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

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

Symboles graphiques — Couleurs de sécurité et signaux de sécurité —

*Partie 2: Principes de conception pour l'étiquetage de sécurité
des produits*



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

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*
- *Part 2: Design principles for product safety labels*
- *Part 3: Design criteria for graphical symbols used in safety signs*

Introduction

There is a need to standardize a system of communicating safety information on products. This part of ISO 3864 provides layouts for product safety labels that can be used to convey safety information related to the installation, operation, use, maintenance and/or disposal of a product. Product safety labels are not to be used as safety signs on walls in workplaces and public buildings.

This part of ISO 3864 builds on the system of hazard communication set forth in ISO 3864-1. This part of ISO 3864 sets forth additional layouts for product safety labels that assist in communicating:

- a) the severity level of the hazard, and
- b) supplementary safety information in word or symbolic form.

To assist in the communication of safety information across language barriers, all of the product safety label layouts shown in this part of ISO 3864 incorporate safety signs. This part of ISO 3864 includes product safety label layouts that use only safety signs as well as layouts that use additional graphical symbols and text. Product safety labels that include text can be used when some of the necessary safety information cannot be communicated in symbolic form, when the combination of safety sign with text is judged to be more effective or when legal requirements in countries mandate the use of text to communicate safety information. Education is an essential part of any system that provides safety information. Because the amount of safety information necessary to operate or service a product safely may be more than can be conveyed in a product safety label, a product's accompanying documentation (e.g. product literature, installation manual, operation manual, service manual) may supplement the product's safety labels to provide the user with the additional information necessary for safety. A product's user documentation also offers a place to educate users on the meaning of the safety signs and supplementary safety information symbols shown on the product's safety labels (see Annex A).

When a product safety label is to be developed, the hazards associated with the product and their corresponding risks should be evaluated. Many factors are considered when deciding whether or not to warn, whether to warn on the product in the form of a product safety label and/or to warn in user documentation. Such factors include the severity of the risk, the probability of engaging the hazard, the degree to which the risk is obvious, and the type of person likely to possibly engage the hazard.

Graphical symbols — Safety colours and safety signs —

Part 2: Design principles for product safety labels

IMPORTANT — The colours represented in the electronic file of this part of ISO 3864 can be neither viewed on screen nor printed as true representations. Although the copies of this part of ISO 3864 printed by ISO have been produced to correspond (with an acceptable tolerance as judged by the naked eye) to the colour requirements, it is not intended that these printed copies be used for colour matching. Instead, refer to the colorimetric and photometric properties specified in 4.1 and ISO 3864-1. As guidelines, references from colour order systems are provided in Annex E for safety colour orange and in ISO 3864-1:2002, Annex A, for other safety colours.

1 Scope

This part of ISO 3864 establishes additional principles to ISO 3864-1 for the design of safety labels for products, i.e. any items manufactured and offered for sale in the normal course of commerce, including but not limited to consumer products and industrial equipment. The purpose of a product safety label is to alert persons to a specific hazard and to identify how the hazard can be avoided.

This part of ISO 3864 is applicable to all products in all industries where safety-related questions can be posed. However, it is not applicable to safety labels used:

- for chemicals;
- for the transport of dangerous substances and preparations;
- in those sectors subject to legal regulations which differ from certain provisions of this document.

The design principles incorporated in this part of ISO 3864 are intended to be used by all ISO Technical Committees and anyone designing product safety labels in the development of product safety label standards for their industries or services.

Statutory or regulatory requirements in some countries may differ from some requirements given in this part of ISO 3864. To facilitate international standardization of product safety labels, this part of ISO 3864 should be considered when revising regulations.

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

ISO 17724, *Graphical symbols — Vocabulary*

3 Terms and definitions

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

3.1 CAUTION
signal word used to indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury

NOTE Adapted from ISO 17724.

3.2 combination product safety label
combination of product safety sign and/or supplementary safety information and/or hazard severity panel on one rectangular label

NOTE A combination product safety label conveys one safety message.

3.3 DANGER
signal word used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury

NOTE Adapted from ISO 17724.

3.4 general warning sign
safety sign used to signify a general hazard

NOTE This safety sign can be used to draw attention to a product safety label (see Figure A.5).

3.5 harm
physical injury and/or damage to health or property

NOTE Adapted from ISO/IEC Guide 51.

3.6 hazard
source of potential harm

NOTE 1 Adapted from ISO/IEC Guide 51.

NOTE 2 The term hazard is generally qualified in order to define its origin or the nature of the expected harm (e.g. electric shock hazard, crushing hazard, cutting hazard, toxic hazard, fire hazard, drowning hazard).

3.7 hazard severity panel
area of a combination or multiple product safety label that communicates the category of risk associated with a hazard

NOTE This panel contains the general warning sign, a signal word and the corresponding background colour (see Table 3).

3.8 multiple product safety label
product safety label that contains two or more safety signs on the same rectangular label and, if used, the supplementary safety information and/or the hazard severity panel

3.9**product safety label**

label on a product that informs the observer of one or more potential hazards and describes the safety precautions and/or actions required to avoid the hazard(s)

[ISO 17724]

NOTE It communicates a hazard, a hazardous situation, a precaution to avoid a hazard, and/or a result of not avoiding a hazard.

