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## **GUIDE 74**

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### **Graphical symbols — Technical guidelines for the consideration of consumers' needs**

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## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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

Draft Guides adopted by the responsible Committee or Group are circulated to the member bodies for voting. Publication as a Guide 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 and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC Guide 74 was prepared jointly by the ISO *Committee on consumer policy* (COPOLCO), and Technical Committee ISO/TC 145, *Graphical symbols*.

## Introduction

Poorly designed and researched graphical symbols, and also the proliferation of graphical symbols with the same intended meaning, can cause confusion for consumers. Such problems will become ever more common in an age of mass travel, mobility of labour, and global trading unless graphical symbols are designed, evaluated and standardized in accordance with procedures set out in the relevant International Standards.

Both the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) have published International Standards that specify the procedures to be followed when producing and standardizing graphical symbols.

Without doubt, graphical symbols can have important benefits in the field of communication, for example,

- they have visual impact,
- they can provide information in a compact form,
- they can provide information in a visual form that is independent of language, and
- they can guide the viewer to a desired outcome or appropriate decision.

However, these benefits are not always achieved in practice and the purpose of this Guide is to ensure that the needs of consumers are adequately addressed when a possible new requirement for a graphical symbol is being considered. If a symbol is to be effective and widely understood, it has to be used frequently, and for the same function. This will help create familiarity for the user. In the case of graphical symbols used on products or equipment, it will reduce the need for consumers to refer repeatedly to the users' manual. However, there will be instances when optimum results can only be achieved by the provision of supplementary text.

It is important for consumers that graphical symbols should clearly and successfully convey the intended message. In particular, they should differentiate between information that relates to safety requirements (including those associated with unsafe use or the misuse of products and equipment) and those which relate to non-safety information. It is therefore recommended that when technical committees consider the development of graphical symbols intended to convey messages to consumers, they ensure that the relevant groups are involved in the development process. This could be through consumer representation on the committee, through undertaking research on consumer usage, or both.

# Graphical symbols — Technical guidelines for the consideration of consumers' needs

**IMPORTANT** — The colours represented in the electronic file of this Guide can be neither viewed on screen nor printed as true representations. Although the copies of this Guide printed by ISO have been produced to correspond (with an acceptable tolerance as judged by the naked eye) to the requirements of ISO 3864-1, it is not intended that these printed copies be used for colour matching. Instead, consult ISO 3864-1 which provides colorimetric and photometric properties together with, as a guideline, references from colour order systems.

## 1 Scope

This Guide gives procedures for the development of graphical symbols for

- public information,
- use in safety signs and product safety labels, and
- use on equipment and products.

Such graphical symbols can be included in consumer documentation.

This Guide does not cover road traffic signs and graphical symbols for use in technical documentation.

Rules for the design of graphical symbols are given in International Standards. This Guide brings together information on relevant international reference documents and standards to assist technical committees and designers to follow “best practice” when considering the need for a new graphical symbol.

**NOTE** This guidance is also applicable at a regional and national level. For example, procedural guidance for CEN technical committees on the preparation of graphical symbols exists in *Guidance — Graphical symbols* in the CEN Business Operations Support System (BOSS): URL <http://www.cenorm.be/boss/>.

## 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 apply.

## 4 Relevant international technical committees

### 4.1 General

The international technical committees responsible for producing International Standards for the development, standardization and registration of graphical symbols covered by this Guide are ISO/TC 145 and IEC/SC 3C. These two committees are responsible for establishing principles for the preparation of graphical symbols and for their standardization.

NOTE In addition, the International Telecommunications Union (ITU-T) covers international symbols to assist users of telephone services.

Technical Committees drafting standards that make reference to graphical symbols, or include signs that contain graphical symbols, should, in addition to following the advice in this Guide, follow the procedures to be found at the relevant committee's website by accessing the URLs given below.

### 4.2 ISO/TC 145

ISO/TC 145 has three subcommittees:

- SC 1, *Public information symbols*,
- SC 2, *Safety, identification, signs, shapes, symbols and colours*, and
- SC 3, *Graphical symbols for use on equipment*.

The ISO/TC 145 website can be accessed as URL <http://www.iso.org/tc145>. The website also includes contact details for the committee's secretariat.

### 4.3 IEC/SC 3C

IEC/SC 3C covers graphical symbols for use on electrotechnical equipment. The secretariat can be contacted at the following URL:

<http://www.iec.ch/cgi-bin/procgi.pl/www/iecwww.p?wwwlang=e&wwwprog=dirdet.p&committee=SC&number=3c>

## 5 Preliminary considerations

### 5.1 Conveying the intended message

The intended message can include the identification of an object (product or equipment), indication of the status of an object or the appropriate behavioural response from users. Designers of graphical symbols should therefore

- a) identify the nature of the hazard or message to be conveyed and, in particular, whether it relates to the user or only to the equipment, and
- b) decide on the information that needs to be conveyed to the target audience and how this should be done (e.g. is the need for a graphical symbol for public information, for use as a safety sign and product safety label, or for use on equipment and products).

