

LED Lighting

*A **Green**, Sustainable Alternative*

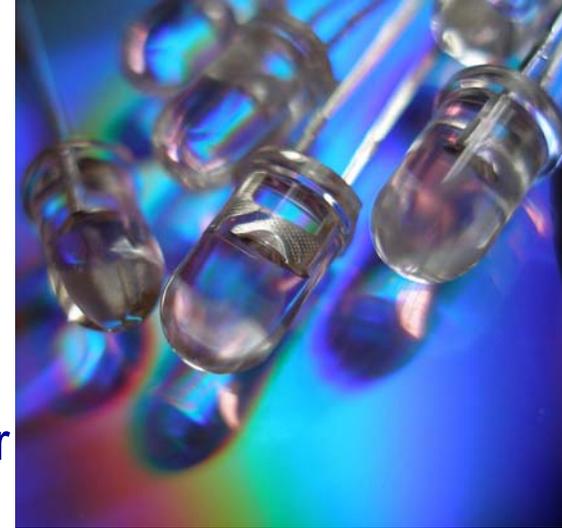
What is LED Lighting?

- A **LED (Light Emitting Diode) Lighting** is a type of **solid state lighting (SSL)** that uses **light-emitting diodes (LEDs)** as the source of light. They usually comprise clusters of LEDs in a suitable housing.

Light emitting diodes (LEDs), perform several different jobs and are found in all kinds of devices. Among other things, they form the numbers on digital clocks, transmit information from remote controls, light up watches and tell you when your appliances are turned on. Collected together, they can form images on a jumbo television screen or illuminate a traffic light.

Basically, LEDs are just tiny light bulbs that fit easily into an electrical circuit. But unlike ordinary incandescent bulbs, they don't have a filament that will burn out, and they don't get especially hot. They are illuminated solely by the movement of electrons in a semiconductor material, and they last just as long as a standard transistor.

LEDs, the enabling components of Howard solid-state lighting products, are semi-conductors that produce white light more efficiently than most traditional light sources. While the white light and high color rendition of LEDs has made them a good alternative to HID, CFL, and incandescent lamps for certain applications, LEDs previously lacked the lumen output and optical control required for general illumination. Recent advances in LED efficiency – and Howard's proprietary technology – have changed that, making LEDs an increasingly obvious choice for environmentally friendly, cost-effective, low-maintenance lighting.



- Monochrome Indicators
 - Traffic lights, automotive, exit signs etc
 - Cell phones, PDAs
 - Direct view displays; video screens
- Emerging Applications
 - Transportation: marine, auto, aviation etc.
 - Lighting market



- **Solid-state lighting (SSL)** refers to a type of lighting that uses light-emitting diodes (LEDs), organic light-emitting diodes (OLED), or polymer light-emitting diodes (PLED) as sources of illumination rather than electrical filaments, plasma (used in arc lamps such as fluorescent lamps), or gas.
- The term "solid state" refers commonly to light emitted by solid-state electroluminescence, as opposed to incandescent bulbs (which use thermal radiation) or fluorescent tubes. Compared to incandescent lighting, SSL creates visible light with reduced heat generation or parasitic energy dissipation. Even conventional fluorescent lamps are essentially solid state light sources, as most light is generated in the solid state fluorescent coating of the tube.
- The typically small mass of a solid-state electronic lighting device provides for greater resistance to shock and vibration compared to brittle glass tubes/bulbs and long, thin filament wires. They also eliminate filament evaporation, potentially increasing the lifespan of the illumination device.



- Efficient lighting is needed for sustainable architecture. A 70 watt LED lamp is the equivalent of a 100 watt HID lamp. A standard HID lamp has a lifespan between 10,000 and 24,000 hours while an LED can continue to operate with reduced efficiency for more than 50,000 hours, two to five times longer than the HID lamp.
- LED lighting could be a cost effective option for lighting applications in garages, parking lots, offices, etc. because of their very long lifetimes, even though they have a much higher purchase price. The challenge is to get buyers and users to be conscious of and make decisions based on life-cycle costs instead of the more obvious initial purchase price.



LEDs present many advantages over traditional light sources including lower energy consumption, longer lifetime, improved robustness, smaller size and faster switching. However, they are relatively expensive and require more precise current and heat management than traditional light sources.

