RHODE ISLAND UST FACILITY OPERATOR TRAINING MANUAL

July 13, 2018

Revision B

This manual contains information about the RI DEM UST Regulations and was developed to help individuals pass the International Code Council (ICC) exams to become certified as Class A and Class B operators.

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IMPORTANT NOTE: The information in this manual is based on the 2011 Revision of the RI DEM UST Regulations. The DEM UST Regulations have been revised to include new Federal requirements and will supersede and replace the 2011 Revision effective October 13th, 2018. As such, the information in this version of manual is only valid until October 12th, 2018. A new version of this manual will be released after October 13th, 2018 to reflect the requirements of the revised regulations.

Disclaimer

This document is intended to serve as a guide and resource for operators of UST facilities in Rhode Island. Federal and state regulations take precedence over any discrepancies or omissions found in the Rhode Island Underground Storage Tank Facility Operator Training Manual.

Contents

How to Use this Manual

Text in red boxes highlight important RI DEM UST Regulations that owners/operators should pay special attention to while reviewing this manual

Text in green boxes highlight new 2015 EPA Regulations that will be incorporated into the RI DEM UST Regulations by 2018.

Bold words are defined in Appendix A

All Figures included in this manual are directly from EPA or RI DEM public documents, unless otherwise noted.

Chapter 1. Introduction

This operator's manual is designed to help owners and operators of underground storage tanks (USTs) with the Rules and Regulations for Underground Storage Facilities Used for Petroleum Products and Hazardous Materials, effective April 21, 2011 (UST Regulations). This manual describes the requirements and best management practices for UST systems to help facility owners/operators remain in compliance with these regulations.

If you are reading this after October 13th, 2018, please be aware that new UST Regulations have gone into effect which are not covered in this version of the Operator Training Manual. This version of the operator training manual is only valid until October 12th, 2018; Please check our website at http://www.dem.ri.gov/ust for an updated version.

As an UST system owner or operator, you have a vital role to play in protecting public health, the environment, and your economic investment. Therefore, determining what UST equipment you have at your facility, maintaining all applicable records, and identifying and understanding the operation and maintenance procedures you need to follow are important.

UST Regulation Applicability

An **underground storage tank** is a tank and any underground piping that has at least ten (10) percent or more of the system volume beneath the surface of the ground. An underground storage tank system includes the tank, piping, underground ancillary equipment, and containment system. The equipment used to store fuel and other regulated substances must be compatible with the material being stored.

What USTs are regulated?

Unless otherwise noted, the UST Regulations apply to:

- all proposed, new and existing underground storage tank facilities, at which petroleum product(s) and/or **hazardous material(s)** are or have been stored in a tank or tank systems. These UST systems may serve institutional, industrial, commercial, educational, agricultural, governmental, residential or other purposes.
- all facilities and/or USTs located at a facility which have been **abandoned**.
- all persons who owned or operated such facilities after May 1985.

What USTs are exempt?

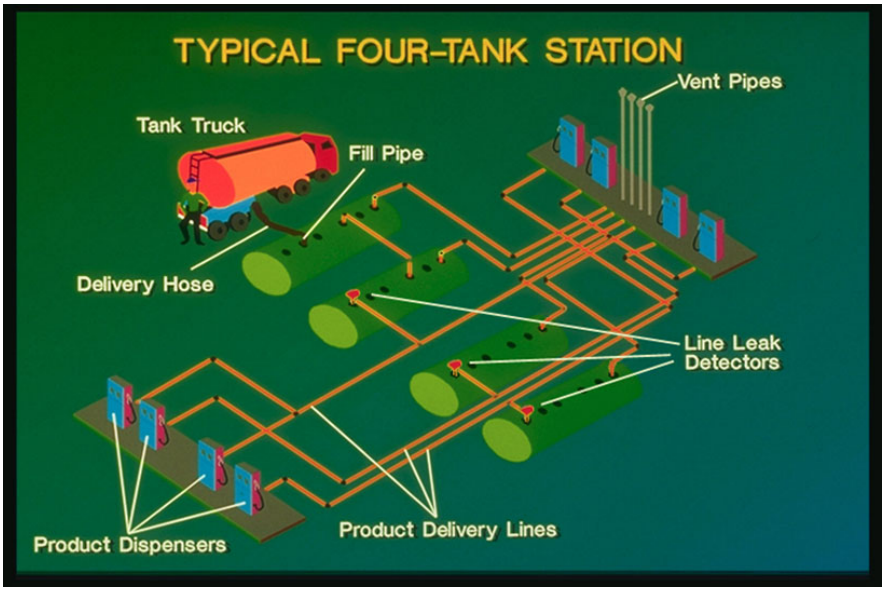
The UST Regulations do not apply to:

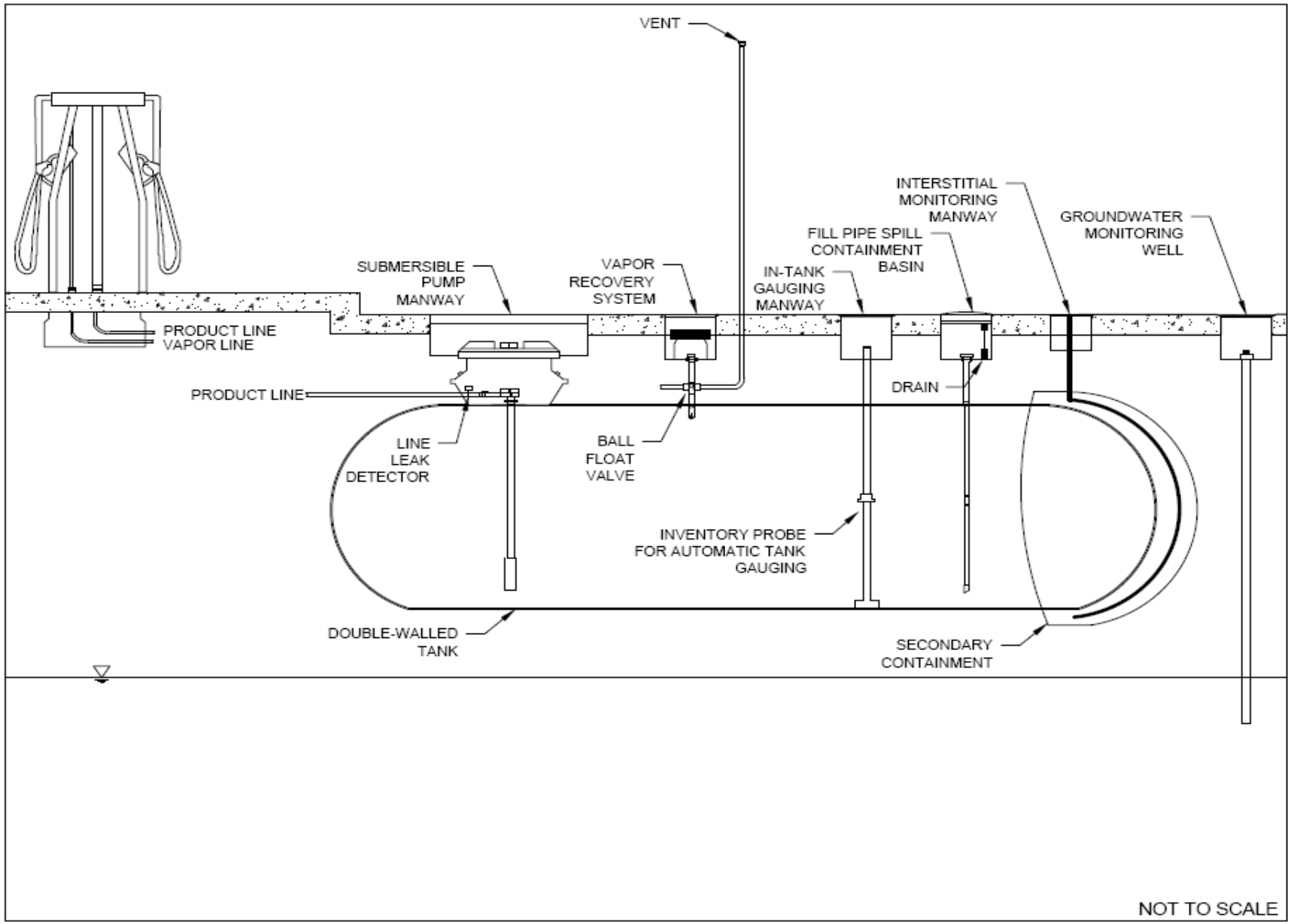
- Hydraulic Lift tanks;
- Storage tanks located entirely within structures, such as a basement or cellar provided that:
    - The structure allows for physical access to the storage tank;
    - The structure is not part of a secondary enclosure; and
    - The tank is situated upon or above the surface of a concrete floor;
- Septic Tanks;
- Pipeline facilities regulated under the Natural Gas Pipeline Safety Act of 1968 or the Hazardous Liquid Pipeline Safety Act of 1979;
- Flow through process tanks;
- USTs storing propane or liquefied natural gas;
- USTs used for the temporary storage of raw material products by industry;
- Emergency Spill Protection and Overflow tanks;
- USTs connected to floor drains or other piping outlets which serve residential structures of a one, two or three family dwelling;
- Oil Water Separators with a planned discharge required to be regulated under the Clean Water Act;
- Residential tanks: Tanks less than or equal to 1,100 gallons in capacity used for storing heating oil of any grade and serving a one, two, or three family dwelling;
- Farm tanks: Tanks less than or equal to 1,100 gallons in capacity and storing heating oil of any grade for non-commercial purposes.

UST systems storing heating oil of any grade that is consumed on-site solely for heating purposes are exempt from operator training, financial responsibility, release detection, and certain corrosion protection requirements. Exemptions are listed in the applicable sections of UST Regulations.

UST System Overview

While each UST facility is unique, all systems consist of common components that allow for the delivery, storage, monitoring, and dispensing of petroleum. There will, however, be variability between USTs and the operator should be aware of the components being used in their UST system. Once known, the operator should use this manual as reference to gain insight as to what the component's functions are, how to operate the components properly, and what the components require for maintenance.




VENT
INTERSTITIAL MONITORING MANWAY
GROUNDWATER MONITORING WELL
FILL PIPE SPILL CONTAINMENT BASIN
SUBMERSIBLE PUMP MANWAY
VAPOR RECOVERY SYSTEM
IN-TANK GAUGING MANWAY
PRODUCT LINE
VAPOR LINE
PRODUCT LINE
DRAIN
LINE LEAK DETECTOR
BALL FLOAT VALVE
INVENTORY PROBE FOR AUTOMATIC TANK GAUGING
DOUBLE-WALLED TANK
SECONDARY CONTAINMENT
NOT TO SCALE

Most UST systems include all or most of these components:

- Tank(s)
- Tank Sump(s) or Piping Transition Sump(s)
- Dispenser(s)
- Dispenser Sump(s) or Pans
- Spill Containment Basins (Spill Buckets)
- Product Line(s)
- Vent pipe(s)
- Vapor Recovery Line(s)
- Fill pipe(s)
- Alarms, Sensors and Automatic Tank Gauges

Tank Construction

USTs are either single-walled or double-walled. **Single-walled tanks** consist of a single, primary tank. **Double-walled tanks** consist of two tanks – a primary tank surrounded by a secondary wall or tank, separated by an **interstitial space**. The purpose of the secondary tank is to prevent a release into the environment in the event of a leak within the primary tank. It can be fitted with a leak detection system which can detect leaks in the primary or secondary tank, and is normally accessed through an inspection port in the tank pad. In addition to single- and double-walled design, USTs may be constructed from a variety of materials, as summarized below.

