

# INTERNATIONAL STANDARD



# 3461

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## Graphic symbols — General principles for presentation

*Symboles graphiques — Principes généraux pour la présentation*

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## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3461 was drawn up by Technical Committee ISO/TC 145, *Graphic symbols*, and circulated to the Member Bodies in May 1974.

It has been approved by the Member Bodies of the following countries :

Australia	Germany	South Africa, Rep. of
Austria	Italy	Sweden
Bulgaria	Mexico	Thailand
Czechoslovakia	Netherlands	Turkey
France	New Zealand	Yugoslavia

The Member Bodies of the following countries expressed disapproval of the document on technical grounds :

Canada  
United Kingdom  
U.S.A.

# Graphic symbols — General principles for presentation

## 1 SCOPE

This International Standard establishes guiding principles for the uniform presentation and propagation of graphic symbols.

## 2 FIELD OF APPLICATION

This International Standard applies to graphic symbols which may be :

**2.1** placed on equipment or parts of equipment of any kind in order to instruct the persons handling the equipment as to its use and operation;

**2.2** placed on sites and ways where people may assemble or move, giving them instructions, such as prohibitions, warnings, rules or limits, regarding their behaviour;

**2.3** used in pictorial reproductions, such as plans, drawings, layouts, guidelines and similar documents.

**NOTE** — The standardization of letters, numerals, punctuation marks, mathematical signs and symbols, and symbols for quantities and units is excluded but such may be used as a component of a graphic symbol.

## 3 DEFINITION

For the purpose of this International Standard, the following definition applies :

**graphic symbol** : A visually perceptible figure produced by means of writing, drawing, printing or other manufacturing technique. It is used to transmit a message and represents in an understandable manner, independently of any language, an object, concept or state.

Graphic symbols stand for objects, concepts or states. (What a symbol stands for is usually known as the "referent".) This includes abstract referents such as conditions, relationships, facts or actions.

## 4 FUNCTIONS

As a rule, graphic symbols are used to :

**4.1** identify (for example to describe a piece of equipment or an abstract concept);

**4.2** qualify (for example to describe a variation or a secondary function);

**4.3** instruct (for example to describe an operation or method of use);

**4.4** command (that something must or must not be done);

**4.5** warn (for example of danger);

**4.6** indicate (for example direction, quantity).

## 5 CRITERIA

In order that the communication process involved in the use of a symbol may function effectively, certain criteria should be applied in developing and evaluating symbols.

**5.1** The verbal description of what the graphic symbol stands for (the referent) should be unambiguous.

**5.2** The symbol should be unambiguous.

This means that :

**5.3** the image content should not be capable of misinterpretation;

**5.3.1** the symbol should not be identical with any other symbol having a different meaning, and should be sufficiently dissimilar to be readily distinguishable from such other symbols;

**5.3.2** the symbol should be so designed as to be capable of clear reproduction whatever the process or size of reproduction chosen and it is important that symbols which are likely to be reproduced in very small form (for example for use on miniaturized equipment) should be as simple as possible so that their meaning will remain clear in all circumstances;

**5.3.3** if the meaning of the symbol is not self-evident, then it should be so designed both in itself and in relation to other symbols that the meaning can be easily learnt and remembered.

## 6 THE DESIGN PROCESS

The design process involved in the production of a symbol should entail :

- 6.1 identification of a need for a symbol;
- 6.2 clear and unambiguous description of the purpose of the symbol and identification of any positioning or movement factors (see clause 11);
- 6.3 an analysis of the environmental and application factors;
- 6.4 consideration of existing or proposed graphic symbols in the same and/or related fields;
- 6.5 design of the graphic form as prescribed in clause 8;
- 6.6 testing of the symbol for legibility, comprehension, etc.;
- 6.7 modification if necessary.

## 7 COMBINATION OF SYMBOLS

To represent certain concepts, graphic symbols may be combined or grouped together. The meaning of any such new concept should be unambiguously defined. A combined symbol so created should be considered as a new graphic symbol.

For reasons of comprehension, it is recommended that as few symbols as possible be combined to form a new symbol.

