भारतीय मानक
Indian Standard

IS 16898 (Part 4) : 2018
ISO 80416-4 : 2005

उपकरण पर प्रयोगार्थ चित्रात्मक प्रतीकों के लिये आधारभूत सिद्धांत

भाग 4 परदे एवं डिस्पले (आईकान) संबंधी प्रयोगार्थ चित्रात्मक प्रतीकों के अधिग्रहण के लिए मार्गदर्शन

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)

ICS 01.080.20; 35.180

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Basic Standards Sectional Committee, PGD 01

NATIONAL FOREWORD

This Indian Standard (Part 4) which is identical with ISO 80416-4 : 2005 '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)' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on recommendation of the Basic Standards Sectional Committee and approval of the Production and General Engineering Division Council.

Other parts in this series are:

Part 1 Creation of symbol originals (published by IEC)
Part 2 Form and use of arrows
Part 3 Guidelines for the application of graphical symbols (published by IEC)

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 7000 : 2014 Graphical symbols for use on equipment — Registered Symbols	IS 16150 : 2017 Graphical symbols for use on equipment — Registered symbols	Identical to ISO 7000 : 2014
ISO 80416-2 : 2001 Basic principles for graphical symbols for use on equipment — Part 2 : Form and use of arrows	IS 16898 (Part 2) : 2018 Basic principles for graphical symbols for use on equipment : Part 2 Form and use of arrows	Identical to ISO 80416-2 : 2001

The technical committee has reviewed the provisions of the following International Standard referred in this adopted standard and has decided that it is acceptable for use in conjunction with this standard:

International Standard	*Title*
ISO/IEC 11581 - 2	Information technology — User system interfaces and symbols — Icon symbols and functions — Part 2 : Object icons
ISO/IEC 11581 - 3	Information technology — User system interfaces and symbols — Icon symbols and functions — Part 3 : Pointer icons
ISO/IEC 11581 - 5	Information technology — User system interfaces and symbols — Icon symbols and functions — Part 5 : Tool icons
ISO/IEC 11581 - 6	Information technology — User system interfaces and symbols — Icon symbols and functions — Part 6 : Action icons
IEC 80416 - 1	Basic principles for graphical symbols for use on equipment — Part 1: Creation of symbol originals
IEC 60417	Graphical symbols for use on equipment

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, helps users to understand the meaning of the symbols. 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 International Standard which is a multi-part standard, addresses the basic rules used to create graphical symbols for use on equipment, including line thicknesses, form and use of arrows, negation elements, and use of the basic pattern which serves as a guide for drawing symbols. 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.

Icons can reduce the apparent complexity of a software-user interface, making it easier to learn and use. This part of ISO 80416 provides guidelines for the adaptation of graphical symbols for use on screens and displays (icons).

This part of ISO 80416 is primarily concerned with the adaptation of graphical symbols for use as icons. However, the guidelines may also be used in the development of icons where suitable graphical symbols do not exist. Annex B contains additional guidelines for this purpose. Annex A provides examples of those symbols adapted as icons.

Indian Standard

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)

1 Scope

This part of ISO 80416 provides guidelines for the adaptation of graphical symbols for use on screens and displays (icons) on a wide range of equipment, such as electrotechnical equipment, photocopiers, vehicle dashboards and home appliances. It also provides principles for maintaining the fidelity of icons to the original graphical symbols.

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 7000, *Graphical symbols for use on equipment — Index and synopsis* [Database available at <http://www.graphical-symbols.info/>]

ISO/IEC 11581-2, *Information technology — User system interfaces and symbols — Icon symbols and functions — Part 2: Object icons*

ISO/IEC 11581-3, *Information technology — User system interfaces and symbols — Icon symbols and functions — Part 3: Pointer icons*

ISO/IEC 11581-5, *Information technology — User system interfaces and symbols — Icon symbols and functions — Part 5: Tool icons*

ISO/IEC 11581-6, *Information technology — User system interfaces and symbols — Icon symbols and functions — Part 6: Action icons*

IEC 80416-1, *Basic principles for graphical symbols for use on equipment — Part 1: Creation of symbol originals*

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

IEC 60417, *Graphical symbols for use on equipment* [database available at <http://www.graphical-symbols.info/>]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 80416-1 and the following apply.

3.1
anti-aliasing
technique using several intensities of colour between the colour of a line and the background colour to create the effect of smoother curves and fewer jagged edges on curves and diagonals

3.2
default
option or attribute already provided by the operating system or application, and which the user can change

3.3
icon
graphical symbol presented on a screen or display

NOTE Icons can be static and interactive and change as the result of user input, or dynamic and change as the result of equipment status.

3.4
icon editor
special software application (or "tool") used for creating icon files

3.5
pixel
pel
smallest addressable graphical element of a screen or display

NOTE Screen or display resolutions are typically referenced by the number of pixels measured horizontally and vertically, e.g. 1 024 by 768 pixels.

4 Area of application

4.1 Screens and displays

Graphical symbols used as icons can be presented upon a screen or display using a full or limited colour palette, or in monochrome. Icons are presented in varying sizes depending upon the specific implementation by the computer software and the attributes of the display technology, for example, the physical dimensions of the screen or display and the number of pixels available. There may be a need to modify the symbol original in order to ensure visual clarity provided that the original graphical impression is retained.

4.2 Supporting documentation

Graphical symbols used as icons reproduced in supporting documentation should convey the same visual impression as those used on the screen or display.

4.3 International Standards

If International Standards prepared by technical committees contain icons adapted from graphical symbols with ISO 7000 or IEC 60417 registration numbers, each icon should be illustrated together with a reference to the registration number of the original graphical symbol.

