BRITISH STANDARD

BS EN 1463-1:2009

Road marking materials — Retroreflecting road studs

Part 1: Initial performance requirements

ICS 93.080.20

BSI British Standards

National foreword

This British Standard is the UK implementation of EN 1463-1:2009. It supersedes BS EN 1463-1:1998 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/509/2, Horizontal road markings and road studs.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Straßenmarkierungsmaterialien - Markierungsknöpfe - Teil 1: Anforderungen im Neuzustand

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Contents

Page

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of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by September 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This European Standard supersedes EN 1463-1:1997.

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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 $\alpha = 0{,}3°$.

Table 9 - Corner points of chromaticity regions for retroreflected radiation of permanent and temporary road studs as new - class CNR1

Colour	Point	x	y
White (uncoloured)	1	0,390	0,410
	2	0,440	0,440
	3	0,500	0,440
	4	0,500	0,390
	5	0,420	0,370
Yellow	1	0,539	0,460
	2	0,530	0,460
	3	0,580	0,410
	4	0,589	0,410
Amber	1	0,549	0,450
	2	0,543	0,450
	3	0,590	0,395
	4	0,605	0,395
Red	1	0,665	0,335
	2	0,645	0,335
	3	0,721	0,259
	4	0,735	0,265
Green	1	0,030	0,385
	2	0,228	0,351
	3	0,321	0,493
	4	0,302	0,692

NOTE 1 If two of the points lie on the spectrum locus line, they shall not be connected by a straight line but shall, in this case, be joined by the boundary of the spectrum locus.

NOTE 2 The night-time colours of retroreflective materials are at present being studied by the International Commission on Illumination (CIE TC 2.19). The limits given in this table are therefore of a provisional nature. It is proposed that these will be revised once TC 2.19 has completed its work.

5.4 Daytime visibility of temporary road studs

When tested in accordance with Annex C and using the measuring geometry 45/0 the road stud body shall have chromaticity coordinates that lie within the permitted regions defined in Table 10 and shall have the minimum luminance factor given in Table 10. Daytime visibility is classified as follows:

- class DCR 0 - no performance determined;
- class DCR 1 - as specified in Table 10.

Table 10 - Corner points of chromaticity regions and minimum luminance factor for temporary road stud bodies as new - class DCR 1

Colour	Point	x	y	Luminance factor β
White	1 2 3 4	0,350 0,300 0,290 0,340	0,360 0,310 0,320 0,370	≥ 0,75
Fluorescent green-yellow	1 2 3 4	0,380 0,320 0,380 0,460	0,620 0,540 0,480 0,540	≥ 0,75
Yellow	1 2 3 4	0,522 0,470 0,427 0,465	0,477 0,440 0,483 0,534	≥ 0,45

5.5 Resilience of depressible road studs

When tested in accordance with Annex D depressible road studs shall show no breakdown of the depressing action and no permanent deformation of such an extent that the retroreflecting part is permanently obscured, even partially.

6 Road stud fixing

All road studs shall be laid in accordance with the manufacturer's instructions.

Removal of temporary road studs shall be possible without damage to the road surface and with a minimum of residue.

7 Marking

All road studs shall be clearly and permanently marked. The following information shall be on the road stud or the packaging or the accompanying commercial documents using a hierarchical method in that order:

a) name or identifying mark of the manufacturer;
b) the road stud type and performance classes as identified in Clauses 4 and 5 of this standard and Clause 6 of EN 1463-2:2000.

Minimum information on the product:

c) the name or identifying mark of the manufacturer.

On the packaging:

d) all information given on the product, plus
e) the road stud type and performance classes as identified in Clauses 4 and 5 of this standard and Clause 6 of EN 1463-2:2000.

On the accompanying commercial documents:

f) none, if **all** information has already been supplied on the product and packaging;
g) any information which **has not already been given** on the product or packaging **plus** all the information given on the product and packaging.

NOTE When annex ZA of this European Standard is used, any information concerning Marking and Labelling in the framework of that Annex should be shown separately from the requirements of this clause (in EN 1463-1) and should be given within the format prescribed in the applicable clause in Annex ZA. In these circumstances, when specific information pertaining to this clause (in EN 1463-1) has already been supplied through the Annex ZA, it does not need to be duplicated.

