INTERNATIONAL STANDARD

ISO 17398

First edition
2004-08-15

Safety colours and safety signs — Classification, performance and durability of safety signs

Couleurs de sécurité et signaux de sécurité — Classification, performance et durabilité des signaux de sécurité

Reference number
ISO 17398:2004(E)

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 17398 was prepared by Technical Committee ISO/TC 145, *Graphical symbols*, Subcommittee SC 2, *Safety identification, signs, shapes, symbols and colours*.

Introduction

This International Standard has been prepared to provide manufacturers/suppliers and purchasers with the means for agreeing and specifying performance parameters for safety signs. The performance parameters agreed for each safety sign shall be maintained throughout that product's expected service life.

This International Standard requires manufacturers/suppliers to classify products and provide comprehensive product descriptions. Both manufacturer/supplier and purchaser have the possibility to specify product requirements in terms of performance levels, and where appropriate, the expected service environment.

Consistent use of this International Standard will assist in improving knowledge of the requirements set out below and further understanding of the performance of various types of safety signs in everyday use.

Safety colours and safety signs — Classification, performance and durability of safety signs

1 Scope

This International Standard specifies requirements for a performance-related classification system for safety signs according to expected service environment, principal materials, photometric properties, means of illumination, fixing methods and surface. Performance criteria and test methods are specified in this International Standard so that properties related to durability and expected service life can be characterized and specified at the time of the product's delivery to the purchaser.

This International Standard does not cover electrical power supplies, their components or electrically powered elements. It also does not cover properties of illuminating components, but the photometric properties for the particular types of safety signs are covered.

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.

ISO 105-X12, *Textiles — Tests for colour fastness — Part X12: Colour fastness to rubbing*

ISO 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 2409, *Paints and varnishes — Cross-cut test*

ISO 2813, *Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20°, 60° and 85°*

ISO 3864-1, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs in workplaces and public areas*

ISO 4046-4:2002, *Paper, board, pulps and related terms — Vocabulary — Part 4: Paper and board grades and converted products*

ISO 4589-2:1996, *Plastics — Determination of burning behaviour by oxygen index — Part 2: Ambient-temperature test*

ISO 4892-2, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc sources*

ISO 4892-4, *Plastics — Methods of exposure to laboratory light sources — Part 4: Open-flame carbon-arc lamps*

ISO 7784-3, *Paints and varnishes — Determination of resistance to abrasion — Part 3: Reciprocating test panel method*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 16069, *Graphical symbols — Safety signs — Safety way guidance system (SWGS)*

ISO 17724, *Graphical symbols — Vocabulary*

IEC 60068-2-75, *Environmental testing — Part 2: Tests — Test Eh: Hammer tests*

IEC 60092-101, *Electrical installations in ships — Part 101: Definitions and general requirements*

IEC 60695-2-10, *Fire hazard testing — Part 2-10: Glowing/hot-wire based test methods — Glow-wire apparatus and common test procedure*

IEC 60695-2-11, *Fire hazard testing — Part 2-11: Glowing/hot-wire based test methods — Glow-wire flammability test method for end-products*

CIE 15.2, *Colorimetry*

CIE 69, *Methods of characterizing illuminance meters and luminance meters — Performance, characteristics and specifications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17724 and the following apply.

3.1
expected service life
period of time, indicated by the manufacturer/supplier, for which a safety sign is expected to retain its classified and described properties

3.2
ordinary safety sign
safety sign which is neither retroreflective nor phosphorescent

3.3
phosphorescent safety sign
safety sign that uses phosphors as pigmentation and emits light for periods of time after an activating energy source has been removed

3.4
pressure-sensitive adhesive
adhesive applied to create a bond between two surfaces by a simple application of pressure

3.5
retroreflective safety sign
safety sign designed using materials which reflect visible radiation in a direction close to the opposite of the direction from which it came

4 Classification and detailed product description requirements

4.1 Classification of safety signs

Safety signs shall be classified according to Table 1.

NOTE Examples of classifications used for designation of safety signs are given in Clause 8.

Table 1 — Classification of safety signs

Class. order	Specification	Classification			Subclause reference
1	Service environment[a]	I = Interior	E = Exterior	S = Special	4.2.2, 5.3, 5.4, 7.3, 7.4
2	Principal material: — R = Rigid — F = Flexible	P = Plastic	M = Metal	O = Other	4.2.3, 5.4, 7.4
3	Photometric property[b]	P = Phosphorescent	R = Retroreflective	O = Ordinary	4.2.3.3, 5.3, 5.5, 5.6, 7.3, 7.11
4	Illumination method	E = External	T = Internal (transilluminated)	B = Both external and internal	4.2.4, 5.2, 7.11
5	Fixing method	M = Mechanical	P = Pressure-sensitive adhesive	A = Alternative	4.2.5, 5.7, 7.12
6	Surface	H = High gloss	I = Intermediate gloss	L = Low gloss	5.1.5

[a] Service environment classifications are defined as follows.

— Interior I: to be used normally in an environment where ambient temperatures are in the range 10 °C to 30 °C, and subject to limited degrading conditions resulting, for example, from impact, abrasion, short periods of temperature variations outside the above range, UV exposure or aggressive atmospheres. It is to be expected that the safety signs will be cleaned regularly with non-aggressive cleaning products.

— Exterior E: to be used normally in climatic conditions that include seasonal and daily temperature and humidity variations, as well as exposure to sunlight, wind and humidity. Climatic conditions may be specified more precisely, for example “Northern Hemisphere”, “Tropical”, and may be complemented with a description of designed resistance to specific atmospheres.

— Special S: to be used normally in service environments other than those denoted by classifications I or E or are conditions denoted by I or E that are specifically described to emphasize the special performance attributes of the product.

[b] Phosphorescent, retroreflective and ordinary are types of safety signs as defined in Clause 3.

4.2 Product description

4.2.1 General

Safety signs shall be provided with a product description to complement the classification according to Table 1.

4.2.2 Service environment

The product description shall describe in detail the service conditions in which the safety sign is to be used, particularly where a special service environment is classified according to Table 1.

4.2.3 Principal materials and construction

4.2.3.1 Description of principal materials and construction

The product description shall describe in detail the exact nature of the principal material of manufacture, to include the construction of any material, including multi-layered material, that is of a composite nature. The description shall include the method used to create layers and adhesion between layers.

A description of the surface characteristics and any specific protection afforded to the material shall be given. If the safety sign is classified as phosphorescent (P) or retroreflective (R), the product description shall include the type of construction of the photometric layer and protection provided to this layer (if any).

The uniformity of the photometric layer across the surface shall be described as well as any areas on the safety sign, such as edges, that do not give the photometric properties.

4.2.3.2 Physical properties of the principal materials and the safety sign

The product description shall describe in detail other physical properties of the safety sign construction material selected from the following list, where applicable, and shall reference the test methods used to determine the physical properties:

— thickness;

— dimensions;

— density;

— tensile strength/elongation at break/modulus;

— tear strength for flexible materials;

— delamination strength for layered composites.

After testing in accordance with 7.10, the product description shall indicate the sub-classification of the principal material of manufacture of the safety sign as either rigid (R) or flexible (F). A material shall be classified as rigid when a 50 mm wide strip of material with one end held firmly to a flat surface produces, under its own weight at a temperature of 23 °C ± 2 °C, an angle of declination $\leqslant$ 5° over a 200 mm length and $\leqslant$ 15° over a 300 mm length. A material shall be classified as flexible when a 50 mm wide strip of material with one end held firmly to a flat surface produces, under its own weight at a temperature of 23 °C ± 2 °C, an angle of declination $>$ 5° over a 200 mm length and $>$ 15° over a 300 mm length.

4.2.3.3 Photometric and surface properties

A description of the appearance of the printed surface of the safety sign at the time of delivery shall be provided.

A description shall be provided of the reproduction method used to incorporate the graphical elements, symbols, safety colours and contrast colours and shall state whether the reproduction of each element is surface or sub-surface.

The product description shall include the colorimetric and photometric properties, tested and verified as being in accordance with ISO 3864-1.

For phosphorescent safety signs, the product description shall include the colour of the phosphorescence. This shall be determined by the spectral emission and its relationship to standard colour definitions during the first 5 min of the phosphorescence period after excitation with the test light source in accordance with 7.11.5.2 a), using the test method specified in CIE 15.2.

The product description shall include the results of testing in accordance with 7.3, together with details of the test conditions (where they differ from those specified in 7.3).

For safety signs classified as phosphorescent (P) in accordance with 4.1, the product description shall include the luminance decay sub-classification (see 5.5), which shall be given in conjunction with the main photometric property classification as either PA, PB, PC or PD.

The photometric properties of safety signs classified as retroreflective shall be sub-classified according to properties at the time of delivery as R1 or R2 as specified in ISO 3864-1.