



Designation: **E1990–16** **E1990 – 21**

Standard Guide for Performing Evaluations of Underground Storage Tank Systems for Operational Conformance with 40 CFR, Part 280 Regulations¹

This standard is issued under the fixed designation E1990; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers information for evaluating tank systems for operational conformance with the Federal technical standards (including the financial responsibility requirements) for underground storage tanks (USTs) found at 40 Code of Federal Register (CFR) Part 280.

1.2 This guide does not address the corrective action requirements of 40 CFR Part 280.

1.3 To the extent that a tank system is excluded or deferred from the federal regulations under Subpart A of 40 CFR Part 280, it is not covered by this guide.

1.4 Local regulations may be more stringent than federal regulation and the reader should refer to the implementing agency to determine compliance.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 Federal Standards:²

[Title 40 Code of Federal Regulations \(CFR\), Environmental Protection Agency, Part 280, Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks \(UST\)](#)

[Title 40 Code of Federal Regulations \(CFR\), Environmental Protection Agency, Part 302, Designation, Reportable Quantities, and Notification](#)

2.2 United States Environmental Protection Agency (US EPA) Standards:³

[510-B-00-003 Financial Responsibility for Underground Storage Tanks: A Reference Manual \(EPA\). January 2000.](#)

[510-K-15-001 Musts for USTs: A Summary of the Federal Regulations for Underground Storage Tank Systems. November 2015.](#)

¹ This guide is under the jurisdiction of ASTM Committee E50 on Environmental Assessment, Risk Management and Corrective Action and is the direct responsibility of Subcommittee E50.01 on Storage Tanks.

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² Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, <http://www.access.gpo.gov>.

³ Available from United States Environmental Protection Agency (EPA), William Jefferson Clinton Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, <http://www.epa.gov>.

[510-K-20-001 UST System Compatibility with Biofuels. July 2020.](#)

[510-K-20-002 Release Detection for Underground Storage Tanks and Piping: Straight Talk on Tanks. August 2020.](#)

[510-K-18-001 Dollars and Sense: Financial Responsibility Requirements for Underground Storage Tanks. July 2018.](#)

[510-B-19-002 through 510-B19-006 Standard Test Procedures for Evaluating Various Leak Detection Methods. May 2019.](#)

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *airport hydrant system, n*—an UST system which fuels aircraft and operates under high pressure with large diameter piping that typically terminates into one or more hydrants (fill stands).

3.1.1.1 *Discussion*—

The airport hydrant system begins where fuel enters one or more tanks from an external source such as a pipeline, barge, rail car, or other motor fuel carrier.

3.1.2 *corrosion protection—protection, v*—to prevent the degradation of a material due to a reaction between the material and its environment.

3.1.3 *field-constructed tank, n*—a tank constructed in the field.

3.1.3.1 *Discussion*—

For example, a tank constructed of concrete that is poured in the field, or a steel or fiberglass tank primarily fabricated in the field is considered field-constructed.

3.1.4 *implementing agency—agency, n*—Environmental Protection Agency (EPA), or, in the case of a State with program approval (or pursuant to a memorandum of agreement with EPA), the designated State or Local agency responsible for carrying out the UST program.

3.1.5 *overflow—overflow, n*—exceeding the capacity of the tank.

3.1.6 *overflow protection—protection, n*—a device used to prevent a tank from being overfilled when product is being added to the tank.

3.1.7 *release detection—detection, n*—a method to determine whether a release of a regulated substance has occurred from the UST system into the environment or into the interstitial space between the UST system and its secondary barrier or secondary containment around it.

3.1.8 *spill—replaced tank, n*—to cause or allow product to enter the environment that was intended to be placed in the ~~remove~~ a tank and install another tank.

3.1.9 *replaced piping, n*—this means to remove 50 percent or more of piping excluding connectors, and install other piping, connected to a single tank.

3.1.9.1 *Discussion*—

For tanks with multiple piping runs, replaced piping applies independently to each piping run.