## 8 GRAPHIC FORM

For each graphic symbol that is required to represent the referent, an original design should be prepared.

8.1 An original design is a symbol design drawn and presented in the manner described in clauses 9 and 10, i.e. drawn out on the basic pattern with due regard to the principles enunciated in clause 10.

The basic pattern described in clause 9 constitutes a frame in which the original design may be inscribed. The lines indicated in the basic pattern (circles, hexagons, octagons, squares, etc.) are intended as an aid to the designer in drawing up the original designs.

8.2 The form of the graphic symbols should be suitable for economical reproduction by means of commonly applied techniques, such as etching, engraving, printing, and photographic means.

8.3 When designing and drawing out an original design for a symbol, the following principles should be observed :

- a) all lines of the original should have a uniform thickness of 2 mm; if, however, the symbol comprises a very few graphic elements, or if required for comprehensibility or visual reasons, a line thickness of 4 mm is permissible;
- b) the minimum spacing between two lines should not be less than 1,5 times the minimum line thickness;
- c) angles smaller than  $30^\circ$  should be avoided;
- d) filled areas should be avoided as much as possible.

## 9 BASIC PATTERN

The basic pattern (figure 1) comprises :

- 1) a basic square of side 50 mm; this measure is equal to the nominal measure,  $a$ , of the original;
- 2) a basic circle of 56 mm diameter having approximately the same area as the basic square;
- 3) a second circle of 50 mm diameter, being the inscribed circle of the basic square (1);
- 4) a second square of side 40 mm, which touches the basic circle (2) with its corners;
- 5) a rectangle of approximately the same area as the basic square (1), with its long side (62,5 mm) horizontal and symmetrical with the basic square;
- 6) a second rectangle having approximately the same area as the basic square (1), with its long side (62,5 mm) vertical and symmetrical with the basic square;
- 7) a third square formed by the lines passing through the points of intersection of the basic square (1) and the basic circle (2); the sides of this square are oriented at  $45^\circ$  to the basic square and the corners of this square define the limits of the horizontal and vertical dimensions of the basic pattern;
- 8) an irregular octagon formed by lines inclined at  $30^\circ$  to the sides of the square (7).

The basic pattern is laid upon a 75 mm X 75 mm square subdivided by a 12,5 mm square grid which also coincides with the basic square (1).

## 10 UTILIZATION OF THE BASIC PATTERN

The original design of a graphic symbol should be fitted into the basic pattern according to the following principles :

- a) for a symbol consisting of a single geometrical form, such as a circle or a rectangle, the corresponding geometrical forms of the basic pattern should be used, in which case the lines of the basic pattern should be the centre lines of the 2 mm thick lines of the symbol being designed;

b) to achieve the impression of uniform perceived size among symbols, attention should be given in the preparation of original designs to the equalization of surface areas; for example, a circle without external

parts should be drawn upon the basic circle (2) (see figure 2c) whereas a circle with external parts should be drawn upon the smaller circle (3) (see figure 2d).

