

## Buying guide for lamps for desk and workplace



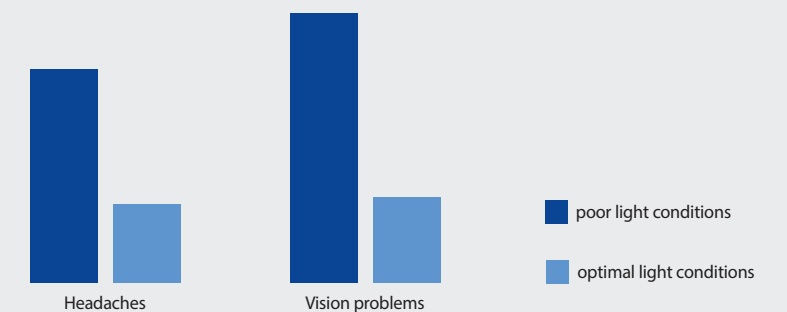
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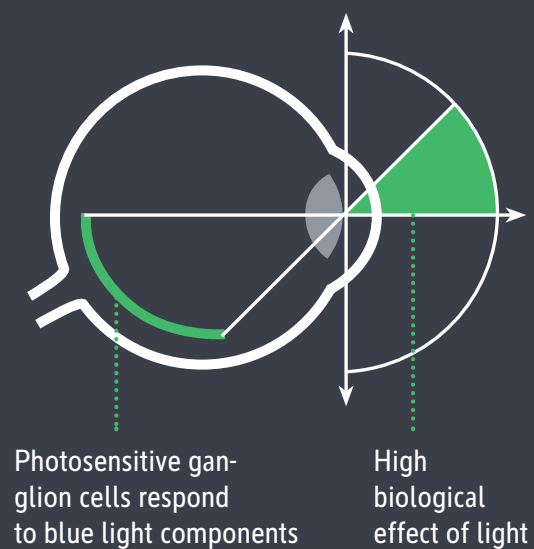


## » HEALTHY LIGHT AT THE WORKPLACE MAKES A DIFFERENCE

With optimal lighting, you can significantly influence your performance and well-being. The wrong light automatically leads to more mistakes and a falling performance curve. Likewise, too little light, glare or too harsh contrasts have negative effects on health and the ability to concentrate. As a result, reactions such as fatigue, burning or watering eyes or headaches can occur. Double dynamic light (change of brightness and colour temperature), as well as the integration of daylight, have a special influence on well-being.



### INCIDENCE OF LIGHT INTO THE EYE: FROM ABOVE AND FROM THE FRONT



### BIOLOGICALLY EFFECTIVE LIGHTING

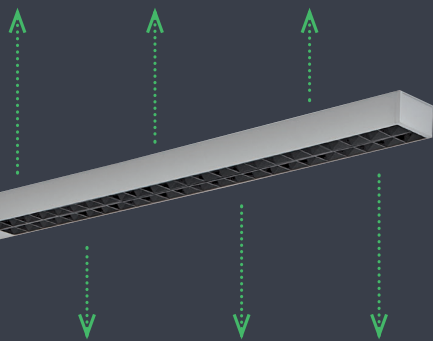
Also called Human Centric Lighting, it is designed to enhance people's well-being and health. It is modelled after natural daylight. This can contribute to better performance and mood. Light that hits the eye from above and from the front is particularly biologically effective. This is achieved e.g. by using large-area ceiling lamps or floor lamps with a proportion of indirect light. Desk or workstation lamps can be used to supplement the lighting conditions at the workplace in order to fulfil classic visual tasks such as reading.

In the morning and throughout the day, cool white light with a high proportion of blue (daylight white light over 5300 K) is recommended to increase concentration and productivity.

In contrast, light without this proportion of blue (warm white light 2700 – 3300 Kelvin) has a low biological light effect. This can create a relaxing and calming illumination. In the evening, the natural increase in melatonin levels is additionally supported and it is easier to fall asleep.

