2005

БДС	**БЪЛГАРСКИ СТАНДАРТ**	**БДС**
	ПРИЛОЖНО ОСВЕТЛЕНИЕ. АВАРИЙНО И ЕВАКУАЦИОННО ОСВЕТЛЕНИЕ	**EN 1838**

ICS 91.160.10

Българският стандарт БДС EN 1838 е одобрен от председателя на Българския институт за стандартизация на 2005-01-31.

Европейският стандарт EN 1838:1999 е въведен чрез потвърждаване за прилагане като български стандарт.

054-0016172-2

Национален № за позоваване БДС EN 1838:2005

НАЦИОНАЛЕН ПРЕДГОВОР

Този стандарт е приет за въвеждане чрез потвърждаване за прилагане като български стандарт от ТК 54.

Следват 12 страници на EN 1838:1999

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1838

April 1999

ICS 91.160.10

English version

Lighting applications - Emergency lighting

Eclairagisme - Eclairage de secours

Angewandte Lichttechnik - Notbeleuchtung

This European Standard was approved by CEN on 22 March 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 1838:1999 E

Contents

Foreword

This European Standard 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of an identical text or by endorsement, at the latest by October 1999, and conflicting national standards shall be withdrawn at the latest by October 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

It is intended to replace in part national standards relating to emergency lighting luminous requirements. It should be read in conjunction with the standards being produced by CEN/TC 169 WG7 "Measurement and presentation of photometric data" and in conjunction with prEN 50172 "Emergency escape lighting systems".

Users of this EN, prepared in the field of application of Article 118 A of the EC Treaty, should be aware that standards have no formal legal relationship with Directives which may have been made under Article 118 A of the Treaty. In addition, national legislation in the Member states may contain more stringent requirements than the minimum requirements of a Directive based on Article 118 A. Information on the relationship between the national legislation implementing Directives based on Article 118 A and this EN may be given in a national foreword of the national standard implementing this EN.

Introduction

Emergency lighting is provided for use when the supply to the normal lighting fails and is therefore powered from a source independent of that supplying the normal lighting.

For the purposes of this standard emergency lighting is regarded as a generic term of which there are a number of specific forms, as shown in figure 1.

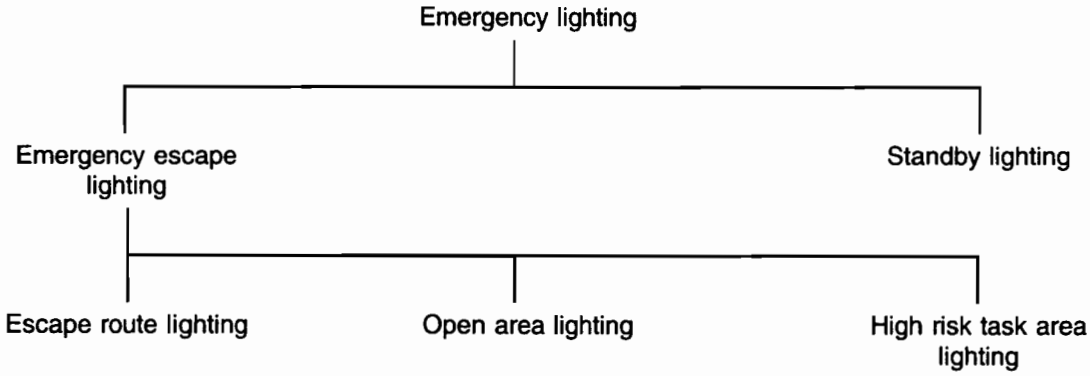


Figure 1: Specific forms of emergency lighting

The requirements given in this standard are a minimum for design purposes and are calculated for the full rated duration period and end of design life of the equipment; the contribution to illumination by reflected light is ignored.

The overall objective of emergency escape lighting is to enable safe exit from a location in the event of failure of the normal supply.

The objective of escape route lighting is to enable the safe exit from a location for occupants by providing appropriate visual conditions and direction finding on escape routes and in special locations, and to ensure that fire fighting and safety equipment can be readily located and used.

