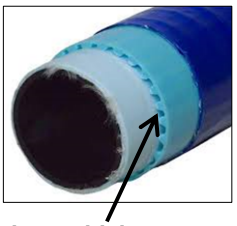
Interstitial Monitoring for Underground Storage Tanks and Piping

Overview

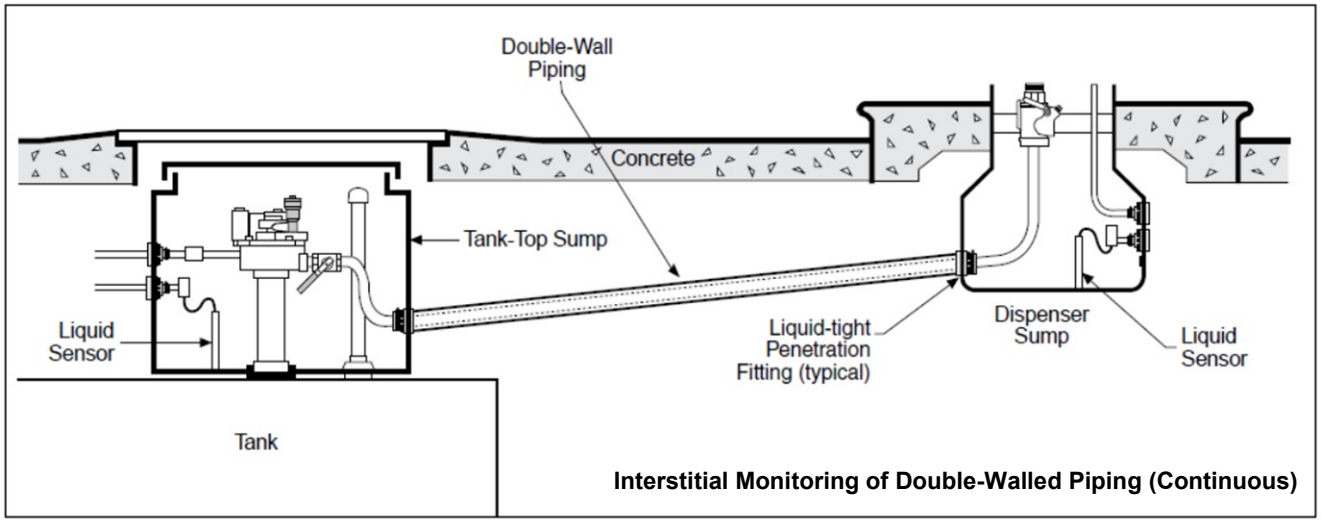
When performed properly, interstitial monitoring is an acceptable monthly release detection method for underground storage tanks (USTs) and piping. It is required for USTs and most piping installed on or after September 15, 2010 in Virginia (9VAC25-580-160.7). This fact sheet explains how to properly conduct the method and required recordkeeping.

How does interstitial monitoring work?

- Interstitial monitoring (IM) refers to checking the space in between a UST/piping and a secondary containment structure for the presence of petroleum. Double-walled USTs or piping are secondarily contained (i.e., by the outer wall); secondary containment also refers to containment sumps into which double-walled piping opens. Any petroleum leaked into the secondary containment will be directed towards an electronic sensor or into a containment sump or observation well, where it can be seen upon visual inspection.



Piping interstitial space



Interstitial Monitoring of Double-Walled Piping (Continuous)

- IM can be conducted continuously by interstitial sensors placed within the secondary containment to detect liquids, gases, or changes in pressure which may indicate a compromised UST/piping run. These are connected to an automatic tank gauge (ATG) which triggers an audiovisual alarm if the sensor detects evidence of a compromised UST/pipe. For example, the diagram above shows a common set-up for interstitial monitoring of piping; liquid sensors are installed in the bottom of containment sumps at each end of the double-walled piping.
- Alternatively, IM can be conducted manually by inspecting the secondary containment at least every 30 days to check for the presence of petroleum (or water, which may indicate a compromised outer wall). These inspections may be visual or carried out with a dipstick and petroleum/water-finding paste, depending on the UST system's design. For example, if there were no liquid sensors in the diagram above, the owner/operator should visually inspect both the tank-top sump and the dispenser sump at least every 30 days.

Will interstitial monitoring work for my UST system?

