



SLOVENSKI STANDARD

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Nadomešča:

SIST EN 13032-2:2005

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Svetloba in razsvetljava - Merjenje in podajanje fotometričnih podatkov svetlobnih virov in svetilk - 2. del: Podajanje podatkov za delovna mesta v notranjih prostorih in na prostem

Light and lighting - Measurement and presentation of photometric data of lamps and luminaires - Part 2: Presentation of data for indoor and outdoor work places

Licht und Beleuchtung - Messung und Darstellung photometrischer Daten von Lampen und Leuchten - Teil 2: Darstellung der Daten für Arbeitsstätten in Innenräumen und im Freien

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Lumière et éclairage - Mesure et présentation des données photométriques des lampes et luminaires - Partie 2 : Présentation des données utilisés dans les lieux de travail intérieurs et extérieurs

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Light and lighting - Measurement and presentation of photometric data of lamps and luminaires - Part 2: Presentation of data for indoor and outdoor work places

Lumière et éclairage - Mesure et présentation des
données photométriques des lampes et luminaires -
Partie 2: Présentation des données utilisés dans les
lieux de travail intérieurs et extérieurs

Licht und Beleuchtung - Messung und Darstellung
photometrischer Daten von Lampen und Leuchten -
Teil 2: Darstellung der Daten für Arbeitsstätten in
Innenräumen und im Freien

This European Standard was approved by CEN on 18 September 2017.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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EN 13032-2:2017 (E)**European foreword**

This document (EN 13032-2:2017) has been prepared by Technical Committee CEN/TC 169 “Light and lighting”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13032-2:2004.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

There are many lighting solutions that can satisfy the lighting criteria specified in EN 12464-1 and EN 12464-2. To design these solutions, photometric data of the equipment are required. The equipment may include the commonly used general purpose luminaires as well as uplighters, wall washers, adjustable directional lights, floodlights, desk lights, etc. This document specifies the required data.

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EN 13032-2:2017 (E)**1 Scope**

This European Standard specifies the required data for lamps and luminaires for the verification of conformity to the requirements of EN 12464-1 and EN 12464-2. It also specifies data that are commonly used for lighting of indoor and outdoor work places. When these data are provided, they should conform to this document.

An increasing number of luminaires mainly those with LED are luminaires with non-replaceable light sources. Therefore data should always be given for luminaires. For luminaires with replaceable lamps, lamp data should also be provided.

NOTE Product, safety and performance data can be found in CENELEC documents (see Bibliography).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12464-1, *Light and lighting — Lighting of work places — Part 1: Indoor work places*

EN 12464-2:2014, *Light and lighting — Lighting of work places — Part 2: Outdoor work places*

EN 12665, *Light and lighting — Basic terms and criteria for specifying lighting requirements*

EN 13201-3, *Road lighting — Part 3: Calculation of performance*

CIE 117, *Discomfort glare in interior lighting* [SIST EN 13032-2:2018
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3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12665 and the following apply.

3.1 lamp energy efficiency class
energy efficiency class assigned to the lamp in accordance with the energy efficiency index defined in Reg. 874/2012

3.2 luminaire lumen maintenance factor

F_{LuLM}
ratio of luminous flux of a luminaire at a given time in the life to the initial luminous flux

Note 1 to entry: The luminaire lumen maintenance factor is applied like the lamp lumen maintenance factor but only to luminaires having non replaceable lamps.

3.3**luminaire survival factor** F_{Lus}

fraction of the total number of luminaires which continue to operate at a given time under defined conditions

Note 1 to entry: The luminaire survival factor includes the built-in control gear and is therefore not equivalent to the lamp survival factor.

3.4**upward flux fraction**

ratio of the upward flux to the total flux of a luminaire

3.5**downward flux fraction**

ratio of the downward flux to the total flux of a luminaire

4 Luminaire data**4.1 General**

Data shall be provided for luminaires with replaceable and non-replaceable lamps.

4.2 Essential luminaire data**4.2.1 General**

The following luminaire data shall be provided for verification where applicable.

4.2.2 Luminaire code**4.2.3 Dimensions of the luminous parts of the luminaire**

The dimensions of those parts of the luminaire, from which light is emitted to produce the luminous intensity values, shall be given in m or m².

NOTE For further information see CIE 117:1995, Annex C.

4.2.4 Luminaire luminous flux

For luminaires the rated luminous flux of the luminaire shall be given.

NOTE 1 For guidance on providing LED luminaire rated flux see EN 13032-4:2015, Clause 4 and Annex E.

