane, and of the correct dimensions to receive the structure. Correct all deficiencies before proceeding.

### 3.2 INSTALLATION

- A. Install products in accordance with engineer's instructions, plans, blueprints, etc, local codes, and in a manner consistent with the installation instruction and recommendation of the manufacturer.
- B. **DO NOT remove the door spacer(s) until ALL ANCHOR BOLTS have been COMPLETELY SET and door operation has been VERIFIED.**
- C. Move and position the shelter using the lifting eyes provided. The neoprene gasket provided should be positioned between the concrete slab and the building mounting flange. If more than one lifting eye is provided **USE A SPREADER BAR.**
- D. After closing the building door(s):
  - i. Layout the anchor bolt pattern. The anchor bolts should be installed in accordance with the engineer's instructions.
  - ii. Drill and set the anchor bolts starting with one on each side of the door(s). The anchor bolts behind and in front of the door(s) should be flat head anchors if the mounting flange is external.
  - iii. Drill the anchor bolt holes to the depth and diameter required by the anchor bolt manufacturer. Stainless steel wedge style concrete anchors [1/2 inch (1,27 cm) diameter x 4-1/2 inches (11,43 cm) long – (minimum)] are recommended. Anchor bolts are to be supplied by others.
  - iv. Verify the operation of the door(s) before installing the remaining anchor bolts.
  - v. **FAILURE to VERIFY the operation of the door(s) BEFORE the remaining anchor bolts are set MAY RESULT in the BINDING of the door against the door frame.**
  - vi. Install the threshold (if supplied) and re-verify the operation of the door(s).
  - vii. After all anchor bolts have been completely set, remove the door spacer(s).
- E. Seal the flange with sealant or grout to ensure watertightness.
- F. Install (as necessary) and test the building accessories in accordance with the manufacturers' instructions.
- G. For additional installation instructions refer to latest revision of document OPB-I.

**WARNING: BUILDINGS ARE NOT INTENDED TO BE GAS TIGHT OR CONTAIN GAS OR CHEMICAL SPILLS. CONSULT ALL APPROPRIATE LOCAL, STATE, AND FEDERAL REGULATIONS BEFORE ENTERING.**

### 3.3 ADJUST AND CLEAN

- A. Clean surfaces in accordance with the manufacturer's instructions.
- B. Remove trash and debris, and leave the site in a clean condition.

END OF SECTION

Document: OPB-S  
Revision: 0  
Date: 7-7-05  
By: Jon Wachter