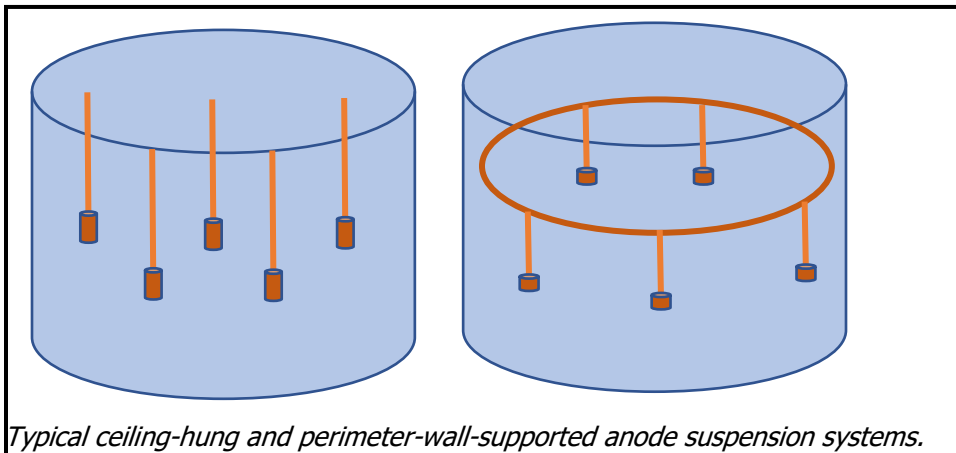


Operator Quiz Corner
What is Cathodic Protection?
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Many welded steel water storage tanks have an anti-corrosion system in place that is known as 'cathodic protection'. A cathodic protection system sends a low voltage current through the water in such a manner that it deliberately corrodes a sacrificial anode instead of any exposed metal surfaces in contact with the water. These systems help prevent tank rust, corrosion and pitting. It is common for many residential hot water tanks to have a sacrificial anode rod that serves the same purpose of minimizing corrosion and extending the life of the hot water tank.

In a municipal water storage tank, there are usually multiple sacrificial anodes (typically made of zinc or magnesium) either hung from the roof or attached along the inside wall of the tank (see figure below). The amount of current applied to the anodes is controlled by a 'rectifier' which is often located in a locked box mounted on the outside wall of the tank or in a nearby accessible panel. The number of anodes required, and the correct applied current is site specific and is best determined by the cathodic protection system provider.



Typical ceiling-hung and perimeter-wall-supported anode suspension systems.

Cathodic protection is not a substitute for having a well-maintained tank coating system. It is important that the cathodic protection system be inspected regularly (anodes should be inspected yearly and replaced as needed) by qualified technicians. Depending on the design anodes can be checked through access ports installed in the roof of the tank and in some cases, it may be necessary to partially or completely drain the tank. Storage tank owners should ensure that the sanitary conditions of the tank are not compromised whenever cathodic protection systems are installed, repaired or inspected.

- 1) _____ are typically made of _____ and _____.
 - a) Sacrificial anodes, lead, copper
 - b) Sacrificial anodes, zinc, magnesium
 - c) Rectifiers, lead, copper
 - d) Rectifiers, zinc, magnesium

- 2) What could result if the sacrificial anode access port on the roof of a tank is not properly closed and sealed once the work is completed.

- a) Loss of pressure in the tank
 - b) Rainwater could enter the tank causing contamination**
 - c) The sacrificial anode could become damaged
 - d) All of the above
 - e) None of the above
- 3) Which of the following cathodic protection devices is used to adjust the low voltage current to the sacrificial anodes?
- a) Amp meter
 - b) Anode
 - c) Voltmeter
 - d) Rectifier**
- 4) True or false? If proper procedures are followed when draining a storage tank for cathodic protection system repairs, it is not necessary to disinfect the storage tank prior to placing it back into service.
- a) True
 - b) False**
- 5) A half million-gallon water storage tank is drained for repairs to the cathodic protection anode support system. How long (hours) will it take to refill the tank if it is being filled at a rate of 925 gpm?
- a) 9 hrs**
 - b) 15 hrs
 - c) 540 hrs
 - d) 925 hrs

Solution:

*ABC Formula to use: **Detention Time = Volume / Flow Rate** where units for volume and flow rate must be compatible*

Volume = 500,000 gallons

Flow Rate = 925 gpm

Detention Time = 500,000 gal / 925 gpm = 540.5 minutes

*540.5 minutes X (1 hr/60 min) = **9 hours***