



Protecting Underground Storage Tanks Against Corrosion

A guide for owners and operators of USTs

This is module f of the PST Super Guide, a comprehensive guide to issues relating to petroleum storage tanks (PSTs). This super guide provides an overview to laws and regulations for PSTs and can be used as an aid in minimizing potential risks. The guide does not replace those laws and regulations which take precedence over any information in this publication.

Module f explains how to protect your underground storage tanks (USTs) against corrosion.

- You, the owner or operator of a PST, are responsible for ensuring compliance with all applicable laws and regulations.
- If your UST system is located in Kinney, Uvalde, Medina, Bexar, Comal, Hays, Travis, or Williamson County, additional requirements related to protecting the Edwards or the Trinity Aquifer may apply (Title 30, Texas Administrative Code [30 TAC], Chapters 213 and 214).
- In addition to the laws and TCEQ rules, local governments and other state and federal agencies may have rules that apply.

What is corrosion protection and what is its purpose?

Corrosion protection is a method of slowing or preventing metal components of a UST system from rusting or otherwise corroding or oxidizing. Its purpose is to ensure the structural integrity of the UST system so that releases of regulated substances do not occur. All underground metal components of a UST system that contain, store, or convey regulated substances are required to be properly protected from corrosion, regardless of age, date of installation, or operational status. This includes, but is not limited to, tanks, piping, and flexible connectors. Other underground metal components associated with a UST system that must also be protected from corrosion include, but are not limited to, fill pipes, vent lines, submersible pump housings, spill containers, and riser pipes.

What are my options?

Since Dec. 22, 1988, all new USTs are required to meet comprehensive corrosion protection standards.

Acceptable methods of corrosion protection include:

1. **Noncorrodible material.** Use of a material that will not corrode when exposed to soil or water, such as fiberglass for tanks or piping, or both.
2. **Electrical isolation.** Involves the protection of below-ground metal components by putting them in an open area such as a sump, manway, vault, or pit, and preventing contact with water and soil.
3. **Composite or fiberglass-coated tanks.** This method does not apply to piping and other system components. Tanks do not need further corrosion protection if they meet certain standards and are constructed as a
 - steel/fiberglass-reinforced plastic composite tank;
 - steel tank with a bonded fiberglass-reinforced plastic external cladding; or
 - steel with a bonded polyurethane external coating.
4. **Secondary containment.** A manufacturing method of installing a wall or jacket around metal tanks or piping that meets specific standards for corrosion protection and protects the primary wall of the steel tank from the corrosive elements of soil and groundwater. For example, jacketed steel tanks.
5. **Cathodic Protection.** Discussed in detail below, this is an option for protecting a UST system from corrosion.
6. **Dielectric Material.** A suitable dielectric coating or wrapping used to protect underground components from corrosion. If using this method, additional cathodic protection is required for components that routinely contain regulated substances.

What is cathodic protection?

There are two types of cathodic protection systems: galvanic system and impressed current.

- **Galvanic System.** A sacrificial anode is connected to a metal component in a UST system. The anode, usually made of zinc or magnesium, is wired to the metal component and the anode corrodes instead of the tank or piping. This method is usually used on smaller structures, such as flexible connectors or other metallic piping components.
- **Impressed current.** Anodes connected to the system through a rectifier introduce an electrical current that will inhibit the corrosion of metal components. The anode is wired to the tank in the same manner as in the sacrificial system, but the metal component has such a large surface area that it requires greater protection. A rectifier pushes a low-voltage current through the impressed current cathodic system. The rectifier is usually located on the wall of the facility and has a gauge capable of reading the amperage output of the system.

Federal regulations require that the cathodic protection system be designed by a corrosion specialist. In Texas, a corrosion specialist must be a licensed professional engineer, or designated as a corrosion specialist by a nationally recognized trade group, such as the National Association of Corrosion Engineers.

Testing frequency

A corrosion specialist or corrosion technician must test all cathodic protection systems:

- at installation;
- three to six months after installation; and
- every three years thereafter.

You must also conduct an operational inspection for impressed current systems every 60 days. Record the results of your operational inspections to demonstrate that the rectifier is working properly (retain documentation for at least five years). Wildly varied rectifier readings may indicate a problem, and you should contact your corrosion specialist for specific instructions.

What records do I need to keep?

You need to keep records to document that you are operating your UST system in compliance with applicable rules. You should keep all installation documentation relating to corrosion protection, including information from the manufacturer of the tank and piping and about the cathodic protection system for the life of the UST system. Installation records can include:

- the original invoice from the tank manufacturer;
- a document from the original UST contractor who installed the tanks, or the original UST on-site supervisor stating the brand and model of each tank installed; or
- a TCEQ regional office installation inspection report showing the brand and model for each tank installed at the facility.

If your system is protected by a cathodic protection system, you should keep the results from your cathodic protection tests and rectifier readings for an impressed current system for at least five years. A sample blank log, titled *60-Day Record of Impressed Current Cathodic Protection*, is provided at the end of module f.