5 Principles of implementation

5.1 General usage

Icons are used widely in contemporary software systems that use graphical user interfaces. They can be static and used solely for visual identification/reinforcement of a textual description, or invoke a function or open an object when selected with a pointer. Icons can also be animated or dynamic and show the current status of the represented object. In contemporary operating systems (or "platforms"), icons have varying attributes and utilize different file types. The specific details of these attributes and file types are not addressed in this part of ISO 80416.

5.2 Types of icons

The following types of icons are addressed in the different parts of ISO/IEC 11581:

— object icons (ISO/IEC 11581-2);

— pointer icons (ISO/IEC 11581-3);

— tool icons (ISO/IEC 11581-5);

— action icons (ISO/IEC 11581-6).

NOTE 1 Action icons are also referred to as "tool bar" icons.

NOTE 2 Some graphical representations might be used in more than one icon type to provide similar functionality. For example, a printer icon could be used to describe the printer object, to start the print action, and to show the printer status or the ink level.

5.3 Relationship between graphical symbols and icons

5.3.1 Consistency

When the same graphical symbol is used both on equipment, in printed or engraved form, and presented on a screen or display as an icon, it is essential that the meaning of the graphical symbol is consistent across all areas of application.

Internationally standardized graphical symbols should not be used with meanings other than those specified.

5.3.2 Adaptation of existing graphical symbols

It is essential that new icons are adapted from existing internationally standardized graphical symbols, where a suitable graphical symbol exists with the same meaning.

NOTE Examples of existing graphical symbols adapted as icons are given in Annex A.

5.4 Colour

5.4.1 Technical considerations

Default colour palettes vary depending upon the operating system. When creating or adapting an icon, it is essential that the default colour palette of the operating system or environment in which the icon will be used is taken into account, so as to avoid unintended results.

For screens or displays using cathode ray tubes (CRT) and liquid crystal display (LCD) panels, 8 bit (i.e. 256 colours) icons are commonly used. However, some devices, for example photocopiers and domestic appliances, can require 2 bit (monochrome) or 4 bit (16 colours) icons.

Within a 4 bit colour palette, additional colours can be created by mixing different colours spatially, i.e. by “checker-boarding” colours of similar tonal values.

Only colours of similar tonal values should be spatially mixed (“dithered”). Mixing colours of contrasting tonal values will create visible “chequer” patterns.

For web applications, a colour palette that can be displayed reliably using different browsers should be used.

5.4.2 Use of colour

It is important to consider all the icons to be used in order to create a harmonious visual impression. Unless there is a specific reason, the same chromatic impression and balance between icons should be maintained.

Because saturated colours are very dominating, they should be used sparingly and for a specific purpose, for example, for warning or change of status.

Where an icon is derived from a standardized warning sign, colour fidelity should be maintained (see ISO 3864-1).

Colour and grey outlines can be used to create a three-dimensional or highlight/shadowed effect in larger icons (e.g. 32 × 32 pixels). For smaller sizes (e.g. 16 × 16 pixels), saturated colours and black outlines can be used to aid their recognition and comprehension.

NOTE The convention for objects or functions currently “unavailable” is to display them as “greyed”, i.e. colourless, icons.

6 Constructing icons

6.1 General

Contemporary display technologies, for example CRT, LCD and PDP (plasma display), impose certain constraints regarding the construction and presentation of graphical symbols on displays. At the sizes where icons are conventionally displayed, it might not be possible to maintain a constant line thickness or regular arcs.

Vector drawing tools can be used for constructing icons. However, contemporary practice is to save and display icons in the form of bitmapped images, i.e. a series of coloured squares (representing individual pixels) within a square or rectangular grid (the “cell”).

Alternative versions need to be created to support all the cell sizes, colour palettes, etc, which the target operating system supports. If the correct sizes are not provided, the operating system might re-size available icons automatically, removing or adding averaged rows and columns of pixels to achieve the required cell size. This process produces unexpected and often undesirable results, and it is recommended that each size version required is individually created by the designer.

NOTE Some operating systems will identify the available display resolution and colour palette in use and present the appropriate combination of cell sizes for the current screen resolution. It is not unusual for an icon file to contain up to eight variations of cell size and colour palette.

Additional design guidelines for new icons, that are not adapted from existing internationally standardized graphical symbols, are given in Annex B.

6.2 Cell sizes

Established operating system conventions exist for the cell sizes of most icon types.

The common icon sizes are 64 × 64, 48 × 48, 32 × 32, 16 × 16 and 8 × 8 pixels. A 24 × 24 pixel cell size is also used, but this is less common. The final presentation sizes of the icons will depend upon a combination of the physical size of the display screen and the colour palette used, for example, 640 × 480 pixels/4 bit, 800 × 600 pixels/8 bit, 1 024 × 768 pixels/24 bit, etc.

6.3 Location of graphical image in cell

Operating-system conventions should be taken into account when locating the graphical image within the cell, in the following ways.

— Some systems require the graphical image to be on the left and base aligned within the cell, while others centralize the graphical image horizontally on a common line above the base of the cell.

— Adjacent icons should not appear to touch. There should be sufficient white space from the outer extremities of the image and the cell sides to avoid this. Whether adjacent icons appear to touch depends on various factors including operating system settings for positioning and stacking.

— Some operating systems require an area of empty (transparent) space surrounding the graphical image to show the object's status, (e.g. available/selected/in use/unavailable), consequently the graphical image may need to be smaller than one designed for other operating systems.

