

Low Liquid Level UST Containment Sump Testing Procedures

This document provides procedures for low liquid level hydrostatic testing as one method of meeting the requirements in 40 CFR 280.35 for periodically testing the integrity of certain containment sumps. The federal underground storage tank (UST) regulation at 40 CFR 280.35 requires that owners and operators using interstitial monitoring of UST system piping as their primary release detection method prevent releases to the environment by ensuring the integrity of each containment sump used for interstitial monitoring of piping. Check with your implementing agency before using this method because it may have requirements that differ from those listed here.

Each containment sump used for interstitial monitoring of piping must be tested using a vacuum, pressure, or liquid testing method at least once every three years to ensure the equipment is liquid tight according to one of these criteria in 40 CFR 280.35(a)(1)(ii)¹:

- Requirements developed by the manufacturer – owners and operators may use this option only if the manufacturer developed requirements;
- Code of practice developed by a nationally recognized association or independent testing laboratory – EPA will accept the integrity test method listed in Petroleum Equipment Institute (PEI) Publication RP1200, *Recommended Practices for the Testing and Verification of Spill, Overfill, Leak Detection and Secondary Containment Equipment at UST Facilities*, available on PEI's website <http://www.pei.org/recommended-practices-exams>; or
- Requirements determined by the implementing agency to be no less protective of human health and the environment than the two requirements listed above.

EPA determined that the requirements, including meeting the conditions and following the procedures, in this document are no less protective of human health and the environment as the first two requirements listed above. These procedures are intended for facilities where EPA is the implementing agency. However, they may also be used as appropriate in states and territories which allow low level hydrostatic testing of containment sumps, but do not already have similar instructions; owners and operators should check with their implementing agencies.

These procedures cover:

- Required conditions;
- Pre-testing checklist;
- Testing steps; and

¹ Testing is not required if the containment sump is double walled and the integrity of both walls is periodically monitored at the same frequency of walkthrough inspections described in 40 CFR 280.36.

- After completing the tests.

In addition, EPA developed a sample form that you may use to document compliance with these procedures.

Required Conditions

The sumps must meet these conditions to use this test method and comply with the requirements of 40 CFR 280.35(1)(ii)(C).

- A liquid sensor is mounted and remains at the lowest point in the sump.
- An owner is required to test the functionality of the liquid level sensor in conjunction with the low level sump test and verify that the sensor works correctly and shuts down the appropriate pump or dispenser. In addition, 40 CFR 280.40(a)(3)(ii) requires an annual test of any liquid sensor used as part of a release detection system. The test of the liquid level sensor performed at the time of low level sump testing may be used to comply with the annual sensor test requirements of 40 CFR 280.40(a)(3)(ii), if all other conditions of 40 CFR 280.40 are completed as required.
- And either:
 - The pump automatically shuts off when liquid activates the sensor, or
 - The dispenser automatically shuts off when liquid activates the sensor, and the facility is always staffed when the pumps are operational.

To use these procedures, ensure all sensors are properly installed and programmed so that they shut off either the pump or dispenser per the instructions above when the sensor detects liquid. You may only use these instructions if your sensors are programmed to both alarm and shut off when in contact with any liquid.

Pre-testing Checklist

Check the three items listed below before using the following step-by-step instructions to perform the low liquid level hydrostatic testing of a containment sump. If after checking the three items you find no issues, then follow the step-by-step instructions to hydrostatically test the containment sump using a low liquid level. If you find issues, you should not test your sump using the step-by-step instructions until you address the issues and your sump passes this pre-testing checklist.

Check 1 – Determine if there is liquid present in the sump at levels high enough to trigger a properly positioned sensor, even if the alarm is not activated. An active alarm may need to be treated as a suspected release per 40 CFR 280.50. Remove any debris or liquid in the containment sump prior to testing.

Check 2 – Identify if sensors' positions are elevated or otherwise manipulated to prevent activation.

- At this point, EPA recommends that you visually inspect the sensor and electrical connections for signs of damage or corrosion to a point where functioning may be impaired. Signs of corrosion suggest the sensor may soon deteriorate and become inoperable. If you believe the sensor is damaged, check with the manufacturer.

