All new and existing tank systems shall be provided with leak detection that complies with ATCP 93.515. There are five common types of approved leak detection UST systems may use:

- Manual Tank Gauging
- Precision Tightness Testing,
- Automatic Tank Gauging (ATG)
  - Interstitial Monitoring (IM)
  - Statistical Continuous Automatic Leak Detection (SCALD)
  - Continuous Statistical Leak Detection (CSLD)
- Statistical Inventory Reconciliation (SIR)
- Interstitial Monitoring (IM).

All methods of tank leak detection for UST systems require consecutive, passing, monthly leak detection tests. If a tank leak detection system is providing inconsistent results, the department may require a precision tightness test to be performed.
LEAK DETECTION REPORT REQUIREMENTS

- Site information including the name of the business, the street address, and the municipality in which the site is located.

- Tank system information including the department-assigned tank identification number, the site identification number designated by the owner or operator, the tank capacity, the product in the tank, the type of pipe system, and whether there are pipe manifolds in the tank system.

- Test method information including the name of the method or equipment used, the material approval number as issued under s. ATCP 93.130, the date the test was performed, the threshold value used to declare a leak, the rate of volumetric change, whether the final result was a pass or fail, and the name and certification of the technician performing the test.
TANK LEAK DETECTION - MANUAL TANK GAUGING

- May be sole method for tanks up to 1,000 gallons for the life of the tank.
- Tanks 1,001-2,000 gallons may use if specific conditions are met. If the tanks are more than 10 years old, must also have monthly monitoring.
- Tanks 2,001 gallons and greater may not use manual tank gauging.
- Procedure requires a shutdown period of at least 36 hours or as listed in Table 93.515.
- No product can be placed into or withdrawn from the tank during shutdown period.
- 2 stick readings at the beginning and 2 at the conclusion of the shutdown period.
- 1/8th inch requirement applies here too.
### Table 93.515
Test Duration and Standards

<table>
<thead>
<tr>
<th>Nominal Tank Capacity</th>
<th>Minimum Test Duration</th>
<th>Weekly Standard (1 test)</th>
<th>Monthly Standard (average of 4 tests)</th>
</tr>
</thead>
<tbody>
<tr>
<td>550 gallons or less</td>
<td>36 hours</td>
<td>10 gallons</td>
<td>5 gallons</td>
</tr>
<tr>
<td>551–1,000 gallons, tank diameter of 48 inches</td>
<td>58 hours</td>
<td>12 gallons</td>
<td>6 gallons</td>
</tr>
<tr>
<td>551–1,000 gallons, tank diameter of 64 inches</td>
<td>44 hours</td>
<td>9 gallons</td>
<td>4 gallons</td>
</tr>
<tr>
<td>551–1,000 gallons and using precision tightness testing every 5 years</td>
<td>36 hours</td>
<td>13 gallons</td>
<td>7 gallons</td>
</tr>
<tr>
<td>1001–2000 gallons(^1)</td>
<td>36 hours</td>
<td>26 gallons</td>
<td>13 gallons</td>
</tr>
</tbody>
</table>

\(^1\) Requires precision tightness testing every 5 years. This method is only allowed until the tank is 10 years old.
ATCP 93.515(4) Precision Tightness Testing:

- By a certified tank system tightness tester, using methods approved under 93.130 to perform precision tightness testing for tanks or piping.

- With permanently installed leak detection equipment as approved under 93.130 to perform precision tightness testing for tanks or piping. (Not generally used as the Material Approval for the equipment requires the tank to be 95% full in most cases)

- Where a certified tank system tightness tester is used, the tester shall include the date and the beginning and end times in the test results report.
ATCP 93.515(5) Automatic Tank Gauging:

- No more than 30 days may elapse between monthly monitoring tests using an automatic tank gauge.
- Monthly monitoring tests shall have the capabilities specified in 93.130(3)(b).
- An automatic tank gauge shall be placed in the center of the tank and no closer than 12 inches from the fill pipe and the submersible pump.
- ATGs shall have a printer that provides specific information.
- ATGs shall be programmed to provide an audible and visual alarm in the event of a tank or line test failure.

