



Anode Rod

Tech Bulletin # 1216

80-496 REV. C

4/15/2021

The main purpose of the anode rod is to reduce the damaging effects of aggressive water on the water heater. Another purpose is to protect against installation related problems such as, stray electrical currents in the piping system and electrolysis between dissimilar metals in proximity to the water heater. Aggressive water will cause the anode to erode. The life of the anode depends on water temperature, amount of water used, water chemistry, and the hardness or softness of the water. Water softeners will also contribute to the change in water chemistry. Cathodic protection is accomplished in the water heater by using an anode. Due to the relative position of the anode alloy to stainless steel and steel in the electromotive series of metals, the anode rod will corrode, producing an abundance of electrons which flow (much the same as an electrical current) to the exposed surfaces of the tank and the connections, and maintaining these surfaces in the electro-negative state.

Occasionally, questions are raised in areas where some unusual water problems occur with resultant odors. For many years, the magnesium anode was and is the standard anode for use in water heater tanks. In general, it is a very good anode; however, the performance is dependent on water chemistry. In waters where the conductivity is low, the anode operates at a very low current level. This means not much cathodic protection. Conversely, where the water conductivity is high, an excessive amount of current is produced with inefficient operation. This will sacrifice the anode sooner than predicted and require more frequent replacement.

Some water systems have excessive sulfate content along with various strains of sulfate reducing bacteria. These bacteria, harmless to health, will grow in the presence of the highly active magnesium anode rod, and using the hydrogen ion from the anode-cathode reaction, will produce hydrogen sulfide gas. The gas smells like rotten eggs. The greater the activity of the anode, the more hydrogen ions are produced – and the more hydrogen sulfide (smelly) gas. These bacteria can be killed with adequate additions of chlorine, such as with an automatic chlorine feeder.

Anode rods have been developed to operate in a broad range of waters without the sensitivity to the various water conditions. If the water heater is producing an objectionable odor, changing the anode to one of a different material may resolve the issue. Although it is not advised, removal of the anode will not impact the product warranty.

RAISING THE STANDARD