Annex A
(normative)

Test method for the determination of the coefficient of luminous intensity

A.1 General

The purpose of this test is to determine the coefficient of luminous intensity R (see CIE publication 17.4) of permanent or temporary retroreflecting road studs. The test may be carried out in the laboratory or in the field trial site.

A.2 Apparatus

A.2.1 Light source, which shall be a stable source and conform to the CIE Standard Illuminant A in its spectral power distribution**.** Its aperture shall be at most 10´;

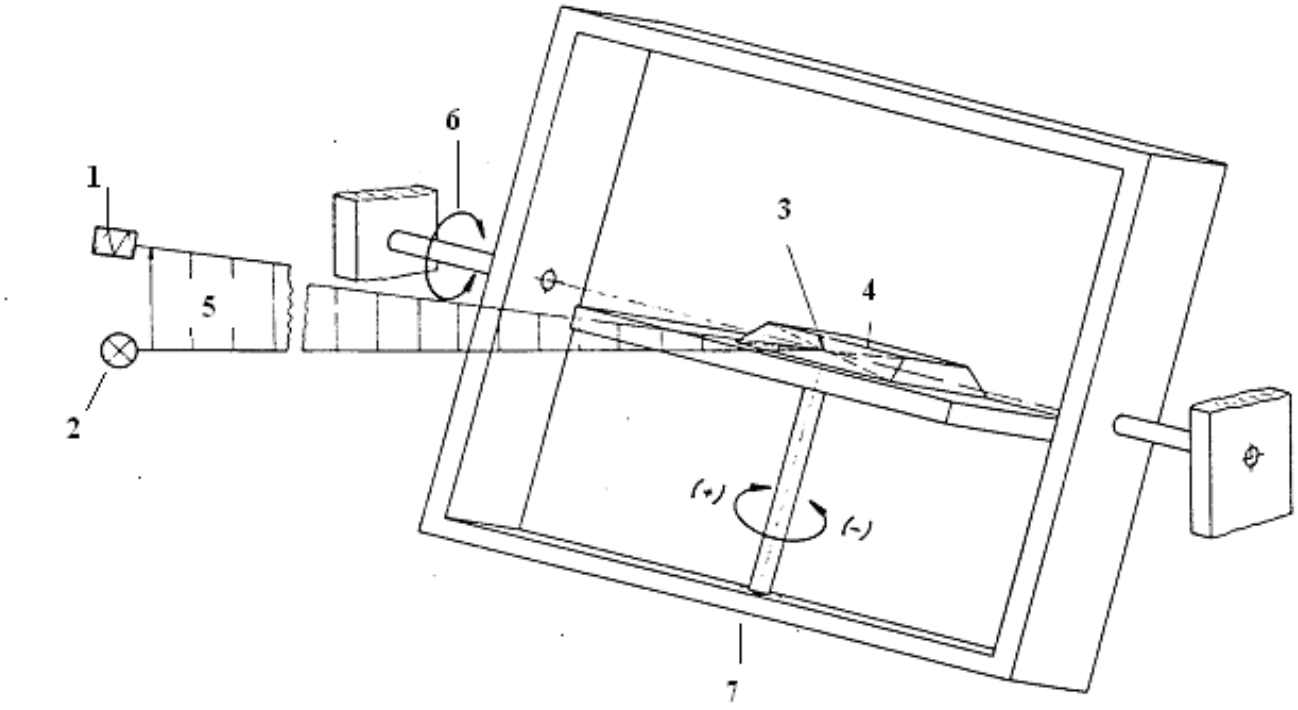
A.2.2 Test piece holder, which shall be capable of holding a road stud such that the entrance angle can be varied in the horizontal plane from 0° to minimum 15° either side of the zero position.

A.2.3 Light measuring instruments

a) **A photoelectric receptor** having a circular aperture of at most 10´**.** It shall have the relative spectral response of the CIE Standard Photometric Observer. The receptor is placed above the light source and the observation plane is thus vertical.

b) **An illuminance meter** with appropriate sensitivity and good linearity of the photometric scale.

NOTE The distance between the road stud under test and the photoelectric receptor position will be determined by the physical size of available light sources and receptors and the required angles of observation. A minimum test distance of 10 m is recommended**.**



Key

1 Photometer head
2 Source
3 Reference point
4 Road stud
5 Angle of observation α
6 Entrance angle first axis β (V)
7 Entrance angle second axis β (H)

Figure A.1 - Angular reference used in the determination of R for retroreflecting road studs

A.3 Procedure

Measure the illuminance produced by the light source at the road stud reference point position perpendicular to the light source (see Figure A.1).