The objective of open area (anti-panic) lighting is to reduce the likelihood of panic and to enable safe movement of occupants towards escape routes by providing appropriate visual conditions and direction finding. The flow of light for escape routes or open areas should be downward to the working plane but illumination should also be provided to any obstruction up to 2 m height above that plane.

The objective of high risk task area lighting is to contribute to the safety of people involved in a potentially dangerous process or situation and to enable proper shut down procedures to be carried out for the safety of other occupants of the location.

There are emerging techniques that when applied to escape routes in addition to conventional emergency lighting luminaires can enhance their effectiveness in an emergency. These techniques are not included in this standard.

Vision varies from person to person, both by the amount of light required to perceive an object clearly and in the time taken to adapt to changes in the illuminance. In general, older people need more light and take a longer time to adapt to low illuminance on a hazard or escape route.

Much anxiety and confusion can be alleviated by strategically placed signs indicating the way out of a location. It is very important that exits are clearly signposted and are visible, whenever the location is occupied.

1 Scope

This standard specifies the luminous requirements for emergency lighting systems installed in premises or locations where such systems are required. It is principally applicable to locations where the public or workers have access.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited in the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 60598-2-22	Luminaires – Part 2-22: Particular requirements – Luminaires for emergency lighting (IEC 60598-2-22:1997,modified)
prEN 50172	Emergency escape lighting systems
ISO 3864 : 1984	Safety colours and safety signs
IEC 50 - Chapter 845	International Electrotechnical Vocabulary - Chapter 845:Lighting

3 Definitions

For the purposes of this standard the following definitions apply:

3.1 emergency lighting: Lighting provided for use when the supply to the normal lighting fails. [IEC 50 - Chapter 845]

3.2 escape route: A route designated for escape in the event of an emergency.

3.3 emergency escape lighting: That part of emergency lighting that provides illumination for the safety of people leaving a location or attempting to terminate a potentially dangerous process before doing so.

3.4 escape route lighting: That part of emergency escape lighting provided to ensure that the means of escape can be effectively identified and safely used when the location is occupied.

3.5 open area lighting (in some countries known as anti-panic lighting): That part of emergency escape lighting provided to avoid panic and provide illumination allowing people to reach a place where an escape route can be identified.

3.6 high risk task area lighting: That part of emergency escape lighting that provides illumination for the safety of people involved in a potentially dangerous process or situation and to enable proper shut down procedures for the safety of the operator and other occupants of the premises.

3.7 stand-by lighting: That part of emergency lighting provided to enable normal activities to continue substantially unchanged. [IEC 50 - Chapter 845]

3.8 emergency exit: A way out that is intended to be used during an emergency.

3.9 safety sign: A sign which gives a general safety message, obtained by a combination of colour and geometric shape and which, by the addition of a graphic symbol of text, gives a particular safety message. [ISO 3864 : 1984]

3.10 externally illuminated safety sign: A sign that is illuminated, when it is required, by an external source.

3.11 internally illuminated safety sign: A sign that is illuminated, when it is required, by an internal source.

4 Emergency escape lighting

4.1 General

To provide visibility for evacuation purposes lighting is required in the volume of the space. In this standard the recommendation is fulfilled by the mounting of luminaires at least 2 m above the floor. Signs which are provided at all exits intended to be used in an emergency and along escape routes shall be illuminated to indicate unambiguously the route of escape to a point of safety.

Where direct sight of an emergency exit is not possible, an illuminated directional sign (or series of signs) shall be provided to assist progression towards the emergency exit.

An escape lighting luminaire complying with EN 60598-2-22 shall be sited to provide appropriate illuminance near each exit door and at positions where it is necessary to emphasize potential danger or safety equipment. The positions to be emphasized shall include the following:

a) at each exit door intended to be used in an emergency;
b) near (see note) stairs so that each flight of stairs receives direct light;
c) near (see note) any other change in level;
d) mandatory emergency exits and safety signs;
e) at each change of direction;
f) at each intersection of corridors;
g) outside and near to each final exit;
h) near (see note) each first aid post;
i) near (see note) each piece of fire fighting equipment and call point.