3.10**residual risk**

risk remaining after protective measures have been taken

[ISO/IEC Guide 51]

3.11**risk**

combination of the probability of occurrence of harm and the severity of that harm

[ISO/IEC Guide 51]

3.12**safety colour**

colour with special properties to which a safety meaning is attributed

[ISO 17724]

3.13**safe viewing distance**

distance a person can be from the product safety label while still able to read the label accurately and have the opportunity to follow the product safety label's message

3.14**signal word**

word that calls attention to a product safety label and designates a category of risk

3.15**supplementary safety information panel**

safety information symbol or safety information text whose main purpose is to provide additional clarification

NOTE A supplementary safety information panel typically communicates hazard consequence or hazard avoidance information.

3.16**target audience**

person(s) to whom the product safety label is intended to convey its safety information

3.17**tolerable risk**

risk which is accepted in a given context based on the current values of society

[ISO/IEC Guide 51]

NOTE Clarifications on tolerable risks are given in Annex D.1.

**3.18
WARNING**

signal word used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury

[ISO 17724]

4 Purpose of safety colours

4.1 General

There are two basic purposes for using a specific safety colour on a product safety label:

- a) the use of colour rapidly draws attention to the product safety label so that it is easily noticed;
- b) the safety colour coding serves to identify and give meaning (through training and/or repeated exposure) to the product safety label as a whole and to its component parts.

Only safety colours in accordance with ISO 3864-1 colorimetric and photometric specifications shall be used, in addition to the colour orange which shall only be used on a WARNING hazard severity panel. Tables 1 and 2 specify the colorimetric and photometric properties of the colour orange. Annex E provides references from colour order systems for the safety colour orange.

Table 1 — Chromaticity coordinates and luminance factor for the colour orange for ordinary materials

Coordinate	Chromaticity coordinates of corner points determining the permitted colour area: Standard illuminant D65 CIE 2° Standard observer				Luminance factor β
	1	2	3	4	
x	0,603	0,538	0,508	0,563	$\geq 0,21$
y	0,397	0,382	0,412	0,436	

Table 2 — Chromaticity coordinates and luminance factor for the colour orange for tighter areas in the chromaticity diagram for ordinary materials

Coordinate	Chromaticity coordinates of corner points determining the permitted colour area: Standard illuminant D65 CIE 2° Standard observer				Luminance factor β
	1	2	3	4	
x	0,590	0,552	0,532	0,567	$\geq 0,25$
y	0,410	0,398	0,418	0,432	

4.2 Contrast colours

Contrast colours shall be in accordance with ISO 3864-1. The contrast colour for orange is black.

4.3 Use of colour

When a geometric shape is used around a graphical symbol, the shape's corresponding safety colour shall identify the type of safety information to be conveyed by the graphical symbol (e.g. warning, prohibition or mandatory action, see ISO 3864-1).

When a hazard severity panel is used, colour shall be used to identify the hazard severity panel's corresponding degree of hazard severity (e.g. DANGER, WARNING or CAUTION, see Table 3).

Table 3 — General meaning and use of colours in hazard severity panels

Background colour of panel	Contrast colour	Meaning/Use	Hazard severity panel illustration
Red	White	DANGER hazard severity panel to identify a high level of risk	
Orange	Black	WARNING hazard severity panel to identify a medium level of risk	
Yellow	Black	CAUTION hazard severity panel to identify a low level of risk	
The outer yellow border to the general warning sign is an option and may be omitted.			
NOTE The safety sign incorporated in these hazard severity panels is the general warning sign W001 specified in ISO 7010.			

5 Hazard severity panels

5.1 General

If the level of hazard severity is to be indicated, a hazard severity panel shall be added to the top of the combination or multiple product safety label. When hazard severity panels are used they shall be rectangular in shape and, as given in Table 3, shall contain all three elements as follows:

- a) the general warning sign;
- b) the signal word;
- c) the corresponding colour.

5.2 Layout of hazard severity panels

The hazard severity panel shall contain the general warning sign followed by the signal word. The signal word and the general warning sign shall be centred together in the hazard severity panel (see Table 3).

5.3 Signal word options

The signal word shall alert viewers to the severity and level of risk of harm (i.e. an estimate of the likelihood of exposure to the hazard and of the probable consequences of exposure to the hazard). There are three choices for a signal word for the hazard severity panel:

- DANGER;
- WARNING; or
- CAUTION.

(See Annex B for standardized signal words in other languages.)

Signal words shall appear in upper case and bold fonts.

6 Type and layout of product safety labels

6.1 General

A product safety label shall comprise of one or more safety signs. In addition, a product safety label may be accompanied by one or more supplementary safety information panels and a hazard severity panel. Supplementary safety information panels shall consist of either text or a supplementary safety information symbol.

Product safety labels shall conform to one of the following seven basic types:

- a) single safety sign;
- b) single safety sign used with a separated supplementary safety information text panel;
- c) single safety sign used with a separated supplementary safety information text panel which includes a hazard severity panel;
- d) combination product safety label not incorporating a hazard severity panel;
- e) combination product safety label incorporating a hazard severity panel;
- f) multiple product safety label not incorporating a hazard severity panel;
- g) multiple product safety label incorporating a hazard severity panel.

NOTE 1 Examples of product safety labels are given in Annex C.

NOTE 2 Development considerations for product safety labels are given in Annex D.

6.2 Single safety sign

When a product safety label is comprised of a single safety sign, the layout of the product safety label shall use the shape and colour of a safety sign as defined in ISO 3864-1 (see Figure 1).

