Lumisave FAQ

Frequently Asked Questions

LED technology continues to develop rapidly as a general light source. As more LED lighting products are introduced on the market, what do retailers, energy efficiency advocates, and consumers need to know to make informed buying decisions.

LED Vs. Conventional Lighting

What are LEDs?

LEDs are light emitting diodes. These are electronic components that produce light by conversion of electrical energy directly to light by the movement of electrons within the material of the diode. They are important because due to their efficiency and low energy, they are beginning to replace most conventional light sources.

Do LEDs require time to reach maximum brightness?

No. LEDs directly convert electrical energy to photons. It is a one step process of electroluminescence that does not require time to reach maximum output. Other sources such as fluorescents or HID work on discharge technology. This requires an arc to warm up and may take a few minutes to reach full output.

What makes LEDs more robust than other light sources?

LEDs have no gases, filaments or any moving parts to fatigue. They provide light through a one step process that takes place within the diode. This give greater resistance to vibrations or jarring that could damage conventional lighting.

How is LED lighting different than other light sources, such as incandescent and CFL?

LEDs produce light by direct conversion of electrical energy to light energy. On the other hand, incandescent light sources produce light by heating a filament until it grows red hot. Linear and compact fluorescent lamps use a UV discharge plus a phosphor to produce the light. HID lamps use the ionisation of gases in a discharge tube which in turn producephotons.

LED lighting products use light emitting diodes to produce light very efficiently. An electrical current passes through a semiconductor. LEDs are “directional” light sources, which mean they emit light in a specific direction, unlike incandescent and compact fluorescent bulbs, which emit light and heat in all directions. For this reason, LED lighting is ableto use light and energy more efficiently in many applications.

Incandescent bulbs produce light using electricity to heat a metal filament until it becomes “white” hot or is said to incandesce. As a result, incandescent bulbs release 90% of their energy as heat.

In a **CFL,** an electric current flows between electrodes at each end of a tube containing gases. This reaction produces ultraviolet (UV) light and heat. The UV light is transformed into visible light when it strikes a phosphor coating on the inside of the bulb.

Lumisave FAQ

Costs and Economic Advantages

Why do LEDs have a higher initial cost than conventional light sources?

LEDs are made of electronic components which need to be packaged together to offer long lasting efficient light sources to the end user. Apart from the LED chip itself which has sapphire and gallium in the semiconductor, the process of packaging with materials like ceramic, rare earth phosphors, silicone, solder and gold wire add to the overall cost. White LEDs require further tests for calibration and standardisation.

What are the hidden costs of conventional light sources?

LEDs, having a longer life, reduce overall maintenance costs. The maintenance cost consists of the cost of new parts, lamps and ballasts, and the labour cost including equipment to replace lamps and ballasts at the end of lamp life cycle. Although the initial cost of conventional light sources is less than LEDs, they do not take into account the operational and maintenance cost of the lighting system after Installation.

LEDs, also consume less energy to convert electrical energy to light. An LED fixture that is capable of producing the same amount of light as a conventional 400W fixture, might only require 200W. The 400W fixture may actually consume 458W, as most conventional lighting does not include the hidden power consumption of the Ballast, where as an LED fixture includes the power consumption of the driver in the total output. Thus the overall cost of a LED system can thus be significantly lower than conventional lighting systems when both power consumption and maintenance costs are included. Most applications with LEDs offer a payback period as low as 3-4 years.

Life Expectancy of LED's

Why is the life of LEDs measured as lumen depreciation?

Unlike conventional light sources that reduce in output and eventually fail, LED products do not normally suddenly fail. Instead, the light output simply reduces over time.
The normal convention is to quote the life when the lumen output has reduced by 30%. (I.e. when the lumen output is down to 70% of the initial Lumens of a New fixture) This is often quoted as the L70 life and is measured in hours.

What does a life of 80,000 hours mean in the case of LEDs?

80,000 hours would imply the time it takes for the LED to reach 30% reduction of total lumen output. This equates to 9.1 years if the light is operated for 24 hours in a day, 12.6 years if the lights are on 18 hours per day and 18.2 years for 12 hours a day.