Positions denoted as h) or i) if not on the escape route nor in an open area shall be illuminated to 5 lx minimum on the floor.

NOTE: For the purposes of this clause 'near' is normally considered to be within 2 m measured horizontally.

4.2 Escape route lighting

4.2.1 For escape routes up to 2 m in width, the horizontal illuminances on the floor along the centre line of an escape route shall be not less than 1 lx and the central band consisting of not less than half of the width of the route shall be illuminated to a minimum of 50 % of that value.

NOTE 1: Wider escape routes can be treated as a number of 2 m wide strips or be provided with open area (anti-panic) lighting.

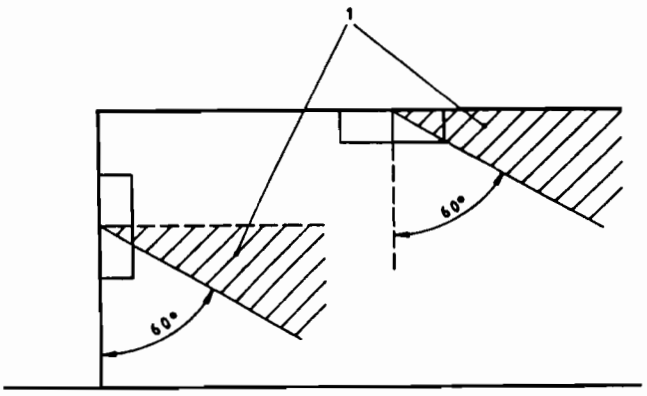
NOTE 2: Countries requiring different lighting levels are given in annex B.

4.2.2 The ratio of the maximum to the minimum illuminance shall not be greater than 40:1 along the centre line of the escape route.

4.2.3 Disability glare shall be kept low by limiting the luminous intensity of the luminaires within the field of view.

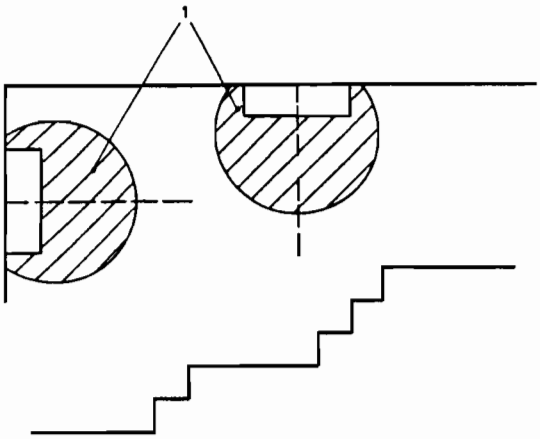
For level horizontal escape routes the luminous intensity of the luminaires shall not exceed the values in table 1 within the zone 60° to 90° from the downward vertical at all angles of azimuth (see figure 2).

For all other escape routes and areas, the limiting values shall not be exceeded at all angles (see figure 3).



1 glare zone

Figure 2



1 glare zone

Figure 3

NOTE: High contrast between a luminaire and its background can produce glare. In escape route lighting the main problem will be disability glare, in which the brightness of the luminaires can dazzle and prevent obstructions or signs being seen.

Table 1: Disability glare limits

Mounting height above floor level h m	Escape route and open area (anti-panic) lighting maximum luminous intensity I_{max} cd	High risk task area lighting maximum luminous intensity I_{max} cd
h < 2,5	500	1 000
2,5 ≤ h < 3,0	900	1 800
3,0 ≤ h < 3,5	1 600	3 200
3,5 ≤ h < 4,0	2 500	5 000
4,0 ≤ h < 4,5	3 500	7 000
h ≥ 4,5	5 000	10 000

4.2.4 In order to identify safety colours the minimum value for the colour rendering index R_a from a lamp shall be 40. The luminaire shall not substantially subtract from this.

4.2.5 The minimum duration of the illumination of the emergency escape lighting allowed for escape purposes shall be 1 h.

4.2.6 The emergency escape route lighting shall reach 50 % of the required illuminance level within 5 s and full required illuminance within 60 s.