Products generally require more than one safety sign to communicate both hazard identification and hazard avoidance information. Thus, safety signs are generally used together; either combined on a multiple product safety label or used individually (e.g. a warning sign placed next to a mandatory action sign and/or a prohibition sign). See ISO 3864-1 to determine the proper layout and colours for warning, mandatory action and prohibition safety signs.



Figure 1 — Layout of safety signs as defined by ISO 3864-1

6.3 Safety sign used with a separated supplementary safety information text panel

Product safety labels may be used together with a supplementary safety information panel containing additional information that supplements or clarifies the meaning of the safety sign. The shape of the supplementary safety information panel shall be rectangular.

The supplementary safety information panel shall be placed below or beside the safety sign (see Figure 2).

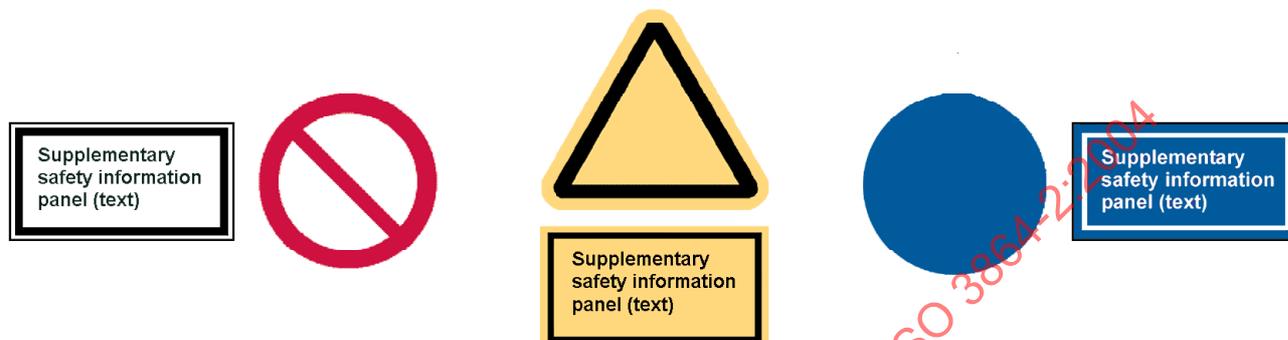


Figure 2 — Layout of safety signs used together with a separated supplementary safety information text panel

6.4 Safety sign used with a separated supplementary safety information text panel which includes a hazard severity panel

Product safety labels may be used together with a supplementary safety information panel that incorporates both a hazard severity panel and additional information in the form of text that supplements or clarifies the meaning of the safety sign. The shape of the supplementary safety information panel shall be rectangular.



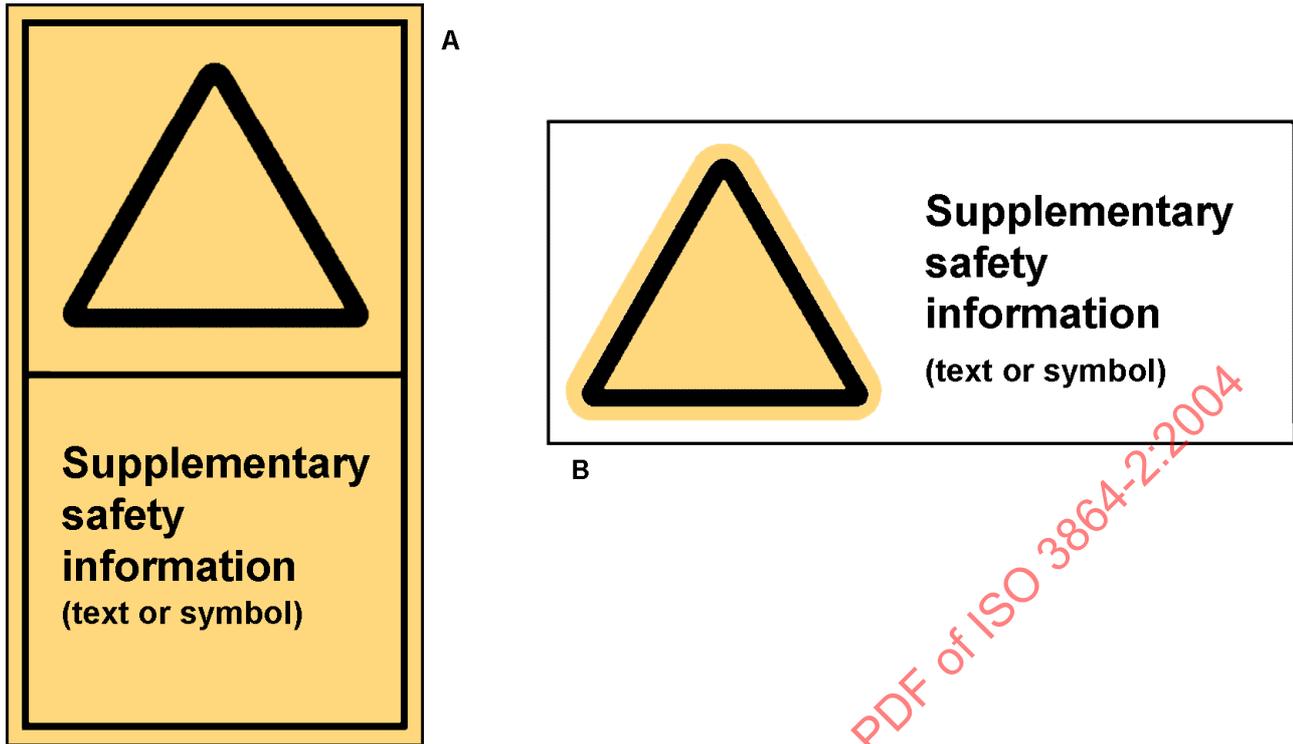
Figure 3 — Layout of safety sign with a separated supplementary safety information text panel which includes a hazard severity panel

