

Specification for

Reflex-reflecting number plates

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Foreword

This British Standard has been prepared under the authority of the Automobile Industry Standards Committee of the BSI, and was first issued in 1967.

Existing vehicle number plates normally have white, light grey or silver coloured letters and numbers on a black background, but recent investigations in this and in other countries have shown certain advantages in the use of black letters and numbers on a white or yellow reflex-reflecting background surface. This standard has, therefore, been prepared at the request of the Ministry of Transport for an alternative to existing types of number plates for use in accordance with the appropriate Regulation.

In this re-issue of the standard, the opportunity has been taken to amend certain requirements in the light of practical experience in manufacture, testing and use of reflex-reflecting number plates.

The following British Standards are referred to in this standard:

BS 873, *The construction of road traffic signs and internally illuminated bollards — Part 1 General traffic signs.*

BS 2092, *Industrial eye-protectors.*

BS 2661-86 & BS 3661, *Methods for the determination of the colour fastness of textiles.*

BS 2662, *Grey scale for assessing staining.*

BS 4727, *Glossary of electrotechnical, power, telecommunications, electronics, lighting and colour terms — Part 4 Terms particular to lighting and colour — Group 01 Radiation and photometry.*

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard, having been approved by the Automobile Industry Standards Committee, was published under the authority of the Executive Board on 11 September 1972

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The following BSI reference relates to the work on this standard:
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1 Scope

This British Standard specifies requirements for reflex-reflecting number plates for fitting to motor vehicles. The standard includes requirements for colorimetric and photometric properties and tests for weather resistance, strength of bonding, and resistance to impact, bending, vibration, corrosion, petrol, water, extremes of temperature, and abrasion.

2 Definitions

For the purposes of this British Standard the following definitions, together with those given in Appendix A, apply:

2.1

reflex-reflecting number plate

a plate exhibiting the registration mark of a vehicle in which the background to the registration mark consists of reflex-reflecting material, integrally attached to a suitable backing material

NOTE The direct attachment with adhesive of reflex-reflecting background material only to the vehicle does not constitute a reflex-reflecting number plate for the purposes of this British Standard.

2.2

sample unit

a reflex-reflecting number plate, as used, complete with numbers and letters including representative fixing holes where appropriate

NOTE Photometric units such as lumen (lm), candela (cd) etc., are as defined in BS 4727.

3 Design

The reflex-reflecting number plate, letters, numbers and margins shall be of a size and type prescribed or otherwise authorized by the appropriate Regulation.

In order to comply with this standard, reflex-reflecting number plates shall fulfill all the requirements and tests specified in the standard.

4 Marking

Each number plate shall be permanently and legibly marked in such position as to be clearly visible when the number plate is fitted to the vehicle, with the following information:

- 1) The name, trade mark or other means of identification of the maker.
- 2) The number of this British Standard, i.e. "BS AU 145a".

NOTE Attention is drawn to the certification facilities offered by BSI; see the back page of this standard.

5 Materials

Reflex-reflecting number plates may be manufactured from any suitable material which shall perform satisfactorily in service.

6 Preparation and finish of substrates

Before the application of the reflex-reflecting surface, all substrates shall be free from grease, oil, dirt and any loose or temporary coatings.

The surface of the substrate shall be suitable for and adequately prepared to receive the reflex-reflecting material to be applied.

7 Reflex-reflecting backgrounds

7.1 Any material may be used for reflex-reflecting backgrounds provided it is applied so as to give the appearance of a continuous reflecting surface and that it complies with all the relevant requirements of this standard.

7.2 Number plates reflectorized by the application of reflex-reflecting sheet material shall, if recommended by the manufacturer of the reflex-reflecting material, be protected by an outer layer of Clear lacquer, or equivalent material, capable of resisting periodic washings with a neutral detergent.

7.3 Where, after the number plate has left the number plate maker's works, it may be pierced with holes that can have a subsequent deleterious effect on the reflective material, the number plate maker shall attach to each number plate a label giving adequate instructions for suitably fixing the number plate to the vehicle, or the individual elements to the number plate, in order to prevent such a deleterious effect.

8 Letters, numbers and borders

Letters, numbers and borders shall be securely attached to the number plate so that they cannot be readily detached therefrom. Where necessary, individual elements attached by adhesion shall be adequately protected against peeling.

9 Adhesive number plates

Where number plates are intended to be attached to the vehicle with adhesive, the number plate maker shall give adequate instructions for the preparation of the surface to which it is to be adhered and shall state the materials or surfaces for which the attachment of his number plate is unsuitable.

10 Colour

10.1 Background. The colour of reflex-reflecting backgrounds shall be

front facing: white

rear facing: yellow

When the reflex-reflecting surface is illuminated by CIE Standard Illuminant A¹⁾, with an observation angle of α° and an entrance angle $V = \pm 5^\circ$, $H = 0^\circ$, the chromaticity values shall be within the area on the chromaticity diagram defined in Table 1.

The colour shall have chromaticity co-ordinates which lie within the area formed by the straight lines defined by the pairs of points 1 and 2; 2 and 3; 3 and 4; and 4 and 1.

10.1.1 When the reflex-reflecting surface is illuminated by CIE illuminant C²⁾ under the condition of 45° incidence and normal view³⁾, the luminance factors shall be

white background: 34 % minimum

yellow background: 27 % minimum

39 % maximum

10.2 Index letters and numbers. Index letters and numbers shall be black in colour and when illuminated by CIE Standard illuminant C²⁾ under the condition of 45° incidence and normal view³⁾, the luminance factor shall be 5 % maximum.

11 Photometric requirements

The coefficient of luminous intensity (CIL) of the background of the plate, when illuminated by Standard Illuminant A⁴⁾, shall be measured for each of the observation angles α and entrance angles β specified in Table 2. The CIL at any of the test points in Table 2 at the 2° observation angles shall not exceed 150 cd/lx.

For making the necessary measurements either of the methods recommended by the CIE or the Road Research Laboratory⁵⁾ for the photometry reflex-reflecting devices shall be used. The normal axis to the plate shall be taken as the H-V direction.

The plate shall not be rotated and all measurements shall be made for $e = 0^\circ$.

The angular subtense values γ and δ shall not exceed $0^\circ 5'$.

NOTE An explanation of the terms and symbols used is given in Appendix A.

Table 1 — Reflex-reflecting material: chromaticity limits

Colour	Co-ordinate	Chromaticity co-ordinates of points at the corners of the area on the chromaticity diagram			
		1	2	3	4
Yellow	x	0.530	0.510	0.560	0.580
	y	0.470	0.470	0.420	0.420
White	x	0.450	0.371	0.414	0.484
	y	0.450	0.410	0.366	0.416

Table 2 — Minimum CIL per square metre of reflex-reflecting background in candelas per lux

Colour	Observation angle α	Entrance angle β			
		Vertical	H	H	H
		Horizontal	5° left and 5° right	30° left and 30° right	45° left and 45° right
White	$0^\circ 12'$		50	25	6
	2°		4	2	0.75
Yellow	$0^\circ 12'$		40	18	4
	2°		3.5	1.5	0.5

¹⁾ As defined in the proceedings of the 1951 meeting of the International Commission on Illumination (CIE)

²⁾ As defined in the proceedings of the 1931 meeting of the International Commission on Illumination (CIE).

³⁾ As defined in Publication CIE No. 15:1971, "Colorimetry", of the International Commission on Illumination.

⁴⁾ As defined in the proceedings of the 1951 meeting of the International Commission on Illumination (CIE).

⁵⁾ See Road Research Technical Paper No. 42, "Reflex reflectors".