Rule 8.04 Mandatory Deadline for Permanent Closure of Single-Wall UST Systems:

- Single wall tanks/piping installed prior to May 8, 1985 must be permanently closed by December 22, 2017
- Single wall tanks/piping installed between May 8, 1985 and July 20, 1992 must be permanently closed within 32 years of the date of installation

Fiberglass-reinforced plastic (FRP)

A fiberglass-reinforced plastic (FRP) UST is commonly used because it is corrosion resistant and durable in underground environments. After years of installing bare steel underground storage tanks for gasoline and diesel fuel, companies discovered that steel tanks could eventually leak due to rusting on both the inside and outside. Since the mid-1960s, rustproof fiberglass USTs have provided a better option for fuel storage.

Figure 1 FRP Tank, Warwick, RI

Cathodically-protected steel

Cathodic protection of a tank involves the use of sacrificial anodes or an impressed electrical current system to chemically prevent corrosion from occurring.

Jacketed steel

Jacketed steel tanks are enclosed by a non-corrodible, non-metallic material such as fiberglass, plastic. The tanks are constructed with a space between the steel wall and the material where the tank can be monitored for leaks.

Clad steel

A clad steel tank consists of a steel tank with a thick layer of non-corrodible material, such as fiberglass, which is bonded to the outside. Unlike jacketed steel tanks, there is no interstitial space between the steel tank and the coating.

Piping Construction

Like tanks, piping systems can be single-walled or double-walled. **Single walled piping** does not have a secondary outer wall and a leak from the pipe will be immediately released into the environment. **Double-walled piping** is a pipe-within-a-pipe. The inner pipe is called the primary pipe (also known as the carrier pipe) and the outer pipe is called the secondary or containment pipe. Leaks from the primary will flow into the secondary and run back into your under-dispenser containment or tank top containment sump, where they can be detected by a leak sensor installed in the sump or by weekly visual checks. Double-walled piping systems will fall under one of two types:

- Ducted pipe, which has a large-diameter (4 inch) outer wall and a smaller-diameter (2 inch) inner pipe. If flexible piping is used to construct the ducted system, the inner pipe slides inside the outer pipe so the inner pipe can be removed and replaced without excavation.
- Coaxial pipe has an outer wall that fits snugly over the inner pipe. The two walls of coaxial pipe are manufactured together at the factory and installed as a unit. In some cases, coaxial pipe is installed within a larger-diameter duct to permit replacement of the coaxial pipe without excavation.

UST piping systems may be either pressurized or suctioned.
In a **pressurized piping system**, a submersible pump is located inside the tank and pumps product from the tank to the dispenser at a typical pressure of 30 pounds per square inch or higher. You will find the pump head inside the tank top sump.
In a **suction system**, the pump is located inside the dispenser. The pump draws product from the tank by suction at a vacuum of three (3) to five (5) pounds per square inch.

Piping material varies and the following paragraphs include a description of some common piping types found in UST systems. Piping material must be approved by Standard UL 971, which certifies the piping as safe after being tested in a laboratory.

Flexible Piping

Flexible piping is usually made of Teflon or non-corrodible nylon and may be fitted with metal connectors. Flexible piping is corrosion resistant and eliminates piping joints because it uses continuous runs. Most flexible piping systems can be used as both pressure and suction product lines.

FRP Piping

FRP piping is rigid, requires little maintenance, and can be used with both pressurized and suction systems.

Steel Piping

Steel piping is usually single-walled and requires cathodic protection to prevent corrosion.

Dispensers

Dispensers deliver product to the customer. Dispensers connected to a suction piping system will contain the suction pump inside. Dispensers may also contain **under-dispenser containment sumps (UDCs)**. UDCs are located under the dispenser and are designed to contain any leaks from the dispenser piping.

Rule 9.14 (E) All newly installed dispenser systems are required to have UDCs. A dispenser system is considered new when both the dispenser and the equipment needed to connect the dispenser to the underground storage tank system are installed. That equipment may include check valves, shear valves, unburied risers or flexible connectors, or other transitional components that connect the dispenser to the underground piping.

Dispenser sumps may also contain electrical conduit to the dispenser meter, product piping and fittings, and a sump leak sensor. Motor vehicle fuel dispensers served by pressurized piping systems must also have a **shear valve**, also known as the emergency, impact, or crash valve. A shear valve is designed to stop product flow if a car strikes the dispenser or if a fire occurs at the dispenser.

Electronic Monitoring Systems

Monitoring systems typically consist of a console attached to various sensors, probes and alarms.

- Automatic tank gauging (ATG) probes measure product level in a tank, measure water levels in a tank, and conduct in-tank testing.
- The sensors monitor dispenser sumps, tank sumps and interstitial spaces for the presence of liquid and measure the level of the brine solution in a tank with a wet interstitial space.
- Alarms may indicate overfilling of a tank, presence of a liquid in a sump or interstitial space, presence of water in a tank, or low product level/whether a delivery is needed.

Tank Top Sumps

Tank top sumps are liquid tight and contain product in the event of a leak, preventing the product from entering the environment. The tank top sumps also serve to protect the components from corrosion by isolating them from the surrounding soil. Double-walled piping systems are designed so that leaks in the piping will flow back to the tank top sump or the dispenser sump. Product in your sump means that you may have a leak in your primary piping. Water in the sump may mean that you have a leak in your secondary piping or a leak in the sump itself. Sump cover seals often deteriorate with age and are difficult to keep water tight.

Prior to October 13, 2021 owners/operators are required to have all single-walled containment sumps, including product piping sumps, STP sumps, transition sumps, and under-dispenser containment, if present, tested for tightness. Single-walled containment sumps must be tested every 3 years thereafter and the test must determine if the sump is liquid tight. Owners and operators must maintain records of these tests for at least three. years. Double-walled containment sumps must be periodically monitored, but are not required to be routinely tested.

Spill Buckets

Spill buckets are installed around fill ports to contain small spills that may occur during deliveries. Often, as the delivery hose is disconnected, some volume of product is spilled and it is the spill bucket's purpose to collect this spillage. Spill buckets must be liquid tight, and kept clean and dry.

Prior to October 13, 2021 owners/operators are required to have all single-walled overfill containment devices, commonly referred to as "spill buckets", tested for tightness. Single-walled spill buckets must be tested every 3 years thereafter and the test must determine if the bucket is liquid tight. Owners and operators must maintain records of these tests for at least three. years. Double-walled spill buckets must be periodically monitored, but are not required to be routinely tested.

Groundwater Monitoring Wells and Tank Pad Observation Wells

Groundwater monitoring wells and **tank pad observation wells** are similar in construction but differ in use. Groundwater monitoring wells are used to detect the presence of petroleum products at the groundwater surface or below. An observation well is used in determining the elevation of the water table. Groundwater monitoring wells are installed outside the tank excavation in locations that ensure the detection of a potential release from any portion of an UST system. Tank pad observation wells, on the other hand, are installed in the tank excavation and extend below the tank but not necessarily into the water table. Both types of wells can provide a pathway for the movement of pollutants and contaminants into the water table, and for this reason their proper design, installation, and maintenance are critical.

Groundwater Monitoring Wells

Groundwater monitoring wells are usually installed as a result of environmental/remediation concerns (to measure the size of spills and the extent/progress of clean-ups). They also may be required for new or replacement UST systems located in environmentally sensitive areas. Groundwater monitoring wells are installed in native soil outside the tank excavation. Their number, location, and depth are determined by the physical conditions at a site, by the degree of contamination, and in order to intercept a contaminant plume.

When required as part of a site investigation at an UST facility, groundwater monitoring wells must be gauged and sampled on a specified schedule (depending on the extent of contamination) and under the guidance of the RI DEM Leaking Underground Storage Tank Program. Wells that are no longer used to gather information on geologic or groundwater properties shall be permanently abandoned in accordance with the RI DEM *Rules and Regulations for Groundwater Quality*.

When groundwater monitoring wells are installed as a condition of approval for new or replacement UST systems, the following apply:

- The water in the wells shall be bailed and evaluated for visual and olfactory evidence of free product no less than once per year.
- Written records of all well check observations are to be maintained as permanent records until three years beyond the life of the facility.
- All owners/operators must promptly investigate and report any evidence of free product in accordance with the UST regulations.

Tank Pad Observation Wells

Tank pad observation wells are used in situations where knowledge of the water table elevation may be necessary (in tightness testing calculations, for example). Tank pad observation wells are located inside the tank excavation and extend one to two feet below the bottom of the tank. As mentioned above, their proper design, installation, and maintenance are critical.

Well Construction Standards and Maintenance Requirements

Groundwater monitoring wells and tank pad observation wells have similar construction standards. Their maintenance requirements are similar, too. Per the UST regulations, monitoring wells and pad wells that are finished at ground level:

- Must be equipped with a labeled and tamper-resistant cover. Labels must identify them as being groundwater monitoring or observation wells. (Clearly marking the manhole cover with a black equilateral triangle on a white background can serve this purpose.)
- Must be fitted with a locking gripper cap or plug.
- Cannot be screened to the top, in order to prevent surface water from infiltrating the wells.
- Must be maintained to assure no pollutants enter the well.

Chapter 2. Operator Training

UST Operator Training is a program mandated by EPA and the 2005 Energy Policy Act. Training and certification should provide individuals with the knowledge required to operate UST systems. Effective August 1, 2012, all Rhode Island UST facilities must have at least one Class A, one Class B, and one Class C operator designated by the owners/operators.

NOTE: The designation of a Class A, Class B, or Class C operator does not limit or relieve the duties of the UST facility owner and/or operator to comply with their legal responsibilities outlined in the UST Regulations.

Operator Training in Rhode Island

In Rhode Island, operator training and knowledge for all **Class A operators** and **Class B operators** is demonstrated by passing an International Code Council (ICC) examination approved by the Department. Certification as a result of passing this examination will be good for five (5) years provided the facility remains in compliance with the regulations.

Each facility owner/operator must complete and submit the Department's certified operators form listing Class A and Class B operators (included in Appendix XXX), and should submit an updated form whenever there is a change in designated Class A and Class B operators.

Rule 8.22 (A) (5) New Class A/Class B Operators
Effective August 1, 2012, all NEW Class A/Class B operators must be certified within 30 days of assuming responsibility for a UST facility in Rhode Island

Class C operators must be trained by the Class A or Class B operator in correct spill response procedures, the general facility layout, and how to respond to emergency alarms for the UST system. All facilities must maintain a list of all its Class C operators assigned to the facility. The list should include the latest date of training, and the name of the Class A or Class B operator that trained each Class C operator (example form included in Appendix XXX). Class C operators must be trained every two years and individuals must be trained BEFORE assuming Class C operator responsibilities at a UST facility.