Place the road stud under test in position**.** Take readings of luminous intensity (I) at the required testing geometries. Ensure that there are no stray light influences.

Photometric calibration techniques and measurement precautions shall be in accordance with CIE publication No. 54:1982.

A.4 Calculation and expression of results

Calculate R using Equation A.1 or A.2:

$$R = \frac{I}{E_{\perp}} \qquad \text{(A.1)}$$

or

$$R = \frac{10^3 M_1 D^2}{M_{2\perp}} \qquad \text{(A.2)}$$

where:

I is the luminous intensity of the road stud, in millicandelas;

$E_\perp$ is the illuminance at the stud perpendicular to the light source, in lux;

R is the coefficient of luminous intensity, in millicandelas per lux;

M_1 is the reading of illuminance at the point of observation produced by the road stud;

$M_{2\perp}$ is the reading of illuminance of source at the road stud reference point;

D is the distance between the road stud and receptor, in meters.·

Annex B
(normative)

Test method for the determination of chromaticity co-ordinates of retroreflected radiation

B.1 General

The purpose of this test is to determine the chromaticity co-ordinates of retroreflected radiation of retroreflectors incorporated in permanent or temporary road studs.

The basic instrumentation may follow either a spectral or a tristimulus method. However, a spectral technique is generally to be preferred.

B.2 Apparatus

B.2.1 Light source, which shall be stable. For the tristimulus method it shall conform to the CIE Standard Illuminant A in its spectral power distribution.

B.2.2 Test piece holder, capable of holding a road stud at an entrance angle β_H of 5°.

B.2.3 Colour measuring instruments, for spectral measurements use a spectroradiometer with good linearity of the scale and wavelength position. For the tristimulus method, use a colorimeter with a photoelectric receptor the spectral response of which closely matches the required tristimulus functions.

B.3 Procedure

Set the apparatus and the road stud to be tested at an angle of observation α of 0,3° and an entrance angle β_H of 5°.

Using the spectral method, take the readings of the light source (M_2) and the road stud (M_1) at intervals of 10 nm or less over the visible region of the spectrum.

Using the tristimulus testing method, take the readings of the X, Y and Z functions of the road stud.

Measurement techniques and measurement precautions shall be in accordance with CIE publication No. 54:1982. Colour functions and calculation methods shall be in accordance with ISO 10526 and ISO 10527.

B.4 Calculation and expression of results

B.4.1 Spectral method

Calculate the coefficient of reflection of the retroreflector for each wavelength, λ, of measurement using Equation B.1.

$$R_{(\lambda)} = \frac{M_{1(\lambda)}}{M_{2(\lambda)}} \qquad \text{(B.1)}$$

Calculate tristimulus values X, Y, Z using Equation B.2, B.3 and B.4.

$$X = k \sum_{380}^{780} R_{(\lambda)} \; S_{(\lambda)A} \; \bar{x}_{(\lambda)} \; \Delta\lambda \qquad \text{(B.2)}$$

$$Y = k \sum_{380}^{780} R_{(\lambda)} \; S_{(\lambda)A} \; \bar{y}_{(\lambda)} \; \Delta\lambda \qquad \text{(B.3)}$$

$$Z = k \sum_{380}^{780} R_{(\lambda)} \; S_{(\lambda)A} \; \bar{z}_{(\lambda)} \; \Delta\lambda \qquad \text{(B.4)}$$

where:

$R_{(\lambda)}$ is the coefficient of spectral reflection;

$S_{(\lambda)A}$ is the relative spectral power distribution of Standard Illuminant A;

$\bar{x}_{(\lambda)}$, $\bar{y}_{(\lambda)}$, $\bar{z}_{(\lambda)}$ are the colour matching functions of a standard colorimetric observer;

k is a constant.

Calculate chromaticity co-ordinates x and y using Equations B.5 and B.6:

$$x = \frac{X}{X + Y + Z} \qquad \text{(B.5)}$$

$$y = \frac{Y}{X + Y + Z} \qquad \text{(B.6)}$$

B.4.2 Tristimulus method

Calculate chromaticity co-ordinates x and y from the readings X, Y and Z using Equations B.5 and B.6.

