

# Road lighting —

## Part 1: Guide to the general principles

# Committees responsible for this British Standard

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- Automobile Association
- British Lighting Association for the Preparation of Standards (Britlaps)
- British Precast Concrete Federation Ltd.
- Chartered Institution of Building Services Engineers
- Council for the Protection of Rural England
- County Surveyors' Society
- Department of Transport
- Institution of Civil Engineering Surveyors
- Institution of Civil Engineers
- Institution of Electrical Engineers
- Institution of Lighting Engineers
- Institution of Mechanical Engineers
- Lighting Industry Federation Ltd.
- Royal Fine Art Commission
- Scottish Office (Building Directorate)

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## Foreword

This Part of BS 5489 has been prepared under the direction of the Electrical Illumination Standards Policy Committee and is a new edition of BS 5489-1:1987, which is withdrawn.

This is Part 1 of a series of standards and indicates general principles associated with codes of practice for lighting roads of various degrees of importance, e.g. road junctions, roundabouts, bridges and underpasses, on which the other Parts are based.

Subsequent Parts deal in detail with the lighting of particular categories of road.

The 1987 edition became necessary following the decision to revise other Parts of BS 5489 to bring them more into line with international road lighting philosophy. This meant a change in emphasis in certain sections of this Part of BS 5489.

This edition introduces technical changes but it does not reflect a full review or revision of the standard, which will be undertaken in due course. It introduces a revised definition of maintenance factor and incorporates editorial improvements.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

## 1 Scope

This Part of BS 5489 gives guidance on the general principles of road lighting on which the other Parts are based. It covers recommendations relating to the aesthetic and technical requirements of road lighting and a general explanation of the principles involved. It also covers maintenance and operation. When using this code of practice, BS 5649-2 should be consulted in order to determine the relation between nominal height and mounting height and overhang and projection.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

## 2 Definitions

For the purposes of BS 5489 the definitions given in BS 6100-2.4.1 apply, together with the following.

NOTE Definitions specific to a particular Part are given in that Part.

### 2.1

#### arrangement

the pattern according to which luminaires are sited in plan, e.g. staggered, opposite, single side and twin central

### 2.2

#### average luminance (of the road surface)

the average luminance over a defined area of the road surface viewed from a specified observer position

### 2.3

#### design attitude (of a luminaire)

the disposition of a luminaire in space, usually indicated by a diagram or by reference to a datum axis such as the spigot entry

### 2.4

#### design spacing

the required spacing between luminaire, calculated as specified in the various Parts of BS 5489, for a straight and level section of the particular type of road

NOTE The particular types of road are identified in the individual Parts of BS 5489.

### 2.5

#### design table

a table for a specified luminaire giving data that enables spacing, threshold increment and surround ratio to be determined for a range of geometries

### 2.6

#### disability glare

glare that impairs vision

### 2.7

#### discomfort glare

glare that causes visual discomfort

### 2.8

#### effective width (WE)

a notional distance, related to the width of the carriageway, the luminaire overhang and the arrangement, used to simplify the design tables

### 2.9

#### equivalent veiling luminance

luminance that is, in effect, superimposed on the visual scene as a result of bright areas in the field of view

NOTE Equivalent veiling luminance is used in the calculation of disability glare where it is represented by the symbol  $L_v$ .

### 2.10

#### geometry (of a lighting system)

the interrelated linear dimensions and characteristics of the system, i.e. spacing, mounting height, effective width, overhang and arrangement

### 2.11

#### light distribution

the distribution of luminous intensity from a luminaire in various directions in space

### 2.12

#### longitudinal uniformity ratio (of luminance) (UL)

the ratio of the minimum to the maximum luminance along a longitudinal line through the observed position on the carriageway

### 2.13

#### low threshold increment (LTI)

a classification applied to a luminaire when the threshold increment it produces is not greater than 15 % for at least 90 % of the geometries quoted in each of the design tables for that luminaire

### 2.14

#### moderate threshold increment (MTI)

a classification applied to a luminaire when it does not fall into the LTI category and the threshold increment it produces is not greater than 30 % for at least 90 % of the geometries quoted in each of the design tables for that luminaire

### 2.15

#### mounting height

the nominal vertical distance between the photometric centre of a luminaire and the surface of the carriageway

**2.16****overall uniformity ratio (of luminance) (UO)**

the ratio of the minimum to the average luminance over a defined area of the road surface viewed from a specified observer position

**2.17****overhang**

the distance measured horizontally between the photometric centre of a luminaire and the adjacent edge of a carriageway. The distance is taken to be positive if the luminaires are in front of the edge and negative if they are behind the edge

NOTE For installation purposes, the centre of a lamp or lamps may be regarded as the photometric centre of a luminaire.

**2.18****set back**

the shortest distance from the forward face of a column to the edge of a carriageway

**2.19****spacing**

the distance, measured parallel to the centreline of the carriageway, between successive luminaires in an installation

NOTE In a staggered installation, the distance is measured parallel to the centreline of the carriageway, between a luminaire on one side of the carriageway and the next luminaire on the other side of the carriageway.

**2.20****surround ratio (SR)**

the ratio of the average illuminance on a strip 5 m in width beside the carriageway to the average illuminance on the adjacent 5 m strip of carriageway

**2.21****threshold increment (TI)**

a notional measure of the effect of disability glare from street luminaires

NOTE The formula from which it is calculated is based on the percentage increase in the luminance of the road surface that would be needed to make an object just visible in the presence of glare when it is just visible in the absence of glare, i.e. where the luminaires are screened from the observer.

**2.22****initial luminous flux of lamp**

the luminous flux of a lamp in lumens after an initial ageing period under stated running conditions

**2.23****lamp flux maintenance factor**

the proportion of the initial luminous flux of a lamp that is produced after a set time

**2.24****luminaire maintenance factor**

the light output ratio of a luminaire after a set time in service divided by its initial light output ratio

**2.25****initial light level**

the light level of an installation with new and clean luminaires fitted with lamps having initial luminous flux

NOTE Light level may be quantified by horizontal illuminance or luminance, or any other appropriate lighting quantity.

**2.26****maintained average light level**

the average light level below which the performance of an installation is not allowed to fall and is the product of the initial light level, the luminaire maintenance factor and the lamp flux maintenance factor or the initial light level and the maintenance factor

**2.27****maintenance factor (MF)**

the product of the lamp flux maintenance factor and the luminaire maintenance factor

NOTE For the purposes of calculation of road surface luminance, it is assumed that there is no depreciation of the reflection of the road surface.

**2.28****full cut off (FCO) luminaire**

a classification applied to a luminaire, which, when installed at the specified design attitude gives zero intensity at and above the horizontal

NOTE Such a luminaire may have a further classification with respect to TI.

**3 Classification of installations****3.1 Basis of lighting requirements**

The level and type of lighting adopted for a road are based mainly on its traffic importance but should also take into account other relevant factors. These include the presence of factories or public resorts, use by public service vehicles, the character of the road, e.g. whether the road is a shopping area or a trunk road in open country, aesthetic considerations, the properties of the carriageway surface and the existence of crests, bends, long straight stretches, adjacent cycleways and footways and overhanging trees.

**3.2 Classification**

For the purposes of BS 5489, road lighting is classified into the nine groups given below.

- a) Lighting for traffic routes (BS 5489-2).
- b) Lighting for subsidiary roads and associated pedestrian areas (BS 5489-3).