Class A Operator Responsibilities

The Class A operator has the primary statutory and regulatory responsibility for maintenance and operation of the UST facility. The Class A operator must pass an examination which demonstrates their knowledge of:

- Spill and overfill prevention
- Release Detection
- Corrosion protection
- Emergency response

- Product and equipment compatibility
- Financial responsibility
- UST registration permitting
- Temporary and permanent closure procedures
- Reporting, recordkeeping, testing, and inspections required by USTs
- Environmental and regulatory consequences of releases
- Training requirements for Class B and Class C operators

The responsibilities of a Class A operator include:

- Ensure proper operation and maintenance of the UST system
- Ensure proper record keeping
- Ensure a proper response to emergencies caused by releases or spills from UST systems
- Make financial responsibility documents available upon request to the Department
- Ensure all UST registration fees are paid to date.
- Ensure that the facility has a certified Class B and a trained Class C operator(s)
- Complete an on-site inspection every month (this may also be conducted by a Class B operator).

Class B Operator Responsibilities

The Class B operator oversees the daily on-site operation and maintenance of an UST system(s). They must have the knowledge and skills to implement applicable regulatory requirements for typical UST systems or site-specific equipment used at their UST facility. Each designated Class B operator must pass an examination which demonstrates their knowledge of:

- Operation and maintenance
- Spill and overfill prevention
- Release Detection and related reporting
- Corrosion protection
- Emergency response
- Product and equipment compatibility and demonstration
- Reporting, recordkeeping, testing, and inspections
- Environmental and regulatory consequences of releases
- Training requirements for Class C operators

The responsibilities of a Class B operator include:

- Ensure that all applicable sections of Rule 8 in the DEM regulations are met including, but not limited to; spill containment, overfill protection, Release Detection (including inventory control), and corrosion protection.
- Ensure that the Class C operators are trained to respond to emergencies caused by releases or spills from the UST system.
- Ensure that someone is designated to be on site for compliance inspections.
- Complete an on-site inspection every month (this may also be conducted by a Class A operator).

Class C Operator Responsibilities

A facility must have a Class C operator present during the hours of its operation. The Class C operator is an employee of the facility, usually a cashier or maintenance person, who is trained to recognize emergencies caused by releases or spills and then take appropriate actions to respond to them.

Each designated Class C operator must be trained by a Class A or Class B operator. The Class C operator must know the appropriate actions (including notifying appropriate authorities) in response to emergencies or alarms caused by spills or releases resulting from the operation of the UST system.

The responsibilities of a Class C operator include:

- Be present at the facility during all operating hours.
- Control or monitor the dispensing or sale of regulated substances from the UST system.
- Properly respond to alarms or releases.
- Notify the Class A or Class B operator and appropriate emergency responders when there is a spill or other emergency.
- Be trained every two years by a certified Class A or B operator

Monthly UST Walkthrough Inspections

The RI DEM Monthly Inspection Checklist MUST be completed and signed by the designated Class A and/or Class B operator every month (30 days). These inspections help to ensure that leak detection equipment is installed and operating properly, that UST components are in good condition, and to help identify and fix unsafe situations that could cause harm to the public and environment. When performing a walk-through inspection, investigate any unusual operating conditions such as leakage, loose fittings, and deterioration. Inspections should focus on system components that operate in difficult environments, have moving parts, or are subject to abuse. Any non-compliance items, operational issues, or alarms MUST be documented. The operator should also document the actions necessary to resolve the violation.

Airport hydrant systems have hydrant pits and hydrant piping vaults that must be inspected during the monthly walkthrough (or at least annually if confined-space entry is required to do so). These items will be included on the RI DEM Monthly Inspection Checklist.

Operator Certification Reciprocity

- New England State ICC certification – valid for 5 years from date of passing the certification exam, as long as the UST facility remains in compliance

- Certification from another state (not ICC) - valid for 1 year from date of certification submittal to RI DEM, as long as the certification doesn't expire and the UST facility remains in compliance

Re-Certification Requirements

If a facility is not in compliance with the UST regulations at the time of a Department- or EPA-conducted UST compliance inspection, Class A and/or Class B operators may be required to be retrained and re-certified within 60 days of the Department's issuance of a letter summarizing a facility's failure to meet significant operational compliance.

Class A and B operators must submit written documentation of their re-certification within 10 days of passing the RI ICC exam(s).

Unmanned Facility Requests

An unmanned UST facility is one that operates without a Class C operator present during all operating hours. You must receive written approval from RI DEM to operate a facility without a Class C operator. Unmanned facility approvals are typically granted for fueling facilities that serve emergency vehicles 24 hours a day.

Environmental Results Program

The ERP is a mandatory facility compliance inspection program. Owners/operators are responsible for conducting their own inspections and certifying their compliance by completing and submitting a Compliance Certification Checklist & Forms Booklet (the "ERP Certifications Booklet"). If a booklet is not submitted on time, DEM may issue a penalty or fine.

At least every three (3) years, the Department will issue an ERP Certification Booklet to all operating UST facilities. The booklet will include the following:

- Non-Applicability Statement
- Compliance Certification Checklist
- Certification Statement
- Return to Compliance Form

Along with the ERP Certification Booklet, the Department will also make available an ERP Compliance Certification Workbook. The ERP workbook will provide guidance to

owners/operators regarding the performance of their ERP inspection and instructions for completing and submitting the ERP Certification Booklet. Owners/operators shall return the completed ERP Certification Booklet to the Department within the time frame specified by the Director.

Chapter 3. Release Detection

As a UST system ages, deterioration at venerable components in the system can result in the of release product into the environment, raising a public health concern and requiring the need for expensive remediation action. It is imperative for operators to ensure methods of release detection have been employed in their UST systems to alert the operator of any potential release.

All federally regulated USTs must have a release detection method (or a combination of methods) that detect a release from any portion of the tank and piping that routinely contains product. The release detection equipment must be installed and calibrated according to the manufacturer's instructions. Only release detection devices that have been certified according to the required EPA performance standards are allowed to be installed.

Release Detection for Tanks

Description of Release Detection Methods for Tanks

Manual Tank Gauging

Manual tank gauging using a gauge stick with an accuracy to 1/8 inch is allowed only for single-walled waste oil and motor oil USTs less than or equal to 2,000 gallons in size.

Once each week, take the tank out of service for 36 hours and measure the product volume before and after this period. The difference in volume before and after the 36 hour period must be:

- 10 gallons or less for tanks up to 550 gallons,
- 13 gallons or less for tanks between 551 and 1,000 gallons,
- and 26 gallons or less for tanks between 1,001 and 2,000 gallons.

Once a month, average the weekly changes in tank volume (taking into consideration positive and negative numbers). This average is required to be:

- 5 gallons or less for tanks up to 550 gallons,
- 7 gallons or less for tanks between 551 and 1,000 gallons,
- and 13 gallons or less for tanks between 1,001 and 2,000 gallons.

If any weekly or monthly change exceeds the allowable amount, then a leak is suspected and the Department must be contacted immediately. Manual tank gauging records should be kept as **routine records** (refer to the glossary for a definition).

Automatic Tank Gauging

An **automatic tank gauging (ATG) system** is used for automatically monitoring the volume of product in a tank. The equipment consists of a probe permanently installed through an opening at the top of the tank. The ATG is programmed to perform a periodic leak test that

measures the loss or gain of a tank's contents. The test is able to detect a 0.2 gallon per hour leak rate from any portion of the tank that routinely contains product.

Any malfunction of an ATG must be repaired within 15 working days of its first occurrence. Any deactivation of a monitoring system and any suspected or confirmed release shall be immediately reported to the Department. All alarms and warnings must be responded to immediately.

ATG systems can also be used to measure any water level in the bottom of the tank. Once a month, a measurement of the water level in a tank should be taken and recorded. Excess water in a tank could be an indication of a hole or simply due to condensation. If the water level measurement exceeds 1 inch, the water must be removed.

Inventory Control

Inventory control (also called inventory reconciliation) is a release detection method that tracks the inputs and outputs of a UST, ensuring that all product flowing through the system is accounted for. Done properly, the method is effective at alerting the operator to any significant losses of product from the UST system.

Over the course of a month, the operator will record:

- Daily tank volumes
- Volume of product delivered to the tank
- Volume of product dispensed

At the end of the month, the operator will reconcile the data and determine that all the product flow is accounted for. If a significant amount of volume is unaccounted for, the operator must alert the Department immediately, as this may signify a leak. Temperature fluctuations or gauge inaccuracy may result in measurement errors and therefore, a UST system is given an allowance of 1% of the total volume of monthly dispensed product + 130 gallons. For example, if 6000 gallons of fuel was dispensed from a UST in a month, then 190 gallons (60 gallons (1% of 6000) + 130 gallons = 190 gallons) would be the maximum allowable difference between the *calculated* volume and the *measured* volume recorded.

Inventory records shall be maintained routinely for a minimum period of three (3) years from the date created.

Interstitial Space Continuous Monitoring

Double-walled tanks are constructed with an inner and an outer wall and the space in between the walls is called the interstitial space. The interstitial space serves to contain fuel leaking from the inner wall, preventing it from entering the environment. Sensors are installed in the interstitial space to detect the leaking fuel and when they do detect fuel, they report to a monitor installed inside the facility, which will visually and audibly alarm to alert the operator of the suspected leak. Although not typical, some tanks have an interstitial space filled with a brine solution. The monitor checks for a change in the level of the brine solution. A drop or increase in brine level signifies a leak.

The following applies to interstitial space continuous monitoring:

- The operator must ensure the proper operation of the continuous monitoring system during a monthly inspection. Records of such tests shall be maintained as routine records.
- The monitors shall not be shut off or deactivated at any time.
- Any malfunction shall be repaired within 15 working days of its first occurrence. Any deactivation of a monitoring system and any suspected or confirmed release shall be immediately reported to the Department.
- Owners/operators must respond immediately to all alarms and warnings.

Rule 8.15 (A) All leak monitoring devices must be inspected, calibrated and tested annually to ensure proper operation. Such testing must be performed by trained, qualified persons and in accordance with the manufacturer's requirements. Records of these tests must be maintained at the facility for 3 years beyond the operational life of the facility.

Tightness Testing

Single-walled tanks can be tested for tightness to determine whether or not a tank is leaking. Tank tightness test methods must be capable of detecting a leak rate of 0.1 gallon per hour taking into account the variation caused by thermal expansion, water table affects, and tank deformation. The tightness test must be performed with the probability that 95% of the time the test will accurately detect a release and produce a false result 5% of the time.

The following applies to tank tightness testing:

- The tank tester must be licensed with RI DEM
- The test method must be approved by RI DEM
- Results of tightness testing shall be submitted to the Department within 15 days of test completion
- Test results which indicate failure or are inconclusive must be reported immediately of the test and in accordance with the RI DEM UST regulations
- Results of tightness testing are to be maintained as **permanent records**.

Interstitial Space Tightness Testing

The interstitial space of double-walled USTs are tested for tightness to ensure that there are no leaks in the tank's walls. Generally, the tester applies a vacuum to the interstitial space. If the vacuum holds over a period of time, than the interstitial space is found to be tight.

Release Detection Requirements for Tanks

Owners and operators of USTs must provide a method, or combination of methods, of release detection based on tank construction (single or double wall), age, substance stored, and in some instances, size. Release detection requirements for the various UST tanks are given here.

