UDC 744.42 : 003.62 December 1986

Technical drawings

Representation in normal projection

Views and special representations

DIN 6 Part 1

Technische Zeichnungen; Darstellung in Normalprojektion; Ansichten und besondere Darstellungen

This standard, together with DIN ISO 6433, September 1982 edition, DIN 6 Part 2, and DIN 5 Part 10, December 1986 editions, supersedes DIN 6, March 1968 edition.

In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.

See Explanatory notes for connection with ISO 128 – 1982 published by the International Organization for Standardization (ISO).

Contents

1 Field of application

This standard applies to the representation of objects in technical drawings and other technical documentation in normal projection, regardless of the manner of their preparation (manual or computer-aided).

If it is necessary to depart from this standard, the rules separately specified for such methods shall apply (e.g. DIN 6774 Part 10).

Other standards apply in some cases for special disciplines (e.g. drawings for the construction industry).

2 General

In this standard, the rules governing the representation of objects in technical drawings are illustrated by means of examples. Even where special requirements make it necessary to depart from these rules, the examples given shall be regarded as the basis for such exceptions.

It must be remembered that all examples only serve to illustrate what is defined in the relevant text. This also means that, in the case of simplified drawings, details which do not add anything essential to the understanding of the example concerned, have either been omitted or only partly represented (e.g. no centre lines in figures 10, 12, 17).

See DIN 15 Parts 1 and 2 for details of lines and their use.

See DIN 6774 Part 1 for principles of the presentation of drawings and lettering.

3 Views

The normal projection[1] in which objects are represented in technical documentation is the orthographic parallel projection as specified in DIN 5 Part 10.

Note. The method defined in subclause 3.1 is preferred and has therefore been adopted for the examples illustrated in this standard.

3.1 First angle projection method[1] [2]

With reference to the front view[1], the other views are arranged as follows (see figure 1):

the view from above is placed underneath,

the view from the left is placed on the right,

the view from below is placed above,

the view from the rear may be placed on the left or on the right,

the view from the right is placed on the left.

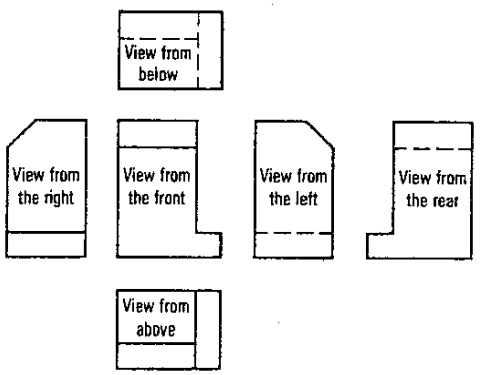


Figure 1.

[1] See DIN 5 Part 10.

[2] Thus designated in ISO 128.

Continued on pages 2 to 11

The symbol identifying the first angle projection method is as shown in figure 2.

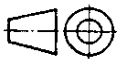


Figure 2.

3.2 Third angle projection method[2])

With reference to the front view[1]), the other views are arranged as follows (see figure 3):

the view from above is placed above,

the view from the left is placed on the left,

the view from below is placed below,

the view from the rear may be placed on the left or on the right,

the view from the right is placed on the right.

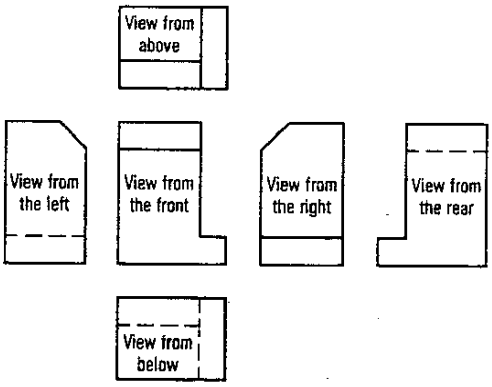


Figure 3.

The symbol identifying the third angle projection method is as shown in figure 4.

Figure 4.

3.3 Use of reference arrows

The views[1]) may also be placed in any desired relationship to one another. With the exception of the principal view[1]), however, the viewing direction for each view represented by this method shall be identified by an arrow referenced to the principal view.

The arrowheads shall have an included angle of approximately 15° and their length shall be approximately 1,5 times that of dimension arrowheads.

