

Technical drawings  
General principles of presentation  
Part 20: Basic conventions for lines  
(ISO 128-20:1996)

This standard has been prepared by the Technical Committee CTN 1 *General standards* the Secretariat of which is held by UNE.

UNE-EN ISO 128-20

Technical drawings  
General principles of presentation  
Part 20: Basic conventions for lines  
(ISO 128-20:1996)

*Dibujos técnicos. Principios generales de presentación. Parte 20: Convenciones generales para las líneas.  
(ISO 128-20:1996)*

*Dessins techniques. Principes généraux de représentation. Partie 20: Conventions de base pour les traits.  
(ISO 128-20:1996)*

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English version

**Technical drawings - General principles of presentation - Part  
20: Basic conventions for lines (ISO 128-20:1996)**

Dessins techniques - Principes généraux de représentation  
- Partie 20: Conventions de base pour les traits (ISO 128-  
20:1996)

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## Foreword

The text of the International Standard from Technical Committee ISO/TC 10 "Technical drawings, product definition and related documentation" of the International Organization for Standardization (ISO), the secretariat of which is held by CMC.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2002, and conflicting national standards shall be withdrawn at the latest by April 2002.

**NOTE FROM CMC** The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## Endorsement notice

The text of the International Standard ISO 128-20:1996 has been approved by CEN as a European Standard without any modification.

## Introduction

ISO 128-20 was prepared as ISO/DIS 12011-1.

ISO 128-20 contains generally applicable rules for the presentation of lines in all kinds of technical product documentation.

The application of lines within drawings of special technical fields varies considerably. Therefore rules of application are not given in this part of ISO 128.

Other International Standards containing rules for lines in specialized fields are listed in annex A.

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# Technical drawings — General principles of presentation —

## Part 20: Basic conventions for lines

### 1 Scope

This part of ISO 128 establishes the types of lines, their designations and their configurations, as well as general rules for draughting of lines used in technical drawings, e.g. diagrams, plans or maps.

### 2 Definitions

For the purposes of this part of ISO 128, the following definitions apply.

**2.1 line:** Geometrical object, the length of which is more than half of the line width and which connects an origin with an end in any way, e.g. straight, curved, without or with interruptions.

#### NOTES

- 1 The origin and the end may coincide with one another, e.g. in the case of a line forming a circle.
- 2 A line, the length of which is less than or equal to half of the line width, is called a dot.
- 3 A test should be made in order to check the appearance of drawings intended to be microcopied or transferred by fax.


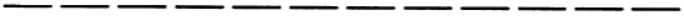



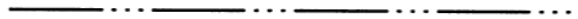









**2.2 line element:** Single part of a non-continuous line, e.g. dots, dashes, which vary in length, and gaps.

**2.3 line segment:** Group of two or more different line elements which form a non-continuous line, e.g. long dash/gap/dot/gap/dot/gap.

### 3 Types of lines

#### 3.1 Basic types

Table 1


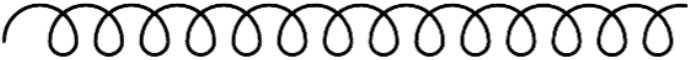


No.	Representation	Description
01		continuous line
02		dashed line
03		dashed spaced line
04		long dashed dotted line
05		long dashed double-dotted line
06		long dashed triplicate-dotted line
07		dotted line
08		long dashed short dashed line
09		long dashed double-short dashed line
10		dashed dotted line
11		double-dashed dotted line
12		dashed double-dotted line
13		double-dashed double-dotted line
14		dashed triplicate-dotted line
15		double-dashed triplicate-dotted line



### 3.2 Variations of the basic types of lines

Possible variations of the basic types of lines in accordance with table 1 are given in table 2.

Table 2

Representation	Description
	uniform wavy continuous line
	uniform spiral continuous line
	uniform zigzag continuous line
	freehand continuous line
<p>NOTE — Table 2 contains only variations of the basic type of line No. 01. Variations of the basic types Nos. 02 to 15 are possible and are presented in the same way.</p>	

### 3.3 Combinations of lines with the same length

#### 3.3.1 Arrangement of two or more lines parallel to each other

For examples see figure 1.

