Shop Fabricated Stationary Aboveground Storage Tanks For Flammable, Combustible Liquids

R912

INSTALLATION INSTRUCTIONS

November 2015

1 TANK SITE EVALUATION AND PREPARATION PRIOR TO INSTALLATION

1.1 The foundation for the tank must be designed to support the tank plus 100% of its contents when full. The design shall also take into account the type of support that is being used and the point load associated with that support. The foundation may be constructed using concrete, asphalt, gravel or other stable material and must include provisions in its design to prevent tank movement. The foundation should include any provisions necessary for seismic design. The foundation design must also include provision for draining surface water away from the tank.

1.2 For tank installations without cathodic corrosion protection, the tank should be grounded in accordance with applicable electrical and fire code standards.

1.3 Where the steel tank body is in contact with the earth, use a zinc grounding rod. Do not use a copper grounding rod.

1.4 Where the tank body is in contact with the earth or foundation, it should be protected from external corrosion. For external corrosion protection using cathodic corrosion protection, consult applicable standards (e.g. National Association of Corrosion Engineers) to provide the tank with appropriate protection from lightning without interfering with the corrosion protection. Steel tanks in contact with the earth should not use copper grounding. Refer to STI R893-89, "Recommended Practice for External Corrosion Protection of Shop Fabricated Aboveground Storage Tank Floors."

1.5 Tanks located in areas subject to flooding must be protected against floatation.

1.6 Aboveground tanks should not be located above underground utilities or directly beneath overhead power lines.The tank shall be protected from vandalism and accidental damage in accordance with all applicable codes, NFPA 30, NFPA 30A, UFC, etc.

2 TANK HANDLING

2.1 Do not handle or install tank without having knowledge and experience in procedures involved with proper and safe installation of an aboveground tank used for storage of stable, flammable and combustible liquids. To avoid tank damage, use skilled, professional installers.

2.2 Equipment for handling the tank shall be of adequate size to lift and position the tank. DO NOT DROP OR DRAG THE TANK.

2.3 Tanks shall be carefully handled. Use cables or chains of adequate length (with spreader bars, if necessary) and size. Attach to the tank using the lifting lugs provided. Care should be taken that the angle between the two cables, at the lift point, shall be no greater than 60 degrees.

2.4 DO NOT HANDLE OR MOVE THE TANK UNLESS IT IS EMPTY.

2.5 This is a stationary tank. Do not use this tank for transport of any product.

3 TESTING

3.1 GENERAL REQUIREMENTS

3.1.1 An on-site air test of the tank may be required by local authorities to ensure no damage has occurred in shipping and handling. All testing shall be performed as described in paragraph 3.2 below.

3.1.2 If the manufacturer has shipped the double wall tank with a vacuum on the space between the walls, read and record the vacuum pressure. If the vacuum gauge reading has dropped more than 2 inches Hg (40.5 6.77 kPa) from the level at which it was shipped, from contact the tank manufacturer.

3.1.3 In lieu of the air pressure test described in paragraph 3.2 below, a vacuum may be applied to the interstice of a double-wall tank or to the interstice of a double-bottom tank.

NOTE: This test procedure may be difficult to conduct for large (greater than 2000 gallons) tanks because of the greater volume of space to be evacuated and difficulty in sealing the tank openings. DO NOT APPLY A VACUUM TO THE PRIMARY TANK OF A DOUBLE-WALL TANK OR TO A SINGLE-WALL TANK. A vacuum of 6 inches Hg (20.3 kPa) is to be applied to the interstice. The vacuum shall be held without a loss for one hour on tanks less than 20,000 gallons and for 2 hours for tanks greater than or equal to 20,000 gallons. If this vacuum cannot be held for the specified time interval, then perform the air test procedure described in paragraph 3.2.

3.1.3.1 Caution must be taken in applying a vacuum to the interstice of a tank and the testing must be stopped if any deformation appears on the tank.

3.2 AIR PRESSURE TEST PROCEDURE FOR TANKS

3.2.1 If the tank is equipped with a long-bolt manway for emergency venting, do not remove the long-bolts from the long-bolt manway. Instead, long-bolt manways must be secured with C-clamps of appropriate size and strength to hold the vent cover in the sealed position to maintain the tank pressures required. If tank is equipped with standard emergency vents, remove emergency vents and cap openings to hold tank pressure as required.

NOTE: Use only calibrated air pressure gauges with a 0-15 psig (0-103 kPa) dial span. The relief valve must have a flow rate at the set pressure that is greater than the flow rate of the air supply line. The regulated air supply test pressure used for this test should be as follows:

a. **HORIZONTAL CYLINDRICAL (AND DIKED TANKS, IF APPLICABLE) TANKS** - Not less than 3 psig (20.7 kPa) nor more than 5 psig (34.5 kPa). Set the pressure relief valve in the air supply line at 5.5 psi (38 kPa).

b. **VERTICAL TANKS** - Not to be less than 1 ½ psig (10.4 kPa) nor more than 2 ½ psig (17 kPa) or that gauge pressure above 1 ½ psig (10.4 kPa) which first causes visible deformation of the tank. Set the pressure relief valve in the air supply line at 2 ½ psig (17 kPa).

c. **RECTANGULAR** TANKS - Not more than 1 ½ psig (10.4 kPa). Set the pressure relief valve in the air supply line at 1 ½ psig (10.4 kPa). This 1 ½ psig (10.4 kPa) pressure is to be used for testing tanks in the field ONLY. In-shop testing will be performed at a different pressure.

