Watertight Tank Testing Regulatory Requirements

Oregon

Watertight testing of the tank into the riser is required during installation. It is also recommended the tank manufacturer watertight test each tank before shipping.

Rule Reference:
340-073-0025(3):
Watertightness. After installation, all tanks must be watertight. The installer must test each tank for watertightness by filling the tank to a point at least 2 inches above the point of riser connection to the top of the tank. During the test there may be no more than a one gallon leakage over a 24 hour period. The tank manufacturer must deliver watertight tanks and should test each tank for watertightness before the tank is shipped from the manufacturing plant.

Arizona

State Comments

This provision requires that a field watertightness test be conducted for all septic tank installations. If water is available at the site, which will be the case in the large majority of installations, added materials and labor costs, will be an estimated $15 to $68. For the sites where water must be delivered, the estimated cost, including site labor for initial tank fill and refill after a 24-hour presoak, is $214. The field water tightness test has significant benefit in ensuring that the septic tank does not leak due to factory defects or damage during installation. In addition, the weight of water in the septic tank during testing ensures that the tank is properly bedded, reducing the chance of major malfunction of the tank upon use by the homeowner.

Rule Reference:
R18-9-A314.5.d:
The septic tank is tested for watertightness after installation by the water test described in subsections (5)(d)(i) and (5)(d)(ii) and repaired or replaced, if necessary.

i. *The septic tank is filled with clean water, as specified in R18-9-A310(A), to the invert of the outlet and the water left standing in the tank for 24 hours and:*
    (1) After 24 hours, the tank is refilled to the invert, if necessary;
    (2) The initial water level and time is recorded; and
    (3) After one hour, water level and time is recorded.
ii. *The tank passes the water test if the water level does not drop over the one-hour period. Any visible leak of flowing water is considered a failure. A damp or wet spot that is not flowing is not considered a failure.*

Montana

Watertight, Vacuum or Pressure (fiberglass only) testing of all tanks used for commercial facilities, multiple-user systems or public systems must be tested in place for watertightness. The rules stop short of requiring this for single family residential systems.

Rule Reference:

7.3

1. *All tanks must be watertight. Tanks used for commercial facilities, multiple-user systems or public systems must be tested in place for watertightness. Watertightness testing for a concrete tank may be conducted using a water test or vacuum test. Watertightness testing for a fiberglass tank may be conducted using a water test, a vacuum test, or a pressure test.*

    1. *7.3.1 Water testing must be conducted by sealing the outlets, filling the septic tank to its operational level, and allowing the tank to stand for at least 8 hours. If there is a measurable loss (2 inches or more), refill the tank and let stand for another 8 hours. If there is again a measurable loss, the tank must be rejected.*

    2. *7.3.2 Vacuum testing must be conducted by sealing all inlets, outlets, and accesses, then introducing a vacuum of 4 inches of mercury. If the vacuum drops in the first 5 minutes, it must be brought back to 4 inches of mercury. If the septic tank fails to hold the vacuum at 4 inches of mercury for 5 minutes, the tank must be rejected.*

    3. *7.3.3 For pressure testing a fiberglass tank, all inlets, outlets, and access ports must be sealed and adequately secured. The tank must be charged with 5 psig (3 psig for a 12-foot diameter tank). Allow tank pressure to stabilize. Disconnect the air supply. If there is any noticeable pressure drop in 1 hour, the tank must be rejected or repaired. Repeat the test after repair. Release air carefully through an appropriate valve mechanism.*

Rhode Island

All septic tanks and their risers are required to be certified watertight by the manufacturer or by on-site testing in accordance with the below rule (which is very similar to ASTMC-1227).

Rule Reference:

26.11

Performance Testing- All septic tanks and their risers must be certified watertight by the manufacturer or by on-site testing. On-site testing for septic tank leakage shall be conducted for tanks assembled at the installation site. The Director may require onsite testing on a case-by-case basis. The testing shall be conducted using either:

26.11.1 Vacuum Test- Seal the empty tank and risers and apply a vacuum to two (2) inches (50 mm) of mercury. The tank is approved if ninety percent (90%) of the vacuum is held for two (2) minutes; or

26.11.2 Water-Pressure Test- Seal the tank and risers, fill with water to the top of the risers, and let stand for twenty-four (24) hours. Refill the tank. The tank is approved if the water level is held for one (1) hour.

Vermont

Requires "leakage testing" in the field for all holding tanks and any tank utilized with a sand filter.