Table 1 Tank Release Detection Requirements for Operation

Type of Tank System*	Minimum Required Release Detection Method(s) for Operation**
Double Wall USTs	Continuous interstitial space electronic monitoring Daily and monthly inventory control
Double Wall USTs Emergency Generator USTs and Waste/Motor Oil USTs only	Continuous interstitial space electronic monitoring
Single Wall USTs Including tanks upgraded with cathodic protection or interior lining	Approved ATG system AND perform a leak test capable of detecting 0.2 gallon/hour leak once per month Daily and monthly inventory control
Single Wall USTs Emergency Generator USTs and Waste Oil/Motor Oil USTs greater than/equal to 2,000 gallons only	Approved ATG system AND perform a leak test capable of detecting 0.2 gallon/hour leak once per month
Single Wall USTs Waste Oil/Motor Oil USTs less than/equal to 2,000 gallons	Approved ATG system AND perform a leak test capable of detecting 0.2 gallon/hour leak once per month OR Manual tank gauging

*** If the UST is manifolded or syphoned and a leak test is required, each tank must be tested separately**

**** Results for any leak tests must be maintained as routine records at the UST facility**

Table 2 Tank Tightness Testing Schedules

Type of Tank System	Preliminary Tightness Test (after install date and test)	Tightness Test Schedule	Any newly installed UST must be tightness tested upon installation All tightness tests must be performed by testers licensed according to Rule 14 of the UST Regulations. DEM must be notified 7 days prior to the testing date and test results must submitted to DEM within 14 days of the test. If a UST system tightness test fails or is inconclusive, the tester must notify the DEM UST Management Program immediately at 401-222-2797 Failed/inconclusive tests require the owner/operator to remove the UST contents within 24 hours OR schedule a retest within 3 days. Failed/inconclusive tests require the owner/operator must submit a Release Characterization Report to DEM within 7 days All tightness testing results should be kept as permanent records.
Double Wall USTs* including Emergency Generator USTs Waste Oil/Motor Oil USTs	Interstitial space tightness test 20 years after UST install date	Every 2 years after initial test	
Single Wall USTs including Emergency Generator USTs Interior Lining/Cathodic Protection Upgrades Waste Oil/Motor Oil USTs less than/equal to 2,000 gallons with leak monitoring device	Tank tightness test every 5 years for a period of 20 years from monitoring device install date	Every 2 years after 20-year period. If 30+ years from install date, tank tightness test every year	
Single Wall USTs Waste Oil/Motor Oil USTs less than/equal to 2,000 gallons with manual tank gauging only	N/A	Tank tightness test every year from date of install	
Single Wall USTs Waste Oil/Motor Oil USTs greater than 2,000 gallons with monitoring device only	Tank tightness test every 5 years for a period of 20 years from monitoring device install date	Every 2 years after 20-year period.	

***Double wall USTs with brine solution in the interstitial space do not require tightness testing but must have the interstitial and reservoir fluid level continuously monitored**

Release Detection for Piping

Description of Release Detection Methods for Piping

Automatic Line Leak Detectors

An **automatic line leak detector (LLD)** is a device installed in a pressurized piping system on the discharge side of a **submersible turbine pump (STP)**. All underground pressurized piping systems must have an automatic LLD. When a release occurs, the device detects the drop in pressure and then interrupts product flow through the piping. An automatic LLD may operate either mechanically or electronically. All LLDs must be able to detect a release of 3 gallons per hour at a line pressure of 10 pounds per square inch.

Figure 2 Line Leak Detector

Figure 3 STP with Line Leak Detector

Mechanical LLDs are mechanically operated pressure valves that detect a loss in piping line pressure each time the pump is turned off. If a leak is occurring from a line, mechanical LLDs DO NOT shut off flow to the pipe and will not trigger an audible or visual alarm when a leak occurs. The only way to tell that a mechanical LLD has been triggered is by noticing that the fuel is dispensed at a very slow rate compared to normal operating conditions.

Electronic LLDs are considered more reliable for leak detection. Electronic LLDs have an electronic detection element that monitors for releases by looking for pressure losses in the piping. Electronic LLDs DO shut down the flow from the STP if a leak is detected. The shutdown will usually appear as an alarm on the ATG.

Rule 8.11 All LLDs must be tested annually in accordance with the manufacturer's requirements and procedures by trained and qualified personnel. Failed or defective LLDs must be replaced immediately. Test results should be kept as permanent records.

Line Interstitial Space Monitoring

Double wall piping systems consist of an inner primary pipe within an outer secondary pipe. The area between the primary and secondary pipe is the interstitial space. Any fuel leaking from the primary pipe flows into the interstitial space. The leaked fuel then flows within this space by gravity to a liquid-tight sump. There is a liquid sensor in the sump which will detect the presence of product. If a leak occurs, the sump will fill with product, trigger the liquid sensor, and the tank monitor will signal an alarm, alerting the operator to the leak.

Interstitial monitoring system requirements include the following:

- A monthly check of the monitoring system to ensure effective operation (performed by the owner/operator). Records of such tests should be maintained as routine records
- An annual inspection, calibration, and test of the monitoring system to ensure proper operation (performed by trained, qualified persons and in accordance with the manufacturer's requirements). Records of such tests should be maintained as permanent records
- All liquid sensors shall be secured in an upright position and located at least one inch below the lowest penetration fitting or entry boot
- The monitors shall not be shut off or deactivated at any time
- Any malfunction shall be repaired within 15 working days of its first occurrence. Any deactivation of a monitoring system and any suspected or confirmed release must be immediately reported to the Department. All alarms and warnings must be responded to immediately

Line Interstitial Space Tightness Testing

Older double-walled piping systems require a tightness test on the interstitial space to ensure the walls of the tank have not developed a leak.

Line Tightness Testing

Single-walled lines can be tested for tightness to reveal any leaks any leaks. Line Tightness Testing methods must be capable detecting a leak at least as small as 0.1 gallon per hour when the line pressure is 1.5 times its normal operating pressure.

Release Detection Requirements for Piping

Table 3 Piping Tightness Testing Schedule

Type of Piping System	Preliminary Tightness Test (after install date and test)	Testing Schedule	**Any newly installed UST must be tightness tested upon installation** **All tightness tests must be performed by testers licensed according to Rule 14 of the UST Regulations.** **DEM must be notified 7 days prior to the testing date and test results must submitted to DEM within 14 days of the test.** **If a UST system tightness test fails or is inconclusive, the tester must notify the DEM UST Management Program immediately at 401-222-2797** **Failed/inconclusive tests require the owner/operator to remove the UST contents within 24 hours OR schedule a retest within 3 days.** **Failed/inconclusive tests require the owner/operator must submit a Release Characterization Report to DEM within 7 days** **Tightness testing results should be kept as permanent records.**
Double Wall Piping	Interstitial space tightness test 20 years after install date	Every 2 years after 20-year period	
Single Wall Piping Pressurized	N/A	Annually	
Single Wall Piping Suction	Tightness testing at 5,8,11,and 13 years after install date	Annually after 13-year period.	
Single Wall Piping European/Safe Suction	Tightness testing at 5,8,11,and 13 years after install date	. Every 2 years after 13-year period. If 30+ years from install date, test every year.	

Release Detection Equipment Testing

Table 4 Leak Detection Devices and Testing Schedules

Type	Testing Schedule	Test Performed by?	Failed/Inconclusive Test	Recordkeeping Requirements
Line Leak Detectors	Annually	Trained or qualified personnel	Failed line leak detectors should be replaced immediately	Permanent Records
Shear/Crash/Impact Valves	At installation and annually thereafter	Owner or operator or qualified personnel	Failed shear/crash/impact valves should be replaced immediately	Routine Records
Leak Monitoring Devices	Annually	Trained or qualified personnel	O/O reports any failed test/ monitoring device deactivation to DEM immediately. AND Repair within 15 days of noted malfunction/failure. If repair can't be made in 15 days, temporarily close UST system until repair is made.	Permanent Records
Continuous Leak Monitoring System	Monthly	Owner or operator	O/O reports any monitoring device deactivation to DEM immediately. AND Repair within 15 days of noted malfunction/failure. If repair can't be made in 15 days, temporarily close UST system until repair is made.	Routine Records

Chapter 4. Spill Protection and Overfill Prevention

Spill Protection and Overfill Prevention Background

The leading cause of releases from UST systems come from spills and overfills during deliveries. Spills may result from disconnecting the delivery hose from the tank's fill pipe before the hose has drained completely, causing product to flow out onto the tank pad. Overfilling occurs when the tank liquid level exceeds tank capacity and product escapes through tank bung holes, vent lines, or fill ports. Leaks from dispensers, pumps, and piping connections are also common. Proper equipment along with good maintenance and operational procedures are necessary to ensure the prevention of significant environmental damage.

Overfill Prevention Equipment

Overfill protection devices are installed on the USTs to help prevent tanks from being overfilled during fuel delivery. Overfill protection is designed to stop fuel flow, reduce fuel flow, or alert the delivery person during delivery before the tank becomes full and begins releasing petroleum into the environment. All underground storage tanks at existing facilities are required to have overfill protection with the following exceptions:

USTs used to store heating fuels consumed on-site solely for heating purposes and installed prior to July 21, 1992; and
USTs that never receive more than 25 gallons at one time.

You can solve overfill problems by:

- Making sure there is enough room in the tank before the delivery is made
- Watching the entire delivery
- Using overfill protection devices

Remote High Level Alarms

This type of overfill protection has a remote indicator that will alarm, both visually and audibly, when the product volume reaches 90% of the tank's capacity or is within on minute of being overfilled. By alarming, the remote high level alarm warns the delivery person that the tank is nearing its capacity and that they must stop filling the tank. Generally, the device is located on a nearby structure, such as the wall of a building.

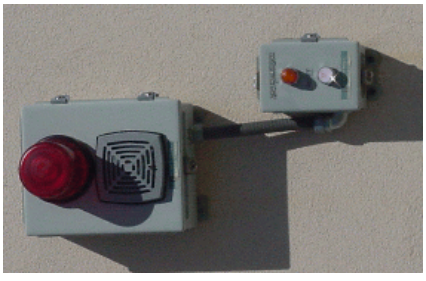


Figure 4 Remote High Level Alarm

Remote high level alarm requirements include the following:

- The overfill alarm must activate when the fuel in the tank reaches 90% of the tank capacity or is within one minute of being overfilled.
- The overfill alarm must be located so it can be seen and/or heard at the UST system delivery location. This ensures the delivery person will be alerted when the tank is almost full.
- The overfill alarm must be checked at least annually to ensure it is functioning properly.

