HOW WE TESTED

Practical Sailor obtained 10 small FM radios from the American Science & Surplus catalog, and two more elsewhere that were nearly identical but lacked earbuds. (We had chosen the original 10 because the earbuds—which wouldn't be immersed—would let us hear the radio even if the speaker failed.)

Testers inserted new batteries to ensure that the radios worked. We then sprayed each one's circuit board and electrical connections liberally with the assigned product and left them to dry overnight.

After ensuring that each radio still worked, we placed them in a fish tank containing seawater, setting them atop bricks to keep them dry. Testers placed the tank in a sunny spot on a cement patio blocked from the wind, and in no time, the specimens were steaming in tropical heat—98˚F and 93 percent humidity. We left the radios to simmer for 10 days, checking them every 24 hours.

All of the radios survived this part of the test, though some were beginning to show signs of minor breakdown in the volume control and our untreated control radio was reduced to emitting only squeaks. The battery compartments on several had begun to crack. In the absence of visible deterioration of the plastic, we hesitate to attribute this to the sprays. It's likely a case of imperfect design, perhaps exacerbated by chemical reaction to the sprays.

After the humidity test, we immersed each radio for an 1½ hours in a pail of seawater. Then, we flushed them with freshwater and let them air dry for 48 hours.

After the dunk test, none was able to emit even a static buzz from the speaker or ear buds. We opened the battery compartments and saw that corrosion had taken place at the battery terminals on every radio except the one treated with TC-11. The on/off/volume-control potentiometer was reduced to a little ball of rust in each radio.

For the next test phase, we attempted to use each product to "insulate" pairs of copper electrodes (made with 18G solid copper wire). We immersed the electrodes in seawater, and connected them, in series with a flashlight bulb, to a 6-volt battery. With the exception of the two heavy, waxy coatings, CorrosionPro Lube and CRC Heavy Duty Corrosion Inhibitor, in each test, the bulb lit and gas bubbles formed on the anode. When we brought the electrodes closer together, the bulb grew brighter, and when we touched the electrodes, it lit as brightly as when we eliminated them from the circuit. It was clear that dielectric films do not protect against a directly applied voltage.

To assess the products' protection against galvanic reactions, we made electrode pairs of copper and solder (60 percent lead, 40 percent tin), submerged them a half-inch apart in seawater, and measured the voltage across them and the current generated via a multimeter.

Our treated electrodes all exhibited a potential difference, ranging from about 0.3 volts to 0.1 volts, but more interesting was the current measured. Electrodes treated with CRC QD, which makes no claims as a dielectric (and in fact leaves behind no coating), showed similar numbers to the untreated pair, but the waxy twins, CRC Heavy Duty and CorrosionPro, showed currents of zero in one spell and .001 milliamps in another. Also close to zero were TC-11 (0.002mA) followed by Corrosion Block (0.004mA) and Boeshield T-9 (0.005mA) and CorrosionX (0.006mA). We would expect those products for which we measured lower PDs and lower currents to, at the very least, retard galvanic reactions.

These cheap radios were sprayed with electrical protectants and then left to sweat it out in the humid atmosphere of an aquarium containing sea water.