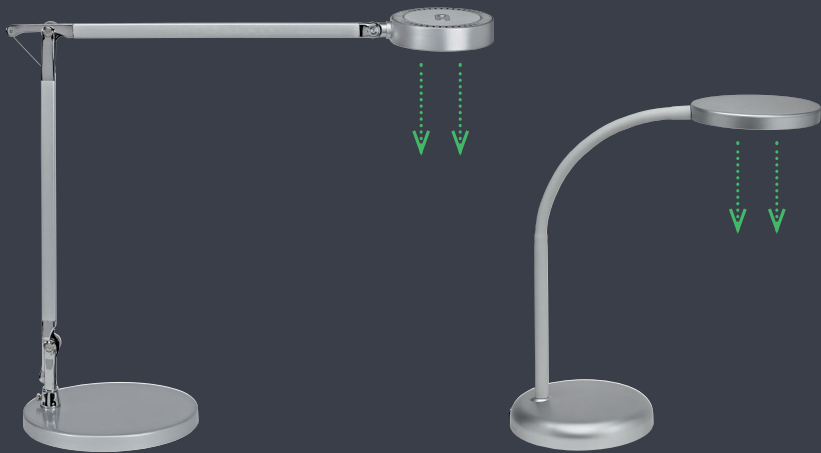
# » BASICS FOR BUYING LAMPS

What questions should I ask myself when buying a luminaire? You can find the answers here.



## FLOOR OR DESK LAMP?

A desk lamp directly illuminates the work surface. Floor lamps can do more, depending on the model: illuminate the desk directly and/or provide indirect general lighting by radiating upwards. With the combination of direct and indirect lighting, you create very good lighting conditions and are independent of your ambient lighting. More about this on page 7

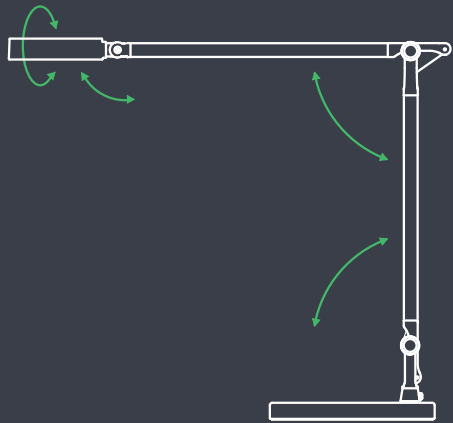


## DESK LAMP WITH SINGLE OR DOUBLE ARM?

A lamp with double arm has a large illumination radius on the work surface and thus provides shadow-free light from above which is useful e.g. for writing. Single arm lamps are usually compact and space saving which makes it easier to take them along.

## CLAMP OR BASE?

Whether desk or floor lamp: Lamps with clamp keep the desk surface free. Moreover, with height-adjustable desks, the distance between the light source and the desk (and thus the illuminance) always remains the same. Free standing lamps can be moved or repositioned more quickly if you change places or want the light to come from another side.



## MOVABLE?

The more you can move the arm or head of the lamp, the better the lighting angle can be adjusted. Joints that allow three-dimensional adjustment - i.e. in all directions - are optimal. This enables targeted lighting without glare.

## DESIGN UND COLOUR?

Whether purist, elegant or in your favourite colour: The only thing that counts is your personal taste and that the luminaire matches the working environment.



## HOW BRIGHT SHOULD THE LIGHT BE?

The lux value shows how bright it is directly on your work surface. It changes depending on the distance of the light source from the work surface, which can also be seen in the MAUL illuminance diagram. For writing and reading, for example, 500 to 1000 lux are recommended on the desk. The amount of light emitted by the lamp is indicated in lumens. Here is an orientation in comparison to an incandescent bulb:

Power in watts conventional incandes. bulb	25 W	40 W	60 W	75 W	100 W
Luminous flux in lumens LED	~249 lm	~470 lm	~806 lm	~1055 lm	~1521 lm

## WHICH LIGHTING TECHNOLOGY?

Go for modern lighting with LED technology. This gives you many design options and saves a lot of energy. Lamps with other lighting technologies are gradually being withdrawn from the market because they consume significantly more energy than LEDs.

