SLOVENSKI STANDARD
oSIST prEN 12368:2019

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Oprema za nadzor in vodenje cestnega prometa - Signalne luči

Traffic control equipment - Signal heads

Anlagen zur Verkehrssteuerung - Signalleuchten

Équipement de régulation du trafic - Signaux

Ta slovenski standard je istoveten z: **prEN 12368**

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Traffic control equipment - Signal heads

Équipement de régulation du trafic - Signaux

Anlagen zur Verkehrssteuerung - Signalleuchten

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 226.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 12368:2019) has been prepared by Technical Committee CEN/TC 226 “Road equipment”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12368:2015.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

The main changes in this revision prEN 12368:2019 compared to the previous edition EN 12368:2015 are as follows:

a) editorial changes for enhanced clarity and consistency;

b) change of the scope to include volunteerly application of this standard to other types of signal heads;

c) clarification of the terms optical surface and reference axis;

d) change of the headline of 4.2 to better match the content;

e) part of the content of 6.3 and 6.4 was moved to 8.2;

f) the explanatory notes in 6.6 referred to the obsolete incandescent lamp technology and were changed based on the current LED technology;

g) change in the wording of 6.8 for better technical clarification;

h) change in the testing method regarding the stabilization of the luminous intensity in 8.2;

i) added the address as an information which is required to be on the product label.

Introduction

Signal heads are mainly used to transfer safety messages to the road user to achieve specific reactions. Signal heads in road traffic transfer this information optically by signal lights which have a specific meaning and which differ in their colour of light and in the design of their illuminating surface.

The visibility of a signal light depends on the colour, luminous intensity, luminous intensity distribution, luminance and luminance uniformity, the surrounding luminance (background luminance), the size of the illuminating area, the phantom light and the distance and angle between observer and signal head.

Four angular distributions of luminous intensities for signal lights are specified. The user can choose between an extra wide, wide, medium and narrow beam signal to obtain a good recognition of the signal for short distances in urban areas, for long distances in rural areas. To achieve a good performance the standard provides a number of different performance levels and two different diameters for the optical units.

This European standard does not require limits for the recognition of red or green signals with reduced luminous intensities operating in a failure mode. These limits depend on the surrounding lights (on or off) and on the situation. However, for a simple rule a red signal should be considered as failed if the luminous intensity in the reference axes is $I \leq 10$ cd, and a green signal should be considered as being in operation if the luminous intensity is $I \geq 0{,}05$ cd.

The working environment for signal heads is relatively harsh and equipment that is deemed “fit for purpose” is expected to last in this exposed, corrosive environment for a minimum of 10 years. It is essential that all materials and manufacturing processes take this into account. The supplier should detail all steps taken to comply with this clause.

The optical performance of signal heads in use is a function of lens soiling, mirror soiling and a decrease of luminous flux from the lamp. To maintain the performance of the signal heads during their lifetime, it is important to ensure that after lamp replacement and cleaning of lens and mirror the light output is restored to as near 100 % as possible and never lower than 80 % of the declared specified performance.

For devices randomly selected from series production it is important that the product characteristic as to minimum luminous intensity of the light emitted, are in each relevant direction, of the minimum values prescribed.

For a full applicability of this European standard the national standardization/regulatory bodies are requested to define the set of classes relevant for their national requirements.

1 Scope

This document applies to signal heads with one or more signal lights of the colours red, yellow and/or green signal lights for road traffic with 200 mm and 300 mm roundels and to optical units to be integrated in signal heads to produce the individual signal lights. It defines the product characteristics for the visual, structural, environmental performances and testing of signal heads and optical units for pedestrian and road traffic use, and the rules for the evaluation of the conformity of these products.

This document can be partly or fully applied on a voluntary basis to other signal heads outside of the scope specified above like for instance white optical units or small signal heads with a diameter smaller than 200 mm.

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 50556, *Road traffic signal systems*

EN 60068-2-1, *Environmental testing — Part 2-1: Tests — Test A: Cold (IEC 60068-2-1)*

EN 60068-2-2, *Environmental testing — Part 2-2: Tests — Test B: Dry heat (IEC 60068-2-2)*

EN 60068-2-5, *Environmental testing — Part 2-5: Tests — Test Sa: Simulated solar radiation at ground level and guidance for solar radiation testing (IEC 60068-2-5)*

EN 60068-2-14, *Environmental testing — Part 2-14: Tests — Test N: Change of temperature (IEC 60068-2-14)*

EN 60068-2-30, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle) (IEC 60068-2-30)*

