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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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.

PLEASE NOTE:
This manual is intended as a broad overview only, and you should not rely solely on this manual for your knowledge of UST operational requirements and emergency response procedures.

It is highly recommended that you study and understand the contents of this manual BEFORE you take your Class A/B operator exam. While this manual contains the information needed to answer many of the questions you may be asked, please remember the exam is timed and you may not have enough time to complete the exam if you have to look up the answer to every question! There may also be questions that are not covered in this manual, and therefore we recommend you also bring a copy of the UST Regulations as an information source as well.
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Chapter 1: Introduction

This operator’s manual is designed to help owners and operators of underground storage tanks (USTs) comply with the Rules and Regulations for Underground Storage Facilities Used for Regulated Substances and Hazardous Materials (“UST Regulations”) which became effective on November 20th, 2018, as well as to be used as a resource for Class A and Class B operators of UST Facilities. This manual is intended to provide a broad overview of the requirements associated with owning and operating an UST system, and is not meant to be all inclusive or cover every requirement or scenario.

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 critical to your success as an owner or operator.

What is a Certified Operator?

The 2005 Energy Policy Act, enacted by President George W. Bush, included a provision that requires all federally-regulated UST system operators to be properly trained and certified to demonstrate adequate knowledge of the safe operation of an Underground Storage Tank system. This resulted in the creation of the UST Operator Program by U.S. EPA, which created three types of UST system operators

- **Class A Operator**: Has primary responsibility for the overall operation and maintenance of a UST system and has an understanding of the statutory and regulatory requirements that relate to the permitting of the facility
- **Class B Operator**: Implements applicable regulatory requirements and oversees the day to day operation of the facility, including the operation, maintenance, and recordkeeping of the UST system
- **Class C Operators**: Responsible for the initial response to alarms, release indicators, or other emergencies caused by spills or releases from a UST system at the facility. This person or individuals must be trained by the Class A operator and have their knowledge of emergency response tested on a routine basis.

Additional information on the Certified operator program is located in Chapter 2.

UST Regulation Applicability

An **underground storage tank system** or **underground storage tank facility** may consist of one or more underground storage tank(s), product or vapor piping, as well as all attached components, ancillary equipment, and containment systems. In situations where a tank or
piping is partially buried, any system where ≥ 10% of the system volume is located beneath the surface of the ground is considered part of an underground storage tank system.

**What USTs are regulated?**

Unless otherwise noted, the Rhode Island UST Regulations apply to:

- All existing, proposed, and new underground storage tank facilities at which regulated substances and/or hazardous materials, including petroleum products, are or have been stored or used.
- Any UST system that serves industrial, commercial, educational, agricultural, governmental, institutional, residential, or other purposes.
  - The only exception to this is that USTs less than 1,100 gallons containing heating fuel used solely for heating purposes located at single, double, or triple unit residences are exempt from these regulations.
- Underground storage tank systems containing gasoline, diesel, waste oil, aviation fuels, lube oils, and any other hazardous or regulated materials are regulated regardless of size or location.
- UST systems which have been abandoned, removed from service, emptied, or are otherwise no longer in use are still regulated.

**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.

What is a Federally Regulated UST?

A federally regulated UST is any UST or UST system that contains a material that is Federally regulated. While this can include many things, for the majority of users this can be simplified to say any fuel used in a motor is federally regulated, while fuels used for heating purposes are not.

<table>
<thead>
<tr>
<th>NOT Federally Regulated</th>
<th>Federally Regulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>All grades of heating oil</td>
<td>Gasoline (all grades and types)</td>
</tr>
<tr>
<td></td>
<td>Diesel</td>
</tr>
<tr>
<td></td>
<td>Kerosene</td>
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<tr>
<td></td>
<td>Aviation Fuels</td>
</tr>
<tr>
<td></td>
<td>Biofuel Blends</td>
</tr>
<tr>
<td></td>
<td>Motor Oils</td>
</tr>
<tr>
<td></td>
<td>Lube Oils</td>
</tr>
<tr>
<td></td>
<td>Most other hazardous substances</td>
</tr>
</tbody>
</table>

Some substances are not Federally regulated, but, **ARE regulated at the State Level!** One such example of this is heating oil – while it is not Federally regulated, it **IS** regulated by State of Rhode Island

**UST Registration**

All USTs that contain any regulated or hazardous substance (e.g., gasoline, diesel, kerosene, aviation fuel, biofuels, solvents, etc.), heating fuels for distribution, heating fuels at any business, commercial or industrial property, agricultural facility, farm, municipality, government property, schools, or other system serving more than 3 units on a residential property are required to be registered with DEM. The only USTs that are not required to be registered are those that store heating fuel for on-site use that are smaller than 1,100 gallons and located at a one, two, or three unit residence.

Registration is required to be renewed on an annual basis by paying a registration fee of $100 per tank. Failure to pay the annual registration fee will result in the addition of cumulative late fees, and the UST registration may be revoked and the facility will be ineligible for reimbursement from the UST financial responsibility fund in the event of a release.
<table>
<thead>
<tr>
<th>Is it required to be Registered?</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST of any size containing any motor fuel (e.g., gasoline, diesel, aviation fuel, biofuels) at any location</td>
</tr>
<tr>
<td>UST containing heating fuel for distribution</td>
</tr>
<tr>
<td>UST containing heating fuel at a business, school, agricultural facility, farm, industrial or commercial property, or municipal or other State or Federal government properties</td>
</tr>
<tr>
<td>UST containing used, recycled, or new motor or lube oil</td>
</tr>
<tr>
<td>UST containing heating fuel at a residential property with 3 or more units</td>
</tr>
<tr>
<td>UST containing a hazardous or regulated substance of any size</td>
</tr>
<tr>
<td>A UST capable of holding $\geq 1,100$ gallons of heating fuel at a single or two family unit</td>
</tr>
<tr>
<td>A UST $&lt; 1,100$ gallons containing heating fuel at a single or two family residential property</td>
</tr>
</tbody>
</table>

**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 hazardous or regulated materials. The majority of systems in Rhode Island are used for storage, distribution, and direct consumption of petroleum products, the most common example of this are gasoline dispensing facilities (e.g., gas stations), or underground heating oil tanks which directly connect to a burner, furnace, heater, or boiler to provide heat to a building.

Despite the similarities, each system, even for the same use, is unique and may contain a mixture of components, materials, or a design that may not exist anywhere else in the State.
and have slightly different requirements than a similar facility located right next door. Therefore, it is important that the owner and operator know the component type specific installed and in use 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.

**UST Construction Types**

USTs are available as single-walled, double-walled, or triple-walled. **Single-walled tanks** consist of a tank with a single-layer wall. These tanks do not have secondary containment, and any cracks, damage, or holes in the tank may result in the product stored being released directly into the environment. The installation of single-walled tanks has been banned since 1992.

**Double-walled tanks** consist of two tanks – a primary tank surrounded by a secondary wall or tank, separated by an **interstitial space**, while a **Triple-walled** tank contains either an inner liner or additional wall with an interstitial space. The purpose of the secondary wall, also known as an outer wall, is to prevent a release into the environment if a leak develops in inner or primary wall. The space between the walls, often referred to as the “interstitial” or “annular” space, may be “dry” (e.g., empty), or may be “wet” (e.g., filled with an inert liquid, typically brine). In both cases, a sensor is located in the interstitial space that detects changes in the liquid level in the interstitial space. In the case of a dry interstitial space, the presence of any liquid may indicate a UST failure, while in a brine-filled tank, any change in the brine liquid level (e.g., gain or loss) may indicate a failure of the UST.

**Rule 1.10(D) Mandatory Deadline for Permanent Closure of Single-Wall UST Systems:**

- 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
- Single wall tanks/piping with an unknown installation date must be closed immediately

*Note: This requirement does not apply to UST systems currently or previously containing heating oil used solely for on-site heating purposes*
Figure 1: Typical UST System; Side view
UST Construction Materials:

USTs may be constructed from a variety of materials, as summarized below.

**Bare Steel**
A bare steel UST, common at the turn of the century, consists of a steel tank with no coatings or protection against corrosion. After years of installing bare steel USTs, companies discovered that steel tanks could eventually leak due to corrosion. Installation of bare steel tanks has been banned in Rhode Island since 1988, and all existing tanks were required to be retrofitted with a corrosion protection system.

**Cathodically-protected steel**
Cathodic protection is a way to prevent corrosion which takes advantage of the fact that due to their chemistry, if two different metals are placed in a similar environment, one metal will preferentially corrode before the other one does. In UST systems, this principal is used by installing sacrificial anodes either attached to, or surrounding, the UST system. The sacrificial anode, often made of Magnesium or Zinc, will preferentially corrode before the steel, greatly slowing or preventing the steel UST from corroding. The sacrificial anodes must be tested and replaced regularly as they degrade, and depending on soil and groundwater conditions, may have a lifespan of between 3 – 10 years. Alternatively, another method called Impressed Current may be used where an electrical current is passed from electrodes in the soil to the tank, creating conditions that are unfavorable for steel corrosion. Impressed current systems, while effective, are rare due to their complexity, frequent maintenance requirements, cost, and energy requirements.

**Clad steel**
A clad steel tank consists of a steel tank with a thick layer of non-corrodible material, such as fiberglass or epoxy which is directly bonded to the outside of the tank wall. The clad steel coating is only designed to isolate the steel from the soil and/or groundwater in order to prevent corrosion of the steel tank and is not intended to act as a leak protection layer. As the clad coating is bonded to the surface of the tank with no interstitial space, a clad steel tank by itself is not considered double walled. However, some manufacturers do make double-walled steel tanks (e.g., USTs with two steel walls with an interstitial space between them) that have a clad steel coating on the outside wall for corrosion protection purposes that would be considered double-walled.
**Jacketed steel**

A jacketed steel tank is a steel tank that is completely enclosed in a non-corrodible, non-metallic and inert material such as fiberglass or plastic. However, unlike clad steel tanks, jacketed tanks are indirectly attached to the tank wall, producing a small interstitial space between the steel and the jacket material which provides an area that can be monitored for leaks. By definition, all jacketed steel tanks are considered double-walled as long as the interstitial space can be continuously monitored for leaks.

**Fiberglass-reinforced plastic (FRP)**

The first inherently corrosion-resistant tank construction material was fiberglass-reinforced plastic (FRP). These tanks do not rust or corrode and are typically much lighter than steel tanks of the same size, however, early tanks were susceptible to delamination and cracking, resulting in releases. Advancements in materials and construction techniques have led to a dramatic reduction in the instances of cracks or delamination, and a large percentage of tanks installed today are constructed of Fiberglass-reinforced plastic.

![Fiberglass-Reinforced Plastic UST](image)

**UST Product Piping**

The requirements for piping used for UST systems depends on upon the piping use, construction type, and construction material, therefore it is important that you know the characteristics of your system, and what they mean.

**Piping Use:**

Piping as part of a UST system can several different purposes, depending on the configuration or design. The most commonly observed uses are:

- **Product piping- Pressurized:** This piping use is used to transfer product from the UST to a dispenser under pressure. Typically there is a pump inside of the tank that is connected to the product piping. Pressures can exceed 90 PSI, so any leak in the piping can result in a catastrophic release. This is the most common piping use and used at most gasoline stations.

