

## Section 4.6: Cathodic Protection



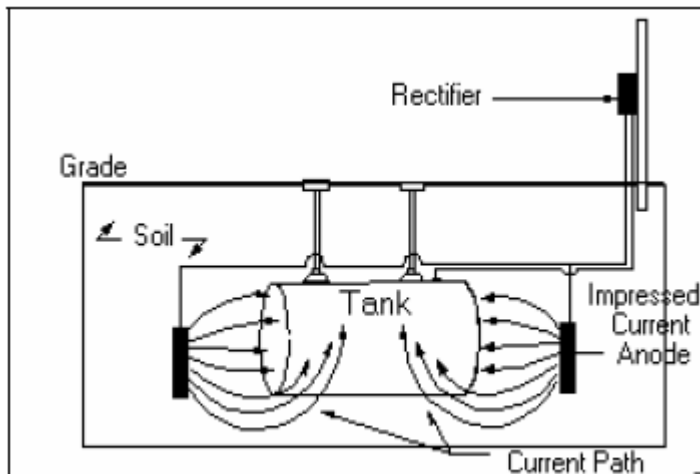
Cathodic protection is one option for meeting the corrosion protection requirements of metal UST components that are in contact with the ground and routinely contain regulated substances. Components of your UST system that may have cathodic protection include: metal tanks, piping, and ancillary equipment such as turbine pump heads and flexible connectors.

There are two types of cathodic protection used for UST systems. They are: (1) impressed current cathodic protection (ICCP), and (2) galvanic (or sacrificial) anodes. These cathodic protection types are briefly described below.

### Impressed Current Cathodic Protection (ICCP)

An ICCP uses a rectifier (an electrical device for converting alternating current into direct current) to provide direct current through anodes to the metal tank, piping, or other underground components to achieve corrosion protection. The diagram below illustrates impressed current cathodic protection.

**How to tell if you have an impressed current system:** You should have an electrical rectifier located somewhere at your facility.



Sample Impressed Current System Diagram

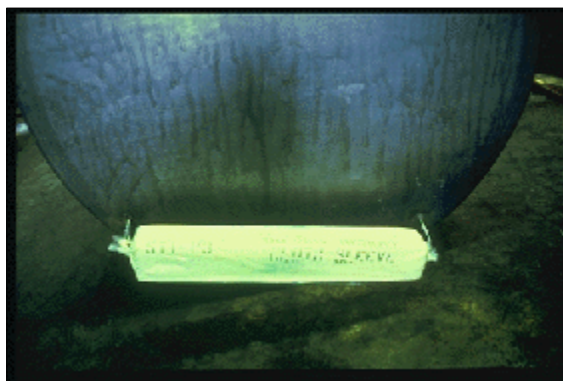


Example Rectifier

## Galvanic (or Sacrificial) Anode Systems

A galvanic (or sacrificial) anode system uses anodes that are buried and attached to metal UST components for corrosion protection. The anode is more electrically active and will sacrifice itself (corrode) to protect the metal component from corrosion. A sample picture of an anode attached to a tank is shown below.

**How to tell if you have a galvanic anode system:** It is more difficult to tell if you have a galvanic anode system because you typically cannot see the anodes and there is no rectifier. The anodes are attached to the underground component they are protecting and are buried. These anodes are usually installed on tanks (such as on the sti-P3<sup>®</sup> tank) at the factory and can be installed on piping and other underground metal components in the field. Ways to help you determine whether you have a galvanic system are to look at any installation paperwork you might have or to contact the contractor who installed the UST and/or cathodic protection system.



Sample Galvanic (or Sacrificial) Anode

### Requirements and BMPs for Cathodic Protection



All cathodic protection systems that are field-installed must be designed by a corrosion expert. Field-installed means that the cathodic protection system was not installed on the tank or piping in the factory. A code of practice must be followed when adding a cathodic protection system to your UST system or when repairing your existing cathodic protection system.

**A corrosion expert** must meet specific qualifications. That person must be either:

1. Certified by NACE as a Corrosion Specialist or Cathodic Protection Specialist, **or**
2. A registered Professional Engineer that has certification or licensing that includes education and experience in corrosion control of buried or submerged metal piping systems and metal tanks.



You must have your galvanic cathodic protection system tested by a qualified cathodic protection tester within 6 months of installation and then at least every 3 years. In addition, if you have any repairs made to your cathodically protected UST system, or if any maintenance or construction in the area of the structure occurs, you must have a cathodic protection test conducted within 6 months of that repair.



If your galvanic cathodic protection system does not pass the test, have your cathodic protection system evaluated and fixed by a corrosion expert within 30 days and submit a report to DEC.



You must keep all records of the operation, repair, and testing of the cathodic protection system for 3 years after the test. A sample cathodic protection test record is provided for you in Appendix D.

A **cathodic protection tester** is a person who can demonstrate an understanding of the principles of all common types of cathodic protection systems as applied to buried or submerged metal piping and tank systems.



If you have an ICCP system, you must inspect the rectifier at least every 60 days to make sure that it is on and operating properly.

- You must record your rectifier readings and keep all records of these checks for 3 years beyond the operational life of the facility. A sample ICCP inspection recordkeeping form is provided for you in Appendix E.
- If your rectifier is not operating within the normal values, contact a corrosion expert to evaluate and fix your cathodic protection system within 30 days.



In addition to inspecting the rectifier every 60 days, you must have a corrosion expert test the impressed current system every 3 years. This is required because changes in soil conditions may cause problems with the ICCP. These problems can be corrected with different voltage or current settings for the rectifier, but only a corrosion expert can make this determination.



Keep all paperwork and testing results related to your cathodic protection system.

The person who installed your impressed current system should have provided you with paperwork to indicate what the normal operating voltage and amperage values are for your cathodic protection system. If you do not have values for the normal operating voltage and amperage, contact the person who installed the system and obtain that information. Record the amperage and voltage readings and compare them to the normal operating values during each inspection.



Vermont's UST regulations require that both galvanic and impressed current systems be tested by an expert every three years. But consider having cathodic protection tests conducted more frequently. The more often you have these tests conducted, the more likely you are to detect cathodic protection problems before releases occur.



Perform inspections of your rectifier more frequently than the 60 day requirement. The more often you inspect the rectifier, the quicker you can detect problems with your cathodic protection system.