
Safety signs and colours

Part 2. Specification for colorimetric and photometric properties of materials

Signalisation et code couleurs en matière de sécurité
Partie 2. Spécification des propriétés colorimétriques et
photométriques des matériaux

Sicherheitszeichen und -farben
Teil 2. Spezifikation für die kolorimetrische und photometrische
Eigenschaften von Materialien

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Foreword

Over many years, widely different codes and systems of safety signs have been developed.

This standard specifies a system for giving health or safety information which keeps the use of words to a minimum. The need for such a system has arisen due to the increase in international trade and travel and the development of work forces which do not share a common language.

Attention is drawn to the fact that education and training is an essential part of any system for giving health or safety information.

BS 5378 was originally published in 1976 and was based upon the draft international standard ISO/DIS 3864 issued by the International Organization for Standardization (ISO). Since publication of that draft, the EEC has issued a Directive (77/576/EEC) 'Council Directive of 25 July 1977 Administrative Provisions of the Member States relating to the provision of safety signs at places of work'. The Directive is based upon the ISO work.

This revision of BS 5378 has been prepared under the direction of the Personal Safety Equipment Standards Committee and consists of two Parts which may be purchased separately. BS 5378 : 1976 is now withdrawn. The international standard, ISO 3864, has not yet been published but the latest draft, ISO/DIS 3864.3, covers the same subject matter as Parts 1 and 2 of this standard, but

is not identical. Attention is drawn in this Part to the main differences between the publications.

Part 1 of this standard, which deals with basic principles and gives examples of safety signs, is intended to bring the standard into line with the EEC Directive (77/576/EEC) and has been prepared in anticipation of the preparation of legislation in the UK to implement the EEC Directive. It is being published simultaneously with this Part.

Further Parts of BS 5378 will be produced, if necessary, to cover any additional requirements.

This Part of this standard gives guidance on preferred sizes for safety signs in appendix A and specifies the colorimetric and photometric properties of materials. These are not specific requirements of the EEC Directive, but are recommendations supplementary to it. The latest draft of ISO/DIS 3864.3 includes requirements for colorimetric and photometric properties which, for blue colours, are more restrictive than the requirements of this Part of this standard. The technical committee responsible for the preparation of this standard, and for monitoring the ISO work, did not agree with the restriction imposed on blue colours in ISO/DIS 3864.3 but the ISO limits have been indicated, for information, in this standard. The colour areas for all other colours are identical with those specified in ISO/DIS 3864.3.

British Standard

Safety signs and colours

Part 2. Specification for colorimetric and photometric properties of materials

1. Scope

This Part of this British Standard specifies the colorimetric and photometric properties of materials and gives the preferred sizes for safety signs complying with the requirements of Part 1.

2. References

The titles of the standards publications referred to in this Part of this standard are listed on the inside back cover.

3. Definitions

For the purposes of this Part of this standard the following definitions apply.

3.1 colour boundary. A (straight) line in the CIE chromaticity diagram (CIE 45-15-200*) separating the area of the permitted colours from that of the non-permitted colours.

3.2 luminance factor. (At a point on the surface of a non-self-radiating body, in a given direction, under specified conditions of illumination.) Ratio of the luminance of the body to that of a perfect reflecting diffuser identically illuminated (CIE 45-20-200*).

3.3 coefficient of retroreflection (R^1) (of a plane retroreflecting surface). The quotient obtained by dividing the luminous intensity (I) of the retroreflecting material in the direction of observation, by the product of the illuminance (E_{\perp}) at the retroreflecting surface on a plane perpendicular to the direction of the incident light and its area (A).

$$R^1 = \frac{I}{E_{\perp} \times A}$$

3.4 ordinary colour. A colour that is neither retroreflecting nor fluorescent.

4. Colorimetric and photometric properties of the materials

4.1 Conditions. The physical requirements with which the materials comply shall be primarily related to daytime colour. Colour measurements shall be made as specified in CIE Publication No. 15† (reference E.1.3.1).

NOTE. For the colorimetric measurements, the material is considered to be illuminated by daylight as represented by the Standard Illuminant D_{65} (CIE 45-15-145‡) at an angle of 45° with the normal to the surface and the observation is made in the direction of the normal (45/0 geometry).

The coefficient of retroreflection shall be measured in accordance with CIE Publication No. 7, 1960 volume D, pages 566 to 571 § using Standard Illuminant A, under the condition that the entrance and observation angles are in the same plane.

4.2 Requirements. When measured under the conditions specified in 4.1, each colour shall have chromaticity coordinates within the colour areas shown in figures 1 or 2, as appropriate. The x and y coordinates of the corner points of the colour areas, and the luminance factors required, shall be as specified in table 1 or table 2, as appropriate. The minimum coefficients of retroreflection for retroreflecting materials shall be as specified in table 3. The signs (including the colours) shall maintain the same meaning under all relevant lighting conditions.

NOTE 1. Retroreflecting materials: if, in practice, the photometric values of the retroreflecting materials drop below 50 % of the required minima given in table 3, or if the chromaticity coordinates fall outside the boundaries in table 1, the materials ARE NOT CONSIDERED SUITABLE FOR SAFETY USE.

NOTE 2. Fluorescent materials: if, in practice, the luminance factors of the fluorescent materials fall below 50 % of the required minima given in table 3, or if the chromaticity coordinates fall outside the boundaries in table 2, the materials ARE NOT CONSIDERED SUITABLE FOR SAFETY USE.

NOTE 3. Ordinary coloured materials: if, in practice, the chromaticity coordinates and luminance factors fall outside the boundaries in table 1, the materials ARE NOT CONSIDERED SUITABLE FOR SAFETY USE.

NOTE 4. Details of colours that are known to comply with the requirements of this clause are given in appendix B.

*CIE (Commission Internationale de l'Eclairage) Vocabulary Publication No. 17, 1970, 'International lighting vocabulary'. CIE publications may be obtained from the National Illumination Committee of Great Britain, c/o The Library, Thorn Lighting Ltd., Great Cambridge Road, Enfield, Middlesex EN1 1UL. Tel. 01-363 5353.

†CIE (Commission Internationale de l'Eclairage) Publication No. 15, 1971, 'Colorimetry'.

‡CIE (Commission Internationale de l'Eclairage) Publication No. 17, 1970, 'International lighting vocabulary'.

§ CIE (Commission Internationale de l'Eclairage) Publication No. 7, 1960, volume D, 'Proceedings 14th session, Brussels'.