- **Product piping – Suction:** This piping use is also used to transfer product from the UST to a dispenser, generator, or to a boiler, burner, furnace or other heating source. However, the pump is located inside the dispenser, generator, or at the boiler, burner, furnace, and generates suction which pulls the product from UST. While this type of system can be installed in any UST system, it is most common with UST systems used for emergency generators or as heating sources.
- Vent Piping: All UST systems are required to have some type of vent system to prevent the buildup of pressure or vacuum inside of the tank which may cause damage. Each tank is connected either directly to a vent, or in the case of multiple tanks, may be connected via a manifold.

**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 essentially 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 drain back into the tank top containment sump, where it can be detected by a leak sensor installed connected to the continuous monitoring system.

Since any leak in the product piping will drain back to the tank top sump, the sump is the first line of defense to alert you of a problem and gives you the opportunity to prevent it from getting worse. If the sump is damaged or in poor condition, contains trash or water, your leak detection equipment might not be able to alert you that the piping is leaking until it is too late. In addition, sumps that routinely have water in them are more likely to rust, resulting in premature component damage, false leak alarms, and increased maintenance costs. Sump covers, manways, and gaskets can wear, erode, or deform over time, allowing rainwater in. Check with your installer about replacing gaskets, repairing or re-sealing joints, or raising the sump top to prevent water from getting in – it could save you a lot in routine maintenance costs!

Generally speaking, there are three types of double-walled product piping:

- **Pipe within a pipe**: Most often used with rigid fiberglass piping, the primary product line is placed inside of a slightly larger outer pipe and using special fittings and connectors, are glued together to form a double-walled pipe with a continuous interstitial space.

- **Coaxial pipe**: Coaxial piping comes from the manufacturer ready to use and consists of two layers of piping sandwiched between a very thin membrane or spacers which form a pipe with a very small (<1/8") interstitial space. Coaxial pipe is often flexible, and some manufacturers offer it on spools in long lengths, allowing installation of a continuous piece of piping without buried joints or couplings.
• Electrofusion Pipe: A relative newcomer, electrofusion piping is similar to the pipe within a pipe concept and consists of a separate inner primary pipe and a slightly larger outer pipe to form an interstitial space. However, unlike the “pipe within a pipe”, electrofusion pipe is constructed of a special high density polyethylene plastic that is both flexible and doesn’t rely on glued connections, rather, the fittings are electro-welded together to form a extremely strong bond that can be field tested.

Some piping is installed inside a large larger flexible tube called a rock guard. The sole purpose of this is to protect the piping and allow future upgrades without excavation. This flexible tube is not considered piping as it cannot be tested for tightness and should not be mistaken for the outer wall of a double-walled pipe.

**Piping Materials**

Material used to construct product piping can vary, however, must conform with NFPA and UL Standard 971, which certifies the piping as safe after being tested in a laboratory.  
- 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 comes in spools in long lengths, allowing continuous runs. Most flexible piping systems can be used as both pressure and suction product lines.
- Fiberglass-Reinforced plastic (FRP) is constructed of fiberglass with plastic coatings to increase durability. FRP piping is rigid, comes in requires little maintenance, and can be used with both pressurized and suction systems.
- Steel piping is usually single-walled and requires cathodic protection to prevent corrosion. It is rarely used in modern UST systems.
- Copper piping is only allowed to be used on suction USTs used for heating fuels and must be isolated from water and soil at all times to prevent corrosion. Copper cannot be used for any pressurized applications or for any federally regulated fuels.

**Dispensers**

Dispensers are connected to the UST system and allow the product to be delivered to the user. Dispensers are most commonly found at gasoline stations, however, may also be present at marinas, heating fuel distribution points, airports, and at private businesses. If the UST system is used to store heating fuel or to supply a emergency generator, the boiler, furnace, or generator may be directly connected to the UST and there might not be a dispenser – it all depends on the design of the system.
Generally speaking, there are two types of dispenser systems: pressurized and suction. In a suction dispenser, the suction pump is located inside of the dispenser and generates a vacuum inside of the product piping which sucks up product from the UST and transfers it to the dispenser. In a pressurized dispenser system, the pump is located inside of the UST, and product is essentially "pushed" into the product piping under pressure. The majority of dispenser systems currently in use are pressurized, however, suction dispensers can still be found at older facilities or systems that are infrequently used. Generally speaking, pressurized systems are more efficient and reliable than suction systems and can deliver a higher volume and flow rate.

All pressurized dispenser systems are required to have a shear valve for each product line that goes into the dispenser. A shear valve is a device that, when disturbed or exposed to fire, automatically shuts off the flow of product and prevents the pressurized fluid in the dispenser and product pipeline from being released. These devices are required because in the event a vehicle hits the dispenser, there is a high risk of a leak, fire, or explosion if any component is damaged. Because the system is under pressure, any fluid inside the product pipeline will continue to flow until the pressure has equalized, resulting in a significant release which may increase the risk of fire, explosion, or other damage. The shear valve protects against this by automatically isolating the pressurized product piping from the dispenser in the event of damage, and prevents the pressurized liquid from being released. It is very important that the shear valve be installed correctly and properly anchored to the surrounding concrete in order to ensure that it operates as designed.

![Figure 8: Shear Valve Anchoring, Option A](image_url)
Since the product piping and dispenser are not under pressure in a suction dispenser, a shear valve is not required. In the event a suction dispenser is hit by a vehicle or catches fire, the piping is not under pressure and therefore the amount of product released will be minimal.

Dispensers are also required to have **under-dispenser containment sumps (UDCs)**. UDCs are located under the dispenser and are designed to contain any leaks or releases from the inside of the dispenser or the fittings connecting the product piping to the dispenser. UDC’s may have several bulkhead fittings on the bottom or sides through which piping or electrical conduit may pass, however, the UDC is required to be liquid-tight. The UDC is also required to be monitored for leaks and have a method to alert the operator if excess liquid collects in the UDC. This can be accomplished by putting a liquid level sensor in each sump, or by leaving the interstitial space between the product piping and the UDC open. This allows any liquid that collects in the UDC to flow into the interstitial space of the product piping, where it will flow into the STP/Piping sump.
which likely already has a liquid level sensor. All under-dispenser containment sumps are required to be tested to ensure they are liquid tight prior to October 13th, 2021 and every three years thereafter.

**Electronic Monitoring Systems**

All UST systems are required to have a continuous monitoring system which is able to alert the operator to abnormal operating conditions. The continuous monitoring system consists of several components:

- The continuous monitoring system console which connects all of the components together and acts as main user interface. The console may be able to perform many functions and alerts depending on the type and options selected. Figure 10 shows one of the most common continuous monitoring system consoles currently in use, the Veeder-Root TLS-350 series.
- 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.

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**All new installations, modifications or repairs to product piping and any equipment used to connect the dispenser to the product piping, or removal of the dispenser, will require under-dispenser containment to be installed if not already present. All dispensers are required to have liquid-tight under-dispenser containment installed prior to December 31st, 2024. This is covered in Rules 1.1(N)(3) and 1.11(M)(5) of the UST Regulations**
Tank Top Sumps

Tank top sumps are attached to the top of the tank and serve two important functions: 1) Allow access to certain components that may be part of, or attached to, the tank, including the submersible turbine pump; 2) Isolate components from surrounding soil or groundwater to reduce corrosion of metal components such as line leak detectors and the STP. Product piping is often present inside tank top sumps as this is where the product lines typically connect to the tank and/or the STP. The tank top sump also acts as a collection point for the interstitial space of the product piping, and all product piping is installed at a slight slope to allow any liquid that collects in the interstitial space to drain back to the sump (Figure 10). Since all sumps are required to have liquid level sensors connected to the Continuous Monitoring System (CMS) (e.g., Veeder-Root), any leak in primary wall of the product piping should collect in the sump and set off a leak alarm on the CMS system.

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 in the groundwater, while a tank pad observation well are primarily used to determine the elevation of the water table in the immediate vicinity of the UST. 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 in the groundwater, while a tank pad observation well are primarily used to determine the elevation of the water table in the immediate vicinity of the UST.
monitoring wells may be installed anywhere on the property that is likely to intercept the groundwater flow path and allows detection of a potential release from any portion of a UST system. In contrast, tank pad observation wells, are only installed in the immediate vicinity of the USTs, and typically are approximately 1 foot deeper than the deepest portion of the UST. Tank pad observation wells are typically only installed when it is necessary to know the depth to groundwater, usually for tank tightness testing purposes. As UST technology has evolved and new test methods have become available, depth to groundwater data may no longer be required to perform accurate tightness testing, and new UST installations may not be required to have tank pad wells.

Groundwater monitoring wells are no longer required to bailed and evaluated for visual and olfactory evidence of free product once per year

Well Construction Standards and Maintenance Requirements
Groundwater monitoring wells and tank pad observation wells have similar construction standards and maintenance requirements. All wells must:

- Must be equipped with a labeled and tamper-resistant cover.
- Be permanently labeled to identify them as groundwater monitoring or observation wells;
- 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.

Any groundwater monitoring well that is no longer in use or must be properly abandoned and sealed by a qualified contractor to reduce the risk of surface contaminants reaching the groundwater. When in doubt, please contact the DEM project manager for the site!

Chapter 2. Operator Training

UST Operator Training is a mandated by U.S. 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. All UST facilities are required to have at least once Class C operator on-site during normal operating hours.

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.
The operator training program breaks down the roles as followed:

**Class A Operator**: Individual who has primary responsibility for maintenance and operation of the UST facility. This role is typically fulfilled by the Owner or senior operator of the facility.

**Class B Operator**: Individual who oversees the day-to-day operations of the facility.

**Class C Operator**: Typically a front-line employee (e.g., cashier or maintenance person) who is trained to recognize emergencies and then take appropriate actions to respond to them.

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**Operator Responsibilities**

**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 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
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 as long as the facility remains in compliance with the regulations.

Any time there is a change in the Class A or Class B operator, the facility owner or operator must submit an updated Class A and Class B Operator registration form to DEM within 30 days. These forms are available on our website at http://www.dem.ri.gov/ust under the “Forms” section.

All facilities must maintain a list of all its Class C operators which includes date they were last trained and the name of the Class A or Class B operator that trained them. Class C operators must be trained every two years and individuals must be trained BEFORE assuming Class C operator responsibilities at a UST facility. The contact information for the Class A and Class B operator should be prominently posted and available to all employees at all times, and Class A and Class B operator are expected to be available to respond to emergencies within a reasonable timeframe.

Monthly UST Walkthrough Inspections

As part of their duties, the Class A or Class B operator must perform a monthly inspection of the UST system to ensure that the 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, the operator should 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. The operator performing the inspection must complete the DEM-provided Operator Monthly Walkthrough Inspection Checklist and maintain that checklist on-site for a minimum of 3 years.

Any non-compliance items, operational issues, or alarms MUST be documented on the checklist and the UST owner and operator must be notified of the non-compliance items. The Class A or Class B operator should also document any actions taken to resolve the violation. The individual performing the monthly walkthrough inspection must be either a Class A or Class B operator registered with DEM for that facility. Monthly walkthrough inspections performed by anyone other than the registered Class A or Class B operator are not considered valid!
Operator Certification Reciprocity

Rhode Island accepts the following out of state Class A and Class B operator certifications:

- ICC certification from Maine, New Hampshire, Vermont, Massachusetts, or Connecticut are accepted from 5 years from date of passing the certification exam, as long as the UST facility remains in compliance.

