SLOVENSKI STANDARD
SIST EN 12352:2024

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Nadomešča:
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Oprema za nadzor in vodenje cestnega prometa - Opozorilne in varnostne luči

Traffic control equipment - Warning and safety light devices

Anlagen zur Verkehrssteuerung - Warn- und Sicherheitsleuchten

Equipement de régulation du traffic - Feux de balisage et d'alerte

Ta slovenski standard je istoveten z: **EN 12352:2024**

ICS:

93.080.30	Cestna oprema in pomožne naprave	Road equipment and installations

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EUROPEAN STANDARD

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English Version

Traffic control equipment - Warning and safety light devices

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

Anlagen zur Verkehrssteuerung - Warn- und Sicherheitsleuchten

This European Standard was approved by CEN on 29 April 2024.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 12352:2024) 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of an identical text or by endorsement, at the latest by December 2024, and conflicting national standards shall be withdrawn at the latest by March 2026.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12352:2006.

The main changes in this revision are as follows:

— The Introduction has been re written to clarify applications of warning lights.

— Definitions 3.1 to 3.4 added for additional clarity.

— Previous definition 3.10 “Principle Axis” removed, and “reference axis” definition updated, adding clarity with fewer axes defined.

— 4.1.1. Descriptive note changed to improve clarity.

— 4.1.2.1 and 4.1.2.2. Reference to Lens changed to light emitting surface (allowing flexibility for those solutions created without the use of a specific lens).

— 4.1.4. Wording changed to add flexibility in the types of light sources.

— 4.1.5. Clarified wording about plane of measurement.

— 4.2.1.1. Requirements for electrical safety clarified as being EN 50556 specification for the traffic market now nominated under the LVD.

— 4.2.1.2.1. The idea of linked pairs or groups of warning lights added.

— 4.2.1.2.3. Classes added.

— 4.2.1.4. Clarified that it is the luminous intensity that is expected to be compliant over the voltage range.

— 4.2.2.1. The idea of linked pairs or groups of warning lights added, classes F5 and F6 added.

— 4.2.2.2. Classes O4 and O5 added.

— 4.3.1. References to test method sections updated (due to the removal of the old Clause 5 “Samples” the test method Clause 6 became 5).

— 4.3.2.3. Corrosion test specification reference updated.

— Old Clause 5 “Sampling” removed.

— Clause 6 “Test Methods” has now become Clause 5 with the removal of the old Clause 5 “Sampling”.

— 5.2. Luminous Intensity test method redefined.

— Clause 6 new Assessment and Verification of constancy of Performance AVCP.

— Clause 7 References updated.

— Old Clause 9 “Evaluation of conformity”, removed, as it is replaced by the earlier new Clause 6 AVCP.

Any feedback and questions on this document should be directed to the users’ national standards body.

A complete listing of these bodies can be found on the CEN website. According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

Warning lights are installed on or at road areas for both permanent and temporary use.

Examples of permanent use are warning lights at pedestrian crossings, railway crossings, exits for fire trucks and ambulances etc. Such warning lights are generally supplied by the mains or some other permanent power supply with a lower voltage.

Permanently installed warnings lights may have properties in terms of photometric and colorimetric performance, electrical and functional properties and construction as described in this document, or they may be in family with signal heads having properties as described in EN 12368, Traffic control – Signal heads.

Temporary use may be at construction sites to warn against uneven ground or obstacles. Warning lights for this purpose often emit constant red light.

The predominant temporary use is, however, at road works. Warning lights for this purpose generally emit flashing yellow light or in some cases alternating yellow light with longer light periods.

The use at road works is varied and includes warning lights mounted on obstacles, warning lights mounted single or in pairs on road signs or barriers to create attention, warning lights used in groups to form running lights to delineate temporary changes of the run of the road, and warning light used in groups to form crosses or arrows mounted on trailers or vehicles in order to inform of blocked lanes or change of lane.

Warnings lights for temporary use either have batteries incorporated into the housing of the warning lights or are supplied by means of electrical wires to large batteries placed elsewhere. The intention of using flashing or alternating light is to enhance the warning aspect and to draw more attention than is obtained with constant light. Because of delay in the response of the eye, a flashing light appears with a lower luminous intensity than the average intensity during the flash. In terms of visibility, the intensity of a flashing light is described by an effective intensity derived by means of a particular equation.

