



**PDHonline Course C232 (2 PDH)**

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## **UST Systems - Maintenance Basics**

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**2012**

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## Section 4 — Spill And Overfill Protection

The purpose of spill and overfill protection equipment is to eliminate the potential for a release during fuel deliveries. The equipment must be in working order and used properly to provide adequate protection from spills and overfills.

Even the best spill and overfill protection equipment can become faulty over time if not properly operated and maintained.

Only one gallon of fuel leaking each week from a poorly maintained spill bucket can result in up to 195 tons of contaminated soil in a year.

Improper maintenance of the spill bucket at the UST site pictured below contributed to significant contamination of soil and groundwater.

### What's The Difference?

#### Spill Protection:

A spill bucket is installed at the fill pipe to contain the drips and spills of fuel that can occur when the delivery hose is uncoupled from the fill pipe after delivery.

#### Overfill Protection:

Equipment is installed on the UST that is designed to stop product flow, reduce product flow, or alert the delivery person during delivery **before** the tank becomes full and begins releasing petroleum into the environment.

The following pages in this section focus on how you can routinely make sure your spill and overfill equipment is operating effectively.

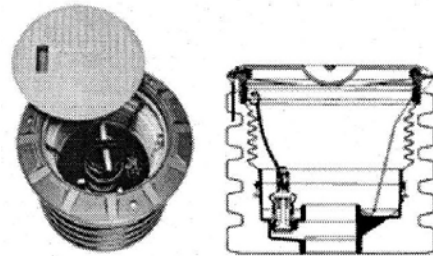


## What Are The Basics Of Spill Protection?

Your USTs must have catchment basins — also called spill buckets — installed at the fill pipe to contain spills that may occur as a result of fuel deliveries.

- The spill bucket is designed to temporarily contain product spills that might occur during fuel delivery. To contain a spill, the spill bucket must be liquid tight.
- **The spill bucket is not designed to contain fuel for long periods of time.** After each delivery, empty and dispose of contents properly.
- Spill buckets need to be large enough to contain any fuel that may spill when the delivery hose is uncoupled from the fill pipe. Spill buckets typically range in size from 5 gallons to 25 gallons.
- If you use a checklist for correct delivery practices (see page 33), spills should be eliminated or reduced to very small volumes that your spill bucket can easily handle.

If your UST **never** receives deliveries of more than 25 gallons at a time, the UST does not need to meet the spill protection requirements. Many used oil tanks fall into this category. Even though these USTs are not required to have spill protection, you should consider using spill protection as part of good UST system management.



Examples Of Spill Buckets

## How Do You Maintain Your Spill Bucket?

The checklist below provides information on properly maintaining your spill bucket.

### ✓ Spill Bucket O&M Checklist

- ☐ **Keep your spill bucket empty of liquids.**  
Some spill buckets are equipped with a valve that allows you to drain accumulated fuel into your UST. Others may be equipped with a manual pump so fuel can be put into your UST by pumping it through the fill pipe. However, keep in mind that when you pump out or drain your spill bucket into your UST, any water and debris may also enter the UST. If a basin is not equipped with drain valve or pump, then any accumulated fuel or water must be removed manually and disposed of properly.
- ☐ **Periodically check your spill bucket to remove any debris.**  
Debris could include soil, stones, or trash.
- ☐ **Periodically check to see if your spill bucket is still liquid tight.**  
Have a qualified UST contractor inspect your spill bucket for signs of wear, cracks, or holes. Based on this inspection, the contractor may suggest a test to determine if the spill bucket is tight or needs repair or replacement.

# What Are The Basics Of Overfill Protection?

Your USTs must have overfill protection installed to help prevent the overfilling of tanks.

Three types of overfill protection devices are commonly used:

- Automatic shutoff devices
- Overfill alarms
- Ball float valves

Each of these forms of overfill protection is discussed in detail on the following pages.

If your UST ***never*** receives deliveries of more than 25 gallons at a time, the UST does not need to meet the overfill protection requirements. Many used oil tanks fall into this category. Even though these USTs are not required to have overfill protection, you should consider using overfill protection as part of good UST system management.

