

## GALVANIC CORROSION

Galvanic corrosion occurs when two dissimilar metals are in contact in the presence of an electrolyte, which is a medium through which an electrical current can flow (i.e. moisture). The rate of corrosion depends upon the amount and concentration of the electrolyte as well as the difference in electrical potential (anodic-cathodic relationship) of the metals as shown in Galvanic Series Chart to the right.

A highly anodic material in contact with a highly cathodic material will corrode much more quickly than two highly cathodic materials or when the materials used are closer together in the Galvanic Series Chart.

When corrosion does occur, the anodic material is the most likely to corrode, whereas the cathodic material is the least likely to corrode.

To reduce the likelihood of galvanic corrosion in a fastened joint, it's recommended to choose materials that are grouped together in the Galvanic Series Chart. If that's not possible, other recommendations are:

- 1) Select materials that are as close together as possible in the Galvanic Series Chart
- 2) Provide a barrier between the two metals, such as paint, non-metallic washer or gaskets
- 3) Design the fastener as the cathode so the cathodic area is small as compared to the anodic area
- 4) Use a metallic finish on the fastener that is close on the chart to the mating material

### Corroded End (Anodic, Least Noble)

Magnesium  
Magnesium Alloys  
Zinc  
Aluminum 1100  
Cadmium  
Aluminum 2024-T4  
Steel or Iron  
Cast Iron  
Chromium-Iron (active)  
Ni-Resist Cast Iron  
Type 304 Stainless (active)  
Type 316 Stainless (active)  
Lead-Tin Solders  
Lead  
Tin  
Nickel (active)  
Inconel Nickel-Chromium Alloy (active)  
Hastelloy Alloy C (active)  
Brasses  
Copper  
Bronzes  
Copper-Nickel Alloy  
Monel Nickel-Copper Alloy  
Silver Solder  
Nickel (passive)  
Inconel Nickel-Chromium Alloy (passive)  
Chromium-Iron (passive)  
Type 304 Stainless Steel (passive)  
Type 316 Stainless Steel (passive)  
Hastelloy Alloy C (passive)  
Silver  
Titanium  
Graphite  
Gold  
Platinum

### Protected End (Cathodic, Most Noble)