Individual fact sheets have been created to outline the common ATG systems. Several examples of leak detection tickets from the ATG can be found at: [https://datcp.wi.gov/Pages/Programs_Services/LeakDetectionStorageTanks.aspx](https://datcp.wi.gov/Pages/Programs_Services/LeakDetectionStorageTanks.aspx)
Interstitial monitoring is a leak detection method that entails the surveillance of the space between a tank system’s walls and the secondary containment system for a change in the steady-state conditions.

Statistical Continuous Automatic Leak Detection (SCALD) monitors the product level and temperature in the tank at idle times. The system will continue to monitor the tank until it has gathered enough data to conclude that the tank system is tight, or there is a possible leak.

Continuous Statistical Leak Detection (CSLD) monitors the product level and temperature in the tank at idle times. The system will continue to monitor the tank until it has gathered enough data to conclude that the tank system is tight, or there is a possible leak.
TANK LEAK DETECTION-INTERSTITIAL MONITORING (IM)

ATCP 93.515(7) Interstitial Monitoring: IM between an underground tank system and a secondary barrier immediately around it may be used only if the system is installed and maintained to detect a leak from any portion of the tank that could contain product, and the system meets one of the following requirements:

- System testing. Post-installation testing verifies the system operates in accordance with the manufacturer’s specifications.

- Double-walled systems. The sampling or testing method shall be capable of detecting a leak through the inner or outer wall in any portion of the tank or piping that routinely contains product.

- Systems with internally fitted liners. Monitoring system shall be installed that is capable of detecting a leak between the inner wall of the tank and the liner. Liner shall be chemically compatible with the substance stored.

- Systems with a barrier in the excavation zone. Must meet additional requirements.

- Interstitial monitoring sensors. Shall be capable of providing an audible or visual alarm that needs manual operator action to silence.
EXAMPLE - INTERSTITIAL MONITORING (IM) REPORT

MAR 10, 2022 3:35 PM
LIQUID STATUS
MAR 10, 2022 3:35 PM

L 1: REG INTERSTITIAL SENSOR NORMAL
L 2: PREM-DIES INTERSTICE SENSOR NORMAL
L 3: BULKHEAD SENSOR SENSOR NORMAL

* * * * * END * * * * *
EXAMPLE - STATISTICAL CONTINUOUS AUTOMATIC LEAK DETECTION (SCALD)
EXAMPLE – CONTINUOUS STATISTICAL LEAK DETECTION (CSLD)
TANK LEAK DETECTION-STATISTICAL INVENTORY RECONCILIATION (SIR)

• Businesses using SIR must meet the requirements of 40 CFR ss. 280.43(h).

• A conclusive pass or fail must be obtained at least every 30 days.

• Daily product inventory records shall be kept current and on-site.

• Tank product level measurements shall be recorded using an electronic inventory probe or an ATG.

• Operator must have a process to submit data to the SIR vendor and receive results back within the 30-day monitoring period.

• If the result of the 30-day monitoring period is inconclusive or missing, another method of leak detection shall be used to determine a conclusive pass or fail for that monitoring period.
Operators using SIR shall review the vendor summary report within 24 hours of receipt. If the summary report indicates a failure, the operator shall take immediate action for assessing and responding to a leak or release.

Statistical inventory reconciliation may not be used as a method of precision tightness testing.

Before changing from another method of leak detection to statistical inventory reconciliation, the operator shall provide the department with proof that precision testing was performed within the previous 12 months, showing the tank system to be liquid-tight.
LEAK DETECTION – RECORD KEEPING

ATCP 93.500(9)(b)4. RECORD KEEPING: Records may be kept electronically, provided they are in a format acceptable to the department.

- (c)1-16 Maintenance of records. Records shall be maintained for the following periods from the date of the most recent test, inspection or upgrade:
  - Monthly leak detection monitoring — 1 year.
  - Annual precision tightness testing — 1 year.
LEAK DETECTION – REPORTS

ATCP 93.510(3)(a)1. Tanks shall be monitored at least every 30 days for leaks using one of the methods listed in 93.515, except as provided in subd. 2. and 93.500(1)(a).

