

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Basic principles for graphical symbols for use on equipment –  
Part 3: Guidelines for the application of graphical symbols**

**Principes élémentaires pour les symboles graphiques utilisables sur le matériel –  
Partie 3: Guide pour l'application des symboles graphiques**

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**Basic principles for graphical symbols for use on equipment –  
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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**BASIC PRINCIPLES FOR GRAPHICAL SYMBOLS  
FOR USE ON EQUIPMENT –****Part 3: Guidelines for the application of graphical symbols**

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**This consolidated version of IEC 80416-3 consists of the first edition (2002) [documents 3C/917/FDIS and 3C/988/RVD] and its amendment 1 (2011) [documents 3C/1687/CDV and 3C/1711/RVC]. It bears the edition number 1.1.**

**The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.**

International Standard IEC 80416-3 has been prepared by IEC subcommittee 3C: Graphical symbols for use on equipment, of IEC technical committee 3: Information structures, documentation and graphical symbols.

This International Standard has been prepared in co-operation with ISO/TC 145.

In order to collect all requirements concerning relevant basic principles within one single numerical series, ISO technical committee 145: Graphical symbols and IEC technical committee 3 agreed to publish all parts of this International Standard within the 80416 series. The Technical Management Board of ISO and the Committee of Action of IEC have decided that, for each part of this series, one organization shall be chosen responsible. The technical committees involved have agreed not to change any part of International Standard 80416 without mutual agreement.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

International Standard 80416 consists of the following parts, under the general title Basic principles for graphical symbols for use on equipment:

- Part 1: 2001, Creation of symbol originals (*published by IEC*)
- Part 2: 2001, Form and use of arrows (*published by ISO*)
- Part 3: Guidelines for the application of graphical symbols (*published by IEC*)
- Part 4: Supplementary guidelines for the adaptation of graphical symbols on screen and displays (icons) (*under consideration, and to be published by ISO*)

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
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- amended.

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## INTRODUCTION

~~A graphical symbol is a visually perceptible figure used to transmit information independently of language. Graphical symbols are used on equipment for a wide range of purposes. For such symbols, consistency in the design of families of symbols used in one location or on similar equipment is an important issue. Equally important is the legibility of symbols when they are reduced to small dimensions. Thus, there is a need to standardize the principles for creating graphical symbols for use on equipment to ensure visual clarity and consistency, and thereby to improve recognition.~~

~~This multi-part standard addresses the basic rules used to create graphical symbols for use on equipment, including line thickness, form and use of arrows, negation elements, and use of the basic pattern which serves as a guideline for drawing. These design principles are required to be used for all graphical symbols for use on equipment which are standardized in ISO 7000 and IEC 60417.~~

A graphical symbol is defined as a visually perceptible figure with a particular meaning used to transmit information independently of language. Graphical symbols are used on equipment for a wide range of purposes. The understanding of such symbols can be improved by consistent design. This is particularly important where families of symbols are used in one location or on similar equipment. Good design also helps to maintain the legibility of symbols when they are reduced to small dimensions for application. Thus, there is a need to standardize the principles for creating graphical symbols for use on equipment to ensure visual clarity, to maintain consistency and thereby to improve recognition.

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The IEC 80416 series is a multi-part international standard which provides basic principles and guidelines for the creation of graphical symbols for use on equipment (Parts 1 and 2) and also principles and guidelines for adapting registered graphical symbols for use in practice (Parts 3 and 4).

[IEC 80416-3:2002+AMD1:2011 CSV](https://standards.iteh.ai/catalog/standards/sist/098e7f6e-b46e-4f63-9a85-11d1c9101101/iec-80416-3-2002-amd1-2011)

[https://standards.iteh.ai/catalog/standards/sist/098e7f6e-b46e-4f63-9a85-](https://standards.iteh.ai/catalog/standards/sist/098e7f6e-b46e-4f63-9a85-11d1c9101101/iec-80416-3-2002-amd1-2011)

IEC 80416-3 has been produced to provide the guidelines required when graphical symbols are applied on equipment for use in a specific context, for supporting documentation and for other International Standards.

