Underground Storage Tank
Critical Installation Requirements

for
Licensed UST System Installers, Removers, and Inspectors

Second Edition

State of Montana
Department of Environmental Quality
Underground Storage Tank Section
March 2018

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INTRODUCTION

The “critical installation requirements” contained in this document will no longer appear on installation and closure permits issued by the department. These requirements remain integral to the installation and closure processes and must be followed whenever they are applicable.

This document does not replace or supplement industry standards for installing USTs. Its purpose is to highlight critical installation elements that the Montana Department of Environmental Quality (MDEQ) has historically felt a need to stress or clearly communicate. This document is not comprehensive but rather is a compilation of commonly used permit conditions.

Administrative Rules of Montana (ARM), Title 17, Chapter 56 sets forth performance standards for new underground storage tank systems. This document highlights certain industry standards for UST installations as outlined by API Recommended Practice 1615, PEI/RP 100-17, PEI/RP 200-13, PEI PR 300-09, PEI RP 1000-14, PEI RP 1100-15, PEI RP 1200-17, PEI RP 1300-13, PEI RP 1400-14, and other standards of design and construction delineated by ARM 17.56. These rules may be accessed at http://www.mtrules.org/gateway/ChapterHome.asp?Chapter=17%2E56.
CRITICAL INSTALLATION REQUIREMENTS
FOR A NEW OR MODIFIED UST SYSTEM

I) PRELIMINARY CONSIDERATIONS

A) Legal
Work must comply with Montana Underground Storage Tank regulations, permit conditions, department-adopted referenced standards, manufacturer specifications, and all other state and local requirements.

B) Local Coordination
Owner and installer must contact the local fire official and the State Fire Marshal at (406) 444-2050 regarding installation of aboveground tanks and components, which are regulated by the Uniform Fire Codes and the Montana Fire Codes. Owner and installer must also contact the local Planning Department, local floodplain Administrator, and the Montana Sage Grouse Habitat Conservation Program for new installations regarding local requirements.

C) Source Water Protection Districts
When installing an underground storage tank system, the owner and installer must contact the applicable source water protection district regarding local requirements.

D) Notification
Notify MDEQ at (406) 444-4656 at least one week before starting work. Provide permit and facility numbers. If this project is the site of an active petroleum release and excavation is required, you must also contact the case manager at (406) 444-6444 at least one week before starting work.

E) Permit Modification
Permit modification is required by MDEQ for any changes from the permitted proposal. Call (406) 444-4656 for any permit modification, including a change of installer.

F) Suspected Contamination
Contact the department at 1-800-457-0568 within 24 hours of discovery, if suspected contamination (soil staining, soil odors, sheen on water, detectable head space concentrations, lab analysis over MDEQ action levels, holes in tanks or piping, or any unusual operating conditions) is discovered, regardless of the suspected source. If a ppm meter is available, collect dual samples and conduct a vapor headspace test on the sample not being submitted to the lab. Call 1-406-324-4777 after hours and on holidays. DO NOT LEAVE A MESSAGE. You must speak to a person in the Waste Management and Remediation Division or the 24-hour Disaster and Emergency Services duty officer.
G) Release Detection Equipment Performance Claims

The department authorizes equipment for UST system installation that has been tested and evaluated by the National Work Group on Leak Detection Evaluation (NWGLDE). The primary goal of NWGLDE is the creation of a list of release detection products that have undergone third party evaluations adhering to specified engineering criteria. The list is a compilation of underground storage tank and piping leak detection system evaluations that have met certain criteria developed by the NWGLDE and the performance requirements established by Title 17, Chapter 56, Sub-Chapter 4 of Administrative Rules of Montana.

If equipment not listed by NWGLDE is proposed, then the installer must submit (with the permit application) a written performance claim substantiating the performance and the way the claim was justified or tested by the equipment manufacturer or installer (ARM 17.56.409). The National Work Group On Leak Detection Evaluations website can be accessed via the following link: http://www.nwglde.org/

H) Setback Distances

- No part of an underground tank system may be located less than 3 feet from a property line.
- Dispensers must be at least 10 feet from the building and property lines.
- The end of the stretched hose must be at least 5 feet from any building openings (windows, doors, or basement or crawl space wells), and all portions of the vehicle being fueled must be on the property. Accurate distances for these setbacks must be provided on the redlined drawing if different from the previously submitted site plan.