The arrows and the related views shall be identified by any preferred capital letters placed directly above or to the right of the arrow line and immediately above the corresponding views (see figure 5).

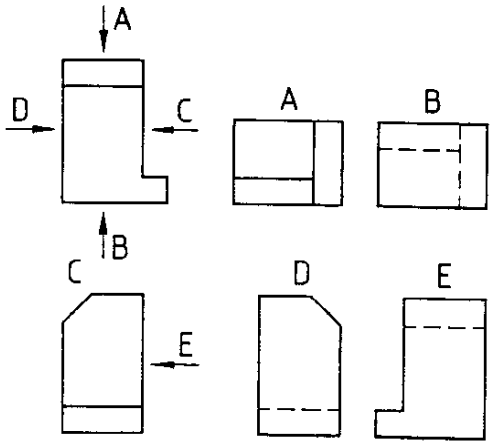


Figure 5.

3.4 Identification of projection method

Which of the methods specified in subclauses 3.1 and 3.2 has been selected shall be indicated by the appropriate symbol (see figure 2 or figure 4) being placed in the title block.

If the title block of the drawing does not provide a special box for this purpose, the symbol shall be placed close to the title block.

No symbol need be drawn for the method described in subclause 3.3. In this case, however, regardless of the viewing direction, the symbols shall always be entered perpendicular to the reading direction of the drawing[3]) (i.e. reading direction of the title block).

3.5 Conventional representations

3.5.1 Visible outlines and edges

Visible outlines and edges shall be represented by continuous thick lines (DIN 15 – A lines).

3.5.2 Hidden outlines and edges

Hidden outlines and edges shall only be represented by dashed thin lines (DIN 15 – F lines) if that makes the depiction of the object easier to interpret, or if, as a result, an appreciable amount of draughting work (e.g. additional views or sections) may then be dispensed with without loss of clarity.

3.5.3 Imaginary intersections (fillets and rounded corners)

Imaginary intersections shall be represented, where necessary, by continuous thin lines (DIN 15 – B lines) not touching the outlines (see figures 6, 7 and 20).

The position of lines indicating fillets and rounded edges is given by the intersections of the projected continuations of the outlines in the view concerned. Dimensions are also referred to the projection lines drawn from these intersections (see figure 7).

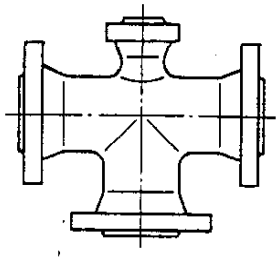


Figure 6.

[1]) See page 1.

[2]) See page 1.

[3]) See DIN 406 Part 2, August 1981 edition, clause 4.

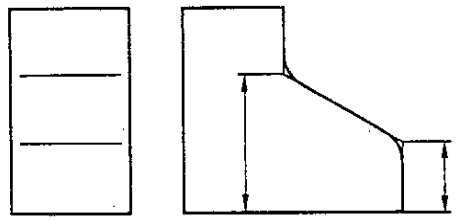


Figure 7.

3.5.4 Symmetrical parts

Symmetrical parts are identified by a line of symmetry extending a little beyond the part concerned. This also applies when a part that is basically symmetrical has asymmetrical features, or is interrupted by another geometrical basic shape (e.g., a slot) (see figures 8 and 16 for examples).

The line of symmetry shall be drawn as a chain thin line (DIN 15 – G line). Short lines of symmetry may be drawn as continuous thin lines (DIN 15 – B lines).

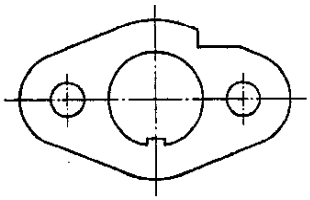


Figure 8.

3.6 Choice of views

The most informative view [1]) of an object shall be chosen as the principal view [1]); this is generally the front view [1]).

In general arrangement and subunit drawings (assembly drawings [4])), the preferred method should be to represent the principal view of the object in the position in which it is used or mounted.

In component drawings (working drawings [4])) the preferred principal view should be that which represents the component in the manufacturing position.

The following rules shall apply if further views or sections are needed to delineate the object without ambiguity or to dimension it completely:

the number of views and sections [5]) shall be restricted to the minimum necessary for defining the object unambiguously and completely;

such additional views and sections shall be so chosen and arranged that the need to show hidden outlines and edges is largely avoided.

