Low Power Lighting

We all should know about compact fluorescent bulbs using typically 1/5 of the power of conventional incandescent bulbs. Typically, an 11Watt fluorescent bulb is equivalent to an old style 60 Watt incandescent. The EC has banned the production of 100 Watt incandescent bulbs from this year and will gradually bring in a ban on other lower power incandescent bulbs in the next few years.

Some people do not like the light given by fluorescent bulbs as it is whiter and more stark. They can give off a small amount of ultraviolet light which a very small number of people have skin problems with. This problem can be solved with shades or reflecting the light off walls and ceilings.

Until recently there has been no affordable low power alternatives to quartz halogen bulbs. These are typically used in recessed down lighters and have two main bulb types, both rated up to 50 Watts each.

MR16 12V which need a transformer

GU10 240V direct

B&Q etc are starting to sell LED alternatives to these but they are charging silly amounts for bulbs that provide much less light of an unpleasant blue tinge. Typically in the range of £25 for a 10 Watt equivalent.

The good news is that it is possible to buy high quality led bulbs of this type on ebay and online shops for as little as £5 each which give as much light as an 50 Watt quartz halogen while using less approx 3 Watts of power. These bulbs come in a variety of configurations and white colour ranges. The two types are based on 3 very bright focused or 60 less bright LEDs.

Where to buy

The internet is the best source as it takes years for new products to get into the high street stores supply chain. The very latest supplies tend to be from China where they are being manufactured. Typically on ebay you will find endless choice of bulbs. China is a good source to buy single bulbs as samples of what will be available here soon (but purely out of curiosity). My advice is don't buy from China. If they go wrong its not cost effective to send them back, you also have no effective guarantee that what you buy is exactly what you get ie the colour may not be as advertised. Look for a UK supplier who will at least guarantee the bulbs for a year. (eg http://www.lustrumlight.co.uk no I don't have shares).

Led types

Cree and Luxion are types of very bright LEDs typically used in clusters of 3. They are most likely to have a warm colour equivalent to a incandescent bulb. They are also more focused. Alternatively clusters of ordinary LEDs typically 60+ will have light colour more like a fluorescent and the light is more diffuse.

Light quality

Owing to the way they work, LED lights do no flash in the way that fluorescents can. They are also light instantly to full brightness.

Colours

The colour a bulb gives out is measured in degrees Kelvin. While claiming to be white LED bulbs cover a range of colours from blue through to amber tinged. The colour range values are:-

3200 Kelvin	warm white light equivalent to a incandescent bulb
4000 Kelvin	white
5000 Kelvin	stark white close to fluorescent
6000+ Kelvin	stark blue light, bright but cold

Lumens

It is very difficult in most bulb descriptions to work out how much light the bulb is actually giving out and how that compares to existing bulbs. The most useful quantity of light is measured in lumens. If a supplier cannot give you that figure look elsewhere. Typically a bulb needs to be able to give at least 200 lumens light to be considered as a replacement for a quartz bulb. Typically 340 lumens is about equivalent to a 40-50Watt halogen although it can vary with the colour range.

Transformers

When using the low voltage LEDs, it is very important not to reuse the transformers that power your existing quartz halogen bulbs. These are typically switched mode electronics and are a designed to deliver too much power for LED bulbs so they will either fail to provide any power at all and will simply ruin the LED bulb. The type of transformers to use are ones specifically designed for LED, often referred to as LED drivers. These are typically about £6+ for a 12Watt transformer, which will power 3-4 LED bulbs.

Wiring

The power used by a LED bulb is extremely low so the wire used doesn't need to be very thick. If you are using low voltage bulbs thin bell wire is sufficient. As they need so little power it is also possible to place the transformers further from the bulbs. Typically with existing halogen bulbs the current is so high that the wiring is limited to a maximum of a metre from the transformer and the wires themselves get quite warm. Runs of 5m and more are perfectly safe with low voltage LEDs.

Dimmable

Most LED bulbs cannot be dimmed, although special dimmable versions are available at greater cost. It is not wise to use them with dimmer switches as the electronics of the dimmer will cause them damage.

Safety

Existing quartz bulbs get very hot and if you are using recessed bulbs they have to be in appropriately safety rated fittings. LED bulbs are very efficient so give off very little heat and are correspondingly safer. If you are not sure what you are doing with electricity use a qualified electrician.

Life time and Costs

Typically a LED bulb will last up to 50000 hours ie in typical use for up to 25 years. The most important thing is how much will it cost and is it worth it? Using very conservative figures a typical quartz bulb lasts 2000 hours and costs around £2. If it is used for an average 3 hour a day and electricity costs 10p kwh. So a single 50Watt bulb would cost a minimum of £6 a year to run and replace. A replacement LED bulb at 3-4 watt and cost of £5 at 30000 hours lifespan would cost about 60p a year. In short you make your money back in a year and then continue to save at least £75 per bulb over the next 25 years. In my own case we have been using a mixture of LEDs for over 6 months and have already made a greater saving than their initial cost.

Future

LED bulb replacements for conventional light fittings are beginning to appear but are currently very expensive and not quite there. Hopefully in the next year or so these will move mainstream.

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