

LED LIGHTING



POWER FORWARD TIP SHEET

WHY ARE BUSINESSES ADOPTING LED LIGHTING?

In recent years, advances in Light Emitting Diode (LED) technology have unleashed new possibilities for attractive, high-efficiency lighting. LEDs offer significant advantages over older lighting technologies and use far less energy than incandescent or CFL fixtures. They produce less heat, which may cut cooling costs in hot summer months. LEDs also have a lifespan many times that of incandescent and fluorescent lighting, which reduces maintenance and operation costs. LED technology has made huge strides in recent years, especially when you factor in the dimming and color-tuning possibilities. Today's LEDs are appropriate for nearly any commercial application.

DO YOUR RESEARCH.

LEDs are a totally unique lighting technology requiring a different design approach than traditional lighting.

There are a number of new manufacturers producing LED products ranging in quality from excellent to poor.

To evaluate the quality of LED products, look for industry labels from ENERGY STAR® or the DesignLights Consortium (DLC). Ask for test reports, such as LM-79 and LM-80. Seek the advice of industry experts. The Department of Energy's Solid State Lighting website is another excellent source for understanding the current state of LED lighting.

Visit <http://www1.eere.energy.gov/buildings/ssl/> to learn more.

DO LEDS PROVIDE HIGH-QUALITY LIGHTING?

The number of white-light LEDs available on the market continues to grow. Commercial options include a wide range of replacement lamps, integrated light fixtures, portable desk/task lights, under-cabinet lights, recessed lights, track heads and outdoor fixtures for street and area lighting.

PSO OFFERS REBATES FOR THE FOLLOWING LED LIGHTING TECHNOLOGIES:

- LED EXIT SIGNS
- LED STRIPS FOR REACH-IN FREEZERS OR COOLERS
- LED SCREW-IN LAMPS TO REPLACE PAR20, PAR38 AND MR LAMPS
- INTERIOR LED FIXTURES AND RETROFIT KITS
- LED PARKING LOT, PARKING GARAGE, FLOOD AND OTHER EXTERIOR FIXTURES

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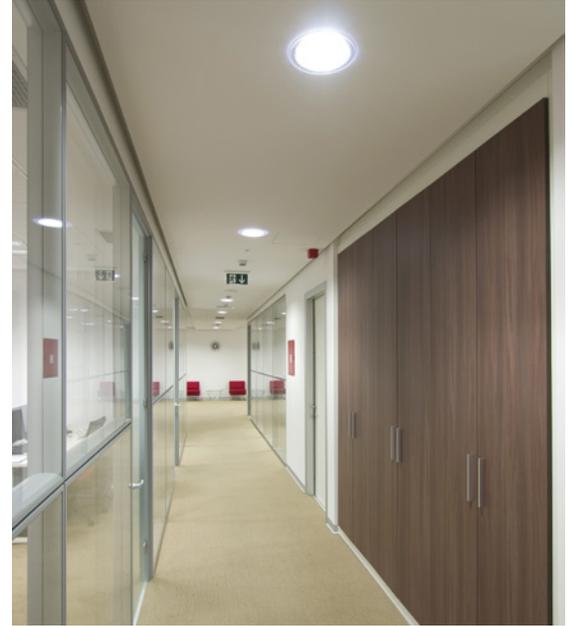
Color appearance and color rendering are important aspects of lighting quality. Most white LEDs have very high correlated color temperature (CCT), often above 5000K. These higher CCT light sources can appear bluish-white, which may be appropriate for industrial or exterior applications. If you prefer a warmer-looking light source, look for LED products with CCTs of 2700K to 3000K. Most indoor applications will look best under neutral-white light, which ranges between 3500K and 4000K on the CCT scale.

HOW LONG DO LEDS LAST?

LEDs are unique in that they rarely fail completely. Rather, their useful light output dims over time. An LED's rated lifetime is generally based on the number of operation hours until the unit is emitting 70% of its initial light output (also known as L70). High-quality white LEDs in well-designed fixtures generally have L70 lifetimes of 50,000 hours or more. A typical incandescent lamp lasts about 1,000 hours, while a comparable CFL lasts 8,000 to 10,000 hours.

HOW COST-EFFECTIVE ARE LEDS?

LED costs vary. High-quality LED products carry a significant cost premium when compared with standard lighting. However, costs for LED products continue to decline as the technology matures. It is important to consider the total life-cycle cost of the new lamp fixtures, including maintenance expenditures, operating expenses and the replacement cost of LEDs compared to standard lighting fixtures.



KEY LED TERMS:

Solid-State Lighting (SSL): An umbrella term for semiconductors used to convert electricity into light. This term is often used as a synonym for LEDs.

Correlated Color Temperature (CCT): A measure of the color appearance of a white light source. CCT is measured in the Kelvin absolute temperature scale. White lighting products are most commonly available from 2700K (warm white) to 5000K (cool white).

Color Rendering Index (CRI): A measure of how a light source renders colors of objects, compared to a "perfect" reference light source. CRI is given as a number from 0 to 100, with 100 being equivalent to the perfect reference source.

Lumen Maintenance: The percentage of light output produced by a light source at a defined point in time during its rated useful life. Lumen maintenance is expressed as the percentage of lumen output at the time of measurement versus the initial lumen output of a brand new installation. For example, if an LED emits 1000 lumens when new and 700 lumens after 50,000 hours of use, the LED would be described as exhibiting 70% lumen maintenance at 50,000-hours of use. When lumen emission degrades to 70%, the LED's useful lifespan is exhausted and a replacement installation is required.

Source: DOE Fact Sheet LED Frequently Asked Questions