6.5 Combination product safety label not incorporating a hazard severity panel

Combination product safety labels combine the safety sign with the supplementary safety information on one rectangular label. On combination product safety labels, the supplementary safety information may be communicated by either text or a supplementary safety information symbol.

Black borders may be used on combination product safety labels to separate the safety sign and the supplementary safety information panel.

Supplementary safety information on combination product safety labels shall be placed below or beside the safety sign (see Figure 4).



EXAMPLE A Vertical layout with overall colour and borders.

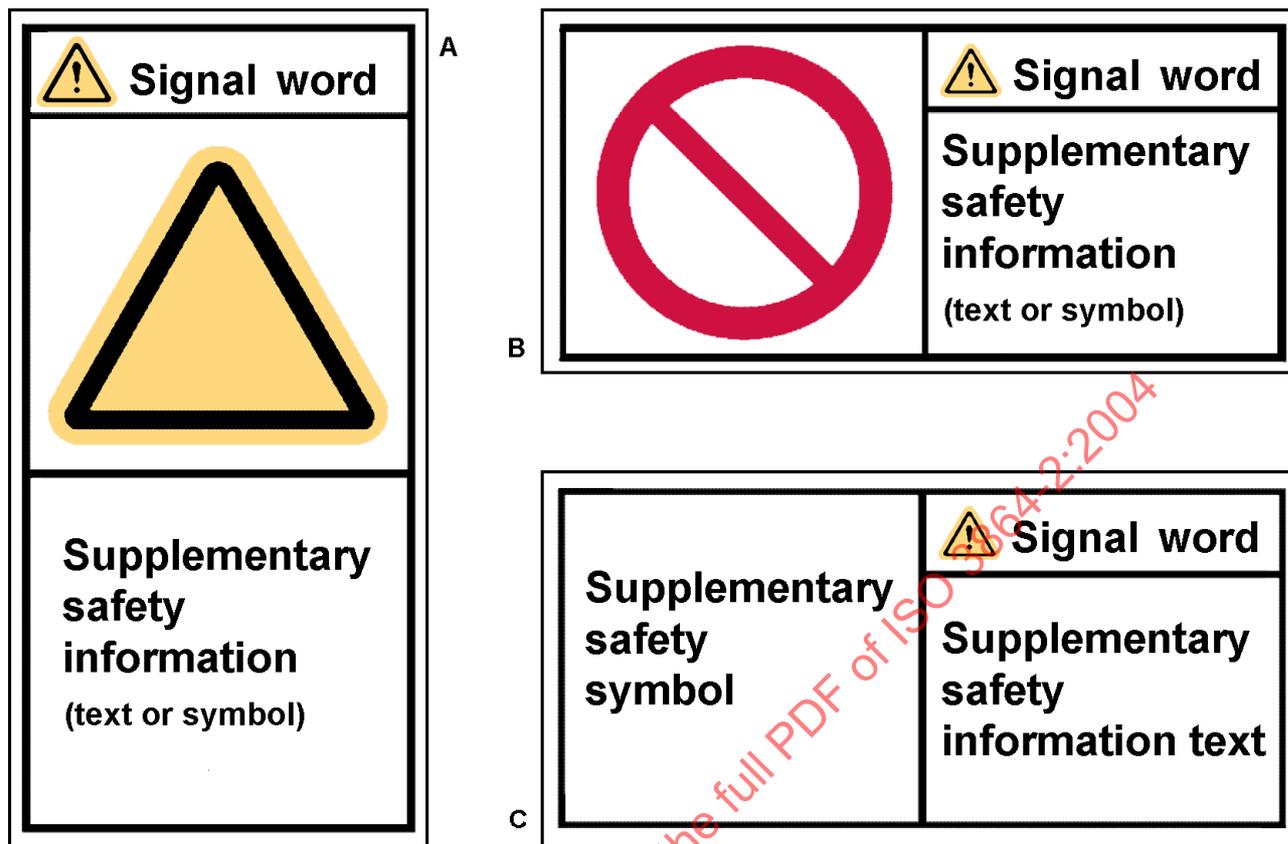
EXAMPLE B Horizontal layout without overall colour and without borders.

Figure 4 — Layout of combination product safety labels without a hazard severity panel

6.6 Combination product safety label incorporating a hazard severity panel

In combination product safety labels with a hazard severity panel, the hazard severity panel shall be placed at the top of a vertical label or above the supplementary safety information panel on a horizontal combination product safety label.

Black borders may be used on combination product safety labels to separate the safety sign and the supplementary safety information panel and the hazard severity panel (see Figure 5).



EXAMPLE A Vertical layout.