3.1.10 *secondary containment or secondarily contained, n*—a release prevention and release detection system for a tank or piping utilizing an inner and outer barrier with an interstitial space that is monitored for leaks.

3.1.10.1 *Discussion*—

This term includes containment sumps when used for interstitial monitoring of piping.

3.1.11 *spill, n*—a release of a regulated substance which results during the filling, placement, removal, or transfer of regulated substances to, or from, a UST system.

3.1.12 *spill prevention—prevention, n*—a device used to prevent or contain a spill associated with removing the fill hose from the tank fill pipe.

3.1.13 *suspected release—release, n*—released product discovered at or near the UST site, observed unusual operating conditions,

such as apparent loss of product; or results from a release detection method that indicates a release. ~~Suspected release does not include situations where a method or equipment is found to be defective, is immediately corrected, and then indicates no release.~~

3.1.13.1 Discussion—

Suspected release does not include situations where a method or equipment is found to be defective, is immediately corrected, and then indicates no release.

3.1.14 ~~underground storage tank (UST)~~—(UST), *n*—any one or combination of tanks (including underground pipes connected thereto) that is used to contain an accumulation of regulated substances, and the volume of which (including connected underground piping) is 10 % or more beneath the surface of the ground.

3.1.9.1 ~~existing tank~~—a tank where installation began on or before 12/22/88.

3.1.9.2 ~~new tank~~—a tank where installation started after 12/22/88.

3.1.15 ~~upgrade~~—*upgrade*, *v*—the addition or retrofit of the UST system or some system components such as release detection, corrosion protection, spill prevention, or overfill protection to improve the ability of an UST system to prevent the release of product and meet the requirements of 40 CFR Part 280.

3.1.15.1 Discussion—

Steel tanks not upgraded by October 13, 2015 to be protected in accordance with 5.3, must be permanently closed except previously deferred UST systems with field-constructed tanks, airport hydrant systems, or where an upgrade is determined appropriate by the implementing agency.

3.1.16 *UST system*—*system*, *n*—an underground storage tank, connected underground piping, underground ancillary equipment, and containment system, if any.

3.2 *Additional Terminology*—The following definitions and discussions, taken directly from the publication “Form and Style for ASTM Standards” shall be included in full in every standard guide or practice produced and passed by Committee E-50 or any of its technical subcommittees, approved April 16, 1997.

3.2.1 *guide*—*guide*, *n*—a compendium of information or series of options or instructions that do not recommend a specific course of action.

3.2.1.1 *Discussion—*

Whereas a practice prescribes a general usage principle, a guide only suggest an approach. The purpose of a guide is to offer guidance, based on a consensus of viewpoints, but not to establish a fixed procedure. A guide is intended to increase the awareness of the user to available techniques in a given subject area and to provide information from which subsequent evaluation and standardization can be derived.

3.2.2 *practice*—*practice*, *n*—a definitive set of instructions procedure for performing one or more specific operations or functions that does not produce a test result.

3.2.2.1 *Discussion—*

A practice is not a downgraded test method. Examples of practices include procedures of interlaboratory testing programs or other statistical procedures; for writing statements on sampling or precision and accuracy; and for selection, preparation, application, inspection, and necessary precautions for the use, disposal, installation, maintenance, and operation of testing equipment. Further examples of practices include but are not limited to: application, assessment, cleaning, collection, decontamination, inspection, installation, preparation, sampling, screening, and training.

3.2.3 *standard*—*standard*, *n*—as used in ASTM International, a nominative document that has been developed and established within the consensus principles of the Society and that meets the approval requirements of ASTM procedures and regulations.

3.2.3.1 *Discussion—*

The term “standard” serves in ASTM International as a nominative in the title of documents such as test methods or specifications, to connote specified consensus and approval. The various types of standard documents are based on the needs and usages as prescribed by the technical committees of the Society.

4. Significance and Use

4.1 This guide is an educational tool for tank owners, operators, and other users and is not intended for use in certifying compliance with the Federal technical standards for underground storage tanks.

