

Appendix 2 GLOSSARY OF LIGHTING TERMS: Lighting

The following definitions for lighting terms are taken from the SLL “Code for Lighting” 2012, with additional definitions included to explain lighting technical terms included in the Lighting Impact Assessment.

Annual operating time

Number of hours per annum for which the lamps are operating (unit: h)

Astronomic Time Clock

See “Solar Time Clock” below.

Atmospheric luminance (Latm)

Light veil as a result of the scatter in the atmosphere expressed as a luminance (unit: $\text{cd}\cdot\text{m}^2$)

Average illuminance (\bar{E})

Illuminance averaged over the specified surface (unit: lx)

Average luminance (L)

Luminance averaged over the specified surface or solid angle (unit: $\text{cd}\cdot\text{cd}\cdot\text{m}^2$)

Brightness

Attribute of a visual sensation according to which an area appears to emit more or less light

Note: obsolete term – luminosity

Brightness contrast

Subjective assessment of the difference in brightness between two or more surfaces seen simultaneously or successively

Carriageway

Part of the road normally used by vehicular traffic

Chromaticity

Property of a colour stimulus defined by its chromaticity coordinates, or by its dominant or complementary wavelength and purity taken together.

CIE 1974 general colour rendering index (Ra)

Value intended to specify the degree to which objects illuminated by a light source have an expected colour relative to their colour under a reference light source

Note: Ra is derived from the colour rendering indices for a specified set of 8 test colour samples. Ra has a maximum of 100, which generally occurs when the spectral distributions of the light source and the reference light source are substantially identical.

Circuit luminous efficacy of a source (c)

Quotient of the luminous flux emitted by the power absorbed by the source and associated circuits (unit: $\text{lm}\cdot\text{W}$)

Colour contrast

Subjective assessment of the difference in colour between two or more surfaces seen simultaneously or successively

Colour rendering

Effect of an illuminant on the colour appearance of objects by conscious or subconscious comparison with their colour appearance under a reference illuminant
For design purposes, colour rendering requirements shall be specified using the general colour rendering index and shall take one of the following values of Ra: 20; 40; 60; 80; 90

Colour rendering index

See CIE 1974 general colour rendering index (above).

Colour stimulus

Visible radiation entering the eye and producing a sensation of colour, either chromatic or achromatic

Colour temperature (T_c)

Temperature of a Planckian radiator whose radiation has the same chromaticity as that of a given stimulus (unit: K) Note: The reciprocal colour temperature is also used, unit: K⁻¹

Contrast

1. In the perceptual sense: assessment of the difference in appearance of two or more parts of a field seen simultaneously or successively (hence: brightness contrast, lightness contrast, colour contrast, simultaneous contrast, successive contrast, etc)

2. In the physical sense: quantity intended to correlate with the perceived brightness contrast, usually defined by one of a number of formulae which involve the luminances of the stimuli considered, for example: $\Delta L/L$ near the luminance threshold, or L_1/L_2 for much higher luminances

Control gear

Components required to control the electrical operation of the lamp(s)

Note: Control gear may also include means for transforming the supply voltage, correcting the power factor and, either alone or in combination with a starting device, provide the necessary conditions for starting the lamp(s)

Correlated colour temperature (T_{cp})

Temperature of the Planckian radiator whose perceived colour most closely resembles that of a given stimulus at the same brightness and under specified viewing conditions (unit: K)

Note 1: The recommended method of calculating the correlated colour temperature of a stimulus is to determine on a chromaticity diagram the temperature corresponding to the point on the Planckian locus that is intersected by the agreed isotherm line containing the point representing the stimulus.

Curfew

Time period during which stricter requirements (for the control of obtrusive light) will apply

Note: It is often a condition of use of lighting applied by a government controlling authority, usually the local government

Cut-off

Technique used for concealing lamps and surfaces of high luminance from direct view in order to reduce glare Note: In public lighting, distinction is made between full-cut-off luminaires, semi-cut-off luminaires and non-cut-off luminaires

Cut-off angle (of a luminaire)

Angle, measured up from nadir, between the vertical axis and the first line of sight at which the lamps and the surfaces of high luminance are not visible (unit: degree)

Daylight

Visible part of global solar radiation

Diffused lighting

Lighting in which the light on the working plane or on an object is not incident predominantly from a particular direction

Direct lighting

Lighting by means of luminaires having a distribution of luminous intensity such that the fraction of the emitted luminous flux directly reaching the working plane, assumed to be unbounded, is 90 to 100 per cent

Directional lighting

Lighting in which the light on the working plane or on an object is incident predominantly from a particular direction

Disability glare

Glare that impairs the vision of objects without necessarily causing discomfort. Disability glare can be produced directly or by reflection

Discharge Lamp

Discharge lamps are a family of electric light sources that generate light by sending an electrical discharge through an ionized gas, a plasma. The character of the gas discharge depends on the pressure of the gas as well as the frequency of the current. Typically, such lamps use a noble gas (argon, neon, krypton and xenon) or a mixture of these gases. Most lamps are filled with additional materials, like mercury, sodium, and metal halides.