In the cases of graphical symbols for public information and graphical symbols for use on equipment, identification of an object or the indication of a state or operation may be the most important aspects of the message to be conveyed to consumers.

In the case of graphical symbols used in safety signs and product safety labels, the critical issue is to communicate the appropriate message in one or more of the following categories:

- prohibition;
- mandatory action;
- warning;
- safe condition/escape route/safety equipment;
- location of fire equipment.

## **5.2 Risk assessments**

In many cases, the nature of the safety issues to be addressed will be identified by a formal risk assessment. The procedures for carrying out risk assessments may be set out in national standards or codes of practice. These may be specified in national legislation.

## **5.3 Target audience**

Consider any particular communication needs of the target audience (e.g. children, older people and people with special requirements) and act accordingly. This may entail using concepts that will be familiar to the target audience and taking into account, for example, limited comprehension and visual acuity.

NOTE ISO/IEC Guide 71 provides guidance on the needs of older persons and persons with disabilities.

It will often be the case that particular graphical symbols will be designed for use in locations that are both a workplace and an area open to the general public. In such situations, the population will comprise both people who would normally be expected to have received training in health and safety matters and untrained members of the general public. One such example is an office building where visitors are admitted: the office workers will have received training relating to their place of work, whereas visitors will not. It is important to ensure that the latter group is taken into account when graphical symbols are designed for such locations.

Identify and make provision for any cultural or ethnic prohibitions that are relevant and ensure they are acted upon. Be very conscious of cultural sensibilities when designing graphical symbols for international use.

Make sure that a graphical symbol does not have an unintended or ambiguous meaning. In this context, the use of letters in graphical symbols should be avoided unless there is confidence that the meaning of such a graphical symbol will be universally understood.

## **5.4 Check for existing symbols that convey the same meaning**

Ascertain whether a graphical symbol suitable for the intended purpose already exists in an International Standard (see Table 1). If a suitable symbol exists, it shall be used. In any field of application, an established graphical symbol should only be used to convey one message.

# **6 Designing a new graphical symbol**

## **6.1 Basic procedures**

If a suitable symbol does not exist, follow the design, comprehension and standardization procedures set out in the relevant International Standards (see Table 2).

Where a graphical symbol is to be used in a safety sign or product safety label, it is essential that the safety colours for the sign or label be in accordance with ISO 3864-1.

## 6.2 Context of use

### 6.2.1 For designers of graphical symbols

It is important for those designing graphical symbols and safety signs to understand the context of use in order to guide design decisions. In particular, the activities being performed by the consumer and the details of the physical, ambient and socio-cultural environment should be identified in line with human-centred design principles (see, for example, ISO 13407).

Critical context-of-use factors may include the following:

- the environment where the graphical symbol, or graphical symbol/sign combination (which may be accompanied by supplementary text) will be used;
- viewing distance;
- illumination and ambient lighting conditions (which may include emergency situations);
- relationship in use to other symbols.

### 6.2.2 Installation and use of graphical symbols and safety signs

Context-of-use factors also need to be taken into account when graphical symbols and safety signs are being applied or installed in practice. Discussion of the following examples is beyond the scope of this Guide, but the examples are included to emphasize the fact that an otherwise excellent, well-researched and designed graphical symbol may lose its effectiveness if poorly reproduced or used in an inappropriate way.

Therefore, in order to maximize the effectiveness of a graphical symbol, it may be necessary (depending on the type of graphical symbol and the application) to take account of the following additional factors:

- avoidance of excessive and inappropriate use of colours;
- possible confusion between the background colours and safety colours;
- the contrast between the graphical symbol and its background;
- size;
- properties of materials and construction (e.g. reflectivity and durability);
- the effect of the technology used to reproduce graphical symbols;
- location (e.g. high, low) and clear lines of sight;
- lighting (both of the sign and its surroundings);
- the need to use supplementary text to improve comprehension;
- the level of gloss which can affect the ability of some people to read signs;
- the needs of those with vision impairments, including colour blindness.



## 7 Relevant International Standards

### 7.1 International Standards for graphical symbols and safety signs

To check whether a graphical symbol for the intended purpose already exists, reference should be made to the standards given in Table 1 as appropriate.

**Table 1 — International Standards that list standardized and registered graphical symbols and safety signs**

Type of graphical symbol/sign	International Standard
Public information symbols	ISO 7001
Safety signs	ISO 7010
Graphical symbols for use on equipment	ISO 7000 IEC 60417

Examples of standardized and registered graphical symbols and safety signs are given in Annex A.

### 7.2 International Standards for design principles and requirements for graphical symbols

When designing a new graphical symbol, refer to the standards in Table 2 as appropriate.

**Table 2 — International Standards for design principles and requirements for graphical symbols**

Type of graphical symbol/sign	International Standard
Public information symbols	ISO/TR 7239
Safety signs	ISO 3864-1, ISO 3864-2, ISO 3864-3 ISO 17398
Graphical symbols for use on equipment	IEC 80416-1, ISO 80416-2, IEC 80416-3, ISO 80416-4

NOTE Further standards of interest are listed in the Bibliography.