4.2 The intent of this guide is to provide an overview of the general requirements. This guide is intended for users who are

generally familiar with the requirements of 40 CFR Part 280. The user is advised that this guide does not contain the level of detail necessary to make the determination of whether specific equipment or services meet the detailed technical performance requirements of 40 CFR Part 280.

4.3 This guide does not cover state and local requirements, that can be more stringent than the federal rules. Owners and operators are responsible for meeting federal, state, and, in some circumstances, local requirements. It is recommended that owners and operators familiarize themselves with these requirements as well.

4.4 Owners or operators may use the sample checklist in **Appendix X1** to assist them in determining operational conformance or they may develop their own checklist based upon this guide.

4.5 This guide and accompanying appendixes are not intended to be used by state or local UST program authorities as a regulatory or administrative requirement for owners or operators. Use of this guide and appendixes by owners and operators is intended to be a voluntary educational tool for the purposes described in **4.1**.

5. UST System Requirements

5.1 *Operational Conformance*—For an underground storage tank (UST) system to be in operational conformance with 40 CFR Part 280, it must have release detection, corrosion protection, spill prevention, and overfill protection. In addition, UST system owners and operators must perform periodic testing of key equipment and visually-based walkthrough inspections.

5.2 *Release Detection*—To meet all release detection requirements, release detection for both tank and piping is required.

5.2.1 *Petroleum Tanks*—~~These tanks may meet release detection requirements by use of one of the following: Tanks installed after April 11, 2016, must be secondarily contained and use interstitial monitoring as the primary method of release detection.~~

5.2.1.1 ~~Monthly monitoring using one of the following: automatic tank gauging, Tanks installed before April 11, 2016 may meet release detection requirements by use of continuous in tank leak detection (CITLD), automatic tank gauging (ATG), vapor monitoring, interstitial monitoring, ground-water-groundwater monitoring, statistical inventory reconciliation (SIR), and/or any other approved method.~~

5.2.1.2 ~~Monthly inventory control and annual tank tightness testing (may be used for existing UST systems which have not been upgraded to meet Federal regulations at 40 CFR Part 280.21).~~

5.2.1.3 ~~Monthly inventory control and tank tightness testing every five years (may start when new UST systems and UST systems that have been upgraded with spill prevention and overfill and corrosion protection meet the Federal regulations at 40 CFR Part 280.20 or 280.21). This release detection method must be replaced or augmented with one of the options in 5.2.1.1 ten years after the tank was installed or upgraded with corrosion protection.~~

5.2.1.2 *Manual Tank Gauging*—This release detection method is only allowed for tanks of 2000-gal capacity or less. This technique may be used if the tank meets the size, test duration, and standard variation requirements listed in **Table 1**.

5.2.2 *Piping*—~~Piping may meet release detection requirements by use of~~ must be monitored monthly using interstitial monitoring unless one of the following exceptions apply:

5.2.2.1 *Pressurized Piping*—~~To meet release detection requirements for pressurized piping installed or replaced on before April 11, 2016, it is necessary to choose one method from 5.2.2.2 and one method from 5.2.2.4.5.2.2.3 (or a single method that satisfies both sections).~~

5.2.2.2 ~~Choose one of the following: automatic flow restrictor, automatic shutoff device, and continuous alarm system.~~

5.2.2.2 ~~Each of these methods must be tested on an annual basis in accordance with the manufacturer's requirements.~~ Choose one of the following automatic line leak detector methods: automatic flow restrictor, automatic flow shutoff device, or continuous alarm system.

(1) Each of the automatic line leak detector methods in 5.2.2.2 must be tested on an annual basis in accordance with the manufacturer's requirements, a code of practice developed by a nationally recognized association or independent testing laboratory, or requirements by the implementing agency.

