



Secondary Containment of Underground Storage Tank Systems

Tanks/Underground #3.19 • February 2010

Minnesota law requires all new underground storage tank (UST) systems, with a few exceptions, to have a liquid-tight secondary containment design which will contain and detect leaks through monitoring of the interstitial space.

Secondarily contained systems are intended to prevent any leaks and spills from impacting the waters of the state, in particular our limited groundwater resources.

This document will help you to select secondary containment systems, install equipment properly, perform interstitial monitoring, interpret the monitoring data, and keep required records.

What does “secondary containment” mean?

The term “secondary containment” means that the tank or piping has:

- an inner primary shell that stores or transports the liquid, and a liquid-tight outer secondary shell or jacket that extends around the entire inner shell and which will contain any leak through the inner shell
- a method for monitoring the space between the shells to detect any leaks

Such tanks and piping are commonly referred to as “double-walled.”

When are secondary containment systems required?

All new and replacement USTs and piping which will contain a regulated substance and which are placed into the ground **after December 22, 2007**, must be secondarily contained. Secondary containment is also required after that date around **new and replacement submersible pumps, and under most dispensers**. Submersible pumps and dispensers are prone to leaks and drips, which over time will lead to soil and groundwater contamination.

Secondary containment is required for these components whether they are part of a new facility, part of an expansion of an existing facility, or replace an existing component.

Exceptions to this rule include:

- UST systems used solely for storage of heating oil to be used on the premises
- vent pipes, fill pipes (drop tubes), and other components that do not routinely contain regulated substances
- “safe suction” piping
- short piping segments (less than ten feet) replaced during a repair

If a tank is replaced, then all piping connected to the tank must be replaced with secondarily contained piping as well.

If a new or replacement dispenser is added to new “safe suction” piping, the piping itself need not be secondarily contained, but there must be under-dispenser containment.

If the UST system will contain fuel that is used both for heating and for another use, such as powering an emergency generator, then the system must be secondarily contained.

What about repairs to UST systems?

The need for repairs to a tank, pipe segment, dispenser, or pump does not by itself trigger a requirement to replace the component with a secondarily contained version, if the component can be repaired without being replaced.

There are two exceptions. First, during a repair, if even a short segment of existing piping is observed to have **pitting-type corrosion**, the entire piping segment between the tank and the dispensers must be replaced with secondary containment piping.

Second, if the existing single-walled piping has **leaked**, the entire piping segment must be replaced, unless the piping is already contained, or the leak was due to an external one-time cause, such as damage during excavation activity.

If system components need to be replaced during a repair, then replacement components must be secondarily contained, with one exception. If a short segment of single-walled piping less than ten feet in length needs to be replaced, this replacement pipe does not need to be secondarily contained.

What about replacing submersible pumps and dispensers?

Replacement submersible pumps, including replacement pump heads, require installation of secondary containment around the pump head.

When replacing existing dispensers, secondary containment underneath the dispenser is only required if work is performed beneath the shear valve or check valve on any equipment used to connect the main piping to the dispenser, such as flexible connectors and risers. In other words, if no new risers, flex connectors, or pipe segments are added, and no existing ones are replaced or modified, then under-dispenser containment is not required.

Shear valves and check valves may be replaced without requiring a new dispenser sump.

If the piping between an existing submersible pump and an existing dispenser is replaced, but the existing dispenser and the existing submersible pump are retained, under-dispenser containment must be added but containment for the submersible pump is not required.

What containment and leak detection designs are acceptable for tanks?

Acceptable secondary containment designs for tanks include:

- double-walled fiberglass-reinforced plastic (FRP)
- double-walled steel with cathodic protection of the outer wall
- double-walled steel with a composite FRP jacket
- single-walled steel with a composite FRP jacket which is designed to contain and detect leaks through the steel wall

Acceptable designs for tank leak detection include:

- Interstitial space has a continuous automatic leak sensing device.
- Interstitial space can be manually monitored.