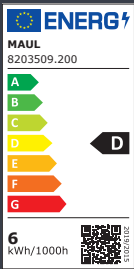
## WHICH LIGHT COLOUR DO I WANT?

The colour impression of light is indicated by the colour temperature in kelvins. The higher the colour temperature, the whiter the colour. Neutral white colour is recommended for reading, warm white creates a relaxed atmosphere for conversations or break times. Lamps with colour vario function allow you to adjust the colour temperature individually, according to how you feel, the time of day or the work task.



**Warm white** (2700-3300 K) is perceived as cosy and homely  
**Neutral white** (3300-5300 K) suitable for focused work at the desk, in the hobby room or office  
**Daylight white** (5300 - 7500 K) promotes concentration and enhances performance

## HOW MUCH ENERGY DOES THE LAMP CONSUME?



The indication in watts (W) tells you how much energy the light source consumes in operation. The lower the number, the less energy is needed. More meaningful is the look at the efficiency (amount of light in lumens per watt): The higher the energy efficiency, the more light you get for the power invested. You can quickly recognise the efficiency of a light source by looking at the label. Due to the new EU regulations, there are only the classes A-G since 1.9.2021. The EU has also tightened the criteria. Therefore, most light sources currently have the classes E to G. You can find tips on how to save energy on page 12.

## DIMMABLE?



With a dimmable lamp, you can adjust the intensity. For example, if you are working at a computer, it can make sense to dim the desk lamp. If you want to read something afterwards, the illuminance should be set to 100 percent again. Combined with a change in colour temperature, you can achieve different lighting moods. A pleasant side effect: by dimming, you save valuable energy and the light source lasts longer.

## WHAT DO THE TERMS ON THE PACKAGING MEAN? WHAT IS THE COLOUR RENDERING INDEX?

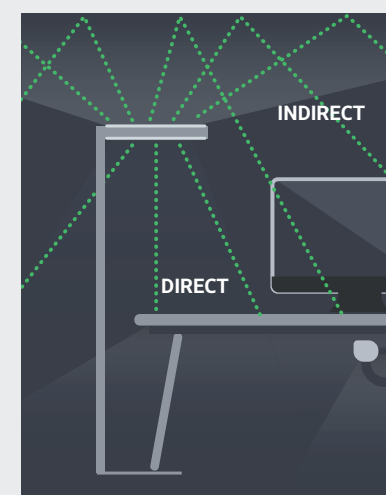
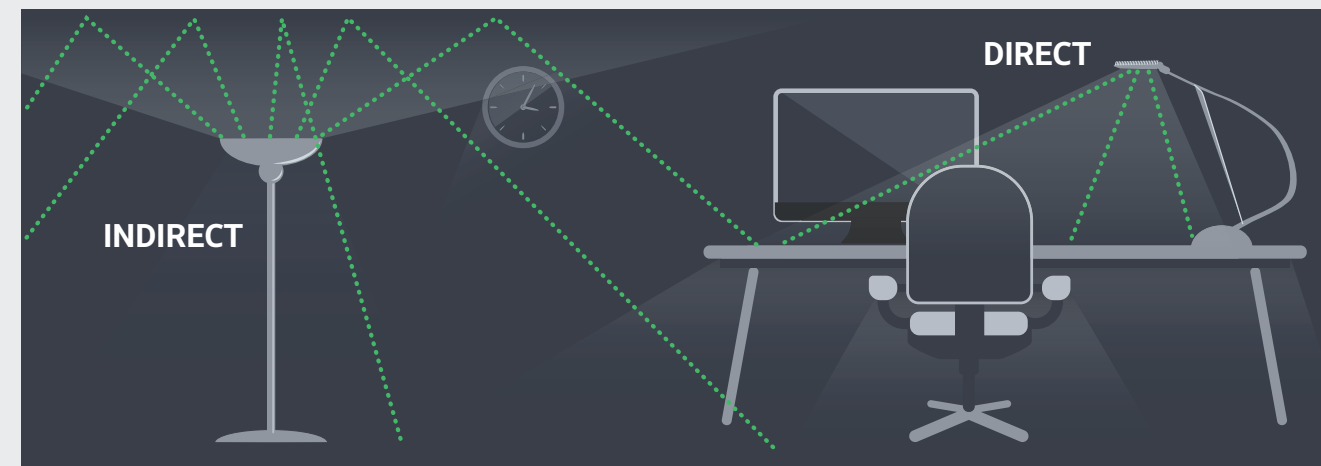
You can find answers to these questions and more interesting information in the **MAULglossary of lighting terms on page 10**





