# Spill and Overfill Control

Tank owners and operators are responsible for ensuring that fuel spills or overfills do not occur during fuel deliveries.

As the person responsible for ensuring that spills and overfills do not happen, it is useful to follow the same delivery procedure each time an underground storage tank (UST) is filled. The procedure should include the following measures:

- Ensure there is enough room in the tank BEFORE each delivery. MEASURE the fuel level in the tank before the delivery;
- Monitor all fuel deliveries from beginning to end;
- Inspect all spill buckets routinely (before and after each delivery); and
- Contain, report and cleanup all spills. Have spill cleanup materials available for small and large spills, post emergency phone numbers in a conspicuous place so the spill can be reported to the appropriate authorities.

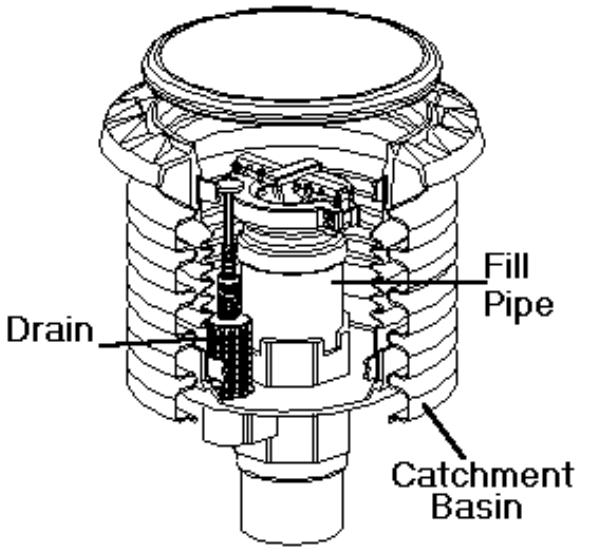
[Note: Spills or overfills of less than 25 gallons that are contained and immediately cleaned up do not have to be reported. Spills or overfills greater than 25 gallons must be reported to the North Dakota Department of Environmental Quality within 24 hours of their discovery.]

## *Spill Buckets*

A spill bucket is a liquid-tight container that surrounds the fill pipe. They typically range in size from a minimum of 5 gallons to 25 gallons and are there to catch and contain any small leaks, drips and spills from the delivery hose during the fuel delivery process.

**The spill bucket is not designed to contain fuel for long periods of time.** After each delivery, operators should empty and dispose of the contents properly.

All tanks must be equipped with a spill bucket if the tank system is filled by transfers of **more** than 25 gallons at one time.




Spill bucket

## *Spill Buckets*

What should a tank operator look for when inspecting spill buckets?

- Are the lids in good condition? *Chipped spill bucket lids, and lids that do not fit securely allow water to enter the bucket.*
- Is the spill bucket free of debris, liquid or ice? *Water and/or fuel sitting in spill buckets will damage the buckets over time.*
- Is the spill bucket free of cracks or holes? *Cracks or holes in the bucket itself allow fuel to leak out. If a spill bucket is damaged it needs to be repaired or replaced.*
- Are the drain valves operational? *If the drain valve is left open it can allow water and debris to enter the tank? [NOTE: Not all spill buckets have drain valves.]*

An example of a clean spill bucket

## *Spill Buckets*

Spill buckets are maintenance items that must be periodically replaced. Given their exposure to weather extremes, they have relatively short lives - often less than 10 years.

Spill buckets are not supposed to store liquid and must be kept clean and emptied expeditiously. Common maintenance problems are illustrated in the pictures above. The spill bucket on the left contains fuel. The middle spill bucket is severely damaged and cannot contain a spill. The spill bucket on the right contains rainwater and cannot hold any fuel that may be spilled while filling the tank.