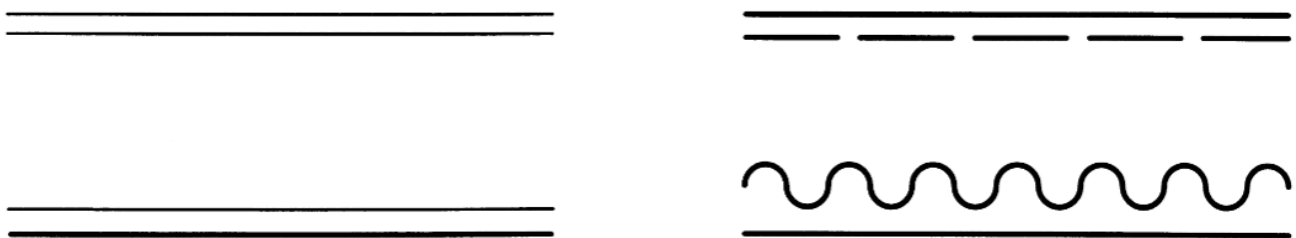


Figure 1

### 3.3.2 Arrangement of two different types of lines

a) With different line widths superimposed.

See figure 2 a) and b) for examples [figure 2 a): a continuous and a dotted line; figure 2 b): a continuous and a dashed spaced line].



Figure 2

b) Arranged next to each other.

See figure 3 for an example (two continuous lines either side of two dashed spaced lines).



Figure 3

### 3.3.3 Arrangement of two continuous lines parallel to each other with regularly recurring connecting elements between them

See figure 4 a) and b) for examples [figure 4 a): blackened circular elements; figure 4 b): blackened trapezoidal elements].

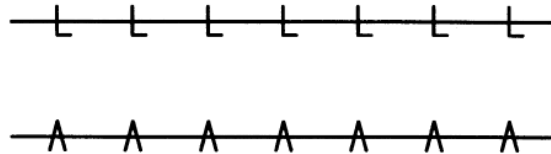


Figure 4

**3.3.4 Arrangement of regularly recurring geometric pictorial elements in association with continuous lines**

a) Without interruption of a continuous line.

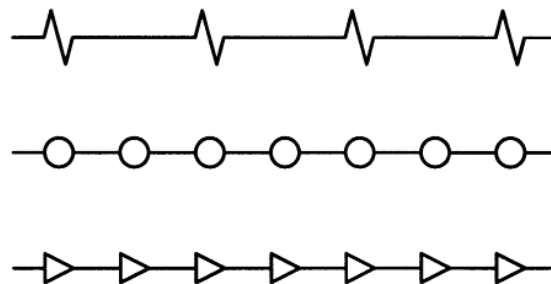
See figure 5 for examples.



**Figure 5**

b) With interruption of a continuous line.

See figure 6 for examples.



**Figure 6**

**4 Line dimensions**

**4.1 Line width**

The width, *d*, of all types of lines shall be one of the following depending on the type and size of the drawing. This series is based on a common ratio  $1:\sqrt{2}$  ( $\approx 1:1,4$ ):

0,13 mm; 0,18 mm; 0,25 mm; 0,35 mm; 0,5 mm; 0,7 mm; 1 mm; 1,4 mm; 2 mm

The widths of extra wide, wide and narrow lines are in the ratio 4:2:1.

The line width of any one line shall be constant throughout the whole line.

**4.2 Deviation in line width**

Line widths may deviate from those specified in 4.1 providing that it is possible to differentiate unambiguously between two adjacent lines with different widths. If drawing equipment which produces constant line width is used, the deviation in line width between two such lines shall not be greater than  $\pm 0,1d$ .

### 4.3 Configuration of lines

For the preparation of drawings by hand the lengths of line elements should conform to those of table 3.

**Table 3**

Line element	Line type No.	Length
Dots	04 to 07 and 10 to 15	$\leq 0,5d$
Gaps	02 and 04 to 15	$3d$
Short dashes	08 and 09	$6d$
Dashes	02, 03 and 10 to 15	$12d$
Long dashes	04 to 06, 08 and 09	$24d$
Spaces	03	$18d$
NOTE — The lengths shown in this table are valid for line elements with semi-circular and squared ends. In the case of line elements with semicircular ends, the length of the line element corresponds to the distance covered by a technical pen (with a tubular tip and using India ink) from the origin up to the end of the line element. The total length of such a line element is the sum of the length shown in table 3 plus $d$ .		

Formulae for the calculation of some of the basic types of line and line elements are given in ISO 128-21. The formulae are intended to facilitate the preparation of drawings using computer-aided design (CAD) systems.

## 5 Draughting of lines

### 5.1 Spacing

The minimum space between parallel lines should not be less than 0,7 mm, unless rules to the contrary are stated in other International Standards.