- Certification as a Class A or Class B operator from any U.S. State UST program is valid for 1 year from the date of issuance and may not be renewed. Upon expiration of the certification, the Class A or Class B operator must take the Rhode Island ICC Operator Training Certification exam.

Re-Certification Requirements

The certification of any Class A or Class B operator may be revoked, rescinded, or no longer recognized if inspection of the facility reveals significant violations of State or Federal UST Regulations. DEM may also require any Class A or Class B operator to be re-trained or re-certified within 60 days of discovery of any violation. If required to be re-certified, the Class A or Class B operator must successfully pass an ICC-administered exam and submit passing test results and new certification to DEM within 10 days.

All ICC issued certifications are valid for 5 years from the date of the exam, and all Class A or Class B operators are required to re-take the exam and receive new certification prior to their certification expiring. Because all individuals are required to be properly certified, any individual performing the duties of a Class A or Class B operator but without proper certification, or with lapsed or expired certification, shall not be considered a Class A or Class B operator, and the facility shall be considered to not have a class A or Class B operator. Therefore, it is important that you keep track of your certification expiration date and ensure that you renew your certification prior to it expiring.

Unmanned Facility Requests

An unmanned UST facility is one that operates without a Class C operator present during all operating hours. Any facility wishing to be regulated as unmanned must meet additional safety requirements and receive prior written approval from DEM. Unmanned facility approvals are typically only granted for fueling facilities that serve emergency vehicles 24 hours a day.

Environmental Results Program

The Environmental Results Program (ERP) is a mandatory self-certification facility inspection program that is performed by the owner or operator. 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 time goes on, USTs, product piping, and their components deteriorate, and the soil around the tank tends to shift and compact, causing additional stresses on vulnerable components. In temperate climates such as Rhode Island, UST components have to deal with a wide range of conditions, from a sunny, humid days where components in the sun may reach 120°F in the direct sunlight, to frigid nights where the temperatures dip to -5°F and are covered with snow, ice, and regularly exposed to road salt and hit by plows removing the snow. Over time, these factors increase the likelihood of a release to the environment, resulting in public health concerns, property damage, extensive environmental damage, as well as costly remediation and civil liabilities. In order to reduce the risk and impact of a release, it is important that operators are familiar with, maintain, and respond to any release detection methods present at their UST facility.

All federally regulated USTs are required to have a release detection method (or a combination of methods) that accurately and quickly detect a release from any portion of the UST system, immediately notifies the operator, and in some cases, automatically takes action to limit the release. There are numerous release detection methods used at UST facilities, and it is the responsibility of the operator to ensure that equipment is installed, calibrated, and routinely checked for proper operation according to the manufacturer’s instructions, and that any indicators of a release are immediately responded to. Only release detection devices that have been met the required EPA performance standards are allowed to be installed.
Release Detection 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 that are not equipped with a ATG.

Manual tank gauging requires that the owner or operator take the tank out of service for 36 hours once per week 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 and is the most common type of gauging system as it performs multiple functions simultaneously. The equipment typically consists of a probe permanently installed in the tank with two floats; one measures the product level, while another measures the level of water in the tank. The ATG is connected to the Leak Detection/Continuous Monitoring console which can be programmed to perform several different types of leak tests that are able to automatically measure any loss or gain of a tank’s contents. The most common tests are the Continuous Statistical Leak Detection (CSDL) Test which continuously measures the product level in the USTs and during periods of inactivity, measures any changes detected. Some facilities may be set up for periodic statistical leak detection where the system is programmed to measure the change in fluid level over a set period of time when the tanks are out of service, usually overnight. Both tests are 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. All alarms and warnings must be responded to immediately. Any deactivation of a monitoring system and any suspected or confirmed release shall be immediately reported to the Department by calling (401) 222-2797.

ATG systems can also be used to measure the amount of product in the tank and the amount of water in the tank without having to manually gauge the tank. When coupled with a Leak Detection/Continuous Monitoring console, the volume of fuel available can easily be ascertained and can make delivery planning easier. ATGs also can be used to measure any water level in the bottom of the tank. Because water is denser than fuel, it sinks to the bottom of the UST until removed. This is problematic for three reasons: 1) In tanks with a steel interior, you essentially have a “puddle” of water at the bottom of the tank that can cause internal corrosion of the UST; 2) Because the pump intake is at the bottom of the UST, if the water level gets high enough, you can begin to suck up water into the distribution system, resulting in water being dispensed from the dispensers instead of product. This can cause serious and expensive damage to vehicles, and the UST system owner and operator are liable for repair costs for anyone who received bad fuel. Finally, 3) Water in a UST system promotes growth of a specialized form of bacteria that produce acetic acid which very rapidly can damage a UST system, as well as frequently clog filters and damage pumps, dispensers, and other UST components. Therefore, UST owners/operators are required to check the water level in the USTs on a monthly basis to ensure there is less than 1” of fuel at all times. Any water level greater than 1” must be immediately pumped out by a qualified vendor.

**Inventory Control**

Inventory control (also called inventory reconciliation) is a release detection method that tracks all inputs (e.g., deliveries) and outputs (e.g., fuel dispensed) of a UST, ensuring that all product flowing through the system is accounted for, and any discrepancy is presumed to be the result of a release or other loss. This release detection is required for all single walled USTs and is no
longer required for Double-Walled tanks. If done properly, the method is effective at alerting the operator to any significant losses of product from the UST system.

On a daily basis, the operator is required to record
- The volume of fuel present in the UST at opening;
- The volume fuel deliveries, if any
- The volume of fuel dispensed;
- The volume of fuel present in the UST at closing;

At the end of the month, the operator must reconcile the data and take a statistical average to determine if over the course of the month if any gains or losses occurred, and if those

**Inventory control is no longer required to be performed for double walled UST systems!**

gains or losses were within the acceptable limits. This can be done by hand using worksheets and templates provided by U.S. EPA, or electronically using Excel worksheets or company-specific programs. 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. Any exceedance outside of the limits may indicate a release in the system, and DEM is required to be notified immediately. Inventory records are considered a routine record and are required to be maintained on-site for a minimum of three years.

**Interstitial Space Continuous Monitoring**
One of the most common forms of release detection for USTs, continuous monitoring of the interstitial space of double-walled tanks is an easy, accurate and low-effort leak detection method. As discussed earlier, all double-walled USTs are constructed of an inner (primary) wall which contains the product being stored, and an outer (secondary) wall which, in the event of a leak in the primary wall, prevents the product from reaching the environment. There is a small space between these walls that is called the interstitial space. In the event there is a leak in the primary wall, any product released will flow into this space, or, alternatively, if there is a leak in the outer wall, groundwater will flow into the interstitial space from outside the tank. In order to know if a leak has occurred, this space needs to be continuously monitored for the presence of fluid. This is accomplished by a sensor which is placed in the interstitial space which constantly checks for fluid, or, in the case of a brine-filled interstitial space, a change in the fluid level indicating a failure of either the primary or secondary wall of the UST.
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 immediately. 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 1.10(M)** 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**

Tightness testing is a method used to ensure that the primary wall, interstitial space, or outer wall is liquid-tight and typically involves applying pressure or vacuum to the component and using specialized equipment to detect changes in pressure or audible leak indicators. The following is required for all UST, product pipeline, sump, under-dispenser containment, and spill containment basin testing:

- Any individual performing a tightness test on a UST or product piping primary wall, secondary wall, or interstitial space must licensed as a tightness tester by RI DEM and can only use methods approved by RI DEM.
- RI DEM routinely performs “spot checks” of tightness testing to ensure they are being done properly and by qualified individuals. To aid in this, all tests require 7 day prior notification to DEM.
- The results of all tightness tests must be sent to RI DEM within 30 days for passing results, or 7 days for failed results.
- Any failed test result must be called into RI DEM immediately by calling (401) 222-2797
- Tightness test results are considered permanent records and must be maintained for the life of the facility.

**Single-Wall UST Tightness Testing**

Single-walled tanks can be tested for tightness by a RI DEM licensed tester using an approved test method 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. Single wall USTs are required to be tested on an annual basis.

Rule 1.10(F)(2)(d) Single wall USTs must be tested for tightness annually regardless of installation date.

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 inner or outer walls. The tester applies a small vacuum to the interstitial space (e.g., the space between the inner and outer wall). If the vacuum holds over a period of time, then the interstitial space is found to be tight. However, if a drop in the pressure is observed, this may indicate that the interstitial space is not liquid tight.

Release Detection for Piping

Automatic Line Leak Detectors
An automatic line leak detector (LLD), sometimes also called a pressurized line leak detector (PLLD) 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 LLD 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 a minimum of 3 gallons per hour at a line pressure of 10 pounds per square inch.

![Figure 13: Mechanical Line Leak Detectors](image-url)
Release Detection Requirements for Tanks

Release detection requirements for the various UST tanks are given here.

**Tank Release Detection Requirements for Operation**

<table>
<thead>
<tr>
<th>Type of Tank System</th>
<th>Minimum Required Release Detection Method(s) for Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Double Wall USTs</strong></td>
<td>Operational ATG system; Continuous interstitial space electronic monitoring; and interstitial tank tightness testing</td>
</tr>
<tr>
<td>Containing any Federally Regulated Material or Motor Fuel</td>
<td></td>
</tr>
<tr>
<td><strong>Double Wall USTs</strong></td>
<td>Operational ATG system; Continuous interstitial space electronic monitoring; and interstitial tightness testing</td>
</tr>
<tr>
<td>Used for Emergency Generator Fuel or Waste/Motor Oils</td>
<td></td>
</tr>
<tr>
<td><strong>Single Wall USTs</strong></td>
<td>Operational ATG system</td>
</tr>
<tr>
<td>Containing any Federally Regulated Material or Motor Fuel</td>
<td>Perform a leak test capable of detecting 0.2 gallon/hour leak once per month Daily and monthly inventory control Annual Tank tightness testing</td>
</tr>
<tr>
<td><strong>Single Wall USTs</strong></td>
<td>Approved ATG system</td>
</tr>
<tr>
<td>Emergency Generator USTs; Waste Oil/Motor Oil USTs &gt; 2,000 gallons</td>
<td>Perform a leak test capable of detecting 0.2 gallon/hour leak once per month Biennial Tank tightness testing (Once every 2 years) Daily and monthly inventory control</td>
</tr>
<tr>
<td><strong>Single Wall USTs</strong></td>
<td>Annual Tank tightness testing</td>
</tr>
<tr>
<td>Waste Oil/Motor Oil USTs &lt; 2,000 gallons</td>
<td>Manual tank gauging</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Tank Tightness Testing Schedules

<table>
<thead>
<tr>
<th>Type of UST</th>
<th>Tightness Test Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Double Wall USTs:</strong></td>
<td></td>
</tr>
<tr>
<td>Dry Interstitial Space</td>
<td>20 years after installation and every two years thereafter¹</td>
</tr>
<tr>
<td><strong>Double Wall USTs:</strong></td>
<td></td>
</tr>
<tr>
<td>Brine-Filled Interstitial Space</td>
<td>As long as brine level in the interstitial space is continuously monitored by a liquid level sensor and a Continuous Monitoring System, no routine tightness tests are required</td>
</tr>
<tr>
<td><strong>Single Wall USTs</strong></td>
<td></td>
</tr>
<tr>
<td>Containing any Federally Regulated Material or Motor Fuel</td>
<td>Annually</td>
</tr>
<tr>
<td><strong>Single Wall USTs</strong></td>
<td></td>
</tr>
<tr>
<td>Emergency Generator USTs; Waste/Motor Oil USTs &gt; 2,000 gallons with ATG</td>
<td>Biannually (e.g., once every 2 years)</td>
</tr>
<tr>
<td>Waste Oil/Motor USTs &lt; 2,000 gallons without ATG</td>
<td>Annually</td>
</tr>
</tbody>
</table>

**Important Notes:**
- All tightness testing results should be kept as **permanent records** for three years beyond the life of the facility.
- If a double walled UST tightness test fails or is inconclusive, the primary wall must be tested within 24 hours.
- All test failures must be reported to RI DEM immediately by calling (401) 222-2797.
- Test results must submitted to DEM within 30 days of the test for passing results and 7 days for failed results.
- All tightness tests must be performed by **RI DEM licensed testers according to Rule 1.16** of the UST Regulations.
- All USTs must be tested for tightness at installation and after burial and compaction.