Any other designs must be approved in writing in advance by the Minnesota Pollution Control Agency (MPCA).

What containment and leak detection designs are acceptable for piping?

Acceptable secondary containment designs for pressurized piping and non-“safe suction” piping include all of the above options for tanks, plus:

- double-walled flexible non-metallic

Acceptable designs for piping leak detection include:

- Interstitial space has gravity drain to sump with continuous automatic leak-sensing device that alarms, restricts flow, or shuts off the pump.
- Interstitial space has gravity drain to sump, plus automatic line leak detector (electronic or mechanical).

Any other designs must be approved in writing in advance by the MPCA.

What containment designs are acceptable for submersible pumps and dispensers?

Secondary containment for submersible pumps and dispensers must be designed to contain a leak from the pump head or dispenser and from any connectors, fittings, and valves beneath the pump head or dispenser, until the leak can be detected and repaired.

Pump and dispenser sumps installed after December 22, 2007, must be constructed of plastic, FRP, or another synthetic material of comparable thickness and durability that is compatible with the stored substance, including any additives, ethanol, or biodiesel. Construction materials not allowed include concrete, which may crack; steel, which is prone to corrosion; and clay, which is not liquid-tight over time.

Pump and dispenser sumps must have liquid-tight sides and bottom. Pump sumps must also have a cover to minimize water infiltration. All points of penetration through the sump, such as for piping and electrical conduit, must be sealed.

Must I notify the MPCA of installation projects?

Pre-notification of the MPCA is required for new UST systems, replacement of UST system components (including submersible pumps and dispensers), and repairs involving full or partial replacement of UST system components. At least ten days in advance of beginning work, notify the MPCA of the project by fax, e-mail, regular mail, or telephone, using the "Ten-day Advance Notice" form.

Then, within 30 days after installation of the UST system, notify the MPCA again of the completion of installation by fax, e-mail, or mail using the "Notification of Installation or Change in Status" form. The form must be signed by the owner or operator and by the certified contractor.

What are the installation requirements?

Contractors who install, repair, or replace UST systems, including tanks, piping, submersible pumps, and dispensers, must be certified for installation by the MPCA. A list of certified contractors is found on the MPCA Web site listed at the end of this fact sheet.

Installers must follow the equipment manufacturer's instructions. In addition, for tank containment guidance, installers may follow STI F841, "Standard for Dual Wall Underground Steel Storage Tanks." For submersible pump and dispenser containment guidance, installers may follow UL-Canada C107.21-1992, "Under-Dispenser Sumps."

How do I conduct interstitial monitoring of my secondary containment tank?

If the tank has a continuous automatic leak-sensing device for the interstitial space, such as an electrical conductivity sensor, pressure sensor, fluid sensor, or hydrostatic sensor, then the tank owner must monitor the device for an alarm signal indicating a leak.

If the tank is manually monitored, the tank owner must check the tank's interstitial space **at least once a month** using a gauge stick to check for product or water in the space. Liquid in the space could mean one of the tank's walls (inner or outer) has a leak.

How do I conduct interstitial monitoring of my secondary containment piping?

At least once a month, the tank owner must visually inspect all sumps to which the interstitial space of secondary containment piping is connected by gravity flow for presence of product. A secondarily contained submersible pump sump with a sump sensor may be checked on an annual basis. If product is found in the sump, the tank owner must determine if it came from the interstitial space, indicating a pipe leak, or from another source.

The tank owner must monitor any sump sensor or automatic line leak detector for an alarm signal, a reduced rate of flow, or a pump shut-down indicating a leak. The sump must then be checked for presence of product coming from the piping.

If my UST system has more than one method of leak detection, do I have to use both?

A secondary containment tank will often have an automatic tank gauge (ATG) for purposes of product level measurement. Most ATGs can also perform leak tests, and there are other tank leak test methods like inventory control, statistical inventory control (SIR), and manual tank gauging that an owner may choose to use, but are not required. **The tank owner must always perform interstitial monitoring on the tank, even if there is an ATG or other test methods are used.**

For secondary containment pressure piping, a second method of leak detection and testing may be required depending on the system design. If there is a continuous leak sensing device (sump sensor), no other leak detection method is required. If there is no sump sensor, then an automatic line leak detector and monthly visual inspections are required.

