

Traffic control equipment — Warning and safety light devices

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British Standard

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee EPL/526, Road traffic control signals, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

This standard contains a number of performance criteria which are defined by the selection of class. This procedure has been adopted to enable European members to select a class that meets the regulatory requirements of that member.

Performance classes for application in the UK are contained in “Traffic Signs Regulations and General Directions” (TSRGD), published by the Stationary Office. Advice should be sought from the Department of the Environment, Transport and the Regions when selecting classes.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 18, an inside back cover and a back cover.

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English version

Traffic control equipment - Warning and safety light devices

Équipement de régulation du trafic - Feux de balisage et
d'alerte

Anlagen zur Verkehrssteuerung - Warn- und
Sicherheitsleuchten

This European Standard was approved by CEN on 15 November 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.



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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 226, Road equipment, the Secretariat of which is held by AFNOR.

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 August 2000, and conflicting national standards shall be withdrawn at the latest by August 2000.

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.

1 Scope

This European Standard specifies the requirements for individual electrically operated light devices, called warning lights, emitting a continuous or regular intermittent light of a single colour which, by their colour and position alone, are used to warn, inform or guide road users. It specifies the requirements for visual, structural and operational performances and the relevant test methods to be used.

This European Standard is not applicable to lighting devices which convey messages by additional means (e.g. variable message signs) or which convey a mandatory instruction (e.g. traffic signals) or which are covered by vehicle lighting regulations.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at 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 60068-2-1

Environmental testing - Part 2: Tests - Test A: Cold (IEC 60068-2-1:1990).

EN 60068-2-2

Basic environmental testing procedures - Part 2: Tests - Test B: Dry heat (IEC 60068-2-2:1974 + IEC 68-2-2A:1976).

EN 60529

Degrees of protection provided by enclosures (IP code) (IEC 60529:1989).

EN 60598-1:1997

Luminaires - Part 1: General requirements and tests (IEC 60598-1:1996, modified).

prEN 50278 : 1997

Road traffic signal systems.

CIE 15.2

Colorimetry.

CIE 17.4

International lighting vocabulary.

CIE 39.2

Recommendations for surface colours for visual signalling.

CIE 54

Retroreflection - Definition and measurement.

3 Definitions

For the purpose of this European Standard, the definitions and units used in the International Lighting Vocabulary (ILV), CIE 17.4, and the following terminology apply:

3.1 effective luminous intensity: the effective luminous intensity I_{eff} for flashing warning lights is that calculated using the Blondell-Rey equation (1):

$$I_{\text{eff}} = \frac{\int_{t_1}^{t_2} I(t) dt}{0,2 + (t_2 - t_1)} \quad (1)$$

t_2, t_1 are time instants at which $I(t) = I_{\text{eff}}$

3.2 horizontal plane (360° warning lights only): the plane which passes through the photometric centre of the warning light when the warning light is in its normal operating position –

3.3 light emitting surface: a single continuous area of surface emitting light

3.4 minimum reference luminous intensity I_{Rmin} : the required minimum (effective) luminous intensity, at the nominal voltage, measured on the reference axis or in the reference plane

3.5 minimum area luminous intensity I_{Amin} : the minimum permissible (effective) luminous intensity, at the nominal voltage, within the specified angle ranges excluding the reference axis or the reference plane

NOTE: This is expressed as a percentage of I_{Rmin} in Table 1.

3.6 maximum area luminous intensity I_{Amax} : the maximum permissible (effective) luminous intensity at the nominal voltage, measured at any point within the specified in angle ranges including the reference axis or the reference plane

3.7 minimum voltage luminous intensity I_{Umin} : the minimum permissible (effective) luminous intensity, at the minimum voltage specified by the manufacturer, measured at any point within the specified angle ranges including the reference axis or the reference plane

NOTE: This is expressed as a percentage of I_{Rmin} in Table 1.

3.8 rated voltage: the voltage of the electrical power supply (battery or mains) as specified by the manufacturer

3.9 photometric centre: unless otherwise specified by the manufacturer, the photometric centre is the geometric centre of the area of the light emitting surface

3.10 principal axis (excluding 360° warning lights): the horizontal axis which lies on the vertical plane of symmetry of the lens and passes through the photometric centre of the warning light when in its normal operating position

3.11 reference axis (excluding 360° warning lights): unless otherwise specified by the manufacturer the reference axis is the axis of maximum luminous intensity within 2° in any direction of the principal axis

3.12 reference plane (360° lights only): unless otherwise specified by the manufacturer the reference plane is the plane of maximum luminous intensity within 2° above or below the horizontal plane

3.13 on-time ($t_2 - t_1$, flashing lights only): that part of a single light pulse during which the actual luminous intensity is equal to or greater than the effective luminous intensity

NOTE: On-time is expressed as a percentage of the complete on/off cycle.

4 Requirements

4.1 Photometric and colorimetric performance

4.1.1 Luminous intensity

When measured in accordance with clause 6, within the angle ranges specified for the relevant class in Table 1, the luminous intensities for warning lights emitting yellow light (C yellow 1 and C yellow 2 as defined in 4.1.4) shall comply with the maximum and minimum limits specified in Table 1.

For warning lights emitting red light (C red as defined in 4.1.4) all minimum luminous intensity values shall be reduced to 35 % of those specified in Table 1. Maximum luminous intensity values shall be as specified in Table 1.

NOTE 1: In Table 1 warning lights are divided into classes primarily by area of lights emitting surface, angular limits for photometric performance and luminous intensities within those angles. Classes L2, L8 and L9 are sub-divided into High (H), Medium (M) and Low (L) luminous intensity bands within the overall luminous intensity limits for each class.

NOTE 2: All the values given for the luminous intensity in Table 1 are given as actual continuous values for steady warning lights and are given as effective luminous intensity for flashing warning lights. Except where limited to a specific Class F designation, shown in brackets, the luminous intensity values given apply to both steady and flashing warning lights in the same L Class.

In order to take account of uneven polar luminous intensity distribution for 360° warning lights only, luminous intensities below the minimum values in Table 1 shall be disregarded provided that they are contained within no more than two sectors each of 30° of the full 360°.

All angles given in Table 1 shall be measured from the reference plane for 360° warning lights (L1) and from the reference axis for all other warning lights.