

# Petroleum Storage

## Fiberglass Underground Tank Specification

### SHORT FORM SPECIFICATION

The contractor shall provide the appropriate double or triple-wall fiberglass storage tank and accessories as indicated on tank drawings. Capacity, dimensions, and fitting locations will be indicated on tank drawings. Tanks shall be manufactured by Fiber Glass Systems. The tank must be tested and installed according to manufacturer's current installation instructions.

### LONG FORM SPECIFICATION

#### 1. GENERAL

##### 1.1. Quality Assurance

###### 1.1.1. Acceptable Manufacturers:

Fiber Glass Systems., Conroe, Texas

###### 1.1.2. Governing Standards, as applicable:

1.1.2.1. Underwriters Laboratories Inc. Standard 1316, Glass-Fiber Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures.

1.1.2.2. Underwriters Laboratories of Canada standard ULC-S615, Reinforced Plastic Underground Tanks for Flammable & Combustible Liquids.

###### 1.1.2.3. National Fire Protection Association codes and standards:

- NFPA 30 Flammable and Combustible Liquids Code
- NFPA 30A Motor Fuel Dispensing Facilities and Repair Garages Code
- NFPA 31 Installation of Oil-Burning Equipment Standard

###### 1.1.2.4. City of New York Department of Buildings M.E.A.

###### 1.1.2.5. American Concrete Institute standard ACI 318, Building Code Requirements for Structural Concrete.

##### 1.2. Submittals

1.2.1. Contractor shall submit \_\_\_\_\_ copies of: shop drawings, manufacturer's product brochures, installation instructions and calibration charts.

#### 2. PRODUCTS

##### 2.1. Double-Wall and Triple-Wall

Fiberglass Underground Storage Tanks

###### 2.1.1. Loading Conditions - Tanks shall meet the following design criteria:

2.1.1.1. External hydrostatic pressure: Buried in ground with 7' of over burden over the top of the tank, the excavation fully flooded and a safety factor of 5:1 against general buckling.

2.1.1.2. Surface Loads: When installed according to manufacturer's current installation instructions, tanks shall withstand surface HS-20 axle loads (32,000 lbs/axle).

2.1.1.3. Internal Load: Primary and secondary tanks shall withstand 5 psig (35kPa), or 3 psig for 12' diameter tanks, air pressure test with 5:1 safety factor.

2.1.1.4. Tanks shall be designed to support accessory equipment such as heating coils, ladders, drop tubes, etc. when installed according to manufacturer's recommendations and limitations.

###### 2.1.2. Product-Storage Requirements

2.1.2.1. All primary tanks must be vented. Tanks are designed for operation at atmospheric pressure only, except for use with vapor recovery systems at a pressure or vacuum not to exceed 1 psig (7 kPa).

2.1.2.2. Tanks shall be capable of storing liquids with specific gravity up to 1.1.

2.1.2.3. Tank shall be capable of storing the following products:

## Specifications

- Diesel fuel oils for oil burning equipment at temperatures not to exceed 150°F.
- Gasoline, jet fuel, aviation gasoline, motor oil (new or used), kerosene, diesel motor fuel at ambient temperatures.
- Alcohol-gasoline blend motor fuels at ambient temperatures:
  - Gasoline-ethanol blends with up to 100% ethanol.
  - Gasoline-methanol blends with up to 100% methanol.
- Oxygenated motor fuels at ambient temperatures with up to 20% (by volume) methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE), di-isopropyl ether (DIPE), tertiary butyl alcohol (TBA), tertiary amyl methyl ether (TAME), or tertiary amyl ethyl ether (TAEE).
- Biodiesel-diesel blends with up to 100% biodiesel (B100 per ASTM) at ambient temperatures.

### 2.1.3. Materials

- 2.1.3.1. The tank shall be manufactured as a matrix of premium resin, glass fibers and silane-treated silica that together result in a composite providing improved corrosion protection.
- 2.1.3.2. Tank inner wall shall be fabricated against a mold to produce a non-air inhibited and high gloss laminate to provide a fully cured inner surface without the need for wax coats, a low coefficient of friction and a natural resistance to the build-up of algae or other contamination on the surface. Wax and wax resin coatings cannot be used to achieve full surface cure on tank shells and endcaps.

