

DETECTING LEAKS FOR PETROLEUM TANKS

You must use one or a combination of the following monitoring methods to meet leak detection requirements.

I. Monitoring Wells

Monitoring wells are shallow observation wells placed around tanks in order to detect leaks.

The wells are checked at least once every 30 days and written records of such must be kept. The Department of Environmental Quality (DEQ) has forms available designed specifically for monitoring well record keeping purposes.

The wells may either be considered groundwater wells or vapor wells depending upon if the wells contain naturally occurring groundwater or are dry.

If the wells contain groundwater, then you simply drop a bailer down the wells and check to see if any petroleum products are floating on the water. If you observe 1/8-inch or more of petroleum, you must report to DEQ immediately.

If the wells are dry, you must check the wells with a device designed to detect petroleum vapors in parts per million. Please contact DEQ if you have any questions about vapor monitoring instruments.

The wells should be placed as close as possible to the tanks and must be in the sand or pea gravel backfill of the tank excavation. If the soil around the tanks is a clay material, then monitoring wells cannot be used and you must use an alternative method of leak detection.

For a typical tank installation of 2 to 5 tanks a minimum of four wells should be installed, one at each corner of the tank bed. If you only have one tank then two wells, one at each end of the tank is necessary. If you have more than 5 tanks all in the same tank bed, please contact DEQ for instructions.

Monitoring Well Construction

Wells should be installed to a depth of at least one foot below the bottom of the deepest tank but no more than 20 feet deep.

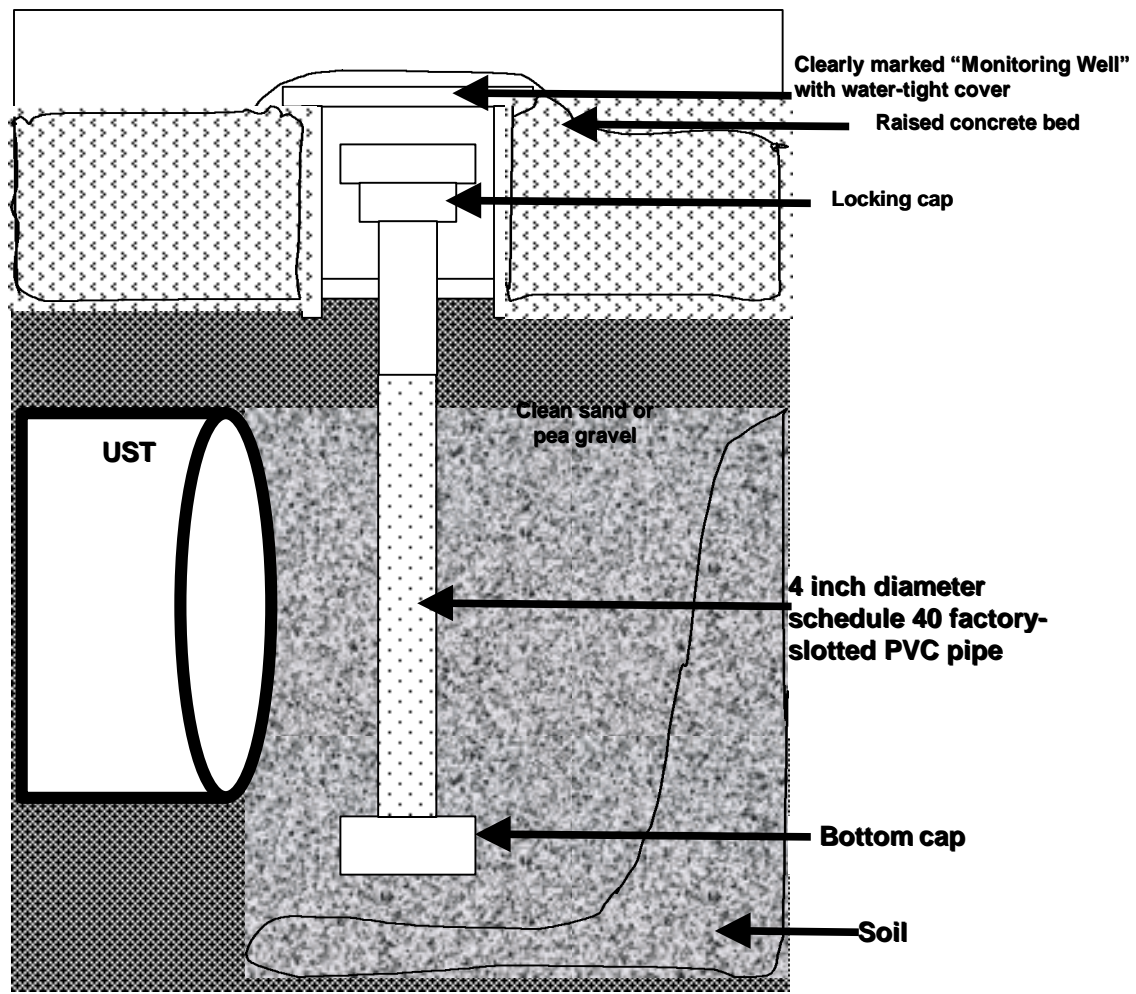
Wells should be constructed of 4-inch diameter PVC pipe with factory slotted 0.02-inch openings.