## » HOW TO LIGHT PROPERLY?

The more closely you adapt the light to your workplace situation, the better the result. The requirements differ greatly, as different illuminance levels are needed depending on the visual task, age, time of day and season.



Ambient conditions (daylight, room size, surface colour and texture, i.e. matt or glossy) also play a major role in the lighting effect.

There are various sets of rules for the ergonomic furnishing of a workplace.

### Rules and regulations for you to read:

- Technical Rules for Workplace Lighting ASR A3.4
- DIN EN 12464-1, Light and lighting - Lighting of work places - Part 1: Indoor work places

### They contain e.g. the following illuminance values:

- Filing, copying, traffic areas 300/500\* lx
- Writing, reading, data processing 500/1000\* lx
- Technical drawings 750/1500\* lx
- Laboratories, measuring stations 500/750\* lx
- At reception desk and counter 300/750\* lx

\* The second value takes special requirements into account, e.g. in low daylight, unusually low-contrast or small reading tasks, or when accuracy is required.

## THE OPTIMAL SOLUTION

**is a balanced combination of daylight, general lighting and individually controllable lights at the workplace. By combining indirect general lighting with direct workstation lighting, an optimal lighting situation can be achieved.**

### THE ADVANTAGES:

- At each workstation, the illuminance can be individually adjusted depending on the person and activity
- You can save energy by setting the basic lighting which is usually lower than the workplace lighting brighter only when needed (e.g. when someone passes by), especially in unused areas. Luminaires with sensors take care of this for you automatically.
- High flexibility for spatial changes
- No reflections or glare on the screens





## » GREATER SAFETY

The safety of lamps cannot be taken for granted. They can be unstably built, poorly wired or equipped with components of poor quality. The result can be a hazard to life and limb (e.g. electric shock, harmful substances, electromagnetic radiation, damage to the eyes) or higher energy consumption.

Buy your lamp from a reputable European supplier indicating a complete address after testing the stability of the lamp and checking it against the list below. Let the QR code on the energy label of the light source guide you to the EPREL database and check whether the manufacturer is verified and

the information is conclusive. This way you avoid safety risks and energy guzzlers.

**You are safe with lamps from MAUL.**

### THE MAUL TEST LABORATORY



We subject our prototypes to various tests on a mandatory basis, either in-house or at various test laboratories, institutes or universities. This enables us to provide answers to the following questions:

**MECHANICS / STRUCTURAL ANALYSIS:** Is the base stable? Is the clamp fitting sufficient? Can the hinges withstand frequent movement?

**ELEKTRONICS / SAFETY:** Is the insulation sufficient? How high is the electromagnetic radiation? Does the light pose a fire risk?

**OPTICS / SAFETY:** Does the lamp emit disturbing light? Does it lead to permanent eye damage? Is the light the right colour? Are colours of illuminated objects accurately reflected?

**SERVICE LIFE:** A durability test is performed on the light sources at our permanent testing laboratory. Performance data is determined in regular intervals e.g. the illuminance, light current or the temperature. Thanks to the durability tests, we are able to provide reliable information on the service life of our products.

