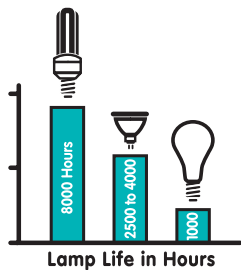
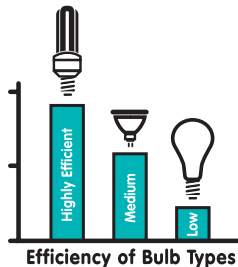


lighting guide 03

A word about efficiency...

There has always been some confusion about how much light you get from the different types of light bulb and how much energy they consume.

The new breed of compact fluorescent (or 'low energy') lamps will only use around 11 watts of power to generate the same light as a normal 60 watt light bulb and they last up to eight times longer. There is no doubt at all that they save you money



over the life of the lamp. A halogen bulb uses about half the energy of a conventional light bulb to generate the same amount of light.

A recent breakthrough in technology has resulted in the appearance of very bright LED lights. These are very small but relatively bright for their size and have a life often in excess of 50,000 hours.

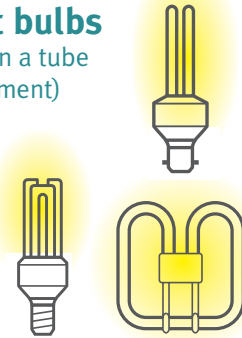
They are yet to appear in any number in domestic lighting but it is only a matter of time.

Lightbulb types

Low energy and fluorescent bulbs

(contain gases in a tube but have no filament)

The new breed of compact fluorescent (or 'low energy') lamps will only use around 11 watts of power to generate the same light as a normal 60 watt light bulb.



There is no doubt at all that they can save you up to 80% on your electricity bill over the life of the lamp, which can last for up to 5 years (10,000 hours). Naturally, if you are using less electricity, you need to generate less electricity and this reduces greenhouse gases, which thin the ozone layer around the earth.

Fluorescent lamps have no filament; they are just a tube with gases in it. Best known as the long white tubes so beloved in utility ceilings of the 1960's and 70's, recent technology has reduced the size and improved the efficiency. Many different shapes and power options are now available.

These lamps are ideal for lights that need to be kept on for a long time i.e. overnight on landings or in hallways. In the past it was felt that fluorescent light was 'cold' but with the invention of 'warm white' lamps this is no longer the case.



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Incandescent light sources (conventional filament bulbs)

These are the conventional bulbs which we all recognise and their chief advantage is the colour of light they emit. Colours of objects are generally more accurate with this type of light bulb and they impart a warm feeling to a room. The disadvantage is that they are inefficient by modern standards and have a relatively short life (around 1000 hours).



Incandescent lamps come in a variety of shapes and sizes and have a number of different fittings:

Bayonet cap (BC), Small Bayonet cap (SBC), Edison screw (ES or E27) and Small Edison Screw (SES or E14). The Edison screw types are becoming more popular in the UK.

Several different coatings are also available with the following properties: Pearl is an all over frosting which diffuses the light and is best used in a light fitting with shades.

Clear bulbs are more attractive when used in fittings where the bulb is visible or a sparkle is required such as crystal chandeliers.

Reflector bulbs have a silvered surface to direct the light in a certain direction and are usually intended for directional fittings such as spot lights.

Halogen light sources (filament bulbs containing halogen gas)

Halogen bulbs produce a very attractive light, closely resembling sunlight. They are more efficient than incandescent bulbs using only half the energy to produce the same light output and last twice as long.



Generally they are small lamps which generate a lot of heat so they can only be used in light fittings designed to cope with the higher temperatures.

There are two main types of halogen lamp available in the domestic market: Low voltage. These lamps operate on 12V which means a transformer has to be fitted either in the light fitting itself or remotely. The advantages of the lower power are that the safer voltage enables manufacturers to produce interesting and slim designs without the need to protect against danger from higher voltages. Transformers can be either electronic or 'wire wound'. The newer electronic transformers are more energy efficient and smaller but more expensive than the conventional wire wound type. Electronic transformers can be damaged by voltage 'spikes' in the mains supply (sometimes referred to as 'dirty mains'). These spikes can be caused by fluorescent lights, older motors, fridges, lift shaft motors etc. If persistent problems occur the use of mains voltage lighting is recommended.