6.4 Line drawing

6.4.1 General

When drawing lines of one or two pixels wide, it is not always possible to maintain constant widths for diagonal lines or regular arcs for curved lines. The technique of anti-aliasing (the addition of less-saturated pixels) can improve the visual quality.

6.4.2 Diagonal lines

Horizontal and vertical lines will appear at constant widths, but diagonal lines of the same apparent thickness are difficult to achieve; a diagonal line of three pixels would be needed to match a horizontal line of two pixels, as illustrated in Figure 1.

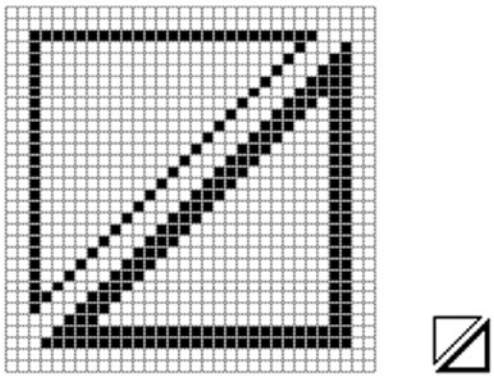


Figure 1 — Examples of diagonal line widths (enlarged and final size)

Diagonal lines of a regular appearance can only be achieved at equivalents of 11,5°, 22,5°, 45,0°, 67,5° and 78,5°, i.e. by “stair-casing” the pixels at ratios of 1:3, 1:2, 1:1, 2:1 and 3:1, as illustrated in Figure 2.

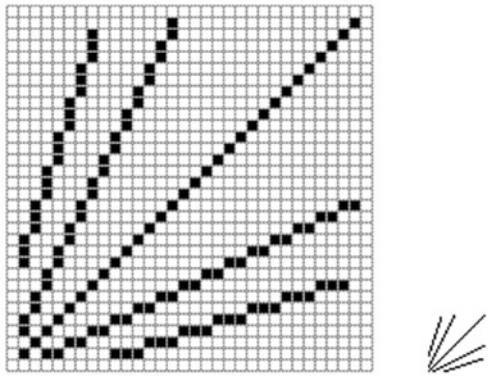


Figure 2 — Examples of regular diagonal lines (enlarged and final size)

6.4.3 Curved lines

One means of achieving more regular line thickness is to carefully anti-alias them using similar colours. However, the lines might appear blurred and this technique only works successfully when the icon border and screen background colours are fixed. Figure 3 shows a circle in which the left side has been anti-aliased and the right side left plain.

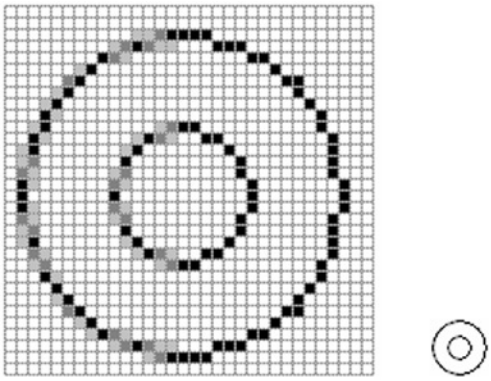


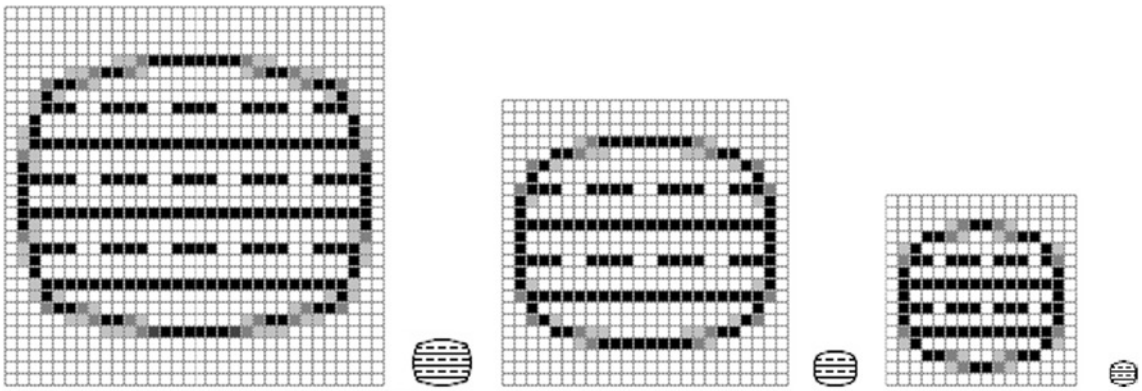
Figure 3 — Examples of anti-aliasing (enlarged and final size)

6.5 Creating alternative versions of resolution/implementation

Visually simple icons and recognition, interpretation and recall. A recommended approach is to begin by designing the icon for a larger cell size, e.g. 48 × 48 pixels. A maximum of three main objects is recommended.

An alternative approach is to begin by defining the minimum quantity of elements that are necessary, ensuring they fit the smallest icon; then the larger versions can be created, adding more detail if appropriate.

Some icon editing tools will provide functions that will stretch or shrink a given image to a new cell size. This can be a useful tool and save time, though the resulting images will still need editing. However, as the cell size increases, either more detail can be added to the objects, or more objects can be added to provide a visually richer icon. Correspondingly, if a smaller icon is required, it is recommended that the quantity of objects or level of detail be reduced, as illustrated in Figure 4.



NOTE This Figure illustrates a representation of IEC 60417-5773: Electronic image, interlacing.

