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ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 128

ENGINEERING DRAWING

PRINCIPLES OF PRESENTATION

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 128, *Engineering Drawing - Principles of Presentation*, was drawn up by Technical Committee ISO/TC 10, *Drawings (General Principles)*, the Secretariat of which is held by the Association Suisse de Normalisation (SNV).

During its first meeting, held in Zurich, in September 1951, the Technical Committee decided to use as the basis for its work the ISA Bulletin No. 32, drawn up by the former International Federation of the National Standardizing Associations (ISA). The development of the various drafts was entrusted to Sub-Committee SC 1, *Preliminary work*, comprising Austria, Belgium, France, Italy, Netherlands, Sweden, Switzerland, United Kingdom and, since 1952, Germany.

After six meetings spaced over the years 1952, 1953 and 1954, the Sub-Committee submitted to the Technical Committee a proposal dealing with the principles of presentation. At its second meeting held in Stockholm, in June 1955, the Technical Committee adopted this proposal as a Draft ISO Recommendation.

On 31 December 1956, the Draft ISO Recommendation was distributed to all the ISO Member Bodies and was approved, subject to a certain number of modifications, by the following 19 (out of a total of 38) Member Bodies:

Australia	*Greece	Norway
*Brazil	Israel	Pakistan
Canada	Italy	Spain
Denmark	Japan	Switzerland
Finland	Mexico	Turkey
France	Netherlands	U.S.S.R.
Germany		

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted, by correspondence, to the Council, which decided, in September 1959, to accept it as an ISO RECOMMENDATION.

The simplest possible figures have been chosen to illustrate the text. Some figures are so clear that they need no comment. The explanatory texts allow these principles to be adopted to those more complicated situations which arise in practice.

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* These Member Bodies stated that they had no objection to the Draft being approved.

TABLE OF CONTENTS

ISO Recommendation R 128 September 1959

ENGINEERING DRAWING

PRINCIPLES OF PRESENTATION

Introductory Note

For uniformity, all the dimensions in this ISO Recommendation are given in metric units only and the figures are in European (First angle) projection. It should be understood that inch units and/or American (Third angle) projection could equally well have been used without prejudice to the principles established.

1. VIEWS

1.1 Designation of the views

View in direction A = View from the front

View in direction B = View from above

View in direction C = View from the left

View in direction D = View from the right

View in direction E = View from below

View in direction F = View from the rear

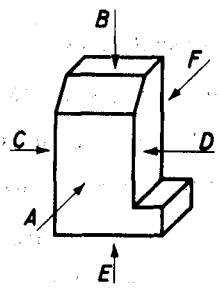

Fig. 1

The front view (principal view) having been chosen, the other usual views make with it and between themselves angles of 90° or multiples of 90°.

1.2 Relative position of views

Two methods exist:

Method E known as the European or First angle method (Fig. 2)

With reference to the front view the other views are arranged as follows:

The view from above is placed underneath
The view from below is placed above
The view from the left is placed on the right
The view from the right is placed on the left

The view from the rear may normally be placed on the left or on the right, as may be found convenient.

The distinctive symbol of this method is shown in Figure 3.

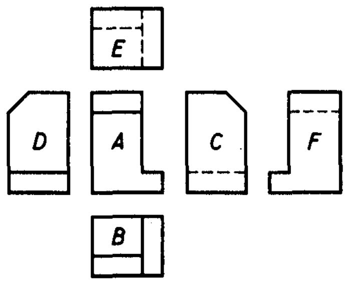

Fig. 2

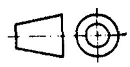

Fig. 3

Method A known as the American or Third angle method (Fig. 4)

With reference to the front view the other views are arranged as follows:

The view from above is placed above
The view from below is placed underneath
The view from the left is placed on the left
The view from the right is placed on the right

The view from the rear may normally be placed on the left or on the right, as may be found convenient.

The distinctive symbol of this method is shown in Figure 5.

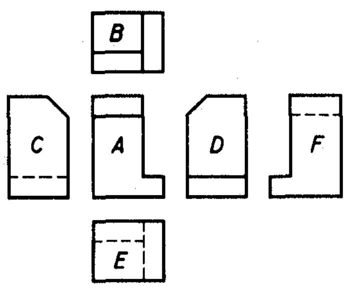

Fig. 4

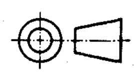

Fig. 5

The method used is indicated on the drawing by means of its distinctive symbol (Fig. 3 and 5).

