
# Testers Take a Look on the Bright Side

To evaluate the LED tricolors, testers used a series of bench tests and sea trials to gauge their performance. Testers also considered construction quality, design detail, price, and warranty.

To confirm each light's visibility at ranges up to 2 nautical miles, we installed a test setup on *PS* test boat *Wind Shadow*, an Ericson 41. The observers loaded into the dinghy and moved away from the boat, noting the lights' visibility at pre-charted distances of a quarter-mile, a half-mile, 1 mile, and 2 miles. All of the test lights were visible up to 2 miles when the ambient surroundings were pitch black; however, when the background light was elevated, the test lights were swallowed up beyond the 1-mile mark.

Testers used a Gossen Luna Pro incident light meter and a Pentax V spot meter to evaluate each light's luminosity. In addition to measuring brightness, we noted the zone of overlap where the red and green sectors could be easily distinguished.

Testers also noted the off-plane visibility of the lights, an important feature that compensates for vessel heel and roll. Each light was set up on a tripod (on level ground) at a 25-degree angle to mimic heel, and testers measured the luminosity of each at this max tilt point.

LEDs are designed to put out a fixed level of light throughout a very wide range of voltage. Contrary to how incandescent lights behave, LEDs show little or no drop in luminosity as voltage plunges below 12 volts DC. In fact, testers ran these lights down to a mega-discharged 6 to 8 volts. The lights remained bright right up until they fluttered off as their load drove the battery voltage below the shut-off point. We monitored power consumption and voltage using a Xantrex Link 10.

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Driver circuitry is a key part of LED bulb or lantern design. It controls electrical current as it reaches the semiconductor material, exciting electrons and catalyzing photon release. The more excited the electrons, the more light energy produced.

Unfortunately, a side effect of this process can be spurious radio frequency (RF) energy that can find its way into the receiver side of some electronic equipment, if it's not filtered or attenuated. For example, many masthead VHF antennas have coils mounted very close to where the tri-color light lives, and the relatively weak VHF signals that they pass along to the receiver can be degraded by electronic interference caused by the drivers in some LED lights.

To get a better understanding of how well each manufacturer had addressed the radio frequency interference (RFI) issue in our test products, testers tuned a handheld VHF to the local weather frequency and measured how closely it could be held to a test light before radio frequency interference made the signal unintelligible. One might point out that a tri-color is at the masthead and a handheld VHF is usually 50 feet or more away. However, a 3-Db, masthead-mounted VHF antenna coil often is situated a few inches away from the tri-color light, and RFI is never a signal enhancer. (Signal Mate suggested that in a standard setup, with a VHF antenna's coaxial running inside the mast, *PS* would have found much lower levels of interference from its light, as well as many of the others.)

Some of the lights, Lopolight in particular, were so well filtered that even with the VHF touching the light, there was almost no interference at all. Other test lights completely obliterated the signal, even from more than a foot away.