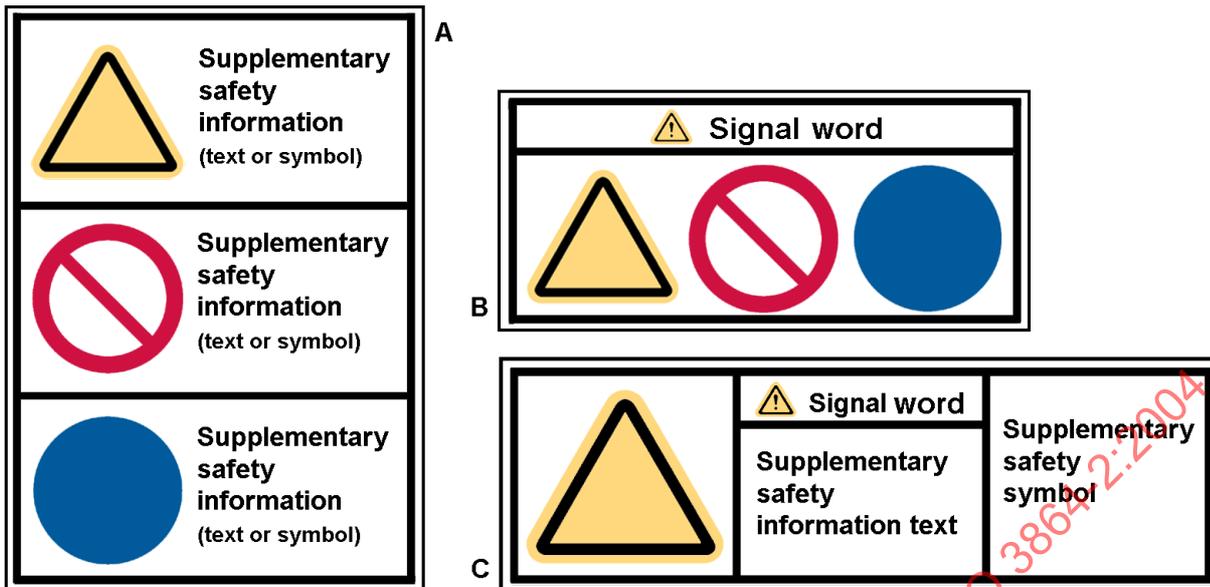
EXAMPLES B and C Horizontal layout.

Figure 5 — Layout of combination product safety labels with a hazard severity panel

6.7 Multiple product safety label not incorporating a hazard severity panel

Multiple product safety labels contain two or more safety signs and the supplementary safety information panel on the same rectangular label.

Black borders may be used on multiple product safety labels to separate the safety signs and the supplementary safety information panel (see Figure 6).



EXAMPLE A Without hazard severity panel.

EXAMPLES B and C With hazard severity panel.

Figure 6 — Layout of multiple product safety labels

6.8 Multiple product safety label incorporating a hazard severity panel

As with combination product safety labels, use of a hazard severity panel is optional for multiple product safety labels. If a hazard severity panel is used, it shall be selected from Table 3 considering the residual risk involved. When multiple hazards are described on a multiple product safety label, and the hazards are categorized at different degrees of risk, the signal word corresponding to hazard having the greatest degree of risk shall be used.

There are a variety of layout options for multiple product safety labels so that product manufacturers may choose which format best suits their product and their product users.

Black borders may be used on multiple product safety labels to separate the safety signs, the supplementary safety information panels and the hazard severity panels (see Figure 6).

Annex A (informative)

Guidelines for increasing the recognition of product safety label components

A.1 General

It is important that the meaning of a product safety label be clearly understood by those who use or service the product. To increase the understanding of a product's safety labels, product manufacturers are strongly encouraged to incorporate information that will help people understand the meaning of the product's safety labels in their product's user documents (e.g. operation manuals, instructions, safety literature, service manuals, etc.). Point of sale information is also to be encouraged within the retail environment. In addition to reproducing the product safety labels in the product's accompanying documentation, reproduction of the following applicable component definitions will assist in the objective of educating the product user so that subsequent recognition of this part of ISO 3864's definitions for the component parts of a product safety label is achieved.

A.2 Graphical symbols

A product safety label always includes a graphical symbol within the geometric shape of a safety sign (see A.3) and if the product safety label has a supplementary safety information symbol, it appears in a rectangular panel. The meaning of the safety signs and supplementary safety information symbols used on the product's safety labels should be explained in the user documentation. This enables the viewer to better understand the meaning of the graphical symbols, making future recognition of the safety signs and supplementary safety information symbols more instantaneous. Additional information may also be added in other types of collateral literature to explain the product's safety signs and supplementary safety information symbols.

A.3 Geometric surround shapes

When used, Figures A.1, A.2 and A.3 and their captions should be reproduced in the user documentation:



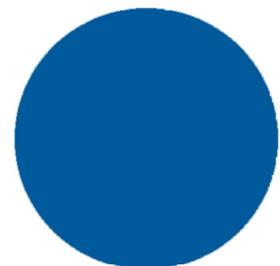
A black graphical symbol inside a yellow triangle with a black triangular band defines a safety sign that indicates a hazard.

Figure A.1 — Warning



A black graphical symbol inside a red circular band with a red diagonal bar defines a safety sign that indicates that an action shall not be taken or shall be stopped.

Figure A.2 — Prohibition



A white graphical symbol inside a blue circle defines a safety sign that indicates that an action shall be taken to avoid a hazard.