Further tests carried out are the inspections of incoming goods in accordance with test procedures based on standards; spot checks, whereby lights are disassembled and checked for possible changes and uncertainties, alongside drop and packaging tests.

### UP-TO-DATE ON DIRECTIVES, LAWS, REGULATIONS AND STANDARDS

**MAUL conscientiously implements all of the more than 26 legal requirements and standards for luminaires.**

On request, you can find out in detail what these are for your lamp in our Declaration of Conformity, which every manufacturer must provide.

### OUR QUALITY PROMISE

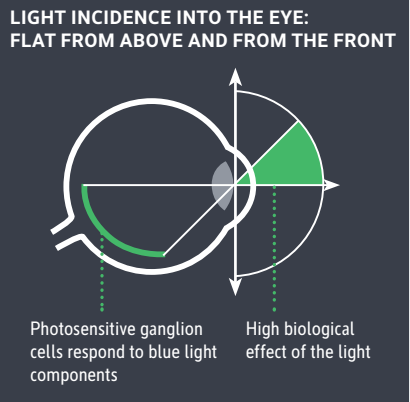
When you buy a MAUL lamp, you can be sure that it complies with the current safety standards and regulations - and that's for sure.



# » MAUL glossary of LIGHTING TERMS

## Biological effect of light

also called melanopic lighting effects or Human Centric Lighting (HCL), is designed to foster human health and well-being and can thus contribute to better mood and performance. It is modelled after natural daylight. During the day, high intensities of daylight white light (colour temperature from 5300 K) can stimulate concentration and performance. Prerequisite: The light must meet the eye from above and from the front (green area in the graphic). In contrast, light with a low proportion of blue (warm white light up to 3300 Kelvin) has a calming and relaxing effect, feelings of wellbeing are increased. A low intensity in the evening makes it easier to fall asleep.



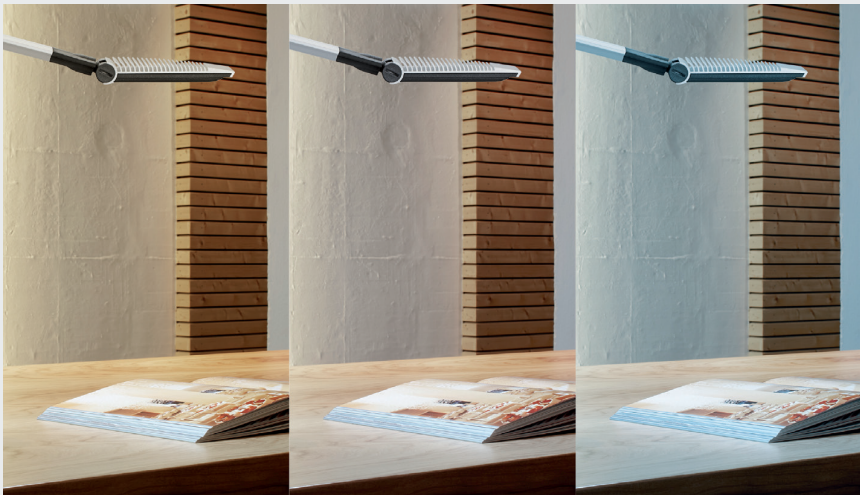
MAUL Colour Vario lamps can be dynamically adjusted in colour temperature and intensity to individual requirements, depending on the time of day (recommended illuminance at office workplaces at least 500 to 1500 lx).

## Colour rendering index (CRI) in Ra

is a measurement describing the quality of the colour reflection from a specific light source. A value of 100 corresponds to the best colour reflection, respectively natural colour reproduction. For the interior lighting, a value greater than 80 must be fulfilled.

## Colour temperature (CCT) in Kelvin (K)

indicates the hue of a specific type of light source. The values range from 2700 – 3300 K (warm white), 3300 – 5300 K (neutral white) to 5300 – 7500 K (daylight or cool white).



