

Sec. 5.2 Testing

After the installation is completed, the system shall be energized, tested, and adjusted. Final testing shall not be conducted until the system has had time to polarize. A representative potential profile shall be conducted to verify that the tank-to-water potential satisfies the criteria for protection as described in Sec. 4.1.1.

The system shall be field tested by conducting IR drop-free potential measurements. The instant-off measurement is the most commonly used measurement for this test.

If the system is not to be commissioned until after the internal coating warranty inspection, the transformer-rectifier disconnect switch shall be locked in the off position.

Sec. 4.1 Design

4.1.1 *Criteria for protection.* The cathodic protection system shall maintain the polarized tank-to-water potential at least as negative as -0.850 V to a copper-copper sulfate reference electrode (CSE) in contact with the stored water and submerged tank surface, or, at least 100 mV of cathodic polarization. The formation or decay of polarization can be measured to satisfy this criterion.

CAUTIONARY NOTES:

1. This criterion is only applicable to steel water storage tanks not having corrosion cells caused by connection to more noble metals, such as copper, brass, or passive stainless steel (nonisolated dissimilar metals).

2. Cathodic protection current causes the pH on the submerged tank surfaces to increase because of the reduction reactions. Depending on the type of tank coating, this may cause blistering of the submerged coating. Tank-to-water potentials should not be more negative than -1.100 volt CSE.

3. The CSE potentials are at 25°C and should be adjusted for actual water temperature [E at temperature $T = E$ at $25^{\circ}\text{C} + k(T - 25^{\circ}\text{C})$ where $k = 0.9$ mV/ $^{\circ}\text{C}$]. For CSE potentials at 77°F , the temperature adjustment is E at temperature $T = E$ at $77^{\circ}\text{F} + k(T - 77^{\circ}\text{F})$ where $k = 0.5$ mV/ $^{\circ}\text{F}$.

4.1.1.1 Potential measurement. The potentials shall be measured free of the effect of voltage gradients (IR drops). The long-life reference electrode may be positioned anywhere in the tank water.