Check 3 – Determine if the sump has cracks, holes, or compromised boots located in the portion of the sump where water will be added during the low liquid sump test. The test requires you add at least 4 inches of water above the height required for sensor activation, so this area must be free of cracks, holes, or compromised boots. If any of these are present in this area, this test method cannot be used.

- At this point, EPA recommends you visually inspect the entire sump. Cracks, holes, or compromised boots anywhere in the sump, including above the sensor activation level, may indicate a degrading sump. Consider replacing or repairing worn components.

Testing Steps

Part A contains steps to test sump sensors for functionality and the ability to shut down product flow. Part B contains steps to test the integrity of the sump itself.

Part A – Functional testing of the sump sensor

Step 1 – Prepare for the sensor functionality test by determining and documenting how the test should be performed.

- Determine the manufacturer of your sensor and details of how the manufacturer specifies a functionality test be performed. A functionality test is performed by adding sufficient liquid to the sump to ensure the sensor activates, unless the manufacturer specifies a different method.
- Different sensor manufacturers may specify different procedures or volumes of water to properly test their products; you must perform the sensor activation test according to the sensor manufacturer's instructions for testing non-discriminating or discriminating sensors. Some manufacturers may specify testing in a container other than in the sump. If your manufacturer specifies testing in the sump, proceed to complete the test by moving to step 2. If the manufacturer specifies testing in a separate container, complete the test and replace the sensor in the sump and proceed to step 2.
- Ensure you keep written documentation from the manufacturer detailing the required procedure and minimum amount of liquid required to activate the sensor, in case your implementing agency requests it.

Step 2 – Secure a measuring stick vertically against the wall nearest the lowest level of the sump and ensure it is located in a visually accessible place so you can read the markings on the measuring stick. Use a clamp, tape, or other adhesive method to immobilize the stick for

the entire course of the test, even while the measuring stick is underwater. Leave several inches of markings visible, ideally between 2 to 8 inches from the bottom of the sump.²

Step 3 – According to the manufacturer’s instructions, immerse the sensor in liquid at least to a height that ensures the sensor alarm can activate.

Step 4 – Determine if the sensor is in alarm.

- You may only use this low level procedure if the sensor alarm activates at the level set per manufacturer’s instructions. If a sensor failed, you may use this procedure only if the failed sensor is repaired or replaced and an alarm activates.

Step 5 – If the sensor alarms successfully, verify that either:

- The pump has automatically shut off when liquid activated the sensor, or
- The dispenser has automatically shut off when liquid activated the sensor, and the facility is always staffed when the pumps are operational.

Step 6 – If the sensor passed the visual inspection, the functional inspection for alarm, and each pump or dispenser is disabled, then go to Part B for integrity testing.

Part B – Testing the integrity of a containment sump

Step 1 – If necessary, add more water into the sump until the liquid level is at least 4 inches above the height required to activate the sensor.

- If you are testing other sumps, remove the sensor from this sump now before adding water. Removing the sensor from the liquid allows for testing other sensors in the UST system for functionality and positive shutdown without interrupting the one-hour liquid tightness test of this sump.

Step 2 – Wait 5 minutes.

- Waiting allows the water level sufficient time to settle in case there is sump deflection from the weight of the added water.

Step 3 – Measure and record the liquid height in the sump. Document the level and the current time on the test report form.

Step 4 – Do not disturb the water in the sump for at least one hour.

Step 5 – After one hour has elapsed since measuring the height of the liquid, check the liquid level again. Record the liquid measurement and the current time on the test report form.

² It may be impractical to access the bottom of some sumps to install a measuring stick against the wall. For this reason or other reasons, some owners or operators may choose to use a float and console type of probe to perform liquid integrity testing. Owners planning to use a float and console type method should position it in the sump now in lieu of securing a measuring stick against the wall.

Step 6 – Compare the two liquid measurement numbers. If the level has dropped by more than 1/8 inch, then the sump failed the low liquid level hydrostatic integrity test. Record the result on the test report form.

