



SLOVENSKI STANDARD

oSIST prEN 1463-1:2020

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Materiali za označevanje vozišča - Odsevniki - 1. del: Zahtevane lastnosti novih odsevnikov

Road marking materials - Retroreflecting road studs - Part 1: Initial performance requirements

Straßenmarkierungsmaterialien - Markierungsknöpfe - Teil 1: Anforderungen im Neuzustand

Produits de marquage routier - Plots rétro-réfléchissants - Partie 1 : Exigences initiales de performance

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EUROPEAN STANDARD
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English Version

Road marking materials - Retroreflecting road studs - Part 1: Initial performance requirements

Produits de marquage routier - Plots
rétro réfléchissants - Partie 1 : Exigences initiales de
performance

Straßenmarkierungsmaterialien - Markierungsknöpfe -
Teil 1: Anforderungen im Neuzustand

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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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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prEN 1463-1:2019 (E)**European foreword**

This document (prEN 1463-1:2019) 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 Formal Vote.

This document will supersede EN 1463-1:2009.

This document has been prepared under a standardization given to CEN/CENELEC by the European Commission and the European Free Trade Association, and supports basic work requirements of Regulation (EU) Nr. 305/2011.

The main changes with respect to the previous edition are listed below:

- To adapt the structure of the standard to the new CEN rules when applying this document as a harmonized standard under EU Regulation 305/2011. The wording and the Annex ZA have been adapted to the CPR, following document TF N 687 rev1.
- The information from former Clause 3 “Terms and definitions” and Clause 4 “Types of road stud” have been integrated into Clause 3 “Terms, definitions and types”.
- The information from former Clause 5 “Performance requirements” have been restructured in the Clause 4 “Performance characteristics and assessment methods” and clearly differentiates now between “Essential characteristics” (i.e. those included in document: CEN/TC 226 N 1318) and others grouped under the headline “In use characteristics”.
- Testing, assessment and sampling methods are listed in now Clause 5.
- Added Clause 6 – Assessment and verification of constancy of performance – AVCP, drafted following document TF N 548 Rev1.
- Removed former Clause 7 “Marking” as sufficient guidance is given in CPR and DoP.
- Drawings have been added in Clause 4 “Performance characteristics and assessment methods” to avoid any misinterpretation.
- Added subclause 4.3 “Durability” to give a clear link to EN 1463-2.
- Added blue colour retroreflecting road studs in accordance with national standards.
- As temporary road studs do not require CE mark, respective paragraphs have been moved to Annex E (informative).

Introduction

The development of this document has been prompted by the appearance of road studs which contain an active element which emits light instead of, or as well as, reflecting light from headlights.

Road studs fulfil a very important function in providing guidance to drivers in conditions of darkness as well as wet weather and poor visibility.

Retroreflective road studs are frequently used to supplement longitudinal road markings. They depend for their brightness on the light from a vehicle's head lamps being reflected back towards the source.

Road studs may be permanent or temporary, and use a glass or plastic reflector, or a plastic reflector with an abrasion resistant protective coating and fulfil several different photometric performance requirements depending on the stud type. Their bodies are typically manufactured with plastic polymers, although fully tempered solid glass (also defined as "safety glass") are also used.

Road studs may also be depressible or non-depressible. In the former, the stud is mounted in a base unit which is embedded into the carriageway. It is designed in such a way that a passing vehicle depresses the stud thus wiping the reflectors clean by a "squeegee" action. Non-depressible studs with rigid retroreflectors can be surface bonded or anchored using suitable adhesives, or embedded into the carriageway using a base unit.

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prEN 1463-1:2019 (E)

1 Scope

This document specifies the performance characteristics and laboratory test methods for retroreflecting road studs intended for use as permanent road marking materials.

This document does not cover non-retroreflective road studs.

Temporary road studs are also covered in a specific annex: Annex E (informative).

It also covers the relevant procedures for assessment and verification of the constancy of performance.

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.

prEN 1463-2:2019, *Road marking materials — Retroreflecting road studs — Part 2: Road test performance specifications*

ISO/CIE 11664-1:2019, *Colorimetry — Part 1: CIE standard colorimetric observers*

ISO 11664-2:2007, *Colorimetry — Part 2: CIE standard illuminants*

CIE publication No. 054.2-2001, *Retroreflection: Definition and measurement*

IEC/CIE publication No. 017.4-1987, *International lighting vocabulary, 4th ed. (Joint publication IEC/CIE)*

3 Terms, definitions and types

For the purposes of this document, the terms and definitions in CIE publication 17.4:1987 apply together with the following.

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 retroreflecting road stud (called “road stud” in this document)
horizontal guiding device that reflects incident light by means of retroreflectors (see 3.2) in order to warn, guide or inform road users

Note 1 to entry: Retroreflecting road studs may be constructed in either one or more integral parts and may be bonded to, anchored within or embedded within the road surface. The retroreflecting portion may be unidirectional or bidirectional, depressible or non depressible. This device may be either permanent (type P) or temporary (type T).

3.2 retroreflector
device which reverses the direction of visible light striking it and returns it along a path substantially parallel to its original path

Note 1 to entry: It may be made of glass (type 1), plastic (type 2) or plastic with an abrasion resistant surface (type 3). It may have a reflective coating at the back.

