



Glossary

PLD machine lights

Quick explanation of key terms
in the field of lights and lighting

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PLD machine lights

With its PLD machine lights, Phoenix Contact offers LED lights that are particularly innovative. The communication interface, various control and mounting options, and the comprehensive portfolio enable optimum integration of this lighting solution in your machinery.

This glossary provides a concise explanation of the key terms in the field of lights and lighting.





Glossary

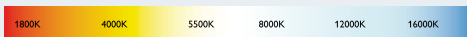
PLD machine lights

C

Candela
(candela, cd) Candela is the unit of (see) luminous intensity.

Color rendering index (CRI) The color rendering index (CRI) refers to a photometric value that can be used to describe the quality of the color rendering of light sources with the same correlated color temperature. The abbreviated German form denoting the color rendering index is R_a . Here, index a expresses the general color rendering index which only includes the values of eight test colors.

Color temperature
(Kelvin, K) The color temperature, which is measured in Kelvin, refers to the temperature that a heated black body (Planckian radiator) must exhibit in order for its emitted light to be perceived as comparable with the actual light present. For example, the glow wire of an incandescent lamp can be considered a black body.
The brighter the wire gets, the higher also the temperature. Depending on the time of day, sunlight has a color temperature of between 5000 and 5500 K.



D

Dimming Dimming is the adjustment of the brightness of lights.

DIN EN 1837

Title of standard: Safety of machinery – Integral lighting of machines

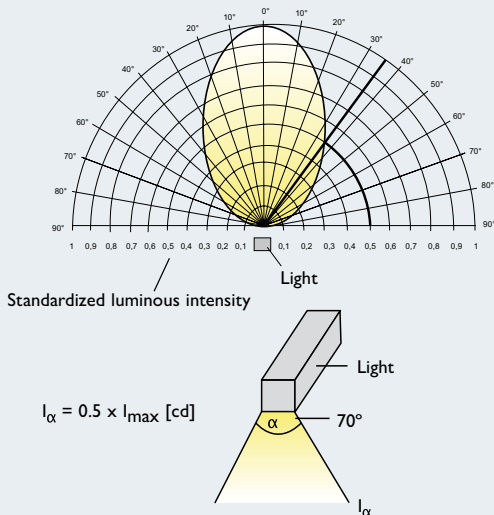
This standard specifies the parameters of integral lighting systems designed to provide illumination in and/or at both stationary and mobile machines to enable the safe use of the machine and the efficient performance of the visual task within and/or at the machine. This standard does not specify lighting systems mounted on the machine to specifically illuminate visual tasks outside the machine. The function and requirements of these systems are defined in the European standard dealing with the lighting of work places.

E**Efficiency**

See Luminous efficacy

Emission angle

The emission angle is a measurement for the area illuminated by the light. The reference edges when defining the emission angle are 50% of the maximum (see) luminous intensity.



G

Glare suppression (glare)

The glare from a light is suppressed by means of a matt glass pane, reflectors or ideally by means of integrated optics. Glare to the human eye is thereby reduced or prevented.

H

Homogenous light

Homogenous light refers to uniform illumination.

I

IEC/EN 60598-1 (VDE 0711-1) Title of standard: Luminaires – Part 1: General requirements and tests

This standard covers issues and topics such as luminaire classification and markings, external and internal wiring, ground conductor connection, protection against electric shock, resistance to dust, foreign objects, and water, insulation resistance, creepage distances and clearances, endurance testing, resistance to heat, fire, and tracking, screw terminal blocks, and screwless terminal blocks. Test methods are described for the individual requirements.

IEC/EN 62471-1 (VDE 0837-471) Title of standard: Photobiological safety of lamps and lamp systems

This standard provides guidance on examining the photobiological safety of lamps and lamp systems, including luminaires. Specifically it specifies the exposure limits, reference measurement technique, and classification scheme for the evaluation and control of photobiological hazards from all electrically powered incoherent broadband sources of optical radiation, including LEDs but excluding lasers, in the wavelength range from 200 nm through 3000 nm.

**IEC/EN 62493
(VDE 0848-493)**

Title of standard: Assessment of lighting equipment related to human exposure to electromagnetic fields

This standard sets out the procedure for assessing general public exposure to electromagnetic fields generated by luminaires. The standard does not deal with electromagnetic compatibility, it is a safety standard and, like the EMF generic standard, is listed under the Low Voltage Directive. The standard applies to luminaires and independent components that are independent of lamps as well as to luminaires with LEDs.

**IEC/PAS 62722-1
(DIN EN 62722-1)**

Title of standard: Luminaire performance – Part 1: General requirements

The standard imposes specific performance and environmental requirements on luminaires incorporating electric light sources for operation from supply voltages up to and including 1000 V where claims of operational performance are made. Unless otherwise detailed, performance data covered under the scope of this standard applies for luminaires in a condition representative of new manufacture, with any specified initial aging procedures completed. Part 1 contains requirements for luminaires to support energy-efficient use and responsible environmental management to the end of their service life. The purpose of Part 1 is to provide a range of requirements that are considered to be generally applicable to most types of luminaires.