3.7 Special views

If the viewing direction needed for a view differs from that stated in the preceding subclauses, e.g. in order to avoid unsatisfactory projections (foreshortening) (see figure 9), or if a view cannot be placed in its correct position using the methods indicated in subclauses 3.1 and 3.2, the method adopted for such a view shall be that specified in subclause 3.3 (see figure 10).

[1]) See page 1.

[4]) See DIN 199 Part 1.

[5]) See DIN 6 Part 2.

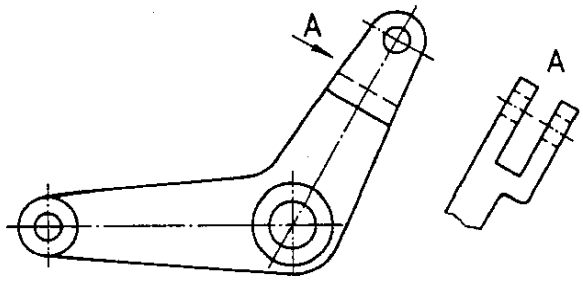


Figure 9.

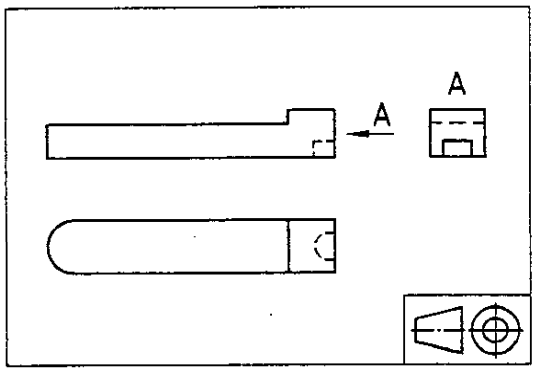


Figure 10.

A view shall generally be placed in the correct position for projection as denoted by the arrow (see figure 9). However, it may also be placed in a different position. In this case, the letter symbol identifying the related view shall be supplemented by a symbol indicating the rotation in the direction concerned (see figure 11).

The angular rotation may also be indicated.

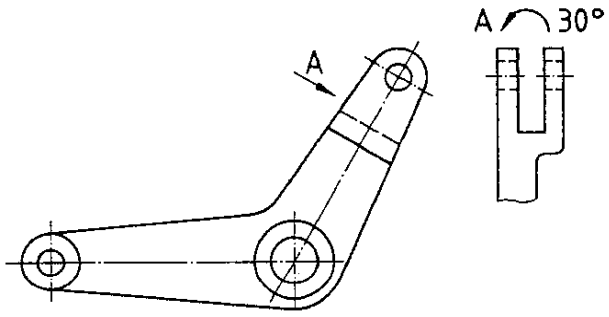


Figure 11.

3.8 Partial views

Objects may also be represented in an incomplete or interrupted view, provided that the intelligibility of the drawing does not suffer (see figure 12).

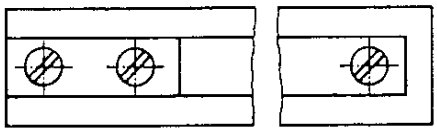


Figure 12.

Symmetrical objects may be drawn as a fraction of the whole, either as a half-view (see figure 13), or as a quarter-view (see figure 14). Such partial views of symmetrical objects shall be represented either as interrupted, but without a break line (see figure 13), or as limited by their centre lines, which are distinguished by two continuous thin short parallel lines (DIN 15 – B lines) drawn at right angles to them at each end.

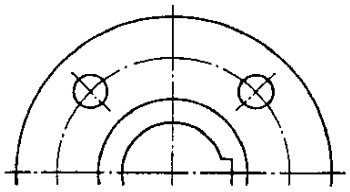


Figure 13.

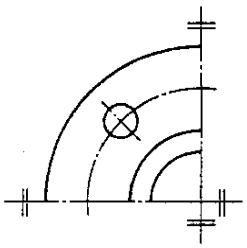


Figure 14.

Symmetrical features of an object shall be represented as local views. For this purpose, they shall be depicted as a view revolved into the plane of the drawing and referenced to the related view by a DIN 15 – G line (as centre line) (see figure 16).

