



LED TECHNOLOGY OVERVIEW
AND PRODUCT GUIDE
FEATURING NUVO
AND KOLOURONE PRODUCTS



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- Overall reliability

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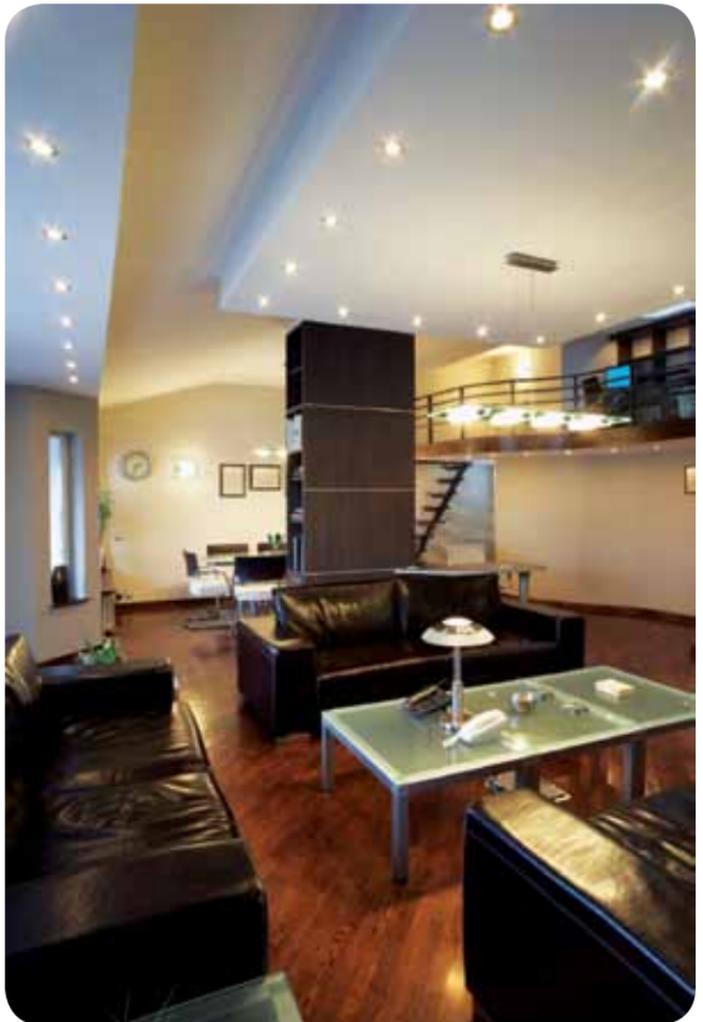
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Understanding LED Lighting

Purchase price and operating costs always figure into the selection of any lighting product, but for LED lighting, many other factors come into play that vary in significance depending on the application. Understanding LED lighting will enable you to optimize the technology's unique attributes, from recognizing quality product design built for lasting performance to using LED in appropriate lighting situations. Enhance your LED knowledge with this handy guide.



UNDERSTANDING LED

Key Benefits of LED Lighting

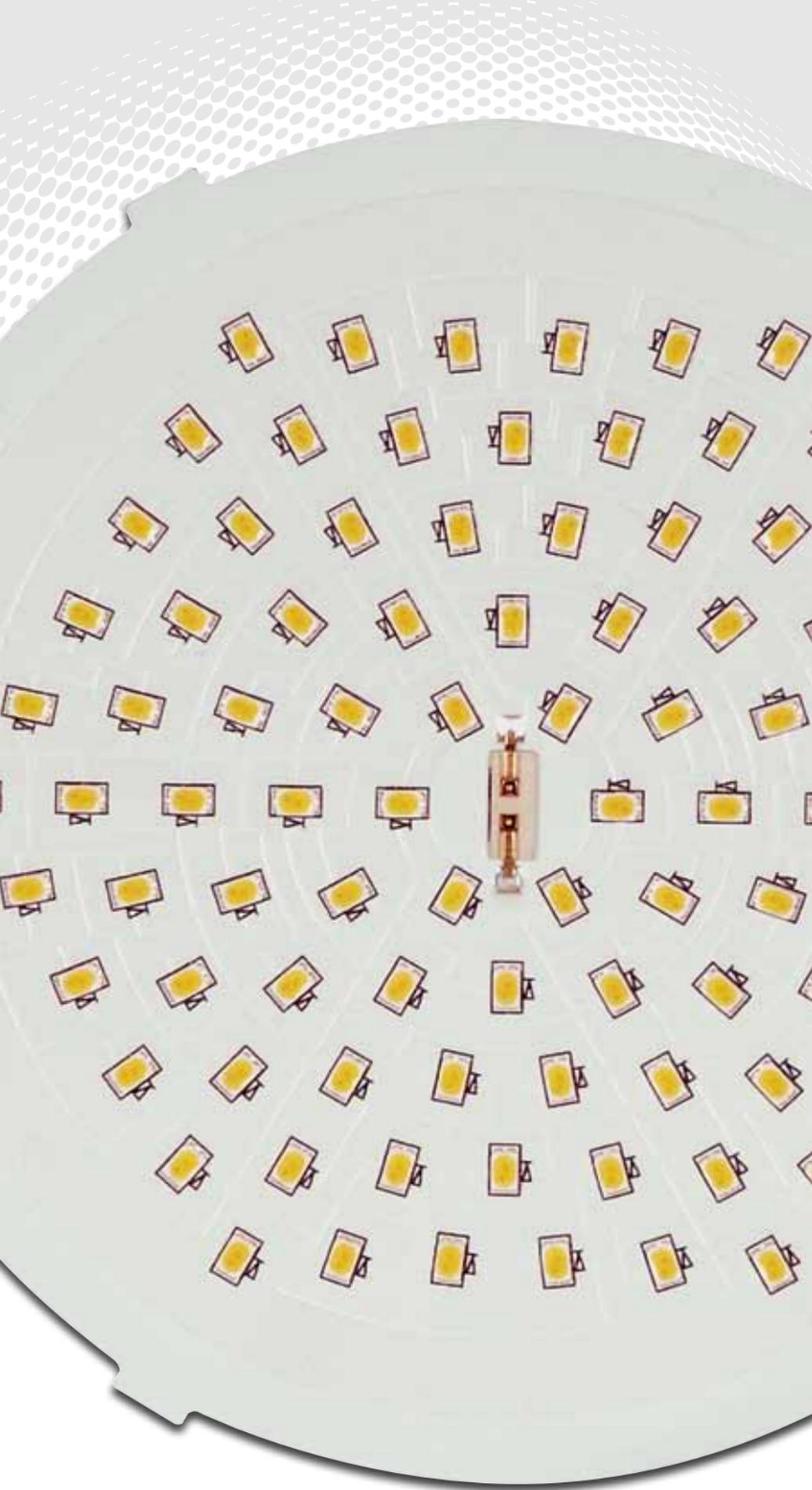
- Directional light emission
- Size and form factor
- Resistance to mechanical failure (i.e., breaking)
- Instant on at full output
- Rapid on/off cycling capability without detrimental effects
- Improved performance at cold temperatures
- Dimming and control capability
- Opportunity for color tuning
- Minimal non-visible radiation [e.g., ultraviolet (UV), infrared (IR)]
- Extended lifetime

Components of LED Lighting

One of the reasons there has been so much confusion surrounding LED lighting is that it works differently than familiar light sources. Incandescent lamps emit light by heating a filament until it glows. Fluorescent lamps use a gas discharge to excite phosphors and create light. High-intensity discharge (HID) lamps use an electric arc discharge. All of these traditional technologies require a glass bulb to contain essential gases and/or coatings.

