



TCEQ REGULATORY GUIDANCE

Program Support and Environmental Assistance Division
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Protecting Underground Storage Tanks Against Corrosion

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 of laws and regulations for PSTs and can be used as an aid in minimizing potential risks. The guide does not replace laws and regulations which take precedence over any information in this publication.

Who should use this guide?

Underground storage tank (UST) owners and operators should use *module f* to understand how to protect their USTs against corrosion. UST owners and operators should note the following:

- You, the owner or operator of a PST, are responsible for ensuring compliance with all applicable laws and regulations.
- If your UST system is in Medina, Bexar, Comal, Kinney, Uvalde, Hays, Travis, or Williamson County, additional requirements related to protecting the Edwards or the Trinity Aquifer may apply ([Title 30, Texas Administrative Code \[30 TAC\]](#),¹ 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.

For more help, contact Small Business and Local Government Assistance at 800-447-2827 or at TexasEnviroHelp@tceq.texas.gov.

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.

You must protect all underground metal components of your UST system that hold or transfer regulated substances from corrosion, regardless of age, date of installation, or operational status. Examples include tanks, piping, and flexible connectors. You must also protect underground metal parts associated with the UST system from corrosion.

1. www.tceq.texas.gov/goto/view-30tac

Examples include fill pipes, vent lines, submersible pump housings, spill containers, and riser pipes.

What are my options?

All USTs must meet comprehensive corrosion protection standards.

Acceptable methods of corrosion protection include:

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

What is cathodic protection?

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

- **Galvanic System.** A sacrificial anode (usually made of zinc or magnesium) is connected to a metal component in a UST system. This causes the anode to corrode instead of the tank or piping. Use this method 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 stops the corrosion of metal components. The anode is connected to the tank in the same way 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 that can read the amperage output of the system.

A corrosion specialist must design the cathodic protection system. In Texas, a corrosion specialist must be a licensed professional engineer or certified as a corrosion specialist by a nationally recognized trade group, such as the Association for Materials Protection and Performance (AMPP; formerly National Association of Corrosion Engineers).

Testing Frequency

Use a corrosion specialist or corrosion technician to test all cathodic protection systems:

- at installation
- three to six months after installation
- once every three years after that

Rectifier Inspections Every 60 Days

You must also conduct an operational inspection for impressed current systems every 60 days. Record the results of your operational inspections to show that the rectifier is working properly. Inconsistent 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 to follow applicable rules. You should keep all installation documentation relating to corrosion protection for the life of the UST system. Installation records include, but are not limited to:

- Tank and piping information and the original invoice from the tank manufacturer, showing the brand and model of each tank delivered to the original site.
- Plans and specifications of the cathodic protection system.
- A document from the original UST contractor or on-site supervisor who installed the tanks stating the brand and model of each tank installed.

If your system is protected by a cathodic protection system, you should keep the results from your periodic cathodic protection tests and rectifier readings for an impressed current system for at least five years. We include a blank [Rectifier 60-Day Inspection](#) sample log sheet at the end of this document that you can use for your records.

If you have an FRP, composite, or jacketed steel tank, then you should keep documents that 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 is also acceptable. Examples of verification documentation include:

- A facility-specific written statement from a licensed UST on-site supervisor employed by a currently registered UST contractor. This must be accompanied by a photograph of an external portion of each tank (visible through a sump or

manway or visible due to partial excavation). The statement and photograph must show:

- A reinforcement ring.
- The exterior of each tank is clearly of FRP construction.
- A permanent factory applied tag or label on the tank that shows the tank brand and model or includes the following specification: "UL-1316."
- A facility specific written statement explaining that a magnet test shows each tank to be non-metallic. The statement must be obtained from an individual qualified in corrosion control, such as:
 - An AMPP-certified Corrosion Specialist.
 - An AMPP-certified Cathodic Protection (CP) Specialist.
 - A Texas-licensed Professional Engineer (P.E.).
- A signed written statement explaining that corrosion protection is not necessary for each tank or line system at the facility. Obtain this from one of the qualified corrosion control individuals listed above.
- A TCEQ regional office installation inspection report showing the brand and model for each tank installed at the facility.
 - You can submit an open [records request](#)² to view submitted documents on file that will help verify your tank's material.
- A facility-specific written statement explaining that each tank is of FRP construction and provides photographic evidence supporting that conclusion. Obtain this from a qualified company that has performed an internal camera survey of each tank.

See the next section for more information on verifying tank material.

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

How do I verify tank material without installation records?

If you do not have installation records, you can still verify the system's construction material and obtain documentation for your records. To determine if TCEQ has documents on file that will help verify your tank's material, you can submit an open records request. TCEQ does not usually receive invoices or other tank installation records; however, sometimes 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 or piping's construction material. The following are some methods you can use to verify construction material:

2. www.tceq.texas.gov/agency/data/records-services/reqinfo.html

- **Visual verification.** If your site has a sump or manway that allows you to see part of your system, a licensed UST contractor or on-site supervisor may visually verify your tank and piping material. 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.
 - **for clad/composite tanks,** photographic evidence showing a permanent, factory-applied tag or label proving tank brand and model; or a specification from an acceptable industry code of practice.
- **Camera survey.** If you can access the fill tube, 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.
- **Photographic evidence.** Pictures clearly showing the tank is of FRP construction.
- **Magnet test.** A UST contractor, UST on-site supervisor, or certified corrosion specialist 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.
 - A summary of how that conclusion was drawn.
- **Remote structure-to-soil test or local tank-to-soil test.** These tests are performed by a certified corrosion technician or corrosion specialist and involve taking structure-to-soil 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.
 - A summary of how that conclusion was drawn.

Where do I find more information?

Find complete requirements in [30 TAC](#)³ for:

- Corrosion Protection Requirements (30 TAC Section 334.49).
- Requirements for UST systems in the Edwards Aquifer (30 TAC Chapter 213):
- Requirements for UST systems over other aquifers (30 TAC Chapter 214).

3. www.tceq.texas.gov/goto/view-30tac

Other online resources include:

- [Corrosion Protection for Petroleum Storage Tanks](#)⁴ assistance developed by our Small Business and Local Government Assistance (SBLGA) program.
- [TCEQ form and publication search](#).⁵
- Find a certified corrosion specialist or technician on the [Association for Material Protection and Performance](#)⁶ webpage.

4. www.tceq.texas.gov/assistance/industry/pst/corrosion-protection-for-psts

5. www.tceq.texas.gov/publications

6. www.ampp.org/education/find-a-professional

Rectifier 60-Day Inspection: Log Sheet

Rectifier Data

Manufacturer and Model		Serial Number	
Rated DC Output (Volts)		Rated DC Output (Amps)	
Rectifier Output* (Volts)		Rectifier Output* (Amps)	

*Record the "as designed" or most recently recommended rectifier output.

Status Log

Date	Rectifier Turned	Tap Setting (Coarse)	Tap Setting (Fine)	DC Output (Volts)	DC Output (Amps)	Hour Meter	Inspector Initials	Comments