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Materiali za oznaģ evanje voziģ a - Odsevniki - 1. del: 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 rétroréflechissants - Partie 1 : Exigences initiales de performance

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

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 1463-1:1997/A1:2009) has been prepared by Technical Committee CEN/TC 226 “Road equipment”, the secretariat of which is held by AFNOR.

This Amendment to the European Standard EN 1463-1:1997 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by September 2009.

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This European Standard supersedes EN 1463-1:1997.

The technical change incorporated in this revision is the Table ZA.1 in Annex ZA.

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Introduction

In Mandate M/111, there is a clear requirement for durability in use. In order to meet this requirement, EN 1463-1 specifies, in Annex ZA Table ZA.1, the standard EN 1463-2 (Road test performance specifications).

However, in the current Table ZA.1, the classes S0 and R0 (no performance determined) are included (just as a way to reflect the result of the mentioned durability test, which requires 1-year of road exposure for the applicant studs) and some notified bodies have interpreted this as meaning that it is not required to test to EN 1463-2 and consequently CE marks are being granted without durability being tested. However, in other cases, the mentioned test has been carried out; therefore, both types of road studs are now in the market granting a “well different” class of CE-marking.

In order to rectify this unsatisfactory situation it is proposed to amend the requirement for “R” to become R1 to R4 - i.e. eliminating R0, which might have caused the confusion, and thus meaning that a road test has to be carried out and the requirement for durability is met. In addition, it is also proposed that the requirement for “S” is deleted as this is not necessary to also have this to ensure durability is tested.

1 Scope

This European Standard specifies the initial performance requirements and laboratory test methods for retroreflecting road studs intended for use as permanent and temporary road marking materials.

2 Normative references

The following referenced documents are indispensable for the application 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 1463-2:2000, *Road marking materials – Retroreflecting road studs – Part 2: Road test performance specifications*

ISO 10526, *CIE standard illuminants for colorimetry*

ISO 10527, *CIE standard colorimetric observers*

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 and definitions

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

3.1
retroreflecting road stud (called “road stud” in this standard)
horizontal guiding device that reflects incident light by means of retroreflectors (see 3.2) in order to warn, guide or inform road users

NOTE 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 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 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

NOTE 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 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.

4 Types of road stud

Road studs are classified in this European Standard in accordance with Tables 1, 2 and 3.

Table 1 - Classification of road studs by use

Use	Type
Permanent road stud [1)]	P
Temporary road stud [2)]	T

[1)] Provides night-time warning guidance and information to road users.

[2)] 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 - Classification 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 - Classification of road studs by design

Design	Type
Non depressible road stud	A
Depressible road stud	B

5 Performance requirements

5.1 Construction

For safety reasons the enveloping profile of the road studs shall not present any sharp edges to 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.

5.2 Dimensions

The height of that part of a road stud designed to be above the road surface shall be as follows:

- class H 0 - no performance determined;
- class H 1 - up to 18 mm;
- class H 2 - from more than 18 mm to 20 mm;
- class H 3 - from more than 20 mm to 25 mm.

NOTE Class H 0 road studs are not intended to be subjected to traffic load.

Maximum horizontal dimensions of that part of a road stud which is exposed to traffic after installation are classified as follows:

- class HD 0 - no performance determined;
- class HD 1 - in the direction of travel: length 250 mm, width 190 mm;
- class HD 2 - in the direction of travel: length 320 mm, width 230 mm.

NOTE Class HD 0 road studs are intended for use when other functional needs of the road stud are required (e.g. to be snowploughed).

Minimum horizontal dimensions of that part of a **temporary** road stud which is exposed to traffic after installation are classified as follows:

- class HDT 0 - no performance determined;
- class HDT 1 - in the direction of travel: length 35 mm, width 84 mm;
- class HDT 2 - in the direction of travel: length 75 mm, width 90 mm.

5.3 Night-time visibility

5.3.1 Photometric requirements

5.3.1.1 Permanent road stud

When tested in accordance with Annex A, each retroreflective face of the road stud shall have a coefficient of luminous intensity (R) as classified (see Table 4) multiplied by the appropriate colour factor given in Table 5.

- class PRP 0 - no performance determined;
- 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 road studs as new

Entrance angle β_H $\beta_V = 0°$	Observation angle α	Min. R mcd · 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

5.3.1.2 Temporary road studs

When tested in accordance with Annex A, each retroreflective face of the road stud shall have a coefficient of luminous intensity (R) as classified (see Tables 6 to 8) multiplied by the appropriate colour factor given in Table 5:

- class PRT 0 - no performance determined;
- class PRT 1 - not less than Table 6;
- class PRT 2 - not less than Table 7;
- class PRT 3 - not less than Table 8.

The minimum R values for type 1, type 2 and type 3 road studs, as new, are given in Tables 6 to 8.

Table 6 - Class PRT 1 - Minimum R values for type 1, type 2 and type 3 read studs as new

Entrance angle β_H $\beta_V = 0°$	Observation angle α	Min. R mcd · 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 7 - Class PRT 2 - Minimum R values for type 1, type 2 and type 3 road studs as new

Entrance angle β_H $\beta_V = 0°$	Observation angle α	Min. R mcd · lx^{-1}		
		Type		
		1	2	3
± 15°	2°	1,4	2,0	1,4
± 10°	1°	7	10	7
± 5°	0,3 °	13	60	40

Table 8 - Class PRT 3 - Minimum R values for type 1, type 2 and type 3 road studs as new

Entrance angle β_H $\beta_V = 0°$	Observation angle α	Min. R mcd · lx^{-1}		
		Type		
		1	2	3
± 10°	1°	7	10	7
± 5°	0,3 °	13	60	40

5.3.1.3 Interpretation of the results

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 Tables 4 or 6 to 8, multiplied by the respective colour factor given in Table 5 provided that:

a) the value is not less than 80 % of the specified minimum; and

b) the average of the left (-) and right (+) measurements for the specific angle is greater than the specified minimum.

5.3.2 Colorimetric requirements

When tested in accordance with Annex B, the retroreflected radiation of a road stud shall be classified as follows and have chromaticity co-ordinates that lie within the permitted regions defined in Table 9.

- class NCR 0 - no performance determined;
- class NCR 1 - as specified in Table 9.

Measurements shall be carried out in accordance with ISO 10526 and ISO 10527 (2° visual field) and with an entrance angle $\beta_V = 0°$, $\beta_H = 5°$ and an observation angle of $\alpha = 0,3°$.