LED lighting is not a “bulb.” LEDs emit light through electroluminescence. It all starts with a tiny chip (also called a die), usually about 1 cm², comprised of layers of semiconducting material. These materials determine the wavelength of radiation, or color, that is emitted.

One or more chips are combined to form LED packages, mounted on heat-conducting material and enclosed in a lens. The resulting device, typically less than 1 cm², can then be used individually or in an array. Finally, LEDs are mounted on a circuit board and incorporated directly into a lighting fixture or made to fit the form factor of a traditional lamp for replacement of older technologies.



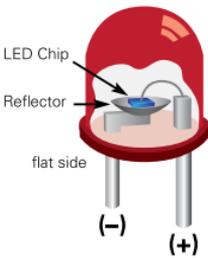
BASIC TECHNOLOGY

How LED Lighting Works

A light-emitting diode, or LED, is essentially a PN (positive/negative) junction opto-semiconductor that emits a single-color light when operated in a forward biased direction. This converts electrical energy into visible light energy. In the past, LEDs were frequently used as “pilot” lights in electronic appliances to indicate whether the circuit was closed or not.

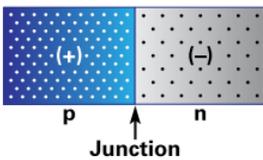
The most important part of an LED is the semiconductor chip located in the center of the bulb as shown below. The chip has two regions separated by a junction. The p region is dominated by positive electric charges, and the n region is dominated by negative electric charges, shown in the middle. The junction acts as a barrier to the flow of electrons between the p and the n regions. Only when sufficient voltage is applied to the semiconductor chip, can the current flow and the electrons cross the junction into the p region.

Light Emitting Diode

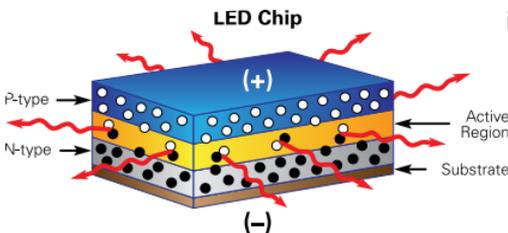


When sufficient voltage is applied to the chip across the leads of the LED, electrons can move easily in only one direction across the junction between the p and n regions. In the p region there are many more positive than negative charges. When a voltage is applied and the current starts to flow, electrons in the n region have sufficient energy to move across the junction into the p region.

LED Semiconductor Chip p and n regions



Each time an electron recombines with a positive charge, electric potential energy is converted into electromagnetic energy. For each recombination of a negative and a positive charge, a quantum of electromagnetic energy is emitted



in a photon of light with a frequency, or color, characteristic of the semiconductor material, usually a combination of the chemical elements gallium, arsenic and phosphorus.

Driver Design

An LED driver is similar to a transformer or ballast. LEDs are current-driven devices, not voltage-driven. Although drive current and light output are directly related, exceeding the maximum current rating will produce excessive heat within the LED chip due to excessive power dissipation. The result is reduced light output and operating life.

LEDs that are designed to operate at a specific voltage contain a built-in current-limiting resistor. Additional circuitry may include a protection diode for AC operation or full-bridge rectifier for bipolar operation. The operating current for a particular voltage is designed to maintain LED reliability over its operating life.

Driving LED Light Sources

LEDs are designed to use low-voltage, constant-current DC power to produce light. LEDs have polarity and, therefore, current only flows in one direction. Driving LEDs is relatively simple and, unlike fluorescent lamps, it does not require an ignition voltage to start. Too little current results in little or no light; too much current and voltage can damage the light-emitting junction of the diode.

As LEDs heat up, the forward voltage drops and the current passing through the LED increases. The increased current generates additional heating of the junction. If nothing limits the current, the junction will fail due to the heat, a phenomenon known as thermal runaway.

Light output fluctuation and compromised lifetime resulting from voltage changes can be eliminated by driving LED light sources with a regulated constant-current power supply. Therefore, constant current drivers are typically recommended for powering LED light sources.

In certain applications, current-limiting devices such as resistors can be an inexpensive alternative to constant-current drivers. However, resistors generate heat and, therefore, waste power. And the heat generated by resistors needs to be dissipated.

In addition, supply voltage changes will translate into light output variances, and resistors alone cannot prevent damage to the LEDs from high voltage. A few applications, such as portable lighting, may tolerate these trade-offs, but resistors are not recommended for most applications.

BASICTECHNOLOGY

Operating Life

Operating life is defined by the reduction of LED light intensity over time. When the LED degrades to approximately half of its original intensity after 100,000 hours, it is at the end of its useful life, although the LED will continue to operate with diminishing output. LEDs are solid-state devices not at risk for catastrophic failure when operated within design parameters. They can function upwards of 100,000 hours at 25°C (77°F) ambient temperature. Unlike standard incandescent bulbs, LEDs resist shock and vibration, and can be cycled on and off without degrading excessively.



Temperature and LED

Each LED light source's performance characteristics are specified for a rated current and for an LED die junction temperature of 25°C. Since most LEDs operate well above this temperature, these values should be considered for comparison reference only. Actual estimated light output should be based on the anticipated operating temperature.

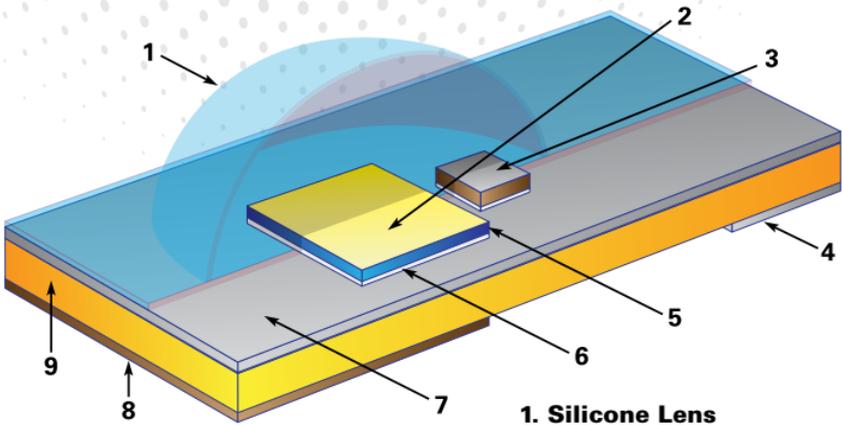
Higher LED die junction temperature can result from increased power dissipation or changes in ambient temperature and can significantly decrease light output. When designing for specific light output or efficacy levels, it is important to consider the effects of temperature and to maximize the system's thermal management.

Temperature variation can also cause slight shifts in color temperature for LED white light sources, so this should also be considered for applications requiring specific wavelengths or maintained color temperature.