Figure A.3 — Mandatory action

A.4 Hazard severity panels

When used, the meaning of the different hazard severity panels as defined in this part of ISO 3864 should be explained in the user documentation. Training is necessary to increase understanding of the multi-tier hazard classification system. The following panels may be used for this purpose.



DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.



WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Figure A.4 — Meaning of hazard severity panels

A.5 General warning sign

When used, the meaning of the general warning sign should be explained in the user documentation. Where literature accompanying a product refers to potential hazards the general warning sign may be used alone or in combination with the proper signal word to draw attention to the nature of the hazard. The following illustration may be used for this purpose.



This is the general warning sign. It is used to alert the user to potential hazards. All safety messages that follow this sign shall be obeyed to avoid possible harm.

Figure A.5 — Explanation of the general warning sign to be found in manuals

Annex B (informative)

Translation of signal words

B.1 General

Table B.1 gives various translations for the three signal words DANGER, WARNING and CAUTION.

Table B.1 — Translations for signal words

Language	DANGER	WARNING	CAUTION
Chinese	危險	警告	注意
Danish	FARE	ADVARSEL	FORSIGTIG
Dutch	GEVAAR	WAARSCHUWING	VOORZICHTIG
English	DANGER	WARNING	CAUTION
Finnish	VAARA	VAROITUS	HUOMIO
French	DANGER	AVERTISSEMENT	ATTENTION
German	GEFAHR	WARNUNG	VORSICHT
Greek	ΚΙΝΔΥΝΟΣ	ΠΡΟΕΙΔΟΠΟΙΗΣΗ	ΠΡΟΣΟΧΗ
Italian	PERICOLO	AVVERTENZA	ATTENZIONE
Japanese	危険	警告	注意
Korean	위험	경고	주의
Norwegian	FARE	ADVARSEL	FORSIKTIG
Portuguese	PERIGRO	ATENÇÃO	CUIDADO
Russian	ОПАСНО	ОСТОРОЖНО	ВНИМАНИЕ
Spanish	PELIGRO	ADVERTENCIA	ATENCIÓN
Swedish	FARA	VARNING	OBSERVERA
Thai	อันตราย	คำเตือน	ข้อควรระวัง
Turkish	TEHLIKE	UYARI	DİKKAT

Annex C (informative)

Examples of product safety labels

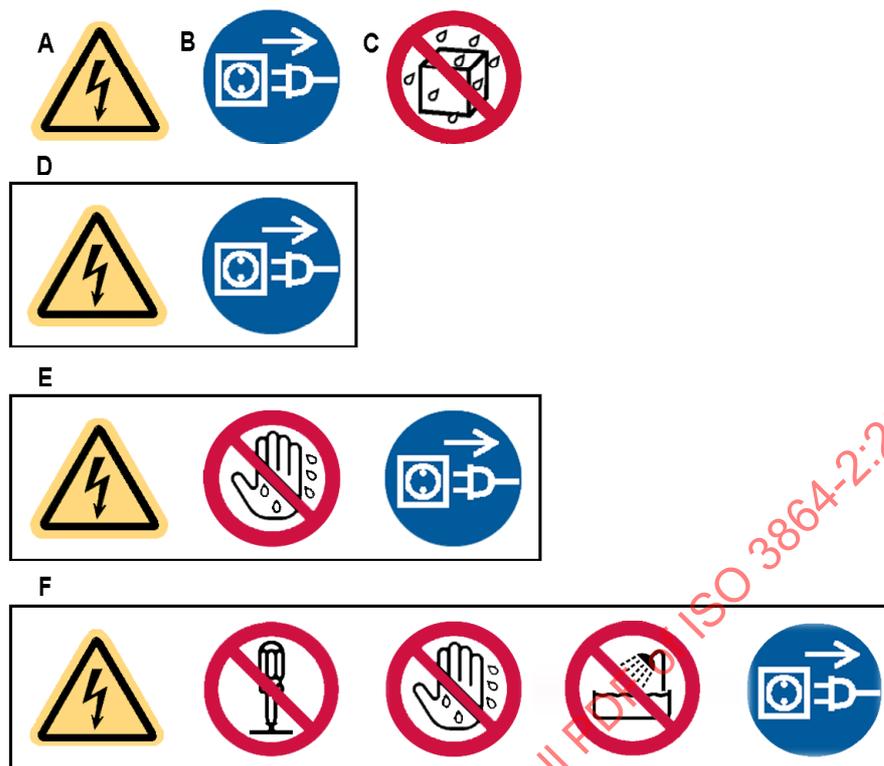
NOTE The examples shown below are not standardized but are found in use in industry.

There are several choices to make when designing a product safety label that conforms to this part of ISO 3864 including the following:

- to use only ISO 7010 safety signs, either individually or placed together on a multiple product safety label;
- to add supplementary safety information text to the ISO 7010 safety signs;
- to add a hazard severity panel;
- to add supplementary safety information symbols;
- to use borders in various ways to separate label components.

The illustrations shown in Figures C.1 to C.3 are intended to give the designer of product safety labels some visual examples of the options for developing label formats according to the principles given in this part of ISO 3864.

Figure C.1 illustrates several approaches for communicating safety information for a product. The use of two or more safety signs communicates both hazard identification and hazard avoidance information.



