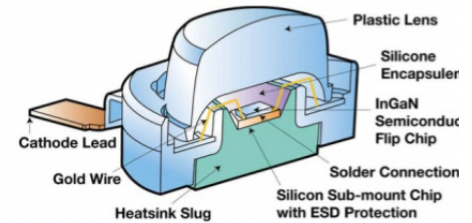


LED - A **light-emitting diode (LED)** is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

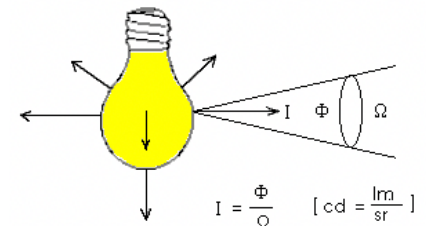


Luminous Flux - Total light output emitted by a light source without considering direction, measured in lumens (lm). This radiation could basically be measured or expressed in watt. This does not, however, describe the optical effect of a light source adequately, since the varying spectral sensitivity of the eye is not taken into account. To include the spectral sensitivity of the eye the luminous flux is measured in lumens and denoted by “lm”. Photopic luminous efficacy of radiation has a maximum possible value of 683lm/W, for the case of monochromatic light at a wavelength of approximately 555nm (green). 1W of monochromatic light at 555nm will be equivalent to 683 lumens.

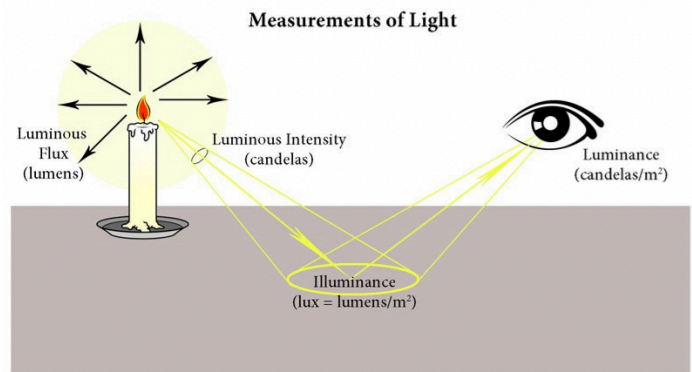


Luminous Intensity - Luminous flux (lumens) emitted in a particular direction per unit solid angle measured in “candela” (cd). Luminous intensity changes depending on the viewing angle. The luminous intensity of a lamp or luminaire is not equal in all directions. By plotting luminous intensity in the room (or in planes) around the lamp or luminaire, luminous intensity distribution can be defined. This offers a precise description of the photometric characteristics of the lamp or luminaire. Luminous intensity distribution is normally represented in the form of either a polar or linear diagram.

Illuminance - The total luminous flux incident on a surface, per unit area. The illuminance requirements of built environments are determined by their intended purpose, and there are two common units of measurement: **Lux** – equivalent to one lumen per square meter, and **Foot-candle** – equivalent to one lumen per square foot. Higher illuminance levels make surfaces appear brighter to the human eye and improve visibility.



Luminance - The brightness of an object or surface, as perceived by human eyesight from a specific direction. Luminance is measured in candelas per square meter (cd/m²). Luminance changes depending on the viewing angle, and high luminance values are the direct cause of glare



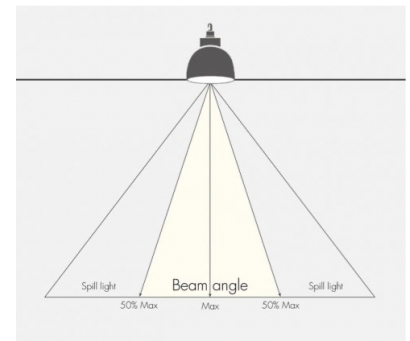
Luminous Efficacy is a measure of how well a light source produces visible light. It is the ratio of luminous flux to power, measured in lumens per watt. Luminous efficacy can be normalized by the maximum possible luminous efficacy to a dimensionless quantity called luminous efficiency.

Lighting (luminous) efficiency is the ratio between the total luminous flux emitted by a device and the total amount of input power (electrical, etc.) it consumes.

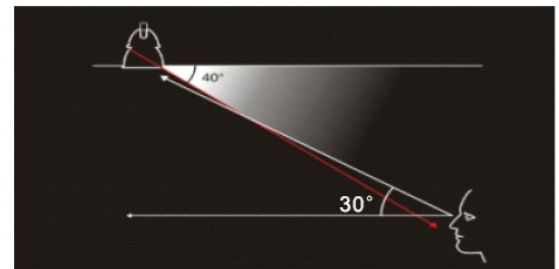
The distinction between *efficacy* and *efficiency* is not always carefully maintained in published sources, so it is not uncommon to see "efficiencies" expressed in lumens per watt, or "efficacies" expressed as a percentage.

The main difference between the luminous efficacy of radiation and the luminous efficacy of a source is that the latter accounts for input energy that is lost as heat or otherwise exits the source as something other than electromagnetic radiation. Luminous efficacy of radiation is a property of the radiation emitted by a source. Luminous efficacy of a source is a property of the source as a whole

Beam Angle – The beam angle, also known as beam spread, is a value that describes the downward light cone emitted by a lighting fixture with a reflector. The beam angle is measured between the downward direction, where the lamp provides maximum lighting intensity, and the direction in which intensity drops to 50%. In other words, a lamp with a large beam angle spread its lighting into a wider cone



Cutoff Angle – The angle between the vertical axis and the first line of sight at which the bare light source is not visible



Color Rendering Index (CRI) – A metric used to describe how faithfully a light source can render the true colors of objects and spaces, where natural light sources like the sun have a perfect index of 100. Using lamps with a high CRI value is very important in high-end interior design of art galleries, clothing stores, museums etc., as they enhance the visibility of decor and fine details



Correlated Color Temperature (CCT) – Color temperature of a light source is the temperature of an ideal black-body radiator (solid object with certain properties heated up to point of incandescence) that radiates light of comparable hue to that of the light source, and its temperature is expressed in Kelvins (K). As a black body gets hotter, wave length of light emits progress through a sequence of colors from red to blue.



Glare – Visual impairment caused by a bright source of light, directly visible or reflected by a surface. There are two types of glare:

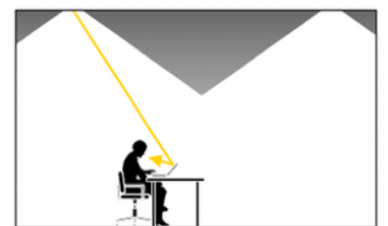
Direct (Discomfort) glare causes an instinctive reaction to close the eyes and look away. This is the type of glare felt when exposed to a potent light or when the sun is directly visible through a window

Direct glare



Reflected (Disability) glare impairs vision, but does not cause the same reaction as discomfort glare. If a light source gets reflected on your laptop screen, for example, it does not bother your eyes but distinguishing objects on the screen may be impossible

Reflected glare



UGR (Unified Glare Rating) – a method of calculating glare from luminaires, light through windows and bright light sources. The UGR rating helps to determine how likely a luminaire is to cause discomfort to those around it.

UGR is calculated by using an equation which takes into account a number of factors that may contribute to glare caused by a luminaire, such as the angle of the luminaire, the likelihood of glare and the lumen output.