After Completing The Tests

Step 1 – Remove the measuring stick from the sump.

Step 2 – Remove water from the sump.³

Step 3 – Reposition the sensor and replace the sump cover and manhole cover.

³ When done with sump testing, properly dispose of the sump test water according to appropriate wastewater disposal authority requirements.

Sample Form For Documenting Compliance With Low Liquid Level UST Containment Sump Testing Procedures

Facility Number: _____ Facility Name: _____

Company: _____

Street Address: _____ City: _____ State: _____ Zip: _____

County: _____

Testing Company Name And Number, If Applicable: _____

Street Address: _____ City: _____ State: _____ Zip _____

County: _____

Tester Name, Printed: _____ Signature: _____

Date Of Test ____/____/____

Instructions: Unless instructed otherwise, place your initials in the boxes on the right side of this form to indicate compliance with the checklist or steps for each sump.		Sump 1	Sump 2	Sump 3	Sump 4	
Pre-testing Checks	1	Determine if there is liquid present in the sump at levels high enough to trigger a properly positioned sensor, even if the alarm is not activated. Remove any debris or liquid in the containment sump prior to testing.				
	2	Identify if sensors' positions are elevated or otherwise manipulated to prevent activation.				
	3	Confirm the sump has no cracks, holes, or compromised boots located in the portion of the sump where water will be added during the low liquid sump test. The test requires you add at least 4 inches of water above the height required for sensor activation, so this area must be free of cracks, holes, or compromised boots. If any of these are present in this area, this test method cannot be used.				
Part A – Functional Testing Steps	1	Prepare for the sensor functionality test by determining and documenting how the test should be performed.				
	2	Secure a measuring stick vertically against the wall nearest the lowest level of the sump and ensure it is in a visually accessible place so you can read the markings on the measuring stick. Use a clamp, tape, or other adhesive method to immobilize the stick for the entire course of the test, even while the measuring stick is underwater. Leave several inches of markings visible, ideally between 2 to 8 inches from the bottom of the sump. Some owners may choose to use a float and console type of probe instead of a measuring stick.				
	3	Immerse the sensor in liquid at least to a height that ensures the sensor is activated and alarm activates.				
	4	Determine if the sensor is in alarm.				
	5	If the sensor alarms successfully, verify that either: The pump has automatically shut off when liquid activated the sensor; or the dispenser has automatically shut off when liquid activated the sensor, and the facility is always staffed when the pumps are operational.				
	6	If the sensor passed the visual inspection, the functional inspection for alarm, and each pump or dispenser is disabled, continue to Part B for liquid tightness and integrity testing. Write pass or fail in the box on the right.				

Spill Buckets, Under Dispenser Containment Sumps, Containment Sumps Category

Containment Sump – Alternative Test Procedures Question & Answer Addendum

Instructions: Unless instructed otherwise, place your initials in the boxes on the right side of this form to indicate compliance with the checklist or steps for each sump.		Sump 1	Sump 2	Sump 3	Sump 4
Part B – Integrity Testing Steps	1	If necessary, add more water into the sump until the liquid level is at least 4 inches above the height required to activate the sensor.			
	2	Wait 5 minutes.			
	3	Measure and record the liquid height in the sump. Document the level and the current time on the test report form. Record the level and time in the box on the right.			
	4	Do not disturb the water in the sump for at least one hour.			
	5	After one hour has elapsed since measuring the height of the liquid, check the liquid level again. Record the liquid measurement and the current time on the test report form. Record the level and time in the box on the right.			
	6	Compare the two liquid measurement numbers. If the level has dropped by more than 1/8 inch, then the sump failed the low liquid level hydrostatic integrity test. Write pass or fail in the box on the right.			
After Test Steps	1	Remove the measuring stick or probe from the sump.			
	2	Remove as much water from the sump as possible. Ensure you properly dispose of the sump test water according to all legal requirements.			
	3	Reposition the sensor, if needed, and replace the sump cover and manhole cover.			
Indicate Pass Or Fail For Each Sump					