## Spill Bucket Testing

No later than April 1, 2021, all spill prevention equipment (such as a catchment basin, spill bucket, or other spill containment device) must be tested to ensure the equipment is operating properly and will prevent releases to the environment by meeting one of the following:

- If the spill prevention equipment is double walled, check the interstitial space every 30 days.
- If the spill prevention equipment is single walled, test at least once every three years to ensure the equipment is liquid tight by using vacuum, pressure, or hydrostatic testing. In most cases the testing will be performed by a qualified service technician.

## *Overfill Prevention*

The underground storage tank rules require that an overfill device must be installed on all tanks that are filled by fuel transfers of more than 25 gallons at one time.

Since tank owners and operators are responsible for ensuring that fuel overfills do not occur, the overfill prevention device is essentially the BACKUP if the right amount of fuel is not ordered or delivered.

The function of overfill prevention devices is to stop or restrict the flow of product into the tank or alert the transfer operator BEFORE the tank is filled to the top. There needs to be enough room in the tank to drain the fuel left in the delivery hose after the fuel transfer is complete.

There are three types of overfill protection devices:

1. Automatic shutoff devices (also known as drop tube shutoff devices or “flapper” valves);
2. Overfill alarms (electronic alarms); and
3. Ball-float valves (also known as float-vent valves). Ball-float valves can no longer be used on new tank installations

The operator must determine what type of overfill prevention is installed on the UST system.

## Drop-Tube Shutoff Valves

The drop tube shutoff valve is a mechanical device installed in line with the drop tube. A drop tube is a thin aluminum tube located inside the tank fill-pipe riser that extends close to the bottom of the tank. The drop tube minimizes vapors created during a fuel delivery.

Typically, there is a float-activated mechanism on the outside of the drop tube that releases a valve, or flapper, inside the drop tube when the liquid level in the tank reaches **95% of full-tank capacity**. The shutoff valve should be positioned so that the float arm is not obstructed and can move through its full range of motion.

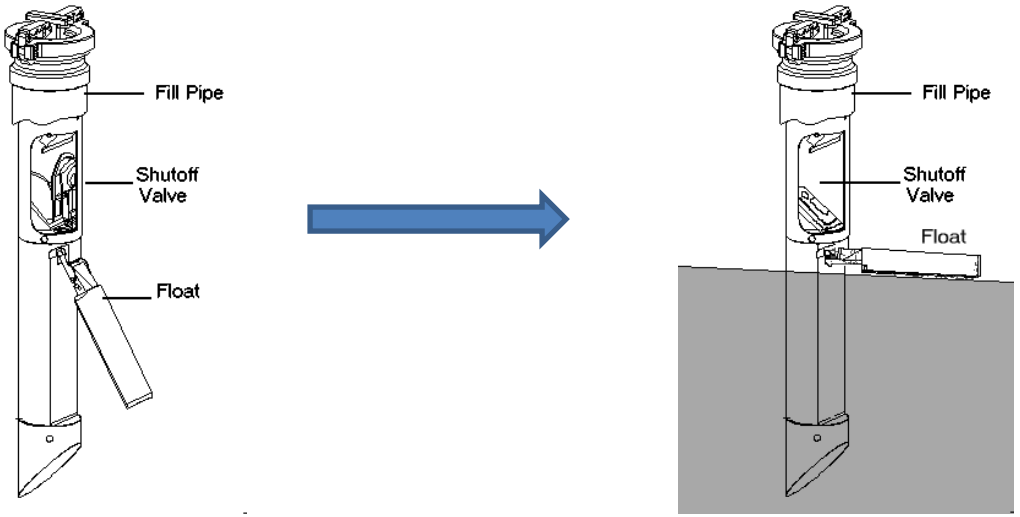
Drop-tube shutoff valve can be seen in the fill pipe

Drop-tube shutoff valve

## Drop Tube Shutoff Valves

When the shutoff valve is released, the product flowing down the fill pipe slams it shut, severely restricting the flow of fuel into the tank.

The delivery hose "jumps" when the flapper closes, alerting the transport driver that the tank is nearly full. The driver should immediately close the delivery valve and drain any remaining fuel in the hose into the tank. To notice the hose "jump," the delivery driver must watch the delivery hose, **not** sit inside the truck or building.



