

Unless protective measures are taken, buried metal tanks, piping, and other metal components of fuel storage systems corrode (rust) and eventually leak product into the environment.

Underground storage tank (UST) system components must be *continuously* protected against corrosion. This can be accomplished by installing non-metallic tanks such as fiberglass, by coating metal tank systems to isolate them from contact with the corrosive environment (soil), or by using a technique called cathodic protection (CP).

There are two types of cathodic protection for metal tank systems: Galvanic CP and Impressed Current CP.



Galvanic CP

Galvanic CP uses anodes that are connected directly to the structure they are protecting. The anode typically consists of zinc or magnesium bars attached to the tank.

Because zinc and magnesium anodes are more reactive than the metal tank or piping they are connected to, they are sacrificed (corroded) instead of the structure they are protecting. Thus, they are referred to as “sacrificial anodes” and are eventually consumed by the process. A STI-P3 tank is an example of galvanic CP.



STI-P3 tanks are shipped with anodes attached to each end. The anodes protect the tank from corrosion.

Corrosion Protection Testing - Galvanic

The procedure used to determine whether a CP system is working must be performed by a qualified cathodic protection tester. It is accomplished with specialized tools, a reference cell and voltmeter.

[NOTE: The CP system must be tested at least once every 3 years, and results of the testing from the last two inspections (6 years) maintained on site to demonstrate compliance.]

The voltmeter reads the voltage between the reference cell and the buried tank or piping. The voltage readings are usually negative, and a reading more negative than -0.85 volts or -850 millivolts is required for metal to be adequately protected against corrosion.

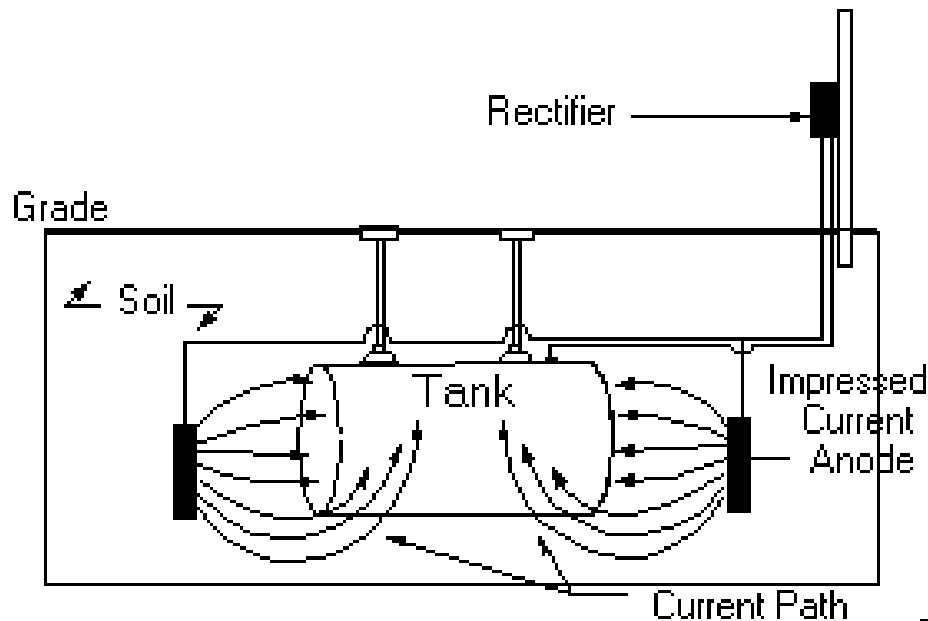


Voltmeter and reference cell used to perform cathodic protection tests.

