

## CORROSION AND ELECTROLYSIS

It has been said by many electrical (gurus) that the term electrolysis is the most confusing and misused term around the boatyard. Electrolysis is a term that is loosely applied to the corrosion processes. The term refers to "solution phenomena" and not to corrosion.

There is a type of corrosion called electrolytic corrosion but it is not electrolysis. Electrolysis refers to the degradation of an electrolyte that occurs as a result of passing electrical current through it. Electrolytic corrosion is caused by a current from an external source, often the boat's battery or shore supply.

The current that causes electrolytic action is called "stray current" and usually emanates from a poorly installed electrical circuit or a bad earthen (ground) arrangement, like a poorly installed electrical circuit or bad ground arrangement on a radio or power tool or a current leak due to damp connections.

In case of the 2B Sure electrolytic anti-fouling system, the system itself is completely electrically isolated from the ship by a galvanic isolator unit.

The confusion is usually between the terms galvanic corrosion and electrolytic corrosion. Galvanic corrosion is caused by an electric current generated by two different metals in a conducting medium such as seawater. When we talk about galvanic corrosion we're talking about an electric exchange. The results of each type of corrosion can be similar and can occur at an alarming rate. The bottom line however is that you can have a properly wired boat moored at a properly wired dock and still be at risk of corrosion.

Where is the safest place to store my boat to repel these enemies of corrosion. It helps if you keep your vessel out of the conducting medium, like seawater, or well away from other vessel's feasting on shore supplied alternating current that may be leaking to or from God knows where. When your vessel is anchored out half the problem is eliminated (this makes a good case for cruising). Now some of you can dry store your vessel and that prevents a host of problems, but many of us are stuck in the wet stuff.

### Galvanic Isolators

Our first line defence against galvanic corrosion is sacrificial anodes, you know those dissolving; jewels your diver friend frequently invoices you for and calls them zincs. Anode according to American Boat and Yacht Council is the electrode of an electrochemical cell with more negative potential, the least noble metal of an electrolytic cell that tends to corrode. For these things to work we must have a galvanic couple. A galvanic couple is a pair of dissimilar conductors (common) metals in electrical contact in an electrolyte such as seawater. I look at it this way, its sort of like the taxpayers are the anode, and the federal government is the cathode. The anodes waste away while protecting the cathodes. I must be least noble because by the end of the year I feel pretty eaten up. In case of the electronic anti-fouling system of Bright Spark, the system itself even helps to protect the ship when it is activated. The copper is forced to be dissolved, and helps protecting the ships anodes.

Thus "Mil.Spec. A - 1800 - J" became the specific military specification (.005% Iron, .005% Copper, .006% Lead, .025 - .070% Cadmium, 1 - 5% Aluminium and the remainder Zinc) elements in a proper anode to protect the ship. When you haul your vessel and find your anode (zinc) coated with an insulating film, it was useless. The non mil spec zinc anodes provide reduced protection levels and form an insulating crust that prevents access of water to the surface. This is like the taxpayer that doesn't pay their taxes, they aren't wasting away and are no good to anyone. There needs to be a balance here and you can be under or over zined. There is much to know about anodes, but lets move on to another weapon that has been developing for some time, galvanic isolators.



Bright Spark

Bright Spark BV postal address Postbus 126 NL-8500 AC Joure The Netherlands visiting address Nipkowweg 15 NL-8501 XH Joure  
T +31-(0)513-419 119 F +31-(0)513-419 332 E info@brightspark.nl I www.brightspark.nl  
registration KvK 01109012 VAT NL810404643B01 bank account 62.21.92.534 IBAN NL86ABNA0622492535 BIC ABNANL2A

According to American Boat and Yacht Council, a galvanic isolator is a device installed in series with the (AC) grounding (green) conductor of the shore power cable to block low voltage DC galvanic current flow, but permit the passage of alternating current (AC) normally associated with the (AC) grounding (green) conductor. This device helps combat galvanic / stray current corrosion. American Boat and Yacht Council have written a standard for construction, installing and testing this equipment that more and more manufacturers are providing and many boaters like myself are installing as an after market upgrade in an effort to protect our vessels. The National Fire Protection Association also diagrams and issues standards in a properly constructed and installed galvanic isolator. This is an important corrosion tool which is effective and necessary, as long as the vessel is connected to shore based power. Its function is to block the flow of galvanic current between dockside and the vessel via the green safety grounding conductor.



Faulty ground paths are contributing factors in every marine related electrocution / drowning. A properly installed galvanic isolator is a device available to equip a vessel to a higher standard. A neighbours boat with stray current problems can cause accelerated corrosion to other boats plugged into the same shore line if they provide a better ground. Stray current would be transmitted to other boats through the common ground wire but can and should be blocked by installing a galvanic isolator.

Maurice Tax

CEO

Bright Spark BV