

What is Electrolytic / Galvanic Corrosion? If you've noticed corrosion on the metal parts of your boat located below the waterline, you are the victim of "electrolytic corrosion," or "galvanic corrosion." The scientific term "electrolytic" or "galvanic" corrosion describes the type of corrosion that anodes are intended to absorb. Galvanic corrosion, an electromechanical action, causes metal parts to decompose. The process is similar to that which happens when batteries are left in a flashlight -- an electrical current is created and continues until one of the metals is eaten up -- the battery goes "dead."

What causes corrosion? This corrosion is normally caused by different metals in close proximity to one another in salt or fresh water. Salt water is a better conductor than fresh water, so corrosion is worse in salt water. This destructive process is caused by electrolysis, an electric current set up between the metal parts of your boat, with salt or fresh water as the electrolyte. Generally, corrosion rates increase in proportion to the amount of oxygen in the water. Additionally, metal that is cracked can easily become anodic and corrode. Higher temperature increases corrosion rates -- doubling for every 55 degrees F (30 degrees C). There are various types of microorganisms that also can contribute to corrosion, either by removing protection or causing a corrosive environment.

Why do I need anodes? You need anodes in your engine and heat exchanger, on lower units and outdrives, and running gear and trim tabs, because when two different metals are in contact, electrons will flow from the more negatively charged metal (anode) to the more positive metal (cathode). If you want to protect both types of metal from corrosion, you must add a third metal such as zinc, although aluminum and magnesium also are used. This active metal becomes the anode for both metals. The zinc, aluminum, or magnesium sacrifices itself to protect the other two metals, hence the term "sacrificial anode."

How to Choose the Correct Type of Anode? The three main water types are salt, fresh, and brackish, a combination of the two. Zinc anodes only protect in salt water. Aluminum anodes protect very well in salt and brackish waters. Magnesium anodes protect the best in fresh water.

DO NOT MIX different types of anodes on the same vessel.

- **Zinc Alloy Anodes -- Salt water only**
 - Not recommended for use in fresh water
 - Alloy is manufactured to meet or exceed US Military Specification (MIL-DTL-18001L)
- **Aluminum Alloy Anodes -- Salt, Fresh or Brackish water**
 - Not recommended, but can be used in fresh water
 - Proven to last longer than zinc due to increased capacity
 - Alloy is manufactured to meet or exceed US Military Specification (MIL-DTL-24779(SH))
- **Magnesium Alloy Anodes -- Fresh water only**
 - The only alloy proven to protect your boat in fresh water
 - **It is not recommended to use magnesium anodes in salt or brackish water.** The result may be an accelerated corrosion rate, which may damage the metal parts of your boat and leave you with no anode protection in a short period of time.
 - **Note:** Fresh water is a much less conductive environment than salt water, therefore magnesium anodes are your best choice as they are much more active than zinc or aluminum anodes. The result is increased efficiency, thus superior protection for your underwater metal components.