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¹ Applies to all federally regulated USTs with the exception of those used for emergency generators; USTs that supply emergency generators are required to be tested once the UST has reached 30 years of age.
Mechanical LLDs are mechanically operated pressure valves that work by comparing the pressure loss each time the STP shuts off. In a tight, leak-free system, the pressure in the product line would remain stable, and would only decrease if a dispenser is activated. However, if the line leak detector detects a pressure loss, the internal valving and diagram change configuration and dramatically reduce the flow of fuel allowed to pass through the line leak detector. However, it **DOES NOT completely shut off the flow** and **does not trigger any audible or visible alarms when activated**. The only indication that it has been activated is a significantly reduced fuel flow rate coming from the dispenser. Therefore, it is very important that if reduced fuel flow from the dispensers is noticed that you immediately check for indications of a release or component failure, and pay attention to any warnings that may appear on the continuous monitoring system, most notably the presence of liquid in the STP sumps.

![Figure 14: Electronic Line Leak Detector](image)

Electronic line leak detectors are placed in a similar location and serve a similar function as a mechanical line leak detector, however, they are more accurate, reliable, and are able to completely shut off the flow of a leaking product pipeline. Electronic LLDs have an electronic detection element that constantly monitors the pressure and flow rate in the product piping, and when an unexpected decrease occurs, the electronic line leak detector sends a signal to the continuous monitoring system notifying the operator via an audible and visible alarm. Depending on the configuration of the system, an electronic line leak detector may also be able to shut off the submerged turbine pump (STP) to prevent further releases when activated.

**Rule 1.10(I):** 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 product 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. If product is released from a leaking primary pipe, it will flow into the interstitial space, which then should drain to a liquid-tight sump which contains a liquid level sensor. Once enough liquid has accumulated, usually about $\frac{3}{4}''$, the liquid level sensor will send an alarm to the continuous monitoring system which will trigger an audible and visible alarm to notify the operator.
The operator must ensure that:

- The liquid level sensor is mounted vertically and secured so it will not tip over;
- The liquid level sensor is no more than 1” off the bottom of the lowest point of the sump;
- The test boots on the product pipeline are loose and pulled back so that the interstitial space is visible and would allow any liquid to flow freely;
- The sump is clean and doesn’t contain any other liquids, including water
- The CMS console is checked daily to ensure no alarms are present;
- The liquid level sensor and CMS are inspected, calibrated, and checked for proper operation on an annual basis by a qualified 3rd party;
- 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

**Double-Walled Product Line: Interstitial Space Tightness Testing**

The interstitial space of double-walled product piping is required to be tested at installation, once the piping has been installed for 20 years, and then every 2 years thereafter for the life of the product piping. Interstitial space tightness must be performed by a qualified and licensed 3rd party tightness tester and must be performed using a DEM-approved method. Typically, the interstitial space is tested by tightening the test boots in the STP sump and under the dispensers and applying a small vacuum or pressure (typically less than 5 PSI) and measuring any pressure loss over 60 minutes. The interstitial space cannot be tested without test boots in place, and therefore if the boots are degraded, damaged, or missing, you may be required to install new test boots in order to allow testing. Operation of a product pipeline that has not been tested is prohibited, and variances to allow single-wall operator are not allowed.

**If product line interstitial space tightness test indicates the interstitial space is not liquid-tight, the primary wall of the product piping must be tested for tightness within 48 hours.**

- If the primary wall passes, any remaining fuel in the UST may be consumed for no more than 30 days, however, no additional deliveries are allowed, and any USTs connected to the product piping must be emptied within 30 days
- If the primary wall fails the tightness test, the product pipeline must be immediately taken out of service and all connected USTs emptied of product
- All product pipelines must be repaired within 60 days or placed into DEM-approved temporary closure

**Single-Walled Product Line: Tightness Testing**

Single-walled product pipelines are required to be tested on an annual basis by a qualified and licensed 3rd party tester using a DEM-approved tightness test method. All approved product line tightness test 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. In the
All single-walled product pipeline tightness tests must:

- Be performed by a 3rd party tester licensed by RI DEM;
- Tested using a DEM-approved tightness test method;
- Be submitted to DEM within 30 days for passing tests and 7 days for failed tests;
- Test results which indicate failure or not able to be tested must be reported immediately in accordance with § 1.10 (H)(5) the RI DEM UST regulations
- Results of tightness testing are to be maintained as permanent records.

Chapter 4. Spill Protection and Overfill Prevention

Spill Protection and Overfill Prevention Background

One of the most frequent causes 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 required on all federally regulated USTs to alert the individuals delivering fuel that the tanks are at capacity and the fuel flow must be stopped. Generally, overfill prevention devices do not completely stop fuel from entering the tank, rather, in most cases they either cause an alarm to go off, or, restrict the flow rate of product going into the tank. Because overfill prevention equipment may not completely prevent an overfill from occurring, it is important that the individuals filling the tanks are aware of the volume available and are closely monitoring the delivery to ensure that the correct volume is delivered. The overfill prevention equipment should NOT be used as an indicator of when the delivery should be stopped – if the overfill prevention equipment is activated, the tank is already at capacity!

Overfill prevention equipment is required to be installed on all USTs that receive deliveries of more than 25 gallons at a time regardless of size or contents.
## Leak Detection Devices and Testing Schedules

<table>
<thead>
<tr>
<th>Type</th>
<th>Testing Schedule</th>
<th>Test Performed by?</th>
<th>Action if Fail or unable to be tested</th>
<th>Recordkeeping Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Wall Product Piping</td>
<td>Annually</td>
<td>Licensed 3&lt;sup&gt;rd&lt;/sup&gt; party Tester</td>
<td>Reported to DEM Immediately and UST system taken out of service</td>
<td>Permanent</td>
</tr>
<tr>
<td>Double-Wall Product Piping</td>
<td>At 20 years and every 2 years thereafter</td>
<td>Licensed 3&lt;sup&gt;rd&lt;/sup&gt; party Tester</td>
<td>Test primary wall within 48 hours and report to DEM immediately. System must be repaired or taken out of service within 30 days.</td>
<td>Permanent</td>
</tr>
<tr>
<td>Line Leak Detectors</td>
<td>Annually</td>
<td>Qualified 3&lt;sup&gt;rd&lt;/sup&gt; Party</td>
<td>Failed line leak detectors should be replaced immediately</td>
<td>Permanent</td>
</tr>
<tr>
<td>Shear/Crash/Impact Valves</td>
<td>Annually</td>
<td>Qualified 3&lt;sup&gt;rd&lt;/sup&gt; Party</td>
<td>Failed shear/crash/impact valves should be replaced immediately</td>
<td>Routine</td>
</tr>
<tr>
<td>Leak Monitoring Devices</td>
<td>Annually</td>
<td>Qualified 3&lt;sup&gt;rd&lt;/sup&gt; Party</td>
<td>Report failure or deactivation immediately. Repair or enter temporary closure within 15 days</td>
<td>Permanent</td>
</tr>
<tr>
<td>Continuous Leak Monitoring System</td>
<td>Monthly</td>
<td>Qualified 3&lt;sup&gt;rd&lt;/sup&gt; Party</td>
<td>Report failure or deactivation immediately. Repair or enter temporary closure within 15 days</td>
<td>Routine</td>
</tr>
</tbody>
</table>
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 one 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, and is required to be visible from the tank pad.

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)
An automatic shutoff valve mechanically restricts 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 an older method of overfill protection that is no longer allowed. The ball float is placed in Stage I vapor recovery riser vent, and as the liquid rises in the tank, the ball floats on top of the liquid, and eventually should block the Stage I riser vent, restricting the vapor leaving the tank and briefly pressurizing the tank, reducing the flow rate of product going into the tank, alerting the delivery person to stop the delivery.

Unfortunately, ball float vents are prone to failure and damage, and therefore are no longer an accepted overfill prevention device. The installation, repair, or replacement of a ball float valve is not allowed, and any ball float found to be damaged or inoperative must be replaced with an alternative overfill prevention method.

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 replacement UST systems, and if found to be damaged or inoperative, must be replaced with another overfill prevention device type.
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 removed and inspected annually;

Vent Alarms

A vent alarm (vent whistle) is a small device, usually a tube, which is typically installed between a heating oil tank and the vent pipe. When oil is pumped into the 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 sound. When the level of the fuel reaches the end of the tube the whistling stops, indicating the tank is full. Rule 1.11(L)(3)(e): Vent Whistles are only allowed on USTs used to store heating fuels for on-site use or USTs supplying emergency generators

Figure 19: Vent Alarm

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”) 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 tank fill points are required to have a liquid-tight spill containment basin capable of holding a minimum of three gallons.

Figure 20  Spill Containment Basin

- 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 (e.g., concrete, pavement)
- If the basin is made of metal, then its exterior wall must be protected from corrosion
- All single-walled spill containment basins are required to be tested for tightness prior to October 21st, 2021, and every three years thereafter.
- Effective November 20th, 2018, the installation of single-walled spill containment basins is prohibited, and any spill containment basin found to be leaking must be replaced with a double-walled basin.

Spill Containment basins are exposed to harsh conditions, ranging from sweltering 100°F hot and humid summer days exposed to direct sunlight, to bitter cold -10°F winter nights covered with snow, ice, and road salt. They are hit by plows, driven over by vehicles, and must be able to contain a highly flammable substance that happens to also be a good solvent. Because of these factors, spill containment basins have a limited life expectancy and may need to be replaced several times throughout the life of a UST system.

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.

![Figure 21: Cracked and Leaking Spill Containment Basin](image)

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.