LED DESIGN

Package Design

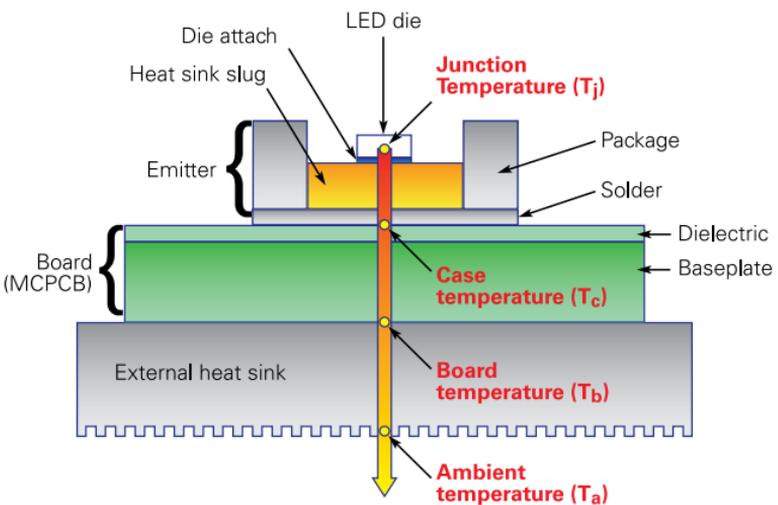
Although not all LED packages are built exactly the same way, the basic components are often similar. Besides the chip that is responsible for emitting light, various components are needed for thermal regulation, producing the desired spectrum, regulating electrical characteristics or distributing the light appropriately. All of these components must work in harmony to produce a high-performance product that capitalized on the advantages of LED lighting:



1. Silicone Lens
2. Phosphor Plate
3. Transient Voltage Suppressor
4. Cathode
5. LED Chip
6. Bond Layer
7. Metal Interconnect Layer
8. Thermal Bed
9. Ceramic Substrate

Junction Temperature

Three things affect the junction temperature of an LED: drive current, thermal path and ambient temperature. In general, the higher the drive current, the greater the heat generated at the die. Heat must be moved away from the die in order to maintain expected light output, life, and color. The amount of heat that can be removed depends upon the ambient temperature and the design of the thermal path from the die to the surroundings.

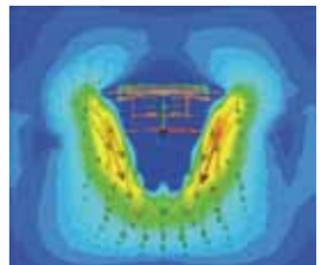


Thermal Design

As power increases to the LED package, there is increased thermal load and more heat to dissipate. Higher temperatures of the LED light sources can result in reduced lumen maintenance and shorten useful life. When designing a system, a heat sink should provide sufficient cooling capacity to keep the die junction below 25°C.



Other methods of cooling are active cooling, which incorporates an internal fan that blows air directly on the LED array, and liquid cooling, which reduces temperature by transferring heat to a liquid as it circulates around the LED packages.

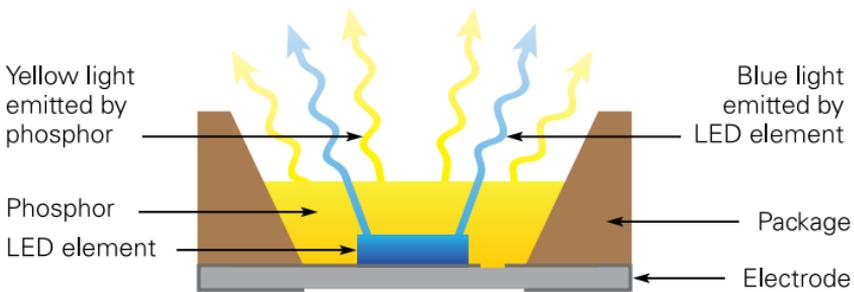


COLOR AND LED

Creating White Light with LEDs

Currently, white light is most often achieved with LEDs using phosphor conversion (PC), but mixed systems that use a combination of colored LEDs (typically red, green and blue, or RGB) are also available.

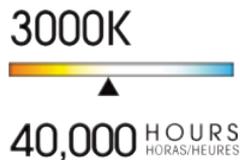
For LEDs, phosphor down-conversion is most commonly based on a blue or near-ultraviolet emitting die that is combined with a yellow-emitting phosphor, or a combination of different phosphors that produce a broad energy distribution. The phosphor(s) may be incorporated into the LED package, or may be located remotely (called remote phosphor). Fluorescent lamps also utilize phosphor down-conversion. Earlier versions of the technology relied on broad-emitting halophosphors, but most current lamps, called triphosphor fluorescent, use a combination of red-, blue-, and green-emitting phosphors.



Correlated Color Temperature (CCT)

Color temperature is an important aspect of color appearance that characterizes how "cool" (bluish) or how "warm" (yellowish) nominally white light appears. Correlated Color Temperature (CCT) is a metric that relates the appearance of a light source

to the appearance of a theoretical black body heated to high temperatures. As a black body gets hotter, it turns red, orange, yellow, white, and finally blue. The CCT of a light source, given in Kelvin (K), is the temperature at which the heated black body most closely matches the color of the light source in question. It characterizes the color of the emitted light, not the color of illuminated objects.



Color Rendering Index (CRI)

At least three aspects of color rendition are relevant to light source selection and application.

First is how closely colors resemble the way they would under a familiar reference source. Second is how visually pleasing an object's colors appear, often referred to as "vivid" or "flattering." Third is how clearly a wide variety of colors can be distinguished from one another when viewed simultaneously under a particular source.. For simplicity, these three facets of color rendering may be called fidelity, appeal, and discrimination.

Binning for Color Consistency

Because the manufacturing process for LEDs has inherent variability, LEDs are sorted, or binned, post-production based on chromaticity, lumen output, and sometimes forward voltage. The tighter the binning, the closer each LED in that bin will appear and perform to another, allowing both manufacturers and specifiers of LED lamps and fixtures to receive a more consistent product.

Recently, the National Electrical Manufacturers Association (NEMA) published an LED binning standard (SSL-3-2010) based on ANSI C78.377-2008. The variability allowed by the NEMA bin sizes and the ANSI tolerances is roughly equivalent to the chromaticity variation seen in currently available compact fluorescent lamps. Some manufacturers may hold themselves to even tighter tolerances.



LED FACTS

Directional Light Transmission

Traditional light sources emit radiant energy in all directions. Because of this, an optical system — a lamp housing or a luminaire, with elements such as a reflector or lens — is typically necessary to point output in the desired direction. If this system is absent or poorly designed, light (and therefore energy) can be wasted as it spills in undesired directions.

Due to the physical characteristic of LED and because they are mounted on a flat surface, LEDs emit light hemispherically, rather than spherically. For task lighting and other applications requiring directional lighting, this often means better efficacy with an LED source.

Of course, sometimes omnidirectional light distribution is desired, as in the case of replacement A-lamps. This is more difficult to achieve with LED, although newer designs entering the market now provide this ability.



Breakage Resistance

The life of standard incandescent and discharge lamps may be compromised by vibration, like when operated in vehicular or industrial applications. LEDs are largely impervious to vibration since they don't have delicate filaments or glass enclosures. This may be beneficial in applications such as transportation lighting (planes, trains or automobiles), lighting on and near industrial equipment, or exterior area and roadway lighting.

Resistance to breakage not only offers benefits while in operation, but also during transport, storage, handling and installation. The soldered leads that connect LED devices mounted on a circuit board may be vulnerable to direct impact, but no more so than cell phones or other electronics.

