



SLOVENSKI STANDARD

oSIST prEN 1463-3:2020

01-marec-2020

Materiali za označevanje vozišča - 3. del: Odsevniki: zahtevane lastnosti

Road marking materials - Part 3: Active road studs: performance requirements

Straßenmarkierungsmaterialien - Markierungsknöpfe - Teil 3: Selbstleuchtende Markierungsknöpfe

Produits de marquage routiers - Partie 3 : Plots actifs : exigences de performance

PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **prEN 1463-3**

oSIST prEN 1463-3:2020

<https://standards.iteh.ai/catalog/standards/sist/2f12d825-7ae6-464e-85fc-680c9ccc96bd/osist-pren-1463-3-2020>

ICS:

93.080.20 Materiali za gradnjo cest Road construction materials

oSIST prEN 1463-3:2020

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 1463-3:2020](#)

<https://standards.iteh.ai/catalog/standards/sist/2f12d825-7ae6-464e-85fc-680c9ccc96bd/osist-pren-1463-3-2020>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 1463-3

January 2020

ICS 93.080.20

English Version

Road marking materials - Part 3: Active road studs: performance requirements

Straßenmarkierungsmaterialien - Markierungsknöpfe -
Teil 3: Selbstleuchtende Markierungsknöpfe

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.

This draft European Standard was established by CEN 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.

[https://standards.iteh.ai/catalog/standards/sist/2f12d825-7ae6-464e-85fc-](https://standards.iteh.ai/catalog/standards/sist/2f12d825-7ae6-464e-85fc-680e9ccc96bd/osist-pr-en-1463-3-2020)

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

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

Contents	Page
European foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Product characteristics.....	7
4.1 Visibility characteristics expressed as day and night-time visibility.....	7
4.1.1 Night-time visibility (only for retroreflecting active road studs).....	7
4.1.2 Luminance (for day and night-time visibility) expressed as light output (cd).....	8
4.1.3 Chromaticity coordinates (x,y) (for day and night-time visibility).....	8
4.2 Light output frequency.....	9
4.3 Electrical safety.....	9
4.4 Electromagnetic compatibility.....	9
4.5 Ingress protection (IP code).....	9
4.6 Durability on road trials.....	9
5 Testing, assessment and sampling methods.....	9
5.1 Test of light output (luminous intensity cd).....	9
5.2 Test of Chromaticity coordinates (x,y) (for day and night-time visibility)	11
5.3 Test of light output flashing frequency	11
5.4 Ingress protection (IP code).....	11
5.5 Test of durability on road trials.....	11
6 Assessment and verification of constancy of performance – AVCP.....	12
6.1 General.....	12
6.2 Type testing.....	12
6.2.1 General.....	12
6.2.2 Test samples, testing and compliance criteria.....	13
6.2.3 Test reports.....	13
6.3 Factory production control (FPC)	14
6.3.1 General.....	14
6.3.2 Requirements	14
6.3.3 Product specific requirements.....	16
6.3.4 Initial inspection of factory and of FPC	17
6.3.5 Continuous surveillance of FPC.....	18
6.3.6 Procedure for modifications	18
6.3.7 One-off products, pre-production products (e.g. prototypes) and products produced in very low quantity	18
Annex ZA (informative) Relationship of this European Standard with Regulation (EU) No. 305/2011	20
ZA.1 Scope and relevant characteristics.....	20
ZA.2 System of Assessment and Verification of Constancy of Performance (AVCP).....	21
ZA.3 Assignment of AVCP tasks.....	21
Bibliography.....	23

European foreword

This document (prEN 1463-3:2020) 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 has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports basic work requirements of Regulation (EU) Nr. 305/2011.