Due to changes in Federal requirements, effective November 20th, 2018, all new and replacement spill containment basins must be double-walled and capable of periodic interstitial monitoring. Spill containment basins that are found to be damaged, leaking, or fail tightness testing must be immediately taken out of service and that fill pipe is ineligible to receive deliveries until repaired or replaced. Repairs of spill containment basins are only allowed if the manufacturer explicitly gives approval and is able to provide repair materials and established repair methods. Ad hoc, temporary, or any repair not explicitly approved by the manufacturer or using unapproved materials are not allowed.
All single-walled spill containment basins must be tested for tightness prior to October 13th, 2021 and every 3 years thereafter. The installation of single-wall spill containment basins was banned on November 20th, 2018 and all new and replacement spill containment basins must be double-walled and capable of interstitial monitoring. This is covered in Rule 1.10(N)(1)(b) of the UST Regulations.

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. This is typically done by using the appropriate color spray paint to paint the cover. Due to the harsh environment fill pipes and fill covers are subject to, you may need to paint the lids frequently to ensure they are properly labeled.
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.

Figure 22  UST Equipment Marking Color Code Chart (Source API RP 1637, 2007)
Tank Top Sumps and Transition Sumps

Tank top sumps (also known as piping sumps or STP sumps) and transition sumps are designed to temporarily contain leaks and spills by providing a low-point collection area in the UST system. In most configurations, the product piping is required to be installed at a slope of 1” per 10 feet of piping, and the tank top sump should always be the lowest point in the 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, where it can be detected by the liquid level sensors, triggering the continuous monitoring system and alerting the operator, who can then respond to the release by stopping the flow of product and safely remove what has collected in the sump. 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.
In addition to acting as a collection point for product piping interstitial space leaks, sumps also protect UST components within them from exposure to soil, groundwater, and moisture, and they effectively isolate UST components from the corrosive effects of subsurface moisture. Sumps also allow easy access to many components allow troubleshooting, repairs, and maintenance to be performed without costly excavations.

It is important that the operator routinely check the continuous monitoring system for warnings or alarms indicating the presence of liquid in the sumps and react accordingly. Even if the contents of the sump is just water from rain – it must be removed immediately, as it reduces the ability of the sump to contain liquid in the event of an actual product leak (the water takes up space that could be used to contain leaking product), and if the operator ignores the alarm because he or she thinks “it’s just water” – they would never know if an actual release occurred until the sump began to overflow. When this happens, it goes from being just a piping repair to a costly environmental remediation along with potential administrative, civil, and criminal penalties, along with the possibility of civil damage lawsuits from neighbors and other affected parties.

All sumps are required to be visually inspected by the operator a minimum of once per year and whenever an alarm or warning from a leak monitoring system indicates the presence of product or water. Inspections must include, at a minimum, visual confirmation that:

- 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 and dispose the fuel or water as hazardous waste.

Owners and operators must have all tank top, STP, piping, and transition sumps tested for tightness by a licensed tester prior to October 13, 2021 and every three years thereafter. Owners and operators must maintain records of these tests onsite in permanent records for three years beyond the operational life of the facility.
Under-Dispenser Containment (UDC)
A under-dispenser containment ("UDC") is a containment basin located underneath the dispenser. It is designed to collect leaks or releases from the dispenser and piping within or above the UDC, preventing the leaked product from reaching soil or groundwater. Under-dispenser containment sumps are not required to have liquid level sensors, and instead rely on the product piping interstitial space to transport any leaks via gravity to the piping sumps which do have sensors. Because of this, all piping boots in under-dispenser containment sumps are required to be loose and pulled back when not in use in order to allow any accumulated product to freely flow into the product piping interstitial space. Like tank top sumps, UDC’s may have multiple penetration fittings that allow product piping, vapor piping, electrical conduit, or other connections to pass through. Over time, these penetration fittings may break down, and therefore it is important to test the under-dispenser containment on a routine basis to ensure that it is still liquid tight. Effective November 20th, 2018, all new or replacement installations, as well as significant modification to any UST component, or removal of a dispenser will require under-dispenser containment to be installed if it is not already present, and all dispensers, regardless of installation date, are required to have under-dispenser containment by December 31st, 2024. All under-dispenser containment sumps must be tested for tightness prior to October 13th, 2021, and every three years thereafter.

Owners and operators must have all under-dispenser containment sumps tested for tightness by a licensed tester prior to October 13, 2021 and every three years thereafter. Owners and operators must maintain records of these tests onsite in permanent records for three years beyond the operational life of the facility.

Rule 1.10(N)(3)(f): When a dispenser is installed, replaced, or any part of the product piping, connections, or connectors to the dispenser are modified, repaired, or replaced, under-dispenser is required to be installed if not already present. All dispensers, regardless of installation date, are required to have under-dispenser containment installed prior to December 31st, 2024.

Fueling Dispensers
On a monthly basis, all hoses, nozzles, and breakaways on fuel dispensers should be checked for loose fittings, deterioration, damage, obvious signs of leakage, and the access door or lower cabinet on all fuel dispensers are should be opened and all internal components, especially unions, shear valves, flex-lines, and other connectors) should be checked for evidence of leaks, damage, tampering, and to ensure that the under-dispenser containment is clean, dry and free from liquid. These items are required to be included on the Class A or Class B operator’s monthly walkthrough inspection and are included on the checklist. Any water, product, or debris in dispenser sumps shall be removed and disposed of properly, and the source of the release should be investigated. Hoses should not contact the ground when the nozzle is not in use to avoid excessive wear and damage to the hose.
Testing of Spill Prevention Equipment

All single-walled spill containment basins, under-dispenser containment, and all sumps are required to be tested for tightness prior to October 13th, 2021, and then every three years thereafter. If your system has a double-walled spill containment basin and is capable of being monitored (e.g., most have a built in vacuum gauge), it must be checked as part of the monthly Class A or Class B operator walkthrough inspection. As of the writing of this manual, there are no double-walled sumps or under-dispenser containment sumps in Rhode Island and therefore will not be covered in this manual.

As of the writing of this manual, the only approved methods to test the tightness of sumps, spill containment basins, and under-dispenser containment are Hydrostatic testing and vacuum testing.

Hydrostatic Testing

In a Hydrostatic Test, the containment basin or sump is completely filled with water and its the depth of the water is measured. In order for the test to be valid, the water must be within 1.5 inches to the top of a spill containment basin and at least 4 inches above the highest penetration fitting or sump sidewall seam on sumps and UDCs. Low level testing (e.g., where the amount of liquid in the sump is less than 4 inches above the highest penetration fitting) is not allowed. After 60 minutes, the water depth is checked again, and if the water depth has changed more than 1/8th of an inch, then the component has failed the test and is considered leaking. If the water depth has changed less than 1/8th of an inch, the component has passed and is considered liquid tight.

Figure 25: Hydrostatic Testing being performed on a new Spill Containment Basin (left) and a piping sump (right)
**Vacuum Test Method**

Some spill containment basins are able to be tested using a specialized vacuum cover. The cover forms a tight seal on the top of the basin, and a 30 inch of water column vacuum is applied to the containment structure. If the vacuum level remains above 26 inches of water column for 1 minute, the test is passing and the basin is considered liquid tight. This method may not be able to be successfully used on all spill containment basins due to differences in designs by different manufacturers, damage to the spill containment basin, or difficulty in getting a good seal. Currently, this method is only available for spill containment basins, and is not available for sumps or under-dispenser containment.

Currently, the Vacuum Test and Hydrostatic test are the only methods approved by RI DEM for tightness testing under-dispenser containment, sumps, and spill containment basins. As other methods are developed, tested, and certified by 3rd parties, RI DEM expects to approve other test methods.

**Double Walled Spill Prevention Equipment Tightness Testing**

Spill containment basins are available as both single-walled and double-walled. If you have a double-walled spill containment basin, you do not have to perform a routine tightness test as long as the spill containment basin has an interstitial monitoring device that is able to indicate when the interstitial space is no longer liquid tight. The most common method of doing this is to have a gauge on the basin which indicates the status of the interstitial space. Double-walled sumps and under-dispenser containment are available from many vendors, however, none have been installed in Rhode Island thus far and therefore will not be discussed in this manual.

**Failed Test Procedures**

Any spill containment basin, sump, or under-dispenser containment sump that is found to no longer be liquid tight is required to be immediately taken out of service.

- For spill containment basins, this means that that delivery point is no longer eligible to receive deliveries until the spill containment basin has been replaced
- For sumps, all product piping that uses that sump as a collection point must be taken out of service until repairs have been made and successfully passes a follow-up test;
- For under-dispenser containment, that dispenser must be taken out of service and isolated from the UST system until repairs have been made and successfully passes a follow-up test;
Repair of Spill Containment Basins, Sumps, and Under-dispenser Containment

- Due to the difficulty, cost-effectiveness, and availability of appropriate repair materials, spill containment basins cannot be repaired unless the manufacturer explicitly allows and provides a procedure for the repair and makes repair materials available. DEM highly recommends that any spill containment basin be replaced. All replacement spill containment basins must be double-walled, and the installation of any single-walled spill containment basin is prohibited.
- In certain circumstances, if additional testing clearly shows that the outer wall of the spill containment basin has failed, but the primary (inner) wall is still liquid tight, the owner/operator may request a variance to continue operation of the spill containment basin, however, the basin will be required to meet all the requirements of a single walled spill containment basin, including routine hydrostatic or vacuum pressure testing.
- Sumps and Under-dispenser containment can be repaired by a qualified 3rd party. All materials used must be compatible and rated for continuous exposure to the material stored in the UST system.
## Release Prevention Equipment Testing

### Spill Containment Basin and Containment Sump Testing Schedules

<table>
<thead>
<tr>
<th>Spill Prevention Device</th>
<th>Initial Test Due Date</th>
<th>Testing Frequency</th>
<th>Failed Test Procedure</th>
<th>Recordkeeping Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Walled Spill Containment Basin</td>
<td></td>
<td>Every 3 years</td>
<td>UST is ineligible for deliveries until basin replaced</td>
<td>Permanent</td>
</tr>
<tr>
<td>Single-walled Sump/Under Dispenser Containment (UDC)</td>
<td></td>
<td>Every 3 years</td>
<td>Take associated piping, dispensers and/or tanks out of service until repaired</td>
<td>Permanent</td>
</tr>
<tr>
<td>Double-walled Spill Containment Basin</td>
<td>October, 13th 2021</td>
<td>Monthly Visual Inspection</td>
<td>UST is ineligible for deliveries until basin replaced or variance granted</td>
<td>Permanent</td>
</tr>
<tr>
<td>Double-walled sump/UDC with interstitial monitoring</td>
<td></td>
<td>Monthly Visual Inspection</td>
<td>Take associated piping, dispensers and/or tanks out of service until repaired or variance granted</td>
<td>Permanent</td>
</tr>
<tr>
<td>Double-walled sump/UDC without interstitial monitoring</td>
<td></td>
<td>Regulated as Single Walled</td>
<td>Take associated piping, dispensers and/or tanks out of service until repaired</td>
<td>Permanent</td>
</tr>
</tbody>
</table>

DEM must be notified of a failed test within 24 hours by calling (401)-222-2797. Passing test results must be submitted within 30 days, and failed tests must be submitted within 7 days.
Chapter 5. Corrosion and Cathodic Protection

Corrosion and Cathodic Protection for Tanks and Piping

Any UST component made of corrosible material, such as steel, copper, and some alloys can corrode if exposed to water, excessive moisture, soil, or acids. Corrosion is a process by which the metal is broken down by chemical reactions, most commonly the reaction between the metal and oxygen and water, moisture, or in some cases, the presence of acids. Components directly in contact with soil or water are the most vulnerable, however there have also been cases where acids generated by naturally occurring bacteria living in diesel have resulted in rapid and substantial corrosion of metal components. Corrosion in UST components in contact with water, moisture or soil can range from 1 – 20 mil per year (MPY) or the equivalent of 0.025 – 0.76 mm per year. While this doesn’t sound like a lot, keep in mind that some USTs may have a wall thickness of only 6.3 mm (0.25 inches), and in conditions favorable to corrosion, it may take as little as a 7 years for an unprotected steel tank to develop holes and resultant leaks.