Although they are not indestructible, LED fixtures do not contain any glass and therefore may be especially appropriate in applications with a high likelihood of lamp breakage, such as sports facilities or vandalism-prone areas. This durability is also welcome in applications where broken lamps would present a hazard to occupants, such as children's rooms, assisted living facilities or food preparation areas.

Operation in Cold Temperature

While cold temperatures present a challenge for fluorescent lamps, LED light output and efficacy actually increases as operating temperatures drop. This makes LEDs a natural fit for refrigerated and freezer cases, cold storage facilities, and many outdoor applications.

No IR or UV Transmission

Ultraviolet (UV) and infrared (IR) are technically part of the spectrum of visible light, but they do not contribute to humans' ability to see. UV radiation can damage artwork, artifacts, and fabrics, as well as cause skin and eye burns, while excessive IR radiation from lighting presents a burn hazard to people and materials.

With traditional light sources, UV and IR emissions are either necessary to generate visible light (as with fluorescent lamps) or simply an unavoidable component. These undesirable emissions can reduce efficacy or require the use of additional safeguards. More than 90 percent of the power drawn by incandescent lamps emits as heat in the form of IR radiation.

LEDs do not emit heat as IR radiation, so the heat must be removed from the device by conduction or convection. Without adequate heat sinking or ventilation, the device temperature will rise, resulting in lower light output. While the effects of short-term exposure to high temperatures can be reversed, continuous high-temperature operation will cause a permanent reduction in light output. And even though the LED may continue to operate, this becomes an important factor in determining the effective useful life of the LED.

LED LIFESPAN

Defining LED Useful Life

To measure the useful life of an LED, you must define an acceptable level of lumen depreciation. At what point is the light level no longer meeting the needs of the application? The answer may differ depending on the application of the product.

For common applications, such as general lighting in an office environment, research has shown that the majority of occupants in a space will accept light level reductions of up to 30 percent with little notice, particularly if the reduction is gradual. Therefore, 70 percent of the initial light level could be considered an appropriate threshold of “useful life” for general lighting.

Checklist

What features should you look for in evaluating the projected lifetime of LED products?

- ✓ Does the LED manufacturer publish thermal design guidance?
- ✓ Does the LED manufacturer have LM-80 lumen maintenance data?
- ✓ Does the lamp design have any special features for heat sinking/thermal management?
- ✓ Does the fixture manufacturer have test data supporting life claims?
- ✓ What life rating methodology was used?
- ✓ What warranty is offered by the manufacturer?

LED Lamps in Operation

When selecting a lamp for replacement purposes, it is important to determine if the lamp is approved for that specific application. An LED lamp will feature warnings or highlight certain features about its design to help determine this.

Warnings might advise against using a particular LED lamp in situations with elevated ambient temperatures or fully enclosed fixtures. The ability to use an LED replacement lamp with timers and photocells, or in wet or damp environments, should be determined prior to selection and installation.

For low voltage products, transformer compatibility is a serious concern. Many low voltage halogen fixtures installed in the past five to 10 years are likely to have an electronic transformer that requires a minimum load, often more than what an LED lamp will draw.



DIMMING LED

Standard Dimming Controls

Typical residential incandescent lamp dimmers are essentially electronic switches that toggle on and off 120 times per second. By delaying the beginning of each half-cycle of AC power (known as “phase control”), they regulate the amount of power to the lamp filament. Because this happens so quickly, most people can’t detect a flicker and just see continuous dimming.

Although the general operation of such electronic dimmers is the same, the specific electrical characteristics of residential dimmers can vary considerably. These variations are immaterial to incandescent lamps, but matter greatly when used with electronic devices such as compact fluorescent lamps (CFLs) and LEDs.

Successful Dimming of LED

LEDs face a dimming challenge similar to that of CFLs: their electronics are often incompatible with dimmers designed for incandescents. An LED driver connected directly to a line-voltage incandescent dimmer may not receive enough power to operate at lower dimming levels or it may be damaged by spikes in current. Some LED products can be used with line-voltage incandescent dimmers, but the dimmer and the LED driver electronics must be carefully matched. Because of variability in installed dimmers, it is not possible to guarantee that a given LED fixture or lamp will work with all dimmers.

It is recommended to select a dimmer that is designed to be used with LED products and to make certain that the dimmer control has been tested and approved by the dimmer LED light source manufacturers.



How do you make sure light output is consistent between products?

Equivalent products should produce the same light output, measured in lumens. Wattage (power input) cannot be used to compare light output, even between two LED products.

Will an LED product focus light in the same manner?

Equivalent products should emit similar amounts of light in any given direction, or luminous intensity distribution. Consider also the pattern created by the light, such as the sharpness of beam edges.

How will objects look under the light?

Warm-white and cool-white light appearance should be the same for an LED product with the same correlated color temperature as a conventional light source. Objects should appear to be the same color when illuminated if the color rendering index is identical.

Are LED lamps the same shape and size as traditional sources?

Since replacement lamps must fit into existing fixtures, equivalent products should be within dimensional tolerances established by the American National Standards Institute (ANSI) for a variety of lamp types.

Will an LED product work with my existing system?

Different accessory components are often required. The type of transformer, dimmer and connected load may affect performance. Manufacturers should provide compatibility charts for their products.

How long will LED lighting last?

Rated useful lifetime comparisons are difficult because rating methods used for LEDs differ from other light sources. Longer lifetime claims should include longer warranties, and the product should continue to perform for the duration of the rated life.

Is LED worth the higher upfront cost?

Calculate energy and maintenance savings over the product's lifetime. LED is typically more expensive on a first-cost basis, but provide significant long-term savings.

LED TERMINOLOGY

Glossary of Terms

CCT — correlated color temperature indicates the relative color appearance of a white light source, from yellowish-white or “warm” (2700-3000 K) to bluish-white or “cool” (5000+ K).

Conduction — transfer of heat through matter by communication of kinetic energy from particle to particle. An example is the use of a conductive metal such as copper to transfer heat.

Convection — heat transfer through the circulatory motion in a fluid (liquid or gas) at a non-uniform temperature. Liquid or gas surrounding a heat source provides cooling by convection, such as air flow over a car radiator.

Heat sink — thermally conductive material attached to the printed circuit board on which the LED is mounted. Myriad heat sink designs are possible; often a “finned” design is used to increase the surface area available for heat transfer. For general illumination applications, heat sinks are often incorporated into the functional and aesthetic design of the luminaire, effectively using the luminaire chassis as a heat management device.

Junction temperature — temperature within the LED device. Direct measurement of junction temperature is impractical but can be calculated based on a known case or board temperature and the material’s thermal resistance.

Life performance curve — a curve that presents the variation of a particular characteristic of a light source (such as luminous flux, intensity, etc.) throughout the life of the source. Also called lumen maintenance curve.

Line voltage — a voltage supplied by the electric grid. In US residential buildings, this refers to 120-volt alternating current (AC) power.

Low voltage — some electrical devices are designed to work with voltage lower than that supplied by the electrical system. Such devices use a transformer or power supply to convert 120V AC power to the voltage and current needed by the device.



Lumen depreciation — the decrease in lumen output that occurs as a lamp is operated.

Luminaire efficacy — light output of a luminaire, divided by total wattage to the power supply, given in lumens per watt (lm/W). Luminaire efficacy accounts for all driver, thermal, and luminaire optical losses.