How much longer does an LED last than a conventional light source?

Typically, an LED will last four times longer than a CFL and 25 times longer than an incandescent source that puts out the same amount of light.

What are the factors that affect the lifespan of the LEDs?

-Unlike discharge lamps, LEDs are semiconductors and their life span is not affected by the number of times they are turned on and off.
-Higher ambient temperatures than that for which the product is rated reduces the life of the LEDs.
-The electrical stress: Power Spikes or Brown Outs, can prematurely damage a driver allowing high current to damage the LEDs.
-Poor Maintenance of the thermal management system. Heat sinks have to be designed to prevent premature failure of LEDs through thermal management, allowing build up of dust and dirt can cause a significant reduction of thermal management reducing the life of the LEDs.

Lumisave FAQ

LED Power Supply

Does L70 also include Life expectancy of the Driver?
No, the life expectancy of the driver is measured separately. Lumisave has chosen to use Meanwell Brand Drivers for all fixtures. These fully sealed, resin filled constant current drivers offer IP67 ratings to protect against vibration, dust and wet locations. With the design of these drivers being so robust this allows Lumisave to provide improved functionality and durability within all fixtures.

Why do LEDs require power supply / drivers?
LEDs are low voltage devices. Hence they require integrated electronics or driver that converts AC line voltage to low DC voltage to power the LEDs.

What are the types of LED Drivers used by Lumisave?
Lumisave offers Meanwell LED drivers suitable to accommodate a voltage range of 120-277V or 347-480V depending on the site requirements.

Although there are currently LED Drivers on the market that allow for DC input voltages, at the present time Lumisave does not offer DC voltage compatibilities.

Dimmable LED drivers are also available on the market, at the present time Lumisave does not offer a dimming solution.

LED Fixtures

Is it true that LEDs do not produce heat?
No. It is true that there is no heat, IR, in the beam. However, the LED chip itself, does produce heat which is related to the overall output. Higher power LEDs generally run hotter than low power ones because of the extra heat to remove.

The LED chip, or light engine produces heat which needs to be dissipated as quickly as possible. This is normally done by using a heat sink. This often has fins and can have an integrated driver compartment. It may become warm, or hot to the touch, depending on the design of the thermal management system. Cool LED fixtures are more efficient than hot ones and have a longer life expectancies.

Why is the heat sink design critical for the performance of an LED fixture?
Thermal management is critical for the performance of LEDs. Increasing heat in LEDs has the following effects in performance characters:
- Reduction in luminous flux
- Colour shift (change in colour appearance)
- Reduction in life of the LED

LEDs are cooled either by passive cooling or active cooling. Passive cooling involves a finned heat exchange system made of cast or extruded metal or plastic coated metal heat sink that offers a totally silent, robust, heat transfer. Passive cooling is reliant on the surface area of heat sink material and is orientation dependant. Lumisave implements a passive cooling method for all LED fixtures.

Active cooling may include conventional fans or diaphragm based forced air cooling. Active cooling using a fan, although more efficient; is noisy, not so reliable, and needs electricity to run. Active cooling lays emphasis on forced air flow rate and is not orientation dependant.

Lumisave FAQ

Retrofit Applications

What aspects need to be taken in consideration when replacing a light source with LEDs in a retrofit scenario?

- The physical dimension of the LED Fixture and how it fits into the existing location.
- The electrical characteristics of LEDs compared to the existing system. (mains voltage, inrush current rating, control methods).
- The light distribution, lumen output and other photometric properties like colour temperature in comparison to the original light source.
- The heat generated by the LED during operation and the maximum operating temperature, and ambient temperature.
- Hazardous Location Ratings and T-Codes

Will the light output be the same?

It is important to ask the supplier for the lumen output of the existing fixture configuration and to compare this with the LED unit you are replacing. If it is a spotlight, compare the two lamps side by side. Poor sales literature often states the raw lumen output from the lamp and not the complete fixture.

Use a computer generated model utilizing the IES files provided by the manufacturer to compare existing light levels to proposed LED light levels.