## BASIC PRINCIPLES FOR GRAPHICAL SYMBOLS FOR USE ON EQUIPMENT –

### Part 3: Guidelines for the application of graphical symbols

#### 1 Scope

~~International Standard 80416 is a multi-part standard which provides principles and guidelines for the creation and application of graphical symbols for use on equipment.~~

This part of IEC 80416 provides guidelines for the application of graphical symbols for use on equipment in order to maintain visual clarity and overall consistency when such graphical symbols are applied. It stipulates the permissible extent by which a symbol original may be modified in reproduction for actual use on equipment.

#### 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.

IEC 80416-1:2008, *Basic principles for graphical symbols for use on equipment – Part 1: Creation of graphical symbols originals for registration*

[IEC 80416-3:2002+AMD1:2011 CSV](#)

ISO 80416-2, *Basic principles for graphical symbols for use on equipment – Part 2: Form and use of arrows*

[92f5fec00c99/iec-80416-3-2002amd1-2011-csv](#)

~~ISO/FDIS 3864-1:2001, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs in workplaces and public areas*~~

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

ISO 3864-2, *Graphical symbols – Safety colours and safety signs – Part 2: Design principles for product safety labels*

IEC 60073, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indication devices and actuators*<sup>1</sup>

~~ISO/DIS 7010:2001, *Graphical symbols – Safety signs in workplaces and public areas*~~

ISO 7010, *Graphical symbols – Safety colours and safety signs – Safety signs used in workplaces and public areas*

ISO 7000, *Graphical symbols for use on equipment – Index and synopsis*<sup>2</sup>

<sup>1</sup> New edition to be published.

<sup>2</sup> The ISO 7000 collection of graphical symbols for use on equipment is also available online, either separately or jointly with the IEC 60417 collection of graphical symbols for use on equipment. ISO Catalogue provides further information on this regard.



ISO 80416-4, *Basic principles for graphical symbols for use on equipment – Part 4: Guidelines for the adaptation of graphical symbols for use on screens and displays (icons)*

IEC 60417-(~~all parts~~), *Graphical symbols for use on equipment*

### 3 Terms and definitions

For the purposes of this part of IEC 80416, the following definitions apply together with the terms defined in IEC 80416-1:

#### 3.1

##### **nominal size**

50 mm; the lateral dimension of the basic square 2 as shown in the basic pattern in IEC 80416-1

#### ~~3.2~~

##### ~~**symbol original**~~

~~drawing of a graphical symbol, prepared in accordance with IEC 80416-1, used for reference or reproduction purposes~~

### 4 Area of application

#### 4.1 Equipment

Graphical symbols may, for example, be printed, engraved, embossed, or moulded on the equipment. The technology used to reproduce a graphical symbol and apply it to a piece of equipment may have an influence on its size and appearance. There may be a need to modify the symbol original in order to ensure visual clarity provided that the original meaning is retained.

#### 4.2 Screens and displays

Symbol originals may need to be modified to take into account restrictions imposed by appearing on a screen or display. In this application, ISO 80416-4 shall be taken into consideration.

~~NOTE 1 ISO 80416-4 (under consideration) gives supplementary guidelines for the adaptation of graphical symbols for use on screens and displays (icons)~~

NOTE 2 IEC 60073 gives basic and safety principles for man-machine interface on screens and displays.

#### 4.3 Supporting documentation

Graphical symbols reproduced in supporting documentation shall convey the same graphical impression as those used on the equipment.

#### 4.4 International Standards

If International Standards prepared by technical committees contain standardized graphical symbols or suitably modified graphical symbols for specific applications, the graphical symbol shall be illustrated together with the registration number and title obtained from either ISO 7000 or IEC 60417.

In cases where modified graphical symbols in accordance with this part of IEC 80416 are adopted, the text "modified" shall be shown under the registration number.

NOTE International standards may also contain graphical symbols for diagrams. In such cases, IEC 60617 database and ISO/IEC 14617 should be consulted.