Automatic Shutoff Valves (Flapper Valves)

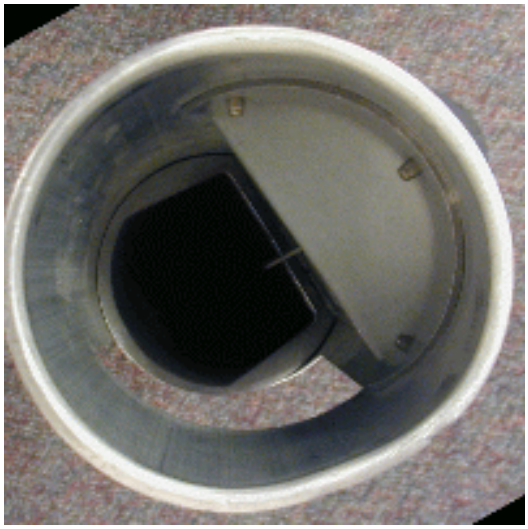


Figure 5 Automatic Shutoff Valve

An automatic shutoff valve mechanically shuts off the flow of product into the tank during delivery when the product level reaches 95% of the tank's capacity. Activation of the valve will cause the fueling hose to jump and alert the delivery person that the tank is full. The delivery person should then cease the delivery and drain the remaining product in the hose into the tank. For this overfill protection device to work effectively, the delivery person should be monitoring the process at all times. The valve can be found by looking down your fill pipe. The figure to the left shows a shutoff valve. You will see what appears to be a line cutting through your fill pipe (or a half moon shape in your fill pipe).

Automatic shutoff valve requirements include the following:

- Automatic shutoff devices must activate when the fuel in the tank reaches 95% of the tank capacity or before the fittings at the top of the tank are exposed to fuel.
- There must not be any object in the fill pipe that would keep the shutoff mechanism from activating.
- Unless specifically designed and in order to avoid a dangerous situation, automatic shutoff devices are not allowed if your tank receives pressurized deliveries.

Ball Float Valves

The ball float valve is another method of overfill protection installed into UST systems. The valve is installed in the vapory recovery line and as the tank fills up from a delivery, the ball in the valve rises to restrict the flow of vapors out of the UST system. The flow rate of the delivery will decrease noticeably, alerting the delivery person to stop the delivery.

Figure 6 Ball Float Valves

For ball float valves to work properly:

- The air hole in the ball float valve must not be plugged
- The ball cage must be intact
- The ball must move freely in the cage

- The ball must seal tightly on the pipe
- The top of the tank must be air tight during delivery so that vapors cannot escape from the tank

Ball float valves are no longer allowed to be installed as overfill prevention into new UST systems or replacement UST systems.

Ball float vent valve requirements include the following:

- Ball float valves must activate by restricting fuel flowing into the tank when the fuel in the tank reaches 90% of the tank capacity or at least 30 minutes before the tank will be overfilled
- You should not use a ball float for overfill protection if your UST receives pressurized deliveries, has suction piping, or has coaxial Stage I Vapor Recovery
- Ball float vent valves must be installed so as to allow annual inspection for proper operation

Vent Alarms

A vent alarm (vent whistle) is a small device, usually a tube, which is typically installed between your tank and the vent pipe. When oil is pumped into your tank, air is displaced from inside the tank and passes through the vent pipe. As the air passes through the vent pipe, it makes a whistling. When the level of the fuel reaches the end of the tube the whistling stops, indicating the tank is full.

Figure 7 Vent Alarm

Rule 9.13(C)(6) Only USTs used to store fuel oils consumed on-site solely for heating purposes and diesel generator USTs are allowed to be equipped with an in-line vent whistle as a method of overfill prevention.

Vent alarm requirements include the following:

- The vent whistle must be installed so as to stop whistling when the tank is 90% full
- Vent whistles may be used only when tight fill, pump-off deliveries are made
- The vent opening must be located adjacent to the fill (within 8 feet, or if not practical then as close as possible to be readily heard by the deliverer)
- Vent whistles must be installed so as to allow annual inspection for proper operation.

Spill Protection

Spill Containment Basins

Spill containment basins (also called spill buckets or catchment basins) are devices located at the fill pipe designed to contain drips and spills of fuel that may occur when a delivery hose is uncoupled from the fill pipe. All underground storage tanks at existing facilities are now required to have spill containment basins around all fills.

Figure 8 Spill Bucket

- Spill basins must be capable of holding a minimum of three (3) gallons
- Spill basins are intended for the temporary containment of fuels and are not designed to hold product for long periods of time
- The basin must be surrounded by an impervious surface
- If the basin is made of metal, then its exterior wall must be protected from corrosion
- USTs with above-ground fill pipes do not require spill containment basins if the ground surrounding the fill pipe is covered with impervious material and is graded to contain spills of at least three (3) gallons. The fill pipe also must extend a minimum of six (6) inches above the finished grade. Above-ground fill pipes located in areas subject to traffic must be protected by concrete-filled bollards.

Maintaining Spill Containment Basins

Spill basins (spill buckets) are to be properly maintained, in good condition, and kept free of water, product, and debris. Spill basins are required to be inspected periodically and before and after deliveries. Any holes, cracks, or other signs of wear might suggest that the bucket is not liquid tight.

Some spill containment basins have a drain valve or manual pump that allows you to drain accumulated fuel into your tank. Be cautious however, when you pump out or drain your spill protection equipment into your tank, water and debris may also enter the tank. If the device does not have a drain valve or pump, then any accumulated fuel or water must be removed manually and disposed of properly (i.e., not on the ground). Treat the fuel or water as hazardous waste.

There are two spill containment basin testing methods. The first involves applying a vacuum to the basin and monitor it for a loss of pressure over time. The second involves performing a hydrostatic leak test, where the basin is filled with water and observed over time. A significant decrease in water level would signify a leak. Owners and operators must maintain the results of these tests for at least three years as routine records.

Correct Filling Practices

As an owner or operator, you are responsible for any releases that occur due to spilling or overfilling during fuel delivery. It is your responsibility to:

- ensure that the amount of fuel to be delivered will fit into the ullage or the available empty space in the tank
- ensure that the transfer operation is monitored constantly to prevent overfilling and spilling

Fill Pipe Labeling

All fill pipes and/or fill box covers shall be permanently labeled or otherwise permanently marked according to the American Petroleum Institute's color coding system (RP 1637), so that the product inside the tank can be identified properly.

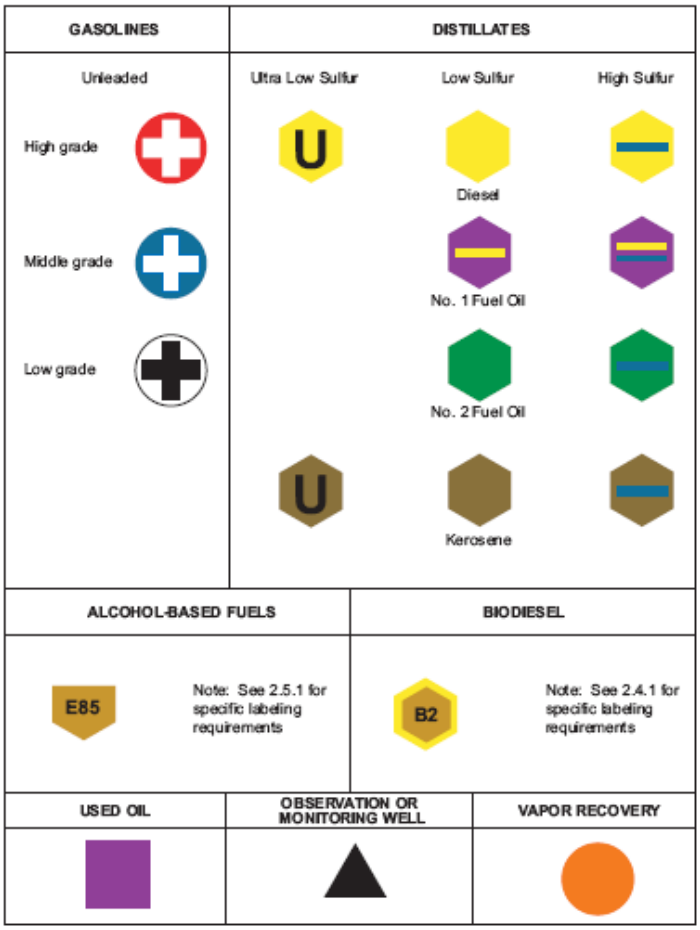


Figure 9 UST Equipment Marking Color Code Chart (Source API RP 1637, 2007)

Submerged Fill Tubes

Fill risers are required to be equipped with a tube that fits directly inside the fill pipe and extends to within six (6) inches or less above the bottom of the tank and is cut at a 45° angle. The fill tube, or drop tube, allows for submerged filling. This helps to prevent foaming and the creation of vapors during fuel deliveries. A submerged fill tube is not required if your tank stores heating oil consumed solely on-site.

Tank Top Sumps and Transition Sumps

Tank top sumps and transition sumps are designed to temporarily contain leaks and spills by providing a low-point collection area in the UST system. If a leak were to occur in the interstitial space of double walled piping, the leaking product would flow by gravity into the tank top or transition sumps, where the operator can safely remove it. It is imperative to continuously monitor tank top and transition sumps for water and product with a liquid sensor because the presence of product in a sump is an indication of a leaking UST system.

Figure 10 Tank Top Sump

Additionally, sumps protect the UST components within them from groundwater, they isolate components from the corrosive effects of subsurface moisture, and they serve as access points for the periodic maintenance upon the system.

All sumps shall be inspected at least annually and whenever an alarm or warning from a leak monitoring device indicates the presence of product or water. Inspection requirements include the following:

- All penetration fittings and entry boots are in good condition.
- All sensors are secured in an upright position and located at least one inch below the lowest penetration fitting or entry boot.
- Sumps shall be kept clean and dry. Properly dispose of any water or product.
- The interstitial space of double-walled piping systems must be kept open so that liquid can flow from the piping interstitial space into the sump.
- All gaskets, sealants, and fittings used in the installation, maintenance, or repair of sumps shall be compatible with the substance stored.

Any accumulated fuel or water found in a sump must be removed manually and disposed of properly (i.e., not on the ground). Treat the fuel or water as hazardous waste.

There are two containment sump testing methods. The first involves applying a vacuum and monitoring for a loss in pressure over time. The second involves performing a hydrostatic leak test, where the containment is filled with water and observed over time for a decrease in water level. A decrease in water level would signify a leak. Owners and operators must maintain records of these tests for at least three years as routine records.

Fueling Dispensers

Fueling dispensers are required to be opened weekly (per the RI DEM Office of Air Resources) and all visible piping, fittings, and couplings inspected for any signs of leakage. Hoses, nozzles, and breakaways are required to be inspected for loose fittings, deterioration, obvious signs of leakage, and improper functioning. The UST regulations require an annual check of a dispenser's emergency shut-off valve (shear/crash/impact valve) (for remote pumping systems). Any water, product, or debris in dispenser sumps shall be removed and disposed of properly.

Under-Dispenser Containment (UDC)

Under-dispenser containment or UDC is a containment basin underneath the dispenser. It is designed to collect leaks from the dispenser and piping within or above the UDC, preventing the leaked product from reaching soil or groundwater. Similar to a pump sump, a UDC must be liquid-tight on its sides, bottom, and at any penetrations. It must allow for visual inspection and access to the contained components or be periodically monitored for leaks from the dispenser system.

Rule 9.14 (E) All newly installed dispenser systems are required to have UDCs. A dispenser system is considered new when both the dispenser and the equipment needed to connect the dispenser to the underground storage tank system are installed. That equipment may include check valves, shear valves, unburied risers or flexible connectors, or other transitional components that connect the dispenser to the underground piping.