## How Can You Help The Delivery Person Avoid Overfills?

To protect your business, you must make every effort to help the delivery person avoid overfilling your UST.

### Use A Checklist On Correct Filling Practices

If correct filling practices are used, you will not exceed the UST's capacity — see page 33 for a checklist on correct filling procedures. Overfills are caused when the delivery person makes a mistake, such as ignoring an overfill alarm.

### Use Signs, Alert Your Delivery Person

The delivery person should know what type of overfill device is present on each tank at your facility and what action will occur if the overfill device is triggered — such as a visual and/or audible alarm or that the product flow into the tank will stop or slow significantly.

***Educate and alert your delivery person by placing a clear sign near your fill pipes, in plain view of the delivery person.*** An example of such a sign follows on the next page.

### **Delivery Person — Avoid Overfills**

- An **overflow alarm** is used for overflow protection at this facility.
- Do not tamper with this alarm in any attempt to defeat its purpose.
- When the tank is 90% full, the overflow alarm whistles and a red light flashes.
- **If you hear the alarm whistle or see the red light flashing,**

**Stop The Delivery Immediately!**

### **Make Sure You Order The Right Amount Of Product**

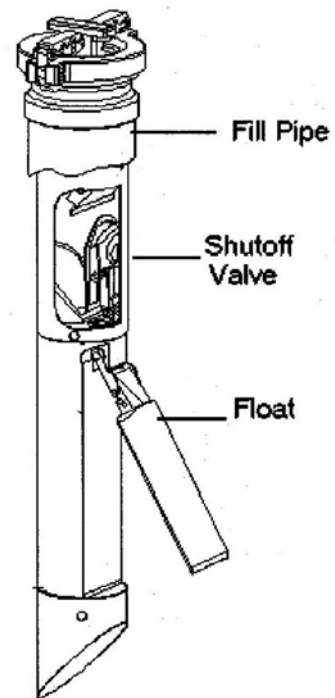
Also, you need to **make sure you've ordered the right amount of product for delivery**. Order only the quantity of fuel that will fit into 90% of the tank. For example, if you have a 10,000 gallon tank with 2,000 gallons already in the tank, you would order at the most a 7,000 gallon delivery (90% of 10,000 is 9,000 gallons; subtracting the 2,000 gallons already in the tank leaves a maximum delivery of 7,000 gallons). Use the checklist formula on page 33. Do your homework right and you reduce the chance of overfills.

## What Should You Do To Operate And Maintain Your Automatic Shutoff Device?

The automatic shutoff device is a mechanical device installed in line with the drop tube within the fill pipe riser. It slows down and then stops the delivery when the product has reached a certain level in the tank. It should be positioned so that the float arm is not obstructed and can move through its full range of motion.

When installed and maintained properly, the shutoff valve will shut off the flow of fuel to the UST at 95% of the tank's capacity or before the fittings at the top of the tank are exposed to fuel.

**You should not use an automatic shutoff device for overfill protection if your UST receives pressurized deliveries.**



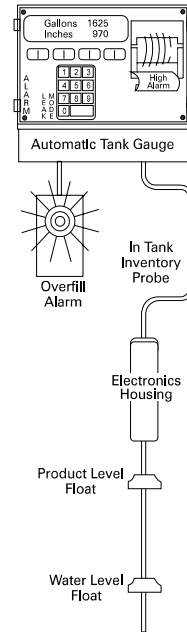
### ✓ Basic O&M Checklist For Automatic Shutoff Devices

- ❑ A qualified UST contractor periodically checks to make sure that the automatic shutoff device is functioning properly and that the device will shut off fuel flowing into the tank at 95% of the tank capacity or before the fittings at the top of the tank are exposed to fuel:
  - Make sure the float operates properly.
  - Make sure there are no obstructions in the fill pipe that would keep the floating mechanism from working.
- ❑ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.