Mains voltage. This relatively new breed of lamps offers the light colour advantage of halogen without the need to house a transformer. The reflector type bulbs are known as GU10 or GZ10 and the latest small envelope non-reflector halogens are known as G9.

Dimmers. Most tungsten and halogen light fixtures are dimmable but only certain types of fluorescent can be dimmed. When installing a dimmer you should check on the compatibility of the fitting with the dimming device and that the dimmer has sufficient capacity to control the load on the circuit.

lighting guide 05

General tips on lighting your home

Many people spend a great deal of money decorating and furnishing their homes to create an atmosphere only to find that something is missing. Good lighting will complement and complete the effect you are seeking but remember that bright lighting is not always good lighting.

A light source creates a pool of light but there is a second effect produced when this light is reflected by surfaces. It is this secondary effect which cannot be reproduced in the shop where you buy your lights. Consider where you are to put the light and the surfaces under and around it. What effect will the reflected light have?

Avoid hard contrasts which can be tiring to the eyes and, where possible, try to combine different types of lighting in the same room. Direct lighting for reading or working, pools of light to highlight features such as paintings or objects and washes of light on walls all help to add atmosphere to a room whilst remaining functional. If a room has to perform several functions, consider installing a dimmer. This will allow a higher light level for working or reading and a lower light level for relaxation. This can prove useful too for older eyes which need more light.

Colour is most important, incandescent bulbs help create a cosy atmosphere in living areas while fluorescent lamps give a cooler, more efficient light for utility rooms. A room

painted in a dark colour will need more light as much of it will be absorbed, whilst lighter colours reflect light. You can add colour to a room by illuminating a coloured surface.

Avoid glare by placing the lights at a height which prevents the eye from seeing the bulb directly. Pendants should not be hung so high that the bulb is clearly visible underneath. Take care that lights placed over reflective surfaces such as glass tables have a diffuser in them.

How much light?

Determining the correct light levels for a home environment is a very complicated subject and depends to a degree on the individuals perception and requirements. The formula below, however, can be used as a rule of thumb.

Measure the room size in square metres and multiply this by 25 (for incandescent lamps) 15 (for halogen lamps) or 19 (if using compact fluorescent lamps). This will give you the total watts required to light the room.

Example 1: a room 5m x 5m has an area of 25sq metres. If we are to use conventional incandescent lamps we multiply this by 25 giving a total wattage of 625 watts. This can be made up as required, for example as follows:

2x 75W table lamps	=150W
2x 3 light ceiling lights each with 40W bulbs	=240W
2x double wall lights each with 40W bulbs	=160W
2x single wall lights each with 40W bulbs	= 80W
TOTAL	=630W

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Example 2: a kitchen 3m x 6m = 18 square metres. If we intend to use low voltage halogen dichroic lamps then we multiply this by 15 to arrive at 270watts required in total. This can be made up as follows:

1x 3 light halogen bar fitting with adjustable heads each with 50W lamps	=150W
6x downlighters mounted in the ceiling each with 20W dichroic lamps	=120W
TOTAL	=270W

Please note that this formula is a guide only and some people prefer more light, others less. A useful measure is to over estimate by 10-15% and install a dimmer to give you more control. If in doubt seek professional advice.

Room by Room

Different rooms have different functions, accordingly each room will have a different lighting requirement. The following guide will help you decide which light sources you need for each room in your house...

Living Room

Avoid using one central light which will create hard shadows and possibly glare. Instead aim to use plenty of different light sources to create pools of light, this will give a more interesting effect.