EN 60068-2-64, *Environmental testing — Part 2-64: Tests — Test Fh: Vibration, broadband random and guidance (IEC 60068-2-64)*

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

EN 60598-1:2015, *Luminaires — Part 1: General requirements and tests (IEC 60598-1)*

3 Terms and definitions

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

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

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

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

3.1
signal head
device which comprises one or more optical units, including the housing(s), together with all the mounting brackets, fixings, hoods, visors, cowls and background screens, whose task is to convey a visual message to vehicle and pedestrian traffic

3.2
optical unit
assembly of components designed to produce a light of the specified nominal size, colour, luminous intensity and shape

3.3
optical surface
surface of the optical unit which emits light

Note 1 to entry: In many cases it is the external surface of the lens.

3.4
lens
light transmitting element of the optical unit which distributes the luminous flux from the light source into preferred directions of the signal light

3.5
background screen
opaque board placed around the optical unit, either incorporated in the housing of the optical unit or detachable, intended to increase the contrast and to enhance visibility

3.6
hood (visor, cowl)
device located above the front of an optical unit to reduce phantom effect or to restrict the field of view

3.7
phantom signal
false signal that is created by sunlight striking an optical unit

Note 1 to entry: For the technologies that don't use coloured filters, the light reflexion doen't induce a coloured image, but decreases the visibility of the signal because of the contrat loss.

3.8
reference axis
axis specified by the supplier, used for environmental and optical tests. If not specified by the manufacture it will be taken as perpendicular to the centre of the optical surface. The reference axis is labelled as 0° / 0°

3.9
Factory Production Control (FPC)
permanent internal control of production exercised by the manufacturer

3.10
batch
quantity of a product manufactured with no change in raw material, equipment, settings or operation as defined in the FPC system manual of the manufacturer

3.11
individual (and non-series)
product manufactured under a manufacturing process that is specifically conceived for one unique production

3.12
apparent luminous surface
projection of the optical surface on a plane perpendicular to the reference axis used for the luminance uniformity and the phantom signal measurements

4 Constructional product characteristics

4.1 General

The manufacturer shall ensure the design is such that there is a facility for maintenance. Any component requiring replacement shall be designed such that this is easily accommodated and does not affect the optical performance of the signal head.

The construction and choice of materials shall be such that they will provide declared performance for a reasonable economic lifetime of the product as verified by the relevant tests given in this European standard.

The supplier shall detail in his documentation what maintenance shall be carried out, including cleaning methods and materials, to ensure that the optical performance shall be maintained to at least 80 % of the minimum values set out in the appropriate parts of 6.3 and 6.4 during the lifetime as defined by the supplier.

During the declared lifetime of the optical unit the colours shall remain within the colour boxes of Table 7.

4.2 Ingress protection

There are 5 classes for the Index Protection, IP, rating in accordance with EN 60529 of a signal head:

— Class I: IP34;

— Class II: IP44;

— Class III: IP54;

— Class IV: IP55;

— Class V: IP65.

NOTE A level of sealing in accordance with IP65 can result in a risk of water collection within the optic housing due to condensation.

Where separate protection of the optical units is required they shall be protected to IP55 or IP65. The signal head, including its optical components, shall be so designed that after installation, during its lifetime as defined by the supplier, including any replacement of components, the optical and mechanical product characteristics are guaranteed to meet the requirements of this standard.

4.3 Performance under impact product characteristic

There are 3 classes of performance under impact, IR1, IR2 and IR3. When required by the regulatory authority this characteristic shall be determined in accordance with Clause 7 Constructional and environmental test methods Table 8 — Impact resistance.

4.4 Constructional integrity product characteristic

The product is expected to survive levels of vibration that may be expected in normal operation. This characteristic shall be determined in accordance with Clause 7 Constructional and environmental test methods Table 9 — Constructional integrity.

5 Environmental, electromagnetic compatibility (EMC) and electrical product characteristics

5.1 Environmental characteristics

The signal heads shall comply with one or more of the following classes of operational temperature ranges:

— Class A +60 °C to –15 °C;

— Class B +55 °C to –25 °C;

— Class C +40 °C to –40 °C.

5.2 Electrical safety, road traffic safety and EMC characteristics

The signal heads shall comply with the requirements of EN 50293.

Whilst this specification is for a traffic signal product, it is clear that this product is connected to a "Traffic system" and as such the connections/wiring, etc. that is required between it and any controller shall meet the requirements of EN 50556 for electrical safety and in particular attention is drawn to 5.1 Electric safety and to 5.2 road traffic safety.