## What Should You Do To Operate And Maintain Your Electronic Overfill Alarm?

This type of overfill device activates an audible and/or visual warning to delivery personnel when the tank is either 90% full or is within one minute of being overfilled. **The alarm *must* be located so it can be seen and/or heard from the UST delivery location.** Once the electronic overfill alarm sounds, the delivery person has approximately one minute to stop the flow of fuel to the tank.

Electronic overfill alarm devices have no mechanism to shut off or restrict flow. Therefore, the fuel remaining in the delivery hose after the delivery has been stopped will flow into the tank as long as the tank is not yet full.



### ✓ Basic O&M Checklist For Overfill Alarms

- ☐ A qualified UST contractor periodically checks your electronic overfill alarm to make sure that it is functioning properly and that the alarm activates when the fuel reaches 90% of the tank capacity or is within one minute of being overfilled:
  - Ensure that the alarm can be heard and/or seen from where the tank is fueled.
  - Make sure that the electronic device and probe are operating properly.
- ☐ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.

## What Should You Do To Operate And Maintain Your Ball Float Valve?

The ball float valve — also called a float vent valve — is installed at the vent pipe in the tank and restricts vapor flow in an UST as the tank gets close to being full. The ball float valve should be set at a depth which will restrict vapor flow out of the vent line during delivery at 90% of the UST's capacity or 30 minutes prior to overfilling.

As the tank fills, the ball in the valve rises, restricting the flow of vapors out of the UST during delivery. The flow rate of the delivery will decrease noticeably and should alert the delivery person to stop the delivery.

For ball float valves to work properly, the top of the tank must be air tight so that vapors cannot escape from the tank. Everything from fittings to drain mechanisms on spill buckets must be tight and be able to hold the pressure created when the ball float valve engages.



**You should not use a ball float valve for overfill protection if any of the following apply:**

- **Your UST receives pressurized deliveries.**
- **Your UST system has suction piping.**
- **Your UST system has single point (coaxial) stage 1 vapor recovery.**

### ✓ Basic O&M Checklist For Ball Float Valves

- ☐ A qualified UST contractor periodically checks to make sure that the ball float valve is functioning properly and that it will restrict fuel flowing into the tank at 90% of the tank capacity or 30 minutes prior to overfilling:
  - Ensure that the air hole is not plugged.
  - Make sure the ball cage is still intact.
  - Ensure the ball still moves freely in the cage.
  - Make sure the ball still seals tightly on the pipe.
- ☐ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.



## ✓ Spill And Overfill O&M Checklist

<b>Spill Bucket</b>	<ul style="list-style-type: none"> <li>❑ <b>Keep your spill bucket empty of liquids.</b> Some spill buckets are equipped with a drainage valve which allows you to drain accumulated fuel into your UST. Others can be equipped with a manual pump so fuel can be put into your UST by pumping it through the fill pipe. However, keep in mind that when you pump out or drain your spill bucket into your UST, any water and debris may also enter the UST. If a spill bucket is not equipped with a drain valve or pump, then any accumulated fuel or water must be removed manually and disposed of properly.</li> <li>❑ <b>Periodically check your spill bucket to remove any debris.</b> Debris could include soil, stones, or trash.</li> <li>❑ <b>Periodically check to see if your spill bucket is still liquid tight.</b> Have a qualified UST contractor inspect your spill bucket for signs of wear, cracks, or holes. Based on this inspection, the contractor may suggest a test to determine if the spill bucket is tight or needs repair or replacement.</li> </ul>
<b>Automatic Shutoff Devices</b>	<ul style="list-style-type: none"> <li>❑ A qualified UST contractor periodically checks to make sure that the automatic shutoff device is functioning properly and that the device will shut off fuel flowing into the tank at 95% of the tank capacity or before the fittings at the top of the tank are exposed to fuel: <ul style="list-style-type: none"> <li>• Make sure the float operates properly.</li> <li>• Make sure that there are no obstructions in the fill pipe that would keep the floating mechanism from working.</li> </ul> </li> <li>❑ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.</li> </ul>
<b>Overfill Alarms</b>	<ul style="list-style-type: none"> <li>❑ A qualified UST contractor periodically checks your electronic overfill alarm to make sure that it is functioning properly and that the alarm activates when the fuel reaches 90% of the tank capacity or is within one minute of being overfilled: <ul style="list-style-type: none"> <li>• Ensure that the alarm can be heard and/or seen from where the tank is fueled.</li> <li>• Make sure that the electronic device and probe are operating properly.</li> </ul> </li> <li>❑ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.</li> </ul>
<b>Ball Float Valves</b>	<ul style="list-style-type: none"> <li>❑ A qualified UST contractor periodically checks to make sure that the ball float valve is functioning properly and that it will restrict fuel flowing into the tank at 90% of the tank capacity or 30 minutes prior to overfilling: <ul style="list-style-type: none"> <li>• Ensure that the air hole is not plugged.</li> <li>• Make sure the ball cage is still intact.</li> <li>• Ensure the ball still moves freely in the cage.</li> <li>• Make sure the ball still seals tightly on the pipe.</li> </ul> </li> <li>❑ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.</li> </ul>