Chapter 5. Corrosion and Cathodic Protection

Corrosion and Cathodic Protection for Tanks and Piping

A tank made of corrodible material, such as steel, will corrode as the tank chemically reacts with oxygen, water, and the acidity present in the soil surrounding the tank. The process can corrode metal from the tank at a rate of 20 microns per year depending upon soil conditions. Excessive corrosion will eventually cause a tank to leak. All regulated tanks that are underground and routinely contain regulated substances must be protected from corrosion. The same is true for regulated piping and includes ancillary equipment such as swing joints, flexible connectors, and other equipment.

Corrosion Protection for Tanks

Fiberglass-Reinforced Plastic Tanks

Fiberglass Reinforced Plastic (FRP) tanks meet the corrosion protection requirements without additional equipment, operation, or maintenance as they are made from non-corrodible material.

Jacketed or Clad Tanks

Some steel tanks are coated or jacketed on the outside with insulating material to prevent corrosion. A common tank type, the sti-P3® tank, is a tank coated with a suitable dielectric material which does not conduct electricity and isolates the tank from the surrounding soil. Tanks clad with a non-corrodible material meet the corrosion protection requirements without additional equipment, operation, or maintenance.

Cathodically-Protected Tanks

Cathodic protection of a tank involves the use of sacrificial anodes or an impressed electrical current system to chemically prevent corrosion of metal from occurring.

Internally-Lined Tanks

Some steel tanks use internal lining for corrosion protection. The internal lining acts as a secondary barrier to contain stored product in the event that the external layer of the tank corroded away. These tanks may or may not also use cathodic protection. In many cases, unprotected steel tanks in Rhode Island have been upgraded with cathodic protection and internal lining in order to meet the December 22, 1998 mandatory corrosion protection deadline. Internal lining is no longer an accepted method of corrosion protection.

The owners and operators must permanently close a tank if the tank:

- The tank is using internal lining as its sole method of corrosion protection
- The tank fails a periodic internal lining inspection
- The tank is not able to be repaired according to code of practice

Corrosion Protection for Piping

All regulated piping that is in contact with the ground (soil) and routinely contains product must be protected from corrosion by:

- Effectively isolating the metal component from direct contact with the ground (isolate the metal component so it is not in contact with the soil).
- Cathodically protecting metal components in contact with the ground.

Corrosion Protection requirements apply to ancillary equipment such as swing joints, flexible connectors, metal joints, and other connections associated with piping. Piping made of non-corrodible material meets the corrosion protection requirements without additional equipment or operation and maintenance.

Types of Corrosion Protection Systems

Impressed Current Cathodic Protection System

An impressed current system electrifies anodes surrounding the metal components of a tank to chemically halt corrosion. The diagram below illustrates impressed current cathodic protection.

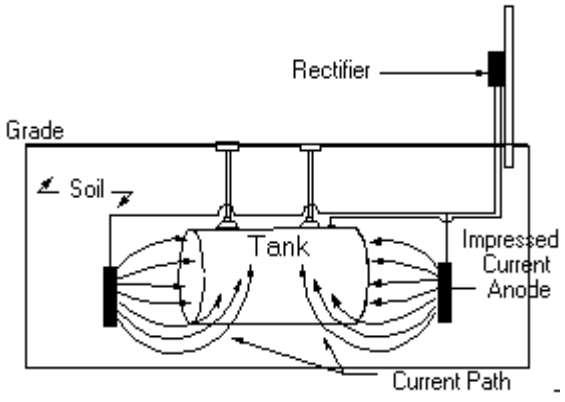


Figure 11 Impressed Current System Diagram and Example Rectifier

Sacrificial Anode Cathodic Protection System

A sacrificial (galvanic) anode system utilizes anodes that are attached underground to metal UST components. The anode will corrode before the UST's metal components because of its strong electric potential. The anode sacrifices itself to save the UST from a high rate of corrosion.

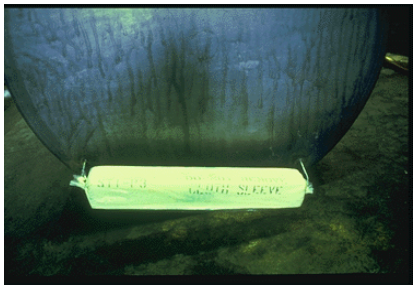


Figure 12 Sacrificial Anode Attached to UST

Interior Lining

Some steel tanks use interior lining as a method of corrosion protection. A layer of lining material is sprayed onto the interior between 125 millimeters and 100 millimeters thick. Interior lined tanks must undergo an internal inspection to ensure the lining is an acceptable thickness. Pass/fail criteria for interior lining inspections shall be in accordance with the requirements of NLPA Standard 631. The inspection results must be maintained at the facility with the lined tank.

Corrosion Protection System Tests

Tests inspections of corrosion protection systems ensure the system is operating properly. An operator will often find out if a cathodic protection system is not functioning properly during an inspection or with the results of a survey.

Impressed Current Operational Tests

An impressed current operational survey (test) must be conducted in accordance with NACE Testing standards by a qualified tester. The survey must include:

- Measurement of anode-to-structure resistance and structure-to-electrolyte resistance
- Measurement of structure-to-reference electrode potential
- Verification of the accuracy of the display module readings
- Adjustment of rectifier as required
- Submission of written report of findings, to be kept in accordance with permanent record keeping requirements

Adequate cathodic protection is being provided by the system if the measurement of Structure-to-Reference electrode potential is -850 millivolts or more negative. During testing, the reference electrode used to measure electrical potential must be placed in soil or backfill. Measurements taken through concrete or asphalt are not considered to be valid. When surveying product piping for electrode potential, measurements must be taken at both ends of the pipe and every ten (10) feet along the pipe.

Sacrificial (Galvanic) Anode Operational Tests

The operational survey of a sacrificial anode cathodic protection system should by conducted by a qualified tester and determine that the tank-to-soil potential reading relative to copper is -850 millivolts or more negative. The reference electrode must be placed in soil or backfill. Measurements taken through concrete or asphalt are not considered to be valid.

Operator Rectifier Inspection

If a facility is using an impressed current system as cathodic protection for its UST system, then an operator must also additionally conduct an inspection of the system every 60 days. The following is included in the inspection:

- Read and record the rectifier DC current output
- Read and record the rectifier DC voltage output
- Inspect the rectifier for physical damage

A log of the rectifier DC current and voltage output must be maintained at the facility.

All corrosion protection systems must be tested and inspected according to the schedules set forth in the UST Regulations; these requirements are summarized in Table 5 of this document.

Table 5 Corrosion Protection Systems Testing Schedules and Requirements

<table>
<tr><th>Type of Protection System</th><th>Initial Testing</th><th>Testing Schedule</th><th>Test Performed by?</th><th>Failed/Inconclusive Test</th><th>Recordkeeping Requirements</th></tr>
<tr><td>Impressed Current Cathodic Protection</td><td>Within 6 months of installation or repair</td><td>Complete operational survey at least every 2 years following installation, and with construction or maintenance activities</td><td>Qualified cathodic protection tester</td><td rowspan="4">Tester reports failed test to DEM within 24 hours and results submitted within 15 days

AND

Repair within 30 days of failed test.
If satisfactory repairs are not made after 30 days, UST temporarily closed. After 180 days, UST permanently closed</td><td rowspan="4">Permanent Records</td></tr>
<tr><td>Sacrificial Anode Cathodic Protection</td><td>Within 6 months of installation or repair</td><td>Complete operational survey at least every 3 years following installation, and with construction or maintenance activities</td><td>Qualified cathodic protection tester</td></tr>
<tr><td>Interior Lining</td><td>Within 10 years after lining installed</td><td>Every 5 years thereafter</td><td>Qualified personnel and in accordance with NLPA Standard 631</td></tr>
<tr><td>Cathodic Protection AND Interior Lining</td><td colspan="2">Cathodic protection to be tested and maintained as outlined above; internal inspection of lining NOT required with cathodic protection system in place</td><td>Qualified cathodic protection tester</td></tr>
</table>

Chapter 6. Leak and Spill Response

Leak and Spill Response Actions

All owners/operators must report, investigate, and clean up spills (of any size), leaks, or releases in accordance with Rule 12 of the UST Regulations, as well as any other applicable provisions of local, state and federal statutes, rules and regulations. The requirements apply to all new, existing, and abandoned tank facilities at which petroleum products and/or hazardous materials are stored underground.

Responding to Suspected or Confirmed Releases

An operator of a UST system should be aware of the circumstances that signify a suspected leak in the UST system. Listed below are some common symptoms that would alert an operator to a release:

- A leak alarm emitting from the tank monitor. There are many sensors placed throughout the UST system, and if they detect a leak, the tank monitor will alarm audibly and visually
- Erratic operation of a dispenser; the line leak detector in a UST will slow the flow rate of dispensed fuel in the case of a detected leak. The operator should recognize slow-flowing fuel as the line leak detector responding to a leak
- Unexplained loss of product from the tank discovered during inventory reconciliation (See Release Detection requirements)
- A UST failed its monthly 0.2 GPH leak test (See Release Detection requirements)
- Failed tightness tests of primary or secondary tank and pipes

If you think you may have a release or your release detection equipment indicates a suspected release, you need to take the following steps, as appropriate.

Step 1: Stop the Release

Take immediate action to prevent the release of more fuel:
Turn off the power to the dispenser and “bag” the nozzle.
Make sure you know where your emergency shutoff switch is located.
If necessary, empty the tank to prevent further contaminating the site. You may need the assistance of your supplier or distributor.

Step 2: Call for Help

Contact your local fire or emergency response authority. Make sure you have these crucial telephone numbers prominently posted where you and your employees can easily see them.

Step 3: Contain the Spill or Overfill

Contain, absorb, and clean up any surface spills or overfills. You should keep enough absorbent material at your facility to contain a spill or overfill of regulated substances until emergency response personnel can respond to the incident.

The suggested supplies include, but are not limited to, the following:

- Containment devices, such as containment booms, dikes, and pillows
- Absorbent material, such as kitty litter, chopped corn cob, sand, and sawdust. Be sure you properly dispose of used absorbent materials.
- Mats or other material capable of keeping spills or overfills out of nearby storm drains
- Spark-free flash light
- Spark-free shovel
- Buckets
- Reels of "caution tape," traffic cones, and warning signs
- Personal protective and safety gear (fuel-resistant gloves)

Step 4: Identify Any Hazards

Identify any fire, explosion, or vapor hazards and take action to neutralize these hazards.

Step 5: Report to Authorities

Owners/operators should immediately report all confirmed and suspected leaks or releases from UST systems to:

- The appropriate local fire official
- DEM 24-hour Emergency Response Hotline at (401) 222-3070
- DEM UST Management Program at (401) 222-2797
- The local public water supplier in the event that a spill occurs in a public supply watershed or in a wellhead protection area for community water supply wells.

Persons reporting leaks or releases to the Department must provide their name and number, the location of the release, the name of the facility, the date and time of the release, the type and amount known of the material released, and the name and phone number of the potential responsible party if known.