## Drop Tube Shutoff Valves

Drop tube shutoff valves work well as long as they are used and maintained properly. There are several potential problems with drop tube shutoff valves to consider:

- Drop tube devices must not be disabled or bypassed**.** A gauge stick in a fill pipe prevents the drop tube shutoff valve from closing. If a gauge stick is discovered in a fill pipe, it should be removed and a service technician called to inspect the overfill valve and ensure it operates properly.

- The sudden closing of the drop tube valve transmits considerable stress to the delivery system. The hose connections to the tank and truck must be secure or they may pop off, creating a significant surface spill.

- There must be a tight-fill connection between the tank and the delivery hose.

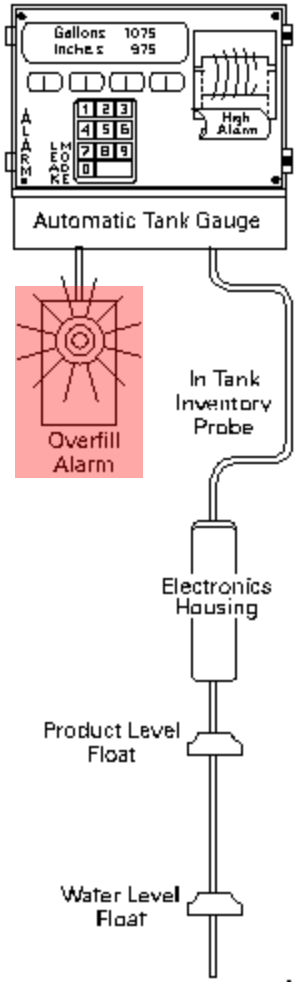
- Deliveries must be made by gravity only. If a delivery is made under pressure (pumped) and the shutoff valve activates, something is likely to break.

**Electronic Alarms**

Of the three available overfill prevention technologies, electronic alarms are the most versatile. Alarms may be used with tanks that receive pumped or gravity deliveries and with tight-fill or loose-fill connections. This type of overfill device activates an audible and/or visual warning to the transfer operator when the tank reaches **90% full**.

A typical overfill alarm can be tied into an automatic tank gauging (ATG) system or a console. The ATG or console should have the ability to trigger a remote alarm. The electronic alarm must be placed in an area that will alert the transfer operator when the tank is no more than 90% full.

The overfill alarm cannot be located inside the station where the transfer operator cannot hear the alarm.



**Electronic Alarms**

An Electronic Alarm-

- Uses a float sensor that triggers an alarm when the tank reaches 90% full.
- Has NO mechanism to shut off or restrict flow.
- Should be activated once a year as part of a functionality test.

[NOTE: While it is NOT an overfill-prevention device by itself, an ATG will also likely sound a beep when the outdoor alarm goes off.]

The transfer operator must be able to see and hear the alarm while filling the tank. When the transfer operator hears the alarm, they should close the valve at the tanker and drain the delivery hose into the tank.

***REMEMBER*** **-** it is the responsibility of the owner and operator to ensure the volume available in the tank is greater than the volume of the product to be transferred to the tank **before** the transfer is made. Likewise, it is the responsibility of the owner and operator to monitor the delivery to prevent overfilling or spilling.

## Electronic Alarms

This unit, which should be located outside the building and near the tank field, contains a red light and a horn. The unit is connected to the ATG panel and should give a visual and audible warning when the UST if filled to 90% of its capacity.

The bell in this photograph is another form of an alarm that can be used for overfill compliance.