Annex C
(normative)

Test method for the determination of chromaticity co-ordinates and luminance factor for daytime visibility

C.1 General

The purpose of this test is to determine the chromaticity co-ordinates and the luminance factor of road stud bodies for daytime visibility.

C.2 Apparatus

C.2.1 Light source, which shall be stable. It shall conform to the CIE Standard Illuminant D_{65} in its spectral power distribution.

C.2.2 Colour measuring instrumentation for the reflected radiation based on either direct measurement of the stimuli X, Y, Z by means of filtered detectors (tristimulus method) or on spectral measurement followed by computation of tristimulus values and chromaticity co-ordinates.

C.3 Measurement and calculation

A measuring geometry of 45/0 shall be used.

Measurements and calculations of chromaticity co-ordinates and luminance factor shall be in accordance with ISO 10526 and ISO 10527 (2° visual field) with the road stud placed on a black background of luminance factor not greater than 0,03.

Annex D
(normative)

Test method for the determination of the resilience of depressible road studs

D.1 Apparatus

D.1.1 Depression testing machine with adjustable depth of depression and a depression rate of (60 ± 3)/min;

D.1.2 Stable bed plate capable of providing a secure mount for the road stud to be tested.

D.2 Procedure

The test shall be carried out at (23 ± 2) °C.
Mount the road stud securely on the bed plate and subject the depressible part of the road stud to 72 000 depressions at a rate of (60 ± 3) depressions per minute, the depth of the depressions being either to the top edge of the reflector face or to the extent to which the part is depressed by normal traffic, whichever is the greater.

D.3 Evaluation of the test

At the end of the test observe the road stud for breakdown of the depressing action or for a permanent deformation to such an extent that the reflecting part is permanently obscured, even partially. Assess and report any such breakdown or permanent deformation.

Annex ZA
(informative)

Clauses of this European Standard addressing the provisions of the EU Construction Products Directive

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under mandate M/111 “Circulation Fixtures” given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard shown in this Annex meet the requirements of the mandate given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the single axis hinges covered by this Annex for the intended uses indicated herein; reference shall be made to the information accompanying the CE marking.

WARNING: Other requirements and other EU Directives, not affecting the fitness for intended uses, can be applicable to the single axis hinges falling within the scope of this European Standard.

NOTE 1 In addition to any specific clauses relating to dangerous substances contained in this standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

NOTE 2 An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (accessed through: http://ec.europa.eu/enterprise/construction/internal/dangsub/dangmain_en.htm).

This Annex establishes the conditions for the CE-marking of the retroreflecting road studs intended for the use indicated in Table ZA.1 and shows the relevant clauses applicable. The scope of this Annex is defined in Table ZA.1.

Table ZA.1 - Relevant clauses

Product: Retroreflecting road studs **Intended use(s)**: For circulation areas			
Essential characteristics	**Requirement clauses in this [and/or another] standard**	**Mandated level(s) or class(es):**	**Notes**
Night time visibility characteristics			
Retroreflectivity	5.3.1.1 of EN 1463-1	None	Threshold levels for Types 1, 2 and 3 road studs, as new, are respectively specified for all colours
Colorimetric requirements Chromaticity co-ordinates (x,y)	5.3.2 of EN 1463-1	None	Pass/fail criteria is specified
Durability in use	EN 1463-2:2000	None	Applicant studs are classified according to their retained performance by: Classes R1 to R4 (% Mean R-value)

The requirement on a certain characteristic is not applicable in those Member States where there are no regulatory requirements for that characteristic for the intended use of the product. In this case, manufacturers placing their products on the market of these Member States are not obliged to determine or declare the performance of their products with regard to this characteristic and the option "no performance determined" (NPD) in the information accompanying the CE marking (see Clause ZA.3) may be used.

The “no performance determined” (NPD) option may not be used, however, where the essential characteristic being relevant for the intended use of the product is subjected to a threshold level or pass/fail criteria.

ZA.2 Procedure(s) for the attestation of conformity of retroreflecting road studs

ZA.2.1 System of attestation of conformity

The system of attestation of conformity for the retroreflecting road studs, in accordance with the decision of the Commission of 24 June 1996 (96/579/EC) as given in Annex III of the mandate M/111 "Circulation Fixtures” is shown in Table ZA.2 for the indicated intended use.