## 5 Size of graphical symbols in use

Symbol originals created on the basis of IEC 80416-1 and ISO 80416-2 and standardized in IEC 60417 and ISO 7000 have a visual impression of size corresponding to the nominal size 50 mm. The symbol original to be applied on equipment may therefore be reduced or enlarged to obtain a graphical symbol in a desired size.

The minimum reduced or enlarged size  $S$  (mm), corresponding to the nominal size (50 mm), of a reproduced graphical symbol in relation to the intended viewing distance  $L$  (mm) may be determined by the following equation to ensure visual clarity.

$$S = \frac{1}{100}L$$

## 6 Modification of symbol originals for application

### 6.1 Modification according to design

To coordinate with the design requirements of equipment, it ~~may be necessary and is~~ allowed:

- ~~a) to change the line thickness;~~
- ~~b) to round the corners;~~
- ~~c) to fill areas;~~
- ~~d) to interrupt crossing lines.~~

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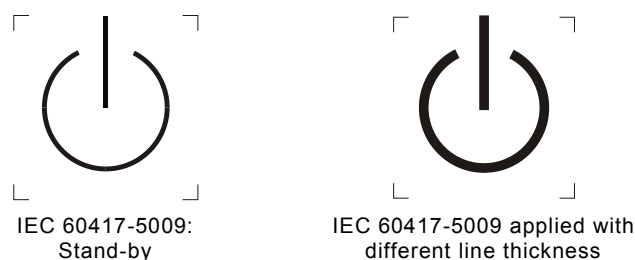
- a) to change the line width;
- b) to round the corners; [IEC 80416-3:2002+AMD1:2011 CSV](https://standards.iteh.ai/catalog/standards/sist/098e7f6e-b46e-4f63-9a85-92f5fec00c99/iec-80416-3-2002amd1-2011-csv)
- c) to fill areas; <https://standards.iteh.ai/catalog/standards/sist/098e7f6e-b46e-4f63-9a85-92f5fec00c99/iec-80416-3-2002amd1-2011-csv>
- d) to interrupt crossing lines;
- e) to adapt distances between graphical elements;
- f) to adapt the relative proportions of graphical elements;
- g) to modify the type of arrow.

If several graphical symbols are applied together, it can be necessary and it is permitted to adjust their relative sizes and positions in order to achieve a balanced appearance on the equipment.

These changes shall only be made to the extent that the basic communicative characteristics of the graphical symbol remain unchanged.

### 6.2 Line thickness

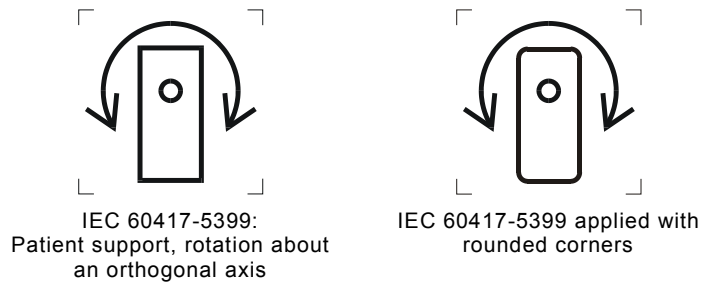
The thickness of the lines may be changed as in the example in figure 1.



**Figure 1 – Example of different line thickness**

### 6.3 Rounded corner of graphical symbols

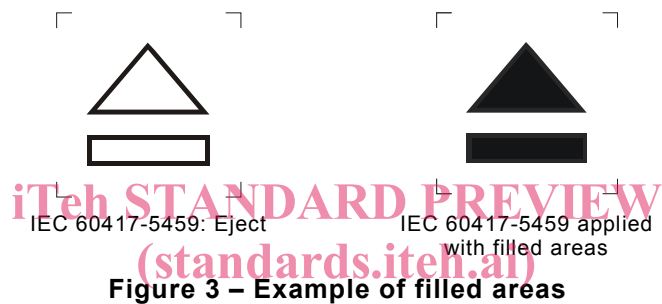
Rounded corners are permitted as in the example in figure 2.