## What Are Your Responsibilities For Correct Filling Practices?

As an owner or operator you are responsible for ensuring that releases due to spilling or overfilling do not occur during fuel delivery.

As part of this responsibility, you must:

- Ensure the amount of product to be delivered will fit into the available empty space in the tank; and
- Ensure the transfer operation is monitored constantly to prevent overfilling and spilling.

One way help ensure the above requirements are met is to follow the checklist on the next page. The checklist describes activities to perform before, during, and after a fuel delivery.



## ✓ Correct Filling Checklist

<b>What To Do Before Your USTs Are Filled</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Post clear signs that alert delivery persons to the overfill devices and alarms in use at your facility.</li> <li><input type="checkbox"/> Make and record accurate readings for product and water in the tank before fuel delivery.</li> <li><input type="checkbox"/> Order only the quantity of fuel that will fit into 90% of the tank.</li> </ul> <p style="text-align: center;"><b>Remember, the formula for determining the maximum amount of gasoline to order is:</b></p> <p style="text-align: center;">(Tank capacity in gallons X 90% ) — Product currently in tank = Maximum amount of fuel to order</p> <p style="text-align: center;"><b>Example:</b> (10,000 gal X 0.9 ) — 2,000 gal = 7,000 gal maximum amount to order</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure fuel delivery personnel know the type of overfill device present at the tank and what actions to perform if it activates. For example, use sample sign on page 27 of this chapter.</li> <li><input type="checkbox"/> Review and understand the spill response procedures.</li> <li><input type="checkbox"/> Verify that your spill bucket is empty, clean, and will contain spills.</li> </ul>
<b>What To Do While Your USTs Are Being Filled</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Keep fill ports locked until the fuel delivery person requests access.</li> <li><input type="checkbox"/> Have an accurate tank capacity chart available for the fuel delivery person.</li> <li><input type="checkbox"/> The fuel delivery person makes all hook-ups. The person responsible for monitoring the delivery should remain attentive and observe the entire fuel delivery, be prepared to stop the flow of fuel from the truck to the UST at any time, and respond to any unusual condition, leak, or spill which may occur during delivery.</li> <li><input type="checkbox"/> Have response supplies readily available for use in case a spill or overfill occurs (see Section 3).</li> <li><input type="checkbox"/> Provide safety barriers around the fueling zone.</li> <li><input type="checkbox"/> Make sure there is adequate lighting around the fueling zone.</li> </ul>
<b>What To Do After Your USTs Are Filled</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Following complete delivery, the fuel delivery person is responsible for disconnecting all hook-ups.</li> <li><input type="checkbox"/> Return spill response kit and safety barriers to proper storage locations.</li> <li><input type="checkbox"/> Make and record accurate readings for product and water in the tank after fuel delivery.</li> <li><input type="checkbox"/> Verify the amount of fuel received.</li> <li><input type="checkbox"/> Make sure fill ports are properly secured.</li> <li><input type="checkbox"/> Ensure the spill bucket is free of product and clean up any small spills.</li> </ul>