TABLE 1 Guide for Owners and Operators

Tank Size	Minimum Duration of Test, h	Weekly Standard (One Test), gal	Monthly Standard (Four-Test Average), gal
Up to 550 gal	36	10	5
551 to 1000 gal (when the tank diameter is 64 in.)	44	9	4
551 to 1000 gal (when the tank diameter is 48 in.)	58	12	6
551 to 1000 gal (also requires periodic tank tightness testing in accordance with 5.2.1.2 and 5.2.1.3)	36	13	7
551 to 1000 gal (also requires periodic tank tightness testing.)	36	13	7
1001 to 2000 gal (also requires periodic tank tightness testing in accordance with 5.2.1.2 and 5.2.1.3)	36	26	13
1001 to 2000 gal (also requires periodic tank tightness testing.)	36	26	13

5.2.2.3 Choose one of the following: annual line tightness testing, monthly monitoring using one of the following: vapor monitoring, ground water monitoring, interstitial monitoring, SIR, other approved methods, such as: electric or electronic line leak detector, and continual reconciliation.

5.2.2.5 *Suction Piping*—For suction piping, you may choose one of the following:

5.2.2.6 Monthly monitoring using one of the following: vapor monitoring, ground water monitoring, interstitial monitoring, SIR and, other approved methods.

5.2.2.7 Line testing every three years.

5.2.2.8 No leak detection requirements if the piping meets the following criteria:

5.2.2.9 The below-grade piping operates at less than atmospheric pressure.

5.2.2.10 The below-grade piping is sloped so that the contents of the pipe will drain back into the storage tank if suction is released.

5.2.2.4 *Suction Piping*—Only one check valve is included in each suction line and it is located directly below and as close as practical to the suction pump: installed or replaced before April 11, 2016, choose one of the following:

(1) Monthly monitoring using one of the following: vapor monitoring, ground water monitoring, interstitial monitoring, SIR and, other approved methods; or

(2) Line testing every three years.

(3) No leak detection is required if the piping meets all the following criteria:

(a) The below-grade piping operates at less than atmospheric pressure.

(b) The below-grade piping is sloped so that the contents of the pipe will drain back into the storage tank if suction is released.

(c) Only one check valve is included in each suction line and it is located directly below and as close as practical to the suction pump.

(d) Satisfying the preceding requirements must be able to be easily determined.

5.2.2.12 Satisfying the preceding requirements must be able to be easily determined.

5.2.3 *Hazardous Substance Tanks*—Release detection for hazardous substance tanks must meet one of the following:

5.2.3.1 Existing UST systems: UST systems installed after October 13, 2015:

~~(1) All hazardous UST systems must meet the new system requirements described in have secondary containment and monthly interstitial monitoring.~~ 5.2.3.2.

~~5.2.3.2 New UST systems:~~ UST systems installed prior to October 13, 2015:

(1) Unless an owner or operator has applied for and received a variance from the implementing agency, new hazardous substance UST ~~system~~system must have each of the following: secondary containment, and monthly interstitial monitoring.

5.3 *Corrosion Protection*—All underground tanks and piping must be protected from corrosion.

5.3.1 *Tanks*—Any portion of the tank that is underground and routinely contains product must have corrosion protection. The following may be used to meet corrosion protection requirements for tanks:

5.3.1.1 Coated and cathodically protected steel,

5.3.1.2 Cathodic protection added,

5.3.1.3 Interior lining added,

5.3.1.4 Cathodic protection and interior lining added,

5.3.1.5 Fiberglass reinforced plastic,

5.3.1.6 Steel tank clad with a noncorrodible material, and

5.3.1.7 Other construction accepted by the implementing agency.

5.3.1.8 Corrosion expert's determination that the site is not corrosive enough to cause it to have a release during the operating life of the tank.

5.3.2 *Piping*—Piping that routinely contains regulated substances and is in contact with the ground must be protected from corrosion. The following may be used to meet corrosion protection requirements for piping:

5.3.2.1 Coated and cathodically protected steel,

5.3.2.2 Cathodic protection added,

5.3.2.3 Fiberglass reinforced plastic,

5.3.2.4 Other construction accepted by the implementing agency, and

5.3.2.5 Corrosion expert's determination that the site is not corrosive enough to cause it to have a release during the operating life of the piping.

