

JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS B 0011-1 : 1998
(ISO 6412-1 : 1989)

**Technical drawings—Simplified
representation of pipelines—
Part 1 : General rules and
orthogonal representation**

ICS 01.100.01; 23.040.01

Descriptors : pipelines, pipework systems, pipes, technical drawing, projection
(drawing), drawings

Reference number : JIS B 0011-1 : 1998 (E)

B 0011-1 : 1998 (ISO 6412-1 : 1989)

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of International Trade and Industry through deliberations at Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law. Consequently **JIS Z 8205 : 1995** is revised and replaced with **JIS B 0011-1 : 1998**, **JIS B 0011-2 : 1998** and **JIS B 0011-3 : 1998**.

JIS B 0011 consists of the following parts, under the general title *Technical drawings—Simplified representation of pipelines*:

Part 1 : General rules and orthogonal representation

Part 2 : Isometric projection

Part 3 : Terminal features of ventilation and drainage systems

Date of Establishment: 1998-01-20

Date of Public Notice in Official Gazette: 1998-01-20

Investigated by: Japanese Industrial Standards Committee
Divisional Council on Machine Elements

JIS B 0011-1 : 1998, First English edition published in 1999-08

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 1999

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

Technical drawings—Simplified representation of pipelines— Part 1 : General rules and orthogonal representation

Introduction This part of JIS B 0011 has been prepared on the basis of ISO 6412-1, *Technical drawings—Simplified representation of pipelines—Part 1 : General rules and orthogonal representation* published in 1989 as the first edition, without modifying its technical content and structure.

The portions underlined with dots in the text and Annex 1 (informative) are items not included in the original International Standard.

Depending on the information it is intended to convey and the form of representation required, a distinction has to be made between graphical representation by means of orthogonal and that by means of isometric representation.

This part of JIS B 0011 deals, therefore, with general rules used for both representations (orthogonal and isometric). Rules applicable only to isometric representation are given in JIS B 0011-2.

For the purposes of this part of JIS B 0011, all dimensions and tolerances on the drawings have been stencilled in upright lettering. It should be understood that these indications could just as well be written in free-hand or inclined (italic) lettering without altering the meaning of the indications.

For the presentation of lettering (proportions and dimensions), see 4.4.

1 Scope This part of JIS B 0011 specifies rules and conventions for the execution of simplified drawings for the representation of all kinds of pipes and pipelines made of all sorts of materials (rigid and flexible).

It shall be used whenever pipes or pipelines have to be represented in a simplified manner.

For the purposes of this part of JIS B 0011, the figures illustrate the text only and should not be considered as design examples.

Remarks : This part of JIS B 0011 might also be of some use for the representation of similar installations, such as ventilation or air-conditioning systems; in such cases, the term “duct”, etc. should be substituted for the term “pipe”.

2 Normative references The following standards contain provisions which, through reference in this text, constitute provisions of this part of JIS B 0011. The most recent editions of the standards listed below (including the amendments) shall be applied.

JIS B 0125 *Graphic symbols for fluid power systems*

Remarks : Cited items from ISO 1219 : 1976, *Fluid power systems and components—Graphic symbols* are equivalent to the corresponding items of JIS B 0125.

JIS Z 8312 *Technical drawing—Line conventions*

Remarks : Cited items from **ISO 128 : 1982**, *Technical drawings—General principles of presentation* and **ISO 6428 : 1982**, *Technical drawings—Requirements for microcopying* are equivalent to the corresponding items of **JIS Z 8312**.

JIS Z 8313-1 *Technical drawings—Lettering—Part 1 : Currently used characters*

Remarks : **ISO 3098-1 : 1974**, *Technical drawings—Lettering—Part 1 : Currently used characters* is identical with **JIS Z 8313-1**.

JIS Z 8314 *Technical drawings—Scales*

Remarks : **ISO 5455 : 1979**, *Technical drawings—Scales* is identical with **JIS Z 8314**.

JIS Z 8317 *Technical drawing—Dimensioning*

Remarks : Cited items from **ISO 129 : 1985**, *Technical drawings—Dimensioning—General principles, definitions, methods of execution and special indications* and **ISO 5261 : 1981**, *Technical drawings for structural metal work* are equivalent to the corresponding items of **JIS Z 8317**.

