



What are LEDs?

Light-emitting diodes (LEDs) are small light sources that become illuminated by the movement of electrons through a semiconductor material, triggered when voltage is applied. The first LED developed for use in practical applications was introduced in 1962. Leotek has been manufacturing LED products for lighting applications since 1992.

What is a semiconductor?

A semiconductor is a substance, usually a solid chemical element or compound, that can conduct electricity under some conditions, but not others, making it a good medium for the control of electrical current.

What does solid-state mean?

When a light-emitting diode is switched on, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence. The term "solid state" refers commonly to light emitted by solid-state electroluminescence.

What are LEDs used for?

Since being introduced in 1962, LEDs have been used as a lighting source within many commonly used electronic devices supplied to the consumer market. LED technology has rapidly advanced over the decades, and usage soon expanded into a diverse range of applications, including the municipal and commercial markets. Leotek traffic and pedestrian signals are now installed in approximately 30% of America's intersections. As an increasingly educated marketplace raised the demand for LED technology, Leotek began manufacturing LED products for applications including railroad signaling, street and area lighting, petroleum and convenience stores, grocery and cold storage, parking lots, and brand image signage.

What are the advantages of LEDs?

From the U.S. Department of Energy (<http://www1.eere.energy.gov/buildings/ssl/>):

"Solid-state lighting (SSL) technology has the potential to cut U.S. lighting energy usage by one-quarter and contribute significantly to our nation's climate change solutions."

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From Energy Star (http://www.energystar.gov/index.cfm?c=lighting.pr_what_are):

“The U.S. Department of Energy estimates that rapid adoption of LED lighting in the U.S. over the next 20 years can:

- *Deliver savings of about \$265 billion.*
- *Avoid 40 new power plants.*
- *Reduce lighting electricity demand by 33% in 2027.*

Why are LED’s referred to as “green technology”?

LEDs use energy and light more efficiently than traditional lighting sources, making LEDs a source of light that is versatile, durable, long lasting and environmentally friendly. LEDs require less energy and offer a longer life span as compared to traditional light sources, reducing lifetime maintenance costs and total costs of ownership. Precision LEDs emit light in a specific direction, providing uniform illumination, while reducing light trespass and light pollution. Leotek LED products are RoHS compliant, contain no lead or mercury, and certain products feature an all-aluminum enclosure that is 100% recyclable.

What are lumens?

Lumen are the unit of measure for determining light.

Why is the life span of an LED measured as lumen depreciation?

LED’s don’t “burn out”; instead, they gradually produce lower light output levels over a very long period of time. The gradual loss of efficacy (lumens per watt) is called lumen depreciation.

What is the difference between efficacy and efficiency?

Luminous efficacy is a measure of how well a light source produces visible light. Efficiency is a measure of how well the light source is produced from electricity.

How long do LEDs last?

LED’s generally last 50,000 hours or longer, but typically, the life span of an LED is measured in lumen depreciation, rather than hours. Most Leotek products are rated to maintain 70% of the initial lumen

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intensity after 50,000 to 100,000 hours of operation. Leotek provides lifetime ratings specific to individual products on product technical specification documents available for viewing at www.leotek.com.

How long is 100,000 hours?

Based upon how many hours per day a fixture is illuminated, 100,000 hours may equal:

| On-Hours of Operation | Hour-to-Year Conversion |
|-----------------------|-------------------------|
| 24 hours per day | 11.4 years |
| 18 hours per day | 14.8 years |
| 12 hours per day | 22.8 years |
| 8 hours per day | 34.2 years |

When a single LED fails, do all LED's fail?

No, failure of a single LED will not produce outage of the entire fixture. Only a single LED will darken, while the rest of the array will remain on. Leotek LEDs are wired "in series," but designed to accommodate for the failure of a single LED.

What is Correlated Color Temperature (CCT)?

Color temperature is a simplified way to characterize the spectral properties of a light source and summarize the results on a linear scale. The Kelvin unit (K) is the basis of all temperature measurement. Low color temperature implies warmer (more yellow/red) light while high color temperature implies a colder (more blue) light.

What is Color Rendering Index (CRI)?

A method for describing the effect of a light source on the color appearance of objects, serving as a quality distinction between light sources emitting light of the same color.

What does "viewing angle" mean?

LEDs emit precise, directional light. Typically, the viewing angle is the full angle at which brightness is half of the brightness from dead center.



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Why is thermal management important?

Some of the electricity in an LED becomes heat rather than light. If that heat is not adequately removed, the LEDs will operate at high temperatures, thereby lowering efficiency and reliability. Leotek products offer superior thermal management capabilities.

How are Leotek LED products evaluated?

Leotek products are evaluated and approved and/or certified by many state Departments of Transportation, as well as other independent testing agencies such as ETL, UL, CSA, and CE. Leotek manufacturing facilities also hold ISO 9001 certification.

How long is the Leotek Warranty Period?

Leotek provides a 5-Year Limited Warranty on most LED products. Specific warranty ratings are listed on product technical specification documents available for viewing at www.leotek.com.