Rule Reference:

1-915(a)2(F) Sand Filters

After installation all components, including septic tanks, pump chambers, recirculation tanks and filter containers, shall be tested by filling to a point at least two inches, but not more than three inches, above the point of riser connection to the top of the tank, chamber, or container. During the test there shall not be a measurable leakage over a twenty-four (24) hour period.

1-919(c)(3) Holding Tanks

the tank, any piping connected to the tank, and all access structures connected to the tank shall be watertight. The tank shall be leakage tested prior to being placed in service;

Utah

Watertight testing in the field is required in accordance with ASTM C-1227 ***OR*** as stated in the below Utah rule. ASTM C-1227 "leakage testing" requires the tank be either vacuum or water tested. The vacuum testing is performed by applying a vacuum to 4 inches of mercury and the tank passes if 90% of the vacuum is held for 2 minutes. Water testing is performed by filling the tank with water (no specified level) and letting it stand for 24 hours then refilling the tank and it is approved if the water level is held for one hour.

Rule Reference:

R317-4-3.3.5

Final On-Site Inspection.

A. After an onsite wastewater system has been installed and before it is backfilled or used, the entire system shall be inspected by the appropriate regulatory authority to determine compliance with these rules.

B. Each septic tank shall be tested for water tightness. Testing may be performed in accordance with the requirements and procedure outlined in the American Society for Testing Materials' Standard ASTM C-1227, or concrete tanks shall be filled 24 hours before the inspection to allow stabilization of the water level. During the inspection there shall be no change in the water level for 30 minutes. Nor shall moving water, into or out of the tank, be visible. The regulatory authority may allow two piece tanks, with the joint below the water level, to be backfilled up to three inches below the joint to provide adequate support to the seam of the tank. Testing shall be supervised by the regulatory authority. Tanks exhibiting obvious defects or leaks shall not be approved unless such deficiencies are repaired to the satisfaction of the regulatory authority.

New Jersey

The *Aerobic Treatment System Guidance* document requires that all tanks be tested for watertightness through one of the following methods as established in the guidance document, see below.

Guidance Document Reference:

H.7

7. *Watertightness of any septic, processing and dispersal system dosing tanks specified in the design must be watertight tested at the installation site after being installed using hydrostatic or vacuum tests. Testing of the tanks shall include all upper portions of the tank, including riser joints. Testing must be done in accordance with the following:*
    - *a. Water tightness testing procedures and criteria for concrete tanks shall follow the methods described in ASTM C-1227 standards or National Precast Concrete Association appropriate testing criteria and procedures*
    - *b. Tanks made of materials other then concrete shall be tested, after installation, in accordance with the methods described in ASTM C-1227 standards, if applicable, or other hydrostatic or vacuum testing methods approved by the tank manufacturer.*
    - *c. Water used for this testing shall be either from a potable water source or Reclaimed Water for Beneficial Reuse authorized by a NJPDES permit.*
    - *d. The use of an onsite potable well for purposes of supplying water for this testing is not recommended. If an onsite potable well is to be used, pumping of the well must be done in a manner which will withdraw water at a rate less than 50% of the safe yield of that well and will not damage the pump or any other component of the well.*

British Columbia

The *Sewage Standard Practice Manual* recommends strongly that all tanks should be tested for watertightness after installation through water or vacuum testing.

Standard Practice Manual Reference:

All tanks, including septic tanks, tanks for installation of treatment plants and pump chambers, should be tested for watertightness after installation where practical *by filling with water (hydrostatic testing) or by vacuum testing. In both cases, the tank should be tested in the ready-to-use state. Inlets and outlets should be plumbed with the appropriate pipes, which can then be plugged for the test. Testing procedures may be found in Appendix O.*

Appendix O Testing Tanks for Watertightness

Hydrostatic Testing

Water-pressure testing determines a tank's watertightness by maintaining a certain water level for one hour after a 24-hour absorption period. Be careful when performing hydrostatic tests on plastic and fibreglass tanks as they gather much of their strength from the soil support. For all mid-seam tanks, keep the backfill near the mid-seam, but leave the seam itself exposed to monitor the test. The following is a suggested water testing procedure for tanks. Note that this test does not evaluate the tank's ability to withstand external pressures: that issue should be assured through adequate engineering design.

