

Specification for

Illuminance meters

ICS 17.180.20

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
Documents

AVA

Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee CPL/34/5, Photometry and Light Classification, upon which the following bodies were represented:

- British Lighting Association for the Preparation of Standards (BRITLAPS)
- Chartered Institute of Building Service Engineers (Lighting Division)
- Department of Trade and Industry (National Physical Laboratory)
- GAMBICA (BEAMA Ltd.)
- Institution of Civil Engineers
- Institution of Electrical Engineers
- Lighting Industry Federation Ltd.

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 October 1996

© BSI 1996

First published December 1945
Second edition February 1968
Third edition October 1996

The following BSI references relate to the work on this standard:
Committee reference CPL/34/5
Draft for comment 95/202995 DC

ISBN 0 580 26236 7

Amendments issued since publication

Amd. No.	Date	Text affected

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
Specification	
Introduction	1
1 Scope	1
2 Definitions	1
3 Classification	1
4 Digital ranges and readouts	2
5 Analogue scales	2
6 Calibration and testing temperature	2
7 Power supply	2
8 Performance requirements for laboratory and field illuminance meters	2
9 Marking	3
Annexes	
A (informative) Guidance on choice of meter range	4
B (normative) Calibration	4
C (normative) Test methods	5
Tables	
1 Test and calibration methods	2
2 Error tolerances for illuminance meters	2
C.1 Example of calculation of correction factor for a high pressure sodium lamp	6
List of references	Inside back cover

Foreword

This British Standard has been prepared by Technical Committee CPL/34/5.

Since the publication of the 1968 edition of this standard, which was confirmed in 1985, there have been improvements in the design of illuminance meters, for example the increased use of digital displays. These developments are reflected in this full revision of the earlier standard.

The previous division of illuminance meters into two types, P1 and P2, has been replaced by two new categories: type L (laboratory instruments), and type F (field instruments).

Compared with the earlier edition, measurement errors have been considered in greater detail, along the lines of CIE Publication 69 [3]. The definitions in this edition have been based on CIE Publication 17.4 [1].

This revision of BS 667 supersedes BS 667 : 1968 which is withdrawn.

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

Specification

Introduction

As lighting levels reduce, the response characteristics of the human eye change from photopic through an intermediate mesopic region at dusk to a scotopic response at night time. It is often inappropriate to measure photopic illuminances at levels below 10 lx. At these levels of illuminances the human eye may respond differently and research work is still in progress on this subject.

Photometric measurements, even under laboratory conditions, are more difficult to determine precisely than many other kinds of physical measurement, and in the case of illuminance meters, liability to error is increased by the fact that many of the essential components of such instruments are susceptible to variation with time and use. These errors can be minimized by care in the design of the instrument as a whole, and also by the user in not exposing it to deleterious conditions of temperature, illumination or atmosphere.

It is recommended that illuminance meters should be returned to the manufacturer, or a competent photometric testing authority at intervals as recommended by the manufacturer for checking and, if necessary, recalibration.

1 Scope

This British Standard specifies requirements for type L (laboratory instruments) and type F (field instruments) meters for the measurement of photopic illuminance. This British Standard is applicable to meters for the measurement of planar illuminance. Annex A gives recommendations for the choice of meter range.

NOTE. If other types of illuminance e.g. semi-cylindrical, are used, reference should be made to CIE Publication 69 : 1987 [3].

2 Definitions

For the purposes of this British Standard the following definitions apply.

2.1 illuminance

The luminous flux per unit area falling on a surface, usually measured in lux (lumens per square metre).

2.2 illuminance meter

Instrument for measuring illuminance.

2.3 photoelectric cell

Detector of optical radiation in which the absorption of photons results in the generation of an electric current or voltage, or causes a change in electrical resistance.

NOTE. The term 'photoelectric detector' is also in use.

2.4 selective or coloured filter

Medium which changes the spectral distribution of radiation by transmission.

2.5 colour temperature

Temperature of the full radiator which emits radiation of the same (or nearly the same) chromaticity as the radiation considered.

2.6 photometer head

Light sensitive detector the spectral response of which is weighted (usually by means of coloured filters) to approximate the CIE spectral luminous efficiency function $V(\lambda)$ of the human eye for photopic vision, together with any cosine correction required.

NOTE. More information on the spectral response and cosine correction is given in C.2 and C.5 respectively.

2.7 calibration plane

Plane normal to the axis of the photometer head to which the measured illuminance values relate.

NOTE. This plane should be chosen so that the readings are in accordance with the inverse square law when using a point source. In the case of a photometer head without a diffuser, this plane is the plane of the limiting aperture; for a photometer head with a plane diffuser, it is the front of the diffuser.

2.8 effective range

Range over which the instrument conforms to the accuracy requirements of this specification.

2.9 secondary standard lamp

Lamp, the photometric characteristics of which are accurately known and calibrated directly against a national standard.

2.10 working standard lamp

Lamp in regular use which is calibrated at regular intervals by reference to a secondary standard lamp.

2.11 secondary standard illuminance meter

Illuminance meter, the photometric characteristics of which are accurately known and calibrated directly against a national standard.

NOTE. Further definitions related to photometry are given in CIE Publication 17.4 [1].

3 Classification

Illuminance meters shall be classified as one of the following two types.

- a) Laboratory illuminance meters, designated type L, which are generally retained in a laboratory or standardizing area, and against which other equipment may be calibrated and the highest precision readings obtained. Such meters may not be suitable for site or field measurements;
- b) Field illuminance meters, designated type F, which are for use in the field, on site and in the working environment. Some accuracy may have to be sacrificed in the interests of the ease of use, robustness and versatility of field meters.