SLOVENSKI STANDARD
SIST EN 13422:2020

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Nadomešča:
SIST EN 13422:2005+A1:2009

Pokončni cestni znaki - Prenosni upogljivi opozorilni in usmerjevalni znaki - Prenosni cestni signalni znaki - Stožci in valji

Vertical road signs - Portable deformable warning devices and delineators - Portable road traffic signs - Cones and cylinders

Straßenverkehrszeichen (vertikal) - Transportable verformbare Warnvorrichtungen und Leiteinrichtungen - Transportable Straßenverkehrszeichen - Leitkegel und Leitzylinder

Signalisation routière verticale - Dispositifs d'alerte et balisages de voie souples et mobiles - Signaux temporaires mobiles - Cônes et cylindres

Ta slovenski standard je istoveten z: **EN 13422:2019**

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

Vertical road signs - Portable deformable warning devices and delineators - Portable road traffic signs - Cones and cylinders

Signalisation routière verticale - Dispositifs d'alerte et balisages de voie souples et mobiles - Signaux temporaires mobiles - Cônes et cylindres

Straßenverkehrszeichen (vertikal) - Transportable Straßenverkehrszeichen - Leitkegel und Leitzylinder

This European Standard was approved by CEN on 16 September 2019.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Turkey and United Kingdom.

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

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European foreword

This document (EN 13422:2019) 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 May 2020, and conflicting national standards shall be withdrawn at the latest by May 2020.

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 13422:2004+A1:2009.

In comparison with the previous edition, the following technical modifications have been made:

a) updating of the normative references;

b) clarification of the definitions in Clause 3;

c) amendment of performance requirements for Class R 3, R_L 3 and L_{rel} 1;

d) clarification of the test method for the relative distribution of retroreflective performance.

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, Turkey and the United Kingdom.

Introduction

This document provides requirements for the construction and visual performance of traffic cones and cylinders. The visual performance at daytime is specified by the colour and luminance factor. The visual performance at night-time is specified by the coefficient of retroreflection R_A, the coefficient of retroreflected luminance R_L and the relative distribution of retroreflective performance L_{rel}.

1 Scope

This document specifies requirements for new traffic cones and new traffic cylinders with retroreflective properties.

This document specifies minimum essential visual and physical performance characteristics; test methods for determination of product performance and the means by which this performance may be communicated to the user and the public including safety enforcement agencies.

The document provides a series of categories or classes by which a traffic cone or traffic cylinder may be specified for use in different applications in accordance with best practice.

In the case of physical properties, performance levels and indicative tests are provided for cold weather, stability, and impact resistance when dropped. Requirements for visual recognition properties, colour, retroreflectivity and luminance are provided.

Provision for identification and marking to declared levels of performance is provided.

There are other product shapes which perform similar functions. This document does not cover devices made in other shapes, or which do not meet the design requirements of this document.

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 ISO 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics (ISO 1043-1)*

EN ISO/CIE 11664-1:2019, *Colorimetry - Part 1: CIE standard colorimetric observers (ISO/CIE 11664-1:2019)*

EN ISO 11664-2:2011, *Colorimetry - Part 2: CIE standard illuminants (ISO 11664-2:2007)*

ISO 4:1997, *Information and documentation — Rules for the abbreviation of title words and titles of publications*

CIE 15:2004, *Colorimetry*

CIE S 017/E:2011, *International lighting vocabulary*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4:1997, CIE S 017/E:2011 and the following 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
traffic cone
three dimensional device of conical shape comprising one or more parts including a base plate, cone body and a retroreflective surface or surfaces

3.2
base plate
lowest part of the traffic cone which supports the cone body, having an upper visible surface, and a lower surface in contact with the support surface

3.3
cone body
part of the traffic cone which is conical in shape, but excludes the base plate and the retroreflective surface(s)

3.4
category A cone
traffic cone in which a minimum of 80 % of the nominal height of the cone is retroreflective

3.5
category B cone
traffic cone in which a minimum of 25 % of the nominal height of the cone is retroreflective

3.6
traffic cylinder
three dimensional device of substantially cylindrical shape comprising one or more parts including a cylinder body, and a retroreflective surface or surfaces

3.7
cylinder body
part of the traffic cylinder which is substantially cylindrical in shape and supports the retroreflective surface or surfaces

3.8
category A cylinder
traffic cylinder in which a minimum of 80 % of the nominal height of the cylinder is retroreflective

3.9
category B cylinder
traffic cylinder in which a minimum of 25 % of the nominal height of the cylinder is retroreflective

3.10
retroreflective surface(s)
part (or those parts) of a traffic cone or traffic cylinder fixed to the cone body or cylinder body which are retroreflective according to the requirements of this document

3.11
height of traffic cone
H
vertical distance, measured between the ground and the top of the traffic cone

3.12
height of traffic cylinder
H
vertical distance, measured between the top of the cylinder body and the lowest extremity of the cylinder body

3.13
test product
product in original size and design, prepared by the manufacturer and submitted to testing

3.14
sample
construction representing parts of the product or its constituents in original materials prepared by the manufacturer and submitted to testing

3.15
product family
products that are related in such a way that testing of one of the products covers all of the products from a product family

4 Product characteristics

4.1 Traffic cones

4.1.1 Design of traffic cones

4.1.1.1 Shape of traffic cones

There shall be two shape classes for traffic cones (S1 and S2).