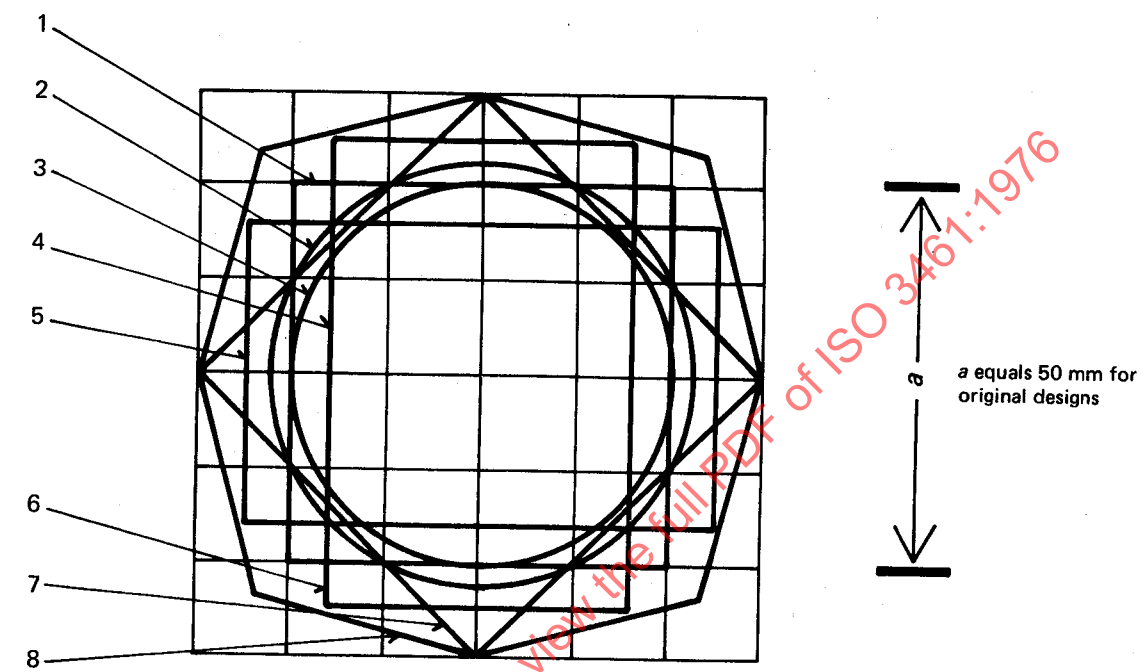


FIGURE 1 – Basic pattern

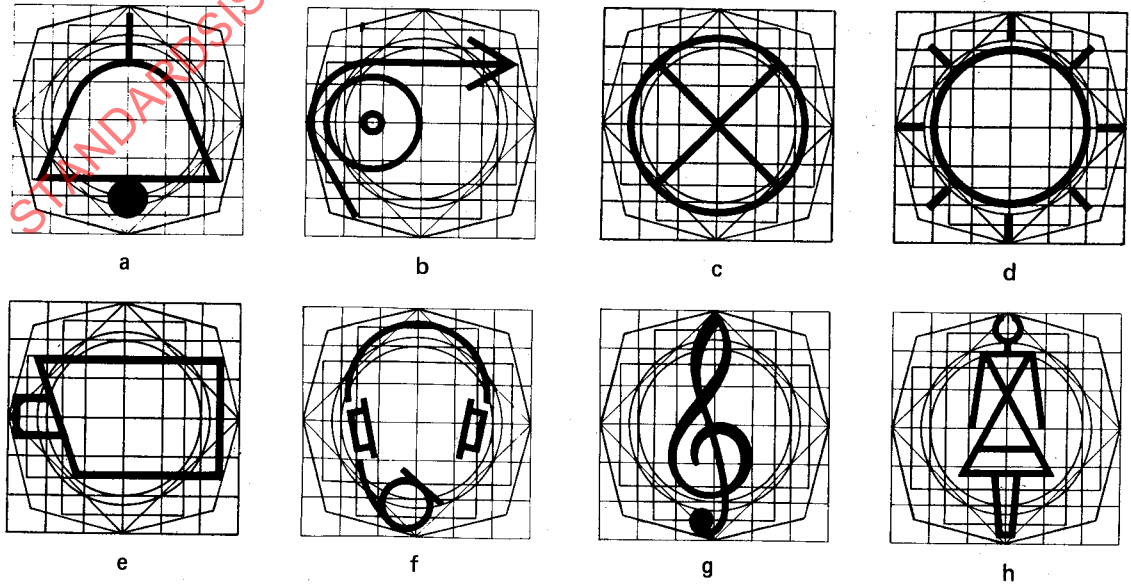


FIGURE 2 – Examples of application

11 ORIENTATION OF THE SYMBOLS

The majority of graphic symbols preserve their meaning in any position. However, when the meaning of a graphic symbol does depend on its orientation or position, this shall be explicitly stated.