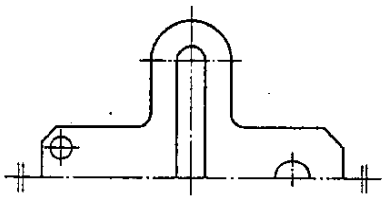


Figure 15.

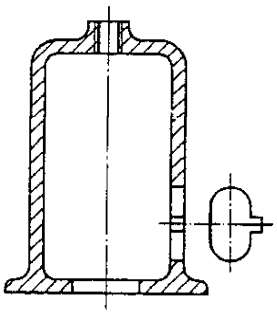


Figure 16.

3.8.1 Interrupted views

The limits of the break shall be represented (for axially symmetrical bodies, too) by a line drawn freehand (DIN 15 – C line) (see figures 12, 18 and 20) or by a zigzag line (DIN 15 – D line). The zigzag line shall be drawn extending about 5 d (d = line thickness) beyond the outline (see figures 17 and 19).

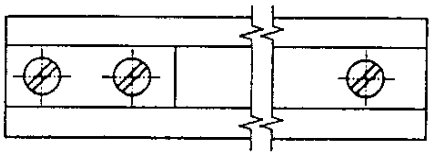


Figure 17.

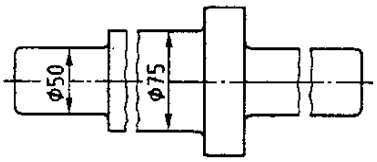


Figure 18.

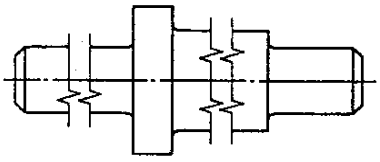


Figure 19.

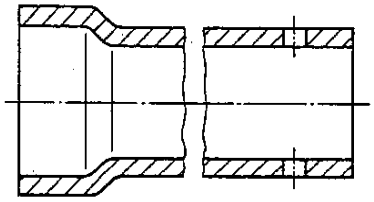


Figure 20.

4 Special representations and symbols

4.1 Details

Features of an object which cannot be clearly represented, dimensioned or identified in the general representation of the object shall be drawn separately as a detail.

A detail may contain features and data that do not appear in the general representation or are only suggested there. The precise form of the feature may be omitted entirely in the general representation (see figures 22 and 23).

The feature drawn as a detail shall be enclosed in a frame (e.g. circular, elliptical, rectangular) in the general representation, using a continuous thin line (DIN 15 – B line). The framed feature and the corresponding detail shall be identified by the same capital letters (same size of lettering as for indicating sections). To prevent any misunderstanding, the symbols used shall not be the same as the symbols adopted, for example, for a section or a view that also requires identification. Use of the last letters of the alphabet (Z, Y, X, ...) is recommended.

The detail shall be placed as near to the framed feature as possible.

In the case of details showing features on a larger scale than that of the corresponding general representation, the scale of the enlargement shall be stated after the identification letter (for method of indication, see ISO 5455, and figures 21 to 23).

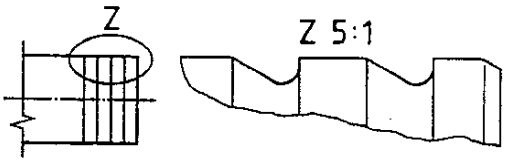


Figure 21.

Features drawn separately may be represented without break lines and, in the case of sections, without hatching. The representation of circumferential edges may be dispensed with (see figures 22 and 23).

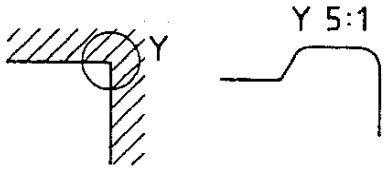


Figure 22.

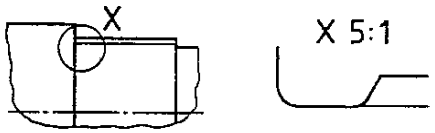


Figure 23.

4.2 Adjacent parts

When it is necessary to represent adjacent parts, their outlines shall be drawn in chain thin double-dashed lines (DIN 15 – K lines). The adjacent part shall not hide the principal part, i.e. edges and outlines of the principal part lying behind the adjacent part shall be drawn as if visible (see figure 24).

Adjacent parts shown in section shall not be hatched.