Let's start with where you sit. An adjustable reading light beside or behind your chair which can be switched whilst seated will prove invaluable. If it can be adjusted for height, even better. Two or three table lamps placed around the perimeter on



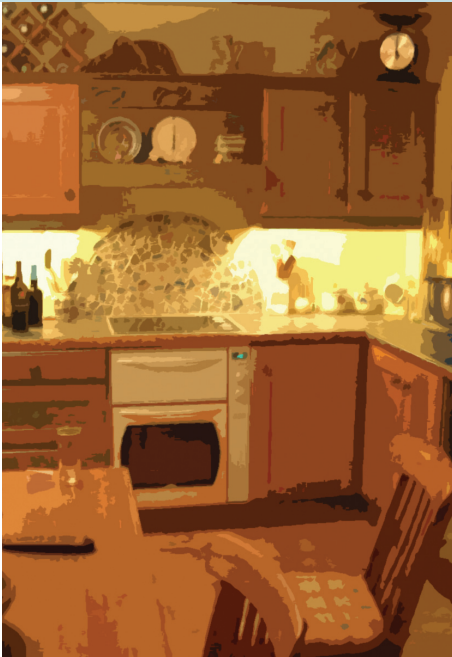
tables, shelves or furniture will give the room a more spacious feeling as the light radiates inwards. These small pools of light also create interest.

Illuminate bookcases, pictures or objects of interest with picture lights or halogen spot lights. This indirect lighting of a different colour will add contrast.

Wall lights and pendants on a dimmer switch can raise the level of illumination in the room without needing to adjust any of the other light sources but beware of glare if they are mounted too high. Indirect light from wall washers (light fittings designed to light the wall and ceiling often made in ceramic or plaster) will create dramatic effects. Remember that the light given from wall washers will be coloured by the surfaces on which they are mounted.

Floor lamps come in many guises and can be very effective at adding general illumination to a dark area where it is not easy to fit wall lights, ceiling lights or table lamps. A floor uplighter gives a bright wash on the ceiling. Some are fitted with dimmers and others have a second flexible arm for reading.

lighting guide 07



Kitchen

We spend most of our time in the kitchen and it has multiple functions, many of which require care to avoid accidents.

A higher level of illumination is required here. Fluorescent tubes under wall mounted units cast an efficient light over work surfaces and prevent shadows. They also ensure you are not blocking out the very light in which you need to work.

A central light is also important in a kitchen to provide a general level of illumination and, if you have the space, the use of halogen spot lights mounted on the wall will help to add accent. If you have glass fronted display cabinets in your kitchen the use of small halogen lights specifically designed for the purpose will add interest.

If your ceiling is low or you want to avoid a central light, consider the use of a number of downlights which create a glare free and pleasing effect whilst remaining functional.

Dining Room

The main light source here will be over the dining table. The use of a dimmer will allow the table to be used for jobs such as sewing and yet give a low mood light for dining.

Don't hang a pendant so low that your diners have to peer round it, about 60cm above the table is about right. Better still fit a rise and fall pendant. If you like to dine by candle light, make sure the heat and smoke are far enough away from the light fitting. If you have a glass dining table, make sure the light is fitted with a diffuser so that your diners are not looking at a reflection of the light bulb. Long tables can be very effectively lit with a longer light fitting suspended on two wires.



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Bathroom

Great care needs to be taken when choosing bathroom lighting as the regulations are strict concerning the type of light you can use.



The bathroom mirror deserves some special attention and a diffused glass light either side will give a good general illumination where it is needed. The alternative is a halogen downlight from the ceiling or fluorescent strip light over the mirror.

The latest generation of mirrors incorporate lights into the mirrors themselves with sections of the reflective surface removed and lights fitted behind them. This is a very effective way of generating an even light and improving safety.

