



Department of
**Environment &
Conservation**

A photograph showing a perspective view looking down a large, dark, cylindrical metal tank. The interior walls are metallic and show some wear. At the far end of the tank, there is a bright opening, possibly a hatch or a window, through which light is streaming, creating a strong contrast with the dark interior. Some equipment is visible in the background through the opening.

Manual Tank Gauging

Standardized Inspection Manual

Technical Chapter 3.1

Tennessee Department of Environment & Conservation | Division of Underground Storage Tanks | October 2015

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**STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF UNDERGROUND STORAGE TANKS**

**TECHNICAL CHAPTER 3.1
MANUAL TANK GAUGING**

EFFECTIVE DATE- October 1, 2015

PURPOSE

The purpose of this technical chapter is to assist Division of Underground Storage Tanks (Division) staff in understanding the regulatory requirements for performing manual tank gauging and provide guidance on acceptable practices for release detection using this method in accordance with the Underground Storage Tank regulations.

This technical chapter contains the current policy of the Division based on the statute and regulations governing the Tennessee Petroleum Underground Storage Tank program and this document supersedes all previously published versions. The most current version of this guidance document will be posted and available on the Division's website.

AUTHORITY

All rules referred to in this technical chapter are contained in Chapter 0400-18-01 and are available on the Division of Underground Storage Tanks website at <http://www.state.tn.us/sos/rules/0400/0400-18/0400-18-01.20130121.pdf>

APPLICABILITY

The method applies to the following categories of tanks:

- Tanks 550 gallons or less
- Tanks 551-1000 gallons which meet specific tank diameters (outlined in Table 1 below)
- Tanks 551-1000 gallons which do not meet the specific tank diameters and tanks 1001-2000 gallons in size. These tanks must also conduct a tank tightness test at least every five years.

Manual tank gauging can only be used for 10 years after the tank was installed for tanks with a capacity of 1001-2000 gallons or tanks of a capacity of 551-1000 gallons that do not meet the specific tank diameters as shown in Table 1. Tanks of greater than 2,000 gallons nominal capacity may not use this method.

Any tank installed on or after July 24, 2007 may not use manual tank gauging (interstitial monitoring is required).

For specific requirements for tank tightness testing, see Technical Chapter 3.7.

INTRODUCTION

Manual tank gauging is an easy and inexpensive release detection method for small volume tanks. The liquid level is measured in a tank at the beginning and ending of an established time period. Any change in liquid level is used to calculate the change in volume, which is compared against established standards to determine whether any differences in the measurements are significant enough to suspect that a release has or has not occurred.



REQUIREMENTS

- 1) Tank liquid level measurements are taken at the beginning and ending of a period of at least thirty-six (36) hours during which no liquid is added to or removed from the tank (to determine the period of time for your particular tank, see Table 1);
- 2) Level measurements are based on an average of two (2) consecutive stick readings at both the beginning and ending of the required period;
- 3) The equipment used is capable of measuring the level of petroleum over the full range of the tank's height to the nearest one-eighth of an inch;
- 4) Petroleum levels are measured and recorded to an accuracy of at least the nearest one-eighth of an inch;
- 5) A release is suspected and shall be reported if the variation between beginning and ending measurements exceeds the weekly or monthly standards as shown in Table 1;
- 6) Manual tank gauging must be conducted weekly for established test duration of a minimum of 36 hours. This test duration may be longer if periodic tightness testing is not performed and the diameter of the tank requires a longer test. Weekly tests and monthly tests must be performed and reconciled with a set

standard to determine the status of the tank. Weekly and monthly standards may vary according to tank capacity and/or diameter (See Table 1 on page 7).

WEEKLY AND MONTHLY TESTS

Weekly tests are calculated by determining the net change (in gallons) between the beginning and ending of the test period. Each product level measurement must be an average of two (2) consecutive measurements. During the entire manual tank gauging event, no product may be placed into or taken from the tank. The two stick readings at the beginning and end of the test period shall be recorded on Form CN-1367, Manual Tank Gauging Monthly Report.

All liquid level measuring equipment must be able to measure the product stored over the full range of the tanks height to the nearest one-eighth inch. If a gauging stick is used to measure product level, then it must be graduated in one-eighth increments and the entire length must be legible. To convert the inches of petroleum measured to gallons, a calibration chart for the tank must be used.

When the weekly test is completed, the net change (positive or negative) of product level should be compared to the weekly standard referenced in Table 1. At the end of each month all four of the weekly tests results should be calculated. Pay careful attention to positive and negative numbers to get the total. For example, +5 and +3 and -2 and -2 should equal +4. If the sum of the weekly or monthly test average exceeds the monthly or weekly standard (see Table 1), then the Division must be notified within 72 hours of a suspected release.