CAUTION: Do not leave pressurized tank unattended while the air supply line is connected. Do not stand in front of tank heads or fittings when pressurizing tank.

Pressurizing of large tanks may result in the slight deformation bulging of the tops and bottom of vertical tanks, bulging of the sides of rectangular tanks, and bulging of the heads and ends of cylindrical tanks. Should visible bulging occur or deformation appears severe, immediately relieve the pressure. Aboveground vertical tanks may have a "weak shell to roof" seam. Do not air pressure test a tank with a "weak shell to roof" seam. Rather, fill these tanks with water and check for leaks.

3.2.2 SINGLE-WALL TANK PRESSURIZING PROCEDURE

3.2.2.1 Install test piping as shown in Figure Temporarily plug, cap or seal off remaining tank openings to hold pressure.

3.2.2.2 Close valves A and B.

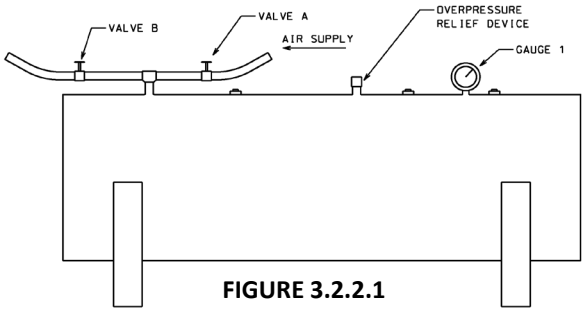


FIGURE 3.2.2.1
SINGLE-WALL TANK

3.2.2.3 Connect regulated test air supply line to test piping as shown in Figure 3.2.2.1.

3.2.2.4 Slowly open valve A to pressurize the tank. Pressure gauge 1 should indicate test air pressure given in paragraph 3.2.1 above. Close valve A. Disconnect regulated test air supply line from test piping.

3.2.2.5 Proceed to paragraph 3.2.4 "Detection of Leaks" below.

3.2.3 DOUBLE-WALL TANK PRESSURIZING

3.2.3.1 The following air pressure testing does not apply to double-wall tanks equipped with interstitial vacuum monitoring systems. In lieu of the air pressure test, the tank may be shipped from the factory with a vacuum in the tank interstice.

Read and record the vacuum pressure. If the vacuum pressure, gauge reading is less than 12 inches Hg (40.5kPa) contact the tank manufacturer.

3.2.3.2 Install test piping as shown in Figure 3.2.3.2. Temporarily plug, cap or seal off remaining tank openings to hold pressure.

3.2.3.3 Close valves A and B. Open valve C.

3.2.3.4 Connect regulated test air supply line to test piping as shown in Figure 3.2.3.2.

3.2.3.5 Slowly open valve A to pressurize the primary tank. Pressure gauge 1 should indicate test air pressure given in paragraph 3.2.1 above.

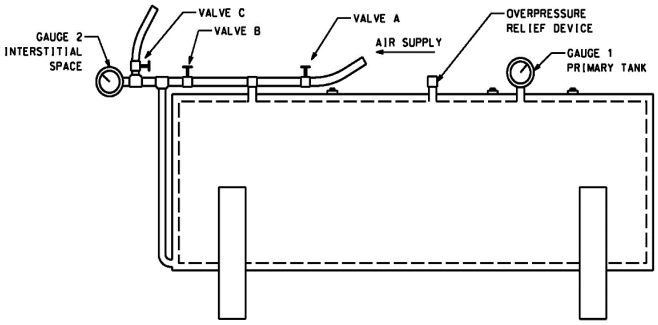


FIGURE 3.2.3.2
DOUBLE-WALL TANK

3.2.3.6 Close valve A. Disconnect regulated test air supply line from test piping.

3.2.3.7 Monitor test pressure in primary tank for 1 hour minimum. A steady drop in pressure reading for gauge 1 indicates there may be a leak in the primary tank. Check the fittings, and gauge, then retest. If the problem persists, contact the tank manufacturer.

3.2.3.8 If no leaks are found, close valve C and slowly open valve B to pressurize the interstitial space between the double walls of the tank. Pressure gauge 1 will indicate a slight drop in test pressure when valve B is opened, but should hold steady at the lower pressure. If test pressure drops below minimum requirements, close valve B, reconnect air supply line and slowly open valve A to increase pressure in primary tank. When the required pressure is indicated on gauge 1 close valve A, disconnect test air supply line. Open valve B to equalize pressure in the primary tank and the interstitial space. Gauge 1 and gauge 2 should have the same pressure reading.