1. *Plug the inlet and outlet pipes with a watertight plug, pipe and cap or other seal. Seal the pipes away from the tank to test any pipe connections that may be of concern.*

2. If testing a mid-seam tank, ensure that the seam is exposed for the water test.
3. Fill the tank to the top.
4. If the tank has a riser, add water into the riser to a maximum of 5.0 cm above the tank/riser seam. Care should be taken not to overfill as the top section of a two-piece tank could become buoyant.
5. Measure and record the level of the water.
6. Let the tank sit for 24 hours. Any obvious leakage during this time should be evaluated and remedied by the application of a suitable sealing compound.
7. If the test reveals leaks that cannot be repaired, the tank is considered unacceptable.
8. Refill concrete tanks to original level after 24 hours as they will absorb some water.
9. Check again after 24 hours. If less than 4 litres is lost in a concrete tank, the leak test is considered acceptable. Table A-11 and Table A-12 provide information for calculating volumes in square and round risers.

Table A-11 and Table A-12 provide information for calculating volumes in square and round risers.

Table A-11 Depth change equivalent to four litres in round risers of various interior diameters.

RISER DIAMETER (CM)	DEPTH (CM) EQUAL TO FOUR LITRES
46	2.4
61	1.4
76	0.9
91	0.6

Table A-12 Depth change equivalent to four litres in square risers of given interior dimensions.

RISER DIMENSIONS (CM)	DEPTH (CM) EQUAL TO FOUR LITRES
18 × 18	1.9
24 × 24	1.1
36 × 36	0.5

When performing hydrostatic testing in cold climates, there are a few important points to consider. First, water is its densest at about 4°C (just above freezing), so water put into a tank at 10–20°C (typical of groundwater) and left in the tank overnight at freezing temperatures will drop the level in the tank a substantial amount (about 2% or 11 litres in a 5,600 litre tank). A 'loss' of 11 litres in the risers will look like a leak. Additionally, water used in the test will freeze and expand by approximately 9%. If the site is not occupied quickly the tank could crack as a result of the test itself.

Vacuum Testing

Vacuum testing verifies that a tank is watertight if it holds 90 percent of a two-inch vacuum of mercury for two minutes.

Vacuum testing of tanks requires less time than hydrostatic testing and can be performed without having water available on the site. Testing should be done on the tank in its ready-to-use state (i.e., pipes in the inlet and outlet, risers with lids, etc.) In this test all pipe penetrations, manholes and risers are sealed airtight and a special insert is sealed on one of the tank manholes. Using a pump, air is evacuated through this insert to a standard vacuum level and the reading on a vacuum gage is recorded. Be careful not to exceed the recommended vacuum level. It is possible to damage or implode a tank.

The 2003 National Precast Concrete Association (US) standard states: "The recommended [vacuum test] procedure is to introduce a vacuum of 4 inches of mercury. Hold this pressure for 5 minutes. During this initial 5 minutes, there is an allowable pressure equalization loss of up to a half-inch of mercury. If the pressure drops, it should be brought back to 4 inches and held for a further five minutes with no pressure drop."

If a tank will not hold the vacuum, leaks should be located and repaired. The test can then be repeated. If the tank cannot be repaired and rendered watertight, it should be replaced. Note that vacuum testing of concrete tanks draws seams together for a positive mastic seal, assuming there are no other problems. With any tank, collapse, deflection, deformation, or cracking indicate a poor quality tank. It is important to test the entire system: tank, pipe sleeves, risers, inspection ports and lids.

Testing Existing Tanks

It is more difficult to check watertightness in an existing septic tank. Adequate testing needs a period of several hours to a day or more without inflow to the tank and sealing off inlet and outlet pipes. Seal the line at the distribution box (or other appropriate place in the case of secondary treatment units) and at the cleanout between the building and the tank. Apply vacuum or water as desired. If there are no leaks, the entire system passes in one step. If there are leaks, successive tests will locate the source or sources. Although actual testing of existing tanks might be impractical, much can be discerned by a thorough inspection of a tank both before and after it has been pumped out. Most tanks built using older methods of construction (such as built-in-place block or brick tanks) would typically not be watertight or structurally sound and probably cannot reasonably be repaired. In some cases it may be possible to do more to check existing tanks. If the soil around the tank is saturated, the tank contents can be pumped down and observations made over the next few hours to detect leakage into the tank around pipe penetrations, seams or through breaks in the tank. Caution should be exercised, however, as high groundwater may cause empty tanks to become buoyant and float out of the ground. Alternately, excessive soil pressure may collapse a tank. In some cases, it may be necessary to excavate completely around the tank to make a visual inspection for leaks. If there is any doubt about the integrity of the existing tank, it should be replaced.