BRITISH STANDARD

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Measurement and presentation of photometric data of lamps and luminaires —

Part 3: Presentation of data for emergency lighting of work places

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ICS 17.180.20; 29.140.40; 91.160.10

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 13032-3:2007. It supersedes BS 5225-3:1982 which is withdrawn.

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Foreword

This document (EN 13032-3:2007) 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of an identical text or by endorsement, at the latest by April 2008, and conflicting national standards shall be withdrawn at the latest by April 2008.

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Introduction

This standard is to be used in conjunction with EN 13032-1. Emergency lighting is required by National Regulations in a number of European countries. This standard specifies the required data for emergency lighting as required by EN 1838.

For the application of this document the terms according to IEC 60050 also applies.

1 Scope

This standard specifies the required data for lamps and luminaires to verify conformity with EN 1838. This standard does not define the data requirements for signage, as these can be found in EN 1838.

2 Normative references

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

EN 13032-1, *Light and lighting - Measurement and presentation of photometric data of lamps and luminaires - Part 1: Measurement and file format*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

NOTE This clause defines terms and quantities that are in use and important to this standard, and which may not be given in IEC 60050.

3.1
correction factor
factor to modify the luminaire data as presented on a particular photometric data sheet to those of similar luminaires (for example: Ballast Lumen Factor, length, lumen corrections)

3.2
essential data
lamp and luminaire data required for the verification of conformity to the requirements of EN 1838

3.3
lamp code
any combination of letters and numbers by which the lamp type is identified

3.4
lamp dimensions
all dimensions of the lamp that are relevant for the luminaire

3.5
luminaire code
any combination of letters and numbers by which the luminaire type is identified

3.6
nominal lamp wattage (W_{lamp})
approximate wattage used to designate or identify the lamp

NOTE The nominal lamp wattage is also (incorrectly) known as rated lamp wattage.

3.7
useful data
lamp and luminaire data beneficial to the designers and users in the planning and operation of lighting installations

3.8
emergency ballast lumen factor (EBLF)
ratio of the luminous flux of the lamp supplied by the emergency ballast to the luminous flux of the same lamp operated with the appropriate reference ballast at its rated voltage and frequency. The emergency ballast lumen factor is the minimum of the values measured at the appropriate time after failure of the normal supply and continuously to the end of the rated time

$$EBLF = BLF \times F_{TIME} \quad (1)$$

3.9
F_{TIME}
minimum light output values measured during the emergency operating time period

3.10
practical emergency lamp flux (PELF)
lowest luminous flux of the lamp observed during the rated duration of the emergency mode

$$PELF = LDL \times EBLF \quad (2)$$

where

LDL is the initial lighting design lumens at 100 h as declared by the manufacturer

4 Essential lamp data

The following lamp data shall be provided for verification:

a) lamp code;

b) lamp dimensions;

c) luminous flux (*LDL*);

d) lamp lumen maintenance factor (*LLMF*);

NOTE 1 The lamp lumen maintenance factor may be presented both as a graph or data in a table. However, to allow the designer to set up an optimal maintenance scheme, it is recommended to present these data in tabular form.

e) lamp survival factor (*LSF*);

NOTE 2 The lamp survival factor may be presented as a graph or as data in a table. However, to allow the designer to set up an optimal maintenance scheme, it is recommended to present these data in tabular form.

f) general colour rendering index (R_a);

g) nominal lamp wattage (W_{lamp}).

5 Luminaire data

5.1 Essential luminaire data

5.1.1 Luminaire code

5.1.2 Normalized intensity table

The tabulated luminous intensity values normalized to a total bare lamp flux in the luminaire of 1 000 lm shall be given in cd.klm^{-1}. The light intensity shall be declared for an ambient temperature of 25 °C and nominal voltage of the emergency ballast and measured in accordance with EN 13032-1. It shall take into account the thermal behaviour of the lamp in the luminaire due to the temperature generated by all the components inside the luminaire. An appropriate thermal correction factor shall be applied if the luminous intensity has been measured in other conditions e.g. with another ballast.

These values (cd/1 000 lm) permit calculation of the Light Output Ratio (*LOR*) of the luminaire.

For luminaires with multiples lamps where light intensity distribution of the luminaire can be different when not all lamps are operated in the emergency mode, the distribution for emergency mode shall be reported.

The number of *C*-planes and γ-angles at which the *I*-values shall be specified, is given in Table 1 and Table 2.