Luminous efficacy — light output of a light source, divided by nominal wattage, given in lumens per watt (lm/W). Does not include driver, thermal, or luminaire optical losses.

Radiation — energy transmitted through electromagnetic waves. Examples are the heat radiated by the sun and by incandescent lamps.

Rated lamp life — the life value assigned to a particular type lamp. This is commonly a statistically determined estimate of average or median operational life. For certain lamp types other criteria than failure to light can be used; for example, the life can be based on the average time until the lamp type produces a given fraction of initial luminous flux.



ENERGY STAR® & LED

The table below briefly outlines the requirements of LED integrated replacement lamps to obtain ENERGY STAR qualification.



LED LIGHT BULBS KEY PRODUCT CRITERIA

PERFORMANCE CHARACTERISTICS:	CURRENT CRITERIA:
Correlated Color Temperature (CCT)	Nominal CCT: 2700K, 3000K, 3500K, or 4000K
Color Maintenance	The change of chromaticity over the minimum lumen maintenance test period (6000 hours) shall be within 0.007 on the CIE 1976 (u',v') diagram.
Color Quality (Color Rendering Index or CRI)	CRI \geq 80, R9 $>$ 0
Dimming	If a product is dimmable, packaging must state this. Minimum efficacy, light output, CCT, CRI, and power factor of dimmable lamps will be confirmed with the lamp operated at full power.
Warranty	A warranty must be provided for lamps, covering material repair or replacement for a minimum of three (3) years from the date of purchase.
Allowable Lamp Bases	Must be a lamp base listed by ANSI.
Power Factor	For lamp power \leq 5W and for low voltage lamps, no minimum power factor is required. For lamp power \geq 5W, power factor must be \geq 0.70.
Minimum Operating Temperature	Integral lamp shall have a minimum operating temperature of -20°C or below.
LED Operating Frequency	\geq 120 Hz
Electromagnetic and Radio Frequency Interference	Integral LED lamp must meet the appropriate FCC requirements for consumer use (FCC 47CFR Part 15).
Audible Noise	Integral lamp shall have a Class A sound rating.
Transient Protection	Power supply shall comply with IEEE C.62.41-1991, Class A operation. The line transient shall consist of seven strikes of a 100kHz ring wave, 2.5kV level, for both common mode and differential mode.
Operating Voltage	Lamp shall operate at rated nominal voltage of 120, 240, or 277 VAC, or at 12 or 24 VAC or VDC.

ROI

Return on Investment (ROI)

65W BR30 Incandescent vs. 11WBR30 LED (28)

LED BULB SAVINGS CALCULATOR

	INCANDESCENT BULB	LED
Cost of each bulb	\$2.99	\$30.00
Wattage	65 Watt	11 Watt
Number of bulbs to be replaced	10 bulbs	—
Electricity cost per year (\$0.12kWh)	\$142.35/year	\$24.09/year
Bulb lifespan (Continuous use)	2,000 hours	25,000 hours
Actual lifespan (when used for 5 hours/day)	1 year 1 month 4 days	13 years 8 months 11 days
No. of times an incandescent/ halogen bulb to be replaced during the LED bulb's lifetime	120 times (12 times per bulb)	—
Total annual cost (Cost of bulb(s) replaced in a year + Electricity in a year)	\$169.63/year	\$24.09/year

SATCO: QUALITY, PERFORMANCE

Since 1966, Satco has been a leading supplier of lighting products. Privately owned and operated, the Satco organization's brand includes thousands of styles of lighting fixtures, lighting and electrical components for the retail, commercial, and manufacturing trade, and a variety of consumer products. Satco branded light bulbs, electrical accessories, lighting hardware and glassware are sold through the company's more than 8,000 distributors.



Satco features 1.2 million square feet of warehouse distribution and sales locations in New York, Miami, Dallas, San Francisco, Seattle and San Juan, Puerto Rico. Satco Express locations are found in Syracuse, NY; Cincinnati, OH; Charlotte, NC; Chicago, IL; La Mirada, CA; Ridgeland, MS; Lavergne, TN; and Canton, MA. Named "The Best of the Test for CFLs" in 2008 by the Good Housekeeping Research Institute, and "Energy Partner of the Year" in the lighting and manufacturing category in 2009, Satco delivers solutions to meet the green building and energy reduction needs of the construction and maintenance industries.



AND EFFICIENCY



The KolourOne brand of LED products is also under the Satco name, in conjunction with Wooree Lighting, a South Korean manufacturing partner of more than 35 years. This partnership brings more than fifty years of lighting experience to the KolourOne line of LED lighting technology. The components of each KolourOne LED lamp, such as LED chips, optics, driver and heat sink are all designed and manufactured in-house, ensuring that each lamp meets Satco's quality, reliability and consistency standards. The unique assembly process allows each lamp to be assembled quickly and without soldering, which leads to a lower level of product failure. KolourOne lamps resemble traditional lamps in size, function, and appearance, but feature enhanced performance, continuous reliability and unique designs to maintain KolourOne's reputation as a trend-setting brand.



Nuvo debuted in June of 2005 with a 242-page catalog featuring more than 1,500 new items. A 350,000 square-foot central distribution center in Dallas houses Nuvo's stylish, affordable, well-crafted products, as well as almost 700 Energy Star qualified products. With one of the industry's most extensive research and development programs dedicated to developing the latest in high-efficiency luminaires, Nuvo is prepared to become a leader in the lighting fixture industry.



In 2008, Satco acquired the Hygrade brand, which offers consumers in the commercial lighting industry energy efficiency, as well as high standards of performance. The majority of Hygrade lamps are made with low levels of mercury, are designed to pass the federal Toxicity Characteristics Leaching Procedure (TCLP) and are classified as RoHS for "lead free".



LED PRODUCTS THAT ONLY EXPERIENCE CAN DELIVER

A GUIDE TO SATCO LED LAMPS

Satco and Satco KolorOne LED lamps are widely known as some of the finest LED lamps in the industry. They begin life in an aggressive R&D program, are manufactured under tight quality-control systems and are thoroughly tested for consistent performance and long-term reliability. Color temperature consistency, luminance, efficiency and all other critical measurements are second to none. Satco's 45+ years of lighting experience is built into every LED lamp we manufacture.



SATCO KOLOURONE PANEL ARRAY LAMPS ADVANCE LED INNOVATION

The Panel Array 1.0 Lamps in the Satco KolourOne line represent the introduction of KolourOne's innovative LED panel array technology to the marketplace. These products offer soft, even illumination in a wide beam spread for common applications without harsh glare.

Building on the success of those products, Satco's KolourOne Panel Array 2.0 lamps incorporate advanced new materials for lightweight, sleek designs that fit in tighter spaces. Higher lumen output and greater throw distance makes these lamps appropriate for higher ceilings. And KolourOne Panel Array 2.0 lamps are ENERGY STAR® qualified.



 **SATCO**®

KolourOne
LED TECHNOLOGY
Experience brilliant innovations

KOLOURONE PANEL ARRAY 1.0 LAMPS



4W MR16 LED Lamp

FEATURES

- Direct replacement for halogen MR16 lamps (20-35W). Uses only 4 watts
- Uniform luminance pattern
- Long "True" Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative Panel Array design
- White finish
- No UV or IR radiation
- Non dimmable
- This product is registered with the US DOE Lighting Facts program
- 3 year warranty*

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Entertainment lighting
- Downlighting
- Display lighting
- Accent lighting

4W MR16 LED Lamp

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8807	4	2,700K	160	40°	White
S8808	4	3,500K	170	40°	White
S8809	4	5,000K	190	40°	White
S8811	4	2,700K	170	60°	White
S8812	4	3,500K	190	60°	White
S8813	4	5,000K	200	60°	White

KOLOURONE PANEL ARRAY 1.0 LAMPS (CONT.)