For secondarily contained tanks and piping installed prior to December 22, 2007, the owner may use either interstitial monitoring or another accepted method of leak detection.

Do I need to report a possible leaking tank or pipe?

Most leaks and spills must be reported. When conducting interstitial monitoring, the tank owner must immediately call the **Minnesota Duty Officer at 651-649-5451 or 800-422-0798** any time that:

- Product is found in a tank's interstitial space or sump, a submersible pump sump, or a dispenser sump during monthly manual tank monitoring or monthly sump checks.
- An interstitial or sump sensor or automatic line leak detector goes into alarm, flow restriction or shut-off mode, and product is found in the sump.

The Duty Officer will then relay the information to the MPCA so guidance can be given about what actions should be taken. **A Duty Officer call is not required for spills and leaks where the amount of the release is verified as less than five gallons of petroleum.**

Whether or not a Duty Officer call is required, the tank owner must investigate and address the cause of all suspected leaks, and clean up any leaked product.

How must the leak detection systems be maintained?

The interstitial space of secondarily contained UST systems must be kept free of water, except for such tanks designed with a brine solution in the interstitial space. Electrical power must be continuously maintained to all devices, as well as a vacuum if required by the device. Sumps must be maintained liquid-tight and free of water, product, and debris.

All manufacturers' maintenance and calibration schedules for sump sensors and line leak detectors must be followed. These schedules may be found in the manufacturers' instruction manual.

At least once a year, sump sensors must be tested for proper function and repaired or re-calibrated as necessary. Testing can be done by either a qualified tester or the tank owner. Testing should follow any manufacturer's instructions, and should verify that the alarm sounds or the pump shuts off or restricts flow when the sensor is in contact with water or product. The sensor should also be checked for proper positioning in the sump. Sensors should be located within one inch off the bottom of the sump unless the manufacturer has a different specification. Sensors should be located at a level lower than the lowest electrical or piping penetration point in the sump.

At least once a year, automatic line leak detectors (both mechanical and electronic types) must be tested for proper function. Testing must be conducted by an MPCA-certified contractor; by a person approved by the manufacturer of the equipment to test the detector; or by a person qualified by reason of training or experience to test the detector. Testing of the detector must comply with the manufacturer's testing requirements and involve creation of a physical leak in a piping segment in order to verify the applicable leak detection threshold used by the tank owner (3 gph, 0.2 gph, or 0.1 gph).

At least once a year, any submersible pump sump must be visually inspected to ensure that it remains liquid-tight, especially where piping penetrates the sump wall or floor.

What records must be kept on file?

Without written records, there is no way to verify that equipment is designed properly and leak detection is being performed. Owners and operators are required to maintain certain written records. These records must be kept at the facility where the tanks are located, or if kept elsewhere, must be immediately submitted to the MPCA upon request.

The following records regarding secondarily contained UST systems must be kept for the (time period) indicated:

- documentation of the manufacturer's written performance claims and maintenance and calibration schedules, for any secondary containment tank, piping, or sump, any sump sensor, and any automatic line leak detector (for life of the component or device)
- documentation of any maintenance, re-calibration, or repairs to any UST system component or device (for ten years)
- results of monthly monitoring of tank sumps, monthly visual inspection of submersible pump sumps (if required), and monthly visual inspection of dispenser sumps (for ten years)
- results of annual function testing of automatic line leak detectors and sump sensors (for ten years)
- results of annual submersible pump sump visual inspection (for ten years)

Need more information?

Visit the UST Program at <http://www.pca.state.mn.us/cleanup/ust.html>. The site has forms, fact sheets, and other information about USTs and UST requirements.

You can also call the MPCA at 651-296-6300 or 800-657-3864.