Figure 4 — Examples of 32 × 32, 24 × 24 and 16 × 16 pixel icons (enlarged and final sizes)

6.6 Filled areas

Care should be taken to maintain the integrity of the original graphical representation when adapting symbols for use on screens and displays. Display technology provides new options for differentiating between parts of the symbol and surrounding area. For example, each of the internal parts of the symbol may be filled using a different colour and the surrounding area may be transparent.

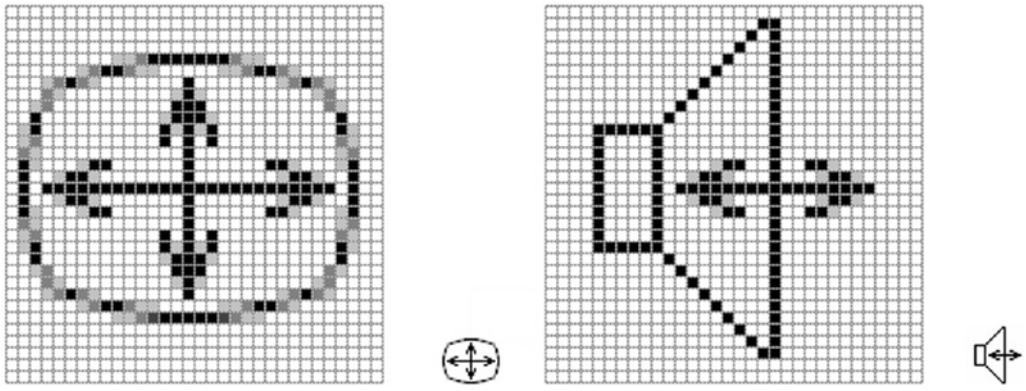
6.7 Distinguishability

The overall set should be considered when adapting individual graphical symbols into icons, ensuring that they are individually distinguishable, particularly when the cell size is reduced and there is a subsequent reduction of detail.

6.8 Representation of arrows

ISO 80416-2 gives basic principles for the use and proportions of arrows.

A consistent style of arrow should be used throughout all icons produced for an application or platform. Figure 5 illustrates the consistent use of the same arrow style.



NOTE This Figure illustrates representations of symbols IEC 60417-5067: Picture size adjustment (left) and IEC 60417-5081: Loudspeaker/microphone (right).

Figure 5 — Examples of arrows used in icons (enlarged and final sizes)

6.9 Composite icons

6.9.1 General

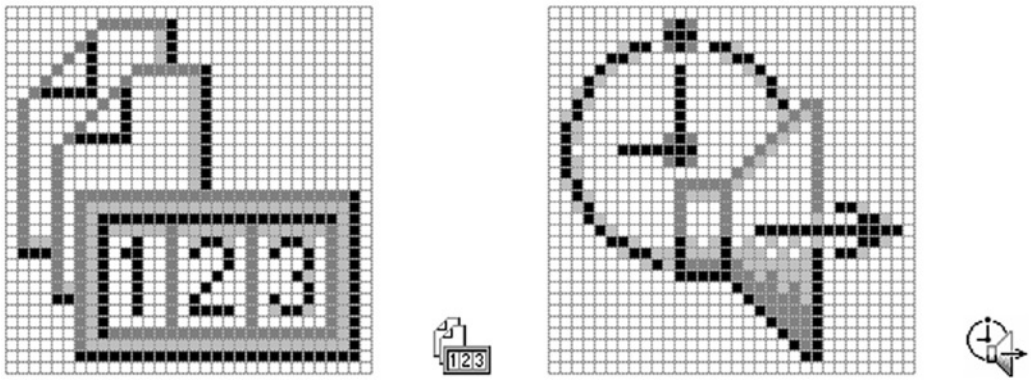
Few icons consist of a single represented object. Frequently, several graphic components might need to be combined to produce a more specific and descriptive icon.

Where possible, the composite icon should be based on standardized graphical symbol elements such as, for example, negation elements and arrows (see IEC 80416-1 and ISO 80416-2).

6.9.2 Cascading elements

With several objects/elements to be presented, overlapping of the components might be necessary to maintain adequate sizes of the objects and imply relationships or sequences. This can be accomplished by "cascading" the objects diagonally, across the available cell area. To maintain the identity and emphasis of these elements, great care should be exercised regarding which components are concealed or revealed and which components require priority or emphasis, for example, which components are to be on the top of the visual hierarchy. This is illustrated in Figure 6.

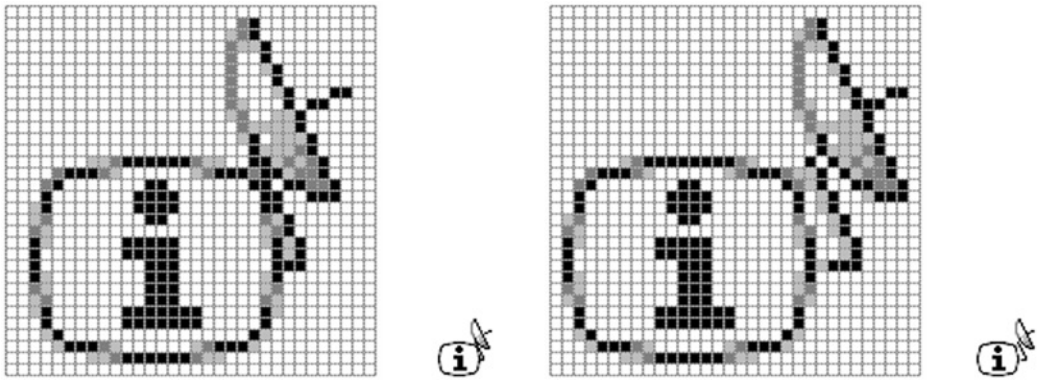
NOTE The prime components will in turn influence the design of any smaller or "mini" icons to be provided for other resolution or implementation versions, and which will probably require a further "distillation" of the design concepts.