Class S1 - The angle between the sides of the cone body and the cone's vertical axis shall be (10 ± 2,5)° for at least the uppermost 75 % H of the traffic cone. The lower 25 % H of the traffic cone above the base plate may have an angle between the sides of the body and the traffic cone's vertical axis of between 7,5° and 14,5°.

Class S2 - The angle between the sides of the cone body and the cone's vertical axis shall be (10 ± 2,5)° for at least the uppermost 75 % H of the traffic cone. The lower 25 % H of the traffic cone above the base plate may have an increased angle between the sides of the body and the traffic cone's vertical axis of between 14,6° and 45°.

4.1.1.2 Shape of the base plate for traffic cones

The base plate shall have a minimum of 4 and not more than 8 sides.

4.1.2 Dimensions of traffic cones

4.1.2.1 General

Traffic cones shall conform to Table 1 and shall be assigned according to weight class (W) of Table 1 achieved. The nominal height of the traffic cone and the weight class required shall be specified by the purchaser. The height *H* of the traffic cone shall not deviate more than 5 % from the nominal height, as specified by the purchaser.

Table 1 — Nominal height *H* of traffic cones and minimum weight *W*

Nominal height *H* in mm	Minimum weight *W* in kg		
	Class W1	Class W2	Class W3
≥ 900 ≤ 1 000	4,80	6,00	7,50
≥ 750 < 900	3,20	4,00	5,00
≥ 500 < 750	1,30	1,90	2,50
≥ 450 < 500	1,10	1,80	2,20
≥ 300 < 450	0,80	0,80	0,80

4.1.2.2 Stacked height of traffic cones

The overall height of two identical traffic cones, when stacked one upon the other, shall not exceed 1,2 H of each individual traffic cone. Traffic cones shall be designed to ensure that, when stacked, they do not bind together, nor damage the retroreflective surface(s).

4.1.2.3 Top of body of traffic cones

The external diameter of the top of the cone body shall be (60 ± 15) mm. The top of the cone body shall have a circular hole provided in its upper surface. The hole shall have a diameter of (40 ± 5) mm.

The area of the cone body immediately below the top of the traffic cone shall have a configuration to provide a hand grip. This area need not be retroreflective and shall not exceed the greater height of either 0,1 H or 60 mm measured from the top.

4.1.2.4 Base plate of traffic cones

When the thickness of the outer edge of the base plate exceeds 15 mm, its plan area shall be contained within a circle whose diameter is 0,75 H of the traffic cone.

When the thickness of the outer edge of the base plate is 15 mm or less, the plan area of the base plate shall be contained within a circle whose diameter is 0,9 H of the traffic cone.

4.2 Traffic cylinder

4.2.1 Design of traffic cylinder

4.2.1.1 Shape of traffic cylinder

Traffic cylinders shall have substantially parallel sides. The lowest 100 mm portion of the cylinder body may be of a different diameter to the portion above 100 mm from the support surface and need not be substantially parallel. A means for drainage of any water entering the traffic cylinder shall be provided.

4.2.1.2 Fixing method for traffic cylinder

The design of such a fixing may be of any type which enables the traffic cylinder to be temporarily installed in or on the road surface while allowing the other requirements of this document to be satisfied.

4.2.2 Dimensions of traffic cylinder

4.2.2.1 Height

Traffic cylinders shall be not less than 450 mm in height nor greater than 1 250 mm in height. The nominal height of traffic cylinders shall be specified by the purchaser. The height *H* of the traffic cylinder shall not deviate more than 5 % from the nominal height, as specified by the purchaser.

4.2.2.2 Top of traffic cylinders

The top of the cylinder body shall not be less than 95 mm or exceed 120 mm in diameter. A circular hole of (30 ± 5) mm diameter shall be provided in the upper 100 mm of each traffic cylinder except where the inclusion of any internal mechanism makes it impracticable to provide such a hole. In this case, the traffic cylinder shall be constructed such that in the event of it being run over, air will exhaust without the traffic cylinder bursting.

4.3 Tolerances

Tolerances for the design, dimensions and weight of traffic cones and traffic cylinders shall be ± 5 % except where stated elsewhere in this document.

4.4 Materials

Materials shall enable conformance to the relevant requirements of this document. Environmental considerations are set out in Annex A, and provision for marking to aid recycling is set out in Clause 8 of this document.