This is placed clearly in a space provided for the purpose in the title block of the drawing near the indication of the scale.

1.3 Special views

If a view is not drawn in one of the six directions defined above (Fig. 1, page 4) or if the position of a view does not conform to the method used for the drawing (Fig. 2 and 4, page 5), the direction of view is shown by an arrow identified by a letter (Fig. 6 and 7).

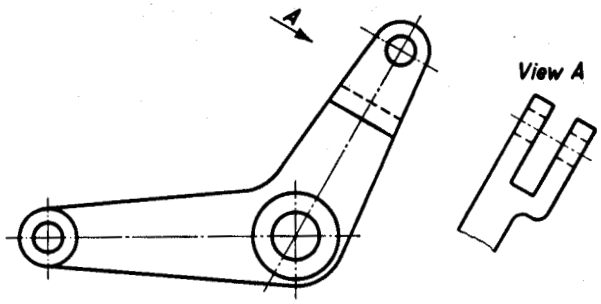

Fig. 6

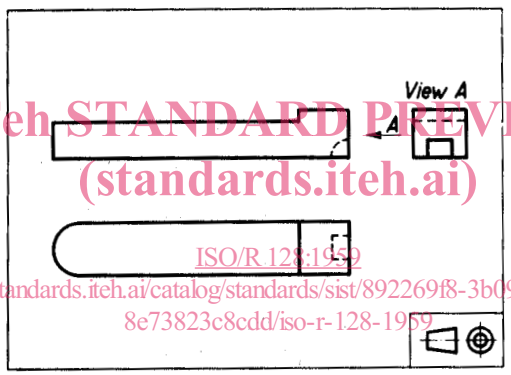

Fig. 7

1.4 Choice of views

The front view should generally show the part in the functioning position. Parts that can be used in any position, for instance screws or bolts, etc., should generally be drawn in the main position of manufacture.

The number of views (including sections) should be limited to the minimum necessary and sufficient to represent the object without ambiguity.

2. LINES

Refer to Figure 8	Type of line	Examples of application
A	Continuous thick	Visible outlines and edges
B	Continuous thin	Fictitious outlines and edges Dimension and leader lines Hatching Outlines of adjacent parts Outlines of revolved sections
C		Limits of partial views or sections, if the line is not an axis
D	Short dashes (medium)	Hidden outlines and edges
E	Long chain thin	Centre lines Extreme positions of movable parts Parts situated in front of the cutting plane (Fig. 31)
F	Long chain thick at ends, thin elsewhere	Cutting planes
G	Long chain thick	Indication of surfaces which are to receive additional treatment