Confirmed Releases: Initial Abatement Actions

Unless directed by the Department to do otherwise, the owner/operator shall take the following actions when a confirmed release occurs:

- Within 24 hours or as soon as practical, arrange for the complete removal of the contents of the UST system in order to prevent further releases into the environment
- Contain all discharged oil, oil-contaminated debris, and hazardous waste. Such materials should be handled, stored and disposed of in accordance with the RI DEM *Oil*

Pollution Control Regulations and other applicable state and federal statutes, rules, and regulations
- Assess fire, health and safety hazards and take reasonable steps to mitigate any such hazards; local fire officials should be consulted
- Inspect any exposed releases and take steps to prevent the migration of any released regulated substance into the environment, including soils, groundwater, or surface waters
- Investigate for the presence of free product and, if present, initiate free product removal consistent with Rule 12.06 of the UST regulations; and
- Carry out other actions as directed by the Department pursuant to the *Oil Pollution Control Regulations*, or other local, state and federal statutes, rules and regulations

Free Product Removal

At sites where free product is present due to a confirmed release, the owner/operator must remove the free product in a manner that minimizes the spread of contamination. Discharges and by-products from free product recovery and disposal operations must be treated or disposed of in compliance with all applicable state and federal statutes, rules, and regulations.

Responding to a Failed Tank or Line Tightness Test

When tank and/or line tightness test results indicate failure or are inconclusive, the tester must notify the Department immediately. The owner/operator must submit the failed/inconclusive test within 15 days of the test date and also submit a Release Characterization Report. Other steps to follow for tanks and/or lines that test as fail or inconclusive are:

- The owner/operator must have the contents of the UST system completely removed with 24 hours; or
- The owner/operator must make arrangements for a retest of the UST system, and the retest must be conducted within three (3) days. If the UST system retest results indicate a failed or inconclusive test, the owner/operator must have the contents of the UST system completely removed within 24 hours of the retest.
- Lines that test as failed or inconclusive shall be taken out of service immediately.
- Containment of all discharged oil, oil-contaminated debris and hazardous waste is required. Such materials shall be handled, stored and disposed of in accordance with the RI DEM *Oil Pollution Control Regulations* and other applicable state and federal statutes, rules and regulations.

A Release Characterization Report also may be required by the Department when unusual operating conditions at a facility create reasonable suspicion of a leak or release.

Release Characterization Report

Within seven (7) days of confirmation of a leak or release of any volume, or a failed tank and/or line tightness test, the owner/operator must submit a Release Characterization Report to the Department summarizing the events related to the leak or release from a UST or UST system and describing the results of initial abatement steps. A Release Characterization Report is not required when the release is documented in a Closure Assessment Report.

At a minimum, the Release Characterization Report should include the following information:

1. Name and address of the facility
2. Data on the nature of the release and the estimated quantity of the release
3. All actions taken to stop the release
4. Available data on the site (land use, groundwater classification, on-site or nearby wells, etc.)
5. Available information on neighboring properties (names, addresses, etc.)

Chapter 7. Compatibility

Biofuel/Alternative Fuel Compatibility

In recent decades, the use of alternative fuels in the United States is growing, and federal mandates require a significant increase in biofuel production. Many retail facilities, such as gas stations and private fueling facilities, already store and dispense ethanol and biodiesel in their UST systems. Ethanol and biodiesel are commonly blended with gasoline and diesel, respectively, and are referred to by their biofuel percentage of the blend: E10, E15, or B20.

Each alternative fuel or alternative fuel blend has unique chemical characteristics that may be different from those of purely petroleum derived gasoline or diesel fuel. Those chemical characteristics may affect how the fuel interacts with UST system materials. Compatibility is the ability of two or more substances (for example the tank or piping material and petroleum) to maintain their respective physical and chemical properties upon contact with one another. It is imperative to ensure that the substances stored in a UST is compatible with the UST system.

If UST materials are not compatible with substances stored in USTs, the substances will degrade the UST and product will leak into the environment. Prior to storing alternative fuels, UST owners and operators should ensure that their UST system is made of or lined with materials that are compatible with the substance stored in the UST system.

Changes in Product Stored: 10%+ Ethanol or 20%+ Biofuel

Beginning on October 13, 2015 owners and operators must notify the Department at least 30 days prior to switching to one of the following:

- Regulated substances containing greater than 10 percent ethanol;
- Regulated substances containing greater than 20 percent biodiesel; or
- Any other regulated substance with compatibility issues identified by the Department.

In addition, owners and operators storing one of these regulated substances must demonstrate compatibility of the UST system (this includes the tank, piping, containment sumps, pumping equipment, Release Detection equipment, spill equipment, and overfill equipment) by using one of the following options:

- Certification or listing of UST system equipment or components by a nationally recognized, independent testing laboratory for use with the regulated substance stored
- Equipment or component manufacturer approval – this approval must be in writing, indicate an affirmative statement of compatibility, specify the range of biofuel blends the equipment or component is compatible with, and be from the equipment or component manufacturer

Owners and operators must maintain records that document compliance with the compatibility requirement. These records must be maintained for as long as the UST system is used to store one of these regulated substances identified above.

Chapter 8. Closure Requirements

Rule 13.02 (A) Abandonment of USTs

The abandonment of any UST system in Rhode Island is prohibited. All UST systems must be properly closed according to the requirements of the UST Regulations and applicable codes of practice (e.g. American Petroleum Institute "Closure of Underground Petroleum Storage Tanks")

Owners/operators who wish to **temporarily close** or **permanently close** a UST system must follow specific guidelines when doing so. UST systems that remain in temporary closure must meet certain requirements for leak detection, corrosion protection, and securing of all openings in the UST system.

Temporary Closure of UST Systems

Any regulated UST system that is being taken out of service for any length of time is required to receive written approval from DEM. Temporary closures are limited to 180 days, however extensions are allowed under extenuating circumstances.

Steps to Temporary Closure Approval

1. Ensure the UST facility meets the all minimum requirements for operation and that:
    a. Tank contents have been pumped down to less than an inch of liquid product
    b. All fill lines are capped and secured against tampering
    c. Manways, pumps, and other components are secured
    d. Suction lines are pumped out
    e. Vent lines are open
    f. Records regarding UST location and size, date on which USTs were taken out of operation, and procedures used to maintain the facility are kept.
2. Continue to comply with all general operating requirements, including but not limited to:
    a. Maintenance of corrosion protection
    b. Release reporting and investigation
    c. Leak and spill response procedures
3. The owner of the facility must complete the "Temporary Closure Application" located on our website at http://www.dem.ri.gov/programs/benviron/waste/pdf/tempapcl.pdf
4. All appropriate documentation required, including pump out documentation, must be included with the application to be considered
5. Send the application to DEM no later than 15 days prior to the anticipated date of removal from service.

Permanent Closure of UST Systems

The removal, filling, or other permanent closure of any UST or UST system that is required to be registered with the Department without prior review and approval by the Department is

prohibited. The removal from service or other temporary closure of any UST that is registered or required to be registered without prior review or approval is prohibited.

Procedure for Permanent Closure of UST systems

All owners/operators that have removed any underground storage tank(s) from operation for more than 180 days and have not been granted an extension of temporary closure by the Department, or who have abandoned any UST, or who desire to permanently close an UST, must comply with the procedures for permanently closing underground storage tanks.

Step One: Submit Closure Application to DEM

Owners/operators wishing to close one or more USTs must complete and submit a permanent closure application to the DEM Permit Application Center (PAC) at least ten (10) days prior to the date the UST is to be permanently removed from service. The application must have original signatures from the appropriate fire department official and the tank owner. A closure fee of $75 per tank and any outstanding registration fees must also be included with the application.

Step Two: DEM Review of Closure Application

The PAC will review the application for administrative completeness. The application is then sent to the DEM UST Management Program for technical review. Once all reviews are finished and the application information satisfies DEM requirements, the owner/operator, contractor, and consultants listed on the application will be contacted by DEM to schedule a date for the UST closure.

Step Three: Scheduling a UST Closure

The closure will be scheduled for a certain date, and a DEM inspector is assigned to oversee closure activities and answer any questions that may arise. A UST Closure Approval Letter is issued by DEM and includes all of this information.

Step Four: UST Closure

The owner/operator may permanently close USTs by removing the tank(s) and related facility components, or if permitted, by closing the UST(s) in place on the scheduled date only. The DEM inspector must be contacted on the scheduled date and will observe the tank removal and soil/groundwater conditions to assess the potential for releases. The closure process and the disposal of a tank's contents and any residual matter must be in accordance with applicable federal, state, and local statutes, ordinances, rules and regulations.

Closure Assessment Reports

A closure assessment report documents the removal of UST systems and site conditions observed, screened, and/or sampled during the closure process. A closure assessment report must be completed under the supervision of a licensed professional engineer or geologist. The closure of the following UST systems require the preparation of a closure assessment report:

- Motor fuel UST systems (diesel, gasoline, etc.) of any size serving a commercial property
- Hazardous materials UST systems of any size serving any type of property

- Motor fuel UST systems greater than or equal to 1,100 gallons serving a residence or farm

In addition, the owner/operator of any permanently closed UST may be required to have a closure assessment performed to determine if a release has occurred.

Certificate of Closure

Following DEM inspection of a closure or receipt of a Closure Assessment Report, the Department shall issue a Certificate of Closure. DEM may require additional actions be taken if there is evidence of a release before issuing a Certificate of Closure.

Closure Recordkeeping

Following UST(s) closure, closure records must be kept three (3) years beyond the operational life of the facility.

Chapter 9. Financial Responsibility

Financial Responsibility Background

Financial responsibility (FR) is the ability to pay for clean-up or third-party liability compensation caused by leaking USTs. Financial responsibility is a requirement of the Federal government (EPA 40 CFR 280). To be in compliance, an owner/operator must demonstrate FR for all regulated underground storage tank systems that store petroleum (with the exceptions given below). If a spill occurs, financial responsibility will ensure that someone can pay clean-up costs and ensure that remediation activities will begin as soon as possible. Owners/operators must demonstrate at least $1,000,000 in financial responsibility for each leaking UST occurrence.

Tanks that do not require owner/operator financial responsibility include the following:

- USTs used solely for the storage of heating or fuel oils consumed on the facility premises;
- Farm or residential USTs with a capacity of 1,100 gallons or less and used solely for the storage of motor fuel which is not for resale;
- UST facilities owned by the state, federal or municipal government which, consistent with EPA requirements, have been deemed to be inherently capable of meeting financial responsibility requirements.

Scope of Coverage

The appropriate scope of coverage that your FR mechanism (or combination of mechanisms) must include different types of obligations and releases.

Types of Obligations

FR must cover the costs of corrective action and third-party compensation. Third-party compensation includes bodily injury and property damage.

Types of Releases

Owners or operators must demonstrate FR for taking corrective action and for compensating third parties for bodily injury and property damage caused by accidental releases. FR does not cover intentional releases. An accidental release may be sudden or non-sudden. All releases, whether sudden or non-sudden, must be covered. This is necessary to ensure adequate coverage for USTs in particular, because it is often difficult to determine whether an UST release is sudden or gradual. Therefore, to ensure adequate protection of human health and the environment both types of coverage are necessary.

Financial Responsibility Mechanisms

UST owners/operators must have an appropriate FR mechanism at their facility. The following mechanisms may be used to comply with the FR requirements. You may use one or a combination of these mechanisms. These mechanisms must provide a "per-occurrence" coverage of at least $1 million (the amount of money that must be available to pay for the costs of clean up for each leaking UST).

