

JAPANESE  
INDUSTRIAL  
STANDARD

Translated and Published by  
Japanese Standards Association

---

---

JIS Z 3021 : 2010

(JWES)

**Welding and allied processes —  
Symbolic representation**

---

ICS 01.080.20;01.100.20;25.160.01

Reference number : JIS Z 3021 : 2010 (E)

PROTECTED BY COPYRIGHT

 **Documents**  
Document Sharing Hub

18 S

Z 3021 : 2010

Date of Establishment: 1955-02-01

Date of Revision: 2010-03-23

Date of Public Notice in Official Gazette: 2010-03-23

Investigated by: Japanese Industrial Standards Committee  
Standards Board

Technical Committee on Welding

---

JIS Z 3021 : 2010, First English edition published in 2011-02

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 2011

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

PROTECTED BY COPYRIGHT

## Contents

|                                                                                                       | Page |
|-------------------------------------------------------------------------------------------------------|------|
| Introduction .....                                                                                    | 1    |
| 1 Scope .....                                                                                         | 1    |
| 2 Normative references .....                                                                          | 1    |
| 3 Terms and definitions .....                                                                         | 1    |
| 4 Configuration of symbolic representation of welding .....                                           | 2    |
| 5 Welding symbol .....                                                                                | 3    |
| 5.1 General .....                                                                                     | 3    |
| 5.2 Elementary symbols .....                                                                          | 3    |
| 5.3 Combined symbols .....                                                                            | 4    |
| 5.4 Supplementary symbols .....                                                                       | 5    |
| 6 Indication of symbolic representation of welding .....                                              | 6    |
| 6.1 Reference line .....                                                                              | 6    |
| 6.2 Position of welding symbol .....                                                                  | 6    |
| 6.3 Arrow line .....                                                                                  | 7    |
| 7 Dimensioning .....                                                                                  | 8    |
| 8 Complementary indications .....                                                                     | 11   |
| Annex A (informative) Example of use of symbolic representation<br>of welding .....                   | 12   |
| Annex JA (normative) Nondestructive test symbol of weld .....                                         | 20   |
| Annex JB (informative) Design of symbolic representation of welding .....                             | 24   |
| Annex JC (informative) Comparison table between JIS and corresponding<br>International Standard ..... | 26   |

## Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Welding Engineering Society (JWES) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS Z 3021** : 2000 is replaced with this Standard.

This **JIS** document is protected by the Copyright Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

# Welding and allied processes — Symbolic representation

## Introduction

This Japanese Industrial Standard was established in 1955 and has gone through five revisions to this day, the most recent of which has taken place in 2000. The revision at this time is made for the purpose to correspond to the technical progress afterwards and to integrate Annex 1 of the previous edition into the text.

This Standard has been prepared based on the third edition of **ISO 2553** published in 1992 with some modifications of the technical contents.

The portions given sidelines or dotted underlines are the matters in which the contents of the original International Standard have been modified. A list of modifications with the explanations is given in Annex JC. Annex JA, Annex JB and Annex JC of this Standard are not stated in the corresponding International Standard.

## 1 Scope

This Standard specifies the symbolic representation of welding, and the indication methods thereof.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows:

ISO 2553 : 1992 *Welded, brazed and soldered joints—Symbolic representation on drawings* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and JIS are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS Z 2300 *Terms and definitions of nondestructive testing*

JIS Z 3001 (standard series) *Welding and allied processes — Vocabulary*

## 3 Terms and definitions

For the purposes of this Standard, the terms and definitions given in **JIS Z 2300** and **JIS Z 3001** (standard series), and the following terms and definitions apply.

### 3.1 weld depth

the depth of weld ( $s$ ) at the groove weld which is the distance from the surface of weld to the bottom of weld at groove weld, which contributes the joint strength [see figure 1 a)]

NOTE : The weld depth is equal to the thickness of the plate [see figure 1 b)] in the case of the full penetration weld; however, not equal to the penetration depth ( $p$ ) in the case of the beam weld, etc. [see figure 1 c)].