Warm white light  
2700 – 3300 Kelvin

Neutral white light  
3300 – 5300 Kelvin

Daylight white light  
5300 – 7500 Kelvin

## DIN EN12464-1 (DIN 5035-1)

is a European norm which defines the lighting needed for indoor workplaces to ensure the optimal visual comfort and performance. The DIN EN 12464-1 replaces the DIN 5035-1.

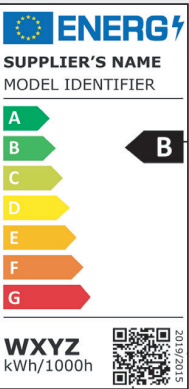
## DIN 5035-8

is a German industrial norm which defines the regulations for working places which exceed the regulations covered by DIN EN 12464-1. It determines the necessary documentation to be provided by the producer to ensure a competent lighting planning of the workplace.

## Directive ASR A3.4 (BGR 131)

This is a German directive concerning workplaces. It determines the specifications on setting up and using lighting devices at the workplace. The rule defines the minimum lighting level and the glare protection levels to ensure the health and safety of the employees. This rule is closely associated to the rules of the Employers Mutual Insurance Association (BGR 131). In addition MAUL offers helpful diagrams which should act as an aid in planning the working environment.

## Energy efficiency class



On the energy efficiency label the efficiency (light yield) is depicted with the letters from A for high efficiency to G for weak efficiency.

## Energy efficiency (η) (lamp or luminaire efficiency/light yield) in lumens per watt (lm/W)

is a measurement for the efficiency of an illuminant. It represents the relationship between the produced light current to the power consumption. The higher the energy efficiency, the more light one achieves for the invested power.

## Glare

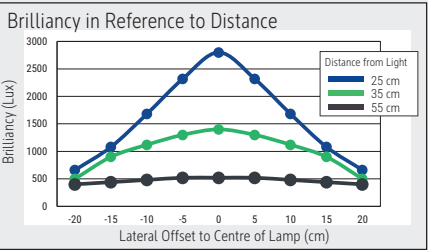
Basically there two forms of glare:

- **Disability glare** means the direct irradiation of light to the eye to a disturbing degree. Visual performance is directly affected. Due to the use of high-power LEDs in lighting technology, each manufacturer or importer must ensure that glare or even damage to the eye cannot occur under normal conditions.

- **Discomfort glare** is a perceived disturbance in full visual performance, e.g. due to a bright light or window, which impairs e.g. the ability to concentrate and the work performance.

Glare can impair safety, e.g. in staircase areas.

## Illuminance diagram



When looking at the picture you can see how much light falls on the desk depending on the distance between the luminaire and the desk. The vertical axis shows the illuminance (Lux) from the distances 25 cm (blue), 35 cm (green) and 55 cm (black) between luminaire head and desk. The highest illuminance is achieved at a distance of 0 cm on the horizontal axis (directly below the luminaire head) and reduces in accordance with the lateral offset.

## Illumination (E) in Lux (lx)

is a measure for the light quantity which falls on the lighted surface (1 lx = 1 lm/m²). The illumination level differs depending on the distance of the light source to the surface.

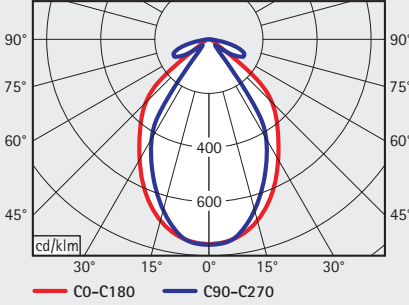
## Illuminant/lamp life (L<sub>70</sub>B<sub>50</sub>)

is the length of time in which 50% of the lamp bulbs of the same construction still function, or with LED light sources the length of time that at least 70% of the original lighting current is radiated.

## Lamp socket

There are many different sockets. In MAUL luminaires you can find the well-known Edison socket E27 for energy-saving and LED lamps. The sockets G23, G5 and 2G11 for fluorescent lamps without an electronic control gear and R7s for halogen light bulbs.