6 Optical product characteristics

6.1 General

The optical units of a signal head should normally be of the same classes regarding luminous intensity, dimming, distribution of luminous intensity and phantom light, but it is permissible in special cases that the classes are different.

EXAMPLE In signal head with red, yellow and green optical units, it can be required that the red be in a brighter class than the yellow and green on high speed roads.

All values in this section refer to the stabilized values according to 8.2.

6.2 Light emitting diameter of optical units

Optical units for road traffic conditions which fall in the scope of this standard shall be circular and have a nominal light emitting diameter of 200 mm or 300 mm ± 10 %. Local requirements could exist in order to state which signal head to use. When no regulation exists, it is not feasible to give strict rules for the situations where either 200 mm or 300 mm optical unit signals should be used, as the requirements for visibility depend on the local conditions of road lay-out and infrastructure, on traffic conditions and light conditions.

6.3 Luminous intensities of optical units

The performance levels for signal lights, for both 200 mm and 300 mm optical units, shall be as specified in Table 1.

Table 1 — Luminous intensities (*I*) for red, yellow and green signal lights in the reference axis

Performance level	1	2	3
I_{min}	100 cd	200 cd	400 cd
I_{max} class 0	200 cd	400 cd	600 cd
I_{max} class 1	400 cd	800 cd	1 000 cd
I_{max} class 2	1 100 cd	2 000 cd	2 500 cd

For example the performance level 2/1 is the designation of an optical light with: I_{min} = 200 cd; I_{max} = 800 cd.

Dimmed operation is an operating mode of the road traffic signal system in which the luminous intensity of the signal heads is reduced. These classes of dimmed operation are available:

— Class D0 Dimmed operation is not required;

— Class D1 As declared by the manufacturer.

For Class D1, the manufacturer shall declare the performance of their signal in dimmed operation against the optical product characteristics of this specification and operational voltage ranges.

NOTE Refer to CLC/TS 50509:2007, Annex B regarding dimmed operation in the Netherlands and Annex C regarding dimmed operation in Spain.

6.4 Distribution of luminous intensity

In Tables 2, 3, 4 and 5 four angular distributions of luminous intensity for optical units are specified as minimum luminous intensities, expressed as percentage values dependent on the choice of the following categories:

— A as a percentage of the measured values on the reference axis;

— B as a percentage of the minimum values as defined in Table 1 required on the on the the reference axis.

Outside the area described in Tables 2 to 5 (as applicable) the luminous intensities shall not exceed the maximum of the relevant class of performance level.

Only the listed combinations of classes and performance levels shall be applied.

Within the field of measurement, the light pattern shall be substantially uniform, i.e. the light intensity in each direction at each test point shall meet at least the level achieved by the next consecutive measurement. e.g. if the measurement in the reference axis is 100 % and at +5 the measurement is 85 % then in between the two a measurement should be at least 85 %.

Table 2 — Extra wide-optical unit (Type E) possible combinations B 1/0, B 1/1, B 2/2

α horiz	0°	±2,5°	±5°	±10°	±15°	±20°	±30°
α vert							
0°	100	–	85	80	–	60	40
–1,5°	–	–	–	–	–	–	–
–3°	80	–	75	–	–	–	–
–5°	60	–	–	45	–	–	–
–10°	50	–	–	–	–	20	–
–20°	20	–	–	–	–	–	10
– means no specific values are required							

Table 3 — Wide optical unit (Type W) possible combinations A 1/0, A 1/1; A 2/0, A 2/1; A 3/0, A 3/1; B 1/2; B 2/1,B 2/2; B 3/2

α horiz	0°	±2,5°	±5°	±10°	±15°	±20°	±30°
α vert							
0°	100	–	85	55	–	3	1
–1,5°	–	–	–	–	–	–	–
–3°	80	–	75	–	–	–	–
–5°	60	–	–	35	–	–	–
–10°	30	–	–	–	–	8	–
–20°	2	–	–	–	–	–	2
– means no specific values are required							

Table 4 — Medium wide optical unit (Type M) possible combinations A 2/0, A 2/1; A 3/0, A 3/1; A 2/2; A 3/2

α horiz	0°	±2,5°	±5°	±10°	±15°	±20°	±30°
α vert							
0°	100	–	75	40	10	1	*
–1,5°	–	–	–	–	–	–	*
–3°	75	–	60	–	–	–	*
–5°	50	–	–	20	–	–	*
–10°	12,5	–	–	–	–	6	*
–20°	1,5	–	–	–	–	–	1
– means no specific values are required							
* means no requirements							