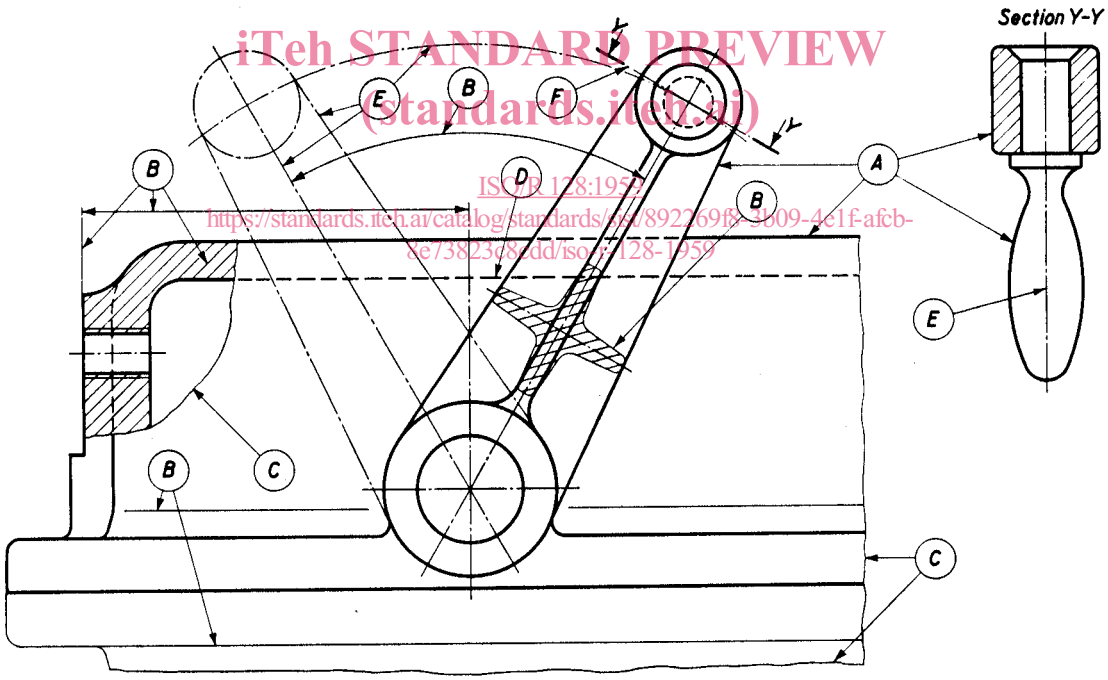

Fig. 8

The thickness of lines should be chosen according to the size and the type of the drawing. For all views of one piece to the same scale, the thickness of the lines should be the same.

An ISO Recommendation will be formulated in due course for other types of lines applicable to special cases (e.g. electrical diagrams or pipework diagrams). In the meantime, the conventions adopted should be indicated clearly by notes on the drawings concerned.

3. SECTIONS *

3.1 Notes on hatching

Hatching is used to make sections evident. It is executed by thin lines at a well defined angle, preferably 45°, to the axis or to the main outline of the section (Fig. 9, 10 and 11).

Fig. 9

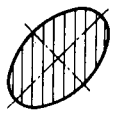

Fig. 10

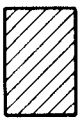

Fig. 11

Separated areas of a section of a single component are hatched in an identical manner. The hatching of adjacent components should be carried out at different angles (Fig. 12).

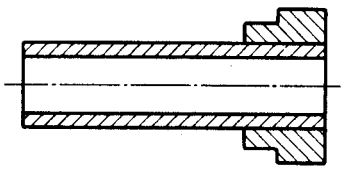

Fig. 12

Spacing between the hatching lines should be chosen in proportion to the size of the hatched section.

In the case of large areas, the hatching may be limited to a zone following the contour of the hatched area (Fig. 13).

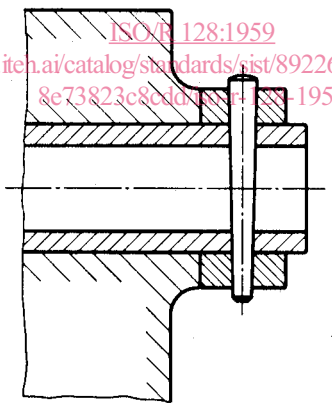

Fig. 13

Where sections of the same part in parallel planes are shown side by side, the hatching lines should be similarly spaced, but offset along the dividing line between the sections (Fig. 14).

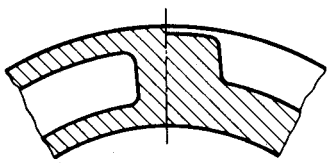

Fig. 14

* In the French language two terms are employed for section :
"*Section*" : A section of the cutting plane where no other outlines are shown.
"*Coupe*" : A section of a cutting plane including other outlines.

Hatching is interrupted for figuring or lettering, if it is not possible to place these outside the hatching (Fig. 15).

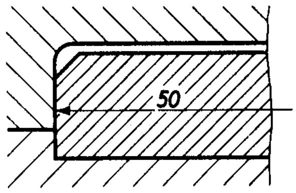

Fig. 15

3.2 Thin sections

Thin sections may be shown entirely black (Fig. 16); a thin space is left between adjacent sections of this type (Fig. 17).

Fig. 16

Fig. 17

3.3 Notes on sections

The general rules for the arrangement of views (clauses 1.2 and 1.3) apply in the same manner, when drawing sections.

Cutting planes are indicated by long chain lines, thickened at the ends, thin elsewhere, and are designated by capital letters, the direction of viewing being shown by arrows resting on the cutting line.

In certain cases the parts located behind the cutting plane may not be drawn completely.

In principle, ribs, bolts, shafts, spokes of wheels, and the like should not be shown in longitudinal section (Fig. 21, page 10).

3.4 Cutting planes (Examples)

Section in one plane (Fig. 18).

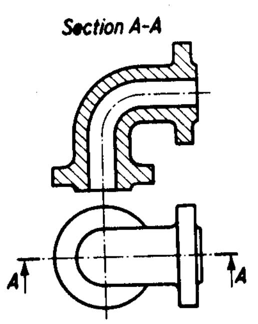

Fig. 18