

Aboveground Fuel Storage Tank Specifications

Flammable Liquid Storage Using Multi-hazard, Protected Aboveground Tanks

PART 1 - GENERAL

1.1 SCOPE

This section specifies the requirements for multi-hazard, protected aboveground storage tanks (ASTs) used for fuel dispensing systems or for stationary engine fuel supply systems.

1.2 APPLICABLE PUBLICATIONS

- NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
NFPA 30/30A - Flammable and Combustible Liquids Code
- UNDERWRITERS LABORATORIES, INC. (UL)
UL 142 - Steel Aboveground Tanks for Flammable and Combustible Liquids
UL 2085 - Protected Tank Standards
- SOUTHWEST RESEARCH INSTITUTE (SwRI)
SwRI 95-03 - Multi-hazard Rating for Protected Secondary Containment Aboveground Storage Tanks for Flammable and Combustible Liquids
- APPLICABLE LOCAL AND STATE REGULATIONS

1.3 DESCRIPTION OF WORK

Furnish all labor, materials, tools, equipment and incidentals required to install aboveground fuel storage tanks and fuel dispensing systems as shown on the drawings and described in the specifications.

1.4 QUALITY

Thoroughly trained and experienced workers familiar with the requirements and procedures shall be used. They shall possess the appropriate skills, experience, competence and required certification to complete the work in accordance with the provisions of these specifications.

PART 2 - MATERIALS AND PRODUCTS

2.1 MATERIALS

All materials and equipment used in this project shall be new and shall meet or exceed the following specifications.

2.1.1 STEEL PLATE.

All steel plate used in the construction of the multi-hazard, protected AST and related accessories shall conform to ASTM A36.

2.1.2 STEEL SHEET

All steel sheet used in the construction of the multi-hazard, protected AST and related accessories shall conform to ASTM A570 Grade 33.

2.1.3 PIPE and TUBING

All pipe used in the construction of the multi-hazard, protected AST and related accessories shall conform to ASTM A120 or ASTM A53 Grade B. All tubing used shall conform to ASTM A179. All couplings, unions, elbows, tees, and fittings used shall conform to the ASTM standard appropriate for the pipe or tubing being connected.

2.1.4 LIGHTWEIGHT INSULATING CONCRETE.

The insulating concrete used in the construction of the multi-hazard, protected AST must include cement, aggregate and water. Cementitious slurries that lack aggregate or include foam fillers are not concrete and will not be acceptable.

2.1.5 TANK EQUIPMENT.

The equipment that is used on the multi-hazard, protected AST as part of its listing requirements or as part of the fuel transfer, storage, or dispensing systems shall meet the following requirements:

- a) All equipment installed shall be designed for use in fuel storage and dispensing systems and shall be compatible with other tank components and with the fuel to be dispensed.
- b) Except for the fuel filters, all equipment that is part of the tank pumping or dispensing system shall be UL Listed for use with flammable and combustible liquids.

2.2 PRODUCTS

2.2.1 PROTECTED ABOVEGROUND STORAGE TANK

The multi-hazard, protected AST shall be constructed with materials conforming to the specifications found in Section 2.1 and the entire assembly shall be listed by a nationally recognized testing laboratory. The multi-hazard, protected AST shall be constructed by a manufacturer that has been regularly engaged in the manufacture of UL Listed Steel Aboveground Tanks for Flammable and Combustible Liquids. The multi-hazard, protected AST shall be listed as a four (4) Hour Fire Rated Protected Aboveground Storage Tank in accordance with SwRI Test Procedure 95-03. The multi-hazard, protected AST shall be designed and constructed in conformance with NFPA 30 and NFPA 30A. It shall consist of a steel internal tank surrounded by a 6" layer of lightweight insulating concrete protected by an outer steel tank and shall meet or exceed the following minimum specifications:

- a) The primary tank shall be constructed of steel plate not less than 3/16" thick for tanks with a total capacity of 4,000 gallons or less and not less than 1/4" for tanks with a total capacity over 4,000 gallons. However, in no case shall the tank be thinner than specified by UL Standard 142.
- b) For fuel storage tanks, the tank fill connection shall be installed inside a UL listed spill containment pan with a capacity of not less than 15 gallons. The spill containment pan shall be permanently attached to the tank and be provided with a hinged lockable cover. The spill containment pan shall be insulated from the primary tank by no less than 5 1/2" of insulating concrete.
- c) Insulation and physical protection shall be provided to the primary tank.
- d) The insulating system shall consist of 6" of lightweight insulating concrete that is protected from the elements and enclosed in a steel tank which shall be constructed of steel not less than 3/16" thick. This outer tank is to be so constructed that it will be leak tight.
- e) The insulating system shall provide thermal protection to all parts of the primary tank except the tank nozzles that are allowed to penetrate the insulation. There shall be no metal-to-metal connections of the outer tank to the internal tank except at the nozzles.
- f) The multi-hazard, protected tank assembly shall be constructed in accordance with a design that has been tested by a nationally recognized laboratory and is listed to:
 - 1.) maintain the primary tank average temperature rise below 260°F and the primary tank maximum temperature below 400°F after 4 hours of exposure to a 2000°F fire.
 - 2.) provide resistance, immediately after successful completion of the oven test specified in 1 above, to impingement by the hose stream specified in SwRI Test Procedure 95-03 without penetration of the primary tank.
 - 3.) meet or exceed, after successful completion of the hose stream test specified in 2 above, the bullet resistance specifications in SwRI Test Procedure 95-03.
 - 4.) provide resistance, after successful completion of the bullet resistance test specified in 3 above, to an impact of 12,000 pounds traveling 10 mph at 18" above the ground surface without penetration of the primary tank, in accordance with SwRI Test Procedure 95-03.
- g) The tests called for in Section 2.2.1.f, Items 1, 2, 3, and 4 shall be performed on a single fully-assembled test tank. After completion of tests called for in 2, 3 and 4, the primary tank must be tested for leakage by sealing all nozzles and emergency vents and pressurizing the tank to not less than 3 psig and not more than 5 psig for 1 hour.
- h) The multi-hazard, protected tank assembly shall be constructed in accordance with a design that has been tested in a **Multi-hazard Fire Test** by a nationally recognized laboratory and is listed in accordance with SwRI Test Procedure 95-03.