JIS Z 8318 *Technical drawings—Tolerancing of linear and angular dimensions*

Remarks : **ISO 406 : 1987**, *Technical drawings—Tolerancing of linear and angular dimensions* is identical with **JIS Z 8318**.

ISO 3461-2 *General principles for the creation of graphical symbols—Part 2 : Graphical symbols for use in technical product documentation***ISO 3545** *Steel tubes and tubular shaped accessories with circular cross-section—Symbols to be used in specifications***ISO 4067-1** *Technical drawings—Installations—Part 1 : Graphical symbols for plumbing, heating, ventilation and ducting***ISO 7573** *Technical drawings—Item lists*

3 Definitions For the purposes of **JIS B 0011**, the following definitions apply.

3.1 orthogonal representation Projection method in which projectors are at right angles to the projection plane.

3.2 isometric representation Projection method in which each of the three co-ordinate axes is inclined at the same angle to the projection plane.

3.3 flow line Representation of the flow path of the inlet or outlet streams or of material, energy or energy carriers.

4 General principles In this clause all general principles are specified which are common to the methods of projection and to the pictorial representations, as recommended in this part of **JIS B 0011**.

4.1 Representation of pipes, etc. The flow line representing a pipe, etc. (irrespective of its diameter), shall be a single continuous thick line (type A, see Table 1 and **JIS Z 8312**), coinciding with the central line of the pipe (see **ISO 4067-1**).

Bends may be simplified by extending the straight length of the flow line to the vertex (see Fig. 1). However, bends may be shown for sake of clarity in the form illustrated in Fig. 2. In this case, if projections of bends would otherwise have been elliptical, these projections may be simplified by drawing circular arcs (see Fig. 3).

4.2 Scale If the drawing is to scale, this shall be indicated in accordance with JIS Z 8314.

4.3 Lines

4.3.1 Thickness of lines In general, only one thickness of line shall be used. However, in cases where more than one line thickness has to be used, the line thicknesses shall be chosen from JIS Z 8312; the relative proportions of line thicknesses $a : b : c$ shall be $2 : \sqrt{2} : 1$. Different line thicknesses shall then be used as follows (see also 4.3.2):

- line thickness a: main flow lines;
- line thickness b: secondary flow lines, lettering;
- line thickness c: leader lines, dimension lines, etc.

4.3.2 Types of line The types and thicknesses of line shown in Table 1 shall be used.

Table 1

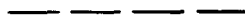
Line type	Description	Application
A 	Continuous thick	A1 Flow lines and connected parts
B 	Continuous thin	B1 Hatching B2 Dimensioning (Dimension lines, projection lines) B3 Leader lines B4 Isometric grid lines
C 	Continuous thin freehand	C1/D1 Limits of partial or interrupted view and section (Indicating the border of a part broken or removed from the object to be connected.)
D 	Continuous thin with zigzags	
E 	Dashed thick	E1 Flow lines specified on other drawing
F 	Dashed thin	F1 Floor F2 Walls F3 Ceilings F4 Holes (hole punchings)
G 	Chain thin	G1 Centrelines

Table 1 (continued)

Line type	Description	Application
EJ 	Extra thick chain line ⁽¹⁾	EJ1 Contract boundary
K 	Chain thin double-dashed	K1 Outlines of adjacent parts K2 Parts situated in front of the cutting plane
Note (1) Four times the thickness of line type G.		

4.3.3 Spacing of lines In accordance with **JIS Z 8312**, the space between parallel lines (including hatching) shall not be less than twice the thickness of the heaviest of these lines, with a minimum spacing of 0.7 mm.

The minimum spacing between adjacent flow lines and between flow lines and other lines should be 10 mm.

4.4 Lettering Lettering shall be in accordance with **JIS Z 8313** (especially **JIS Z 8313-1**); lettering type B vertical is preferred. The line thickness of the lettering shall be the same as the line thickness of those tpd-symbols to which the lettering is close or associated (see **ISO 3461-2**).

4.5 Dimensioning

4.5.1 In general, dimensioning shall be in accordance with **JIS Z 8317**. Nominal dimensions may be indicated in accordance with **ISO 3545** using the short designation "DN" (see Fig. 1).

The outer diameter (d) and the wall thickness (t) of pipes may be indicated in accordance with **JIS Z 8317** (see Fig. 2). If necessary, an item list (see **ISO 7573**) giving additional information on the pipes, including the associated equipment, may be added to the drawing. Lengths shall start from the outer faces of the pipe ends, flanges, or centre of the joint, whenever appropriate.