I) Corrosion Protection Tests

If a cathodic corrosion protection system was installed for any component of an UST system, then a corrosion protection test is required for that component after the UST system has reached polarization equilibrium and within six months of installation (date that the Certification of Compliance is received by the department) by a qualified corrosion protection tester. Refer to department testing standards for details. All cathodic protection tests of tanks must include readings at each end, each side and at the top center of each tank. Piping tests must be done every 20’ of piping length. All other metallic components (risers, flex connectors, vent standpipes, etc.) must also be tested.

II) CRITICAL INSTALLATION REQUIREMENTS

The subjects covered below are those identified by the department as critical to a successful installation. For further guidance and a complete list of installation requirements, see the manufacturer’s instructions and the appropriate industry referenced standards.

A) Tank Installation Procedures

A tank installation is the installation of any underground storage tank.
i) **Secondary Containment or Double Walled Tank Systems**

Any UST that is replaced or installed must employ department approved secondary containment (Double Walled tanks and piping systems) and employ approved continuous interstitial monitoring as a monthly leak detection method. Any UST that is replaced or installed must have under-dispenser containment and tank top containment sumps installed. All containment sumps must be liquid tight and be compatible with the substance conveyed by the piping. Containment sumps must allow for visual inspection and access to the UST components contained within and allow the system to be monitored.

ii) **Tank Anchoring**

Tank anchoring must be installed per PEI/RP100-17. Tank anchoring calculations (buoyancy calculations) are to be performed by the manufacturer with calculations achieved with water estimated to the top of the tank. All anchors shall have corrosion protection. If tank deadmen are used for float-out prevention they must have cathodic protection installed. A cathodic protection design must be submitted before the application may be approved.

iii) **Unstable Soils**

If unstable soil (or groundwater) is present in the tank basin, then the installer or designer must install geotextile filter fabric on the bottom and sides of the tank hole. Filter fabric must be positioned before the select bedding and backfill is in place.

iv) **Bedding and Backfill**

For fiberglass tanks, bedding and backfill must be pea gravel, washed naturally and rounded 1/8" to 3/4" with no more than 3% passing a 3/8” sieve.

For STI-P3 tanks, bedding and backfill must be pea gravel, with backfill washed naturally and rounded 1/8" to 3/4" with no more than 3% passing a 3/8” sieve. Backfill may also be clean, washed sand. For other types of tanks, contact the manufacturer.

v) **Siphon Tanks and Anti-Siphon Requirements**

The owner or operator of an UST system that is located at an elevation that produces a gravity head on an underground piping system shall ensure that the product pipe is equipped with a department approved anti-siphon valve, a department approved normally closed solenoid valve, or any other department approved device designed to prevent siphoning. For tanks with piping or dispensers located lower in elevation than the liquid level, (siphon tanks), a solenoid valve must be installed after the submersible pump in the product line to prevent siphoning of the tank in the event of a leak. Refer to the leak detector manufacturer’s instructions regarding placement of the solenoid and mechanical line leak detector. Submit a detail of the installation with the application.
vi) Corrosion Protection

For any new corrosion protection installation, a corrosion protection design must be submitted before the application may be approved.

Metallic tank risers must be protected from corrosion by heat shrink sleeves, non-corrodible offset sleeves, watertight boots, or STI coating and sacrificial anodes.

A corrosion expert shall use the following criteria for the corrosion protection design for any metal tank anchor components that must be protected:

- Ensure that anode lead wires extend to a surface terminal station from each strap.
- The leads must have two lead wires cad-welded at different locations extending to the surface terminal station.
- One strap connection connects to the anode and one strap connection lead is used to test the corrosion protection.

vii) Tank Leak Detection

- The liquid sensing probe series installed must be approved for use with the ATG panel and the liquid stored.
- For interstitial systems using a leak detection panel, the sensor series must be approved for use with the leak detection panel and the liquid stored.
- All tank leak detection installations must be conducted by personnel who are certified by the manufacturer for installing the equipment.

