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**Fiberglass Underground Tank Specification**

**for**

**Aqueous Fire Fighting Foam (AFFF)**

**Short Form Specifications**

The contractor shall provide the appropriate underground fiberglass storage tank for Aqueous Fire Fighting Foam (AFFF) application and any optional accessories as indicated on tank drawings. Capacity, dimensions, and fitting locations and sizes will also be indicated on tank drawings. The tank will be as manufactured by Containment Solutions, Inc. The tank will be installed according to manufacturer’s current installation instructions.

**Long Form Specification**

*Part I: General*

**1.01 Quality Assurance**

* 1. Acceptable Manufacturers:Containment Solutions, Inc., Conroe, Texas

**Manufacturing Standards:**

1. Tank shall be manufactured to meet or exceed the requirements of U.L. 1316 Underwriters Laboratories, Inc. Glass-fiber Reinforced Plastic Underground Storage Tanks for Petroleum Products.
2. ASTM D4097Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
3. American Concrete Institute standard ACI 318, Building Code Requirements for Structural Concrete.

**1.02 Submittals:**

Contractor shall submit to engineer \_\_\_ copies of shop drawings for each tank and \_\_\_ copies of manufacturer’s literature, including installation instructions and calibration charts.

*Part II: Products*

**2.01 Double-Wall Fiberglass Underground Tanks**

1. Loading Conditions - Tanks shall meet the following design criteria:
   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. Surface Loads: When installed according to manufacturer's current installation instructions, tanks shall withstand surface HS-20 axle load  
      (32,000 lbs/axle).
   3. Internal Load: Primary and secondary tanks shall withstand  
      5 psig (35 kPa) air pressure test with 5:1 safety factor. (3 psi for 12’ tanks).
   4. Tanks shall be designed to support accessory equipment when installed according to manufacturer's recommendations and limitations.
2. Product-Storage Requirements
3. All primary tanks must be vented. Tanks are designed for operation at atmospheric pressure only.
4. Tanks shall be capable of storing liquids with specific gravity up to 1.1.
5. Tank must be operated at ambient temperature
6. Tank shall be capable of storing the following products:
   1. The tank will normally be empty and will be used to temporarily contain chemicals after some emergency event. The tank is not designed for the continuous storage of these chemicals. To insure short exposure times, the tank must be emptied and then rinsed and cleaned of any residual chemicals within 72 hours of use.
7. Materials
   1. The tank shall be manufactured as a matrix of premium resin modified to include a 0.100” liner with surface veil and vinyl ester resin, glass fibers and silane-treated silica that together result in a composite providing improved corrosion protection.
   2. Tank inner wall shall be fabricated against a mold to produce a non-air inhibited and high gloss laminate to provide fully cured inner surface without the need of 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.
   3. Tank to include liner with surface veil on 100% of the tank interior surface per Section 7.1.1 of ASTM D4097 (Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks).
8. Dimensional Requirements (refer to Containment Solutions literature)
   1. Nominal capacity of the tank shall be \_\_\_\_ gallons / liters.
   2. Nominal outside diameter of the tank shall be \_\_\_\_ feet.
   3. Nominal overall length of the tank shall be \_\_\_\_ feet.
9. Monitoring Capabilities
10. Double 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.
11. The following continuous monitoring conditions shall be compatible with the cavity between the inner and outer tanks:
    1. Vented to atmosphere
    2. Vacuum – 5 psig maximum
    3. External hydrostatic pressure – 7’ maximum groundwater head pressure over tank top
12. Tanks larger than 600 gallons 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.
13. The monitoring fitting for the monitoring space shall be a 4" NPT fitting.
14. The monitoring system shall be capable of detecting a breach in the inner and outer tank under the following installed conditions:
    1. When the primary tank is empty.
    2. When the primary tank is partially or completely full and the ground water table is below tank bottom.
    3. When the primary tank is partially or completely full and the tank is partially or completely submerged in groundwater.
15. The leak detection performance of the monitoring system shall be tested and verified by a qualified independent consultant to detect leaks in the primary or secondary tank walls as small as 0.10 gallons per hour within one-month.
16. 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) and be listed as a continuous interstitial monitoring method (liquid filled) by NWGLDE.
17. Hydrostatically monitored solution used in the monitoring space shall  
    be compatible with the tank and be of a contrasting color to the tank.

**2.02 Accessories**

1. Flanged Manways
   1. The standard manway is 22" I.D. and will be furnished with gaskets and carbon steel cover.
   2. Location – see standard tank drawings.
   3. Optional: manway extension shall be fiberglass and \_\_\_\_ feet long.
2. Tank Bottom Deflector Plates:
   1. Fiberglass plates will be installed under each service fitting and manway opening.
3. Secondary Containment Collar
   1. Tank entry warning label shall be affixed to collar.
   2. The collar shall be fiberglass reinforced plastic, 42" or 48" in diameter  
      and shall be factory-installed in accordance with drawings.
   3. The collar shall include an internal adhesive channel.
4. Adhesive Kit (Kit AD)
   1. Alcohol compatible adhesive kit shall provide a watertight seal at the tank sump and containment collar joint to prevent the ingress or egress of water. The adhesive kit includes resin, catalyst, mixing stick, putty knife, sandpaper, grout bag, and installation instructions.
5. Tank Sumps
   1. Tank sump components shall be constructed of fiberglass reinforced plastic and provided by the tank manufacturer.
   2. UL label shall be affixed to tank sump components.
   3. The tank sump shall be 42" or 48" 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.
   4. 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.
   5. A 34" O.D. watertight lid shall be provided at the manway location of the tank and provide a watertight seal to the sump enclosure with12" of water above the lid and remain leak free.
   6. Refer to tank sump drawings for standard models and configurations.
6. Anchor Straps
   1. Straps shall be supplied by the tank manufacturer.
   2. Number and location of straps shall be as specified by manufacturer.
   3. Each strap shall be capable of withstanding a maximum load  
      of 25,000 lbs.
7. Prefabricated Concrete Deadmen Anchors
8. Design Conditions – Deadmen shall meet the following design criteria:
   1. Deadman shall be designed to ACI 318
   2. Manufactured with 4,000 psig concrete
   3. Manufactured in various lengths to fit specified tank
   4. Provide adjustable anchor points for hold down straps
9. Deadman anchors shall be supplied by the tank manufacturer
10. Fittings Threaded NPT
    1. All threaded fittings shall be located on a manway cover or the tank top center line. Fittings to be supplied with temporary thread protectors or threaded plugs.
    2. All standard fittings shall be 4" diameter NPT half couplings.
    3. Internal piping shall be terminated at least 4" from the tank bottom  
       (6" for 12' diameter tanks).
11. Fittings – Fiberglass Gusseted Nozzles:
    1. All fiberglass nozzles will be supplied with flat-faced flanges and bolt pattern in accordance with ANSI B165, Class 150.
       * 1. Fiberglass nozzles shall be constructed of vinyl ester resin.

#### Part III: Tank Testing and Installation

**3.01**

1. Testing - Tank shall be tested and installed according to the CSI Installation Instructions in effect at time of installation.
2. Installation - Tank shall be installed according to the CSI Installation Instructions in effect at time of installation. Contractor shall be trained by the tank manufacturer

# *Part IV: Limited Warranty*

**4.01 Limited Warranty**

Warranty shall be Containment Solutions Chemical Tank limited warranty in effect at time of delivery.