

Section 4.4: Corrosion Protection for Tanks



All of your regulated tanks that routinely contain regulated substances must be protected from corrosion.

You can protect your underground tank from corrosion in several ways. Your tank may be:

- made of a non-corrodible material (such as fiberglass)
- a steel tank that is coated and cathodically protected
- a steel tank jacketed or clad with a non-corrodible material
- a steel tank that is cathodically protected and internally-lined

Internal lining and cathodic protection require periodic operation and maintenance.

- ✓ Keep all paperwork related to your corrosion protected tanks (examples include paperwork related to installation, cathodic protection, integrity assessment, repair, and internal lining).

To determine requirements and BMPs for corrosion protection of your tank(s), do the following:

1. Identify the type(s) of tank(s) at your facility. Check the appropriate boxes in the table below.

Note: If you have compartmentalized tank(s), treat each compartment as a separate UST. If you have manifolded tanks, treat each as a separate UST.

2. For each type of tank you checked, go to the section of the Workbook listed in the right column of the table. Use the information on requirements and BMPs to complete your self-certification checklist.

What Type(s) Of Underground Tank(s) Do You Have at Your Facility?	UST Number:				Go to these sections for information
	1	2	3	4	
Fiberglass Reinforced Plastic (FRP) Tank					Section 4.4.1
Jacketed Steel Tank (polyethylene or fiberglass)					Section 4.4.1
Clad Steel Tank					Section 4.4.1
Coated and Cathodically Protected Steel Tank					Sections 4.4.2; 4.6
Internally Lined and Cathodically Protected Steel Tank					Section 4.4.3

Note: A steel tank without corrosion protection in a regulated UST system is out of compliance with the regulations and must be permanently closed. Contact the UST Program if you think you have a regulated UST that is not protected from corrosion.

Note: If your tank type is not listed on the table, contact DEC to determine what you must do.

If you know the type(s) of tanks you have, skip the description information below and proceed as instructed in the table above. Otherwise, take the following steps to figure out what is at your facility:

- Read the descriptions below of the different tank types.
- Look through your records to see if they match any of the names in the descriptions.
- Contact the contractor who installed your UST.

Tank Type Descriptions

Protected Steel (P): Steel tank coated at the factory and built with sacrificial (galvanic) anodes, and usually equipped with dielectric nylon bushings in the bungholes. There are several industry codes for this type of tank, with sti-P3® being one of the most well-known.

Fiberglass-Reinforced Plastic (PFRP): While the term Fiberglass-Reinforced Plastic (FRP) is technically correct, these tanks are more commonly referred to as fiberglass tanks.

Polyethylene-Jacketed Steel Tank (PECS): This is a double-wall tank with a steel inner wall and a plastic outer wall. Titan® tanks and Total Containment Tank Jackets® are two common examples.

Fiberglass-Jacketed Steel Tank (PFCS): This is a double-wall tank with a steel inner wall and an outer wall made of fiberglass reinforced plastic material. Permatanks® are a common example of this type of tank.

Clad Steel Tank: This is a steel tank that has a thick layer of non-corrodible material such as fiberglass or urethane that is mechanically bonded (clad) to the outer wall of the steel tank which protects the outer part of the steel wall from corroding. Examples include: ACT-100®, ACT-100-U®, Glasteel®, and Plasteel®.

Steel with Impressed Current (PIC): These tanks are either:

- bare steel tanks that have been retrofitted with an impressed current system
OR
- protected steel tanks (such as a sti-P3®) that had an anode failure that could not be remedied by addition of one or more galvanic anodes, and consequently were retrofitted with impressed current. There are not many tanks like this remaining in service in Vermont.

Protected Steel Fiberglass Lined (PL): This refers to a protected steel tank (such as sti-P3®) steel tank that was lined with fiberglass. This is most commonly done when a double-wall steel tank is found to have a leak in the inner wall, so the interior of the tank is lined to ensure the integrity of the inner wall.

Lined Steel Tank with Impressed Current (PLIC): This refers to a bare steel tank that was retrofitted with both an impressed current system, and was lined with fiberglass.

Internally Lined and Cathodically Protected Steel Tank - This is a steel tank that has both internal lining and cathodic protection. Typically, this type of tank was installed as a bare steel tank and had cathodic protection and internal lining installed at some later date. Usually this type of tank will have an ICCP system. If you are not sure whether you have a cathodic protection system, see the “Determining If You Have Cathodic Protection” section below.

Determining If You Have Cathodic Protection - There are two types of cathodic protection systems commonly used to protect your steel tank from corrosion - impressed current cathodic protection (ICCP) and sacrificial (galvanic) anodes.

Impressed current system - If you have an impressed current system you will have a rectifier (a device for converting alternating current into direct current) located somewhere at your facility.