7W PAR20 LED Lamp

FEATURES

- Direct replacement for halogen PAR20 lamps (50W). Uses only 7 watts.
- Dimmable
- Uniform luminance pattern
- Long "True" Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative Panel Array design
- White finish
- No UV or IR radiation
- This product is registered with the US DOE Lighting Facts program
- 3 year warranty*

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor residential and commercial lighting
- Entertainment lighting
- Downlighting
- Display lighting
- Accent lighting

7W PAR20 LED Lamp

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8878	7	2,700K	290	30°	White
S8879	7	3,500K	325	30°	White
S8881	7	5,000K	385	30°	White



14W PAR30 LED Lamp – Short Neck

FEATURES

- Direct replacement for halogen PAR30 lamps (75W). Uses only 14 watts.
- Dimmable
- Uniform luminance pattern
- Long "True" Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative Panel Array design
- White finish
- No UV or IR radiation
- This product is registered with the US DOE Lighting Facts program
- 3 year warranty*

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor residential and commercial lighting
- Entertainment lighting
- Downlighting
- Display lighting
- Accent lighting

14W PAR30 LED Lamp – Short Neck

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8911	14	2,700K	650	40°	White
S8912	14	3,500K	680	40°	White
S8913	14	5,000K	805	40°	White



14W PAR30 LED Lamp – Long Neck

FEATURES

- Direct replacement for halogen PAR30 lamps (75W). Uses only 14 watts.
- Dimmable
- Uniform luminance pattern
- Long “True” Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative Panel Array design
- White finish
- No UV or IR radiation
- This product is registered with the US DOE Lighting Facts program
- 3 year warranty*

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor residential and commercial lighting
- Entertainment lighting
- Downlighting
- Display lighting
- Accent lighting

14W PAR30 LED Lamp – Long Neck

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8821	14	2,700K	610	40°	White
S8822	14	3,500K	660	40°	White
S8823	14	5,000K	710	40°	White



17W PAR38 LED Lamp

FEATURES

- Direct replacement for halogen PAR38 lamps (90W). Uses only 17 watts.
- Dimmable
- Uniform luminance pattern
- Long “True” Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative Panel Array design
- White finish
- No UV or IR radiation
- This product is registered with the US DOE Lighting Facts program
- 3 year warranty*

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor residential and commercial lighting
- Entertainment lighting
- Downlighting
- Display lighting
- Accent lighting

17W PAR38 LED Lamp

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8858	17	2,700K	785	40°	White
S8859	17	3,500K	875	40°	White
S8861	17	5,000K	900	40°	White

KOLOURONE PANEL ARRAY LAMPS 2.0*



7W PAR20 LED Lamp

FEATURES

- Direct replacement for halogen PAR20 lamps (50W). Uses only 7 watts.
- Dimmable
- Tight beam focus and intensity
- Uniform luminance pattern
- Long throw
- Long "True" Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative Panel Array design
- Advanced narrow neck design
- Lightweight
- White finish
- No UV or IR radiation
- ENERGY STAR® qualified
- This product is registered with the US DOE Lighting Facts program
- 3 year warranty**

** See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor residential and commercial lighting
- Entertainment lighting
- Downlighting
- Display lighting
- Accent lighting



7W PAR20 LED Lamp

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8921	7	2,700K	280	40°	White
S8922	7	3,500K	320	40°	White
S8923	7	5,000K	360	40°	White

* Available November, 2012



13W PAR30 LED Lamp – Short Neck

FEATURES

- Direct replacement for halogen PAR30 lamps (75W). Uses only 13 watts.
- Dimmable
- Tight beam focus and intensity
- Uniform luminance pattern
- Long throw
- Long "True" Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative Panel Array design
- Advanced narrow neck design
- Lightweight
- White finish
- No UV or IR radiation
- ENERGY STAR® qualified
- This product is registered with the US DOE Lighting Facts program
- 3 year warranty**

** See separate warranty for complete terms and conditions.

APPLICATIONS

- Wet location IP65
- Security lighting
- Indoor downlighting
- Display lighting
- Accent lighting



13W PAR30 LED Lamp – Short Neck

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8934	13	2,700K	670	40°	White
S8935	13	3,500K	770	40°	White
S8936	13	5,000K	810	40°	White
S8941	13	2,700K	670	60°	White
S8942	13	3,500K	770	60°	White
S8943	13	5,000K	810	60°	White



13W PAR30 LED Lamp – Long Neck

FEATURES

- Direct replacement for halogen PAR30 lamps (75W). Uses only 13 watts.
- Dimmable
- Tight beam focus and intensity
- Uniform luminance pattern
- Long throw
- Long “True” Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative Panel Array design
- Advanced narrow neck design
- Lightweight
- White finish
- No UV or IR radiation
- ENERGY STAR® qualified
- This product is registered with the US DOE Lighting Facts program
- 3 year warranty**

**See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor residential and commercial lighting
- Entertainment lighting
- Downlighting
- Display lighting
- Accent lighting



13W PAR30 LED Lamp – Long Neck

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8947	13	2,700K	670	40°	White
S8948	13	3,500K	770	40°	White
S8949	13	5,000K	810	40°	White
S8971	13	2,700K	670	60°	White
S8972	13	3,500K	770	60°	White
S8973	13	5,000K	810	60°	White



17W PAR38 LED Lamp

FEATURES

- Direct replacement for halogen PAR38 lamps (90W). Uses only 17 watts.
- Dimmable
- Tight beam focus and intensity
- Uniform luminance pattern
- Long throw
- Long “True” Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative Panel Array design
- Advanced narrow neck design
- Lightweight
- White finish
- No UV or IR radiation
- ENERGY STAR® qualified
- This product is registered with the US DOE Lighting Facts program
- 3 year warranty**

**See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor down lighting
- Display lighting
- Accent lighting



17W PAR38 LED Lamp

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8977	17	2,700K	840	40°	White
S8978	17	3,500K	890	40°	White
S8979	17	5,000K	990	40°	White
S8984	17	2,700K	840	60°	White
S8985	17	3,500K	890	60°	White
S8986	17	5,000K	990	60°	White

KOLOURONE PANEL ARRAY 2.0 LED LAMPS (CONT.)*



7W MR16 LED Lamp

FEATURES

- Direct replacement for halogen MR16 lamps (20-35W). Uses only 7 watts
- Tight beam focus and intensity
- Uniform luminance pattern
- Long throw
- Long "True" Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative Panel Array design
- Advanced narrow neck design
- Lightweight
- White finish
- No UV or IR radiation
- ENERGY STAR® qualified
- Non dimmable
- This product is registered with the US DOE Lighting Facts program
- 3 year warranty**

**See separate warranty for complete terms and conditions.

APPLICATIONS

- Entertainment lighting
- Downlighting
- Display lighting
- Accent lighting



7W MR16 LED Lamp

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8845	7	2,700K	400	40°	White
S8846	7	3,500K	420	40°	White
S8847	7	5,000K	460	40°	White