- **Tank:** Interstitial monitoring may be used for any double-walled or secondarily contained tank, but it *must* be used for tanks installed on or after September 15, 2010, and tanks containing CERCLA listed hazardous substances.
- **Piping**: Interstitial monitoring may be used for any double-walled or secondarily contained piping system, but it *must* be used for pressurized and un-safe suction piping installed on or after September 15, 2010, and hazardous substance piping. *(Note: all pressurized piping systems must also have automatic line leak detectors.)*
- UST systems must be installed with properly designed secondary containment and monitoring devices/ports (in accordance with 9VAC25-580-160.7) to use IM for release detection.
- For more information on using IM for emergency generator piping, please consult the US Environmental Protection Agency's Automated Interstitial Monitoring (AIM) guidance (EPA 510-K-22-002).

What are the operational requirements?

Set-Up: Ensure your UST system is properly designed and eligible to use IM (see previous section). If your facility has an Automatic Tank Gauge, consider the installation of sensors for continuous monitoring.

	Continuous Interstitial Monitoring (via sensors)	**Manual Interstitial Monitoring** (visual)
Every 30 Days:	Check the liquid/sensor status report on your ATG. If all sensors indicate no issues (e.g., status "OK" or "Normal"), print the report and file it. If any sensors are in alarm, you must investigate by visually inspecting the piping sumps or manually checking the tank interstitial space (e.g., dipstick with fuel/water-finding paste). Sensor alarms must be investigated within 24 hours. If the alarm cannot be explained by something other than a release (e.g., sensor malfunction) and cleared, and/or reappears after an initial fix cleared it, you must report a suspected release to DEQ within 24 hours. Note: Continuous IM for piping requires that you keep your containment sumps dry and clean, and your sensors properly positioned (upright, on the sump bottom). Issues of water intrusion (e.g., through a cracked sump lid) or incorrectly positioned sensors (e.g., laid on side, pulled up away from sump bottom) will cause false alarms and prevent the detection of real issues.	To monitor piping, visually inspect all piping containment sumps (STP, under-dispenser, transition if applicable). To monitor a tank, check the interstitial access points (e.g., dipstick with fuel/water-finding paste). Record the date of the inspection, inspector's name, and the ID and observations for each sump/interstitial access in a logbook or the DEQ-provided form. All sumps/interstitial accesses should be clean and dry with no unusual operating conditions. The presence of liquids (fuel, water) or other unusual conditions in sumps/interstitial accesses must be investigated within 24 hours. If the conditions cannot be explained by something other than a release and/or reappear after an initial cleanup, report a suspected release to DEQ within 24 hours. Note: Manual IM for piping requires that you keep your containment sumps dry and clean. Issues of water intrusion (e.g., through a cracked sump lid) or debris build-up will conceal the bottom of the sump and prevent the detection of real issues.
Every Year:	Have a qualified testing company perform an annual operability test on the ATG console and the interstitial sensors to ensure proper function. Any equipment which fails testing must be repaired and re-tested. (If you are using IM for a tank, probe testing/functionality is not required.)	Inspect any handheld equipment (e.g., dipsticks) used to conduct interstitial monitoring. Any equipment in poor condition (e.g., faded measurements, expired paste) should be replaced.
Every 3 Years:	If using IM for piping, have a qualified testing company perform a tightness test on all containment sumps used for IM, in accordance with the manufacturer's instructions or an industry standard. Any equipment which fails testing must be repaired and re-tested.	

What records do I need to keep?

Piping Continuous IM	**Piping Manual IM**	**Tank Continuous IM**	**Tank Manual IM**
• Past 12 months of sensor status reports • Annual sump sensor testing • Triennial containment sump testing	• Past 12 months of sump visual inspection records • Annual inspection of any handheld equipment (e.g., dipsticks), if used • Triennial containment sump testing	• Past 12 months of sensor status reports • Annual interstitial sensor testing • Annual ATG testing (testing of probe not required if using IM)	• Past 12 months of interstitial access inspection records • Annual inspection of handheld equipment (e.g., dipsticks) for operability

Written documentation of any maintenance or repairs of release detection equipment must be maintained for at least one year; it is advisable to maintain this documentation for as long as the method is used.

For more information:

- Contact the Office of Spill Response & Remediation at tank@deq.virginia.gov, or contact your regional DEQ Office: https://www.deq.virginia.gov/get-involved/about-us/contact-us