Because of this, all USTs, product piping, and UST components containing regulated substances (e.g., motor fuels such as gasoline, diesel, aviation fuel, motor oils, waste oils, etc) that are in direct contact with water, excessive moisture, or soil are required to be protected against corrosion. Corrosion can be eliminated or reduced in many ways:

Physical Isolation:

Because both oxygen and moisture are required for the chemical reaction causing corrosion to occur, if the metal component is physically isolated from either oxygen or moisture, the reaction cannot occur. Isolation of the component be accomplished in several ways, including:

- **Jacketed, Clad, and Fiberglass Reinforced Plastic Wrapped Tanks**
  Several manufacturers make steel tanks are coated or jacketed on the outside with strong, water resistant layer of fiberglass, epoxy, or reinforced plastic. This outer layer physically isolates the tank from the soil and groundwater, preventing the chemical reaction causing corrosion from occurring. Although durable, jacketed or clad tanks are still vulnerable to internal corrosion, and it is important to ensure that water levels inside the tank are managed appropriately.

- **Internally-Lined Tanks**
  In the past, 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. A layer of lining material, typically a liquid plastic, was sprayed onto the tank...
interior between 125 mm and 100 mm thick and allowed to cure to a hard finish. Tanks with a lined interior were required to undergo an internal inspection on a routine basis to ensure the lining is an acceptable thickness and has not detached from the tank, showed signs of blistering or other failure. Due to reliability and testing problems, internally-lined tanks were prohibited in 1992, and internal lining is no longer considered an accepted method of corrosion protection of a UST.

**Cathodically-Protected Tanks and Product Pipelines**

Cathodic protection of a tank or product pipeline involves the use of sacrificial anodes or an impressed electrical current system which prevents or limits the chemical reaction which causes metal USTs and product pipelines to corrode.

### Types of Corrosion Protection Systems

**Impressed Current Cathodic Protection System**

An impressed current system uses electricity to prevent the chemical corrosion process from occurring. Typically, anodes are placed in close proximity to the tank and connected to an device called a rectifier, which creates a electrical current between the anode and the tank. This current disrupts the chemical corrosion process.

While effective, impressed current systems require frequent maintenance and inspections to ensure proper operation and protection. Impressed current systems are required to be inspected and tested by a Corrosion Specialist every 2 years, and the rectifier must be checked by the Class A or Class B operator every 60 days. As soil conditions change, the amount of current required to maintain appropriate cathodic protection may vary, therefore the operator may need to frequently adjust the rectifier in order to achieve optimal performance. While many still exist, they have largely been replaced by sacrificial anodes cathodic protection systems.
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.

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 *Error! Reference source not found.* of this document.

Sacrificial Anode Cathodic Protection System

A sacrificial (galvanic) anode system consists of several large pieces of a sacrificial metal, typically zinc, which are either mounted to the UST, or connected to the UST via wire. When connected, the form a galvanic cell, and the sacrificial anode will preferentially corrode instead of the metal UST, product pipeline, or other metal UST components. A sacrificial anode system is required to be tested every 3 years to ensure that the galvanic cell is still operating and that enough

**Figure 28  Sacrificial Anode Attached to UST**
of the sacrificial anode metal remains. If the connection is broken, or the sacrificial anode is completely consumed, the metal UST components will no longer be protected and will begin to corrode, therefore, it is important that the sacrificial anode is inspected every 3 years. The lifespan of a sacrificial anode system is highly dependent on the soil and groundwater the system is installed in; some may last the life of the tank, while some may need to be replaced every 3 years – it all depends on the local soil and groundwater conditions.

**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.
Cathodic Protection Testing Requirements

<table>
<thead>
<tr>
<th>Type of Protection System</th>
<th>Initial Testing</th>
<th>Testing Schedule</th>
<th>Test Performed by?</th>
<th>Recordkeeping Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impressed Current</td>
<td>At installation and any modification</td>
<td>Cathodic Protection inspection and test every 2 years; Operator inspection of rectifier every 60 days;</td>
<td>NACE certified cathodic protection tester</td>
<td>Permanent Records</td>
</tr>
<tr>
<td>Sacrificial Anode</td>
<td>At installation and any modification</td>
<td>Cathodic Protection Inspection and test every 3 years</td>
<td>NACE certified cathodic protection tester</td>
<td></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>
<td></td>
</tr>
<tr>
<td>Cathodic Protection AND Interior Lining</td>
<td>Cathodic protection to be tested and maintained as outlined above; internal inspection of lining NOT required with cathodic protection system in place</td>
<td></td>
<td>NACE certified cathodic protection tester</td>
<td></td>
</tr>
</tbody>
</table>

DEM must be notified of a failed test within 24 hours by calling (401)-222-2797. Passing test results must be submitted within 30 days, and failed tests must be submitted within 7 days.
Chapter 6. Leak and Spill Response

Leak and Spill Response Actions

All owners/operators must report, investigate, and clean up spills, leaks, or releases of any size in accordance with Rule 1.14 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 and existing tank facilities, regardless of use or operational status, where regulated substances and/or hazardous materials are stored.

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:

- An audible or visible alarm coming from the tank monitor or continuous monitoring system or console (e.g., Veeder-Root, INCON). There are many sensors placed throughout the UST system, and if they detect a leak, the tank monitor or continuous monitoring system console 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 and/or secondary tank and pipes.
- An overfill during a fuel delivery.
- Any visible release observed from a dispenser hose, nozzle, or breakaway.

Any possible indication of a release should be treated seriously and immediately investigated. If a release is confirmed, you must notify DEM by calling (401) 222-2797 immediately to report the release. **Releases of any size are reportable!**
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:

- If present, activate the emergency shutoff switch
- Turn off the power to the supply pump (either STP or vacuum pump). This will prevent the lines from being pressurized and prevent release of product from failed product lines or dispensers.
- Turn off power to the dispensers and take them out of service by cutting the supply power and placing a “out of service” bag over the nozzle.

**Step 2: Call for Help**

- Call 911 to request response from the local fire department and hazardous materials response team
- Call DEM Emergency Response at (401) 222-3070 to report the release. Emergency Response is staffed 24 hours a day, 365 days a year
- If applicable, notify the owner and operator, Class A, and Class B operator of the emergency.
- If there is an indication the that UST is the source of the release, call your supplier or an environmental response firm to have the USTs pumped out and emptied

**Step 3: Identify Any Hazards**
Identify any imminent additional hazards, including fire, explosion, or vapor hazards and take action to neutralize these hazards.

**Step 4: Contain the Spill or Overfill**
For surface spills, if safe to do so, contain, absorb, and clean up any 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 5: Notify the DEM UST Program

- Within 24 hours, you are required to report the incident to the DEM UST Management program by calling (401) 222-2797. Please note that DEM Emergency Report is a separate division and only deals with immediate, imminent hazards, and does not necessarily notify all required parties, or address long-term remediation of release. It is important that you notify the UST management program to ensure repairs can be coordinated and the site can be fully assessed for contamination and, if necessary, remediation.
- Within 24 hours, you are required to report the incident to 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.
- Within 7 days of the release, the Class A or class B operator should complete a release characterization report and submit it to the DEM UST Management Program.

Persons reporting leaks or releases to the Department should be prepared to provide their name, location and name of the facility, contact information, a summary of the events which led to the release.

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 1.14(F) 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

**Double-Walled USTs and Product Pipelines**

When a double-walled tank and/or line interstitial tightness test results fail or are unable to be tested, the tester must notify the Department immediately. In addition, the following must occur:

1. The primary wall must be tested tightness tested within 24 hours;
2. If the primary wall is tested as tight, the UST component may remain in operation until the product in the system is consumed, or for 30 days, whichever is shorter. No additional product may be added to the UST system until it has been repaired. All components must be repaired within 60 days of the initial failed test or immediately placed into DEM-approved temporary closure.
3. If the primary wall of a tank or product pipeline fails the tightness test, or is unable to be tested, the impacted UST system must immediately be taken out of service and the contents of the tank removed within 24 hours. The failed components must be repaired within 60 days of the initial failed test or immediately be placed into DEM-approved temporary closure.

**Single-Walled USTs and/or Product Pipelines**

When tank tightness test results indicate that a single-walled UST or product pipeline is no longer liquid tight (e.g., failed) or are unable to be tested, the owner/operator must perform the following actions:

1. Immediately notify DEM by calling (401) 222-2797
2. The owner/operator must immediately take the UST system out of operation and have the contents of the failed UST or product pipeline removed within 24 hours;
3. Hire a qualified 3rd party to perform an investigation and identify the exact source of the release;
4. Submit a release characterization report to DEM within 7 days of the failed test;
5. Within 60 days, repair the failed component. If unable to be repaired, the system must be placed in temporary closure or permanently closed.
6. If a release to the environment is confirmed, hire a qualified 3rd party to perform a Site Investigation and submit a Site Investigation Report.

**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.
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: Repairs and Modifications

Repairing or Modifying a UST or UST System

Historically one of the biggest causes of UST system failure and release of product was due to improper installation or illegal modifications by individuals or contractors who were not properly trained or qualified to perform the work. In order to prevent this from happening, DEM requires that most repairs or modifications to the UST system receive prior approval and review by DEM, and that some modifications are only performed by properly trained and licensed individuals. Many repairs or modifications have special requirements or additional tests required once the repair has been completed. A complete table showing the repair or modification requirements is included in Appendix X.

Many repairs or modifications require DEM review of a scope of work, project materials, submittal of a site plan, and documentation of proper licensure by the contractors working on the project. In any situation where soil is excavated, a qualified environmental consultant is required to be on-site and screen the soils for the presence of contaminant. In many cases, an inspection performed by a DEM staff member is required prior to burial of the component, and testing, calibration, or certification must be performed by a qualified 3rd party post burial and paving. In the event an illegal repair or modification is performed, or the component is buried prior to inspection, DEM may require the area to be re-excavated for inspection and all tests be repeated, and in some circumstances, removal of the repaired or modified component.

