

CITY OF BAKERSFIELD UNDERGROUND STORAGE TANK RE-INSPECTION OF LINED TANK PROCEDURES



Industry Codes - Consensus Standards

Informational Sources:

API 1631 "Interior Lining of UST's"
CCR, Title 23, Division 3, Chapter 16, Underground Storage Tank Requirements
UFC 79-6 "Interior Lining of UST's"

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TANK RE-INSPECTION SEQUENCE

1. Excavation
2. Removal of liquid product
3. Tanks shall be thoroughly degassed or air purged to remove flammable vapors
4. Tank entry & cleaning; only when Bakersfield Fire Department, Office of Prevention Services has authorized entry (LEL % less than 5%)
5. Perform ultrasonic thickness test (special inspector, i.e., qualified engineer)
6. Results of ultrasonic test sent to a regulatory agency
7. The coating will be inspected by a 3rd party "special inspector" or "coating expert" or "qualified professional engineer"
8. Coating certification, i.e., special inspector report sent to regulatory agency whether or not tanks are suitable for continued use
9. Tanks are re-sealed

RE-INSPECTION REQUIREMENTS

Within 10 years of the lining, and every five years thereafter, a coatings expert must conduct an evaluation of the tank and lining. A special inspector, i.e., qualified professional engineer, may do this in lieu of the coatings expert. Depending on whether the tank is steel or fiberglass the inspection must include all of the following:

1. Determine that the tank(s) has been cleaned so that no residue remains on the tank wall.
2. Determine that the tank has been vacuum tested at a vacuum of 5.3 inches of Hg for no less than one minute. This vacuum test is not required if the tank is constructed of fiberglass and is submerged in groundwater by more than 50% of its depth.
3. If the tank is constructed of fiberglass, taking interior diameter measurements to verify whether the cross-section has compressed by more than one percent of the original diameter.
4. Visually checking the tank interior and lining for discontinuity, compression, tension cracking, and corrosion.
5. For steel tanks, testing the entire tank interior using a thickness gauge on a one foot grid pattern with metal wall thickness recorded on a form that identifies the location.
6. Testing for thickness and hardness of the lining in accordance with nationally recognized industry codes to verify that the lining meets the standards under which the lining was applied.
7. For steel tanks, testing the lining using a electrical resistance holiday detector in accordance with nationally recognized industry codes. The owner operator shall have all holidays repaired and checked in accordance with nationally recognized industry codes.
8. Certification from the special inspector, or coatings expert, or qualified professional engineer that:
 - a. The tank is suitable for continued use for a minimum of five years.
 - b. The tank is suitable for continued use for a minimum of five years only if it is relined or other improvements are made.
 - c. The tank is no longer suitable for continued use and shall be closed.
9. Prior to re-inspection a permit is required for the following conditions:
 - a. Tank Testing Permit (Inspection only).
 - b. Modification Permit (If re-lined or improvements are made).

The above steps must be performed in accordance with NLPA (National Leak Prevention Association) Standard 631, API (American Petroleum Institute) Recommended Practice 1631 of UL (Underwriters Laboratories) 1856, AND local fire regulations. In addition, other federal, state and local regulations may apply.

CONTRACTOR QUALIFICATIONS

Tank lining contractors will be entering confined spaces, handling toxic and flammable chemicals, and potentially affecting the safety and well being of anyone within the vicinity of the tank lining operation. A qualified tank lining contractor will have the proper training and experience to eliminate any possible harm to site personnel, the environment and the surrounding public.

TRAINING:

A properly trained contractor can provide documentation of:

1. Initial 40 hour HAZWOPER training and the most recent 8 hour HAZWOPER refresher course for each of his employees needed on site;
2. Confined space safety training for all site personnel; and,
3. Any specific training required by the tank lining material manufacturer.

EXPERIENCE:

A properly experienced contractor will be able to:

1. Provide several references where similar work has been performed;
2. Coordinate activities with other contractors on site;
3. Schedule the services of other necessary service providers (such as special inspectors); and,
4. Obtain necessary permits.

PAPERWORK:

A prepared contractor will have:

1. Standard Operating Procedures;
2. A written Safety and Health Program
3. Confined Space Entry permits; and,
4. The proper equipment and personal protection necessary to do the work in a safe and effective manner.

OVERVIEW OF UNDERGROUND STORAGE TANK LINING RE-INSPECTION PROCEDURES

These procedures follow U.F.C. standard 79-6. "Interior Lining of Underground Storage Tanks, 1997 Edition."

SITE CONDITIONS:

1. Prior to excavation, the site shall be safeguarded from all sources of ignition for a distance of at least 50 feet on all sides of the excavation until the area is vapor free. A temporary chain link fence will be set up at this location prior to excavation. The site shall be equipped with only explosion proof equipment and lighting; and water or air drive tools. The excavation area shall be continuously monitored for oxygen and explosion levels if hazardous vapors are present. Appropriate personal protective and safety equipment shall be provided. Barricades and warning signs reading "Flammable-No Smoking" shall be provided at all entry points to the work area and all areas not under direct supervision of the Site Safety Officer.

Prior to beginning work at this location, tanks shall be emptied of their contents and degassed according to the SCAQMD Rule 1149, and tested for hazardous conditions. All equipment shall be properly bonded and grounded.

2. At least (2) portable fire extinguishers each having a rating not less than 80B:C
3. Precautions shall be taken to prevent the accumulation and discharge of static electricity in accordance with the March, 1982 edition of API Standard 2003.