3.3**non depressible road stud**

substantially rigid road stud not designed to deform under the passage of traffic (type A)

3.4**depressible road stud**

road stud designed to have one or more parts which deform under traffic and recover to their original geometry after removal of the traffic load (type B)

3.5**bonded road stud**

road stud fixed to the road surface using an adhesive applied to the stud and/or to the road surface at the time of installation

3.6**self-adhesive road stud**

road stud precoated with adhesive

Note 1 to entry: An adhesion enhancer (see 3.7) may be required under some climatic conditions.

3.7**adhesion enhancer**

additional coating on the load bearing surface of the road stud or on the road surface which improves the performance of the adhesive bond

3.8**anchored road stud**

road stud fixed to the road surface using an anchor or spigot

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Note 1 to entry: The anchor(s) or spigot(s) may be an extension of the road stud body or a separate part(s) supplied for the purpose. The principal load bearing interface of the road stud and the road is between the surface of the road and the underside of the road stud.

3.9**embedded road stud**

road stud fixed into a prepared cavity of an appropriate dimension cut into the road surface

Note 1 to entry: The principal load bearing interface of the road stud and the road is between a downward facing surface of the road stud and an upward facing surface of the cavity.

3.10**types of road stud**

road studs are designated in this document in accordance with Tables 1, 2 and 3

Table 1 — Designation of road studs by use

Use	Type
Permanent road stud ^a	P
Temporary road stud ^b	T
^a Provides night-time warning guidance and information to road users. ^b Provides daytime and night-time warning guidance and information to the road user by stimulating the use of three senses. It is received visually and can be heard and felt through the rumble effect. Temporary road studs are used only at road construction/maintenance sites.	

Table 2 — Designation of road studs by reflector

Reflector	Type
Glass	1
Plastic	2
Plastic with abrasion resistant layer	3
NOTE The abrasion resistant layer is applied on the surface exposed to traffic.	

Table 3 — Designation of road studs by design

Design	Type
Non depressible road stud	A
Depressible road stud	B

4 Performance characteristics and assessment methods

4.1 General

For safety reasons the enveloping profile of the road studs shall not present any sharp edges in use. In addition, regardless the material used for manufacturing the body of the stud (plastic polymers, solid glass etc.), it shall not break down into small chunks or jagged shards by the action of the traffic.

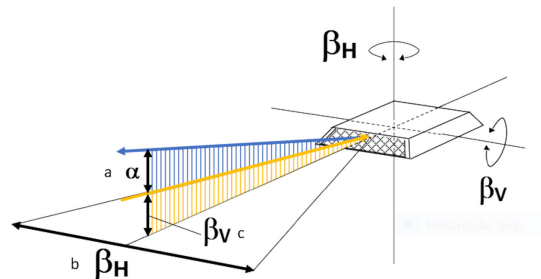
If the road stud consists of two or more parts, each replaceable part shall be removable only with a tool recommended by the manufacturer.

The performance of the road studs is defined by the following characteristics: dimensions; night time visibility; daytime visibility and resiliency.

4.2 Essential characteristics

4.2.1 Night time visibility

4.2.1.1 General explanation to angles



Key

- a observation angle 0,3°, 1°, 2°
- b entrance angle ± 5°, ± 10°, ± 15°
- c illumination angle 0°

Figure 1 — Definition of α , β_H , β_v

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4.2.1.2 Photometric characteristics

Photometric characteristics (coefficient of luminous intensity) shall be determined in accordance with 5.1.

The coefficient of luminous intensity (R) shall be determined in accordance with 5.1 (laboratory). Each retroreflective face of the road stud shall have a coefficient of luminous intensity (R) as designated (see Table 4) multiplied by the appropriate colour factor given in Table 5.

- class PRP 0 - no performance required;
- class PRP 1 - not less than given in Table 4.

Table 4 — Class PRP 1 - Minimum R values for type 1, type 2 and type 3 under $\beta_v = 0^\circ$ road studs as new

Entrance angle β_H $\beta_v = 0^\circ$	Observation angle α	Min. R $\text{mcd} \cdot \text{lx}^{-1}$		
		Type		
		1	2	3
± 15°	2°	2	2,5	1,5
± 10°	1°	10	25	10
± 5°	0,3°	20	220	150

Table 5 — Colour factors for the retroreflectors of road studs

Colour	Colour factor
White	1,0
Yellow	0,6
Amber	0,5
Red	0,2
Green	0,2
Blue	0,1

A road stud shall not be considered to fail the photometric requirements if the measured coefficient of luminous intensity at any one position of measurement is less than the values specified in Table 4 multiplied by the respective colour factor given in Table 5 provided that:

- a) the value is not less than 80 % of the specified minimum;
- b) the average of the left (-) and right (+) measurements for the specific angle is greater than the specified minimum.

4.2.2 Colorimetric characteristics for the retroreflective element

The chromaticity coordinates of retroreflected radiation of a road stud shall be determined in accordance with 5.2.

Measurements shall be carried out in accordance with ISO/CIE 11664-1:2019 and ISO 11664-2:2007 (2° visual field) and with an entrance angle $\beta_V = 0^\circ$, $\beta_H = 5^\circ$ and an observation angle of $\alpha = 0,3^\circ$.

The retroreflected radiation of a road stud shall be classified as follows and have chromaticity coordinates that lie within the permitted regions defined in Table 6.

- class NCR 0 - no performance required;
- class NCR 1 - as specified in Table 6.