

WATER HEATER TECHNICAL BULLETIN

BULLETIN 43

CATHODIC PROTECTION

GALVANIC SERIES TABLE	<p><u>Corroded end -- anodic or active</u></p> <p><i>Magnesium</i></p> <p>Zinc</p> <p><i>Aluminum</i></p> <p>Steel or Iron</p> <p>Lead tin solder</p> <p>Lead</p> <p>Tin</p> <p>Nickel</p> <p>Inconel</p> <p>Brass</p> <p>Copper</p> <p>Bronze</p> <p>Copper nickel alloy</p> <p>Monel</p> <p>Silver solder</p> <p>Silver</p> <p>Graphite</p> <p>Gold</p> <p>Platinum</p> <p><u>Protected end - cathodic, or noble</u></p>
GENERAL	<p>A low resistance electrical circuit is established in the water heater to control corrosion through cathodic protection.</p> <p>Cathodic protection is a form of combating corrosion. It is actually an application of electricity to prevent corrosion because corrosion is essentially a flow of electric current. Cathodic protection can be defined as a means of protecting a surface from corrosion by making that surface cathodic through the use of a current derived from an anode. This protective current keeps the metallic ions at the cathodic surface from going into solution and thereby corroding. A naturally induced voltage is created due to the potential difference between various metals. Dry cells and storage batteries are based upon this principle.</p> <p>If tank construction materials are anodic to metallic areas, rapid tank failure may result. This phenomena is called galvanic corrosion. It is perhaps the severest form of corrosion in water heaters. However, the electromotive or galvanic series can be used to advantage by making the tank and its components cathodic to the anode. Magnesium and Aluminum are two of the three with the highest potential of the materials listed. Therefore, they are the most common sacrificial anode used for cathodic protection.</p>