



## **PREPARATION FOR OPENING A TANK AND TANK ENTRY**

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The following information is taken from the American Petroleum Institute - Publication 1631. Both state and federal rules/regulations allow an underground storage tank (UST) owner/operator to use this industry code as a guidance for compliance with permanent closure and change-in-service requirements, more specifically, the proper method(s) of "opening" a tank for entry. It is important to understand that other industry codes (i.e., API Recommended Practice 1604 and API Publication 2015) should also be followed when cleaning and closing an UST system.

#### **Safety Precautions:**

Sources of ignition must be removed from the area surrounding the tank(s) and vapor vents during periods when flammable vapors might be expelled. Work will not commence if the direction of the wind might carry vapors into areas where they could produce a hazardous condition (e.g., ignition, breathing).

A combustible gas indicator shall be used to check for hazardous vapors in the area. All open flame and spark-producing equipment within the vapor hazard area shall be shut down. Electrical equipment used in the area must be explosion-proof (Class I, Division I, Group D) or approved for the service.

#### **Removal of Liquid Product:**

As much product, water, and sediment as possible shall be removed using explosion-proof or air-driven pumps. Pump motors and suction hoses must be bonded to the tank to prevent electrostatic ignition hazards. A small quantity of water can be pumped into the tank to float the product from a low spot to where it can be pumped from the tank. Also, where possible, fill (drop) tubes shall be removed to allow for maximum removal of all liquid and to provide for adequate air ventilation.

#### **Removal of Flammable Vapors (Gas Freeing):**

The tank shall be thoroughly purged only with air to remove flammable vapors or residue capable of producing flammable vapors. The concentration of flammable vapors in a tank may go through the flammable range before a safe atmosphere is obtained. It, therefore, is necessary that precautions are taken to eliminate the possibility of the discharge of static electricity during gas freeing procedures.

Air pressure in the tank must not exceed 5 psig. To prevent excess air pressure, the vent line must be checked to make certain it is free from obstructions and traps.

Ventilation of the tank can be accomplished by one of two methods which are listed below:

- a. An eductor-type air mover usually driven by compressed air, shall be properly bonded to prevent the possibility of static electricity generation and discharge. When using this method, the fill (drop) tube should remain in place to ensure ventilation at the bottom of the tank. Tank(s) equipped with fill (drop) tubes which are not removable should be purged by this method. An extension shall be used to discharge vapors a minimum of twelve (12) feet above grade.
- b. Diffused blown-air is a second ventilation method. When using this purging method, it is imperative that the air-diffusing pipe is properly bonded to prevent the discharge of a spark. Fill (drop) tubes must be removed to allow proper diffusion of the air in the tank. Air supply should be from a compressor, which has been checked to ensure a clean air supply, free from volatile vapors. Air pressure in the tank must not exceed 5 psig.

### **Testing Flammable Vapor Concentrations:**

An important phase of the operation is the testing for flammability of the vapor in the excavated area and in the tank. Such tests are to be made with a combustible gas indicator which is properly calibrated on hexane in air and thoroughly checked and maintained in accordance with manufacturers' instructions. Persons responsible for testing must be completely familiar with the use of the instrument and the interpretation of the instrument's readings.

The tank vapor space is to be tested by placing the combustible gas indicator probe into the fill opening with the fill (drop) tube removed. Readings should be taken at the bottom, middle and upper portions of the tank and the instrument should be cleared after each reading. If the tank is equipped with a nonremovable fill tube, readings should be taken through another opening. Liquid product must not enter the probe. The vapors should be tested at the vent riser or eductor while the air mover is in operation and purging is in progress, and also in the tank itself with purge air shut off. Readings of 10 percent or less of the lower flammable limit (LFL), as indicated in the tank and at the vent riser or eductor, must be obtained before the tank is considered safe for opening.

### **Opening the Tank:**

If no manway exists, an opening with the minimum dimensions of 18" by 18" shall be cut in the tank top avoiding welded seams. The tank section to be removed should be marked with chalk and a hole drilled with an explosion-proof (such as air driven) drill at one corner of the section. After the hole is drilled, the tank vapors must again be tested by inserting the meter probe into the hole to verify that the vapor concentration does not exceed 10 percent LFL.

[Note: It is important that the purging, air ventilation and testing continue throughout the entire operation. During the tank cutting operation, minimal air pressure should be maintained to prevent a blow-out.]

The tank should be cut using an explosion-proof (such as air-driven) saber saw or snipper using lubricating oil to reduce friction, heat and possible sparks. Prior to the final cut, the plate should be supported to prevent its falling into the tank.

### **Tank Entry:**

Before entering tanks, the procedures described in API Publication 2015 "Cleaning Petroleum Storage Tanks" and 2015A "A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning" should be followed. This includes checking the oxygen content inside the tank with a properly calibrated oxygen monitor.

At all times, personnel entering the tank shall be equipped with positive pressure air supplied equipment with full face enclosure and safety harness connected to a safety line held by an attendant outside the tank. Oil and water-resistant rubber or neoprene boots and gloves shall be worn. Clothing shall cover the arms, legs, torso and head of tank entry personnel. Disposable clothing, impervious to product, is preferred. Clothing saturated with product shall be removed immediately. All personnel working inside the tank should be familiar with ANSI Z117.1 "Confined Spaces Safety."

Tests with the combustible gas indicator and oxygen monitor should be performed periodically in the tank to ascertain that the tank vapors and oxygen content are in the safe range.

If you should have any questions concerning "opening" a tank and tank entry or the underground storage tank rules in general, please contact the Division of Waste Management at 701-328-5166. Copies of the above-referenced industry codes can be obtained from this office. A copy of the North Dakota Underground Storage Tank Rules can be purchased from the Department or referenced at <https://deq.nd.gov/wm>.

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## **NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY**

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