NOTE 4 In certain cases when computer-aided drawing techniques are used, the spacing of lines on the drawing does not represent the actual spacing, e.g. for the representation of screw threads. This fact has to be considered when data sets are established, e.g. for the operation of machine tools.

## 5.2 Junctions

### 5.2.1 Types

The basic types of lines, Nos. 02 to 06 and Nos. 08 to 15 should preferably meet at a dash; see figures 7 to 12.

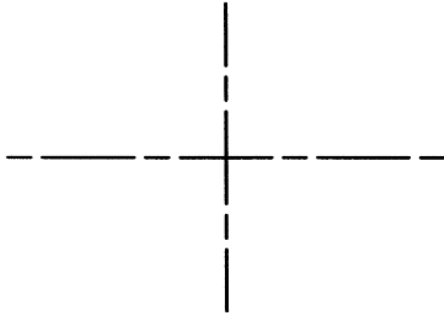


Figure 7

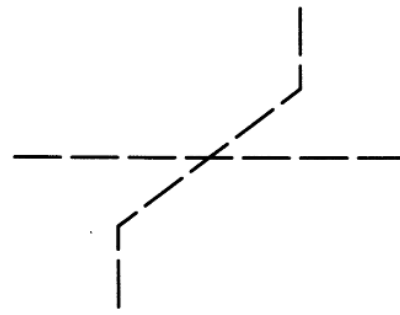


Figure 8

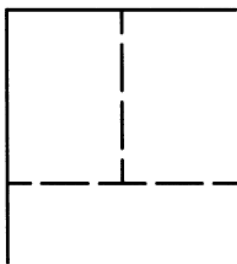


Figure 9

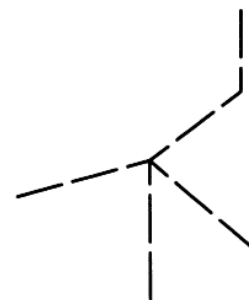


Figure 10

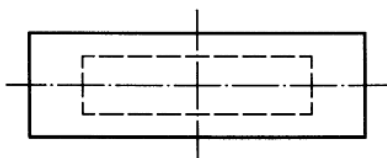


Figure 11

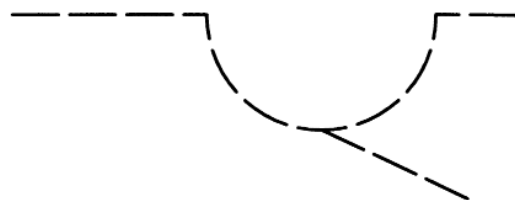


Figure 12

Lines of basic type No. 07 should preferably meet at a dot, see figure 13.

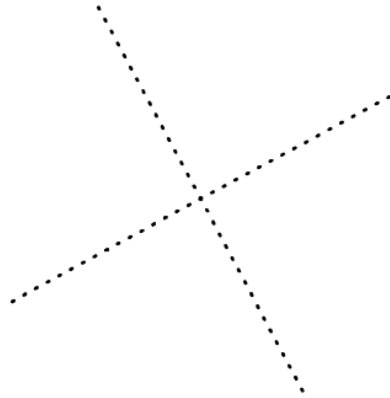


Figure 13

### 5.2.2 Representation

The requirement of 5.2.1 shall be fulfilled by starting the lines at the junction (see figure 14) or by using a complete, or partial, cross formed by dashes (see figures 15 and 16).