Compliance with clauses 4.2.1 to 4.2.4 and 4.2.6 can be checked by measurement or by comparison with authenticated data from a supplier.

4.3 Open area (anti-panic) lighting

4.3.1 The horizontal illuminance shall be not less than 0,5 lx at the floor level of the empty core area which excludes a border of 0,5 m of the perimeter of the area.

4.3.2 The ratio of the maximum to the minimum anti-panic area lighting illuminance shall not be greater than 40:1.

4.3.3 Disability glare shall be kept low by limiting the luminous intensity of the luminaires within the field of view. These shall not exceed the values in Table 1 within the zone 60° to 90° from the downward vertical at all angles of azimuth (see figure 2).

4.3.4 In order to identify safety colours, the minimum value for the colour rendering index R_a from a lamp shall be 40. The luminaire shall not substantially subtract from this.

4.3.5 The minimum duration allowed for escape purposes shall be 1 h.

4.3.6 The anti-panic area lighting shall reach 50 % of the required illuminance within 5 s and full required illuminance within 60 s.

Compliance with clauses 4.3.1 to 4.3.4 and 4.3.6 can be checked by measurement or by comparison with authenticated data from a supplier.

4.4 High risk task area lighting

4.4.1 In areas of high risk the maintained illuminance on the reference plane shall be not less than 10 % of the required maintained illuminance for that task, however it shall be not less than 15 lx. It shall be free of harmful stroboscopic effects.

4.4.2 The uniformity of the high risk task area lighting illuminance shall be not less than 0,1.

4.4.3 Disability glare shall be kept low by limiting the luminous intensity of the luminaires within the field of view. These shall not exceed the values in Table 1 within the zone 60° to 90° from the downward vertical at all angles of azimuth.

4.4.4 In order to identify safety colours, the minimum value for the colour rendering index R_a of a lamp shall be 40. The luminaire shall not substantially subtract from this.

4.4.5 The minimum duration shall be the period for which the risk exists to people.

4.4.6 High risk task area lighting shall provide the full required illuminance permanently or within 0,5 s depending upon application.

Compliance with clauses 4.4.1 to 4.4.4 and 4.4.6 can be checked by measurement or by comparison with authenticated data from a supplier.

4.5 Stand-by lighting

When stand-by lighting is used for emergency escape lighting purposes it shall comply with the relevant requirements of this standard.

Where a stand-by lighting level lower than the minimum normal lighting is employed, the lighting is to be used only to shut down or terminate processes.

5 Safety signs

Safety signs for emergency escape and first aid signs shall meet the following requirements:

> NOTE: Attention is drawn to the requirement for the format of the sign boards for safety signs specified in the Council Directive 92/58/EEC of 24 June 1992 on the minimum requirements for provision of safety and/or health signs at work.

5.1 Safety signs shall be illuminated to at least 50 % of the required luminance within 5 s and full required luminance within 60 s.

5.2 The colours shall conform to the requirements of ISO 3864.

5.3 The luminance of any area of safety colour of the sign shall be at least 2 cd/m^2 in all relevant viewing directions (see annex A).

5.4 The ratio of the maximum to the minimum luminance within either white or the safety colour shall be not greater than 10:1.

NOTE: High variation of adjacent points should be avoided.

5.5 The ratio of the luminance L_{white} to the luminance L_{colour} shall be not less than 5:1 and not greater than 15:1 (see annex A).

5.6 As an internally illuminated sign is discernible at a greater distance than an externally illuminated sign of the same size the maximum viewing distance (see figure 4) shall be determined by use of the following equation:

$$d = s \cdot p \qquad (1)$$

where:

d is the viewing distance;
p is the height of the pictogram;
s is a constant: 100 for externally illuminated signs; 200 for internally illuminated signs.