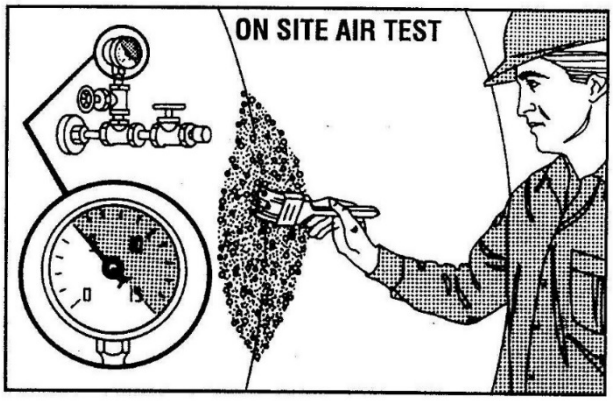
WARNING: Do not apply air pressure to the interstitial space between the walls of a double wall tank without air pressure in the primary tank.Do not apply air pressure to the interstitial space that is higher than the air pressure in the primary tank. Damage to the tank may result.

3.2.3.9 Close valve B. Hold test pressure in interstitial space for 1 hour minimum. A steady drop in pressure gauge 2 indicates there may be a leak in the interstitial space. Check the fittings, the gauges, and then retest. If the problem persists, contact the tank manufacturer.

3.2.3.10 Proceed to paragraph 3.2.4 “Detection of Leaks” below.

3.2.4 DETECTION OF LEAKS

3.2.4.1 Immediately apply leak test solution to tank exterior surfaces, welds, fittings, etc. Check for leaks. No leaks are permitted. If leaks are found, notify the tank manufacturer. If no leaks are found, testing of the tank is complete.



3.2.4.2 For single-wall tank, open valve B, then slowly open valve A to release test air pressure. For double-wall tank, open valve C, then slowly open valve B to release test air pressure.

3.2.4.3 **WARNING:** Emergency relief vents and long bolt manways must be operable to prevent causing tank failure by over-pressurization.

4 TANK PIPING AND ACCESSORIES

4.1 Install all permanent piping and fittings using compatible, non-hardening thread sealant material.

4.2 All unused tank openings must be properly sealed and tested to be liquid and vapor tight prior to putting the tank into service.

4.3 DO NOT WELD ON THE TANK, MODIFY OR PENETRATE THE TANK STRUCTURE IN ANY WAY WITHOUT THE EXPRESS WRITTEN PERMISSION OF THE TANK MANUFACTURER.

4.4 All tank accessories shall be installed as required per local codes. Anti-siphon devices, overfill shut-offs and alarms, vents gauges, emergency vents, etc. are common requirements for tanks storing motor fuels for the purpose of being dispensed into motor vehicles.

5 MAINTENANCE

5.1 The tank operator should perform periodic walk-around inspections to identify and repair areas of damage to the tank or the coating. Check for proper drainage around the tank area.

5.2 It is imperative that the tank exterior be inspected periodically to ensure that the integrity of the coating is maintained. The frequency of periodic repainting will be based upon environmental factors in the geographic area where the tank is located. Special consideration should be given to the selection of the paint, surface preparation and coating application. The coating selected should be suitable for use with the current coating, or the existing coating should be removed. The coating selected should be of industrial quality.

5.3 Proper site preparation and maintenance are vital to ensure drainage of surface water. Should ground conditions change or settlement occur, take the appropriate steps to maintain proper drainage and prevent standing water near or under the tank area.

5.3.1 For diked tanks, remove any product spills immediately. Be sure to dispose of hazardous material properly.

5.3.2 For diked tanks fitted with a drain, drain off water only. Drain openings are required to be maintained liquid tight.

5.4 The primary tank should be inspected monthly for the presence of water at the lowest possible points inside the primary tank. Remove any water found. Water and sediment in fuel can cause plugging of filters. Also, bacterial growth, in this media, can cause filters to plug and cause corrosion of tanks and lines. For procedures on how to check for the presence of water and removal of water, refer to STI RP111, Storage Tank Maintenance. For copies of the RP and more information, please go to www.steeltank.com.

5.5 Tank relocation requirements – Aboveground storage tanks are often relocated. The following instructions are to be followed when this occurs. All steps are to be documented and the documentation is to be kept for the life of the tank.

5.5.1 The hazards associated with the cleaning, entry, inspection, testing, maintenance or other aspects of ASTs are significant. Safety considerations and controls should be established prior to undertaking physical activities associated with ASTs. Cleaning of tanks must be per state and local jurisdiction requirements.

5.5.2 Refer to STI Standard SP001, "Standard for the Inspection of Aboveground Storage Tanks" for requirements concerning tank inspections. This SP001 Standard details requirements for inspections based on the tank installation and age. A tank must undergo the appropriate inspection prior to relocation.

5.5.3 The tank must be subjected to a pressure (or vacuum) test as detailed paragraph 3.2 above except an inert gas, such as nitrogen, should be used for tanks that have previously held fuel.