## Light distribution curve



The light distribution curve (or luminous intensity distribution curve) shows how the light emitted from the luminaire head is distributed in the room.

As an example, the space is shown in a simplified way on two levels: The red curve (C0,0 – C180,0) shows the lateral light distribution curve, the blue curve (C90,0 – C270,0) shows the longitudinal curve to the light source. 0° is the downward vertical of the light direction. Lighting planners can use this information to create and simulate lighting concepts because it is precisely defined for each lamp how it emits light into the room.

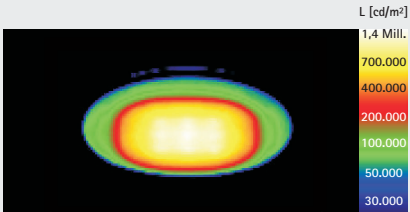
## Light intensity (I) in Candela (cd)

is a measurement for the strength of a light beam. It shows the fraction of visible light that is emitted in a specific direction (solid angle).

## Luminance (L) in Candela per square metre (cd/m²)

is a measure of the impression of brightness created when looking at the luminaire or an object. Typical values: Sun 1.600.000.000 cd/m², high power-LED 50.000.000 cd/m², fluorescent lamp 20.000 cd/m².

## Luminance distribution



In this diagram the brightness impression is shown as seen from a specific angle from the light bulb. When looking directly and vertically at the luminous surface, the viewing angle is 0°, and increases the more the lamp is viewed from the side, e.g. 60° (sideways from below).

## Luminous flux (Φ) in Lumen (lm)

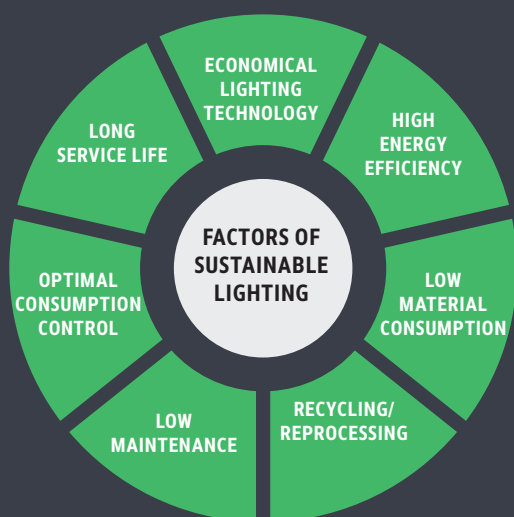
is the sum of all light which is emitted in all directions from a light source.





## » greener@work

### TIPS FOR ENERGY-SAVING LIGHTING



**Using light wisely is good for the environment and your budget. Here are a few suggestions on how to reduce energy usage:**

#### USE DAYLIGHT

Utilise the daylight, it saves money and creates a good atmosphere. Avoid glare when doing so. With dimmable lamps, you can reduce the brightness of the lamp whenever there is sufficient daylight.

#### TARGETED ILLUMINATION

Switch off the light when the daylight is sufficient or you are not at your desk. Lamps with sensors do this work for you and dynamically adjust the brightness to the available daylight. Be careful not to consume electricity in standby mode.

#### CHECK THE EFFICIENCY RATING:

Check the efficiency label and choose lamps with higher energy efficiency ratings.

#### USE LED TECHNOLOGY

Switch to LEDs. LEDs use more than 80 percent less energy than a conventional incandescent bulb.

#### CHOOSE LIGHT WALL COLOURS

Light walls absorb less light and reflect more than dark walls. But be aware: glossy surfaces can cause troublesome reflections.

#### DO NOT USE LAMPS WHICH HAVE PERMANENTLY FITTED BULBS

Bulbs (illuminants) do not last as long as lamps. Look for a model with replaceable light source.

#### PROPER DISPOSAL

Hand in LEDs at collection points for electrical appliances or recycling centres, because they contain valuable raw materials that can be reused. The same goes for energy-saving light bulbs as they contain small amounts of mercury. You can find more information about this at your consumer advice centre.