RI DEM UST Fund

The Rhode Island Underground Storage Tank Financial Responsibility Fund serves as the main mechanism for demonstrating FR for UST systems in Rhode Island subject to FR requirements. The Fund operates as a reimbursement program for expenses related to environmental cleanup and third-party compensation costs. To be eligible, facilities must be in compliance with the UST regulations and must incur a $20,000 deductible expense. The Fund will pay up to $1 million per release. For more information, see the Fund's website at http://www.dem.ri.gov/ustboard/index.htm.

Financial Test of Self-Insurance

This option involves no source of funding other than the owner or operator. Those who pass the test are expected to be able to pay for their corrective action and third-party compensation obligations. How these firms arrange to pay their obligations is solely their decision. The financial test must demonstrate a tangible net worth of at least $10 million.

Corporate Guarantee

An owner/operator may secure a corporate guarantee from another eligible firm. The provider of the guarantee has to pass one of the financial tests listed in the regulations.

- Insurance coverage - buy insurance from an insurer or a risk retention group.
- A surety bond - obtain a surety bond, which is a guarantee by a surety company that it will satisfy FR obligations if the owner or operator does not.
- A letter of credit - obtain a letter of credit, which obligates the issuer to provide funding for corrective action and third-party compensation.
- A trust fund - set up a fully-funded trust fund administered by a third-party to pay for corrective action and third-party compensation.

Personal savings account are not a valid financial responsibility mechanism.

Local Government FR Mechanisms

- A bond rating test - A local government may demonstrate (or guarantee) FR by passing a bond rating test.
- A financial test - A local government may demonstrate (or guarantee) FR by passing a financial test.
- A guarantee - A local government may obtain a guarantee from another local government or the state.
- A dedicated fund - A local government may demonstrate (or guarantee) FR by establishing a fund.

Chapter 10. Notification and Recordkeeping

Record Notification Requirements

Transfer of UST Facility Ownership/Registration

The owner of a UST facility must provide written notice to DEM of their intent to sell the facility to a new owner at least 30 days prior to the anticipated transfer of ownership date.

Changes to UST Facility Registration Information

Owners/operators must report any changes on the original registration form (including a change in product stored) to DEM within 10 days of that change.

Recordkeeping Requirements

Permanent Records

These records must be kept for a minimum of 3 years beyond the operational life of a facility:

- The UST facility registration application
- All records of modification or repairs to the UST facility
- Annual test results of leak detection equipment/systems
- Results of monitoring well checks
- UST closure activity documentation (closure assessments, site investigations, etc.)
- All records of leaks, spills, site investigations, and remedial activities
- Tank/line tightness test results
- All records pertaining to the operation and maintenance of corrosion protection methods
- Equipment warranties and manufacturer checklists

Routine Records

These records must be kept for a minimum period of 3 years from the date made:

- Records of all calibration standards and maintenance performed
- Records of strip charts, electronic recall device and/or manual recordings for any continuous monitoring system
- Results from monthly test of continuous monitoring system
- Operator monthly inspection checklist
- Daily and monthly inventory recordkeeping
- Records of annual shear valve tests

Chapter 11. Delivery Prohibition

UST Facility Violations Subject to Delivery Prohibitions

USTs located at a facility may be deemed ineligible for delivery, deposit, or acceptance of petroleum or hazardous materials if the facility has one or more of the following violations:

- Failure to have the required spill prevention equipment installed
- Failure to have the required overfill protection equipment installed
- Failure to have the required Release Detection equipment installed
- Failure to have the required corrosion protection equipment installed

Delivery prohibition may also apply to a facility if the owner/operator fails to complete corrective action and submit documentation within 60 days following written notice from the Department of one or more of the following violations:

- Failure to properly operate and/or maintain Release Detection equipment, perform tank or pipeline tightness testing, and/or compile inventory control records
- Failure to properly operate and/or maintain spill protection, overfill prevention, or corrosion protection equipment
- Failure to maintain Financial Responsibility and the Regulations promulgated under the "Rhode Island Underground Storage Tank Financial Responsibility Act"
- Failure to register or maintain registration including payment of all required fees; or
- Failure to obtain or maintain required certification for Class A, Class B and/or Class C operator(s)

Delivery Prohibition Red Tag Program

Upon classification of an UST system as ineligible for delivery, deposit, or acceptance of petroleum or hazardous materials, the Department will determine and record the inventory of petroleum or hazardous materials remaining in each of the USTs located at the facility and a red tag will be affixed by the Department to the fill pipe(s) of all USTs located at the facility. The tag or device must be:

- Located on the fill pipe of the UST;
- Affixed in a manner that it is easily and immediately visible to the product deliverer; and
- Affixed in manner that it cannot be removed and reattached without obvious visual evidence.

No owner, operator, product deliverer or other person shall deliver, deposit, or accept petroleum or hazardous materials into an UST which has a red tag affixed to the fill pipe.

USTs that are not brought into compliance, including submission of all required notification and documentation to the Department within 30 days after a red tag has been affixed, shall be immediately placed into temporary closure.

USTs that are not brought into compliance, including submission of all required notification and documentation to the Department within 180 days after a red tag has been affixed, shall be immediately permanently closed.

APPENDICES

Appendix A: Glossary

Abandonment
The action of taking a UST or UST system out of operation for a period of greater than 180 consecutive days without meeting the closure requirements put forth by the Department.

The relinquishment or termination of possession, ownership, or control of underground storage tanks by vacating or by disposition, without meeting the closure requirements put forth by the DEM.

Airport Hydrant Fuel Distribution System
A UST system which fuels aircraft. In a typical Airport Hydrant Fuel Distribution System, a pipeline, barge, rail car, or other motor fuel carrier deposits fuel into a tank where it flows under high pressure through large diameter piping into one or more hydrants (fill stands). The aircraft is fueled from product stored in the hydrants.

Automatic Line Leak Detector
A leak detection device installed in a pressurized piping system. The device detects a drop in pressure from a leaking pipe and then halts product flow through the piping, preventing product from being released into the environment. An automatic LLD may operate either mechanically (using a pressure valve) or electronically (using an electronic detection element). All underground pressurized piping systems must have an automatic LLD.

Class A operator
A certified operator, designated by owner of the facility, responsible for the overall operation and maintenance of the UST facility. An Class A operator receives their certification by taking and passing the Rhode Island ICC exam for UST operators, which demonstrates their knowledge of the statutory and regulatory requirements relating to the permitting of USTs.

Class B operator
A certified operator who is designated by owner of the facility to implement the daily aspects of operation, maintenance, and record keeping of the UST facility. A Class B operator receives their certification by taking and passing the Rhode Island ICC exam for UST operators.

Class C operator
A certified operator, designated by the owner of the facility, whose primary responsibility is to respond to alarms or emergencies caused by spills or releases from a UST system at the facility. A Class C operator receives their training from a certified Class A operator.

Double Walled Tanks
A tank comprised of two complete inner and outer shells that provide both primary and secondary containment of product.

Double Walled Piping
Piping comprised of two complete inner and outer shells that provide both primary and secondary containment of product.

Department of Environmental Management
"DEM" or the "Department of Environmental Management" or the "Department" means the Rhode Island Department of Environmental Management and/or any office thereof.

Field-Constructed Tank
A tank that is fabricated in the field. A field-constructed tanks may be steel, fiberglass, or concrete and may range from conventional sizes of 500 to 10,000 gallons to very large sizes of greater than 2 million gallons. The operation and maintenance requirements Field-constructed tanks may differ from those for conventional UST systems.

Ground Water Monitoring Wells
Groundwater monitoring wells are installed at a facility to collect groundwater samples. Samples are analyzed to measure the size and extent of a release from a UST. The number, location, and depth of the wells are determined by the physical conditions of the site and the degree of contamination.

Hazardous Materials
Substances required to be handled with additional care because of the risk they pose on the environment. Refer to the UST Regulations for an expansive definition of the substances deemed to be Hazardous Materials.

Interstitial Space
The space between the inner and outer walls found in double walled tanks and piping. The interstitial space is often monitored with sensors to detect the presence of product, which would indicate a leaking system.

Leak
A loss or gain of 0.05 gallon per hour or more of fluid from a UST system.

Permanent Closure
The action of permanently removing a tank from service either by removing the tank from the ground or by filling the tank with a sand and concrete filler to ensure that it is not used again. To permanently close a tank, the UST owner must follow by the tank closure procedures put forth by DEM which can be found in this manual under "Procedure for Permanent Closure".

Pressurized Piping system
A piping system with submersible pump located directly above the tank that delivers product under pressure from the tank to the dispenser at a typical pressure of 30 pounds per square inch or higher.

Release
Any spilling, leaking, pumping, pouring, injecting, emitting, escaping, leaching, or disposing of any material stored in an underground storage tank system subject to these regulations into groundwater, surface water, soil, air or any other environmental media.

Routine Records
Records which are required to be maintained at the facility or another approved location for a minimum period of three years from the date acquired. Routine records are those results, readings, or documentation regularly accumulated during the proper operation of a facility and include paperwork such as operator inspection checklists, monthly inventory records, equipment calibration, testing results, and maintenance records.

Shear Valve
A valve installed on the fuel supply line underneath the dispenser which stops all flow of product in the case of an impact or vehicular collision with a fuel dispenser, preventing the risk of a catastrophic release.

Single Walled Piping
Piping comprised of only a single shell.

Single Walled Tanks
A tank comprised of only a single shell.

Spill
A loss of petroleum product or hazardous material in a manner other than a leak, such as a delivery or while fueling, such that the product or material is likely to enter groundwater, surface water, soil, air or any other environmental media.

Submersible Turbine Pump
A pump found in pressurized piping systems that moves product from the tank to the dispenser. A submersible turbine pump is often chosen at fueling stations because of its ability to deliver product at a high flow rate to multiple dispensers. It can be found above the tank inside the sump.

Suction System
In a suction piping system, a pump located at the dispenser, draws product from the tank at a vacuum of three (3) to five (5) pounds per square inch.

Tank Pad Observation Wells
Tank pad observation wells are used specifically to determine the elevation of the water table around the tank. They are installed within the tank pad and extend one to two feet below the bottom of the tank.

Temporary Closure
The status of a tank which has been removed from service for a period of 180 days (i.e. The tank is in "Temporary Closure") by following the temporary closing procedure found in this manual under "Temporary Closure of UST systems".

The action of removing the tank from service for a period of 180 days by following the temporary closing procedure found in this manual under "Temporary Closure of UST systems" (i.e. The tank has been "Temporarily Closed"). Temporary Closures often occur during the dormancy period when a fueling facility ownership is being transferred. Temporary Closures may also be required by the DEM when operational conditions indicate a leak or release.

Under Dispenser Containment
A containment basin located underneath the dispenser designed to contain product released from leaking valves, piping, or piping connections.

Underground Storage Tank
Any underground tanks whose volume is 10 percent or more beneath the surface of the ground. The term includes the tank and its associated components used to contain petroleum product or hazardous material. The term shall also include piping whose volume is 10 percent or more beneath the surface of the ground.

Appendix C: RI DEM Forms

UST Registration Form

Monthly Inspection Checklist for Class A/Class B Operators

Class A/Class B Operator Registration Form

Temporary Closure Application

Permanent Closure Application