7.6W A19 LED Lamp

FEATURES

- Dimmable
- Long Life, 30,000 hours
- High efficiency / environmentally friendly
- Innovative design
- Lightweight
- No UV or IR Radiation
- 3 year warranty**
- ENERGY STAR qualified

**See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor residential lighting
- Downlighting
- Accent lighting
- Table lamps
- Pendant lighting



7.6W A19 LED Lamp

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8795	7.6	2,700K	460	180°	White
S8796	7.6	3,500K	480	180°	White
S8798	7.6	5,000K	510	180°	White

* Available November, 2012

MINIATURE LAMPS



2W LANDSCAPE BA15S LED Lamp

FEATURES

- Long life – 20,000 hours
- High efficiency
- Offered in 3000K
- Attractive design- seamless integration
- Instant on at full brightness
- Mercury free - environmentally positive
- Very low maintenance cost
- OMNI directional lens
- Replaces a 20W halogen lamp
- 3 year warranty*

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Landscape lighting
- Display lighting
- Accent lighting
- Security lighting

2W Landscape BA15S LED Lamp

Item Number	Watts	Color Temp.	Lumens	Finish
S8968	2	3,000K	100	Silver



2W G4 Bi-Pin LED Lamp

FEATURES

- Long life – 20,000 hours
- High efficiency
- Offered in 3000K
- Attractive design- seamless integration
- Instant on at full brightness
- Mercury free - environmentally positive
- Very low maintenance cost
- OMNI directional lens
- Replaces a 20W halogen lamp
- 3 year warranty*

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Decorative fixtures
- Display lighting
- Accent lighting

2W G4 Bi-Pin LED Lamp

Item Number	Watts	Color Temp.	Lumens	Finish
S8969	2	3,000K	110	Silver

KOLOURONE INDOOR/OUTDOOR WET LOCATION LED LAMPS



7W PAR20 Lamp-Indoor/Outdoor

FEATURES

- Direct replacement for halogen PAR20 lamps (20-35W). Uses only 7 watts.
- Uniform luminance pattern
- Long "True" Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative design
- Available in Black/Silver or White finish
- No UV or IR Radiation
- Dimmable
- 3 year warranty*

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Wet location IP65
- Security lighting
- Indoor downlighting
- Display lighting
- Accent lighting

7W PAR20 LED Lamp – Indoor/Outdoor

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8955	7	2,700K	300	40°	White
S8956	7	3,500K	320	40°	White
S8957	7	2,700K	300	40°	Black
S8958	7	3,500K	320	40°	Black



13W PAR30 LED Lamp – Short Neck Indoor/Outdoor

FEATURES

- Direct replacement for halogen PAR30 lamps (50-75W). Uses only 13 watts.
- Uniform luminance pattern
- Long "True" Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative design
- Available in Black/Silver or White finish
- No UV or IR Radiation
- Dimmable
- 3 year warranty*

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Wet location IP65
- Security lighting
- Indoor downlighting
- Display lighting
- Accent lighting

13W PAR30 LED Lamp – Indoor/Outdoor Short Neck

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8959	13	2,700K	540	40°	White
S8961	13	3,500K	555	40°	White
S8962	13	2,700K	540	40°	Black
S8963	13	3,500K	555	40°	Black

KOLOURONE HIGH-PERFORMANCE LAMP



17W PAR38 LED Lamp – Short Neck Indoor/Outdoor

FEATURES

- Direct replacement for halogen PAR38 lamps (75-90W). Uses only 17 watts.
- Uniform luminance pattern
- Long “True” Life, 30,000 hours / High efficiency / Environmentally friendly
- Innovative design
- Available in Black/Silver or White finish
- No UV or IR Radiation
- Dimmable
- 3 year warranty*

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Wet location IP65
- Security lighting
- Indoor downlighting
- Display lighting
- Accent lighting

17W PAR38 LED Lamp – Indoor/Outdoor

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8964	17	2,700K	780	40°	White
S8965	17	3,500K	825	40°	White
S8966	17	2,700K	780	40°	Black
S8967	17	3,500K	825	40°	Black



11W AR111 LED Lamp

FEATURES

- Long life – 30,000 hours
- High efficiency – only 11 watts
- Offered in 3200K and 6500K
- Attractive design – seamless integration
- No IR or UV – protects valuable objects
- Instant on at full brightness
- Mercury free – environmentally positive
- Very low maintenance costs
- Reduces cooling costs – generates very little heat
- 3 year warranty*
- C.U.L. listed

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Display and showcase lighting
- Recessed lighting
- Retail merchandising

11W AR111 LED Lamp

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8761	11	3,200K	500	25°	Gray
S8762	11	6,500K	620	25°	Gray
S8763	11	3,200K	500	40°	Gray
S8764	11	6,500K	620	40°	Gray

SATCO A19, DECORATIVE AND GENERAL PURPOSE LED LAMPS



8W A19 LED Lamp

FEATURES

- Dimmable
- Long Life, 25,000 hours
- High efficiency / environmentally friendly
- Innovative design
- No UV or IR Radiation
- 3 year warranty*
- Retail clamshell package
- ENERGY STAR® qualified

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor residential lighting
- Downlighting
- Accent lighting
- Table lamps
- Pendant lighting



8W A19 LED Lamp

Item Number	Watts	Color Temp.	Lumens	Beam Angle
S8995	8	3,000K	450	180°



3.5W Decorative LED Lamp

FEATURES

- Dimmable
- Long Life, 25,000 hours
- High efficiency / environmentally friendly
- Innovative design
- No UV or IR Radiation
- 3 year warranty*
- Retail clamshell package

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor residential lighting
- Downlighting
- Accent lighting
- Table lamps
- Pendant lighting

3.5W Decorative LED Lamp

Item Number	Watts	Color Temp.	Lumens	Beam Angle
S8996	3.5	3,000K	180	240°

KOLOURONE LED DOWNLIGHT RETROFIT*



S8998

S8997

6W PAR16 LED Lamp

FEATURES

- Direct replacement for 35-45W halogen lamps
- Dimmable
- Long Life, 25,000 hours
- High efficiency / environmentally friendly
- Innovative design
- White finish
- No UV or IR Radiation
- 3 year warranty*
- Retail clamshell package

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Indoor residential lighting and commercial lighting
- Downlighting
- Accent lighting
- Pendant lighting

6W PAR16 LED Lamp

Item Number	Watts	Base	Color Temp.	Lumens	Beam Angle
S8997	6	E26	3,000K	370	40°
S8998	6	GU10	3,000K	370	40°



13.5W LED Downlight Retrofit

FEATURES

- 2010 Reddot Product Design Award
- Dimmable
- Fits narrow socket fixture types
- U.L. damp location listed
- Adjustable height (patented)
- Easy & Quick installation
- Non-glare / Uniform luminance patterns
- Interchangeable color rings allow for custom/creative design options
- Long "True" Life, 30,000 hours / High efficiency / Environmentally friendly
- No UV or IR Radiation
- 3 Color bands supplied with each unit; white, red and green
- 3 year warranty**
- ENERGY STAR® qualified

**See separate warranty for complete terms and conditions.

APPLICATIONS

- Replaces incandescent medium base 120V lamps
- Indoor residential and commercial lighting



13.5W LED Recessed Down Light Retrofit

Item Number	Watts	Color Temp.	Lumens	Beam Angle	Finish
S8848	13	2,700K	770	110°	White

* Available November, 2012

The more things change, the more they look the same.