For relationship with Regulation (EU) 305/2011, see informative Annexe ZA, which is an integral part of this document.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 1463-3:2020](https://standards.iteh.ai/catalog/standards/sist/2f12d825-7ae6-464e-85fc-680c9ccc96bd/osist-pren-1463-3-2020)

<https://standards.iteh.ai/catalog/standards/sist/2f12d825-7ae6-464e-85fc-680c9ccc96bd/osist-pren-1463-3-2020>

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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 1463-3:2020](https://standards.iteh.ai/catalog/standards/sist/2f12d825-7ae6-464e-85fc-680c9ccc96bd/osist-pren-1463-3-2020)

<https://standards.iteh.ai/catalog/standards/sist/2f12d825-7ae6-464e-85fc-680c9ccc96bd/osist-pren-1463-3-2020>

1 Scope

This document specifies the initial and the retained performance requirements and laboratory test methods for solar powered, hardwired and communicating active road studs intended for use as permanent road marking materials.

In accordance with Low Voltage Directive 2014/35/EU, product characteristic electrical safety is applicable only to those active road studs which are designed with voltage rating between 50 and 1 000 V for alternating current and between 75 and 1 500 V for direct current. Voltage ratings refer to the voltage of the electrical input or output, not to voltages that may appear inside the equipment.

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 1463-1:2009, *Road marking materials - Retroreflecting road studs - Part 1: Initial performance requirements*

EN 1463-2:2000, *Road marking materials - Retroreflecting road studs - Part 2: Road test performance specifications*

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code)*

EN 50293:2012, *Road traffic signal systems - Electromagnetic compatibility*

EN 60598-1:2015, *Luminaires - Part 1: General requirements and tests*

EN 60598-2-13:2006, *Luminaires - Part 2-13: Particular requirements - Ground recessed luminaires*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1463-1 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

active road stud

horizontal guiding device that is fixed to the surface of a road and emits light in order to warn, guide or inform road users

Note 1 to entry: An active road stud provides a light output by itself, while a retroreflective road stud provides retroreflected light when illuminated by the headlamps of a vehicle. Retroreflective road studs are covered by EN 1463-1:2009.

Note 2 to entry: An active road stud can be fitted with a retroreflector so that it provides a light output both directly and by retroreflection.

Note 3 to entry: An active road stud can be self-contained in the sense that it incorporates all light generation means and does not rely on an external source of light or power. Light generation means include one or more light sources, typically LED's, and a power supply, typically a battery that is charged by a solar panel integrated in the upper surface of the road stud.

prEN 1463-3:2020 (E)

Note 4 to entry: As opposed to a self-contained active road stud, an active road stud can also be hardwired in the sense that it receives light through fibre optics or power through a wire. Means to feed light or power are not considered in this document.

Note 5 to entry: An active road stud can have one or more luminous faces intended for emitting light in one or more traffic directions.

Note 6 to entry: An active road stud can emit light that appears constant to the human eye or be flashing at a low frequency. The emitted light can be any of the colours white, yellow/amber, red, green or blue.

Note 7 to entry: As with a retroreflective road stud, an active road stud can be fixed to a road surface by being bonded to, entered within or embedded within the road surface. Additionally, an active road stud can be depressible or non-depressible.

3.2 luminance expressed as light output (cd)

for the purpose of this document the term luminance expressed as light output (cd) is used to describe luminous intensity measured in cd

