

Road marking materials — Road marking performance for road users

The European Standard EN 1436:1997, with the incorporation of amendment A1:2003, has the status of a British Standard

ICS 93.080.20

National foreword

This British Standard is the English language version of EN 1436:1997, including amendment A1:2003, published by the European Committee for Standardization (CEN).

The UK participation in its preparation was entrusted by Technical Committee B/509, Road equipment, to Subcommittee B/509/2, Horizontal road markings and road studs, which has responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

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English version

Road marking materials — Road marking performance for road users

(includes amendment A1:2003)

Produits de marquage routier —
Performances des marques appliquées sur la
route
(inclut l'amendement A1:2003)

Straßenmarkierungsmaterialien —
Anforderungen an Markierungen auf Straßen
(enthält Änderung A1:2003)

This European Standard was approved by CEN on 1997-06-20. Amendment A1 was approved by CEN on 2003-01-02. 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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CEN

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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by February 1998, and conflicting national standards shall be withdrawn at the latest by February 1998.

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

Foreword to amendment A1

This document (EN 1436:1997/A1:2003), 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 1436:1997 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

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

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Introduction

Road markings together with road studs form the means for horizontal signalization.

Road markings include longitudinal markings, arrows, transverse markings, text and symbols on the surface of the highway etc.

Road markings can be provided by the application of paint, thermoplastics materials, cold hardening materials, pre-formed lines and symbols or by other means.

Most road markings are white or yellow, but in special cases other colours are used.

Road markings are either permanent or temporary. The functional life of temporary road markings is limited by the duration of the road works. For permanent road markings it is best for reasons of safety to have a functional life that is as long as possible.

Road markings can be applied with or without the addition of glass beads. With glass beads the retroreflection of the marking is achieved when the marking is illuminated by vehicle headlamps.

The retroreflection of a marking, in wet or rainy conditions, can also be enhanced by special properties. The properties can be produced by surface texture (as with profiled markings), large glass beads or other means. In the case of surface texture, the passage of wheels can produce acoustic or vibration effects.

1 Scope

This standard specifies the performance for road users of white and yellow road markings, as expressed by their reflection in daylight and under road lighting, retroreflection in vehicle headlamp illumination, colour and skid resistance.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 48:1994, *Testing of elastomers — Determination of indentation hardness of soft rubber (IRHD)*.

ISO 4662:1986, *Rubber — Determination of rebound resilience of vulcanizates*.

ISO/CIE 10526:1991, *Colorimetric illuminants*.

CIE 17.4, *International lighting vocabulary 1986*.

3 Definitions, symbols and abbreviations

For the purposes of this standard, the following definitions apply, together with the definitions for the CIE 2° standard observer in CIE 17.4.

3.1

luminance coefficient under diffuse illumination (of a field of a road marking): Q_d ($\text{mcd} \cdot \text{m}^{-2} \cdot \text{lx}^{-1}$)
quotient of the luminance of the field of the road marking in the given direction by the illuminance on the field

3.2

coefficient of retroreflected luminance (of a field of a road marking): R_L ($\text{mcd} \cdot \text{m}^{-2} \cdot \text{lx}^{-1}$)
quotient of the luminance L of the field of the road marking in the direction of observation by the illuminance $E_{\perp}$ at the field perpendicular to the direction of the incident light

3.3

skid resistance tester value (of a road marking)

skid resistance quality of a wet road surface measured by the friction at a low speed of a rubber slider upon this surface. The abbreviation SRT applies

3.4

functional life (of a road marking)

period during which the road marking fulfils all the requirements initially specified by the responsible road authority

4 Requirements

4.1 General

The requirements specified aim primarily at the performance of road markings during their functional life. The requirements are expressed by several parameters representing different aspects of the performance of road markings and, for some of these, in terms of classes of increasing performance.

NOTE 1 The length of the functional life depends on whether the road marking is of short or long durability, on whether or not the road marking is run on by traffic (e.g. symbols on the carriageway compared to continuous edgelines), on the traffic density, on the roughness of the road surface and on matters relating to local conditions such as the use of studded tyres in some countries.

NOTE 2 The classes enable different priorities to be given to the different aspects of performance of road markings depending on particular circumstances. Classes of high performance cannot always be achieved for two or more of the parameters simultaneously.

4.2 Reflection in daylight or under road lighting

For the measurement of reflection in daylight or under road lighting, the luminance coefficient in diffuse illumination Q_d is used. It shall be measured in accordance with Annex A and is expressed in $\text{mcd} \cdot \text{m}^{-2} \cdot \text{lx}^{-1}$.

Road markings in the dry condition shall conform to Table 1.

NOTE The luminance coefficient under diffuse illumination represents the brightness of a road marking as seen by drivers of motorized vehicles in typical or average daylight or under road lighting conditions.

Table 1 — Classes of Q_d for dry road markings

Road marking colour	Road surface type	Class	Minimum luminance coefficient under diffuse illumination, Q_d $\text{mcd} \cdot \text{m}^{-2} \cdot \text{lx}^{-1}$
White	Asphaltic	Q0	No requirement
		Q2	$Q_d \geq 100$
		Q3	$Q_d \geq 130$
		Q4	$Q_d \geq 160$
	Cement concrete	Q0	No requirement
		Q3	$Q_d \geq 130$
		Q4	$Q_d \geq 160$
Yellow		Q5	$Q_d \geq 200$
		Q0	No requirement
		Q1	$Q_d \geq 80$
		Q2	$Q_d \geq 100$
		Q3	$Q_d \geq 130$

NOTE The class Q0 is for when daytime visibility is achieved through the value of the luminance factor β ; see 4.4.

4.3 Retroreflection under vehicle headlamp illumination

For the measurement of retroreflection under car headlamp illumination, the coefficient of retroreflected luminance R_L is used. It shall be measured in accordance with Annex B and is expressed in $\text{mcd} \cdot \text{m}^{-2} \cdot \text{lx}^{-1}$.

Road markings in the dry condition shall conform to Table 2, and shall conform to Table 3 during wetness and to Table 4 during rain.

NOTE The coefficient of retroreflected luminance represents the brightness of a road marking as seen by drivers of motorized vehicles under the illumination of the driver's own headlamps.