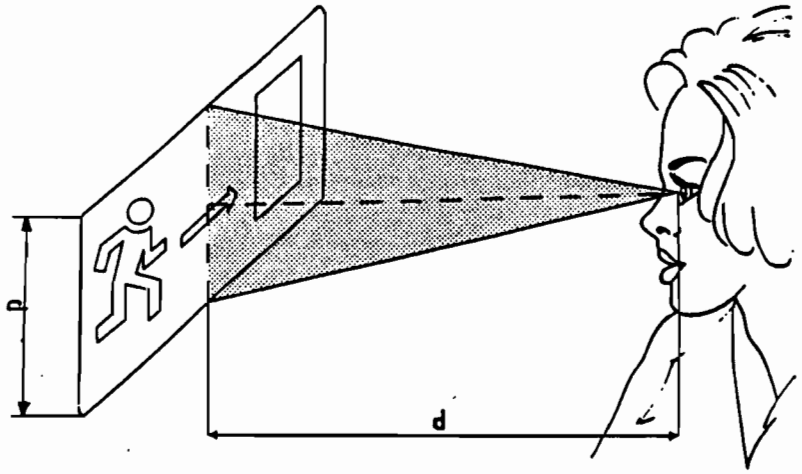


Figure 4: Viewing Distance

Annex A (normative)

Luminance and illuminance measurements

A.1 Luminance measurements of signs

Luminances are measured normal to the surface over a 10 mm diameter patch for each coloured surface of the sign.The minimum and maximum luminance is measured over the areas of each colour.For the coloured background a 10 mm wide outer border is excluded from the measurements. In order to determine the luminance ratio between two adjacent colours the luminance measurement should be taken at a distance of 15 mm on either side of the junction of the two colours. A search shall be made for the maximum and minimum ratios. If the area of colour is less than 30 mm the patch size shall be reduced.

For safety signs with a shortest side less than 100 mm the diameter of the patch size and the width of the excluded border shall be reduced to not less than 10 % of that shortest side.

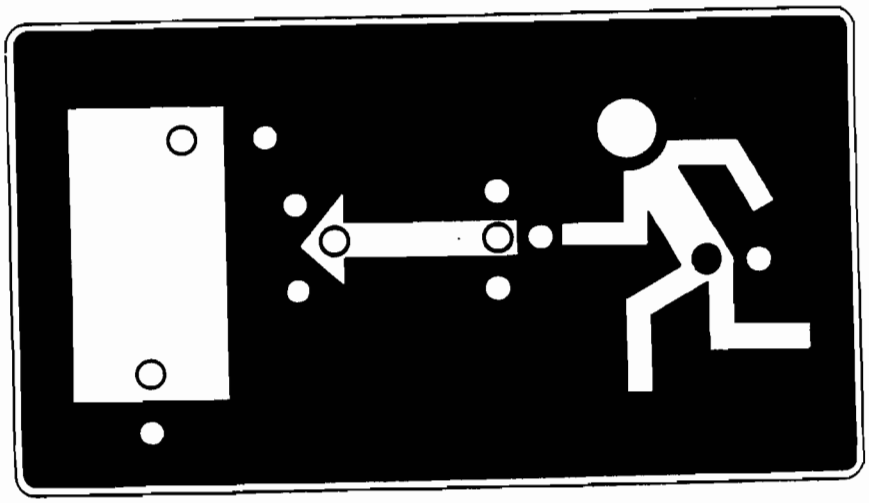


Figure A.1: Typical example of measurement positions

A.2 Instrumentation for site measurement

All illuminance measurements shall be made with a cosine photopic V(λ) – corrected meter and all luminance measurements shall be made with a photopic V(λ) – corrected meter.

The meter shall have an error tolerance not exceeding 10 %.

The measurement may be taken up to 20 mm height above the floor.

Annex B (informative)

Countries requiring different light levels

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN/CENELEC member.

This European Standard does not fall under any Directive of the EC.

In the relevant CEN/CENELEC countries these A-deviations are valid instead of the provisions of the European Standard until they have been removed.