Table ZA.2 - System of attestation of conformity

Product(s)	Intended use(s)	Level(s) or class(es)	Attestation of conformity system(s)
- Permanent marking tapes and preformed road markings - Traffic paints, hot applied thermoplastics, cold applied plastics (with or without anti-skid aggregates) including premixed glass beads - Traffic paints, hot applied thermoplastics, cold applied plastics (to be used for road marking) put on the market with indications on types and proportions of dropped-on glass beads and/or anti-skid aggregates - Retroreflecting road studs	For circulation areas	None	1
System 1: See Directive 89/106/EEC (CPD) Annex III.2.(i), without audit-testing of samples			

NOTE Despite the fact that this European Standard is limited in its scope to retroreflecting road studs, the list of mandated products has been copied, in Table ZA.2, exactly as it is in mandate M/111 “Circulation Fixtures”.

The attestation of conformity of the retroreflecting road studs falling within the scope of this European Standard shall be carried out in accordance with the evaluation of conformity procedures indicated in Table ZA.3.

Table ZA.3 - Assignment of evaluation of conformity tasks (for System 1)

Tasks		Content of the task	Clauses to apply
Tasks for the manufacturer	(1) Factory production control (F.P.C)	All characteristics of Table ZA.1	EN 13212:2001
	(2) Further testing of samples taken at factory	All relevant characteristics of Table ZA.1	Subclause 5.5 of EN 13212:2001, as appropriate
Tasks for the certification body	(3) Initial type testing	All characteristics of Table ZA.1	Subclauses 5.3.1.1 and 5.3.2 of EN 1463-1 and EN 1463-2:2000, as appropriate
	(4) Initial inspection of factory and of F.P.C	All characteristics of Table ZA.1	EN 13212:2001, as appropriate
	(5) Continuous surveillance, assessment and approval of F.P.C.	All relevant characteristics of Table ZA.1	EN 13212:2001, as appropriate

A manufacturer having a Quality System conforming with EN ISO 9001 and which addresses the requirements of this Annex, is recognised as satisfying the F.P.C requirements specified in Table ZA.3.

Where the retroreflecting road studs falling within the scope of this European Standard have previously been tested in accordance with all the relevant requirements herein specified, such tests may be taken into account for initial type testing purposes in order to avoid unnecessary additional testing burden.

ZA.2.2 Certificate and Declaration of Conformity

When compliance with the system of attestation of conformity is achieved, the approved certification body shall draw up and retain a Certificate of Conformity (EC Certificate of Conformity) with the information indicated below.

The EC Certificate of Conformity shall include the following information:

a) name, address and identification number of the approved certification body,

b) name and address of the manufacturer, or his authorised representative established in the EEA and place of production,

c) description of the product (at least type and dimensions, according to EN 1463-1/subclauses 4 and 5.2 respectively), its intended use (e.g. for trafficked areas) and fixing instructions according to EN 1463-1/clause 6,

d) copy of the CE-marking information,

e) provisions to which the product conforms (i.e. Annex ZA of this European Standard),

f) particular conditions applicable to the use of the product, if any,

g) the product conformity certificate number,

h) conditions and period of validity of the certificate, where applicable, and

i) name of, and position held by, the person empowered to sign the certificate.

This EC Certificate of Conformity entitles the manufacturer to affix the CE marking, as described in Clause ZA.3 of this Annex.

In addition, for each product covered by an EC Certificate of Conformity, the manufacturer shall draw up a Declaration of Conformity (EC Declaration of conformity) including the following information:

j) provisions to which the product conforms (i.e. Annex ZA of this European Standard),

k) particular conditions applicable to the use of the product, if any,

l) name and address of the manufacturer, or his authorised representative established in the EEA,

m) name and address of the approved certification body,

n) description of the product and a copy of the information accompanying the CE-marking,

o) number of the attached EC Certificate of Conformity, and

p) name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.

Both documents must be presented, by supplying with the original documents the corresponding translations, in the official language or languages of the Member State of the EU in which the product is to be used.

ZA.3 CE marking and labelling

The CE-marking must be affixed visibly, legibly and indelibly, with the form as described in Council Directive 93/68/EC and in Council Decision 93/465/EC, and must be easily accessible to the market surveillance authorities.

The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking must be affixed before the product is placed on the market. The manufacturer, or his authorised representative established within the EEA, may decide when to affix the CE marking depending upon the circumstances of the production process of the product. Where the CE marking is affixed sometime after the manufacture of the product, the validity of the testing carried out during production must be confirmed.