- i) The multi-hazard, protected tank assembly shall be constructed with integral supports that provide the capability to rigidly anchor the tank to its concrete foundation for resistance to seismic loads. The integral supports shall be filled with lightweight concrete insulation.
- j) The external surfaces of the outer tank, nozzles and supports shall be protected from the elements with two coats of a high performance industrial epoxy and urethane coating system. The total minimum dry film thickness shall be 4 mils. The color shall be light ivory or white.
- k) Except for the vent riser pipe and access assembly, if any, the tank shall be fabricated and assembled at the manufacturer's facility.
- l) The multi-hazard, protected aboveground storage tank shall be the **MH Series SuperVault** as manufactured by Industrial Metal Fabricators, Inc., Park Equipment Company, Dunn Industries, Trusco Tank Inc., or approved equal.

2.2.2 TANK VENTS

- a) Normal Vents. Each compartment of the primary tank shall be equipped with a normal venting device sized in accordance with the requirements of NFPA 30. The venting device(s) shall be installed so that it exhausts upward at an elevation no less than 12 feet above the ground.
- b) Emergency Vents. Each compartment of the primary tank shall be equipped with an emergency vent sized in accordance with NFPA 30.

2.2.3 GAUGING

The tank shall be equipped with a float actuated level gauge capable of indicating the approximate fluid level in the tank.

2.2.4 MONITOR PORT

- a) The tank shall be equipped with a monitor port that may be utilized for the detection of leaks from the primary tank into the secondary containment tank. The monitor port shall be a minimum of 2" steel pipe rigidly attached to the tank and suitable for manual or automatic electronic monitoring.
- b) The monitor port shall be furnished with a lockable cap and shall be marked to clearly indicate that it is not a fill port.

2.2.5 ACCESS STAIRS or GROUND LEVEL FILL SYSTEM

If the tank fill adaptor is located higher than 3'6" above the ground surface or located on top of the tank more than 1' 6" from the side of the tank, then an access platform or a ground level fill system shall be provided.

The access platform shall meet the following requirements:

- a) The access platform shall provide a working surface no less than 20 inches in width and 20 inches in length.
- b) The access platform shall be no more than 36" below the top of the tank.
- c) The design of the steps and platform shall conform with all applicable requirements of OSHA.

The ground level fill system shall meet the following specifications:

- a) All piping shall be welded, unitized construction.
- b) A "dry-break" style camlock adaptor shall be used to prevent spills or riser pipe drainback upon disconnection.
- c) The spill containment pan shall be equipped with a hand pump to transfer spilled product to the storage tank.
- d) A fuel return swing check valve shall be used to allow fuel to be transferred from the spill containment pan to the fill piping.
- e) The drop tube shall have a built in anti-siphon device.

2.2.6 TANK SIGNAGE

Each tank shall be provided with signs affixed to the tank exterior in the proper location and configuration to meet applicable code requirements.

2.2.7 TANK LOCATION

The tank(s) shall be provided with minimum setback and clearances in accordance with local fire codes.

2.2.8 CONCRETE FOUNDATION SLABS

Reinforced concrete foundations shall be designed by the tank manufacturer to limit the soil bearing pressure to no more than 1000 psf. Complete design calculations for the foundation stamped by a professional civil or structural engineer licensed to practice in the State of _____ shall be included with the tank submittal. Concrete and reinforcing steel shall conform to the specifications of the design engineer.

PART 3 - EXECUTION

3.1 TANK INSTALLATION

Aboveground tanks shall be installed as recommended by the tank manufacturer and approved by the owner's representative. The tanks shall be installed in accordance with the manufacturer's installation procedure in effect at the time of installation. The pumps, tanks and appurtenances shall result in a complete working system. Aboveground tanks shall be placed on a reinforced concrete slab, cast in place or pre-cast, as designated on the drawings and in accordance with the tank manufacturer's approved design. Compacted flexible material shall be placed under the concrete slab.

Electrical service and fuel piping to the pump unit shall be installed in accordance with the drawings and the requirements within these specifications, as well as all applicable N.E.C. and NFPA Codes.

3.2 SUBMITTALS

The contractor shall provide three (3) sets of submittals including manufacturer's product data sheets, installation instructions, certificates of compliance with testing requirements, engineering data, and equipment specifications.

The contractor will be responsible to obtain the necessary permits.

3.3 PROTECTED FUEL STORAGE TANK

Contractor shall provide aboveground steel fuel storage tank(s) as specified in Section 2 above in the quantity, size and arrangement as shown on the drawings. Included with the delivery of each tank shall be the manufacturer's certification of listing and compliance with NFPA 30.

The completed installation shall comply with the requirements of NFPA 30 and the conditions of approval stated on the permits. The tank(s) shall carry a label from a nationally recognized independent test laboratory stating that fire, hose steam, ballistics and impact tests were all performed on a single fully-assembled test tank.

3.4 WARRANTY

The tank manufacturer shall furnish in writing a thirty (30) year warranty.