Environmental Chamber Recreates a Wet, Salty World

For this test, four different terminal block panels were assembled using the various combinations of wires, terminals, and anti-corrosion sprays to be tested. The photos on page 16 offer good examples of what the panels looked like. The panels were then put into our environmental chamber designed to replicate long-term exposure on a cruising boat.

This chamber was an enclosed, but not air-tight, box held at 105 degrees with a layer of sea water in the bottom. The sea water was condensed to have two times the salinity of ordinary sea water (70,000 ppm NaCl as tested). The exposure cycle was as follows:

- Turn heat off. Allow to cool to 70 degrees.
- Gently wet (watering can) with salt water, uncover, and allow samples to dry for 60-84 hours.
- Close chamber and heat to 105 degrees for 12 hours. Because the samples are cooler, condensation will occur.
- Repeat two times each week.

This regimen mimics procedures employed during accelerated corrosion testing of automobile parts and is generally held to compress two years of use into two weeks of testing, depending on the precise variables.

Because the bilge of the boat is already a harsh environment, we believe this testing method will only compress the time frame perhaps 20 times instead of the 52 times projected for automotive parts. We do know that the wires look as bad as any we have seen in a wet bilge after 20 years of exposure; we credit the high salinity imparted by the drying cycle for most of the acceleration.

It could be argued that this test is excessive for connections made in a dry cabin, but any location on a saltwater boat is vulnerable to corrosion, particularly when DC current is introduced. Although “live” wires would have presented a more realistic scenario, testers did not want to risk the chance of stray-current wreaking havoc with the test panels in such a highly conductive environment. How relevant the test conditions are to a real-life scenario will depend very much upon the individual boat and the location in question.