Discomfort glare

Glare that causes discomfort without necessarily impairing the vision of objects. Discomfort glare can be produced directly or by reflection

Downward light output ratio (of a luminaire) (RDLO)

Ratio of the downward flux of the luminaire, measured under specified practical conditions with its own lamps and equipment, to the sum of the individual luminous

fluxes of the same lamps when operated outside the luminaire with the same equipment, under specified conditions

Efficacy

See luminous efficacy of a source

Flicker

Impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time

Floodlighting

Lighting of a scene or object, usually by projectors, in order to increase considerably its illuminance relative to its surroundings

Flux

See luminous flux, rated lamp luminous flux

General colour rendering index

See CIE 1974 general colour rendering index

General lighting

Substantially uniform lighting of an area without provision for special local requirements

Glare

Condition of vision in which there is discomfort or a reduction in the ability to see details or objects, caused by an unsuitable distribution or range of luminance, or extreme contrasts See also disability glare and discomfort glare

High Pressure Sodium Lamp

A gas-discharge lamp that uses sodium in an excited state to produce light, commonly used in street lighting installations in the UK.

Illuminance

illuminance is the total luminous flux incident on a surface, per unit area, measured in lux (lx) or lumens per square metre.

Illuminance meter

Instrument for measuring illuminance

Intensity

See luminous intensity

Intensity distribution

See luminous intensity distribution

Lamp

Source made in order to produce an optical radiation, usually visible

Note: This term is also sometimes used for certain types of luminaires

Lamp luminous flux

See rated luminous flux

LED Lamp (Lighting Emitting Diode)

An LED lamp is a light-emitting diode (LED) product that is assembled into a lamp or an array designed for installation in a specific luminaire or lighting product. For exterior architectural lighting applications, good colour rendering white LED products are used. These systems typically use a blue (or violet) LED light source in conjunction with a phosphor to create white light.

Life of lighting installation

Period after which the installation cannot be restored to satisfy the required performance because of non-recoverable deteriorations

Light output ratio (of a luminaire) (RLO)

Ratio of the total flux of the luminaire, measured under specified practical conditions with its own lamps and equipment, to the sum of the individual luminous fluxes of the same lamps when operated outside the luminaire with the same equipment, under specified conditions

Light Pollution

Brightening of the night sky caused by street lights and other man-made sources, which has a disruptive effect on natural cycles and inhibits the observation of stars and planets.

Light source

See "Source"

Local lighting

Lighting for a specific visual task, additional to and controlled separately from the general lighting

Luminaire

Apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all of the parts necessary for fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply

Luminance (in a given direction, at a given point of a real or imaginary surface) (L)

A photometric measure of the luminous intensity per unit area of light travelling in a given direction. It describes the amount of light that passes through or is emitted from a particular area, and falls within a given solid angle. The SI unit for luminance is candela per square metre (cd/m^2).

Luminosity

See "Brightness"

Luminous efficacy of a source (g)

Quotient of the luminous flux emitted by the power absorbed by the source (unit: $\text{lm}\cdot\text{W}^{-1}$)

Luminous environment

Lighting considered in relation to its physiological and psychological effects

Luminous flux (W)

Quantity derived from radiant flux W_e by evaluating the radiation according to its action upon the CIE standard photometric observer (unit: lm)

Quantity derived from radiant flux (radiant power) by evaluating the radiation according to the spectral sensitivity of the human eye (as defined by the CIE standard photometric observer). It is the light power emitted by a source or received by a surface (unit: lumen, lm)

Luminous intensity (of a source, in a given direction) (I)

Luminous intensity of a source (lamp or luminaire) as a function of direction in space

Maintained illuminance (\bar{E}_m)

Minimum average illuminance (unit: lx)

Maintained luminance (L_m)

Minimum average luminance (unit: $\text{cd}\cdot\text{m}^{-2}$)

Note 1: Value below which the average luminance on the specified area should not fall

Note 2: It is the average luminance at the time maintenance should be carried out

Maintenance cycle

Repetition of lamp replacement, lamp/luminaire cleaning and room surface cleaning intervals

Maintenance factor

Ratio of the average illuminance on the working plane after a certain period of use of a lighting installation to the initial average illuminance obtained under the same conditions for the installation

Maximum illuminance (E_{max})

Highest illuminance at any relevant point on the specified surface (unit: lx)

Maximum luminance (L_{max})

Highest luminance of any relevant point on the specified surface (unit: $\text{cd}\cdot\text{m}^{-2}$)

Measurement field (of a photometer)

Area including all points in object space, radiating towards the acceptance area of the detector

Metal Halide Lamp

An electric lamp that produces light by an electric arc through a gaseous mixture of vaporised mercury and metal halides (compounds of metals with bromine or iodine). Metal halide lamps are similar to mercury vapour lamps, but contain additional metal halide compounds which improve the efficacy and colour rendering properties of the lamp. Ceramic metal halide lamps use ceramic arc tubes, similar to those used in

high pressure sodium lamps, which improve the colour consistency of the light source.