Examples :

- a) Graphical symbol not dependent on its position :

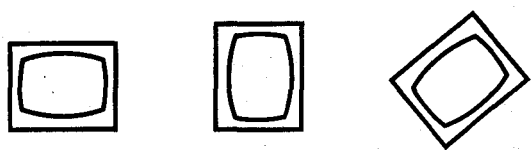


FIGURE 3 – Television receiver

- b) Graphic symbol dependent on its position :

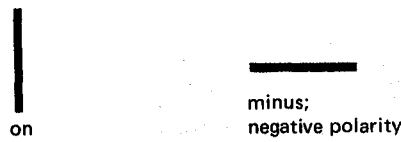


FIGURE 4

The statement concerning the position dependency could read as follows :

“The meaning of the graphic symbol depends on its position. Care shall be taken that it is not reproduced on rotating controls.”

12 USE OF THE GRAPHIC SYMBOL

In the majority of cases, use can be made of photographic techniques, for which the original design shown in single sheet form in ISO 3957<sup>1)</sup> may be used. An example of a typical single sheet presentation is shown in figure 5.

To facilitate reproduction and application of the original, visual-centring lines are always shown on each original design (see figure 5).

The dimension *a* is a nominal dimension of the original design and is normally made equal to 50 mm in the original design. The actual overall dimensions of original designs will in most cases differ from this nominal dimension. These overall dimensions are indicated on the single sheet as a proportional factor of *a*, for example height = 1,48 *a*. This means that the height of the original symbol design is 1,48 × 50 mm = 74 mm for a nominal *a* of 50 mm. The largest possible horizontal or vertical dimension is 1,5 *a* (75 mm for *a* = 50 mm).

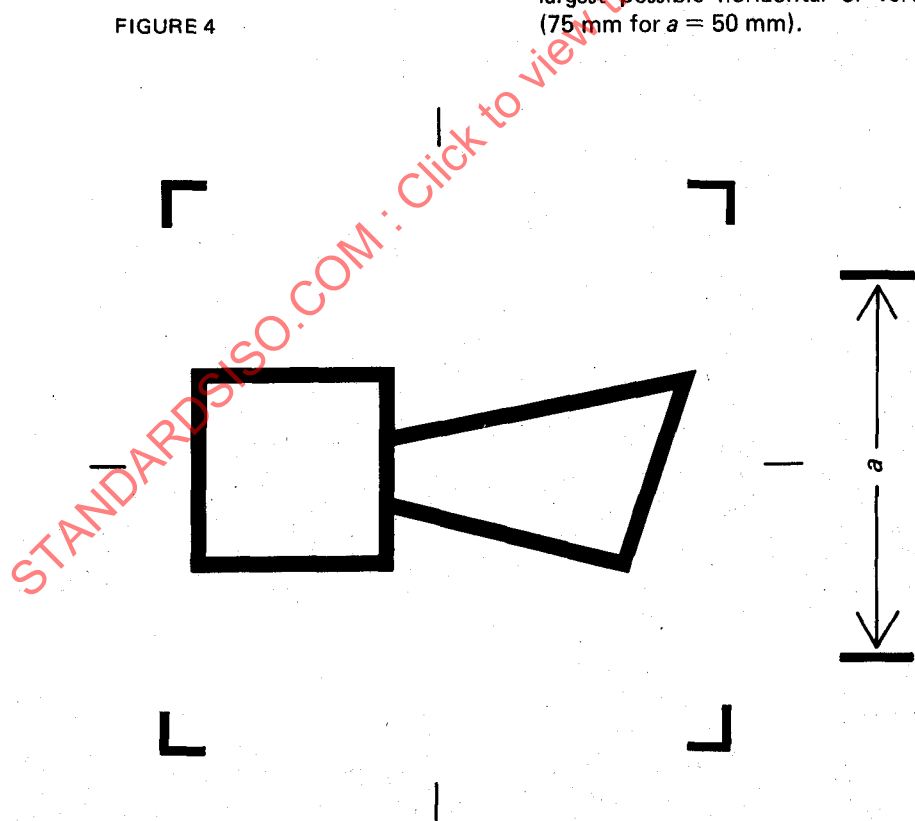


FIGURE 5 – Example of a symbol with visual-centring lines

1) ISO 3957, *Graphic symbols — Index, survey and compilation of the single sheets.* (In preparation.)