B) Pipe Installation Procedures

A pipe installation includes new installations, re-piping, connecting to existing pipe, and installation of vents and siphon lines.

i) Double-Walled or Secondary Containment Piping

- If over 50 percent of the piping length is being replaced (measured from the piping terminus at the tank to the nearest point where product is dispensed or otherwise used) or any pressurized product pipe is replaced, then the entire length of product piping must be replaced with secondarily-contained (double walled) piping.
- Any UST that is newly installed must employ secondary containment piping (double walled piping) and employ approved continuous piping interstitial monitoring as a monthly leak detection method.
- Secondary containment piping and sump must be liquid tight.
- Secondary containment piping must be sloped back to the containment sump and sealed on the upper end (only applicable to European or U.S. suction systems installed with heating oil and emergency generator tanks).
- Double-walled product piping must have a continuous slope at a minimum of 1/8” per foot to each containment sump with no sags or traps. If a consistent elevation drop of 1/8” per foot cannot be maintained between the sumps, a transition sump and sensor must be installed so that this elevation drop can be maintained.
ii) Under-Dispenser Containment

Under-dispenser containment must be installed under dispensers when:

- A new UST system is installed.
- Dispensers and any associated hardware used to attach the dispenser to the product piping are replaced.
- Product piping is repaired or replaced at an associated dispenser island.
- Significant modifications are made to the concrete at a dispenser island.
- The department determines under-dispenser containment is necessary.
- Under-dispenser containment that is installed must employ approved interstitial monitoring, be liquid-tight on all sides, bottom, and at any penetration points, be compatible with the substance conveyed by the piping, and allow for visual inspection and access to the UST components contained inside.

iii) Joints

- Pipe being installed must be the same manufacturer as the existing pipe, or the connection to the existing pipe must be a threaded joint. All threaded joints must have surface access or liquid tight sumps.
- Unions should be avoided. If unions are unavoidable, they must be rated minimum 250 psi.
- Glued joints for fiberglass piping must be cured with heat packs if the ambient temperature is less than 60 degrees Fahrenheit.
- All connections for double-walled flexible piping must be made in sumps unless continuous double-walled containment is provided by UL listed manufacturers fittings.

iv) Single-Walled Suction Piping

Suction piping must slope at least 1/8” per foot back to the tank without any sags or traps. For Safe suction piping, double walled piping is not required, but it is highly recommended. Safe suction piping is defined in rule as below-grade piping that operates at less than atmospheric pressure, is closed so that the contents of the pipe will drain back into the storage tank if the suction is released, has only one check valve in each suction line, and the check valve is located directly below and as close as practical to the suction pump.

v) Single-Walled Pressurized Piping Repairs

If the department approves a single walled pressurized piping repair, an EPA approved 0.1 gph tightness test must be conducted on all single-wall product piping after the installation (including surface concrete) is complete and before the UST system is put into service. This test must be submitted to the department with the completed permit paperwork.

vi) Vapor Recovery Piping

Installation and testing of the vapor recovery piping is suggested to be in accordance with PEI RP300-09. This is to ensure that the vapor recovery system can be put into use with a minimum of re-certification.
vii) Backfill

Pea gravel bedding and backfill must be washed and naturally rounded 1/8" to 3/4" with no more than 3% passing a 3/8 sieve. Alternative backfills must be approved by the manufacturer before installation.

viii) Flex Connectors

- Install flex connectors in the product and vapor recovery piping at the tank, base of dispensers, and anywhere a direction change of 30 degrees or more occurs with less than a 4' straight run on either side of it.
- Flex connectors in contact with soil must be protected from corrosion by heat shrink sleeves, containment sumps, or watertight boots.
- Flex connectors must be UL listed for hydrocarbons.
- Flex connectors exposed to the atmosphere must be fire rated.