**IEC/PAS 62722-2-1-E
(DIN EN 62722-2-1)**

Title of standard: Luminaire performance – Part 2-1: Particular requirements for LED luminaires

This standard specifies the performance requirements for LED luminaires, together with the test methods and conditions required to demonstrate compliance with this standard. It applies to LED luminaires for general lighting purposes where claims of operational performance are made.

**Illuminance
(lux, lx)**

The illuminance depends on the distance from the light source. It corresponds to the (see) luminous flux per illuminated area ($1 \text{ lx} = 1 \text{ lm/m}^2$) and can be converted into the (see) luminous flux and (see) luminous intensity. For example: two lights that have the same luminous flux but differing emission angles have different illuminance values at the same distance. The lights with the lower emission angle achieve higher illuminance. The larger the area with the same luminous flux, the lower the illuminance.

K**Kelvin**

Among other things, the Kelvin is the unit of (see) color temperature.

L**LED**

An LED (light-emitting diode) is an electronic semiconductor component which, when current flows, emits light in the conducting direction.

LED service life For LED service life, a distinction is made between two types of service life: average service life and useful life. Average service life indicates the number of hours it took for 50% of the LEDs in a test group to fail. Useful life indicates the number of hours it takes until an LED emits just 70% (L70) or 50% (L50) of the measured initial luminous flux.

Lumen (lm)

Lumen is the unit of (see) luminous flux.

**Luminance
(cd/m²)**

The brightness of a luminous or illuminated area as perceived by the human eye is referred to as luminance (L). The luminance is calculated from the (see) luminous intensity per area (cd/m^2).

**Luminous efficacy
(lumen/watt,
lm/W)**

Luminous efficacy is a measure of the efficiency of a lighting appliance or light. It is expressed in lumens per watt (lm/W).

**Luminous flux
(lumen, lm)**

The luminous flux corresponds to the total radiant flux (luminous power) of a light source, irrespective of the direction of light. The luminous flux is therefore referenced when calculating the (see) luminous efficacy.

Example: the luminous flux of a household candle is approximately 12 lm and of a 60 W incandescent lamp approximately 700 lm.

**Luminous intensity
(candela, cd)**

Luminous intensity is a characteristic of the light source and therefore does not depend on the distance from the light source, but rather the direction of the emitted light. It is the radiant flux of a light source per (see) solid angle, weighted with the spectral sensitivity of the eye; i.e., the (see) luminous flux per solid angle (1 cd = 1 lm/sr).

Measuring the luminous intensity in candelas over the total solid angle in steradian (sr) gives the luminous flux of the light source in lumen (lm).

Example: a candle, which emits light in all directions, has a luminous intensity of 1 cd, a 60 W incandescent lamp has approximately 55 cd.

Lux (lx)

Lux is the unit of (see) illuminance.

P

Planckian radiator

A Planckian radiator (black body) is an idealized body. It absorbs all incident electromagnetic radiation (e.g., light) completely.

It is not only an ideal source of thermal radiation, which emits electromagnetic radiation (e.g., light) with a characteristic spectrum that is determined by the temperature alone and used as the basis for theoretical observations, but also a reference for practical investigations of electromagnetic radiation (e.g., color temperature).

R

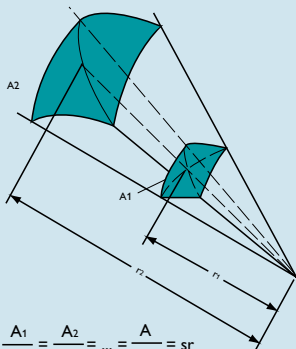
R_a value See Color rendering index (CRI)

Regulation No. 245/2009
+ No. 237/2010 The purpose of this EU regulation is the implementation of Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for fluorescent lamps without integrated ballast, for high-intensity discharge lamps, and for ballasts and luminaires able to operate such lamps, and the repeal of Directive 2000/55/EC of the European Parliament and of the Council. Supplement 237/2010 resulted from requirements governing LED luminaires.

S

Solid angle (steradian, sr)

The solid angle is a three-dimensional angle expressed by the unit steradian (sr). A solid angle of 1 sr encloses an area of 1 m² on a sphere with a radius of 1 m. As the entire surface of the sphere occupies a surface area of $S = 4 \times \pi \times r^2$, the corresponding full solid angle is 12.57 sr.



$$W = \frac{A_1}{r_1^2} = \frac{A_2}{r_2^2} = \dots = \frac{A}{r^2} = \text{sr}$$

V

VDE 0711-1 See IEC/EN 60598-1

VDE 0837-471 See IEC/EN 62471-1

VDE 0848-493 See IEC/EN 62493

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