Per colour, only one type of retroreflective material shall be used on the traffic cone or cylinder.

No specific clauses relating to dangerous substances are contained in this standard. National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets. In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction website on EUROPA accessed through: http://ec.europa.eu/growth/tools-databases/cp-ds_en.

5 Test methods

5.1 Determination of chromaticity and luminance factor β in dry conditions

Measurement of chromaticity and luminance factor shall be made in accordance with the procedures defined in CIE 15:2004 using spectral distribution according to CIE illuminant D65 (EN ISO 11664-2) and 45°a/0° geometry for the CIE 1931 (2°) standard colorimetric observer (EN ISO/CIE 11664-1:2019, Clause 5).

5.2 Photometric tests

5.2.1 Determination of minimum initial coefficient of retroreflection R_A

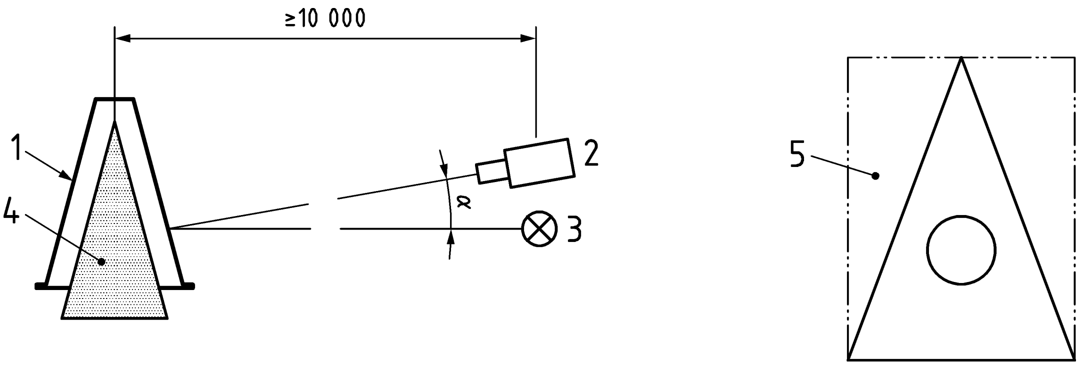
The measurement of the minimum initial coefficient of retroreflection R_A shall be made using CIE illuminant A (EN ISO 11664-2) in accordance with the procedures defined in CIE 54.2:2001.

The test measurements shall be performed on a production representative sample of retroreflective material measuring an area of at least 30 cm² mounted according to the manufacturer's instructions onto a flat support sheet.

5.2.2 Determination of the coefficient of retroreflected luminance R_L for retroreflective traffic cones or traffic cylinders

The coefficient of retroreflected luminance R_L shall be measured using the apparatus shown in Figure 1. The traffic cone or traffic cylinder to be tested shall be a representative manufacturing sample. A traffic cone shall be mounted on a support such that the base plate is aligned horizontally. A traffic cylinder shall be mounted with the cylinder body in a vertical position in the manner required by the manufacturer. The test shall be repeated from 4 sides, by rotating the cone around its axis by 90° steps (typically starting with the overlap of the retroreflective material as 0°). All 4 measurements shall be evaluated.

Dimensions in millimetres



Key

1 test traffic cone
2 photometer Le
3 light source Li
4 support for cone
5 masked area, Ø 40 mm circular aperture

Figure 1 — Side view of the equipment for testing the coefficient of retroreflected luminance

The distance between the test sample, traffic cone or traffic cylinder, and the photometer/ light source arrangement shall be not less than 10 000 mm. The photometer shall have an aperture of between 2' and 6' (minutes of arc), and the aperture of the light source shall not exceed 10' (minutes of arc), in both cases as seen from the location of the test sample. The observation angle α, i.e. the angle between the photometer and the light source as seen from the location of the test sample, is adjusted to the desired value. The light source shall have a spectral distribution according to CIE standard illuminant A (EN ISO 11664-2:2011) and the photometer shall have spectral sensitivity according to the V(λ) distribution. Refer to CIE publication No. 54, including suitable methods of calibration and suppression of ambient signal.

A measurement field on the test sample is defined by means of a circular aperture of 40 mm in a mask. The distance between mask and test sample should be minimized. For traffic cones, position the mask tilted back (following the angle of the cone) and place it directly on the cone surface. In case of traffic cylinders, the mask shall be placed in a vertical position just in front of the test sample.

Alternatively, when the photometer has optics to define a circular measurement field on the test sample, as with a luminance meter, the mask may be omitted. The diameter of the measured field shall not exceed 20 % of the diameter of the test sample at the elevation on the test sample where the measurement takes place.

The measurement field is placed on the vertical centre line of the test sample at such a height that a single colour of retroreflective surface is fully included within the measurement field.