NOTE The left-hand icon is composed from symbols ISO 7000-0709: Double original/master fault, and ISO 7000-0695: Counter, and the right-hand icon is composed from symbols IEC 60417-5440: Programmable timer, general and IEC 60417-5127: Loudspeaker in operation as such.

Figure 6 — Examples of cascaded components (enlarged and final sizes)

When cascading components, care should be taken to avoid visual "clumping" which will result where lines or shapes from differing objects visually combine and result in the visual equivalent of an ink blot. This effect can be avoided by superimposing these lines as a single pixel thickness, or by separating them further. This technique is illustrated in Figure 7.

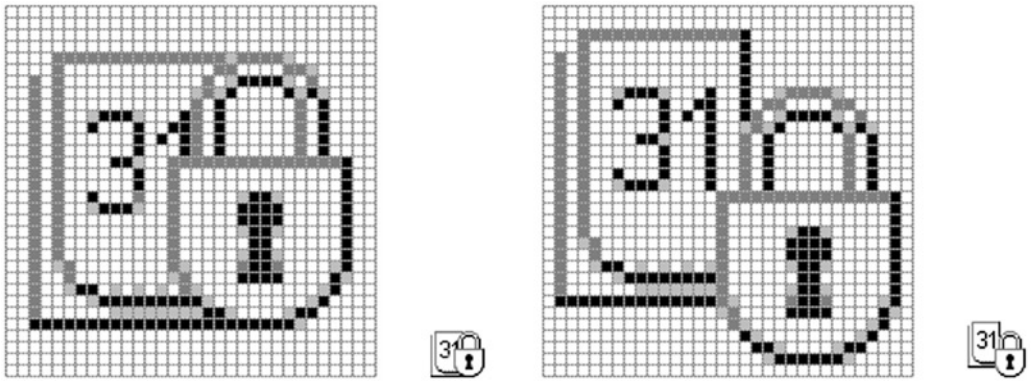


NOTE This Figure illustrates a representation of an icon composed from symbol ISO 7000-2026: Help, and symbol IEC 60417-5464: Satellite reception mode, general.

Figure 7 — Examples of "clumped" and "un-clumped" components (enlarged and final sizes)

6.9.3 Visually continuous lines

"Run-ons" (where a line in one object coincides with a similar direction line in a second object, and can appear to continue through both objects resulting in a visual linking) should be avoided. The visual result might not be desirable. By judicious over-lapping or offsetting the objects, this can be avoided, as illustrated in Figure 8.

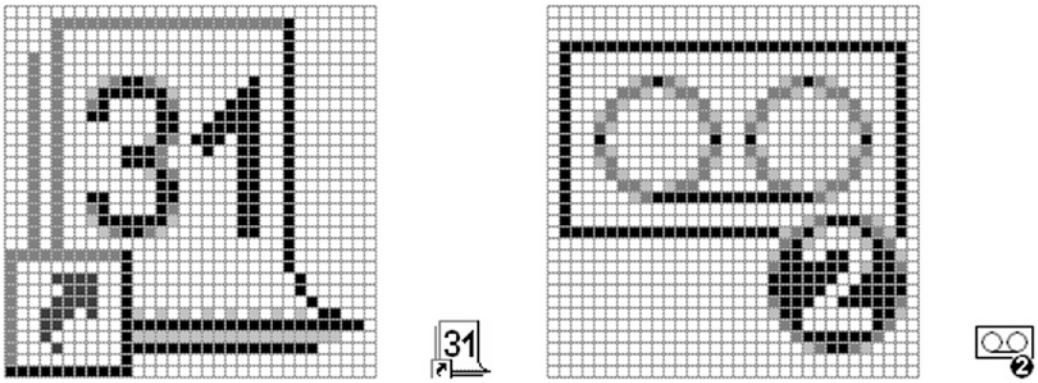


NOTE This Figure illustrates a representation of an icon composed from symbol IEC 60417-5662: Date, and symbol ISO 7000-1656: Lock.

Figure 8 — Examples of "run-on" and non-"run-on" components (enlarged and final sizes)

6.9.4 Additional elements

Within the design, always consider that additional elements can be added automatically by the operating system. For example, "shortcut" arrows (as illustrated in Figure 9), status indicators and shared resource indicators are typically overlaid in the lower part of desktop icons.



NOTE This Figure illustrates a representation of icons from symbols IEC 60417-5662: Date (left) and IEC 60417-5561: Cassette (right)

Figure 9 — Example of icons with additional elements (enlarged and final sizes)

7 Icon behaviours

7.1 General

To provide additional information to the user, icons can show their status, be animated or be dynamic.

7.2 Status indication

Depending upon their implementation, alternative versions of icons might be required to indicate that a process has ended, the prevention of a function, an inaccessible function, or of the availability of a function when the pointer moves over an icon. When creating such icons, the established conventions and guidelines provided by the operating system provider should be followed. For example, the “greying out” of a tool bar icon indicates that a function is not currently available.

7.3 Animated icons

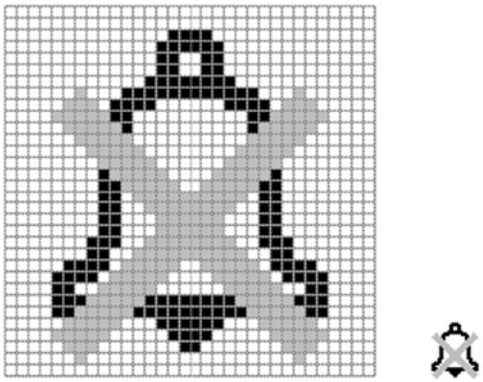
Animated icons can be used to draw the user's attention to a specific condition, or to show that an operation is in process. For example, a printer icon could flash to indicate that the printer has run out of paper or toner.