RECORDKEEPING

The last twelve months of manual tank gauging records shall be maintained as required by rule .03(2)(b)4. and .04(5) and recorded on Form CN-1367, Manual Tank Gauging Monthly Report. If applicable, the results of the most recent tank tightness test must be retained until the next test is conducted. Records must be kept at the site or at a readily available alternative site and be immediately available for inspection by the Division as required by .03(2)(c)1. If tank ownership changes, then the release detection and/or tank tightness testing records must be transferred to the new owner at the time of ownership transfer as required by rule .03(2)(d).

REPORTING

If monitoring results from the manual tank gauging tests (**weekly or monthly**) indicate the tank system may have had a release, then the owner and/or operator shall notify the Division within 72 hours and begin release investigation and confirmation steps as required by rule .04(3)(b)2.(v) and .05(1)(a)3. If the monitoring device was determined to be defective (i.e. a gauging stick is broken or an ATG is being used to record measurements and is found to be defective) and a suspected release was not reported to the Division, then documentation shall be maintained demonstrating that the device was defective. **Documentation** justifying why a suspected release due to a defective device was not reported must be maintained and provided to the Division upon request.

If the results from any tightness testing indicate the tank and/or lines may have had a release of petroleum, then the Division must be notified within 72 hours of a confirmed release as required by rule .04(3)(c)4. and .05(1)(a)3. Owners and/or operators must take immediate action to prevent any further release of the petroleum into the environment, and take immediate action to identify and mitigate fire, explosion, and vapor hazards. Owners and/or operators must repair or replace the tank and/or piping, and begin corrective action, if the test results for the system, tank, or delivery piping indicate that a leak exists as required by rule .06(3).

REFERFENCES

Tennessee Underground Storage Tank Regulations, Chapter 0400-18-01 et. seq.

U.S. Environmental Protection Agency-Office of Underground Storage Tanks

APPENDICES

- 1) Table 1-Testing Criteria
- 2) Manual Tank Gauging Monthly Report

TABLE 1

TANK SIZE	MINIMUM DURATION OF TEST	WEEKLY STANDARD (One test)	MONTHLY STANDARD (Average of 4 Tests)
up to 550 gallons	36 hours	10 gallons	5 gallons
551-1000 gallons (diameter 64 in.)	44 hours	9 gallons	4 gallons
551-1000 gallons (diameter 48 in.)	58 hours	12 gallons	6 gallons
551-1000 gallons*	36 hours	13 gallons	7 gallons
1001-2000 gallons**	36 hours	26 gallons	13 gallons

* For all tanks of 551-1000 gallon capacity that cannot meet test duration requirements over 36 hours, a tank tightness test must be performed at least every five years.

** Must be combined with tank tightness testing at least every five years.



STATE OF TENNESSEE
 DEPARTMENT OF ENVIRONMENT AND CONSERVATION
 DIVISION OF UNDERGROUND STORAGE TANKS
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MANUAL TANK GAUGING MONTHLY REPORT

All applicable sections of this report must be legibly completed in their entirety, documenting all results of manual tank gauging. **This method may not be used for tanks of capacity greater than 2,000 gallons. Any tanks, regardless of capacity installed on or after July 24, 2007 may not use this method.**

- Complete section I through IV for all tanks being monitored.
- Complete Tank Tightness Testing Form when conducting required tank tightness test (required every five years).
- The owner/operator of the underground storage tank (UST) system is to maintain a copy of this report for each month for a period of 12 months.
- Compare weekly readings and the monthly average of the four weekly readings with the standards shown in the following table. If the calculated change exceeds the weekly standard, the tank may be leaking. Also, the monthly average of the four weekly test results must be compared to the monthly standard in the same way. If either the weekly or monthly standards have been exceeded, the tank may be leaking. Contact your local environmental field office to report the suspected release within seventy-two (72) hours and begin release response activities.

Tank Size	Minimum Duration of Test	Weekly Standard (1 test)	Monthly Standard (4 test average)
Up to 550 gallons	36 hours	10 gallons	5 gallons
551-1,000 gallons (when tank diameter is 64")	44 hours	9 gallons	4 gallons
551-1,000 gallons (when tank diameter is 48")	58 hours	12 gallons	6 gallons
551-1,000 gallons (also requires periodic tank tightness testing)	36 hours	13 gallons	7 gallons
1,001-2,000 gallons (also requires periodic tank tightness testing)	36 hours	26 gallons	13 gallons

I. UST FACILITY		II. UST OWNER	
UST Facility ID #:		Name/Company:	
Facility Name:		Address:	
Address:		City, State, Zip:	
City:	County:	Phone: () -	

III. TESTING INFORMATION

- An additional copy of this report is to be completed for each tank that qualifies for the method.

Tank Number ____		Month/Year ____ / ____		
	Week 1	Week 2	Week 3	Week 4
Start Test	Date: Time:	Date: Time:	Date: Time:	Date: Time:
First Initial Stick Reading				
Second Initial Stick Reading				
Average Initial Stick Reading				
Initial Gallons (convert inches to gallons) [a]				
End Test	Date: Time:	Date: Time:	Date: Time:	Date: Time:
First End Stick Reading				
Second End Stick Reading				
Average End Reading				
End Gallons (convert inches to gallons) [b]				

