

## Options

In general, there are three ways to illuminate a space in a building or a house. They are light bulbs called incandescent or halogen, fluorescent, and light emitting diode (LED). Each of these lighting options is available in both bulb and tube varieties.

By nature, the incandescent and halogen lighting are the least efficient lighting solutions. Incandescent and halogen bulbs work from heating up a coil of wire until it glows, emitting light. Fluorescents and LEDs work from moving electrons between different energy levels by exciting them. When an electron is excited, it moves to another energy level and emits a photon, more commonly known as a light wave.

The difference between an LED and a fluorescent is that the fluorescent needs a power consuming ballast to turn on. The ballast is required in each fluorescent fixture, in order to condition the current supplied to the tube. This ballast consumes power and the resulting "ballast loss" is not included in the rated watts of the bulb. LEDs have a lower wattage than fluorescents and do not have this ballast loss. These are both reasons LEDs are the most energy efficient.

## Lighting Color

Light color is measured in Kelvin, and can be referred to as "temperature" due to these units of measurement. Lights come in different colors, usually fluorescent lighting has a whitish/blue color tone to it, this can be seen in the figure below, it is rated at around 3500 K whereas an incandescent is approximately 2700 K. LED light bulbs can range in color greatly. Normally they are rated at around 5000 K.

Though daylight is rated at around 6500 K and should be considered as a more natural choice for lighting, people have become accustomed to the dim, 2700 K glow radiated by the incandescent light bulb. Due to consumer complaints about the default ultraviolet color of LEDs, people are continuously developing new technologies to replicate fluorescent and incandescent lighting colors in LEDs.

Choosing what lighting color is appropriate for an SME involves these options. Some retail stores choose to paint the walls and organize things in a certain manner in order to create an ambiance that makes customers feel comfortable. For example, a restaurant may want to create a romantic atmosphere. This means that they would choose dim lighting with a color close to candle, that is to say, 1850 K. To achieve this, they should choose a light with a low color temperature and applying a similar opaque color to the walls to reflect the light.

Searching for new lighting with equivalent color to that of an incandescent is very important for retail stores that fall into the category previously described above. Other retail stores that would apply for this yellowish light would be stores with a lot of wood, either wood display units or stores with actual wood products. Stores that may want a bright white, 5000 K bulb would be those similar to a jewelry shop where it is advantageous to have a brilliant display.



Figure 1: Different colours of lighting.  
<http://www.myledlightingguide.com/Blog/Images/color.png>

## Lumens

Another characteristic of lighting that must be examined closely is the amount of light that is seen in the room; this is measured in lumens. Usually, the box the bulb or tube is packaged in will clearly display how

many lumens the bulb has in a typical setting. If not, a simple search on any Internet search engine describing the fitting type and wattage will usually reveal how many lumens the bulb has. LEDs that are rated as equivalent are usually less bright than the bulb they are supposed to equate to. Over time, fluorescent tubes and bulbs will lose brightness until they eventually fade to black. LEDs on the other hand lose less of their luminosity over time; this means that selecting a LED tube with around 10-15% less lumen should be acceptable.

## Labour Cost

When considering replacing fluorescent tubes with LED tubes, there is a small amount of labor that must be included in the cost of the new tubes. There is certain wiring that is connected to the fitting's ballast that must be reconfigured so that they bypass the ballast; it is recommended that an electrician or trained person conduct this type of job. This will of course add to the initial cost of using the energy saving lighting. Most offices and residences have a room height of around three meters, and scaffolding is not required for labor conducted on this type of room. As soon as the height exceeds three meters, the electrician must introduce scaffolding to the job, which then increases the labor costs and disturbance to employees significantly. For light bulbs, like halogen spotlights, retrofitting an LED equivalent is literally as easy as changing a light bulb, which means there is no additional initial cost to the bulb.

## Choosing Lighting with Higher Efficiency

Technology is advancing at such an alarming rate in so many different areas, that it is impossible to keep track of all of it. The best lighting technology, available today, is LED lighting, which takes advantage of a different kind of physics not normally known for application in lighting a room. As technology increases and better materials are found, the cost and efficiency of lighting will only improve. However, choosing more efficient lighting is not as simple as finding a light bulb or tube with a lower wattage, watts being the amount of power needed to illuminate the light bulb. A few additional lighting characteristics must be considered before choosing the lighting that is right for you.

# Energy Efficient Lighting Information

How to choose the best lighting for your business

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