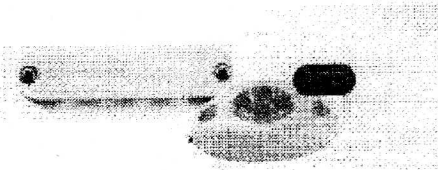


## Marine lighting made easier.

**Q. I'm not sure what type of Marine lighting to use (halogen, LED, incandescent or fluorescent). Why should I use one type over another?**

A. For task, accent, and art lighting, halogens are a good choice due to their excellent CRI (color rendering index) value. For general lighting, we recommend halogen or compact fluorescents (neutral color temperature) with a CRI of 80 or more. If efficiency is a major concern, LEDs are an excellent choice for task lighting, courtesy lighting and specialty applications such as livewell lights and compartment lights. In engine rooms, fluorescent lamps with a cool-white color temperature throw a lot of light and are very efficient. Incandescent lamps have good color rendering, are relatively inexpensive and readily available. However, they are inefficient and are adversely affected by voltage fluctuations, so they are not the best choice for many marine applications.



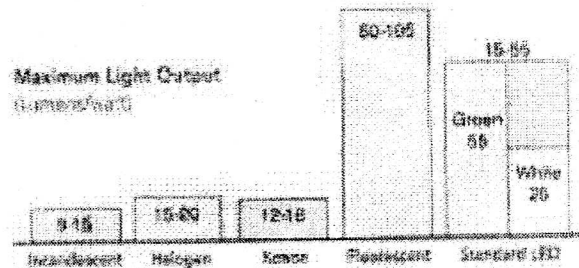
**Q. LEDs are big news. Why don't all fixtures use them?**

A. Although LEDs are attractive to boat owners for their low energy use, their luminous flux is low compared to other light sources. Several LEDs must be clustered together at different angles to approximate the light output of one standard incandescent bulb.

The angle of illumination can vary (depending on the application). To achieve enough light (in foot-candles) to illuminate objects, the LED must have a viewing angle of between 15-20 degrees. Therefore, bulkhead-mounted reading lights or chart lights are well suited for this type of illumination.

For courtesy lights, LEDs with a wider viewing angle (lower foot candles) are a good choice. Up to now, this inverse ratio between viewing angle and foot-candles has limited LED usage to specific applications. However,

## Marine Lighting Specialists



**Q. How does bulb wattage vary with each type of light to get the same light output?**

A. As the chart above illustrates, light output (measured in Lumens/watt) varies according to bulb type. Therefore, on average, 1 watt of fluorescent is equivalent to almost 6 watts of incandescent (or 4 watts of halogen). LEDs are available in narrow beam, medium beam, and wide beam; the wider the beam angle, the lower the intensity of light output. Generally it takes between 7-9 LEOs for adequate reading and task lighting. It can take 20+ LEOs to equal the light output of a 10W halogen spot (however, it is believed that we could see a 2-fold increase in the intensity of LEDs over the next two years.)

**Q. There seem to be many different terms used to describe light intensity or light output. What are the differences between these terms and how are they measured?**

A. **Luminous Flux** is the total amount of lamp light in all directions and is measured in Lumens. **Luminous Intensity** is the concentration of light in a particular direction and is measured in Candelas. **Illuminance** is the density of light on a surface and is measured in lux units. **Luminance** is the concentration of light directed toward the eye and is measured in Candela/square meter.

**Q. How do I dim a circuit that is low voltage AC (powered by a transformer)?**

A. There are two ways to do this. You may dim from the output side of the transformer using a low voltage AC dimmer, or you may use a standard AC dimmer on the supply side of the transformer. If