### 2.1.4. Dimensional Requirements (refer to Fiber Glass Systems literature)

- 2.1.4.1. Nominal capacity of the tank shall be \_\_\_\_\_ gallons / liters.
- 2.1.4.2. Nominal outside diameter of the tank shall be \_\_\_\_\_ feet.
- 2.1.4.3. Nominal overall length of the tank shall be \_\_\_\_\_ feet.

### 2.1.5. Monitoring Capabilities

- 2.1.5.1. Double and triple-wall tanks shall have a monitoring space between the walls to allow for the free flow and containment of leaked product from the primary tank. The monitoring space shall provide equal communication in all directions.
- 2.1.5.2. The following continuous monitoring conditions shall be compatible with the cavity between the inner and outer tanks:
  - Vented to atmosphere
  - Vacuum – 5 psig maximum
  - Positive air pressure (3 psig maximum)
  - External hydrostatic pressure – 7' maximum groundwater head pressure over tank top
- 2.1.5.3. The monitoring system shall be capable of detecting a breach in the inner and outer tank under the following installed conditions:
  - When the primary tank is empty.
  - When the primary tank is partially or completely full and the ground water table is below tank bottom.
  - When the primary tank is partially or completely full and the tank is partially or completely submerged in groundwater.
- 2.1.5.4. The leak detection performance of the monitoring system shall be listed as a continuous interstitial monitoring method (liquid filled) by the National Work Group on Leak Detection Evaluations (NWGLDE). The system should be capable of detecting leaks in the primary or secondary tank walls as small as 0.10 gallons per hour within one-month.
- 2.1.5.5. The hydrostatic monitoring system shall be capable of a precision tank test that is listed by the National Work Group on Leak Detection Evaluations (NWGLDE).
- 2.1.5.6. If hydrostatically monitored, any solution used in the monitoring space shall be compatible with the tank and be of a contrasting color to the tank.

## 2.2. Accessories

### 2.2.1. Flanged Manways

- 2.2.1.1. The standard manway is 22" I.D. and will be furnished with UL listed gaskets and covers (30" and 36" manways are optional).