Clause	Deviation
1	**France**[1])
	Certified products are mandatory with defined performances. Illuminance and luminance design principles are not used.
4	**Italy**[2])
	For cinemas, theatres and similar locations the minimum illuminance level measured at 1 m above the floor shall be 5 lx in proximity to the stairs and Exit doors. A minimum illuminance of 2 lx is required along escape routes. Where defined illuminance levels are required by law, they shall not be considered as design values but actual measured values including reflectance and available when emergency lighting is required.
4.1	**France**[1])
	g), h) and i) are not included in the French requirements.
4.2	**France**[1])
	On escape routes, certified emergency luminaires must be installed with a spacing of not more than 15 m (30 m in schools).
4.2.1	**Ireland** (S.I. No. 497 of 1997)
	I.S. 3217 : 1989 "Code of Practice for Emergency Lighting". Clause 4.2.1 *Defined escape routes*: The horizontal illuminance at floor level on the centre line of a clearly defined escape route shall be not less than 0,5 lx.
	United Kingdom (SI No. 1065, SI No. 2179, SI No. 1709)
	BS 5266 : Part 1 : 1988 "Emergency Lighting". Clause 4.2.1 *Defined escape routes*: The horizontal illuminance at floor level on the centre line of a defined escape route should be not less than 0,2 lx. In addition for escape routes up to 2 m wide 50 % of the route width should be lit to a minimum of 0,1 lx. Wider escape routes can be treated as a number of 2 m wide bands.

---

[1]) The deviations from France are based on the following national regulations:

Règlement de sécurité contre l'incendie dans les ERP, arrêté du 25 juin 1980 modifié, livre II, chapitre VIII, section III.

Arrêté du 10 novembre 1976 relatif aux circuits et installations de sécurité dans les établissements soumis au code du travail.

[2]) The deviation from Italy is based on the following national regulations:

Decree of the Ministry of the Interior dtd. 1986-02-01 (Garages)
Decree of the Ministry of Transport dtd. 1988-01-11 (Underground)
Decree of the Ministry of the Interior dtd. 1992-08-26 (Schools)
Decree of the Ministry of the Interior dtd. 1994-04-09 (Hotels)
Decree of the Ministry of the Interior dtd. 1996-03-18 (Sport premises)
Decree of the Ministry of the Interior dtd. 1996-08-19 (Cinemas, theatres and public entertainment)

4.2.6/4.3.6 **Germany** (§ 7 Abs. 4 der Arbeitsstättenverordnung und der Arbeitsstätten-Richtlinie ASR 7/4)

The period between the failure of the normal lighting when the electric supply fails and the reaching of the required illuminance shall last not longer than 15 s.

4.2.6 **Ireland** (S.I. No. 497 of 1997)

I.S. 3217 : 1989 "Code of Practice for Emergency Lighting". Clause 4.2.6 *Response time*: The emergency lighting specified in this code should be provided within 5 s of the failure of the normal lighting supply.

United Kingdom (SI No. 1065, SI No. 2179, SI No. 1709)

BS 5266 : Part 1 : 1988 "Emergency Lighting". Clause 4.2.6 *Response time*: The emergency lighting detailed in this code should be provided within 5 s of the failure of the normal lighting supply, but at the discretion of the enforcing authority this period can be extended to a maximum of 15 s in premises likely to be occupied for the most part by persons who are familiar with them and the escape routes.

4.3 **France** [3])

Certified emergency lighting products must provide 5 lm/m^2 of floor area. To achieve adequate uniformity, the luminaire must be spaced less than 4 times their mounting height (with minimum two products in a room).

4.4 **France** [3])

These categories are not included in the French requirements which are risk based.

5 **France** [3])

The French regulation refers to the French Standard NF 08-003 (or other European countries equivalent standards).

General **France** [3])

The photometric approach with illuminance is not used in building open to the public and in work places.

United Kingdom (SI No. 1129, SI No. 1125)

CP 1007 : 1955 "Maintained lighting for cinemas". Clause 322

---

[3]) see footnote [1])

Annex C (informative)

Bibliography

prEN 12665	Lighting applications – Basic terms and criteria for specifying lighting requirements
prEN 12193	Lighting applications – Sports lighting
CEN/TC169/WG 6	Lighting applications – Tunnel lighting
prEN 13032-1	Lighting applications – Measurement and presentation of photometric data of lamps and luminaires – Part 1 : Measurement
ISO 6309	Fire protection – Safety signs