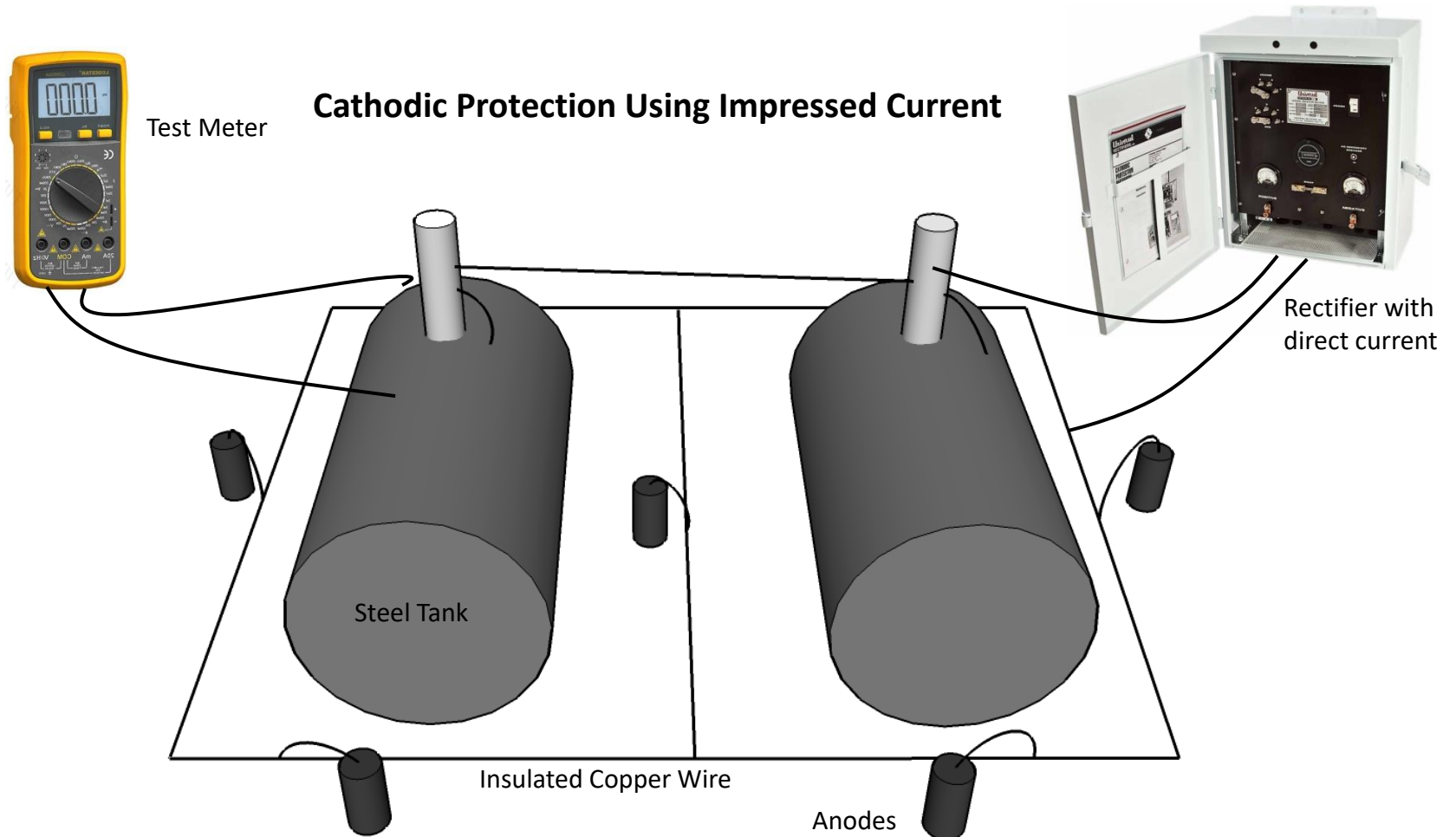
Impressed Current CP

Impressed current corrosion protection uses standard 110-volt electricity, which is converted to direct current by a rectifier. The direct current from the rectifier powers buried anodes that provide the protection to the metal components of the UST system.

Because anodes (both galvanic and impressed current) are designed to wear out over time, the tank system owner or operator must have the CP system tested every three years to determine if adequate corrosion protection is being provided to the metal tank or piping.



Impressed Current CP

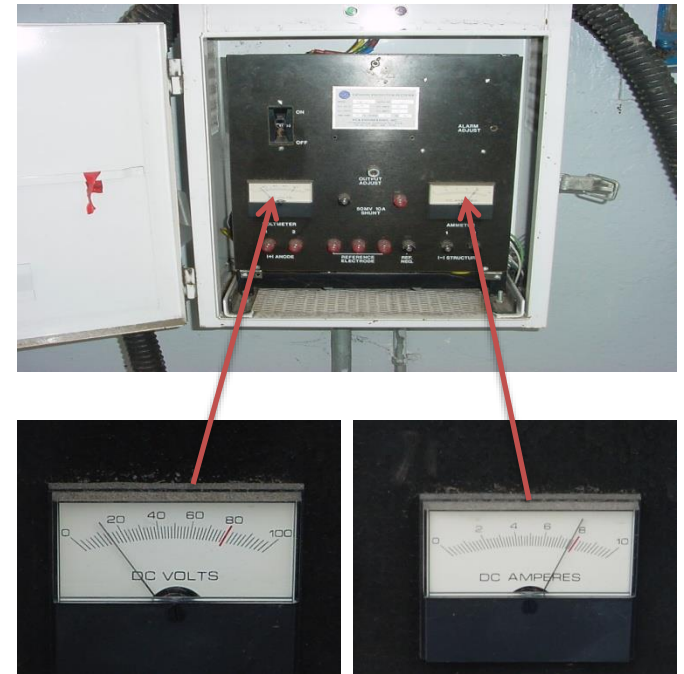


Corrosion Protection Testing – Impressed Current

Owners and operators with UST systems that use impressed current CP must also record rectifier readings every 60 days to verify the system is operating properly. [NOTE: The rectifier readings from the last three inspections (180 days) must also be maintained on site to demonstrate compliance.]

The voltage and amperage readings on the rectifier will be different for each facility. The actual numbers are not important, but it is important that the numbers do not change much over time.

If the voltage or amperage readings change by more than approximately 10% from what they were when the CP system was first installed, then it is likely that something has affected the system and it needs to be inspected by a corrosion expert.



This rectifier contains both an ampmeter and voltmeter. To verify that the rectifier panel is on, these gauges should have values above zero. The readings do not tell you that the system is protecting the tanks and lines, it only indicates that the unit is on and operating.

Corrosion Protection Testing

What does a tank owner do if the CP system fails the test?

First Failed Test - The CP tester should conduct some trouble-shooting procedures. These include being sure the ground is thawed and moist and checking for electrical isolation and continuity of the CP system components.

Second Failed Test - Unless the problem is frozen soil, the CP system should be retested within a week or two of the first test. If readings are still not passing, the tank owner must have the CP system inspected and repaired by a corrosion expert.

When properly installed and maintained, CP can prevent corrosion on the outside surfaces of steel tanks, piping, and other metallic storage system components. It is the UST operator's job to ensure that the CP system is properly maintained and operated so that the UST system remains protected from corrosion.

Owners or operators are required to maintain the CP system until an UST is removed from the ground. Temporarily closed UST systems must continue to have a corrosion protection test performed every three years. In addition, temporarily closed UST systems that use impressed current must also record their rectifier readings every 60 days to verify the system is operating.