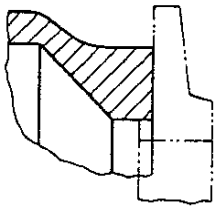


Figure 24.

4.3 Initial outlines

When it is necessary to depict the initial outline of a part prior to its final forming, this may be indicated by chain thin double-dashed lines (DIN 15 – K lines) (see figures 25 and 26).

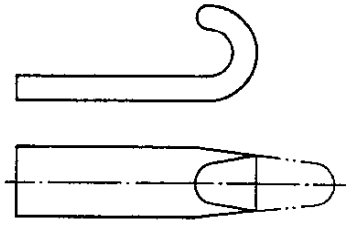


Figure 25.

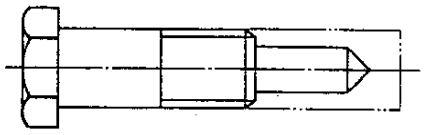


Figure 26.

4.4 Final outlines in unfinished parts

The final outline may be shown in the representation of an unfinished part by means of chain thin double-dashed lines (DIN 15 – K lines) (see figure 27).

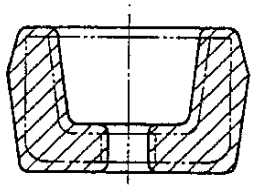


Figure 27.

4.5 Extreme positions

The extreme positions of movable parts shall be represented by chain thin double-dashed lines (DIN 15 – K lines) (see figure 28).

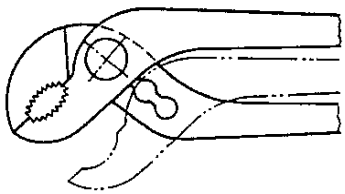


Figure 28.

4.6 Bend lines

Bend lines in developed views shall be represented by continuous thin lines (DIN 15 – B lines) (see figure 29).

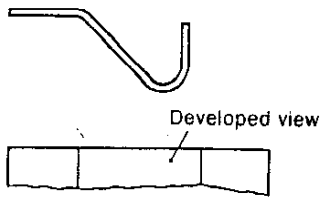


Figure 29.

4.7 Surface structuring

Surface structuring (e.g. stamping, chequering, knurling, chasing) shall be represented by continuous thick lines (DIN 15 - A lines). It is recommended that only part of the structuring should be drawn (see figure 30).

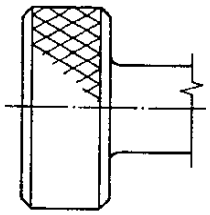


Figure 30.

4.8 Transparent objects

In subunit and general arrangement drawings it is permissible for parts such as scales and similar items that are positioned behind transparent components to be represented as if visible (see figure 31).

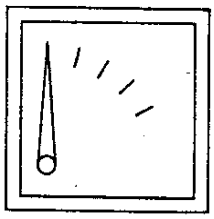
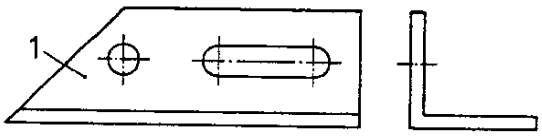


Figure 31.

4.9 Mirror image components

When simple components are identical mirror images, a single representation may suffice for both objects, provided that no errors can arise in manufacture as a result. An explanatory note shall be placed near the title block (see figure 32).

If necessary, simplified representations of the two parts drawn on a reduced scale without dimensioning may be provided in order to emphasize the differences.



Part 1 as drawn
Part 2 identical mirror image

Figure 32.

4.10 Special conventions

4.10.1 Plane faces

Plane faces shall be indicated by a diagonal cross of continuous thin lines (DIN 15 - B lines) if this obviates the need for further views (see figures 33 to 36); the diagonal cross is also permitted in cases where there are several views, and in such cases it may also appear in each view.

Note. In building and civil engineering drawings, the diagonal cross stands for "cavity".

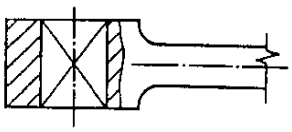


Figure 33.

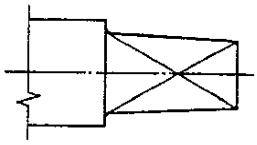


Figure 34.

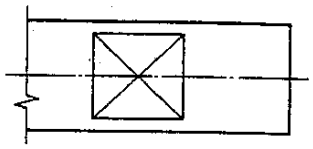


Figure 35.