Blinking or flashing of dynamic icons that may cause epileptic seizures should be avoided. Implementors of this guideline should refer to relevant national standards or most recent research for the range of frequencies to be avoided.

In general, animated icons should be used with caution and displayed for a limited time only, unless a critical condition has occurred. Multiple animated icons, which create distraction and cause confusion, should be avoided.

7.4 Dynamic icons

Dynamic icons are used to show the change in state of an object or condition. For example, following the rectification of an alarm condition, the presented icon could be overlaid with an “X” (“delete” symbol) to signify the subsequent cancellation of the alarm. This is illustrated in Figure 10.



NOTE This Figure illustrates representations of symbol ISO 7000-2301: Urgent alert indicator, with the addition of a "delete" symbol.

Figure 10 — Example of a dynamic icon (enlarged and final sizes)

8 Consistency

The visual balance of icons should be consistent within a set. Icons presented in one set should be displayed using a similar visual style, for example, a similar degree of realism.

The use of icon elements and graphical concepts in icons should be in accordance with those already used in IEC 60417 and ISO 7000.

Graphical concepts already used in home/office applications (i.e. International Standards and well-established industry conventions) should also be considered.

9 Orientation

The interpretation of the meaning of an icon can depend on its orientation, and care should be taken to avoid ambiguity. For example, a representation of a symbol, for example ISO 7000-2567 "Fuse box access", that is depicted upside down on a display screen (as illustrated in Figure 11) could be interpreted to have a different meaning (for example, ISO 7000-0247: Battery charging condition, which is illustrated in Figure 12) than when depicted in its upright orientation.

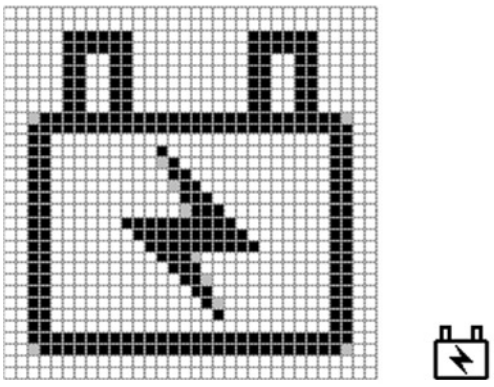


Figure 11 — Example of an ambiguously orientated icon (enlarged and final sizes): "Fuse box access" capable of being misinterpreted as "Battery charging condition"

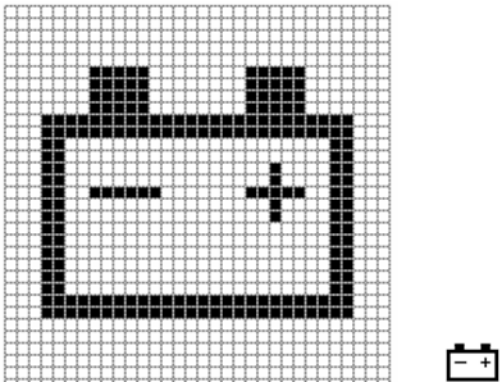
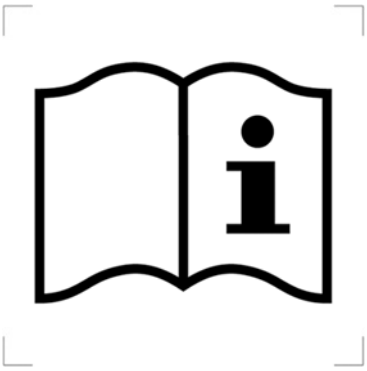


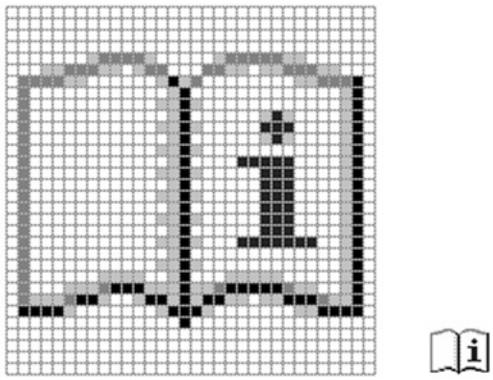
Figure 12 — Example of symbol ISO 7000-0247: Battery charging condition, adapted as an icon
(enlarged and final sizes)

Annex A
(informative)

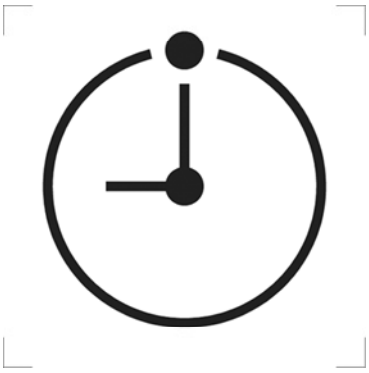
Examples of graphical symbols adapted as icons



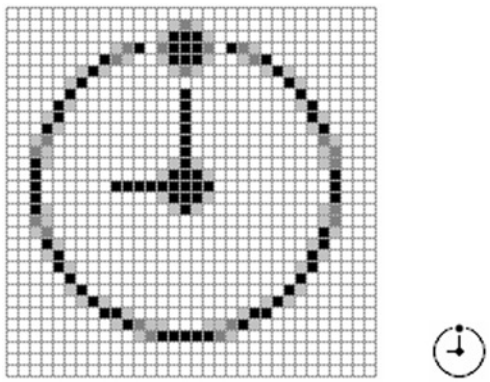
ISO 7000-1641: Operator's manual operating instructions