- 2. Tanks installed prior to February 1, 2009, that have a capacity of 1,000 gallons or less may use manual tank gauging conducted in accordance with 93.515(3) as the sole means of leak detection provided it is performed weekly.

  Note: Under 93.500(1)(a), continuous electronic interstitial monitoring is generally required for all secondary containment installed on or after February 1, 2009.

(b) Failed tests. If a passing test using monthly monitoring is not achieved, the site shall be assessed for the presence of a release in accordance with 93.575 to 93.585.

(c) Inconsistent results. The authorized agent or the department may require a precision tightness test to be performed where any of the following events occur:

- 1. A tank system is accumulating water for no apparent reason.
- 2. A leak detection method is providing erratic results.
- 3. A tank system is tested with multiple leak detection methods that show different results.
IMPORTANT NOTE!

Depending on the method of leak detection, and the approved equipment, there may be minimum product levels and minimum test times required to generate a valid test. If you are unfamiliar with the equipment, always check the material approval for what constitutes a valid test.

Example: A Gilbarco Veeder Root TLS 350 requires a minimum of tank volume and duration to complete a static test. This particular information can be found on Material Approval Number 20130002.
### LEAK DETECTION REPORTS-(CONTINUED)

<table>
<thead>
<tr>
<th>Maximum Tank Size</th>
<th>Up to 15,000 gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Version</td>
<td>N/A</td>
</tr>
<tr>
<td>Minimum Tank Level</td>
<td>N/A</td>
</tr>
<tr>
<td>(0.2 gph testing only-0.1 gph testing must be performed at 95%)</td>
<td>Minimum product level is based on tank diameter as follows:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Probe Working Length</strong></td>
</tr>
<tr>
<td></td>
<td>(Tank ID in inches)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>24 thru 28</td>
<td>9</td>
</tr>
<tr>
<td>27 thru 36</td>
<td>12</td>
</tr>
<tr>
<td>37 thru 47</td>
<td>15</td>
</tr>
<tr>
<td>48 thru 58</td>
<td>15</td>
</tr>
<tr>
<td>59 thru 69</td>
<td>21</td>
</tr>
<tr>
<td>70 thru 79</td>
<td>24</td>
</tr>
<tr>
<td>80 thru 90</td>
<td>27</td>
</tr>
<tr>
<td>91 thru 101</td>
<td>30</td>
</tr>
<tr>
<td>102 thru 111</td>
<td>33</td>
</tr>
<tr>
<td>112 thru 122</td>
<td>36</td>
</tr>
<tr>
<td>123 thru 133</td>
<td>39</td>
</tr>
<tr>
<td>134 thru 143</td>
<td>42</td>
</tr>
<tr>
<td>144 thru 154</td>
<td>45</td>
</tr>
<tr>
<td>155 thru 165</td>
<td>48</td>
</tr>
<tr>
<td>166 thru 175</td>
<td>51</td>
</tr>
<tr>
<td>176 thru 177</td>
<td>54</td>
</tr>
<tr>
<td>Waiting time between filling tank and test start&lt;sup&gt;1&lt;/sup&gt; (Stabilization Time)</td>
<td>8 hours minimum (monthly -0.2 gph)</td>
</tr>
<tr>
<td>Waiting time between dispensing and test start</td>
<td>8 hrs. 15 min. minimum (annual-0.1 gph)</td>
</tr>
<tr>
<td>Minimum Test Period&lt;sup&gt;2&lt;/sup&gt;</td>
<td>2 hours (0.2 gph test)</td>
</tr>
<tr>
<td></td>
<td>3 hours (annual-0.1 gph)</td>
</tr>
</tbody>
</table>

1. Monthly and annual testing can only be performed on one tank at a time. If two or more tanks are manifolded together, an isolation valve (siphon break) will have to be installed so as to separate the tanks individually.
2. Minimum level from probe bottom is same as product level in tank, assuming the typical configuration where the probe touches the bottom of the tank.
3. There must be no delivery during waiting time.
4. There must be no delivery or dispensing during testing.
A facility is required to provide verifiable documentation. With the exception of Interstitial monitoring, all methods of leak detection need the complete supporting documents for verification. Not only will you review the tank leak detection records from the ATG, SIR Reports, etc.; you will also review the inventory records. If you are completing a Fuel Quality inspection, you will review these records for IM as well.