What is the best way to compare the output of LEDs with other light sources?

Sometimes simply comparing the lumen output of LEDs and conventional light sources may not be adequate. The amount of light falling on specific task area (the lux) gives a more realistic comparison. You should also consider the illumination on the walls. This helps identify applications where LEDs offer better solutions than other light sources.

Industry Standards

What are the LED lighting standards referenced in the Energy Star specification?

- **ANSI** (American National Standard Institute) - Establishes definitions of solid state lighting devices and components. It also provides a common terminology.
- **IESNA** (Illuminating Engineering Society of North America) - Provides procedures for reproducible measurements of photometry, colour and electrical characteristics of solid state lighting products.
- **UL** (Underwriters Laboratories) - Write safety standards for LED products including drivers, controllers, arrays, packages and modules.
- **NEMA** (National Electrical Manufacturers Association) - makes recommendations for mechanical, thermal and electrical interfaces between for luminaires.

What standards are used to classify LED fixtures for harsh, underwater and outdoor conditions?

IP (Ingress protection) ratings or UL (Universal Laboratories) ratings are commonly used standards for LED product suitability for various harsh, underwater or outdoor applications.

Example:

IP65	**IP**	**6**	**5**
	IP Letter Code	1st Digit	2nd Digit

	1st Digit (Solids)	2nd Digit (Moisture)
0	No Protection	No Protection
1	Objects > 50mm	Vertical Drip
2	Objects >12.5mm	Angled Drip
3	Objects > 2.5mm	Spraying
4	Objects > 1mm	Splashing
5	Dust Protected	Jetting
6	Dust Tight	Power Jetting
7		Temporary Immersion
8		Continuous Immersion
9		High Pressure Water Jet

Lumisave FAQ

Industry Standards (Continued)

What are HAZLOC fixtures?

Being a diverse Industrial based company, Lumisave fixtures can be found in various types of applications and environments. Any industry that processes, uses or manufactures materials that may give rise to a flammable atmosphere (gas, mist, liquid, dusts or even small fibres) may have a potentially explosive atmosphere. These special locations require specially tested and designed fixtures for safe operations. Lumisave offers Class I Div II, Class II Div II and Class III Div II fixtures for specified hazardous locations.

Class I A location made hazardous by the presence of flammable gases or vapors that may be present in the air in quantities sufficient to produce an explosive or ignitable mixture

Class II A location made hazardous by the presence of combustible or electrically conductive dust

Class III A location made hazardous by the presence of easily ignitable fibers or flyings in the air, but not likely to be in suspension in quantities sufficient to produce ignitable mixtures

Division 1 A location where a classified hazard exists or is likely to exist under normal conditions

Division 2 A location where a classified hazard does not normally exist but is possible to appear under abnormal conditions

Group A – Acetylene
Group B – Hydrogen
Group C – Ethylene
Group D – Propane
Group D – Methane
Group E – Combustible Metal Dust
Group F - Combustible Carbonaceous Dust
Group G – Combustible Dust not in Groups E or F (Flour, Grains, Wood, Plastics, Chemicals)

Max. Surface Temperature	T Code
450°	T1
300°	T2
280°	T2A
260°	T2B
230°	T2C
200°	T3
180°	T3A
135°	T4
100°	T5
80°	T6

How do I know the fixture is safe?

In Canada, every light fixture must have a CSA or equal label. In the USA, UL or equal label is required. “c” or “us” designator may be used to show the Certification is acceptable in both Canada and USA.

These marks of conformity tell you that the seller claims that the fixture conforms to all the relevant safety standards and can be tracked through the control number.

Intertek
4000453

Can I repair or modify the fixture?

No, any changes to the original construction of the fixture must remain unchanged. Any third party changes will have the potential of voiding certification ratings. If a problem with a Lumisave fixture is to occur, it is important to not open and inspect the fixture for troubleshooting while still under the warranty term. Opening the fixture and breaking the factory seal will void warranty under the fixture. The appropriate course of action is to contact Lumisave and present the issue; arrangements will then be made to deal with the problem.