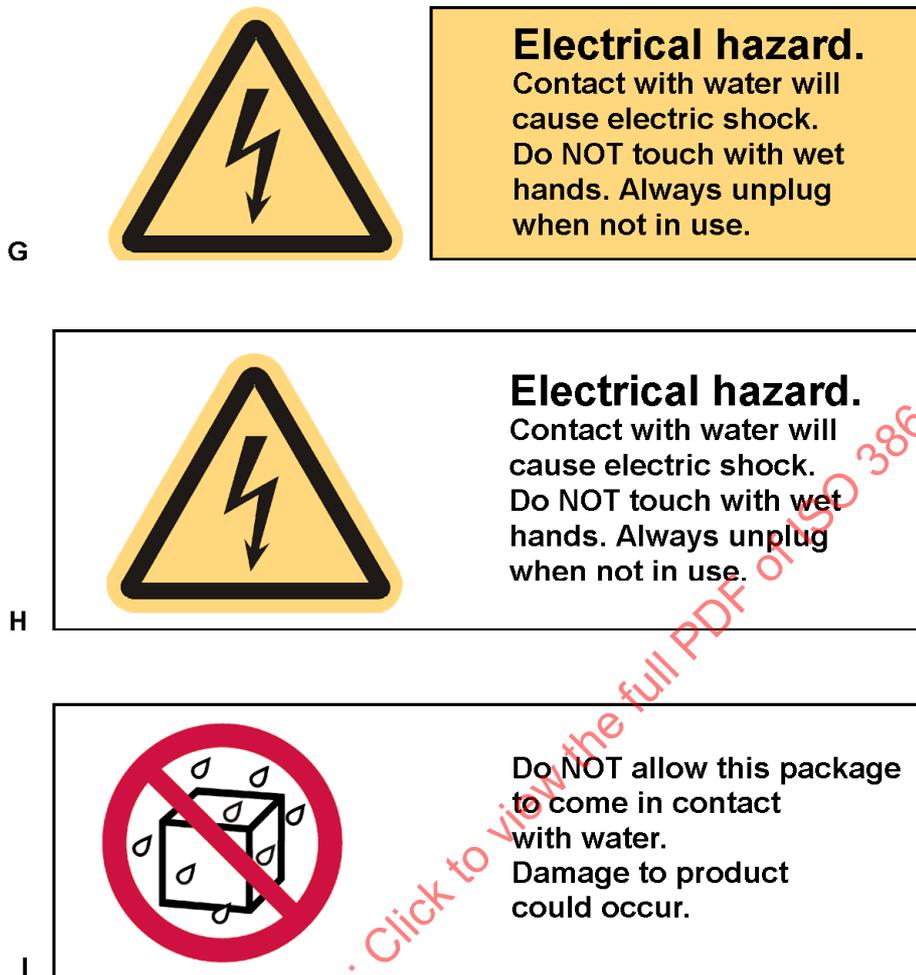
Examples A and B might be used together on the product to indicate an electrical hazard (A) and that the user should disconnect (unplug) the product (B). Example C might be used on the product's packaging to indicate that the product should not come in contact with water.

Example D shows two safety signs on a combination product safety label.

Examples E and F add additional hazard avoidance safety signs to convey additional safety messages including "Do not disassemble", "Do not touch with wet hands" and "Do not use in shower".

Figure C.1 — Formats without hazard severity panels and without supplementary safety information panels

Figure C.2 illustrates product safety labels that include the addition of supplementary safety information text.