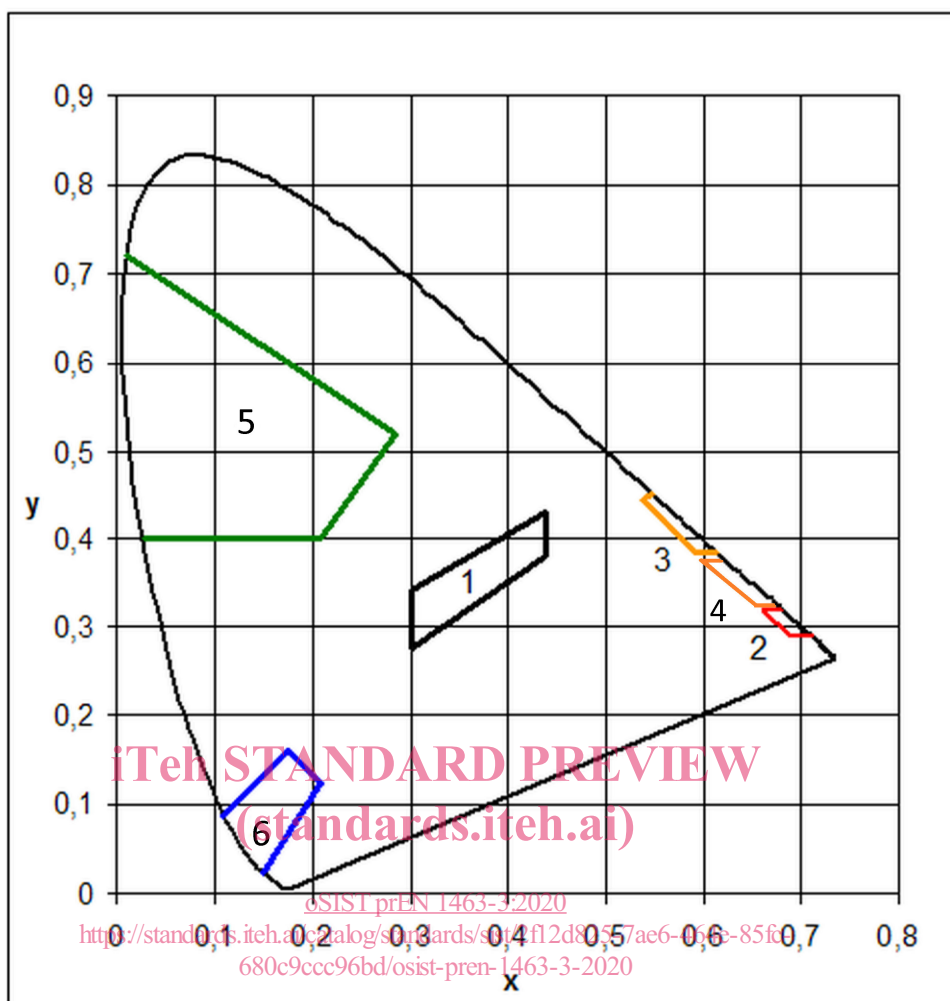
3.3 chromaticity co-ordinates (x,y)

chromaticity coordinates of the colours are defined in accordance with the CIE 1931 Standard Colorimetric 2° Observer as referenced in CIE 15

Note 1 to entry: For the purpose of this standard colours white, red, yellow/amber, orange, green and blue are defined using chromaticity coordinates of corner points of chromaticity regions for emitted radiation as specified in Table 1 and outlined in Figure 1.

Table 1 — Corner points of chromaticity regions for emitted radiation

Colour		Colour coordinates of corner points			
		1	2	3	4
White	x	0,300	0,440	0,440	0,300
	y	0,342	0,432	0,382	0,276
Red	x	0,660	0,680	0,710	0,690
	y	0,320	0,320	0,290	0,290
Yellow/Amber	x	0,536	0,547	0,613	0,593
	y	0,444	0,452	0,387	0,387
Orange	x	0,624	0,605	0,650	0,669
	y	0,370	0,370	0,331	0,331
Green	x	0,009	0,284	0,209	0,028
	y	0,720	0,520	0,400	0,400
Blue	x	0,109	0,173	0,208	0,148
	y	0,087	0,160	0,125	0,025



Key

- 1 white
- 2 red
- 3 yellow/amber
- 4 orange
- 5 green
- 6 blue

Figure 1 — Chromaticity regions for emitted radiation of active road studs

4 Product characteristics

4.1 Visibility characteristics expressed as day and night-time visibility

4.1.1 Night-time visibility (only for retroreflecting active road studs)

Retro-reflectivity for night-time visibility (only for retroreflecting active road studs) expressed as Coefficient of Luminous Intensity (R') is provided in EN 1463-1:2009, 5.3.

prEN 1463-3:2020 (E)

4.1.2 Luminance (for day and night-time visibility) expressed as light output (cd)

The light output (luminous intensity cd) of an active road stud is described by the minimum luminous intensities supplied by each luminous face of the active road stud in a number of directions defined by a horizontal and a vertical angle. These directions shall cover reference direction and at least combinations of the two angles as given in Table 2. Additionally, the light output is described by the maximum luminous intensity supplied by each luminous face of the active road stud in any direction. Reference direction is given by manufacturer.