The CE conformity marking consists exclusively of the letters “CE”, in the previously specified form, followed by the identification number of the approved certification body and then the following additional information:

a) the name or identifying mark of the producer and registered address;

b) the last two digits of the year in which the marking was affixed;

c) the number of the EC certificate of conformity;

d) the number and the year of this European Standard (i.e. EN 1463-1:2009);

e) the description of the product and intended use;

f) the indications on how to identify the mandated characteristics of the product;

g) characteristics against which the “No performance determined” (NPD) option is relevant.

NOTE This (name or identifying mark of the producer) is the name of the manufacturer not the authorised representative established in the EEA. The purpose of this information is to identify the legal entity responsible for the manufacture of the product. The CPD does not require the manufacturer to be established in the EEA nor does it require that a manufacturer from a non-EEA country has an authorised representative established in the EEA however, the entity affixing the CE-marking does.

The CE symbol and the name or identifying mark of the producer **is the minimum marking that must appear on the product**. The other essential information shall be placed, 1) on the product, or 2) on the packaging, or 3) on the accompanying commercial documents. These options represent a hierarchy of preference. Additionally, the location lower in the hierarchy must repeat that part of the information already placed higher up in the hierarchy.

The information affixed on the product shall be placed so that it is clearly visible after installation carried out in accordance with the manufacturer's instructions.

On the packaging:

h) all information given on the product, plus

i) the identification number of the approved certification body,

j) the indications to identify the type of product according to EN 1463-1, clause 4 (e.g. P2A for a P/permanent, 2/with plastic retroreflectors, A/non depressible road stud) and its intended use,

k) the number and the year of this European Standard (i.e. EN 1463-1:2009),

l) the last two digits of the year in which the marking was affixed,

m) the number of the EC certificate of conformity,

n) the indications on how to identify the mandated characteristics of the product, and

o) characteristics against which the “No performance determined” (NPD) option is relevant.

On the accompanying commercial documents:

p) none, if **all** the information has already been supplied on the product and on the packaging;

q) any information which **has not already been given** on the product or packaging **plus** all the information given on **the product and on the pac**kaging.

The identification o**f th**e mandated characteristics shall be made as follows:

EN 1463-1	- European Standard of reference including the year of publication of the last applicable version.
Retroreflectivity	- Types of retroreflectors are classified in EN 1463-1, Clause 4 Table 2. Declare which type (i.e. Type 1, Type 2 or Type 3).

Colorimetric requirements	
Chromaticity co-ordinates	- Colours of retroreflectors are listed in EN 1463-1, Clause 5 Table 5. Declare the Colour.
Durability in use	- Classes of durability are obtained by compliance with EN 1463-2. Declare the performance class obtained by using the criteria established in EN 1463-2:2000, Clause 6.

In the following **example**, a format for the presentation of the CE marking and accompanying information is given:

Table ZA.4 - Example of CE-marking information

CE **0123-CPD-0001**	*CE conformity marking, consisting of the "CE"-symbol as given in directive 93/68/EEC.* *Identification number of the approved certification body*
AnyCo Ltd, PO Box 21, B-1050 **09** **P2A** **0123-CPD-0456** **EN 1463-1:2009** **Mandated characteristics:** • **Retroreflectivity – Type 2** • **Retroreflector colour – WHITE** • **Durability in use – R2** **Release of dangerous substances**	*Name or identifying mark and registered address of the producer* *Last two digits of the year in which the marking was affixed* *Type of retroreflecting road stud according to EN 1463-1/Clause 4* *Number of the EC Certificate of Conformity* *Number and year of this European Standard* *According to EN 1463-1, as appropriate:* *See Clause 4, Table 2* *See 5.3.2, Table 9* *Performing classes after road trials in accordance with EN 1463-2:2000* *Information on product and on regulated characteristics*

In addition to any specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliance is claimed together with any information required by that legislation. European legislation without national derogations does not need to be mentioned.

Bibliography

[1] EN 13212:2001, Road marking materials – Requirements for factory production control

[2] EN ISO 9001, Quality management systems – Requirements (ISO 9001:2000)

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BSI Group
Headquarters 389
Chiswick High Road,
London, W4 4AL, UK
Tel +44 (0)20 8996 9001
Fax +44 (0)20 8996 7001
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