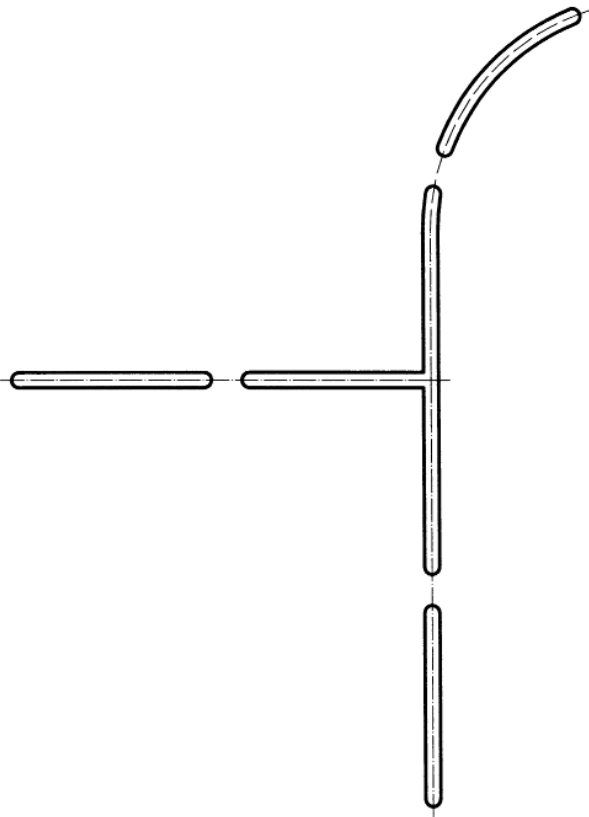


Figure 14

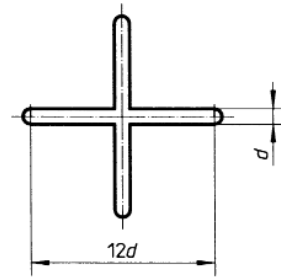


Figure 15

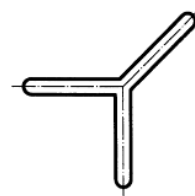


Figure 16

### 5.3 Location of a second line

Two different ways of draughting two parallel lines are shown in figure 17 a) and b). The preferred version is shown in figure 17 a) (the second line is drawn below or to the right of the first line).

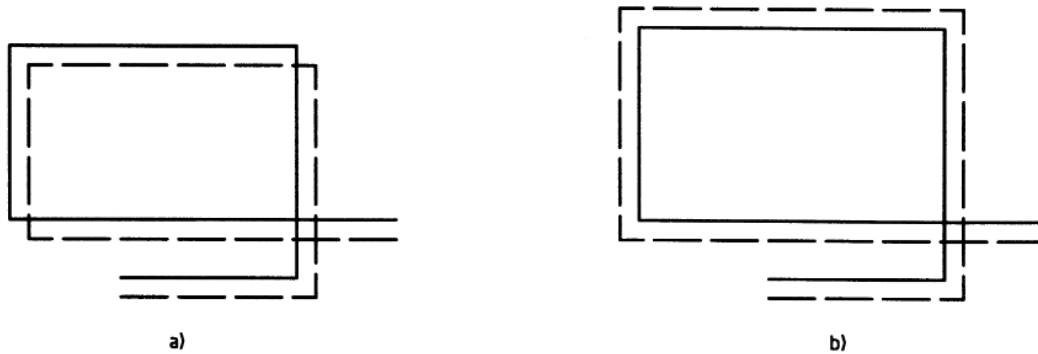


Figure 17

## 6 Colours

Lines shall be drawn in black or white depending on the colour of the background. Other standardized colours may also be used for drawing standardized lines. In this case, the meaning of the colours shall be explained.

## 7 Designation

The designation of the basic types of lines shall comprise the following elements in the order given:

- "Line";
- reference to this part of ISO 128;
- the number of the basic type in accordance with table 1;
- the line width in accordance with 4.1;
- the colour (if applicable).

### EXAMPLES

Designation of a line of type No. 03 (03), line width 0,25 mm (0,25):

**Line ISO 128-20 - 03 × 0,25**

Designation of a line of type No. 05 (05), line width 0,13 mm (0,13) and white in colour:

**Line ISO 128-20 - 05 × 0,13 / white**

## Annex A

(informative)

### Bibliography

- [1] ISO 128-21:1996<sup>1)</sup>, *Technical drawings — General principles of presentation — Part 21: Preparation of lines by CAD systems.*
- [2] ISO 1219-1:1991, *Fluid power systems and components — Graphic symbols and circuit diagrams — Part 1: Graphic symbols.*
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- [4] ISO 3511-2:1984, *Process measurement control functions and instrumentation — Symbolic representation — Part 2: Extension of basic requirements.*
- [5] ISO 3511-3:1984, *Process measurement control functions and instrumentation — Symbolic representation — Part 3: Detailed symbols for instrument interconnection diagrams.*
- [6] ISO 3511-4:1985, *Industrial process measurement control functions and instrumentation — Symbolic representation — Part 4: Basic symbols for process computer, interface, and shared display/control functions.*
- [7] ISO 5455:1979, *Technical drawings — Scales.*
- [8] ISO 6428:1982, *Technical drawings — Requirements for microcopying.*
- [9] ISO 10628-1:1996<sup>1)</sup>, *Flow diagrams for process plants — Part 1: General rules.*

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1) To be published.



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