1. Product Inventory Records

   A. Delivery Manifests

   B. Inventory Reconciliation

   C. Bills of lading from the delivery terminal
DELIVERY MANIFEST/BILL OF LADING

Product Type should be clear
Product delivered should be recorded in gross gallons
### DAILY PRODUCT INVENTORY RECORDS

<table>
<thead>
<tr>
<th>Date</th>
<th>Start Stick Gallons</th>
<th>Delivered Gallons</th>
<th>Gallons Pumped</th>
<th>Book Inventory</th>
<th>End Stick Inventory Gallons</th>
<th>Over (+) Short (-)</th>
<th>Month to Date</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1000.0</td>
<td>500.0</td>
<td>200.0</td>
<td>1300.0</td>
<td>60.0</td>
<td>1300.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1500.0</td>
<td>100.0</td>
<td>150.0</td>
<td>1150.0</td>
<td>20.0</td>
<td>1150.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>1500.0</td>
<td>0.0</td>
<td>300.0</td>
<td>1500.0</td>
<td>40.0</td>
<td>1500.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>850.0</td>
<td>0.0</td>
<td>85.0</td>
<td>935.0</td>
<td>5.0</td>
<td>935.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>765.0</td>
<td>260.0</td>
<td>50.0</td>
<td>535.0</td>
<td>0.0</td>
<td>535.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>505.0</td>
<td>500.0</td>
<td>100.0</td>
<td>505.0</td>
<td>10.0</td>
<td>505.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>905.0</td>
<td>0.0</td>
<td>50.0</td>
<td>900.0</td>
<td>-10.0</td>
<td>900.0</td>
<td>-10.0</td>
<td>JS</td>
</tr>
<tr>
<td>8</td>
<td>800.0</td>
<td>0.0</td>
<td>0.0</td>
<td>900.0</td>
<td>-105.0</td>
<td>895.0</td>
<td>-105.0</td>
<td>JD</td>
</tr>
</tbody>
</table>

- Delivery should match shipping manifest.
- Gallons Pumped should match sales reports.
- Inventory should have a corresponding inventory ticket from the ATG (if used).
DAILY PRODUCT INVENTORY RECORDS

<table>
<thead>
<tr>
<th>Date</th>
<th>Start Stock</th>
<th>Delivered</th>
<th>Gallons Pumped</th>
<th>Book Inventory</th>
<th>End Stock</th>
<th>Over (+)</th>
<th>Short (-)</th>
<th>Month to Date</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1000.0</td>
<td>500.0</td>
<td>200.0</td>
<td>1300.0</td>
<td>1300.0</td>
<td>0.0</td>
<td>0.0</td>
<td>JS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1300.0</td>
<td>0.0</td>
<td>150.0</td>
<td>1150.0</td>
<td>1150.0</td>
<td>0.0</td>
<td>0.0</td>
<td>JS</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1150.0</td>
<td>0.0</td>
<td>300.0</td>
<td>850.0</td>
<td>850.0</td>
<td>0.0</td>
<td>0.0</td>
<td>JS</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>850.0</td>
<td>0.0</td>
<td>65.0</td>
<td>785.0</td>
<td>785.0</td>
<td>0.0</td>
<td>0.0</td>
<td>JS</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>785.0</td>
<td>0.0</td>
<td>250.0</td>
<td>535.0</td>
<td>535.0</td>
<td>0.0</td>
<td>0.0</td>
<td>JS</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>535.0</td>
<td>0.0</td>
<td>100.0</td>
<td>435.0</td>
<td>435.0</td>
<td>0.0</td>
<td>0.0</td>
<td>JS</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>435.0</td>
<td>0.0</td>
<td>0.0</td>
<td>435.0</td>
<td>435.0</td>
<td>0.0</td>
<td>0.0</td>
<td>JS</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>435.0</td>
<td>0.0</td>
<td>0.0</td>
<td>435.0</td>
<td>435.0</td>
<td>0.0</td>
<td>0.0</td>
<td>JS</td>
<td></td>
</tr>
</tbody>
</table>

Delivery should match shipping manifest.