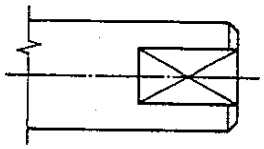


Figure 36.

4.10.2 Machining and rolling direction

The machining or rolling direction of materials may be indicated by a double arrow as shown in figures 37 and 38.

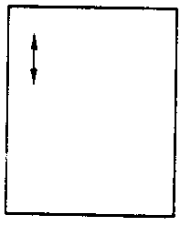


Figure 37.

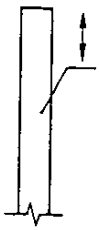


Figure 38.

5 Simplified representation

5.1 Repetitive geometrical features

Repetitive geometrical features of an object need only be represented as frequently as necessary for their definitive presentation (see figures 39 to 43). See DIN 406 Part 2 for leader lines and dimensioning.

The centres of the repetitive geometrical features, e.g. holes, shall be defined by centre-line crosses (see figures 39 to 41).

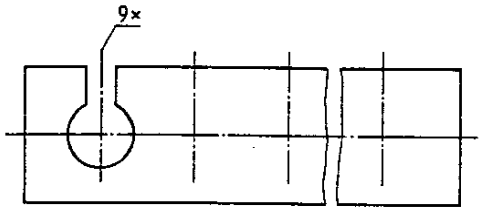


Figure 39.

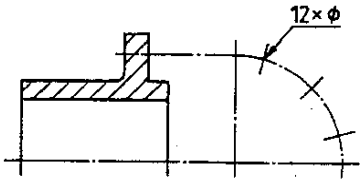


Figure 40.

Pitches on hole circles may also be shown, not drawn to scale, as hole patterns (see figure 41).

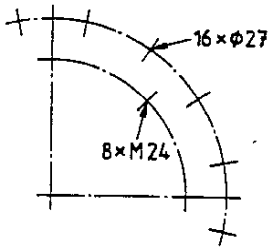


Figure 41.

Where other geometrical features are concerned (e.g. as illustrated in figures 42 and 43), the region accommodating the remaining features shall be delineated by a thin continuous line (DIN 15 – B line).

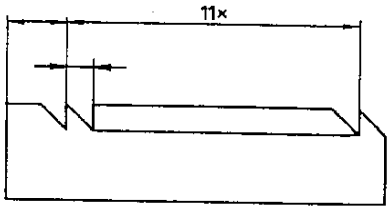


Figure 42.

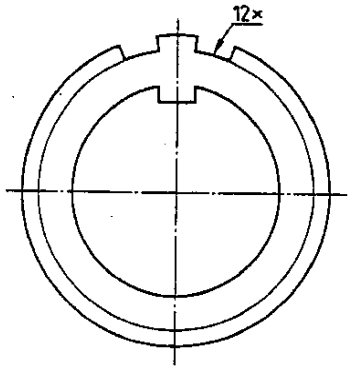


Figure 43.

The number of the repetitive geometrical features and pitches shall always be stated, if not apparent from the representation or from other information (see figures 39 to 43).

5.2 Slight inclines or curves

If inclines or curves (on angled surfaces, tapers, pyramids) are too slight to be clearly indicated in the relevant projection, their representation may be dispensed with. In such cases, only the edge corresponding to the projection of the smaller dimension shall be drawn as a continuous thick line (DIN 15 – A line), as indicated by the projection lines in figures 44 and 45, drawn here by way of explanation, only.

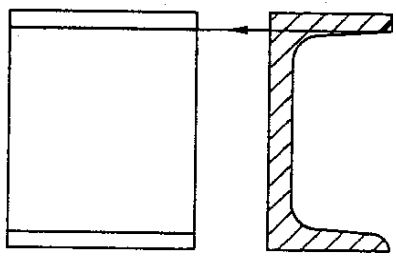


Figure 44.

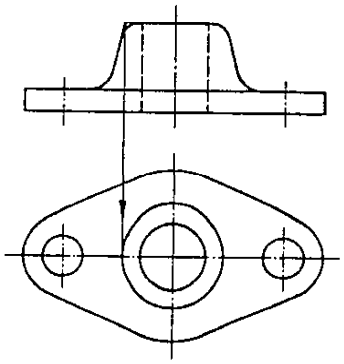


Figure 45.

