## Bright ideas for your LED Lighting needs.

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For a full listing of LED lighting, visit grainger.com/lighting

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Can’t find it? Just ask. Contact us online or by phone—24/7. We make it easy to find the product you need.
LED technology continues to develop rapidly as a general light source. As more LED products and light fixtures are introduced on the market, what do businesses need to know to make informed buying decisions?

Are LEDs energy-efficient?
Good LED system and luminaire design is imperative to energy-efficient LED lighting fixtures. For example, a new LED recessed downlight can produce nearly 700 lumens using only 6.5 watts, for a luminaire efficacy of 107 lumens per watt (lm/W). Conversely, poorly-designed luminaires using even the best LEDs may be no more efficient than incandescent lighting.

- Good quality warm white LEDs produce about 70 lm/W
- CFLs produce at least 50 lm/W
- Incandescent lamps typically produce 12–15 lm/W

Do LEDs provide high-quality lighting?
High correlated color temperature (CCT) light sources appear “cool” or bluish-white. These are less efficient than cool white LEDs, but have improved significantly, to levels of 107 lumens per watt (lm/W). Conversely, LED coated with yellow or multi-chromatic PC primary colors of light.

How long do LEDs last?
Unlike other light sources, LEDs usually don’t “burn out” instead, they get progressively dimmer over time. LED useful life is based on the number of operating hours until the LED is emitting 70% of its initial light output. LEDs must be “heat sunk” and in direct contact with materials that can conduct heat away from the LED.

- Quality white LEDs in applied products have a useful life of 30,000 to 50,000 hours
- CFLs last 8,000 to 10,000 hours
- Good linear fluorescent lamps can last more than 30,000 hours
- Incandescent lamps last about 1,000 hours

Are LEDs cost-effective?
Good quality LED products currently carry a significant cost premium compared to standard lighting technologies. However, costs will continue to decline. It is important to compare total lamp replacement, electricity, lamp costs and maintenance costs over the expected life of the LED product to determine overall cost effectiveness.

LED LIGHTING TERMS

- **CCT** – Correlated color temperature; a measure of the color appearance of a white light source. CCT is measured on the Kelvin absolute temperature scale. White lighting products are most commonly available from 2700K (warm white) to 5000K (cool white).
- **CRI** – Color rendering index; a measure of how a light source renders colors of objects, compared to a reference light source. CRI is given as a number from 0 to 100, with 100 being identical to the reference source. In general, a minimum CRI of 80 is recommended for interior lighting.
- **SSL** – Solid-state lighting; umbrella term for semiconductors used to convert electricity into light.
- **LED** – Light-emitting diode.
- **RGB** – Red, green, blue. One way to create white light with LEDs is to mix the three primary colors of light.
- **PC** – Phosphor conversion. White light can be produced by a blue, violet, or near-UV LED coated with yellow or multi-chromatic phosphors. The combined light emission appears white.

**QUALITY FACTS**

**Light Output/Lumens**
The higher the number, the more light is emitted. Reported as “Total Integrated Flux (Lumens)” on LM-79 test report.

**Watts**
The lower the wattage, the less energy used. Reported as “Power (Watts)” on LM-79 test report.

**Lumens per Watt/Efficacy**
The higher the number, the more efficient the product. Reported as “Efficacy” on LM-79 test report.

**IESNA LM-79-2008**
Industry standardized test procedure that measures performance qualities of LED luminaries and integral lamps. It allows a true comparison of luminaires regardless of the light source.

**UNIQUE LED CHARACTERISTICS**
- Direct light where it is needed
- Can be very compact and low-profile
- No breakable glass or filaments
- Performance improves in the cold
- Require no “warm up” time
- Lifetime not affected by frequent switching
- Compatible with electronic controls to change light levels and color characteristics
- LEDs intended for lighting do not emit infrared or ultraviolet radiation
- Provide long-term maintenance cost savings with fewer lamp change-outs

FOR MORE INFORMATION

**GRAINGER SITES**

- grainger.com/lighting – Grainger’s lighting center and your source for all your lighting needs.
- grainger.com/green – Green resources for energy conservation, waste management, green cleaning, and water conservation.

**LIGHTING-FACTS.COM** – LED Lighting Facts Label Program ensures proper LED lighting performance and proper registration as a quality product. Sponsored by the DOE.

**GOVERNMENT ENERGY SITES**

doe.gov – Department of Energy site which sets energy standards, ensures cleanup, performs research and gives guidance.

eere.energy.gov – Energy Efficiency & Renewable Energy site offering programs, offices, and resources.

doe.gov – DOE Solid-State Lighting Portfolio. The DOE and its partners working to accelerate advances in solid-state lighting.

**LIGHTING FACTS LABEL**

Grainger is partnered with the Department of Energy through the Solid-State Lighting Quality Advocates program. Grainger has "taken the pledge" in that all new LED lamps, ballasts, and fixture solutions will include the new SSL Lighting Facts label from our manufacturers. This label provides a snapshot of product performance data that will assist customers in making a buying decision and protects against any exaggerated claims. This Lighting Facts label will only appear on LED lighting products including self-contained replacement lamps and fixture products that have been tested in accordance with the LM-79 standard.

**UNDERSTANDING THE FACTS OF LED APPLICATIONS**

**Background** – LEDs are semiconductor devices with fill gases and coatings of various types, and contain no mercury or halogen gas. LED lighting starts with a tiny chip about 1 mm

**EXAMPLES OF LED LIGHTING APPLICATIONS**

General illumination applications that may most benefit from the LED attributes described in this document include the following:

- Undercabinet lighting
- In-cabinet accent lighting
- Adjustable task lighting
- Refrigerated case lighting
- Outdoor area lighting
- Elevator lighting
- Recessed downlights

**Lighting Facts**

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**QUALITY FACTS PROGRAM & LIGHTING FACTS ™ LABEL**

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- **Color Rendering Index (CRI):** Measures color accuracy. Color rendition is the affect of the lamp’s light spectrum on the color appearance of objects.

- **Correlated Color Temperature (CCT):** Measures light color.

- **“Cool” colors have higher Kelvin temperatures (3000–5000 K), “warm” colors have lower color temperatures (2700–3500 K). Color temperatures higher than 6500 K are outside of the defined region for white light, but may be appropriate for outdoor applications.

- This SSL Quality Advocates program requires that IESNA LM-79-2008 test data be widely published. LM-79 is the new industry standard for performance measurements, allowing the following attributes: Light Output (Lumens), Watts, Lumens per Watt (Efficacy), Color Accuracy (CRI), and Correlated Color Temperature (CCT).