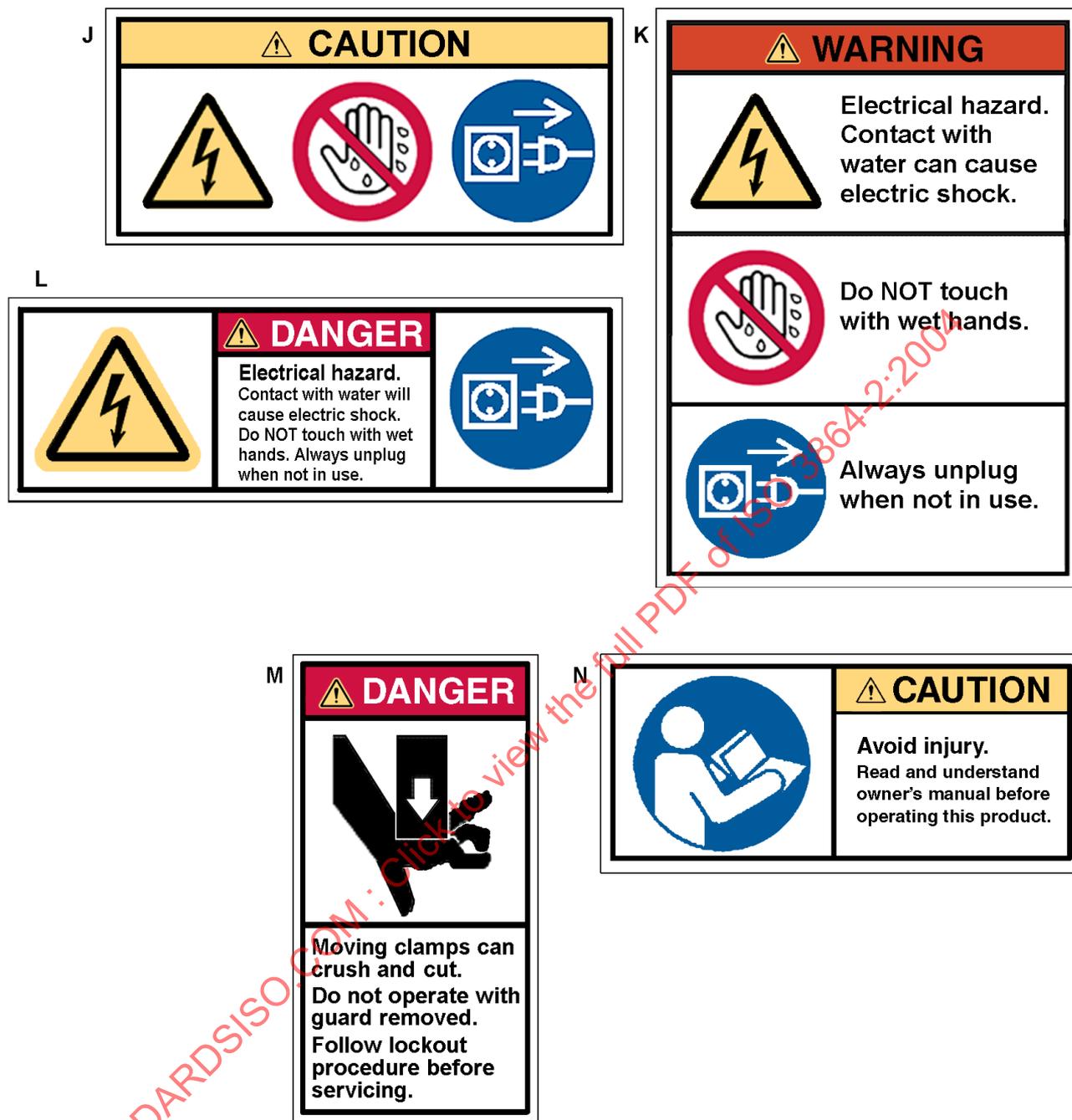


Example G shows the product safety label placed next to a supplementary safety information text label.

Examples H and I both show the safety sign and a supplementary safety information text on one combination product safety label.

NOTE In the examples shown in this figure, the safety sign's message is repeated in the supplementary safety information text panels. Although not mandatory, such an approach may help to educate those who see the safety sign as to its intended meaning.

Figure C.2 — Formats without hazard severity panels but with supplementary safety information text panels



Example N is a product safety label that uses a hazard severity panel, a safety sign and a supplementary safety information text to communicate the safety message.

NOTE The choice of hazard severity panel made for the above examples was arbitrary. To choose the proper hazard severity panel, see the definitions for hazard severity panels in Clause 3. Also, in several of the examples shown in this figure, the safety sign's message is repeated in the supplementary safety information text panel. Although not mandatory, such an approach may help to educate those who see the safety sign as to its intended meaning.

Figure C.3 — Formats with hazard severity panels and with supplementary safety information panels

Annex D (informative)

Product safety label development considerations

D.1 Hazard analysis and risk assessment

Prior to developing a product safety label, an assessment of the product's hazards and the risk associated with each hazard should take place. Key to this exercise is evaluating what residual risks remain after protective steps have been taken in the design and guarding of hazards and determining which of these hazards should be addressed with the use of safety labelling. Information overload in the form of too many product safety labels should be avoided. For many products, all foreseeable hazards resulting from the use and possible misuse of the product cannot be warned about in the form of safety labels. Choices should be made concerning which hazards pose the greatest risk and require a safety label. In the same manner, decisions should be made concerning which hazards need to be addressed in user documentation (e.g. the product's packaging, information sheets, operation and service manuals). Such an evaluation will also determine what tolerable risks remain after taking these proactive measures. (See ISO/IEC Guide 51 for more information on hazard/risk analysis and assessment).

D.2 Determination of the target audience

One of the primary factors to consider when designing a product safety label is the intended target audience (i.e. the people who will be using or servicing the product or who may possibly come in contact with the hazard). Determining the target audience will be helpful in determining the best product safety label layout for conveying the safety information. Decisions should be made concerning whether to use a safety sign as the product safety label or a safety sign with a supplementary safety information text panel. Will a hazard severity panel be used? If words are to be used, will translation of the message/signal word into other languages be necessary? Should new product safety labels be developed which better convey the necessary information? Will training and education be necessary to reinforce the product safety label's message? Special considerations may be necessary depending on whether or not the target audience is the general public or specially trained personnel. If a portion of the target audience is visually handicapped, some consideration may be given to tactile safety labels which may include raised elements of the graphical symbols and/or Braille. The level of a target audience's education is also a factor in deciding whether text should be included on the product safety label and whether or not comprehension testing of the safety signs is necessary.

Helpful references when developing consumer related safety labels are included in the ISO/IEC Guide 37 and the ISO/IEC Guide 14.

D.3 Comprehension testing and evaluation of product safety labels

If it is considered appropriate to evaluate the effectiveness of product safety labels to communicate the desired safety messages, then the completed label may be evaluated according to methods considered appropriate by the product supplier.

If a product safety label consists only of a safety sign, then comprehension testing may be carried out using ISO 9186. The criteria of acceptability shall be at values sufficiently high to have confidence that the intended audience will understand the product safety label.

If such a safety sign can have an application as a safety sign for the public in the general application of safety signs and work places, then consideration should be given to its standardization in ISO 7010.