## Specifications

- 2.2.1.2. Location – see standard tank drawings.
- 2.2.1.3. Optional manway extensions shall be fiberglass and \_\_\_\_\_ feet long.
- 2.2.2. Fill Tubes - Fill tubes of appropriate design shall be supplied by contractor.
- 2.2.3. Hydrostatic Monitor Accessories
  - 2.2.3.1. Tanks 6' diameter and larger shall have an integrally mounted annular space reservoir installed on the tank for factory-installed brine and continuous hydrostatic monitoring. The reservoir shall be constructed of fiberglass reinforced plastic materials and be included in the tank warranty.
  - 2.2.3.2. The monitoring fitting for the monitoring space shall be a 4" NPT fitting.
  - 2.2.3.3. Brine monitoring fluid shall be a calcium chloride solution.
  - 2.2.3.4. Double float reservoir sensor supplied by contractor shall be designed for CSI reservoirs. The components of the sensor shall be compatible with brine and provide two alarm points positioned 10" apart.
- 2.2.4. Secondary Containment Collars
  - 2.2.4.1. Shall be factory installed.
  - 2.2.4.2. The collar shall be fiberglass reinforced plastic, 42", 48" or 54" in diameter and shall be factory-installed in accordance with drawings.
  - 2.2.4.3. The collar shall include an internal adhesive channel.
- 2.2.5. Adhesive Kits (Kit AD)
  - 2.2.5.1. Adhesive kit shall be supplied by tank manufacturer.
  - 2.2.5.2. Adhesive kit shall provide a watertight seal at the tank sump and containment collar joint to prevent the ingress of water or egress of fuel. The adhesive kit includes resin, catalyst, mixing stick, putty knife, sandpaper, grout bag, and installation instructions.
- 2.2.6. Tank Sumps
  - 2.2.6.1. Tank sump shall be supplied by the tank manufacturer.
  - 2.2.6.2. Tank sump components shall be constructed of fiberglass reinforced plastic. The tank sump shall be 42", 48" or 54" in diameter and must mount to the secondary containment collar. Standard tank sump shall consist of an octagon shaped base (round base is optional), round body extension and enclosure top.
  - 2.2.6.3. The octagon base shall be 24" in height and provide 19" high panels for piping entry points. The base must be capable of joining to the collar with an internal adhesive channel.
  - 2.2.6.4. A 34" or 40" watertight lid shall be provided by the tank manufacturer.
  - 2.2.6.5. Refer to tank sump drawings for standard models and configurations.
- 2.2.7. Sump Entry Fittings
  - 2.2.7.1. All Sump Entry Fittings shall be shipped and supplied by tank manufacturer.
  - 2.2.7.2. All Sump Entry Fittings shall be UL-971 listed fiberglass reinforced plastic (FRP) fittings.
  - 2.2.7.3. All Sump Entry Fittings shall be manufactured using compression molding and/or filament winding.
  - 2.2.7.4. All Sump Entry Fittings shall be assembled and installed using UL listed adhesives from the tank manufacturer.
- 2.2.8. Ladders
  - 2.2.8.1. Ladders shall be supplied by the tank manufacturer (carbon steel, stainless steel, aluminum).
- 2.2.9. Anchor Straps
  - 2.2.9.1. Straps shall be supplied by the tank manufacturer.
  - 2.2.9.2. Number and location of straps shall be as specified by manufacturer.
  - 2.2.9.3. Each strap shall be capable of withstanding a maximum load of 25,000 lbs.
- 2.2.10. Prefabricated Concrete Deadmen Anchors
  - 2.2.10.1. Design Conditions – Deadmen shall meet the following design criteria:
    - Deadman shall be designed to ACI 318
    - Manufactured with 4,000 psig concrete

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## Specifications

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- Manufactured in various lengths
- Provide adjustable anchor points for hold down straps

### 2.2.11. Liquid Sensor Drawstring

2.2.11.1. Galvanized steel drawstring shall be factory installed at the monitoring fitting to facilitate field insertion of sensor.

### 2.2.12. Fittings Threaded NPT

2.2.12.1. All threaded fittings shall be located on a manway cover or within 12" of the tank top center line. Fittings to be supplied with temporary thread protectors or threaded plugs.

2.2.12.2. All standard fittings shall be 4" diameter NPT half couplings.

2.2.12.3. Internal piping shall be terminated at least 4" from the tank bottom (6" for 12' diameter tanks).

### 2.2.13. Red Thread IIA Riser Pipe

2.2.13.1. Riser Pipe shall be shipped and supplied by tank manufacturer.

2.2.13.2. All 4" Riser Pipe shall be UL-971 listed fiberglass reinforced plastic (FRP) pipe.

2.2.13.3. All 4" Riser Pipe shall meet the following minimum performance requirements when installed in a tank fitting - 316 ft-lb torque and 1990 ft-lb bending moment.

2.2.13.4. All Riser Pipes shall be assembled and installed using UL listed adhesives from the tank manufacturer.

2.2.13.5. All Riser Pipe shall thread into a tank mounted FRP 4" NPT fitting, provided by tank manufacturer.

2.2.13.6. Riser pipe threads shall be factory machined to comply with ANSI-ASME Std B1.20.1 for NPT threads.

## 3. EXECUTION

### 3.1. Installation and Testing

3.1.1. Fiberglass underground tanks must be tested and installed according to the current installation instructions provided with the tank (refer to Fiber Glass Systems Pub. No. INS1300). Tanks are installed with pea gravel or crushed stone as specified in current installation instructions. Fiber Glass Systems' tanks may only be used for storing products listed in the current limited warranty.

## 4. LIMITED WARRANTY

### 4.1. Limited Warranty

4.1.1. Warranty shall be Fiber Glass Systems limited warranty in effect at time of delivery.