Gallons Pumped should match sales reports.

Inventory should have a corresponding Inventory Ticket from the ATG (if used).

What could have happened here?
All Pressurized Underground lines require Automatic Line Leak Detectors!

ATCP 93.515(8)(b) Automatic line leak detectors. Underground piping systems serving a storage tank with a submersible pump or pressurized booster pump shall be provided with an automatic line leak detector that alerts the operator to the presence of a leak by restricting or shutting off flow from the pump, when it detects leaks of 3 gallons per hour at 10 pounds per square inch line pressure within 1 hour.

- If a facility that requires Automatic Line Leak Detection does NOT have it installed, it shall be immediately shut down / Red Tagged.
- Safe suction systems or above ground lines generally do not require line leak detectors.
LINE LEAK DETECTORS-
MECHANICAL
LINE LEAK DETECTORS-MECHANICAL (MLLD)
LINE LEAK DETECTORS-ELECTRONIC (ELLD)
LINE LEAK DETECTORS-ELECTRONIC (ELLD)
LINE LEAK DETECTOR INSTALLATION

Line Leak Detector Installation or Upgrade shall be documented on form TR-WM-133 (formerly ERS-9 LD).
ATCP 93.510 (4) Leak detection for piping. (a) Pressurized piping. Underground piping that conveys regulated substances under pressure shall comply with all of the following requirements unless all of the piping is visible:

1. The system shall be equipped with an automatic line leak detector in accordance with s.ATCP 93.515 (8) (b).

2. Single-wall piping systems shall have at least one of the following leak detection methods:
   a. An annual precision tightness test.
   b. Monthly monitoring to the 0.2 gallon per hour rate.

3. Double-wall piping systems shall use one of the leak detection methods in subd. 2., or statistical inventory reconciliation, or continuous interstitial monitoring, except as provided in s.ATCP 93.500(1)(a). Note: Under section s.ATCP 93.500 (1) (a), continuous electronic interstitial monitoring is generally required for all secondary containment installed on or after February 1, 2009.

4. If a passing test using monthly monitoring is not achieved, the site shall be assessed for the presence of a release in accordance with ss. ATCP 93.575 to 93.585.
The Method of Leak Detection must match what is recorded on the site’s Permit to Operate (PTO) Application. The facility must provide ONE of the following:

- Consecutive .20 gph Monthly Line Leak Test results.
- Monthly Line Interstitial Monitoring.
- .10 gph Annual Line Leak Test Results if the ATG is approved to complete that test.
- If the ATG equipment is not capable of detecting a .10 gph leak the facility is required to maintain records of the monthly .20 gph or an annual .10 gph precision piping test recorded on form TR-WM-125 (formerly form ERS-10778 LT).
- The annual functionality test for the line leak detectors shall be recorded on TR-WM-124 (formerly ERS-10778 LLD). This test must include inducing a .30 gph @ 10PSI leak on the mechanical or electronic line leak detector.
EXAMPLE - CONSECUTIVE .20 GPH MONTHLY LINE LEAK TEST RESULTS
LINE LEAK DETECTION (CONTINUED)
ATCP 93.510(4)(b) – Suction piping. Different requirements than pressurized piping.
• Standard suction piping equipped with monthly interstitial monitoring will provide passing monthly reports or a passing precision tightness test every three years.
Thank You!

Bureau of Weights and Measures

DATCPWMCompliance@wisconsin.gov

WISCONSIN DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION (DATCP)