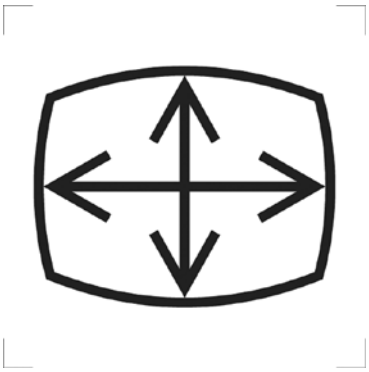
ISO 7000-1641 adapted as an icon
(enlarged and final sizes)



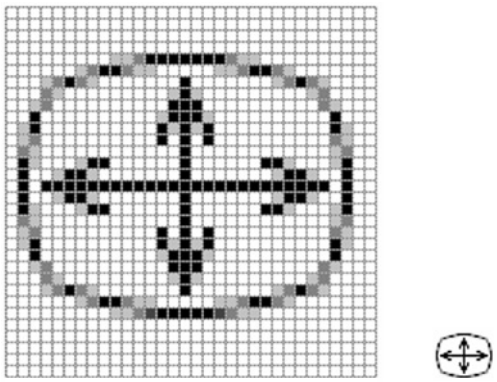
IEC 60417-5440: Programmable timer, general



IEC 60417-5440 adapted as an icon
(enlarged and final sizes)



IEC 60417-5067: Picture size adjustment



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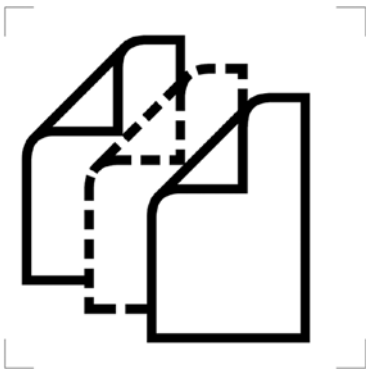
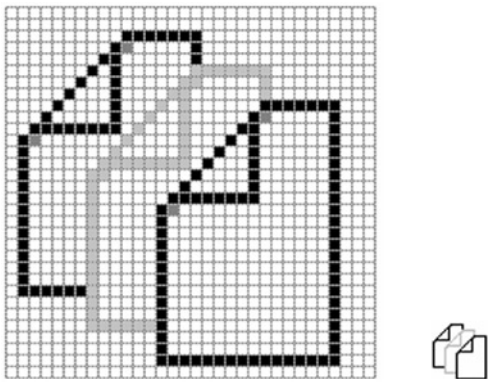
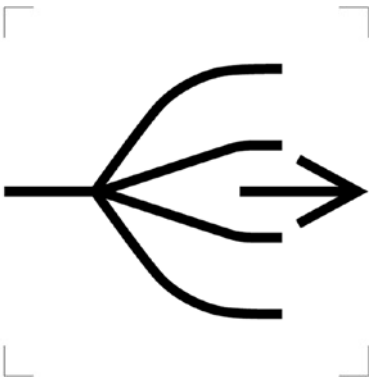


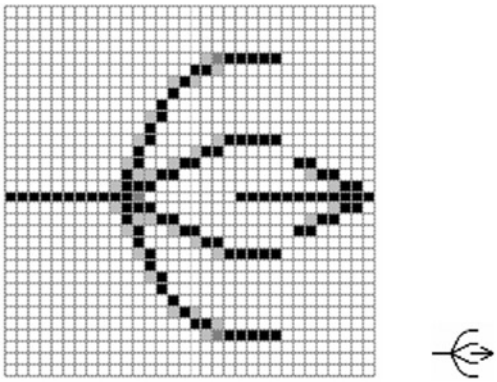
ISO 7000-0710: Missed original (master) **fault**



ISO 7000-0710 adapted as an icon
(enlarged and final sizes)



ISO 7000-0698: Empty sorter



ISO 7000-0698 adapted as an icon
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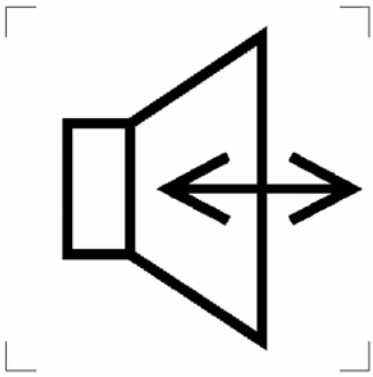
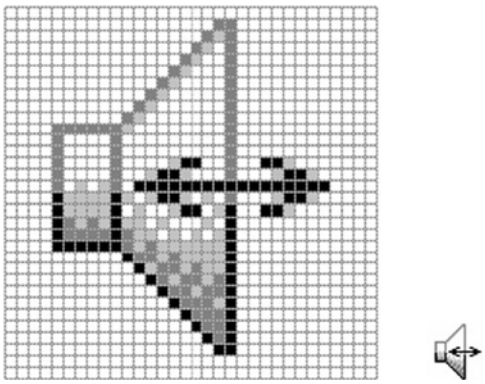


IEC 60417-5081: Loudspeaker/microphone



IEC 60417-5081 adapted as an icon
(enlarged and final sizes)

Annex B
(informative)

Design guidelines for new icons

B.1 Degree of abstraction

Icons in the interface can represent both objects and functions, and can also provide warnings, indicate statuses, etc.