Sample Rectifier



Sample Rectifier

Sacrificial (galvanic) anode system - It is more difficult to tell if you have this type of cathodic protection system because the anodes are buried and attached to the tank. You cannot see them and there is no rectifier. Look at any installation or permit paperwork you have or contact the contractor who installed the tank or cathodic protection system to try to determine if you have a sacrificial (galvanic) anode system. A sti-P₃[®] tank uses a sacrificial (galvanic) anode system.

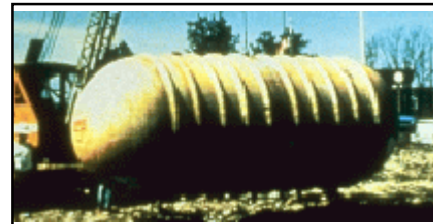
4.4.1 Fiberglass Reinforced Plastic (FRP) Tanks, Jacketed Steel Tanks, and Clad Steel Tanks



Fiberglass Reinforced Plastic (FRP) tanks, jacketed steel tanks, and clad steel tanks meet the corrosion protection requirements without additional equipment or operation and maintenance.

BMPs for Fiberglass Reinforced Plastic (FRP) Tanks

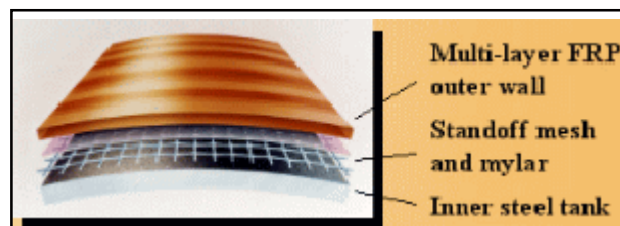
- ✓ Have your tanks periodically checked for deflection (a measure of the roundness of your tank). Since these tanks can become brittle over time, excessive deflection could eventually result in cracking or catastrophic failure. Contact your tank manufacturer for information on deflection testing.



Sample FRP Tank

BMPs for Jacketed Steel Tanks

- ✓ Have your jacketed steel tanks periodically tested by a qualified contractor to make sure the space between the steel tank and non-corrodible material is tight. This space is known as the interstitial space or secondary containment area. If your primary tank wall



Sample Piece of a Jacketed Tank

were to have a leak and the secondary containment space was not tight, a release could result in costly and time-consuming cleanup.

4.4.2 Coated and Cathodically Protected Steel Tanks

Requirements for Coated and Cathodically Protected Steel Tanks



The coating must be on the outside of the tank and must be made of a suitable dielectric material (a material that isolates the tank from the surrounding soil and does not conduct electricity). A sti-P3[®] tank is the most common type of coated and cathodically protected steel tank.



You must comply with specific testing and recordkeeping requirements for cathodic protection. This information can be found in Section 4.6. **Before completing the self-certification checklist**, read the cathodic protection section.



Sample Coated and Cathodically Protected Tank

4.4.3 Internally Lined and Cathodically Protected Steel Tanks

Requirements and BMPs for Internally Lined and Cathodically Protected Steel Tanks



When you combine the use of internal lining and cathodic protection, you must meet specific testing and record keeping requirements for cathodic protection, which are in Section 4.6. **Before completing the self-certification checklist**, read the cathodic protection section.



You must keep all records of repairs for the life of the internally-lined tank.



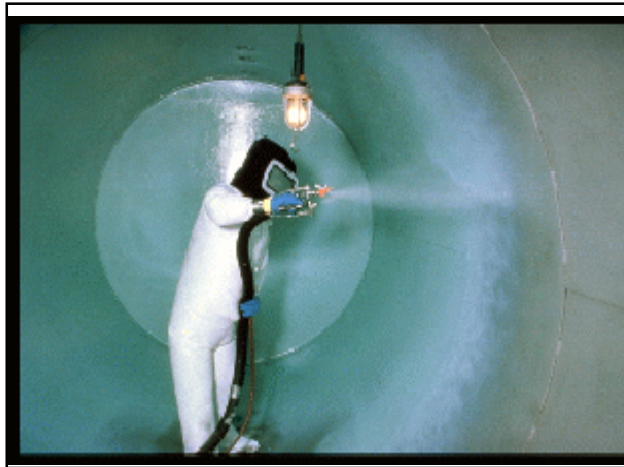
A code of practice must be followed when adding or repairing an interior lining to your tank and prior written notification to and approval by DEC is required.



Your tanks must pass inspection. If your tank does not pass its inspection, you must correct the problem and re-inspect the tank.



Keep records of your lining installation and lining inspections. These records may be useful in determining whether your tank is in compliance with the corrosion protection requirements. Inspection records are required to be kept for three (3) years beyond the life of a facility.



Sample of a Tank being Interior Lined

- ✓ Have your internal lining checked periodically even if the inspections are not required.
- ✓ Keep records of your lining and cathodic protection installations. These records may be useful in determining whether your tank is in compliance with the corrosion protection requirements.