NOTE 2 For luminaires with replaceable lamps, the rated luminous flux of the luminaire can be derived by multiplying the rated luminous flux of the lamp by the light output ratio (LOR) of the luminaire. If the ballast(s) of the luminaire mention(s) a ballast lumen factor (BLF) value, it is advised in this case to multiply first LOR by the BLF value. For guidance see also EN 13032-1.

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4.2.5 Luminous intensity table

The intensity table shall be given either as absolute or as normalized luminous intensity table.

- a) Absolute luminous intensity table: Absolute luminous intensity data (in candela (cd)) of a lamp or a luminaire (equipped with a lamp or lamps of specified type and power) shall be given as a table. Lamp type and rated power shall be declared.
- b) Normalized luminous intensity table: Normalized luminous intensity data of a luminaire (equipped with a lamp or lamps of specified type and power) shall be given as a table, normalized to a luminous flux of 1 000 lm and provided in candela per kilolumen ($\text{cd} \cdot \text{klm}^{-1}$). The source of the normalization shall be stated (lamp or luminaire).

The minimum number of C-planes and γ -angles at which the I-values shall be presented, is given in Tables 1 and 2.

Table 1 — Number of C-planes for various intensity distributions

Luminous intensity distribution	C-planes
Radially symmetric	One C-plane
Symmetric about two planes	Every 15° from 0° to 90°
Symmetric about one plane	Every 15° from 0° to 180° or every 15° from 90° to 270°
Asymmetric	Every 15° from 0° to 360°

Table 2 — Number of γ -angles for various types of luminaires

Type of luminaire	Downward Flux Fraction F_{DF}	γ -angles
Downlighting	> 0,9	Every 5° from 0° to 90°
Downlighting with upward component	0,1 to 0,9	Every 5° from 0° to 180°
Uplighting	< 0,1	Every 5° from 90° to 180°

For floodlights, both used in indoor and outdoor lighting installations, the measurement and presentation of the normalized I-table might be in B- β instead of C- γ notation.

For TI-calculations (see EN 12464-2:2014, Table 3) the data as required in EN 13201-3 shall be provided.

NOTE 1 The Downward Flux Fraction F_{DF} is the ratio of the Downward Light Output Ratio R_{DLO} and the Light Output Ratio R_{LO} of the luminaire: $F_{DF} = R_{DLO}/R_{LO}$ (see also 4.3.5).

NOTE 2 Luminaires with a concentrated intensity distribution might require more angles at which the luminous intensity data are present (e.g. every 1° in the area where 90 % of the luminous flux is emitted).

NOTE 3 Data at finer intervals might be required for more accurate calculations and for lighting software involving visualizations.

4.2.6 Luminance table

The table shall give the average luminaire luminance (at maximum lumen output) at elevation angles γ of 65°, 70°, 75°, 80° and 85° from the downward vertical in C-planes as specified in Table 1.

4.2.7 Unified Glare Rating

For unified glare rating (UGR) data presentation the tabular method as described in CIE 117 shall be used.

Manufacturers publishing UGR tables shall declare the spacing to height ratios (SHR) used in calculations.

NOTE 1 For determining UGR, the reference plane for SHR calculation is at eye level (1,2 m above the floor).

NOTE 2 The condition 4H/8H and reflectances of ceiling/walls/floor of 0,7/0,5/0,2 taken from the UGR table is often used as a reference.

4.2.8 Ballast lumen factor

When the electrical performance of the ballast, used in the photometric measurements, deviates more than 5 % from standard, then a ballast lumen factor (BLF) shall be specified.

4.2.9 Shielding angle

Data shall be provided as specified in EN 12464-1.

4.2.10 Rated luminaire power (P_r)

The rated luminaire power refers to the maximum power during the operating life of the luminaire.

4.2.11 Luminaire lumen maintenance factor

The luminaire lumen maintenance factor is only applicable for luminaires with non-replaceable lamps. Otherwise the lamp lumen maintenance factor shall be used.

To generate an optimal maintenance schedule it is recommended to give the data for the luminaire lumen maintenance factor in a table.

NOTE 1 The data for the luminaire lumen maintenance factor can be presented as a graph or in a table.

NOTE 2 The luminaire maintenance factor F_{LM} is not included in luminaire lumen maintenance factor.

4.2.12 Luminaire survival factor

The luminaire survival factor is only applicable for luminaires with non-replaceable lamps. Otherwise, the lamp survival factor shall be used.

To generate an optimal maintenance schedule it is recommended to give the data for the luminaire survival factor in a table.

NOTE The data for the luminaire survival factor can be presented as a graph or in a table.