Informative reference : As for the nominal diameter of pipes, some pipes are classified by figures followed by the symbol A or B in Japanese Industrial Standards relating to piping. "DN" represents the nominal size.

4.5.2 Pipes with bends should be generally dimensioned from central line to central line of the pipelines (see Figs. 1 and 2).

If it is necessary to specify the dimension from the outside or inside external protection or surface of the pipe, the dimension may be specified by arrows pointing to short thin strokes parallel to the projection line or flow line representing the pipe (see Fig. 3).

The dimensions from outer to outer, from inner to inner and from inner to outer vertex are shown in Figs. 3 a), 3 b) and 3 c), respectively.

4.5.3 Radii and angles of bends may be indicated as shown in Fig. 4.

The functional angle shall be indicated; in general, angles of 90° are not indicated.

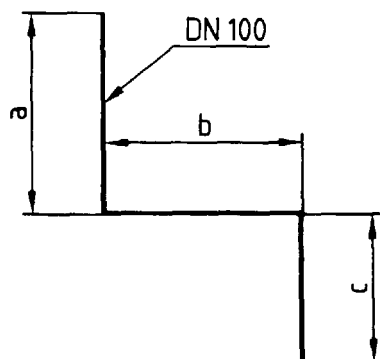


Fig. 1

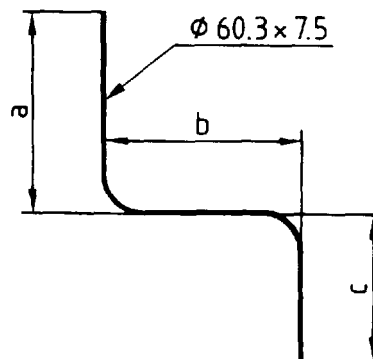


Fig. 2

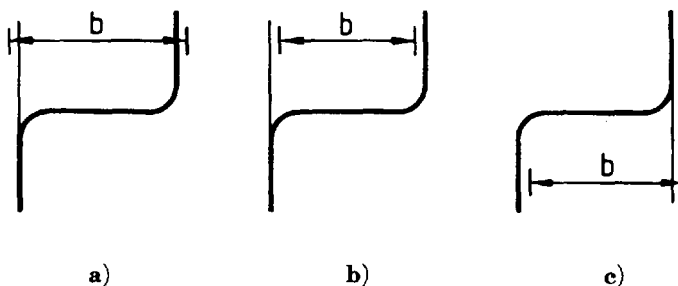


Fig. 3

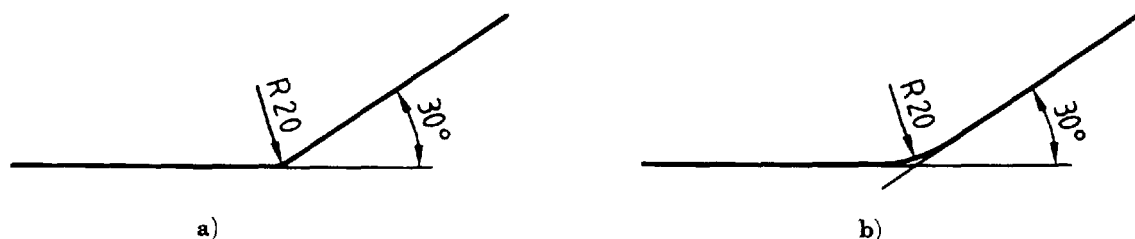


Fig. 4

4.5.4 Levels refer generally to the centre of the pipe and should be indicated in accordance with ISO 129 (see Fig. 5). If, in special cases, it is necessary to specify the level to the bottom of a pipe this shall be indicated by the reference arrow pointing to short thin strokes, as specified in 4.5.2 [see Fig. 3 and 8 a)].

A similar rule shall be applied to indicate levels to the top of the pipe [see Fig. 8 c)].

4.5.5 The direction of slope shall be indicated by a right angled triangle above the flow line, pointing from the higher down to the lower level.

The amount of slope shall be indicated in accordance with the methods shown in Figs. 6 to 8.

It may be useful to specify the level of the sloping pipe, either at its higher or at its lower end, or at any convenient point, by referring to a datum level (see Fig. 8).