5.4 *Spill Prevention and Overfill Protection*—Tanks that ~~received~~receive regulated substances in quantities greater than 25 gal at one filling need to have spill prevention and overfill protection.

5.4.1 To meet the spill prevention requirement, equipment that will contain the product in the transfer hose when the transfer hose is detached from the fill pipe (for example, a catchment basin) ~~must~~should be used to prevent release of product to the environment.

5.4.2 To meet overfill protection requirements, one of the following must be used:

5.4.2.1 Automatic shutoff device,

5.4.2.2 Overfill alarm, ~~and~~or

5.4.2.3 Ball float valve.

~~5.4.3 *Compatibility*—owners and operators of USTs are required to use UST systems made of or lined with materials that are~~

compatible with the substance stored in the UST system (40 CFR 280.32). In accordance with the EPA Office of Underground Storage Tanks June 2011 guidance, tank owners may demonstrate compatibility of UST system equipment by using components that are certified by the manufacturer or listed by a nationally recognized, independent testing laboratory for use with the fuel stored.

5.5 Compatibility—owners and operators of USTs are required to use UST systems made of or lined with materials that are compatible with the substance stored in the UST system (40 CFR 280.32).

5.6 Periodic Testing—At least once every three years, unless otherwise noted, the following equipment must be tested in accordance with either the manufacturer’s instructions, a code of practice developed by a nationally recognized association or independent testing laboratory, or requirements by the implementing agency.

5.6.1 Spill prevention equipment;

5.6.2 Containment sumps used for interstitial monitoring of piping;

5.6.3 Leak detection equipment must be tested annually:

5.6.3.1 Automatic tank gauge and other controllers,

5.6.3.2 Probes and sensors,

5.6.3.3 Automatic line leak detector,

5.6.3.4 Vacuum pumps and pressure gauges, and

5.6.3.5 Hand-held electronic sampling equipment.

5.7 Visually-based Walkthrough Inspections—At least monthly, unless otherwise noted, the following equipment must be inspected as indicated or in accordance with a code of practice developed by a nationally recognized association or independent testing laboratory that checks equipment in a comparable manner as indicated.

5.7.1 Spill Prevention Equipment—Should be checked for damage, to remove liquid and debris and obstructions in fill pipe, ill cap is securely on the fill pipe, and if the spill prevention equipment is double walled, check for leaks in the interstitial space.

5.7.2 Release Detection Equipment—Should be operating with no alarms or other unusual operating conditions, and records are current.

5.7.3 Containment sumps should be inspected annually for damage, to remove liquid and debris, and if the sump is double wall, check for leaks in the interstitial space.

5.7.4 Hand-held release detection equipment such as tank gauge sticks and groundwater bailers should be checked annually to ensure operability and serviceability.

6. Financial Responsibility

6.1 Financial Responsibility—Owners or operators of USTs which hold petroleum must demonstrate financial responsibility. These requirements are designed to ensure that someone can pay the costs of cleaning up leaks and compensating third-parties for bodily injury and property damage caused by leaking USTs. The total amount of coverage required under the federal rule is determined by the type of business, the amount of throughput of the tanks at a facility, and the number of tanks owned nationwide. The amount of coverage that an owner must demonstrate may be changed due to coverage provided by a state financial assurance fund. The following mechanisms—Petroleum refiners or marketers must maintain \$1 000 000 coverage per occurrence. Nonmarketers with throughput of 10 000 gallons or less per month must maintain \$500 000 coverage per occurrence. Owners or operators of 100 or fewer tanks must maintain \$1 000 000 annual aggregate coverage while those with over 100 tanks must maintain \$2 000 000 annual aggregate coverage. The following mechanisms, alone or in combination, may be used to meet the financial responsibility requirements: