

# INTERNATIONAL STANDARD

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## **Graphical symbols — Safety colours and safety signs —**

### **Part 1: Design principles for safety signs in workplaces and public areas**

*Symboles graphiques — Couleurs de sécurité et signaux de sécurité —*

*Partie 1: Principes de conception pour les signaux de sécurité sur les lieux  
de travail et dans les lieux publics*



Reference number  
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Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.ch](mailto:copyright@iso.ch)  
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## ISO 3864-1:2002(E)

### 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 3.

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 part of ISO 3864 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 3864-1 was prepared by Technical Committee ISO/TC 145, *Graphical symbols*, Subcommittee SC 2, *Safety identification, signs, shapes, symbols and colours*.

This part of ISO 3864, together with ISO 7010, cancels and replaces ISO 3864:1984, which has been technically revised.

ISO 3864 consists of the following parts, under the general title *Graphical symbols — Safety colours and safety signs*:

— *Part 1: Design principles for safety signs in workplaces and public areas*

The following part is under preparation:

— *Part 2: Design principles for product safety labels*

Annex A of this part of ISO 3864 is for information only.

## **Introduction**

There is a need to standardize the system for conveying safety information so that it relies as little as possible on the use of words to achieve understanding. As a consequence of continued growth in international trade, travel and mobility of labour, it has become necessary to establish a universal communications method for conveying safety information.

Lack of standardization can lead to confusion and even accidents. Education is an essential part of any system that provides safety information.

Although safety colours and safety signs are essential to any safety information system, they cannot replace the use of proper working methods, instructions and accident-prevention measures and training.



# Graphical symbols — Safety colours and safety signs —

## Part 1:

## Design principles for safety signs in workplaces and public areas

### 1 Scope

This International Standard establishes the safety identification colours and design principles for safety signs to be used in workplaces and in public areas for the purpose of accident prevention, fire protection, health hazard information and emergency evacuation. It also establishes the basic principles to be applied when developing standards containing safety signs.

This part of ISO 3864 is applicable to workplaces and all locations and all sectors where safety-related questions may be posed. However, it is not applicable to the signalling used for guiding rail, road, river, maritime and air traffic and, generally speaking, to those sectors subject to a regulation which may differ.

NOTE Some countries statutory regulations might differ in some respect from those given in this part of ISO 3864.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 3864. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 3864 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 7000, *Graphical symbols for use on equipment — Index and synopsis*

ISO 7001, *Public information symbols*

ISO 7010, *Graphical symbols — Safety signs in workplaces and public areas*

ISO 9186, *Graphical symbols — Test methods for judged comprehensibility and for comprehension*

ISO/CIE 10526, *CIE standard illuminants for colorimetry*

CIE 15.2, *Colorimetry*, second edition

CIE 54, *Retroreflection — Definition and measurement*

IEC 60050-845:1987, *International electrotechnical vocabulary (IEV) — Chapter 845: Lighting*

IEC 60417-2:1998, *Graphical symbols for use on equipment — Part 2: Symbol originals*

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### 3 Terms and definitions

For the purposes of this part of ISO 3864, the following terms and definitions apply.

#### 3.1

##### coefficient of retroreflection

$R'$

(plane retroreflecting surface) luminous intensity ( $I$ ) of a plane retroreflecting material in the direction of observation divided by the product of the illuminance ( $E_{\perp}$ ) of the retroreflecting surface on a plane perpendicular to the direction of the incident light and its area ( $A$ )

$$R' = \frac{I}{E_{\perp}A}$$

#### 3.2

##### combined material

material which combines the optical characteristics of photoluminescent and retroreflective materials

#### 3.3

##### critical detail

element of a graphical symbol without which the graphical symbol cannot be understood

#### 3.4

##### fluorescence

photoluminescence in which the emitted optical radiation results from direct transitions from the photo-excited energy level to a lower level, these transitions taking place generally within 10 ns after the excitation

[IEC 60050-845-04-20:1987]

#### 3.5

##### luminance contrast

$k$

luminance of the contrast colour  $L_1$  divided by the luminance of the safety colour  $L_2$  where  $L_1$  is greater than  $L_2$

$$k = \frac{L_1}{L_2}$$

#### 3.6

##### luminance factor

ratio of the luminance of the surface element in a given direction to that of a perfect reflecting or transmitting diffuser identically illuminated

#### 3.7

##### luminescence

emission, by atoms, molecules or ions in a material, of optical radiation which for certain wavelengths or regions of the spectrum is in excess of the radiation due to thermal emission from that material at the same temperature, as a result of these particles being excited by energy other than thermal agitation

[IEC 60050-845-04-18:1987]

#### 3.8

##### ordinary material

material which is neither retroreflecting nor luminescent

**3.9**

**retroreflecting material**

material which reflects radiation in a direction close to the opposite of the direction from which it came

**3.10**

**phosphorescence**

photoluminescence delayed by storage of energy in an intermediate energy level

[IEC 60050-845-04-23:1987]

**3.11**

**photoluminescence**

luminescence caused by absorption of optical radiation

[IEC 60050-845-04-19:1987]

**3.12**

**safety colour**

colour with special properties to which a safety meaning is attributed

NOTE Properties of safety colours are given in clause 11.

