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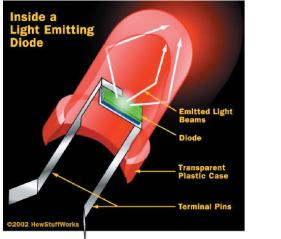
### LED Lighting Guide

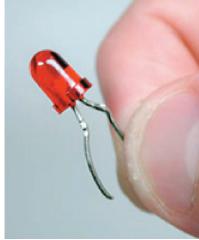


light emitting diodes

#### LED Lighting Guide

LED's are semi conductor diodes that convert electricity into light energy. When electricity is passed on to the LED chip a colored light is emitted. The color emitted is directly related to the chemical composition of the LED chip. Another way to describe an LED is "solid state lighting" (SSL). Please view the picture of an LED here below with the critical components.





## What are the chief benefits and features of LED's as a source of light?

#### **Lower Power Consumption**

LED's consume 10% of the energy of incandescent lamp. This means lower power requirements and batteries will last 10 times longer

#### Reliability

LED's are rated for 100,000 hours of operation or 11.5 years continuous use. The extended life translates into less downtime and related labor/replacement costs

#### Durability and virtually little or no heat

Since LED's do not employ a filament as an incandescent, solid state lighting is impervious to shock and vibration. With very little heat produced, LED' are not susceptible to heat deterioration of its inner parts, like filaments employed in incandescent bulbs.

#### **LED Quality of Light**

LED's emit a noticeably intense directional output of light. The light emitted from an LED is stronger, sharper and more vibrant than an incandescent, which emits light predominantly as a result of intense heat.

#### How does an LED emit white light?

LED white light is created by:

(a) mixing several LED chips of different colors to make white light in the LED housing *OR* 

(b) using a blue LED with a phosphor coating which converts the blue light to white

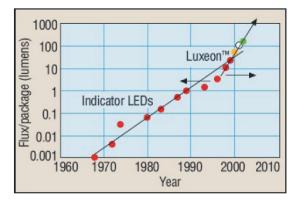
#### Why do white LED lamps cost so much more than colored LED's like red or amber?

Due to the extra fabrication process which requires additional labor and component costs, white LED's cost more than colored ones. While costs have been coming down with production efficiencies there are also licensing costs associated with patents acquired by companies in the white LED field.

#### Why aren't LED's brighter?

LED brightness has increased remarkably since 1962 when the first practical LED was developed. Dr. Roland Haitz, a forerunner and physicist

working at Agilent Technologies, established Haitz's Law which states that LED luminous output will double every 18-24 months.



#### Since LED lights are more expensive, are they worth the purchase?

While being more expensive at the out set, they save money over the long run due to their longer life and in the case of batteries which will last 10 times longer in a LED battery operated device.

#### What kinds of lighting products incorporate LED's?

- Flashlights Emergency Lights Occupancy Sensor lights Tail Lamps Transportation Signal Lamps Traffic Lights Clearance and Side Marker Lamps Night Lights
- Home Lights Industrial Lights Mood Lighting Head Lights Outdoor Lighting Medical Purpose Probes Cosmetic Skin Repair Therapy

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