Visual metaphors can easily be provided for object (or noun) icons as the objects inevitably exist in the physical world. There are established conventions for common office objects such as files, documents, mail and printers. ISO/IEC 11581-2 standardizes a core set of these icons.

Function (or verb) icons are less easy to design. Typically, these functions are represented by association with the object upon which they operate or the object resulting from their action. ISO/IEC 11581-6 standardizes a core set of these.

It might be more appropriate to use an object with a historical association to the system object, rather than to represent the real object itself. For example, a bell is often used to signify an alarm. This is no longer the real object in everyday use, but is far more memorable and has a significant association to the user than the electronic circuit that makes the sound of an alarm.

Abstract geometric symbols should only be used when the search for metaphorical solutions has been exhausted. Although there are few conventions from which the meaning of abstract symbols can be derived (e.g. flowcharting, safety/road traffic signs), there are no clear conventions or guidelines as to their universal use and interpretation.

Established safety signs should not be used for situations where no personal danger or hazard is present.

B.2 Cultural considerations

The icon designer should be very aware of cultural sensibilities when designing icons for international markets.

For example, using the symbolism of hands and gestures, an upright, open-palmed hand facing the viewer can mean “STOP!”. In Greece it can mean “Go to Hell!”, whereas in sign language it can mean “Listen!” or “You look at this”. Similarly the “thumbs up” gesture can mean “OK!”, but in some countries it will have a highly derogatory meaning. In Eastern cultures, presentation or associations with the soles of feet or palms of hands are insulting. Similarly, certain body parts, animals, or other objects, might have negative or religious connotations for some groups, and should be avoided.

B.3 Text in icons

Unless icons can easily be replaced by sets for local use, text or specific language-dependent acronyms in icons should be avoided. Text can increase recognition time, but might not be understood by part of the user population, even if translations are provided.

B.4 Icon shapes

When designing icons, the outline shapes (silhouettes) should be varied as much as possible to aid differentiation and recognition by the user. This is similar to typography where it is recognized that, in Latin languages, text set in mixed upper and lower case is easier to recognize and therefore read than text set all in upper case.

B.5 Visual language

Consistency is a critical element of icon design. A family of metaphorical objects should be adopted or established together with visual hierarchies, a set of colours, etc., and should not then be arbitrarily changed.

Where large sets of icons are required, the entire set should be considered.

— Where should there be commonality or diversity?

— Where might elements be reused?

— What are the rules for combining elements?

— Where should relationships exist between elements?

— Would consistent positioning of re-used elements be of benefit?

Consistency binds together this visual language, speeding the user's understanding and recall.

B.6 Two- and three-dimensional design

Icons can be designed in two or three dimensions. Current practice is to create three-dimensional (e.g. isometric view), photo-realistic, icons. For visual consistency, it is necessary to observe the established operating system conventions and style guidelines for which the icons are to be designed. Figure B.1 illustrates a printer icon, rendered in two-dimensional and three-dimensional styles.

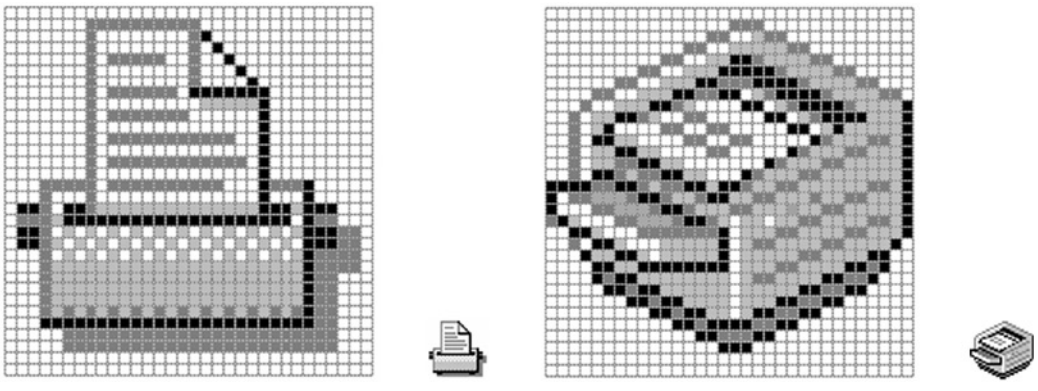


Figure B.1 — Examples of two-dimensional and three-dimensional icons (enlarged and final sizes)

B.7 Depth of field

To maintain the individual identity of overlaid components, “greying” the rear-most component to increase the impression of depth or distance should be considered. In addition, the use of pale grey pixels on the rearmost component, where the superimposed component(s) “touch”, can further aid separation and identification. This is illustrated in Figure B.2.

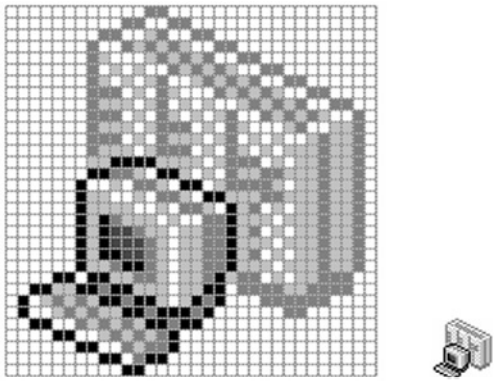


Figure B.2 — Examples of greyed components (enlarged and final sizes)

Bibliography

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

[2] ISO/IEC 11581-1, *Information technology — User system interfaces and symbols — Icon symbols and functions — Part 1: Icons — General*

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