ix) Pipe Leak Detection Equipment

All underground piping that conveys regulated substances under pressure must be equipped with an Automatic Line Leak Detector (ALLD). A Mechanical Line Leak Detector (MLLD) or Electronic Line Leak Detector (ELLD) must be installed in the leak detector port of each piping systems Submersible Turbine Pump (STP). All pressurized piping must have an annual 0.1 gph line tightness test conducted; or the piping run must employ an approved monthly monitoring method. All underground piping that conveys regulated substances under suction must either have a 0.1 gph line tightness test conducted at least once every three years or the piping run must employ an approved monthly monitoring method. Underground piping that meets the departments definition and standards of safe suction requires no piping release detection. Safe suction piping is defined in rule as below-grade piping that operates at less than atmospheric pressure, is closed so that the contents of the pipe will drain back into the storage tank if the suction is released, has only one check valve in each suction line, and the check valve is located directly below and as close as practical to the suction pump.

Any pressurized product piping installed or replaced on or after 8/24/2007 must employ secondary containment (double walled), terminate in a liquid tight sump at each end. All sumps must be liquid-tight on all sides, bottom, and at any penetrations. The secondary containment system must be compatible with the substance conveyed by the piping. And allow for visual inspection and access to the UST components. For continuous interstitial monitoring of double-walled piping, interstitial monitoring liquid sensors must be installed in all product-piping sumps and must be approved for use with the leak detection panel.
All pressurized piping runs must have an approved method of catastrophic piping leak detection installed to monitor the line. All catastrophic piping leak detection equipment must be able to:

- Alert the operator to the presence of a leak by restricting flow or shutting off the flow of the regulated substance through the piping run, or triggering an audible or visual alarm may be used only if the equipment detects leaks of three gallons per hour at ten pounds per square inch line pressure within one hour.

For pressurized piping runs, MLLD and ELLDs are approved by the department to meet this requirement.

For suction piping systems used for emergency generators and heating oil tanks, an auto-dialer may be approved by the department to meet this requirement.

x) Vent Lines

- Vent risers must extend a minimum of 3’ over roofs and adjacent structures. If free standing, vents must extend a minimum of 12’ aboveground.
- Flex connectors must be installed in the rigid vent piping at the tank, base of vent riser, and anywhere a direction change of 30 degrees or more occurs with less than a 4’ straight run on either side of it.
- Vent piping must slope at least 1/8” per foot back to the tank without any sags or traps.

xi) Master-Satellite Dispenser Installation

A master and slave dispenser arrangement with single-walled piping utilizing mechanical line leak detectors must be installed with a continuous (no solenoids or check valves) piping system from the submersible pump to the satellite dispenser.

C) Cathodic Protection

The addition of corrosion protection to new or existing installations is the addition of an impressed current system, anodes, heat shrink sleeves, non-corrodible offset sleeves, watertight boots or STI coating.
i) Impressed Current Installation Procedures

- Anodes must be located as shown on the corrosion protection design proposal.
- Anodes cannot be repositioned more than 2' laterally to accommodate underground obstructions. Any repositioning beyond this requires prior review and approval from the department (406) 444-5300.
- Anodes must be located 10-15 feet from the tank for optimum current and ion distribution. Location outside of this area requires prior review and approval from the department (406) 444-5300.
- The centerline of the vertical anodes must be at least as deep as the centerline of the tank. Horizontal anodes must be placed at or below the centerline of the tank or the historical frost line, whichever is deeper.
- Wires must be placed below the surface concrete or asphalt with aggregate or other cushioning material between the wires and the concrete or asphalt. If there is no concrete or asphalt present, wires must be at least 24" below the surface. Wires may not be placed directly in concrete.
- Anodes must have coke breeze backfill placed at least 6" below the anode, 6" above the anode, and completely filling the interstitial space around the anode without any voids.
- Any below-grade connection must be coated with either a waterproof or STI approved type coating.
- Soil potentials must be provided after cathodic protection is installed. After the UST system has reached equilibrium, and within 6 months, a qualified corrosion protection tester must perform a comprehensive corrosion protection test according to department criteria.

ii) Magnesium Anode Installation Procedures

- Anodes cannot be repositioned more than 2' laterally to accommodate underground obstructions. Repositioning beyond this requires prior department review and approval.
- Except for spike anode installation, the centerline of the anodes must be below the historical frost line.
- Any below-grade connection must be coated with either a waterproof or STI-approved coating.
- Wires must be placed below the surface concrete or asphalt with aggregate or other cushioning material between the wires and the concrete or asphalt. If there is no concrete or asphalt present, wires must be at least 24" below the surface. Wires may not be placed directly in concrete.
• Soil potentials must be provided after cathodic protection is installed. After the UST system has reached equilibrium and within 6 months, a qualified corrosion protection tester must perform a comprehensive corrosion protection test according to department criteria.