Table 2 — Combinations of horizontal (H) and vertical (V) angles for measurement of luminous intensity

Direction	Angle combination in (°)										
	-15	-10	-7	-5	-2	0	2	5	7	10	15
Horizontal											
Vertical	2,67	1,83	—	1	0,5	0	0,5	1	—	1,83	2,67
	10	6	—	3	2	0,5	2	3	—	6	10
	—	—	7	4	—	2	—	4	7	—	—
						3					
						4					
						6					
						7					
						10					

When light is emitted in pulses in periods of less than 0,5 s, the luminous intensities are to be understood as effective luminous intensities I_{eff} calculated using the Blondell-Rey Formula (1):

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

where

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

NOTE When light is emitted only within a time interval Δt and $I(t)$ is constant at I within that time interval, I_{eff} can be determined by:

$$I_{\text{eff}} = \frac{I \times \Delta t}{0,2 + \Delta t}$$

The declared values shall be tested in accordance with 5.1.

4.1.3 Chromaticity coordinates (x,y) (for day and night-time visibility)

When tested in accordance with 5.2, the emitted radiation of each luminous face of an active road stud shall be described by measured chromaticity coordinates (x,y) and declared as either of the colours white, red, yellow/amber, orange, green or blue.

Chromaticity coordinates (x,y) of retro-reflected light (only for retroreflecting active road studs) are provided in EN 1463-1:2009, 5.3.

4.2 Light output frequency

Active road studs can emit light in pulses/flushes. The lowest flashing frequency of the light emitted is determined as the number of pulses per minute and expressed in Hz. The lowest flashing frequency of the light emitted shall be measured in accordance with 5.3.

4.3 Electrical safety

Active road studs with input or output voltages between 50 and 1 000 V for alternating current and between 75 and 1 500 V for direct current shall conform to EN 60598-1:2015 when tested in accordance with EN 60598-2-13:2006.

4.4 Electromagnetic compatibility

Active road studs shall conform to EN 50293:2012 when tested in accordance with EN 50293:2012, Clause 7 for electromagnetic emission and EN 50293:2012, Clause 8 for electromagnetic immunity.

4.5 Ingress protection (IP code)

Protection against dust and water shall be declared in accordance with EN 60529 and tested in accordance with 5.4.

4.6 Durability on road trials

The durability of retro-reflectivity for night-time visibility of retroreflecting active road studs is tested after road trials in accordance with EN 1463-2. During this test, the retroreflecting active road studs need not have any light output.

The durability of the following characteristics of active road studs shall be tested after a road trial in accordance with 5.5:

- Luminance (for day and night-time visibility) expressed as Light output (Cd) declared in accordance with 4.1.2 in reference direction.
- Chromaticity coordinates (x,y), for night-time declared in accordance with 4.1.3.
- Light output frequency (Hz) declared in accordance with 4.2.

The characteristics are measured both before and after exposure to the road trial.

5 Testing, assessment and sampling methods

5.1 Test of light output (luminous intensity cd)

A luminous face of an active road stud is assigned a reference centre and a reference direction, which points against the traffic direction intended for that luminous face.

The active road stud is mounted in a goniometer such as shown in Figure 2, with the reference centre in the rotation centre of the goniometer and the reference direction pointing along the optical bench towards a photometer.

The photometer is placed at such a distance D between the locations 1 and 4 in Figure 2 that neither the luminous face nor the receptive surface of the photometer exceeds 10' (minutes of arc) as seen from that distance.