5.3 Intersections

When parts intersect (e.g. intersections between two cylinders, see figures 46, 48 and 50, or between a cylinder and a rectangular prism, see figures 47 and 49), the representation of very shallow intersection curves or of minimally displaced lines of intersection may be simplified, i.e. they may either be drawn as straight lines, or omitted entirely.

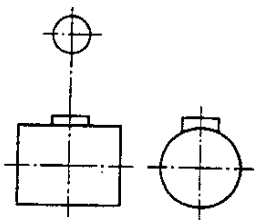


Figure 46.

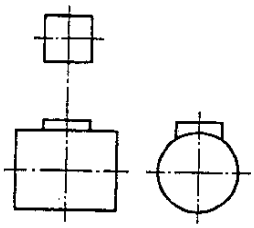


Figure 47.

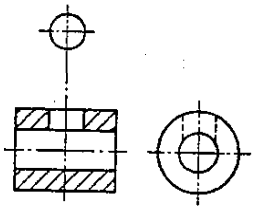


Figure 48.

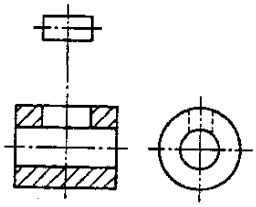


Figure 49.

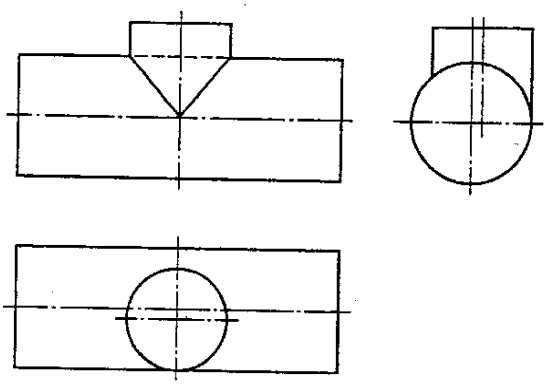


Figure 50.

5.4 Objects consisting of identical elements

Objects consisting of identical elements, e.g. stacks of stampings and windings, may be represented as if composed of a single element (see example of coil, figure 51).

It is permissible to indicate the position of the elements by continuous thin short lines (DIN 15 - B lines) (see figure 52).

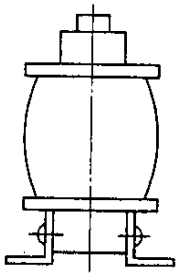


Figure 51.

Figure 52.

5.5 Indication of contours

When the contours of features cannot or are not to be definitively delineated, the space presumed to enclose them may be indicated by chain thin double-dashed lines (DIN 15 - K lines) (see figures 53 and 54).

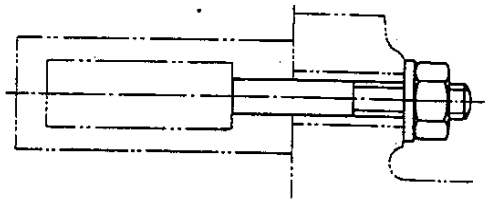


Figure 53.

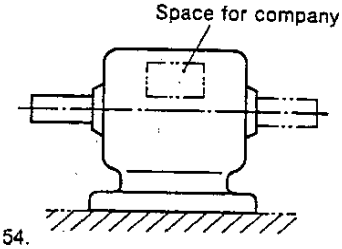


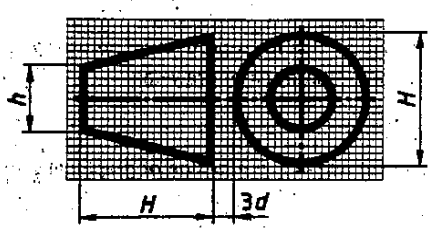
Figure 54.

Appendix A

Proportions and sizes of graphical symbols

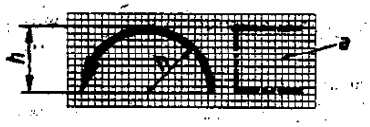
For coordinating the size of the graphical symbols specified in this standard with other entries made in the drawing (dimensions, tolerance data), the following rules, which are in line with ISO 3461 Part 2*), shall be observed.