DO IT RIGHT THE FIRST TIME!
Repairs or modifications should only be performed by experienced, qualified, and properly licensed contractors. “Cheap” repairs almost always cost more money in the long run, and illegal or poor quality repairs have many hidden costs, such as financial penalties, additional investigation and repair costs, and in the event of a release, you will not be eligible for the UST Reimbursement Fund and will be 100% liable for clean-up costs!
<table>
<thead>
<tr>
<th>Repair or Modification Type</th>
<th>Prior Approval Required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modification or repair of UST or product piping</td>
<td>Yes</td>
</tr>
<tr>
<td>Repair or replacement of any sump, spill containment basin, or under-dispenser containment</td>
<td>Yes</td>
</tr>
<tr>
<td>Replacement or repair of line leak detector</td>
<td>No</td>
</tr>
<tr>
<td>Replacement or Repair of sump liquid level sensors</td>
<td>No</td>
</tr>
<tr>
<td>Replacement or repair of shear valves</td>
<td>No</td>
</tr>
<tr>
<td>Repair of Continuous Monitoring System Console</td>
<td>No</td>
</tr>
<tr>
<td>Replacement of piping boots inside of a sump</td>
<td>No</td>
</tr>
<tr>
<td>Replacement of piping boots outside of a sump</td>
<td>Yes</td>
</tr>
<tr>
<td>Any activity that requires saw cutting asphalt, concrete, or excavation of soil</td>
<td>Yes</td>
</tr>
<tr>
<td>Replacement of dispenser hoses or nozzles</td>
<td>No</td>
</tr>
<tr>
<td>Repair or replacement of overfill protection device (e.g., flapper valve, ball float, overfill alarm)</td>
<td>Yes</td>
</tr>
<tr>
<td>Repair or replacement of automatic tank gauge</td>
<td>No</td>
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<tr>
<td>Repair or replacement of riser pipe</td>
<td>Yes</td>
</tr>
<tr>
<td>Repair or replacement of drop tube (e.g., internal liner)</td>
<td>No</td>
</tr>
<tr>
<td>Repair or replacement of UST interstitial space liquid level sensor</td>
<td>No</td>
</tr>
<tr>
<td>Repair, maintenance, or replacement of dispenser</td>
<td>No</td>
</tr>
<tr>
<td>Repair, modification, or replacement of any cathodic protection component</td>
<td>Yes</td>
</tr>
<tr>
<td>Repair, modification, or replacement of below-ground vent piping</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Chapter 8: Compatibility

Biofuel/Alternative Fuel Compatibility

Within the past 10 years, the use of alternative fuels in the United States has grown dramatically. Many retail facilities, such as gas stations and private fueling facilities, already store and dispense ethanol blends of gasoline 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.

Biofuels and ethanol are chemically different than traditional petroleum-derived fossil fuels, and older UST systems may not have been designed or intended to hold these types of fuels due to potential compatibility problems. For example, some brands of pipe thread sealants used in the 1960’s, 1970’s, and 1980’s were only formulated with gasoline or diesel in mind, and when exposed to ethanol or biodiesel, begin to breakdown may cause leaks. Therefore, it is important that before the contents of a UST system are changed, the owner/operator is able to demonstrate that all components of the system, including the product piping and USTs themselves, are compatible with the new contents of the tank. If UST materials are not compatible with substances stored, the substances may degrade the UST components causing permanent damage and a release to the environment. Prior to storing alternative fuels, UST owners and operators should ensure that their UST system is constructed of with materials that are compatible with the substance stored in the UST system.

UST systems have been required to be compatible with up to 10% Ethanol since the late 1980’s, however, as the alternative fuel market matures and new options become available, it is important to check with DEM and the manufacturer of your UST components to ensure they are compatible before switching to a different product type. Generally, there is not a problem if switching from gasoline to diesel or vice versa, or switching to a different fuel supplier, however, if you decide to switch to biodiesel or a blend of gasoline or diesel that contains more than 10% ethanol or 20% biofuels, caution should be used to ensure your system is compatible with these higher ethanol/biodiesel blends. When in doubt, you should call DEM for additional guidance.

Owners/Operators must notify the DEM at least 30 days prior to switching to:
- Any substances containing greater than 10 percent ethanol;
- Any substances containing greater than 20 percent biodiesel;
- Any substance not originally intended to be store when the UST was installed
Demonstrating Compatibility

Owners and operators storing any regulated substance or hazardous material are required to demonstrate compatibility prior to placing it into any UST system. For commonly used products such as gasoline, diesel, heating fuels, kerosene, aviation fuels, or motor or lube oils, this is typically a simple process and the appropriate manufacturer documentation is supplied during the installation process. However, if you intend on putting any other regulated or hazardous substance into a UST system, including blends of gasoline containing greater than 10% ethanol or 20% biodiesel, you must provide documentation that the UST system and all components that will come into contact with the substance are fully compatible and will not break down, corrode, or otherwise be damaged. This may be challenging for older systems if the component manufacturers are no longer in business, or if component was never designed or manufactured to store that particular material. Generally speaking, prior to DEM approving any change in material stored or used in a UST system, one or more of the following is required:

- Certification or listing of UST system equipment or components by a nationally recognized, independent testing laboratory
- Written approval from the equipment or component manufacturer clearly stating that their product(s) are compatible with the material intended to be stored
- 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 9: Closure Requirements

There may come a time when an owner/operator decides to permanently or temporarily cease operation of a UST or UST system. This may be due to repairs, seasonal closures, replacement of the UST, Product pipeline, or other UST components, illness, property transfer, or a variety of other reasons. As an operator, it is important you are aware of what is required if a UST or UST system needs to be taken out of service for an extended period of time or removed entirely.

In order to be in compliance with State and Federal requirements, all UST systems must either be in active use, temporarily closed, or permanently closed. Any UST system that has been taken out of service or not used for more than 30 days and has not been granted temporary closure approval by DEM is considered abandoned and in violation of the law. Abandonment of a UST or UST system is strictly prohibited, and may result in enforcement action, including administrative penalties and requirement to remove the UST system!

**Rule 1.15(B)(1) Abandonment of USTs**

Any UST or UST system that has been out of service for more than 30 days is considered abandoned. To avoid this, you must apply for temporary closure status.

**Temporary Closure of UST Systems**

Temporary closure of a UST system is a way the UST or UST system can be taken out of service while still remaining in compliance with the regulations and Laws. Temporarily closed USTs or UST systems must be completely empty and must be approved by DEM. Temporary closures are given in increments of one year and can be renewed if required. The maximum cumulative length of time a UST or UST system can be in temporary closure is five years.

**Steps to Temporary Closure Approval**

1. Ensure the UST facility meets the following requirements:
   a. All USTs contain <1” of product;
   b. All product piping and vapor return lines are emptied and purged of any remaining product;
   c. All fill and vapor recovery ports are capped and secured against tampering;
   d. Vent lines contain appropriate pressure/vacuum relief valves and are not capped;
   e. Electricity to all STPs and dispensers is physically disconnected;
   f. A certified Class A and Class B, or Class A/B operator is assigned to the UST facility;
   g. Manways, pumps, and other components are secured;

2. UST facilities in temporary closure must meet the following minimum requirements:
   a. The Cathodic protection system on the UST system should continue to operate and be tested according to the normal schedule (e.g., every 3 years for Sacrificial
Anodes; every 2 years for Impressed Current and rectifier inspected and recorded every 60 days);
b. Release reporting and investigation requirements should still be met
c. A Class A, Class B, or Class A/B operator must inspect the site twice per year to check the condition of UST components. The operator should measure the amount of product in the tank once per year to confirm the amount of liquid has not changed.
d. The owner of the UST facility must continue to pay all UST registration fees and comply with all applicable federal, state and local requirements

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.

Rule 1.15(C)(5)(j) Approval of temporary closure may be revoked at any time by DEM for failure to meet the minimum requirements of temporary closure

Requesting an Extension to a Temporary Closure
1. The “Temporary Closure Application” should be re-submitted by the owner/operator at least 30 days before the current temporary closure expires
2. A UST facility inspection should be conducted by the Class A/B operator within 30 days of the application to document the UST facility conditions.
3. DEM may require additional documents or repairs made before granting approval of the extension.

Re-opening a UST system in Temporary Closure
1. DEM must be notified 30 days prior to re-opening the UST system. The owner/operator of the facility must receive written approval before adding any product into the UST system
2. The following must be completed:
   a. 3rd party inspection and testing of the shear valves, continuous monitoring system, ATG, and line leak detector to ensure proper operation;
   b. For double-walled USTs and product pipelines, perform tightness tests of both the UST interstitial space and product piping interstitial space. For single-walled USTs or product pipeline, the primary wall must be tested for tightness. All tests must be performed by a DEM-licensed tightness tester using a DEM-approved tightness test method.
   c. Completion of a “passing” compliance inspection by a DEM inspector
Permanent Closure of UST Systems

Any UST system that is required to be registered with the department must follow the DEM permanent closure process to permanently close as UST or UST system. In most cases, permanent closure of a UST system requires complete removal of all UST and UST components from the ground and proper disposal at an off-site recycling facility.

In rare circumstances where removal of the UST or UST system is impossible due to proximity to utilities, risk of structural damage to surrounding structures or infrastructure, or inability to extract the tank due to limited overhead clearance, a closure in place may be approved. A closure in place requires that the entire UST system be cleaned, multiple core samples are taken through the bottom of the tank to determine if a release occurred, and the UST system is filled with a hardening flowable fill.

Permanent closure may be required for any of the following reasons:
- The owner/operator wishes to close or replace the system;
- The UST, UST system, or product piping has been abandoned;
- Any component of the UST, UST system, or product pipeline has exceeded the maximum temporary closure duration of five years;
- The UST, UST system, and/or product pipeline has failed tightness testing and was unable to be satisfactorily repaired within the required timeframe;
- The UST, UST system, and/or product pipeline exhibit evidence of structural failure, excessive corrosion, or damage;
- The UST, UST system, or product pipeline no longer meets the minimum requirements outlined in §§ 1.10 and 1.11 of this Part;
- The UST, UST system, product pipeline, or UST components exhibit evidence of a release;
- As required by the Director.

What are the Requirements for Permanent Closure?

The closure of any UST systems that is required to be registered by the department or stored federally regulated materials is required to be approved and overseen by RI DEM. This generally includes any UST or UST system containing gasoline, kerosene, diesel, used or new motor or lube oils, aviation fuels. This also applies to any UST or UST system containing heating fuels of any grade used at industrial, commercial, public, government, military, or educational facilities, and any UST or UST system larger than 1,100 gallons at a private residence.

A Closure Assessment Report is required for any facility containing federally regulated materials. A closure assessment is performed by a qualified environmental consultant and typically involves screening soils using specialized meters and collecting soil and groundwater samples for analysis to determine if a release occurred. DEM inspectors are also required to be on-site during the UST removal to determine the condition of the UST, look for evidence of a
release, and direct initial remediation efforts. Any UST removal or closure that occurs without prior DEM approval and on-site DEM inspection is considered an illegal closure, and the property owner may be required to perform intensive soil sampling to determine if soil or groundwater contamination exists, and may also be subject to significant financial penalties.

How do I permanently close a UST?

Step 1: Find a Contractor
RI DEM does not have specific regulations or requirements for contractors who perform UST tank closures, and therefore we are unable to recommend or provide a list of contractors. We recommend that you speak with your gasoline supplier, 3rd party tester, or colleagues for recommendations, or, use your favorite internet search engine to look for contractors who perform UST system closures. We recommend that you contact multiple companies for estimates, as availability, experience, abilities, and insurance may vary widely. If you are required to perform an site assessment as well, you may also need to find an environmental consultant, however, most experienced UST system contractors will be able to provide you with this service or direct you to someone familiar with the requirements in Rhode Island.

Step 2: Submit Closure Application to DEM
Owners/operators wishing to permanently close a UST or UST system 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. The closure application is typically completed by the contractor performing the closure.