There is some saving of emitted luminous flux associated with flashing or alternating light compared to constant light. The corresponding saving of power from the battery supply has practical significance.

The classic warning lights are based on incandescent lamps, mostly low voltage halogen incandescent lamps. The on-time of the flashes of these warnings' lights cannot be short because of the delay in the response of low voltage halogen incandescent lamps.

A development is based on xenon flash lamps with very short flashes. These lamps use less power than low voltage halogen incandescent lamps. The shortness of the flash has the negative effect that it is difficult to perceive the position of the warning light.

A further development is based on Light Emitting Diodes, LEDs. LEDs in themselves have characteristic colours of the emitted light, for instance red, yellow, green and blue depending of the types, and are used with the colour of light intended for the warning lights – mostly yellow. This eliminates the need for obtaining the colour by means of filtering in a coloured front lens or glass and improves the overall luminous efficacy.

The LEDs are well suited for control of the light output, the on-time and the cycle period. This has the practical advantage that a single product can be used for more than one application.

1 Scope

This document 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. These devices rely upon existing furniture to provide the mounting.

This document 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.

This document does not consider horizontal loads because it is the mounting to which they are fixed, which is not covered by this document, which has to resist applied horizontal loads.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 50293, *Road traffic signal systems - Electromagnetic compatibility*

EN 60068-2-1, *Environmental testing - Part 2-1: Tests - Test A: Cold*

EN 60068-2-2, *Environmental testing - Part 2-2: Tests - Test B: Dry heat*

EN 60529, *Degrees of protection provided by enclosures (IP Code)*

EN IEC 60598-1:2021, *Luminaires — Part 1: General requirements and tests*

EN 12899-3, *Fixed, vertical road traffic signs - Part 3: Delineator posts and retroreflectors*

CIE 15, *Colorimetry*

CIE 54.2:2001, *Retroflection — Definition and measurement*

EN 50556, *Road traffic signal systems*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org

3.1
steady, alternating and flashing lights
lights emitting respectively continuous light, continuous light in periods of minimum 0,5 seconds and pulses of light in periods of less than 0,5 seconds

3.2
cycle period (flashing and alternating lights only)
t_{cycle}
duration of the complete on/off cycle measured in seconds (s)

3.3
flash or alternation rate (flashing and alternating lights only)
number of flashes or light periods per minute

3.4
on-time (flashing and alternating lights only)
t_{on}
flashing lights: part of a single light pulse during which the actual luminous intensity is equal to or greater than the effective luminous intensity measured in seconds (s)

alternating lights: duration of a single light period in seconds (s)

3.5
state of dimming
actual state of dimming characterized in a unique manner

3.6
mode of operation
actual mode of operating a warning light defined by flash or alternation rate, on-time and state of dimming

3.7
effective luminous intensity (flashing lights only)
I_{eff}
luminous intensity (cd) of a steady light source that would have the same visual range as the flashing light in question effective luminous intensity I_{eff} for flashing warning lights is that calculated using the Blondell-Rey equation (1):

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

Where

t_1 and t_2, are time instants at which $I(t) = I_{eff}$ and define the on-time by $t_{on} = t_2 - t_1$

3.8
horizontal plane (360° warning lights only)
plane which passes through the photometric centre of the warning light when the warning light is in its normal operating position

3.9
light emitting surface
single continuous area of surface emitting light

3.10
minimum reference luminous intensity
I_{Rmin}
required minimum (effective) luminous intensity, at the nominal voltage, measured on the reference axis or in the reference plane

3.11
minimum area luminous intensity
I_{Amin}
minimum permissible (effective) luminous intensity, at the nominal voltage, in any direction within a specified angular range

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

3.12
maximum area luminous intensity
I_{Amax}
maximum permissible (effective) luminous intensity at the nominal voltage, in any direction within a specified angular range

3.13
minimum voltage luminous intensity
I_{Umin}
minimum permissible (effective) luminous intensity, at the minimum voltage specified by the manufacturer, in any direction within a specified angular range

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

3.14
rated voltage
voltage of the electrical power supply (battery or mains) as specified by the manufacturer

3.15
photometric centre
unless otherwise specified by the manufacturer, the photometric centre is the geometric centre of the area of the light emitting surface

3.16
reference axis (excluding 360° warning lights)
axis specified by the manufacturer, used for environmental and optical tests

3.17
reference plane (360° lights only)
plane specified by the manufacturer, used for environmental and optical tests