Minimum illuminance (E_{min})

Lowest illuminance at any relevant point on the specified surface (unit: lx)

Minimum luminance (L_{min})

Lowest luminance at any relevant point on the specified surface (unit: $cd \cdot m^{-2}$)

Mixed traffic

Traffic that consists of motor vehicles, cyclists, pedestrians, etc

Motor traffic (motorised traffic)

Traffic that consists of motorised vehicles only

Obtrusive light

Spill light which because of quantitative, directional or spectral attributes in a given context gives rise to annoyance, discomfort, distraction or reduction in the ability to see essential information

Note 1: In the case of outdoor sports lighting installations, obtrusive light is considered around the installation and not for spectators, referees or players within the sports area

Note 2: In the case of large tertiary buildings with predominantly glazed facades, interior lighting may be considered as obtrusive light if it gives rise to annoyance, discomfort, distraction or a reduction in the ability to see essential information due to light spilling outside of the building structure

Operating time (t)

Time period for the energy consumption (unit: h)

See also annual operating time

Principal area ($A_{Principal}$)

Actual playing area needed for the performance of a certain sport

Note: Usually this means the actual marked out 'field' area for that sport (for instance football), but in some cases, this area comprises an extra playing area around the marked area (e.g. tennis, volleyball, table tennis). The dimensions of the particular area should be checked at the time when a lighting installation is being installed

Performance

See visual performance

Photometer

Instrument for measuring photometric quantities

Photometry

The science of the measurement of light, in terms of its perceived brightness to the human eye.

PIR Detector (Passive Infra-Red Detector)

An electronic sensor that measures infrared (IR) light radiating from objects in its field of view. Used to identify motion within its field of view.

Reflections

See veiling reflections below.

Reflectance

The ratio of light reflected from a surface to that incident upon it

Shielding angle

The angle between the horizontal plane and the first line of sight at which the luminous parts of the lamps in the luminaire are directly visible (unit: degrees)

Note: The complementary angle to the shielding angle is named cut-off angle

Solar Time Clock

An electronic time-keeping device which measures the passage of time based on the Sun's position in the sky. The device calculates latitude and longitude coordinates and the current time/day of the year, automatically calculating the sunrise and sunset times.

Source (light source)

Object that produces light or other radiant flux

Note: The term light source indicates the source is essentially intended for illuminating and signalling purposes

Spacing (in an installation)

Distance between the light centres of adjacent luminaires of the installation

Spacing to height ratio

Ratio of spacing to the height of the geometric centres of the luminaires above the reference plane

Note: For exterior lighting, the reference plane is usually the ground

Spill light (stray light)

Light emitted by a lighting installation which falls outside the boundaries of the property for which the lighting installation is designed

Spotlighting

Lighting designed to increase considerably the illuminance of a limited area or of an object relative to the surroundings, with minimum diffused lighting

Surrounding area (immediate surrounding area)

Band surrounding the task area within the field of vision

Task area

Area within which the visual task is carried out

Traffic lane

Strip of carriageway intended to accommodate a single line of moving vehicles

Unified glare rating limit (RUGL)

Upper limit of glare by the CIE Unified Glare Rating system

Uniformity (luminance, illuminance) (U_o)

Ratio of minimum illuminance (luminance) to average illuminance (luminance) on (of) a surface.

Upward light output ratio (of a luminaire) (RULO)

Ratio of the upward flux of the luminaire, measured under specified practical conditions with its own lamps and equipment, to the sum of the individual luminous fluxes of the same lamps when operated outside the luminaire with the same equipment, under specified conditions

Note 1: Upward light output ratio is sometimes signified by the abbreviation ULOR

Note 2: The luminaire attitude should be declared so that appropriate corrections to the ULOR can be made if, in application, the installed attitude is different

Veiling luminance

See equivalent veiling luminance

Veiling reflections

Specular reflections that appear on the object viewed and that partially or wholly obscure the details by reducing contrast

Visual acuity

1. Qualitatively: capacity for seeing distinctly fine details that have very small angular separation

2. Quantitatively: any of a number of measures of spatial discrimination such as the reciprocal of the value of the angular separation in minutes of arc of two neighbouring objects (points or lines or other specified stimuli) which the observer can just perceive to be separate

Visual comfort

Subjective condition of visual well-being induced by the visual environment

Visual field

Area or extent of physical space visible to an eye at a given position and direction of view

Note: It should be stated whether the visual field is monocular or binocular

Visual performance

Performance of the visual system as measured for instance by the speed and accuracy with which a visual task is performed

Visual task

Visual elements of the activity being undertaken

Note: The main visual elements are the size of the structure, its luminance, its contrast against the background and its duration

Window

Daylight opening on a vertical or nearly vertical area of a room envelope