PREPARATION FOR OPENING THE TANK:

1. The product and vapor-recovery piping for each tanks shall be disconnected and blanked off. The vent line for each tank being worked on shall be isolated from the other tanks. (All tanks shall be shut down completely while this work is being performed.)
2. Electrical switches supplying electrical current to submerged pumps and other equipment connected to the tank shall be disconnected and locked.
3. Product, water and sediment shall be removed as thoroughly as is possible using explosion proof or air-driven pumps. Pump motors and suction hoses shall be bonded to the tank to prevent electrostatic ignition hazards. A small quantity of water is allowed to be pumped into the tank to float the product from a low spot where it can be pumped from the tank. Also, where possible, fill or drop tubes shall be removed to allow for maximum removal of all liquids and to provide for adequate air ventilation, except where an eductor-type air mover is used.

PURGING:

1. The tank shall be thoroughly purged with air to remove flammable vapors. Precautions shall be taken, in accordance with API Standard 2003, to eliminate the possibility of static electricity discharge during gas freeing operations.
2. Air pressure in the tank shall not exceed 5-psig. To prevent excess air pressure, the vent line shall be checked to make certain it is free from obstruction and traps.
3. Ventilation of the tanks shall be accomplished by utilizing an eductor-type air mover that has been properly bonded to prevent the possibility of static electricity generation or discharge. Fill or drop tubes shall remain in place to assure that the vapors are drawn from the bottom of the tank. An extension tube shall be used to discharge vapors a minimum of 12 feet above the surrounding grade.

4. Tests shall be conducted to determine flammability of the vapor in the excavated area and in the tank. The type and manner of testing will be based on the method used to ventilate the tank.
5. Work on the tank will not be permitted until reading of 5% or less off the lower flammable limit are obtained.

OPENING THE TANK:

1. Purging, air ventilation, and testing shall be continuous throughout the entire tank re-opening operation.

TANK ENTRY:

1. Prior to tank entry, a representative of the Bakersfield Fire Department, Office of Prevention Services will certify that the tank is safe to enter.
2. All personnel entering the tank shall be equipped with positive-pressure air-supplied (SAR) equipment with full-face enclosure and safety harness connected to a safety line held by a standby person outside the tank. A mechanical device such as a tripod shall be onsite to insure personnel can be pulled out of the tank. The tank shall be continuously monitored for oxygen and LEL levels during tank work. If an unsafe atmosphere exists, entry personnel shall immediately leave the confined space. An unsafe atmosphere shall mean any atmosphere that is below 21% or above 23% oxygen or an atmosphere that is above 5 percent LEL. Also please note that there will be a minimum of four personnel working on site during the inspection process.
3. A self-contained breathing apparatus shall be immediately available to the standby person for rescue operations or other emergencies.
4. Oil and water resistant rubber or neoprene boots shall be worn by all tank-entry personnel.

Clothing shall cover the arms, legs, torso, and head of all tank-entry personnel. Disposable clothing, impervious to the product, shall be used.
5. Tests with combustible gas indicator shall be performed every 30 minutes in the tank to ascertain that the tank vapors are 5 percent or less of the lower flammable limit. A log showing frequency of monitoring will be maintained during entry.

During sludge removal, monitoring shall be continuous.
6. The vent line shall remain clear and unobstructed to allow continuous ventilation. All other lines and openings shall be plugged or capped off to ensure no liquids or vapors can enter the tank.

PREPARATION AND QUALIFICATION OF TANKS:

1. A visual inspection and assessment of the tank's condition shall be conducted to determine if the tank will satisfy the criteria for acceptance.
2. Before entering the tank for inspection, the interior atmosphere of the tank shall be tested with a combustible gas indicator to ascertain that the tank vapors are 5 percent or less of the lower flammable limit, and verified by the Bakersfield Fire Department Office of Prevention Services.

Tank entry personnel shall be equipped and clothed in accordance with U.F.C. Standard 79-6, Section 79.602.7.1., 2, 3, and 4.

3. The entire internal surface of the tank shall be visually inspected. If electrical light fixtures and cords are to be used, they shall be approved for Class I, Division 1, Group D hazardous locations.
4. The visual inspection shall determine the existence and extent of defects such as pitting, perforations, split seams, internal corrosion, and evidence of shell metal thickness. The shell metal thickness shall be determined by the Ultrasonic Thickness Gauging Procedures described in Appendix II of UFC Standard 79-6. The minimum acceptable average shell metal thickness shall be greater than 75% of the original shell thickness but not less than 1/8 inch.

TESTING OF THE TANK LINING:

1. A high-voltage electrical inspection, Holiday Tightness Test, shall be performed using a Tinker Razor Holiday Detector Model AP/W output power voltage pac 6,000 volt/1,600 volt 15-inch silicon brush electrode, or other acceptable instrument to ensure the absence of air pockets or pin holes in the lining material.

The test shall be conducted at a rate of 100 volts per mil of nominal lining thickness, but in no case less than 10,000 volts.

2. A lining thickness test shall be performed using an Elcometer thickness gauge or the acceptable instrument to determine that the lining thickness meets the above equipment. A lining hardness test shall be performed using a Barcol Hardness Tester GYZJ 935 or other acceptable instrument to determine that the lining hardness meets the manufacturer's specifications.

TANK CLOSURE

The contractor information is submitted to our office for review and approval.

1. Special inspector report.
2. Re-certification if repaired or relined.