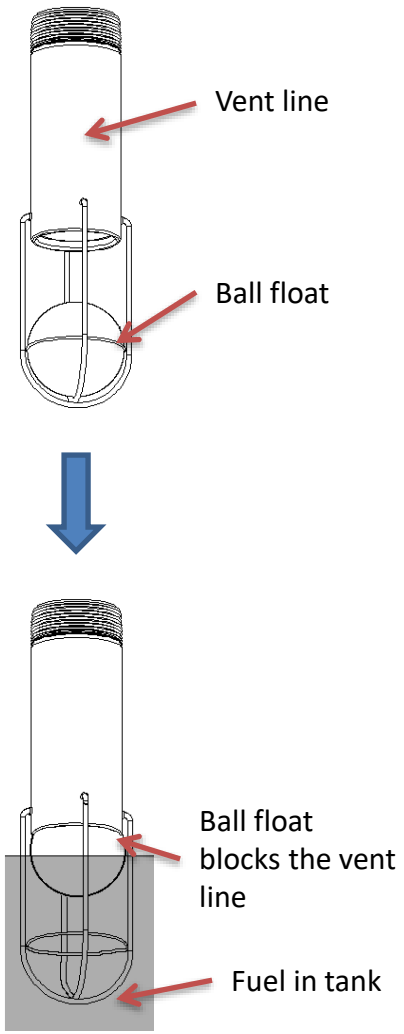
## Ball-Float Valves (Float-Vent Valves)

Ball floats consist of a short length of pipe that extends down into the top of the tank from the vent opening. Typically, a wire cage containing a hollow ball is fastened to the lower end of the pipe. The ball sits below the end of the pipe within the wire cage. Ball-float valves are no longer allowed in new tank installations.

If the product level is below that of the ball, the tank vent pipe remains open and the tank can "breathe" or maintain vapor flow. If the fuel level is too high, the ball floats up and blocks the vent opening. With the vent blocked, the flow rate of the delivery will decrease noticeably and should alert the transfer operator to close the valve at the tanker and drain the delivery hose into the tank

[NOTE: The Underground Storage Tank rules require the ball-float device to be set to operate at 90% of full tank volume.]

Every opening along the tank top must be tight for the ball-float vent valve to work properly. An open cap (ATG probe riser, gauging riser, spare riser or stub out) allows vapors to escape at ground level and prevents pressure from building in the tank.



## Ball-Float Valves (Float-Vent Valves)

Owners of tank systems that use ball-float vent devices should be aware of the following situations that create extremely hazardous conditions:

DO NOT Use Ball-Float Devices…

- **On new tank installations.**
- **On tanks that receive pressurized (pumped) deliveries:** The tank may become over pressurized, causing it to rupture.
- **On tanks with remote fills and gauge openings:** Fuel may escape through the gauge opening if the tank is overfilled.
- **On tanks with suction pumps:** When the ball float closes off the vent pipe, pressure builds in the tank and a fuel overfill will escape from the pump at the dispenser.
- **On tanks with loose fills:** If the delivery hose is not tightly clamped to the tank fill pipe, fuel will back up the fill pipe and spill onto the ground when the ball-float valve closes.
- **On generator or heating oil tanks:** These types of tanks very often have pumped deliveries and loose-fill connections, two things that are not compatible with ball-float valves.

Ball-float valve

**Ball-Float Valves (Float-Vent Valves)**

The ball-float valve should periodically be checked by a service technician to make sure it is functioning properly and that it will restrict fuel flowing into the tank at 90% of the tank capacity:

- Ensure that the ball-float valve is not plugged.
- Make sure the ball cage is intact.
- Ensure the ball still moves freely in the cage.
- Make sure the ball still seals tightly on the pipe.

***REMEMBER* -** it is the responsibility of the owner and operator to ensure the volume available in the tank is greater than the volume of the product to be transferred to the tank **before** the transfer is made. Likewise, it is the responsibility of the owner and operator to monitor the delivery at all times to prevent overfilling and spilling.

## Overfill Prevention Testing

No later than April 1, 2021, all overfill prevention equipment must be inspected and tested at least once every three years. At a minimum, the inspection must ensure that overfill prevention equipment is set to activate at the correct level specified and will activate when regulated substances reach that level.  A service technician typically performs the tests.

If a ball-float valve is not operating properly it must be replaced with another form of overfill device such as a flapper valve or overfill alarm.