Step 3: 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 4: Scheduling a UST Closure
The closure will be scheduled for the next available inspection date unless other arrangements are made. Please be aware that due to limited staffing and the unpredictable nature of UST closures, your preferred closure date may not be available, and during peak periods, there may be a several week wait to schedule a UST closure inspection. Therefore for time-sensitive closures, we recommend that you submit your application and schedule the closure well in advance and perform as much pre-closure activities as possible prior to the closure date to limit the number of surprises that may occur on the date of the closure. Once scheduled, DEM
will issue the owner/operator a UST Closure Approval Letter which includes the date of the closure, along with the name and contact information of the assigned closure inspector.

**Step 5: 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 must 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 is required for any UST or UST system that contained motor fuels (e.g., gasoline, diesel, kerosene, aviation fuel), and must be completed under the supervision of a licensed professional engineer or geologist. In some cases, owners of systems where a closure assessment is not required (e.g., heating oil tanks) may still perform them to aid in the sale of the property or as a requirement of a bank or other lending institution which holds the mortgage to the property.

**Certificate of Closure**
Following DEM inspection of a closure and, if applicable, the receipt of a Closure Assessment Report, the Department shall issue a Certificate of Closure. This is a legal document which shows that the USTs were removed in accordance with applicable DEM requirements.

**LUST Designation**
If evidence of contamination or a leaking tank was observed during the UST closure or is presented in the Closure Assessment Report, the facility may be designed as a Leaking Underground Storage Tank (LUST) facility. The facility will be assigned a project manager to oversee the clean-up and remediation of the property, and the owner/operator will be required to develop and Complete a Corrective Action Plan to remediate the soil and groundwater. DEM may require additional actions be taken if there is evidence of a release before issuing a Certificate of Closure.

**Closure Recordkeeping**
All closure records are considered permanent records and must be kept for three (3) years beyond the operational life of the facility.
Chapter 10: 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 Federal requirement and all UST facility operators are required to demonstrate that they have sufficient assets, insurance coverage, or are in good standing with the Rhode Island LUST reimbursement fund in order to pay all costs associated with the clean-up or remediation of any release from their UST system. Owners/operators must demonstrate that they have a minimum of $1,000,000 in coverage.

These requirements DO NOT apply to:
- USTs used solely for the storage of heating or fuel oils consumed on-site
- 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.

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

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 event).

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 all applicable 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. It is important to note that failure to comply with any UST regulation or RIGL will make you ineligible for reimbursement, and you will be liable for 100% of any expenses incurred. Therefore, it is important that you remain in compliance with RI DEM rules and regulations at all times, and immediately address any instances of non-compliance. Any facility which remains out of compliance with the UST Regulations will not be considered compliant with the Federal Financial Responsibility requirements unless they are able to demonstrate financial responsibility via the Financial Test of Self Insurance or Private Insurance.

Financial Test of Self-Insurance
This option involves no source of funding other than assets of 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/Private Insurance
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.

Any facility which does not comply with any of the RI DEM or Federal UST Regulations, Rules, or requirements will not be eligible for reimbursement from the Rhode Island Financial Responsibility Fund in the event of a release and you will be liable for 100% of the cost! Therefore, it is important that you immediately address all instances of non-compliance observed and ensure that you comply with any notices received from RI DEM or U.S. EPA
Chapter 11: Notification and Recordkeeping

Notification Requirements

Changes to UST Facility Registration Information
DEM must be notified of any change to the owner or operator of any UST or UST system within 7 days of the change. Verbal notifications are not accepted, and all changes must be submitted in writing using the DEM-supplied form called “Change in Ownership of a UST or UST Facility” available on our website.

All permanent and routine records must be given to the new owner and/or operator upon transfer of registration. The old owner and/or operator may keep copies of the records, however, the originals are required to be transferred to the new owner.

Recordkeeping Requirements

Permanent Records
Any record designated as “permanent” must be kept for a minimum of 3 years beyond the operational life of a facility. This includes:
- UST facility registration application;
- UST and Product Piping primary and interstitial tightness test results;
- All sump, spill containment basin, and under-dispenser containment tightness testing results and repair records;
- All records related to the modification or repairs to the UST facility;
- Annual test results of leak detection equipment/systems;
- UST closure activity documentation (closure assessments, site investigations, etc.);
- All records of leaks, spills, site investigations, and remedial activities;
- All records pertaining to the operation and maintenance of corrosion protection methods;
- Equipment warranties and manufacturer checklists;
- Documents of UST system compatibility with substances greater than 10% ethanol and/or 20% biodiesel if applicable;

Routine Records
Any record designated as “Routine” must be kept for a minimum period of 3 years from the date it was created. Routine records include:
- Records of all maintenance performed;
- Records of all strip charts or Continuous Monitoring System printouts;
- Results from monthly test of continuous monitoring system;
• Operator monthly inspection checklist;
• Daily and monthly inventory recordkeeping (for single-walled tanks only);
• Records of annual shear valve tests;

Chapter 12: Delivery Prohibition

UST Facility Violations Subject to Delivery Prohibitions

If a facility owner or operator fails to maintain the UST or UST system, the Department may issue a delivery prohibition, also known as a “red tag”. When a delivery prohibition is issued, members of DEM and the local, State, or DEM police will place a locking cover over all fill pipes, preventing delivery of any product. A list of facilities that are issued delivery prohibitions is maintained by DEM and published on our website and is sent to all fuel distributors in Rhode Island. Adding any product to a UST system that has a delivery prohibition is a serious crime, and any party who attempts to do so will face severe penalties.

DEM may issue a delivery prohibition for any of the following reasons:
• Failure to have or maintain spill prevention equipment;
• Failure to have or maintain overfill protection equipment installed;
• Failure to have or maintain Release Detection equipment installed;
• Failure to have or maintain adequate corrosion protection;
• Failure to investigate a release or spill;
• Failure to repair leaking, damaged, defective, or unsuitable components within the required time frame;
• Failure to comply with corrective action or remediation of a release;
• Failure to perform any routine test, including tightness testing of any component;
• Failure to maintain Financial Responsibility
• Failure to register or maintain registration including payment of all required fees;
• Failure to obtain or maintain required certification for Class A, Class B and/or Class C operator(s)
Delivery Prohibition Red Tag Program

Once a delivery prohibition has been issued by the Department, all USTs located at the facility will have a locking cover placed on all fill points. 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, are required to be permanently closed and are not eligible to re-open.

Chapter 13: Compliance and Enforcement

Compliance Inspections

The Rhode Island Department of Environmental Management performs routine compliance inspections at all UST facilities. These inspections may be announced or unannounced and are intended to assess the compliance of the facility, owner, and operators with State and Federal requirements. The Rhode Island UST Regulations require UST owners and operators to cooperate fully with all inspections. The frequency of inspections will vary with the type and past compliance history of the facility, and for facilities with past compliance issues, inspections may be more frequent. During the inspection, DEM personnel may open sumps, spill containment basins and dispensers, review the alarm history on the continuous monitoring system, assess employee preparedness and emergency response capabilities, as well as review all permanent and routine records. Please remember that since these records are required to be maintained on-site, if you are unable to produce the records during an inspection, this will be considered a violation and you will fail the inspection.
Class A and Class B Liabilities

Generally, the responsibility and liability of a Class A or Class B operator for violations observed, as well as any subsequent enforcement actions and penalties against a facility will depend on the role the Class A or Class B operator has in the facility. If the Class A or Class B operator is also a owner, facility operator, or otherwise involved in the day to day operation of the facility, then they would be considered a responsible party and liable for any violations observed as an owner/operator. However, if the Class A or Class B operator is a 3rd party hired solely to fulfill the roles of a Class A or B operator and have no ownership stake or involvement in the day to day operation of the facility and do not meet the definition of a responsible party, they generally will not be responsible or liable for violations observed as long as they are reported to the owner as required. The Class A and Class B operators are expected to report all violations observed immediately to the owner/operator and document them on the monthly inspection checklist, and if the violation is present for more than three consecutive months, they must have the owner or operator sign the DEM-supplied monthly operator checklist to document that the owner was informed of the deficiencies. DEM understands that many 3rd party operators are hired to fulfill the requirements, and may not have ability to actually perform repairs or resolve issues present at the facility, and therefore, it is important that the Class A and Class B operator take steps to protect themselves by documenting they reported these violations to the owner. In the event the owner refuses to sign an acknowledgement, or if the violations go unresolved, the Class A and Class B operator should notify DEM immediately.

Class A and Class B operator certificates may be revoked and rescinded by DEM at any time for failure to fulfill the basic responsibilities outlined in Rule 1.10 of the UST Regulations. If your certificate is revoked or rescinded, you will be required to be re-trained and will have to take the certification exam again at your expense.

Letter of Non-Compliance

If violations of the UST Regulations are present, typically the first enforcement step is a Letter of Non-Compliance. This is a letter sent to the facility owner/operator that outlines the violations present and what action is required to resolve them. A Letter of Non-Compliance is considered an informal enforcement action and allows the owner/operator to resolve the violations outside of the formal enforcement process, and typically does not have any penalties attached. If the violations are resolved in the timeframe given and documentation is provided to DEM, the matter will be considered resolved. If, however, the violations are not resolved, the matter will be escalated to a Notice of Intent to Enforce.
**Notice of Intent to Enforce**

A Notice of Intent to Enforce is the first step in the formal enforcement process. You may receive a Notice of Intent to Enforce if you failed to respond adequately to a Letter of Non-Compliance, or, if serious violations of the UST Regulations are suspected or observed that require immediate action. This letter is sent to all legal respondents, including the property owner on record with the municipal tax assessor, registered owner/operator, as well as all businesses and resident agents identified by the State of Rhode Island Secretary of State as doing business at the property address. A Notice of Intent to Enforce will clearly identify the violation, the specific rule or regulation that has been violated, as well as remedial action required. If the violations are resolved within the timeframe given, the matter will be considered resolved. However, if you fail to resolve the violations, the matter will be escalated to a Notice of Violation.

**Notice of Violation**

A Notice of Violation is a legal order requiring specific remedial actions and the assessment of financial penalties (e.g., fines) as a result of failing to comply with the UST Regulations and/or resolve outstanding violations within the timeframe given. A Notice of Violation is sent to all responsible parties, and is also recorded on the Land Evidence Record for the property, and will remain on the record until the Notice of Violation has been resolved. Financial penalties in a Notice of Violation can be as high as $25,000 per violation per day and will vary with the severity of the violation. Required remedial actions may range from addressing the specific violation to complete removal and permanent closure of the UST system. Failure to comply with a Notice of Violation may result in DEM bringing the case to Rhode Island Superior Court where a judicial order, additional financial or criminal penalties, including jail time, may be issued.
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.

Containment Sump
A liquid tight container that contains any leaks from piping, dispensers, pumps, and related components in the containment area. This includes dispenser sumps (UDCs), transition sumps, and tank top sumps.
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.

**Regulated Substance**
Any substance defined in section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980. Common regulated substances used in USTs include motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils.

**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**
A monitoring well installed within the tank pad that extends one to two feet below the bottom of the tank. A tank pad well might not intersect the groundwater table, depending on the site’s geologic conditions.

**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 (UDC)**
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.