D) Monitoring Wells Procedures, Installation and Abandonment

The MDEQ, Underground Storage Tank Section no longer permits the installation and monitoring of wells for leak detection purposes. All out-of-tank leak detection methods, including ground water monitoring and vapor monitoring are being phased out by the department and will no longer be valid forms of tank or piping leak detection. The department expects to formally phase out all out-of-tank leak detection methods by October 2023. Existing tank systems utilizing an out-of-tank leak detection method will have to switch to an approved method of tank and piping leak detection by October 2023.

For monitoring well guidance for remediation of Underground Storage Tanks, please contact the MDEQ Petroleum Tank Cleanup Section at 406-444-6444.

Monitoring well procedures, including installation and abandonment, is regulated by the Department of Natural Resources and Conservation (Montana DNRC), under the Board of Water Well Contractors, Construction Standards 36.21.6 and 36.21.8.

E) Tank Lining Installation Procedures

• Tank lining installed on an UST system does not meet the departments requirements for tank corrosion protection or upgrade requirements.
• All repairs must be conducted in accordance with all applicable state, federal and local laws and regulations.
• Any holes, perforations, or rust plugs that penetrate through the metal must be immediately reported to the department (406) 444-0495 and must be repaired according to the manufacturer’s recommendation and under the supervision of a manufacturer’s authorized representative or the tank manufacturer must certify that the repaired tank meets the manufacturer’s design standards. Provide the manufacturer’s certification to the department.
• Lining is to be a nominal 125-mil thickness.
• After lining, conduct a “Barcol” hardness test, an Elcometer lining thickness test, and either a tank tightness test to the overfill level or a high voltage holiday test. Submit results to the department.
• Contact the department at (406) 444-1435 or (406) 444-5345 to discuss disposal options for the sludge and the spent sandblast material.
F) Spill Protection Installation Procedures

- Work must comply with Montana Underground Storage Tank regulations, permit conditions, manufacturer’s specifications, department adopted industry standards and all other state and local requirements.
- Spill buckets must be thread-on design, not slip over, and must be UL listed.
- Install the surface concrete with sufficient slope such that surface water is prevented from entering the spill containment manhole.

G) Overfill Protection

- Ball float vent valve overfill devices (flow restrictors) may not be used on any new UST installation.
- Ball float vent valve overfill devices (flow restrictors) may not be used for any overfill prevention device replacement.
- Ball float vent valve overfill devices (flow restrictors) may not be used on any suction systems or on systems that receive pressurized delivery.
- Existing vent ball extractors must have access risers extending to the surface and have a cap that is removable without wrenches or special tools.
- External high level overfill alarms must be set at 90% of the tank volume (or less) and must be audible to the delivery driver at all times.
- Overfill Prevention Valves (flapper valve) installed in the drop tubes of a fill port must be set to activate at 95 % tank capacity, maximum.

H) Containment Sump Tightness Testing

An owner or operator of an UST system who conducts piping interstitial monitoring as the primary leak detection method shall conduct one of the following tests to determine liquid tightness of the containment sumps. Testing must be conducted by a Montana Licensed UST installer or Licensed UST inspector. Failed tests must be reported to the department.

- Hydrostatically test all containment sumps once every three years with liquid for one hour to a height six inches above the highest sump penetration. A passing test must show no liquid loss measured during the testing interval.
- Vacuum or pressure test containment sumps in accordance with the testing equipment manufacturer's instructions and pass/fail requirements.
- Functionally test containment sumps as recommended by the manufacturer of the containment sump. All newly installed sumps or modified sumps must be tightness tested per the requirements above to ensure that they are liquid tight.