**3.13**

**safety marking**

marking which adopts the use of safety colours and/or safety contrast colours to convey a safety message or render an object or location conspicuous

**3.14**

**safety sign**

sign which gives a general safety message, obtained by a combination of a colour and geometric shape and which, by the addition of a graphical symbol, gives a particular safety message

**3.15**

**supplementary sign**

sign that is supportive of another sign and the main purpose of which is to provide additional clarification

## **4 Purpose of safety colours and safety signs**

**4.1** The purpose of safety colours and safety signs is to draw attention rapidly to objects and situations affecting safety and health and to gain rapid understanding of a specific message.

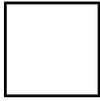
**4.2** Safety signs shall be used only for instructions which are related to safety and health.

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5 General meaning of geometric shapes and safety colours

The general meaning assigned to geometric shapes, safety colours and contrast colours for safety signs is given in Table 1.

Table 1 — General meaning of geometric shapes, safety colours and contrast colours

Geometric shape	Meaning	Safety colour	Contrast colour	Graphical symbol colour	Example of use
 Circle with diagonal bar	Prohibition	Red	White <sup>a</sup>	Black	<ul style="list-style-type: none"> <li>— No smoking</li> <li>— No unauthorized vehicles</li> <li>— Do not drink</li> </ul>
 Circle	Mandatory action	Blue	White <sup>a</sup>	White	<ul style="list-style-type: none"> <li>— Wear eye protection</li> <li>— Wear personal protective equipment</li> <li>— Switch off before beginning work</li> </ul>
 Equilateral triangle	Warning	Yellow	Black	Black	<ul style="list-style-type: none"> <li>— Danger hot surface</li> <li>— Danger acid</li> <li>— Danger high voltage</li> </ul>
 Square   Rectangle	Safe condition Means of escape Safety equipment	Green	White <sup>a</sup>	White	<ul style="list-style-type: none"> <li>— First aid room</li> <li>— Fire exit</li> <li>— Fire assembly point</li> </ul>
 Square   Rectangle	Fire safety	Red	White <sup>a</sup>	White	<ul style="list-style-type: none"> <li>— Fire alarm call point</li> <li>— Fire fighting equipment</li> <li>— Fire extinguisher</li> </ul>
 Square   Rectangle	Supplementary information	White or the colour of the safety sign	Black or the contrast colour of the relevant safety sign	Symbol colour of the relevant safety sign	As appropriate to reflect message given by graphical symbol

<sup>a</sup> The contrast colour white includes the contrast colour for phosphorescent material under daylight conditions with properties as defined in Table 4.

## 6 Process for standardization and design principles to be used for the development of safety signs

The process of development of graphical symbols for safety signs for possible future inclusion in ISO 7010 shall start with the clear definition of the specific message to be communicated and other details required for the completion of the application form for the standardization of safety signs. The proposed sign variants shall be designed according to the colour, geometric shape and other criteria of this part of ISO 3864.

Following the submission of the application form to ISO/TC 145, a search is carried out within ISO sources and from member countries for existing symbols or other variants from national and international sources. In the case that only one variant is defined, graphic designers from member countries shall be encouraged to offer alternatives.

The process for selection of variants for comprehension testing according ISO 9186 shall be as follows:

- in a collection of variants with very similar content reduce to one variant;
- exclude variants already tested/included in ISO 7000, ISO 7001 and IEC 60417-2;
- ensure colour and shape conform to the grammar of ISO 3864-1;
- exclude variants which offer a strong possibility of confusion due to graphic similarity or duplication with standardized graphical symbols or graphic elements.

The criteria of acceptability for standardization are given in ISO 7010.

## 7 Layout of safety signs

### 7.1 General

The safety colours, contrast colours and geometric shapes (see clause 5) shall be used only in the following combinations to obtain the five basic types of safety signs (see Figures 1 to 7).

Where a graphical symbol is not available to indicate a particular desired meaning, the meaning shall be obtained preferably by using the appropriate general sign together with a supplementary sign (see Figures 8 to 16).

Borders are recommended to achieve contrast between the safety and/or supplementary sign and the surrounding. The value of the border is 0,025 to 0,05 of the geometric shape as shown in Figures 1 to 10 and using the dimensions " $a_s$ " for rectangular signs. For practical reasons  $d$  is equal to  $d_s$  and  $b$  is equal to  $b_s$  within a tolerance of 5 %.

The borders of transilluminated safety signs shall not have a luminance greater than the contrast colour.