- *Efficiency:* LEDs produce more light per watt than incandescent bulbs.
- *Color:* LEDs can emit light of an intended color without the use of color filters that traditional lighting methods require. This is more efficient and can lower initial costs.
- *Size:* LEDs can be very small (smaller than 2 mm²) and are easily populated onto printed circuit boards.
- *On/Off time:* LEDs light up very quickly. A typical red indicator LED will achieve full brightness in microseconds. LEDs used in communications devices can have even faster response times.
- *Cycling:* LEDs are ideal for use in applications that are subject to frequent on-off cycling, unlike fluorescent lamps that burn out more quickly when cycled frequently, or HID lamps that require a long time before restarting.
- *Dimming:* LEDs can very easily be dimmed either by Pulse-width modulation or lowering the forward current.

- *Cool light*: In contrast to most light sources, LEDs radiate very little heat in the form of IR that can cause damage to sensitive objects or fabrics. Wasted energy is dispersed as heat through the base of the LED.
- *Slow failure*: LEDs mostly fail by dimming over time, rather than the abrupt burn-out of incandescent bulbs.
- *Lifetime*: LEDs can have a relatively long useful life. One report estimates 35,000 to 50,000 hours of useful life, though time to complete failure may be longer. Fluorescent tubes typically are rated at about 10,000 to 24,000 hours, depending partly on the conditions of use, and incandescent light bulbs at 1,000–2,000 hours.
- *Shock resistance*: LEDs, being solid state components, are difficult to damage with external shock, unlike fluorescent and incandescent bulbs which are fragile.
- *Focus*: The solid package of the LED can be designed to focus its light. Incandescent and fluorescent sources often require an external reflector to collect light and direct it in a usable manner.
- *Toxicity*: LEDs do not contain mercury, unlike fluorescent lamps.

- *Retrofits to existing lighting fixtures*
- *Luminaries to illuminate highways*
- *Freeways*
- *Parkways and thoroughfares*
- *Local and collector roads*
- *Parking areas*
- *Intersections*



- *Residential exteriors*
- *Entry ways*
- *Walkways*
- *Perimeters*
- *Parking garages*
- *Storage areas*
- *Wet industrial/commercial spaces.*



NEW

LED Fixtures:



Small LED Cobrahead



LED Canopy



Small LED Cobrahead

Howard's LED Cobra Head is your best choice for energy-efficient, environmentally friendly lighting for roads, highways, and thoroughfares. Howard LED Cobra Heads use up to 50% less energy than traditional metal halide fixtures and maintain virtually all their luminosity for the 10+ year life of the light, significantly reducing replacement and maintenance costs. And Howard's proprietary photometric design techniques minimize glare and improve nighttime visibility to deliver superior illumination and roadway safety. Howard's Cobra Heads are designed to meet all LEED requirements for light pollution reduction credits by minimizing light trespass, reducing sky-glow and reducing the impact on nocturnal environments.



Small LED Cobrahead

Features and Specs:

Distribution Patter – IESNA Type II

Life Expectancy – 50,000+ hours

Input Wattage – 73 Watts

Efficacy – 53 Lumens per Watt

Cutoff – Full

Glare – Low

Housing – Die-Cast

Lens – Flat Glass or Profile Acrylic

Compliance – Dark Sky compliant

Comparison – 100 Watt MH or HPS



LED Canopy

Howard Canopy LED lighting is the environmentally friendly, cost-effective, maintenance-free alternative to traditional lighting. Howard canopy fixtures use up to 75% less energy and contain no mercury. These LED fixtures are extremely durable, providing quality, efficient maintenance-free illumination for more than ten years. The fixtures can be surface-mounted. They are also completely water-tight (IP66-rated), so they can be cleaned with a simple hose down.



LED Canopy

Features and Specs:

Life Expectancy – 50,000+ hours

Input Wattage – 36 or 50 Watts

Efficacy – 60 Lumens per Watt

Housing – Die-Cast

Lens – Injection Molded Polycarbonate

Comparison – 175 Watt MH or 150 Watt HPS

Assembly – Sealed to be dirt and bug-free



- *Lighting is critical especially for security*
- *LED Lighting is extremely efficient
(less operating costs)*
- *LED Lighting is environmentally friendly
(no mercury or toxins)*
- *LED Lighting means Zero Maintenance
(50,000 hours / 10+ years)*



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The End