Wells must have a bottom cap on the screened section of the well.

Typically, the screened portion of the well should extend from the maximum of 20 feet below ground surface to within three feet of land surface. If it is known that the groundwater in your area is very high, such as two feet below land surface, then the screen portion of the well will have to be higher so that you can monitor any gasoline that floats on top of the groundwater. However, you must make sure surface water does not get into the well and contaminate it. A clearly marked water tight manhole should be installed to prevent accidental introduction of petroleum products or contaminants into the well. In addition to the water tight manhole, a seal around the well should be established by pouring concrete between the monitoring well and the manhole.

The monitoring well should be capped with a liquid proof cap that can be locked or secured.

The concrete around the manhole cover should be sloped (mounded) to prevent surface water from accumulating around the well opening.



II. Automatic Tank Gauging Systems (ATGS)

ATGS are electronic devices permanently installed in the tanks and linked to a computerized control console. These systems are capable of performing several different functions including inventory control and leak testing. The "leak test" is a function whereby the system is capable of detecting a leak as small as 0.2 gal/hour. A valid leak test must be performed at least once every 30 days. Although it is not required, the DEQ recommends that inventory control be performed in conjunction with the monthly leak test.

III. Secondary Containment with Interstitial Monitoring

This method detects leaks in the space between the tank and the second barrier or wall. Double-walled tanks, tanks fitted with internal liners, and tanks that are enclosed inside liners are all examples of secondary containment systems.

If double-walled tanks are the secondary containment system of choice, the owner must have a method to test the space between the inner and outer tanks. This space is referred to as the interstitial space. Some manufacturers test the space by (1) pulling a vacuum, or (2) testing for petroleum vapors, or (3) observing color changes in liquid. Most of the double-walled tanks are designed to some national code of standards. As an owner, you should request the code that the tank manufacturer adhered to when building his tank.

If a secondary barrier such as a liner is used, care must be taken to ensure that you can monitor for a leak. For instance, you could install an impermeable liner and slope it so that any gas would flow to a monitoring well. The liner that you install must (1) be compatible with the petroleum product, (2) be sufficiently thick and impermeable to direct a release to a monitoring point, and (3) not interfere with the tank's cathodic protection system. To use a liner as a secondary containment system, the liner must always be above the groundwater and not in a 25 year flood plain. If a monitoring well is used it, must be clearly marked "Monitoring Well". The well must be designed similarly to a groundwater monitoring well which is described above. The area between the tank and the liner must be sufficiently porous to allow the petroleum to reach the monitoring point.

IV. Manual Tank Gauging (MTG)

Manual tank gauging can be used only with tanks of 2,000 gallon capacity or less. MTG is a simple method whereby the tank is taken out of use for a period of at least 36 hours each week. The length of the test depends on the capacity and dimensions of the tank and whether or not MTG is done in conjunction with tank tightness testing. Please refer to following the table for what test duration is required and what the allowable weekly/monthly change is. The DEQ has forms available designed specifically for MTG.

Table 1 (MTG)

Tank Capacity (gallons)	Weekly Change (gallons)	Monthly Change (gallons)	Test Duration (hours)
550	10	5	36
1000(64"X73")	9	4	44*
1000(48"X128")	12	6	58*
1001-2000	26	13	36**

*Can be reduced to 36 hours if conducted in conjunction with tank tightness testing.

**Must be conducted in conjunction with tank tightness testing and will only be valid until December 22, 1998, or for ten years following installation or upgrade whichever is later.

V. Monthly Inventory Control with Tank Tightness Testing

This method combines manual inventory control information ("sticking of tanks") and tank tightness tests. This method can only be used until December 22, 1998, or for 10 years following tank installation or upgrading, whichever is later. After this deadline, you must perform one of the other leak detection methods. If an owner wishes to use this method he has to stick his tanks religiously. The inventory control has to meet the following conditions:

The operator must record inputs, withdrawals, and the amounts still remaining in the tank each operating day.

You must be able to measure the height of the product to the nearest 1/8 inch.

The gasoline inputs are reconciled with delivery receipts by sticking the tanks before and after delivery.

Product inventory control must be conducted monthly. Your inventory should be within 1.0 percent of flow-through plus 130 gallons on a monthly basis. If you exceed the allowable differences in inventory control for two months, you must report your results to DEQ. However, any gross loss of product must be reported immediately to DEQ.

The deliveries are made through a drop tube that extends to within one foot of the tank bottom.

The tank tightness testing must be capable of detecting a 0.1 gallon per hour leak rate from any portion of the tank that routinely contains product while accounting for the effects of thermal expansion or contraction of the product, vapor pockets, tank deformation, evaporation or condensation, and the location of the water table.

Tank tightness testing must be conducted once every 12 months or once every five years for ten years following tank installation or upgrading. Upgrading means the tank is equipped with spill and overfill devices and is protected from corrosion.

The DEQ has forms available designed specifically for inventory control.