If you have an FRP, composite, or jacketed steel tank, then you should keep documents to verify tank material, such as original installation records. If installation records are not available, documentation verifying the tank's material from a licensed UST contractor, UST on-site supervisor, or corrosion specialist may also be acceptable.

Whatever method(s) you use, you must document your system's corrosion protection.

How do I verify tank material without installation records?

If you don't have installation records, you can still verify the system's construction material and obtain documentation for your records. To determine if TCEQ has previously-submitted documents on file that will help verify your tank's material, you can make an open records request. Go to www.tceq.texas.gov/agency/data/records-services/reginfo.html for more information and to request records for your facility. Be

aware that TCEQ does not generally receive invoices or other tank installation records; however, in some instances, original installation inspection reports may be available.

If records are not available, you may need a currently licensed UST contractor, on-site supervisor, corrosion technician, or corrosion specialist to properly verify your tank and/or piping's construction material. The following are some methods used to verify construction material:

- **Visual verification.** If your site has a sump or manway that allows you to see part of your system, your tank and/or piping material may be visually verified by a licensed UST contractor or on-site supervisor. To document this, you should obtain:
 - a written statement from the licensed professional verifying tank material; and
 - **for FRP tanks or piping**, photographic evidence clearly showing the tank is of FRP construction; *or*
 - **for clad/composite tanks**, photographic evidence showing a permanent, factory-applied tag or label clearly indicating tank brand and model or a specification from an acceptable industry code of practice.
- **Camera survey.** If the fill tube is accessible, a licensed UST contractor or UST on-site supervisor can conduct an internal camera survey of your tanks to determine if they are FRP. To document this, you should obtain:
 - a written statement from the licensed professional verifying the tank material; and
 - photographic evidence clearly showing the tank is of FRP construction.
- **Magnet test.** A UST contractor, UST on-site supervisor, or certified corrosion technician can conduct a magnet test to distinguish between steel (or composite) and FRP tanks; this is because the magnetic force is much less for FRP. To document this, you should obtain:
 - a written statement from the licensed professional verifying the tank's construction material;
 - the test results; and
 - a summary of how that conclusion was drawn.
- **Remote structure-to-soil test and/or local tank-to-soil test.** These tests are performed by a corrosion technician or corrosion specialist and involve taking structure-to-soil and/or tank-to-soil potential measurements. The results will help determine your tank's construction material and whether your UST system meets corrosion protection requirements. To document this, you should obtain:
 - a written statement from the licensed professional verifying the tank's construction material;
 - a copy of the test results; and
 - an explanation of the test results.

Where do I find more information?

The complete requirements for corrosion protection may be found in 30 TAC 334.49, available online at

<[texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=334&rl=49](http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=30&pt=1&ch=334&rl=49)>.

Requirements for UST systems in the Edwards Aquifer may be found in 30 TAC 213, available online at

<[texreg.sos.state.tx.us/public/readtac\\$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=213](http://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=213)>.

Requirements for UST systems over other aquifers may be found in 30 TAC 214, available online at

<[texreg.sos.state.tx.us/public/readtac\\$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=214&rl=Y](http://texreg.sos.state.tx.us/public/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=214&rl=Y)>.

The Small Business and Local Government Assistance Program has information designed to assist UST system owners and operators online at

<<http://www.tceq.texas.gov/assistance/industry/pst/>>.

Download TCEQ publications online at <www.tceq.texas.gov/goto/publications>.

The National Association of Corrosion Engineers has a list of corrosion specialists and corrosion technicians at <www.nace.org>. You can search for corrosion specialists in your area by clicking on the link at the right side of the page titled “Find a Certified Professional.”

For confidential environmental compliance assistance for small businesses and local governments, contact Small Business and Local Government Assistance via the hotline at 800-447-2827 or online at <www.TexasEnviroHelp.org>.



60-Day Record of Impressed Current Cathodic Protection

If you have questions on how to complete this form or about the Petroleum Storage Tank (PST) program, please contact Small Business and Local Government Assistance at its hotline, 800-447-2827, or online at www.sblga.info.

Facility Information

Facility Name:	Facility ID No.:
Street Address:	City, State, Zip:

Instructions

- This form may be used to document operational checks of the cathodic protection system rectifier at least once every 60 days.
- If your rectifier is so equipped, you should also record the output voltage and current, and the number of hours indicated on the meter.
- Any significant variance should be reported to your corrosion professional so that any necessary repairs or adjustments can be made.
- A corrosion specialist or corrosion technician should test your cathodic protection every three years.
- Keep this form on file for at least five years.

Impressed Current Rectifier Data

Important System Information	Your Data
Rectifier Manufacturer:	
Rated DC Output (<i>record volts and amps</i>):	
Rectifier Model:	
Rectifier Serial Number:	
What is the “as designed” or most recent recommended rectifier output? (<i>record volts and amps</i>):	