The four short visual-centring lines mark, at their imaginary point of intersection, the visual centre point of the graphic symbol. This visual centre point is an aid for arranging or positioning the symbol in relation to its surroundings, or for balancing the arrangement of several graphic symbols in relation to one another as well as to their surroundings.

NOTE — These visual-centring lines should be retained as long as is necessary for the correct positioning of the symbol(s) in their pre-determined positions. Subsequently, the visual-centring lines should be removed.

### 13 REDUCTION AND ENLARGEMENT OF THE ORIGINAL

For the application of the symbols it may be necessary either to reduce or to enlarge the size of the original to a

suitable size at which it will actually appear. The nominal dimension *a* should be used as a *gauge*. Practice has shown that dimension *a* may be reduced to 3 mm without the symbol losing its legibility. In the case of symbols composed of many graphic elements, or when reducing to less than 3 mm, it is recommended to check that clear identification is still possible.

### 14 USE OF COLOUR

In general, the graphic form of a symbol reproduced in black and white should be sufficient for its identification. However, there are cases in which the meaning of the symbol does depend on the application of one or more colours. In this case the relevant colours are specified on the single sheet concerned.

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## ANNEX

### EXPLANATION OF SINGLE SHEET FORM

The form shown on the following page will be used for the presentation of official ISO single sheets for graphic symbols (ISO 3957).

The text in the single sheets is in English and French with space left below the French version of the text for insertion of the appropriate national language.

Measuring limits for the nominal measure  $a$  are thick lines, located outside the grid on the right-hand side, visible for alignment purposes even with large reductions (for example  $a = 3$  mm). The two inner edges of these measuring limits define the nominal measure value.

— Four of these short lines define the position of the visual centre point (see clause 12).

┌ These four right angles (5 mm X 5 mm X 1 mm thick) are intended for aligning the position of the

graphic symbol with an over-printed grid. They must be added to the original designed drawings.

The over-printed grid should be in light blue or light grey, so that it will not be visible when black and white film reproduction is used. The grid is required for:

- a) mechanical reproduction of the graphic symbols, for example by plotter;
- b) digital coding;
- c) manual reproduction;
- d) positioning of lines between symbols (for example in diagrams).

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Graphical symbol : Stop (of action)

Symbole graphique : Arrêt (mise hors service)

ISO 3957 —

Original symbol  
Symbole original

( $a = 50$  mm)

Real dimensions

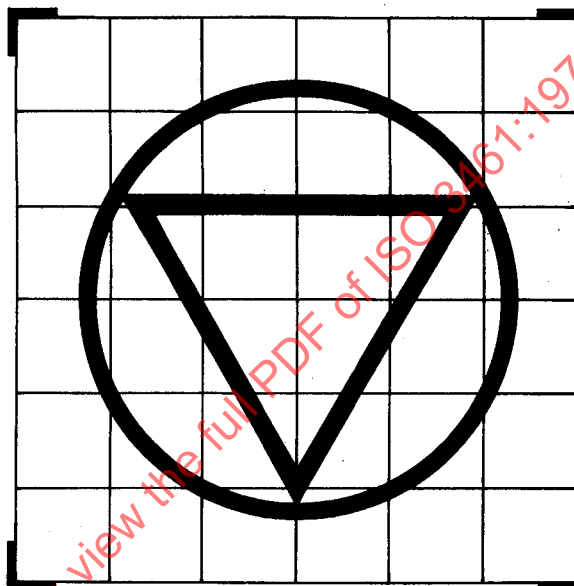
Height :  $1,16 a$

Width :  $1,16 a$

Dimensions réelles

Hauteur :  $1,16 a$

Largeur :  $1,16 a$



Application :

on any kind of equipment;  
to identify the button by means of which an action is stopped.

Application :

sur tout matériel;  
pour marquer le bouton au moyen duquel une opération est stoppée.

For general information see ISO 3461

Pour information générale voir ISO 3461