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

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

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

Type of luminaire	Downward Flux Fraction (*DFF*)	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 used in indoor and/or outdoor lighting installations, the measurement and presentation of the normalised *I*-table may be in *B*-β instead of *C*-γ notation.

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

5.1.3 Luminaire maintenance factors (*LMF*)

All data shall be declared.

NOTE The luminaire maintenance factor (*LMF*) may be presented as a graph or as data in a table. However, to allow the designer to set up an optimal maintenance scheme, it is recommended to present these data in tabular form.

5.1.4 Luminaire service correction factors (*LSCF*)- all data shall be declared

5.1.4.1 Temperature correction if operated in an ambient other than 25 ^{o}C.

5.1.4.2 Cable voltage correction factor (central systems) for luminaires operating at voltages other than rated voltage.

5.2 Useful luminaire data

5.2.1 Physical dimensions of the luminaire

The physical dimensions, which are basically the length and width or diameter of the luminaire and its height, shall be provided.

5.2.2 Intensity diagram

The intensity distribution shall be presented as a graph and is mainly intended to provide a first impression of the shape of the luminous intensity distribution. The graph may be in any form (e.g. polar, Cartesian, etc.).

5.2.3 Spacing tables

If pre-calculated spacing of the luminaires is provided by the manufacturer, all correction factors and assumptions shall be declared (see Annex A).

NOTE 1 For uplighting, the ceiling can be treated as part of the luminaire for the first reflection.

NOTE 2 The Downward Flux Fraction (*DFF*) is the ratio of the Downward Light Output Ratio (*DLOR*) and the Light Output Ratio (*LOR*) of the luminaire: *DFF* = *DLOR/LOR*.

Annex A
(informative)

Illuminance calculation on a horizontal plane from a point source

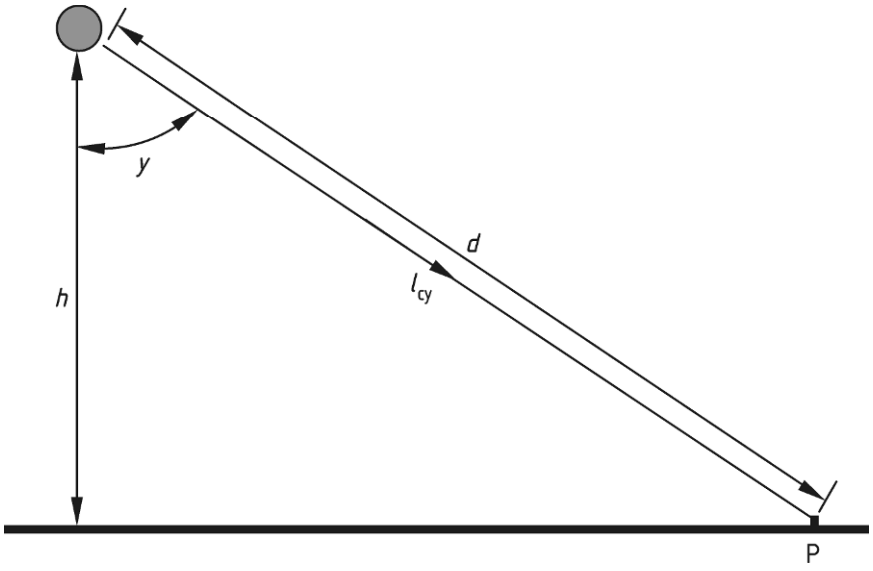

Figure A.1

Illuminance curves show the variation of illuminance along a straight line, these curves can be produced for a particular height or they may be produced as relative diagrams with the distance from the light source expressed in terms of the mounting height (*h*).

The horizontal illuminance at point *P* on the floor is given by the following formula:

$$E_p = \frac{I_{cy}}{d^2}\cos y = \frac{I_{cy}}{h^2}\cos^3 y \qquad \text{(A.1)}$$

where

$$I_{cy} = I_{cy}\text{normalized} \times \frac{\text{PELF}}{1000} \times \text{LLMF} \times \text{LMF} \times \text{LSF} \qquad \text{(A.2)}$$

E is the horizontal illuminance at point *P* (lux);

$I_{\theta\phi}$ is the intensity from the luminaire at elevation θ and azimuth ϕ (candelas);

h is the height of the luminaire above the floor (metres);

d is the distance from the luminaire to point *P* (metres);

y is the angle between the downward vertical and point *P* at the centre of the luminaire;

c is the horizontal plane;

γ is the vertical plane.

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[10] The Workplace Directive (89/654)

[11] The Signs Directive (90/664)

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