**Figure 2 – Example of rounded corner**

### 6.4 Filled areas

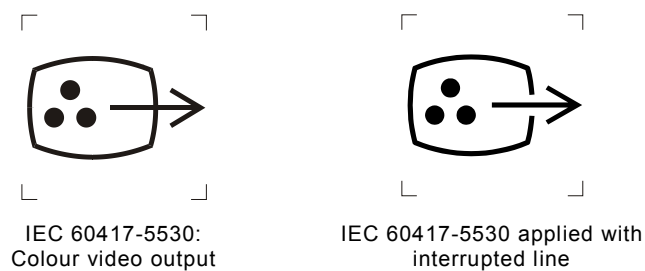
White areas may be filled as in the example in figure 3.



**Figure 3 – Example of filled areas**

### 6.5 Interruption of crossing lines

Crossing lines may be interrupted as in the example in figure 4.



**Figure 4 – Example of interrupted lines**

### 6.6 Modification of arrow type

The arrow type may be modified as in the examples given in Figure 11.

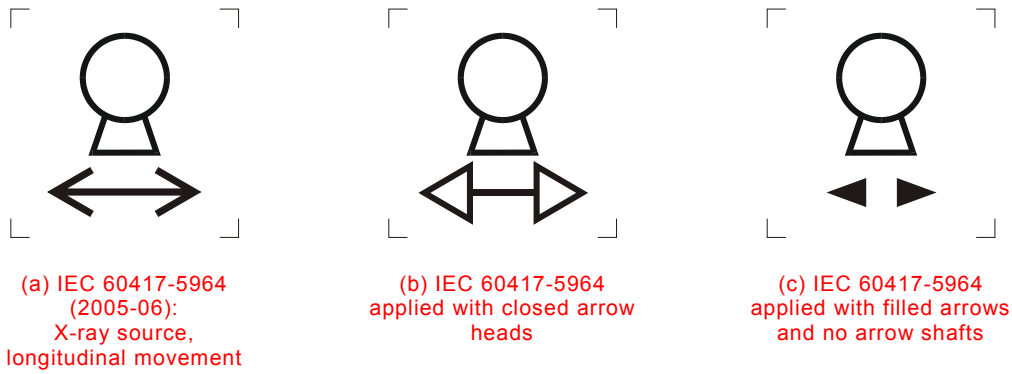


Figure 11 – Examples of arrows

## 7 Negation

The meaning of a graphical symbol may be negated using a cross of line thickness 2 mm formed by two diagonal bars at right angles as defined in 6.9 of IEC 80416-1. The bars of the negation cross shall be continuous. An example is shown in figure 5. As an exception, for purpose of visual clarity (the angle at which the diagonal bars meet may deviate from 90-degree).

The meaning of graphical symbols registered in ISO 7000 and IEC 60417 may also be negated when they are applied. The method and the meaning of negation should be in agreement with IEC 80416-1:2008, 7.9.

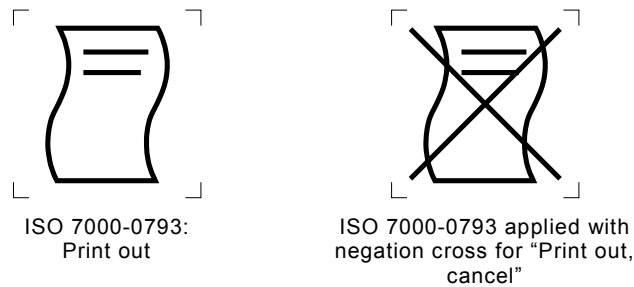


Figure 5 – Example of application of negation for a standardized graphical symbol

The red circle with the red negation bar as defined in ISO/FDIS 3864-1:2001 for safety applications shall not be used for negation of graphical symbols for use on equipment.

An application of a circle with a diagonal bar defined in ISO 3864-1 to graphical symbols denotes a 'prohibition'. Therefore, a circle combined with a diagonal bar, in any colour including black and white, shall not be used for other meaning than prohibition.

## 8 Arrows

Where two arrowheads are used in the symbol original to indicate direction of movement in opposite directions, one of the arrowheads may be omitted in order to indicate a single direction of movement as shown in the example in figure 6.