Incandescent
BR30



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LED BR30

Introducing Ditto. LED efficiency has never looked so conventional.

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ADVANCED LED TECHNOLOGY MADE EASY!

The Ditto LED replacement for BR30 reflector lamps are so similar to the lamps they replace that there's almost no way to tell them apart, except for the lower electric bills! Ditto has the same look and lighting capabilities as a BR30, they're even dimmable like a BR30, and they can be used anywhere a BR30 lamp is being used now. Ditto LED BR30's contain no harmful toxins and emit no UV or IR radiation. Satco Ditto lamps—this is advanced LED technology made easy.

11W BR30 "Ditto" LED Lamp

FEATURES

- Direct replacement for 65W incandescent lamps use only 11 watts
- Dimmable
- Long Life, 25,000 hours
- High efficiency / environmentally friendly
- Innovative design
- No UV or IR Radiation
- 3 year warranty*
- Retail window box package

APPLICATIONS

- Indoor residential and commercial lighting
- Downlighting
- Display lighting
- Accent lighting

11W BR30 "Ditto" LED Lamp

Item Number	Watts	Base	Color Temp.	Lumens	Beam Angle
S8993	11	E26	3,000K	700	108°
S8994	11	GU24	3,000K	700	240°

* See separate warranty for complete terms and conditions.

LED DOWNLIGHT RETROFITS



9W LED Recessed Directional Downlight Retrofit

FEATURES

- Direct replacement for reflector lamps
- Fits 4" recessed fixtures
- Dimmable
- U.L. damp location listed
- Directional gimbal
- Long Life, 40,000 hours
- High efficiency / environmentally friendly
- Innovative design
- No UV or IR Radiation
- 3 year warranty*
- Retail window box package
- ENERGY STAR® qualified

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Residential
- Office
- Retail
- Hospitality



E26 adapter supplied



GU10 socket adapter, accessory S9000



10W LED Recessed Down Light Retrofit

Item Number	Watts	Color Temp.	Lumens	Beam Angle
S8991	9	3,000K	550	40°



18W LED Recessed Downlight Retrofit

FEATURES

- Direct replacement for reflector lamps
- Fits 5" and 6" recessed fixtures
- Dimmable
- U.L. damp location listed
- Long Life, 40,000 hours
- High efficiency / environmentally friendly
- Innovative design
- No UV or IR Radiation
- 3 year warranty*
- Retail window box package
- ENERGY STAR® qualified

* See separate warranty for complete terms and conditions.

APPLICATIONS

- Residential
- Office
- Retail
- Hospitality



E26 adapter supplied



GU24 socket adapter, accessory S8999



18W LED Recessed Down Light Retrofit

Item Number	Watts	Color Temp.	Lumens	Beam Angle
S8992	18	3,000K	1100	85°

KOLOURONE MOTIVATION™ LIGHT ENGINE

SLEEK, HIGHLY EVOLVED LIGHT SOURCE.

Completely self-contained with no external driver, KoloourOne Motivation LED modules are as easy to change as a conventional bulb. And like conventional bulbs, they turn on instantly and are compatible with most dimmers. But unlike traditional sources, they consume only 5 to 20 watts and have a lifetime rating of more than 25,000 hours.

The ultra-sleek, fully integrated design enables greater freedom for streamlined fixtures in new shapes. And they can be wired in series for designs requiring greater lumen output.



Male-male connector with 3" wire, accessory 80/903



Single male connector with 18" power lead, accessory 80/902

4.8W Motivation Linear LED Fixture Module

FEATURES

- Self-contained – plug and play design – easily replaceable module with integrated power supply eliminates complex wiring; no need for external driver, heat sink or optics
- Space-saving design; integrated driver allows for very sleek, low-profile design of fixtures
- Maximum life – rated at 25,000+ hours – more than 10 years of typical use
- Maximum energy efficiency – savings of up to 80% over comparable incandescent bulbs;

uses less than 5 watts

- Fully dimmable – compatible with most conventional dimmers
- RU damp location listed
- 3 year warranty*

* See separate warranty for complete terms and conditions.

4.8W Motivation Linear LED Fixture Module

Item Number	Watts	Color Temp.	Lumens	Beam Angle
80-900	4.8	2,700K	285	100°
80-901	4.8	3,500K	300	100°

**INSPIRE LED
COLLECTION**

Introducing LED
INSPIRE™
by Nuvo lighting.

**EIGHT NEW DESIGNS.
ONE HIGHLY-EVOLVED LIGHT SOURCE.**

Nuvo's Inspire collection brings LED efficiency to every venue or room in the house with a complete line of dramatic new fixtures built around Motivation™, the self-contained, easily replaceable new LED light engine from KolourOne.

Founded by Satco to bring more than 45 years of experience to the development of advanced LED lighting, KolourOne designs and manufactures innovative LED devices that deliver energy savings of up to 80% over incandescent lamps. Now, with the Inspire collection from Nuvo Lighting, LED efficiency is available in pendants, sconces and flush-mounts for every interior application and decor.

 **SATCO®**

NUVO®
LIGHTING



Frame

Bold rectangles create strikingly modern sconces and pendants to wash walls and illuminate work or seating areas with bright, even light – and the very highest levels of energy efficiency. Pendant, island pendant and wall sconce, in Hazel Bronze or Brushed Nickel finish.

INSPIRE LED COLLECTION



Stix

Dramatic fixtures that may be mounted on the wall or suspended from the ceiling, Stix luminaires will add a unique focal point in any room design, and deliver significant energy savings over conventional fixtures. Pendant, mini pendant, island pendant and wall sconce, in a Hazel Bronze finish.



Raindrop

Raindrop fixtures transform a number of classic lamp shapes with a distinctive design and a unique removable aquamarine insert, creating pendants, sconces, vanities, and flush and semi-flush ceiling drums like no others. Large pendant, small pendant, semi-flush drum, flush drum, vanity or wall sconce in a Polished Nickel finish.



Wave

Distinguished by softly undulating ribbons, Wave wall sconces and ceiling pendants create a clean, graceful design statement around the advanced technology within. Pendant, mini pendant, island pendant and wall sconce, in Hazel Bronze or Brushed Nickel finish.

INSPIRE LED COLLECTION



Bin

Textured black metal supports and ribbed glass panels form handsome wall and ceiling fixtures that deliver soft, diffused light and thoroughly modern energy efficiency. Pendant, island pendant and wall sconce, in a Textured Black finish with clear ribbed glass.



Panel

Comprised of just four frosted glass panes over a textured black metal frame, the Panel pendant is a beautifully proportioned paragon of simplicity and energy efficiency. Pendant, in a Textured Black finish with frosted glass panels.



Trax

Twin ribs of brushed nickel or Hazel Bronze support a gently curved pane of frosted glass, creating an elegant, eye-catching new sconce designed to complement any decor. Island pendant or wall sconce, in a Hazel Bronze or Brushed Nickel finish.



Chase

With a cylinder of etched opal glass flanked by supports of tapered Brushed Nickel or Hazel Bronze, Chase is a bold, substantial alternative to the traditional wall sconce. Wall sconce in a Hazel Bronze or Brushed Nickel finish.



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