

SECTION 33 16 00
FIBERGLASS TANK SOLUTIONS
FUEL STORAGE TANK SPECIFICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Underground Fuel Tanks:
 - 1. For tank installations in the following locations:
 - a. United States.
 - 2. For the following applications:
 - a. Fuel Storage.

1.2 RELATED SECTIONS

- A. Section 02200 – Earthwork.
- B. Section 03300 – Concrete.

1.3 REFERENCES

- A. Underground Fuel Tanks:
 - 1. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
 - 2. NFPA 30: Flammable and Combustible Liquids Code.
 - 3. NFPA 30A: Code for Motor Fuel Dispensing Facilities and Repair Garages.
 - 4. NFPA 31: Standard for the Installation of Oil-Burning Equipment.
 - 5. ASTM D4097: Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
 - 6. ASTM D3299: Standard Specification for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
 - 7. ANSI/CAN/UL/ULC 1316: Underwriters Laboratories (UL) Standard for Fibre Reinforced Underground Tanks for Flammable and Combustible Liquids.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300 – Administrative Requirements.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including, but not limited to, the following:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation manual and operating guidelines.
- C. Shop Drawings: Tank manufacturer shall submit the following for review and approval prior to fabrication of the tanks:
 - 1. Detailed shop drawings of each tank complete with all accessories supplied by the manufacturer.
 - 2. Detailed shipping, handling and installation instructions.

1.5 QUALITY ASSURANCE

- A. Tank installations:

1. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of federal, state, and local authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with tank manufacturer's Installation and Operating Guidelines recommendations for delivery, storage, and tank handling.

1.7 WARRANTY

- A. Warranty: Provide manufacturer's standard limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

- A. Tank installations:
 1. Acceptable Manufacturer: Acceptable Manufacturer: Fiberglass Tank Solutions, which is located at: 436 S. State Hwy 7, Camdenton, MO 65020. Telephone: 573-317-9620. Email: info@fgtsolutions.com. Web: fgtsolutions.com.
 2. Acceptable Pre-cast Deadmen Manufacturer: Fiberglass Tank Solutions, which is located at: 436 S. State Hwy 7, Camdenton, MO 65020. Telephone: 573-317-9620. Email: info@fgtsolutions.com. Web: fgtsolutions.com.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600 – Product Requirements.

2.2 UNDERGROUND FUEL TANKS

- A. Tank Design - Fiberglass reinforced plastic (FRP) tanks:
 1. Tank Design: Double-Wall or Triple-Wall vessel as specified and shown on the Drawings.
 2. The tank size, fittings and accessories shall be as shown on the drawings.
 3. Tank shall be manufactured with continuous monolithic structural ribs that are placed at a standard 24" spacing along the cylinder of the tank.
 4. Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used.
 5. Tank shall be vented to atmospheric pressure.
 6. Tank shall be capable of handling liquids with specific gravity up to 1.1.
 7. Tank shall be compatible with liquids identified in the manufacturer's standard limited warranty.
 8. Actual tank capacity shall be equal to or greater than the nominal capacity listed on sales literature and production drawings.
 9. Tanks shall have ASME 80:10 tank ends, allowing for maximum capacity with minimum tank footprint.
 10. Multi-compartment tanks, the internal bulkhead/divider wall does not include any seam/joints on the tank exterior.
 11. Interior corrosion barrier: premium vinyl-ester used for resin-rich corrosion barrier with a minimum 100mil corrosion barrier, including C-Veil.
 12. Primary wall construction: filament or helically wound laminate of resin and continuous glass fiber with structural ribs integral to wall; ribs constructed over a foam form.
 13. Secondary (outer) wall for DW tanks bonded to inner wall using a 3D structural glass material forming a monitorable interstice.
 14. Exterior finish: smooth hot-coat finish for additional corrosion resistance.

- B. Loading Conditions – Tank shall meet the following design criteria:
1. Internal Load – Tank shall be designed to withstand a 5-psig air-pressure test with a 5:1 safety factor.
 2. Surface Loads – Tank shall be designed to withstand surface H-20 and HS-20 axle loads when properly installed according to manufacturer's current Installation Manual and Operating Guidelines.
 3. External Hydrostatic Pressure – Tank shall be designed for 7 feet of overburden over the top of the tank, the hole fully flooded, and a safety factor of 5:1 against general buckling.
- C. Interstitial Space:
1. The interstitial space between the tank walls shall be constructed with a glass reinforcement material which provides a structural bond between the tank walls while creating a defined interstice that allows for free flow of liquid.
- D. Tank Monitoring System:
1. General:
 - a. The continuous monitoring system shall include monitoring fluid factory-installed in the interstitial space and within a fiberglass tank-top mounted reservoir.
 2. Design:
 - a. The continuous monitoring system shall be designed to always detect a leak in either the primary or secondary wall, regardless of the water table conditions at the installation site.
 - b. The interstice of the tank shall be designed for a 5:1 safety factor beyond normal hydrostatic operating pressure to ensure structural integrity and to prevent false leak alarms.
- E. Fuel Storage Applications:
1. Governing Standards, as applicable:
 - a. American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.
 - b. NFPA 30: Flammable and Combustible Liquids Code.
 - c. NFPA 30A: Code for Motor Fuel Dispensing Facilities and Repair Garages.
 - d. NFPA 31: Standard for the Installation of Oil-Burning Equipment.
 - e. ASTM D4097: Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
 - f. ASTM D3299: Standard Specification for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
 - g. ANSI/CAN/UL/ULC 1316: Underwriters Laboratories (UL) Standard for Fibre Reinforced Underground Tanks for Flammable and Combustible Liquids.
 2. Tank Accessories – Fuel Storage Applications:
 - a. Tank Anchoring:
 - 1) Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs.
 - 2) Galvanized turnbuckles shall be supplied by the tank manufacturer.
 - 3) Prefabricated concrete anchors shall be supplied and manufactured by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.
 - 4) Pre-cast concrete deadmen to be manufactured by Fiberglass Tank Solutions LLC, located at 436 S. State Hwy 7.
 - 5) Substitutions are not permitted.

- b. Manways:
 - 1) The standard manway shall be flanged, 22 inches I.D. and complete with gaskets, bolts and cover.
- c. Threaded Fittings:
 - 1) All threaded fittings shall be NPT half or full couplings, in 2-inch, 4-inch and 6-inch diameters.
 - 2) Threaded fittings are available in FRP, carbon steel and stainless steel.
 - 3) Fittings shall be installed on the tank-top centerline or in the cover of the manway.
- d. Flanged Fiberglass Nozzles for Separators:
 - 1) Flanged fiberglass nozzles available in 2-inch, 4-inch and 6-inch diameters.
 - 2) All flanged nozzles shall be flanged and flat-faced and conform to Class 150 bolting patterns as specified in ANSI/ASME B16.5.
- e. Secondary Containment Collars:
 - 1) The tank shall have factory-installed 42-inch or 48-diameter containment collars.

PART 3 EXECUTION

3.1 TESTING

- A. Tank shall be tested according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

3.2 INSTALLATION

- A. Tank shall be installed according to the tank manufacturer's Installation Manual and Operating Guidelines in effect at time of installation.

END OF SECTION