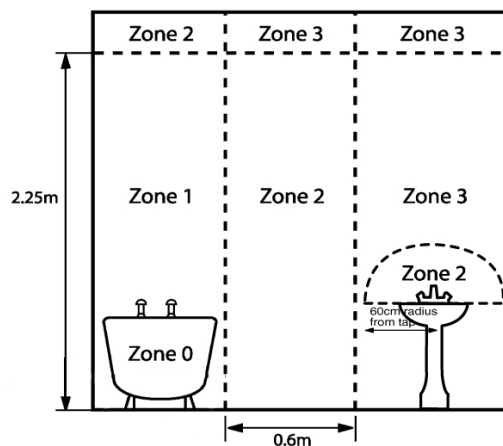
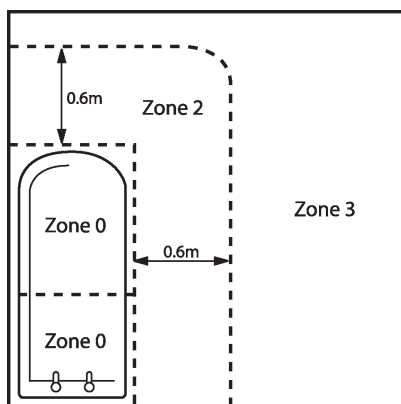
For general illumination in the rest of the bathroom either use downlights for

their refreshing halogen colour or a high output flush ceiling fitting to suit the décor.

Portable lights are not permitted in a bathroom so for mood lighting use ceiling mounted directional spotlights aimed away from the bath and at interesting features. Lights designed specifically for showers are available and must be carefully fitted according to the instructions.

The following information is a guide to help you understand what fittings can be placed where. This is not an installation guide and reference should be made to the IEE Wirings Regulations (16th Edition) or a qualified electrician.

Firstly it is important to understand the rating by which bathroom and some outdoor lights are classified. IP rating stands for 'Ingress Protection' and is always followed by two characters. These two numbers refer to level of protection and it is important that you choose fittings with the correct rating according to where they are to be sited within the bathroom.



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The diagrams on the left show a bathroom split into four clear zones: 0, 1, 2 and 3.

Zone 0 is inside the bath or shower itself. Any fitting used in this zone must be low voltage, (max 12v) and be rated at least IP67 which is total immersion proof.

Zone 1 is the area above the bath to a height of 2.25m from the floor. In this zone a minimum rating of IP44 is required. If the fitting is 240v a 30ma residual current device (RCD) must also be used to protect the circuit in this zone.

Zone 2 is an area stretching 0.6m outside the perimeter of the bath and to a height of 2.25m from the floor. In this zone an IP rating of at least IP44 is required.

In addition it is good practice to consider the area around a wash basin, within a 60cm radius of any tap to be considered as zone 2.

Zone 3 is anywhere outside zones 0,1 and 2 (subject to specific limits) and where no water jet is likely to be used. No IP rating is required.

In addition to the above, if there is a likelihood of water jets being used for cleaning purpose in zones 1,2 and 3 a fitting rated a minimum IP65 must be used.

Full details can be found in the latest copy of the IEE wiring regulations.

Bedroom

This is an area so often neglected. Consider the number of functions required of a bedroom.

For dressing you may need a general illumination or, if your partner has to rise at a different time, do you need a lower level pool of light which won't disturb them? A well positioned downlighter will help here.

Many people read in bed and with a double room, it is useful to have



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bedside lights which are individually switched. Adjustable reading lamps are ideal if you want to read while your partner sleeps. For convenience and safety you should aim to have all of the bedroom lights controlled from the bed.

Dressing tables used for make-up will need more specific lighting and the use of two slender table lamps either side of a mirror gives a good working light without glare and will add to the cosy effect of the room.

Try to create pools of light to reduce any hard contrasts. Adding a table lamp or illuminating pictures will be very effective.

Study

A general background illumination is important to avoid the hard contrast if only a desk lamp is used. Indirect wall washers or a floor lamp will do nicely.



For the desk lamp look for one which is adjustable for height and will reach over the area where you are working. It is most important to avoid working in shadows.

If you have a computer try and light the wall behind it to avoid tiring your eyes when looking at the screen. Make sure the lights in the room do not reflect off the screen into your eyes.

Children's Rooms

A good central ceiling light is useful to provide a general illumination and a bedside or wall mounted reading lamp is recommended.

Night lights for children's rooms give peace of mind and cost very little to run.

Older children will want to have fun lighting and there are many effective novelty lights but always be safety conscious and choose lights which are suitable for the age of the child.

The information here is intended as a guide and contains several generalisations for illustrative purposes. For more technical information refer to an electrician and specific product data.

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