

LED EXPLAINED

All you need to know about LED..



LUMENS

Lumens are a measure of light. One lumen is equivalent to the light from a wax candle (approx). A standard 40w light bulb would have a lumen output of approx 450lm. A Compact Fluorescent Lamp (CFL) with the same lumen output (450lm) would only use on average 9w But an LED uses considerably less depending on the type used. A general guide the efficacy of an:

Incandescent lamp is 10-12 lm per watt

Compact fluorescent is approx 50-60 lm per watt

LED can vary from 40-90 lm per watt.

Fact: the higher the lumens the brighter the lamp.



WATTS

A watt is a measure of the power consumed. The wattage of a bulb tells you how much electricity it uses, not (as lots of people think) how much light it produces. Lamps have always used watts as an indication of the light that can be expected from the bulb (more power more light!!). But, with new technology and much more efficient lamps, watts are becoming increasingly irrelevant eventually all lamps will be/ should be measured in Lumens per watt.



VOLTAGE

Voltage is the pressure within the circuit that's generated by the electricity company. Different countries use different voltages according to the way thier infrastructure has been constructed.

In the UK it's 240 volts,

In America it's 110 volts,

In most of Europe it's 220 volts,

In the Far East the current is also 220 volts.



COLOUR RENDERING INDEX

CRI (Colour Rendering Index) measures light quality of light source as directly compared with sunlight (which is given the maximum CRI value of 100). The closer a light source CRI is to 100, the better its ability to show true colours.

So lamps with a CRI of 85-95 are great for art galleries, Jewellery shops and high end retail shops.

In 2013 European regulations changed so that all new LED imported lamps must have a minimum CRI of 80 for indoor use and 65 for external use (outdoor lamps and garden lamps typically). This change has improved the light quality for houses across the UK.



COLOUR TEMPERATURE

Correlated Colour Temperature (CCT) describes the appearance of the light in degrees Kelvin.

It is the measure of the colour of light emitted;

It can be quite yellow and is described on most light bulb packaging as 2700k or 3000k but can also be a very blue white again shown as 6000k up to 6500k.

In the UK most lamps are 2700k to 3500k but you can get 4000k and 5000k as well.



INCANDESCENT LIGHT BULBS

This is the type of bulb that most of us are used to seeing but over the last few years has been taken out of the UK market as they are so inefficient.

As electricity passes through the wire in the lamp, friction is generated by the passing of electrons, heating the wire until it glows very brightly.

Approximately 90% of the energy used by an incandescent light bulb is lost in the form of heat with only 10% of its output being actual light.

This technology has not really evolved since the original designs were developed over 100 years ago.



HALOGEN LIGHT BULBS

A halogen light bulb is an incandescent lamp with a tungsten filament contained within. (Again this bulb is very well known in the UK and typically can be found in kitchens and bathrooms). When combined with an inert gas and a small amount of halogen the chemical cycle deposits evaporated tungsten back onto the filament, extending the life of the bulb. This makes them more efficient than incandescent bulbs, but they do run very hot indeed although they are nowhere near as efficient as LEDs or CFLs.

Halogen lamps are generally small and generate a lot of heat as mentioned above so they can only be used in fittings that will withstand high temperatures. Due to their size, halogen lamps are perfect for smaller light fittings though they lack the sophistication and energy saving attributes of the alternatives.



COMPACT FLUORESCENT LAMPS

Ok so this is slightly more technical but here goes: the central element in a fluorescent lamp is a sealed glass tube. The tube has two electrodes, one at each end, which are wired to an electrical circuit running an alternating current.

Inside the tube is a cocktail of mercury and gases (typically argon) which is kept under very low pressure.

When you turn the lamp on, an electrical arc passes through the glass tube; as the arc passes through the mercury in the tube turns from a liquid/solid to a gas.

This combination causes ultraviolet light photons to be released. Our eyes don't register ultraviolet photons, so it needs to be converted into light the human eye can register. Coated along the inside of the tube is a special phosphor powder that, when combined with ultraviolet light, creates a visible light, making it possible for manufacturers to vary the colour of the light by using different combinations of phosphors. So again you can get 2700k up to 6500k (explanation above in CCT) Specifically in a 'compact' fluorescent lamp the tube is folded this gives you that distinctive look that compact fluorescent have to make the lamp smaller and the ballast is normally built in so the lamp can replace the conventional light bulb.

Most CFL's do tend to take a small amount of time to get started so may not offer full light immediately.



LED LAMPS

LED (light emitting diode) or solid-state lighting technology. Simply, instead of emitting light from a vacuum (as an incandescent bulb does) or a gas (as a CFL does), an SSL emits light from a piece of solid matter. In the case of traditional LED, that piece of matter is a semiconductor.

Stated very simply, an LED produces light when electrons move around within its semiconductor structure. A semiconductor is made up of a positively charged and a negatively charged component. The positive layer has "holes" – openings for electrons; the negative layer has free electrons floating around in it.

When an electric charge strikes the semiconductor, it activates the flow of electrons from the negative to the positive layer.

Those excited electrons emit light as they flow into the positively charged holes.

LEDs in the beginning had quite low outputs but have made recent improvements which have allowed for much better performance. You can now find LED replacement bulbs for nearly all traditional light bulbs including candles & spot lamps and even GLS styles equivalent up to 100w incandescent.



LAMP CAPS



GU10



SBC
Small Bayonet Cap



SES
Small Screw



BC
Bayonet Cap



ES
Large Screw



G9



G4



PIR

PIR or a Passive Infrared Sensor is a sensor that is used on outdoor lights. It detects movement so that the light will come on when you need it to without having to use a switch.

The light will only come on if it is dark enough. Products can be adjusted for duration times, range and light level.