The symbols (and, where applicable, additional information in area *a* in figure A.2) shall be presented in accordance with figures A.1 to A.3.



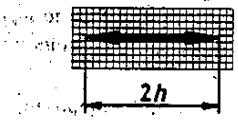
ISO first angle projection method
DIN 30 600 registration number: 05026-2

Figure A.1.



Revolved representation (in this example to the left)
DIN 30 600 registration number: 05028-2

Figure A.2.



Rolling direction – machining direction
DIN 30 600 registration number: 00269-2

Figure A.3.

The range of sizes to be used for the graphical symbols and additional data is given in table A.1.

Table A.1.

Dimensions in mm

Basic size of the graphical symbol, character size h, see DIN ISO 3461 Part 2*)	3,5	5	7	10	14	20
Line thickness d for symbol and character	0,35	0,5	0,7	1	1,4	2
Dimension H	7	10	14	20	28	40

*) At present at the stage of draft.

Standards referred to

DIN	5 Part 10	Technical drawings; projections, terminology
DIN	6 Part 2	Technical drawings; representations in normal projection, sections
DIN	15 Part 1	Technical drawings; lines; principles
DIN	15 Part 2	Technical drawings; lines; general application
DIN	199 Part 1	Terminology associated with technical drawings and parts lists
DIN	406 Part 2	Dimensioning on drawings; rules
DIN	6774 Part 1	Technical drawings; principles for the preparation of drawings for reproduction purposes
DIN	6774 Part 10	Technical drawings; principles for the computer aided preparation of drawings
DIN 30 600		Graphical symbols; registration, designation
ISO 128		Technical drawings; general principles of presentation
ISO 3461 Part 2		(at present at the stage of draft) Graphical symbols; rules for the design of graphical symbols for technical product documentation
ISO 5455		Technical drawings; scales

Other relevant standards

DIN	5 Part 1	Drawings; axonometric projections; isometric projection
DIN	5 Part 2	Drawings; axonometric projections; dimetric projection
DIN	15 Part 3	Technical drawings; lines, use for representing ships' hulls
DIN	199 Part 4	Terminology associated with technical drawings and parts lists; amendments
DIN	6771 Part 1	Title blocks for drawings, plans and lists
DIN	6771 Part 2	Printed forms for technical documents; printed form for parts list
ISO 6414		Technical drawings for glassware
ISO 6433		Technical drawings; item numbers

Previous editions

DIN 36: 10.22.
DIN 6: 11.22, 10.56, 03.68.

Amendments

The following amendments have been made in comparison with DIN 6, March 1968 edition.

a) The content has been subdivided into DIN 6 Parts 1 and 2, DIN 5 Part 10 and DIN ISO 6433.

b) The standard has been revised as regards its content and re-edited to take account of ISO 128 – 1982 (see Explanatory notes).

c) Simplified representations as specified in draft Standard DIN 30 Part 1, April 1982 edition, have been adopted.

Explanatory notes

This standard has been prepared on the basis of ISO 128 – 1982 and is intended to provide uniform basic rules for representation in technical drawings in all areas of use. According to its terms of reference, ISO 128 – 1982 only covers ground that is common to all fields of technology. Hence, supplementary rules for the individual disciplines will almost certainly be required.

Specifications of the present standard deviating from ISO 128 – 1982:

1. The denoting of plane faces by a diagonal cross is not only allowed for square ends, but also for all flats that require separate identification.
2. To avoid misunderstandings, the use of a diagonal cross for indicating rectangular openings is not permitted.
3. Clause 3 of ISO 128 – 1982 (Lines) has been incorporated in DIN 15 Parts 1 and 2.
4. Subclause 3.5 of ISO 128 – 1982 (Termination of leader lines) has not been incorporated in this standard, because a corresponding specification already exists in DIN 406 Part 2.

The original content of DIN 6 has been subdivided in accordance with a resolution taken by ISO/TC 10 which provides for a more systematic organization of drawing practice as a whole, the aim being to deal with each subject only in a standard, or to confine the treatment of a subject to one particular document. DIN 6 Part 2 deals with the subject of sections. See ISO 6433 for item numbers.

In addition, all conventional simplifications relevant to the field of representation specified in draft Standard DIN 30 Part 1 have been incorporated in this standard.

Alphabetical index

International Patent Classification

B 42 D 15/00
B 43 L 13/00