

Tightness testing for underground storage tanks

When is tank tightness testing required?

Tank tightness testing is not employed as a routine monthly leak detection method, but is instead used under special circumstances. Tank tightness testing may be required when a less precise monthly tank leak detection method indicates a failing test result to verify if a release has occurred. If a routine monthly tank leak detection results indicate a failing result, or if a passing test is not achieved monthly, operators must investigate and/or contact a contractor to inspect the system for equipment deficiencies. If the subsequent results still indicate a failing test, a tank tightness must be conducted to verify if a leak has occurred or not.

If your method of routine leak detection is statistical inventory reconciliation (SIR), there may be times when a tank tightness test is required. If the SIR results indicate a failing result, or are inconclusive for two months in a row, then a tank tightness test must be conducted.

Tank tightness testing is also required following a repair to a tank or a repair to an internal tank lining to confirm that the tank is still tight.

What is a tank tightness test?

Tank tightness testing (also known as precision testing or integrity testing) is an analytical method that determines if a tank leaks in quantities at least as small as 0.1 gallons per hour (gph). Generally, technicians come on-site to conduct this test with mobile equipment, although some automatic tank gauges have been certified to perform tightness tests.

Who conducts a tightness test?

The person conducting the tank tightness test must be an agency-approved tester. Most manufacturers of tank tightness testing equipment will also certify the tester. Some Minnesota Pollution Control Agency (MPCA) certified underground storage tank (UST) contractors and independent testing companies would perform tank tightness tests. Remember, well-trained and experienced testers are very important to get accurate test results. It is recommended that you check references.

What types of tightness tests are available?

Tightness tests are divided into two broad categories: volumetric and non-volumetric.

Volumetric tests, as the name implies, operate by applying a slight pressure to the tank and then carefully measuring for any change in volume over time. Depending upon the method, volumetric tests require either partially full or overfilled tanks. Some partially full tests are also capable of testing the empty part of the tank, which is called an "ullage" test. Volume is dependent upon the temperature of the product, so temperature readings must be taken continuously. Another volumetric method measures the mass of the product to detect a volume change.

Non-volumetric tests use other principles and methods to determine a leak instead of measuring the volume. For instance, one method puts a slight vacuum on the tank and then uses acoustic sensors to listen for the sound of water bubbling into the tank. Another method places a chemical marker into the product in the tank and checks for its presence outside the tank. If the tank is leaking, the chemical marker, a volatile liquid, will be detected outside the tank.

What performance standard must the tank tightness test method meet?

The tightness test method must be able to detect a leak at least as small as 0.1 gph.

How do I know if my tank tightness test method meets the performance standards?

The tank tightness test method must be evaluated by a third-party testing laboratory to determine if it meets the required performance standards. The federal government then reviews the evaluation; if the minimum standard is met, the method and vendor are listed on the National Work Group of Leak Detection Evaluations (NWGLDE) website found at <http://nwglde.org/>. The test results from this evaluation are known as performance claims and must be provided to you.

How do I know which method to use?

There are many factors influencing which test works best for your situation. For instance, with some products it is difficult to accurately measure temperature and volume, so a mass measuring test or tracer test could be used. Some tanks are situated in a clay-like soil that is not appropriate for a tracer test. In addition, some methods cannot be used on larger tanks.

If you do not want to fill your tank, then an ullage test may be a good option. Remember, an ullage test only tests the headspace. You should contact several vendors to determine which method is most appropriate for your system.

How do I prepare for a tank tightness test?

Since the tank must be taken out of service for the test, choose a time when your station is closed or business activity is low. Contact vendors well in advance so they can work with your schedule.

Also, arrange for product delivery so your tank is filled to the level needed to conduct the test. Since most volumetric tests depend on temperature, an adequate waiting period between adding product to the tank and beginning the actual test should be considered (usually three to six hours). Finally, review background information about the tanks and the surroundings, such as the age, size, tank material, and the groundwater level because the vendor may need this information before beginning the test.

What problems occur with tightness testing?

Many factors can disturb a test. Experienced testers are well aware of problems that may occur and know how to deal with them. Here is a list of some common problems encountered.

- Not enough time is allowed for the temperature between new product and old product to equalize.
- Vapor pockets develop if the tank is slightly tilted.
- Bungs on the top of the tank are loose.
- Groundwater creates counter pressure masking a leak.

What records must be kept on file?

Without written records, there is no way to verify that the tank tightness test was performed. Owners and operators are required to maintain certain written records. These records must be kept at the facility where the tanks are located, or if kept elsewhere must be immediately submitted to the MPCA upon request.

The following records must be kept for at least **five years**:

- Test results
- Testing vendor's or manufacturer's written performance claims

What other situations warrant conducting a tank tightness test?

If you are selling or buying property with tanks, it may be a good idea to conduct tank tightness testing to determine if the tanks are tight or leaking at the time of purchase.

If water enters the tank and the source of the water cannot be determined, a tank tightness test can pinpoint the location of the water ingress.

Remember, a tightness test will only indicate if a tank is leaking above the test's threshold value of 0.1 gph. Smaller leaks may not be detected.

Do I have to report a possible leaking tank based on the tank tightness test results?

Any time a tank fails a tightness test, the tank owner must immediately call the Minnesota Duty Officer at 651-649-5451 or 1-800-422-0798. You must immediately empty the tank that is leaking, investigate, and resolve all suspected leaks.

Note: The performance standard for the tightness test requires a leak to be detectable at 0.1 gph with 95% confidence. Technology is improving quickly in this area and many methods are able to detect smaller leaks with 95% confidence. Therefore, a tank can fail a test with a leak rate smaller than 0.1 gph. The Minnesota Duty Officer must be called for these smaller leaks as well.

Need more information?

Visit the UST Program at <https://www.pca.state.mn.us/waste/underground-storage-tank-systems>. The site has forms, fact sheets, and other information about USTs and UST requirements.

You can also call the MPCA at 651-296-6300 or 1-800-657-3864 and ask for the UST Program.