## 8 Evaluating the comprehensibility of safety signs (including product safety labels) and public information symbols

It is accepted that the best way to assess the effectiveness of a graphical symbol in conveying the intended message is by some form of controlled and impartial evaluation using individuals representing the target audience.

Such an impartial evaluation should include the following:

- a) the careful and consistent preparation of test specimens of graphical symbol variants for use in a testing procedure;
- b) objective and informed selection of a group of people representative of the target audience; age, gender and any special needs should be considered in the selection process, and respondents should be from more than one country and culture;
- c) consistent administration and invigilation of the test procedure;

d) validation and recorded analysis of the test data.

ISO 9186 sets out procedures for evaluating the comprehensibility of graphical symbols.

## 9 Validation, standardization and registration of graphical symbols

The purpose of validation, standardization and registration is to ensure that graphical symbols and safety signs

- conform to the relevant design principles,
- do not duplicate symbols that already exist,
- have met acceptable comprehensibility criteria, where appropriate, and
- can be entered into a database for subsequent retrieval.

The procedures for the validation of graphical symbols vary depending on their type and intended use. Information on these procedures and on how graphical symbols may be submitted to the relevant committee for validation and registration can be obtained by accessing the appropriate committee website as indicated in Clause 4.

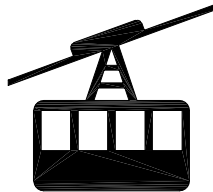
Information on these procedures is also set out in the ISO/IEC Directives and, in particular, in Annex SQ of the *ISO/IEC Directives Supplement — Procedures specific to ISO*, and in Annex J of the *ISO/IEC Directives Supplement — Procedures specific to IEC*.

## Annex A (informative)

### Examples of standardized and registered graphical symbols and safety signs



ISO 7001-0011  
Stairs  
(public information)



ISO 7001-0033  
Cable car, large capacity  
(public information)



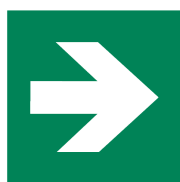
ISO 7010-W007  
Warning, obstacles  
(warning)



ISO 7010-P002  
No smoking  
(prohibition)



ISO 7010-F001  
Fire extinguisher  
(fire safety)



ISO 7010-E005  
Direction arrow  
(safe condition)



ISO 7010-M001  
General mandatory  
action sign



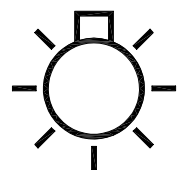
ISO 7000-0086  
Windscreen wiper



ISO 7000-0423  
Manual cleaning



IEC 60417-5002  
Positioning of cell



IEC 60417-5012  
Lamp

NOTE The examples from ISO 7010 illustrate the shapes, colours and basic types of safety sign as specified in ISO 3864-1.

## Bibliography

### ISO/IEC International Standards

- [1] ISO 3864-2, *Graphical symbols — Safety colours and safety signs — Part 2: Design principles for product safety labels*
- [2] ISO 3864-3, *Graphical symbols — Safety colours and safety signs — Part 3: Design criteria for graphical symbols used in safety signs*
- [3] ISO 6309, *Fire protection — Safety signs*
- [4] ISO 7000, *Graphical symbols for use on equipment — Index and synopsis*
- [5] ISO 7001, *Public information symbols*
- [6] ISO 7010, *Graphical symbols — Safety colours and safety signs — Safety signs used in workplaces and public areas*
- [7] ISO/TR 7239, *Development and principles for application of public information symbols*
- [8] ISO 9186, *Graphical symbols — Test methods for judged comprehensibility and for comprehension*
- [9] ISO 13407, *Human-centred design processes for interactive systems*
- [10] ISO 17398, *Safety colours and safety signs — Classification, performance and durability of safety signs*
- [11] ISO/IEC 80416-1, *Basic principles for graphical symbols for use on equipment — Part 1: Creation of symbol originals*
- [12] ISO/IEC 80416-2, *Basic principles for graphical symbols for use on equipment — Part 2: Form and use of arrows*
- [13] ISO/IEC 80416-3, *Basic principles for graphical symbols for use on equipment — Part 3: Guidelines for the application of graphical symbols*
- [14] ISO 80416-4, *Basic principles for graphical symbols for use on equipment — Part 4: Supplementary guidelines for the adaptation of graphical symbols for use on screens and displays (icons)*
- [15] IEC 60417, *Graphical symbols for use on equipment*

### ISO/IEC Guides

- [16] ISO/IEC Guide 71, *Guidelines for standards developers to address the needs of older persons and persons with disabilities*

### ITU-T Recommendations

- [17] ITU-T Recommendation F.910 (02/95), *Procedures for designing, evaluating and selecting symbols, pictograms and icons*
- [18] ITU-T Recommendation E.121 (07/96), *Pictograms, symbols and icons to assist users of the telephone service*



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