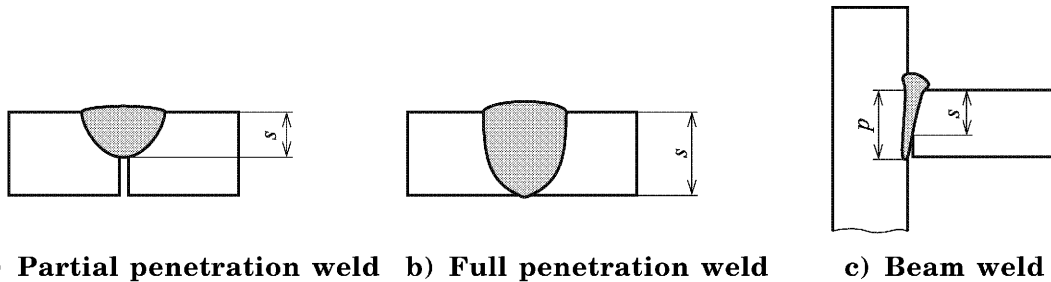


Figure 1 Weld depth

### 3.2 weld width

the width of weld ( $b$ ) at the welding face in the case of the keyhole weld, which contributes the joint strength [see figure 2)]

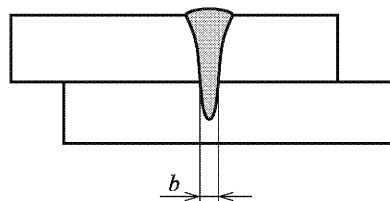


Figure 2 Weld width

## 4 Configuration of symbolic representation of welding

The configuration of symbolic representation of welding shall be as follows.

- The symbolic representation of welding shall be composed of the arrow line, the reference line and the welding symbol [see figure 3 a)].
- For the symbolic representation of welding, dimensions shall be added if necessary, and the supplementary designation may be added on the tail [see figure 3 b)].
- When the welding symbol and the like are not designated, this joint means the simple welding [see figure 3 c)].

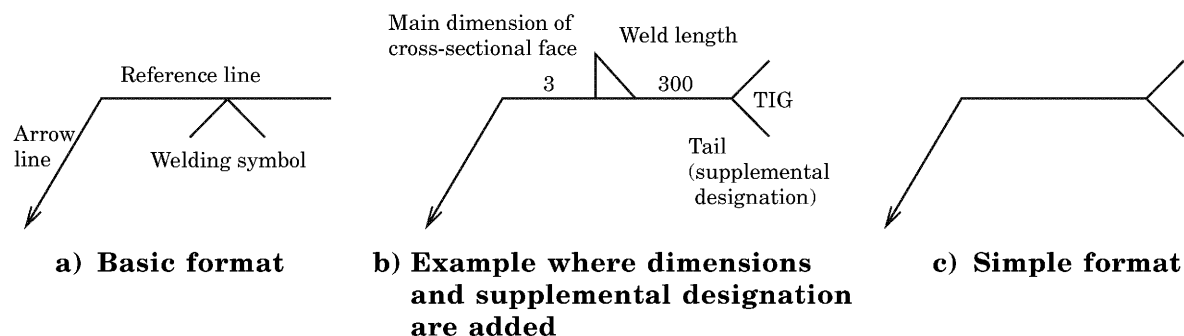


**Figure 3 Configuration of symbolic representation of welding**

## 5 Welding symbol

### 5.1 General

The welding symbol shall be the elementary symbol, the combined symbol and the supplementary symbol, and shall be as given in **5.2**, **5.3** and **5.4**, respectively.

NOTE : Examples of use of symbolic representation of welding are given in Annex A and designs thereof are given in Annex JB.

### 5.2 Elementary symbols

The elementary symbols shall be as given in table 1.

NOTE : The dotted line in the column of symbol of the table indicates the reference line.

**Table 1 Elementary symbols**

| Designation                                                                                                                                                                                                                                                                                                                                              | Symbol | Example of use (informative)    | Complement                         | Designation                  | Symbol | Example of use (informative)      | Complement |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------|------------------------------------|------------------------------|--------|-----------------------------------|------------|
| Square groove                                                                                                                                                                                                                                                                                                                                            |        | <b>1-1</b><br>to<br><b>1-5</b>  | Also, applicable to surface joint. | Plug weld<br>Slot weld       |        | <b>10-1</b><br>and<br><b>10-2</b> |            |
| Single V groove                                                                                                                                                                                                                                                                                                                                          |        | <b>2-1</b><br>to<br><b>2-4</b>  |                                    | Bead weld                    |        | <b>11-1</b>                       |            |
| Single bevel groove                                                                                                                                                                                                                                                                                                                                      |        | <b>3-1</b><br>and<br><b>3-2</b> |                                    | Overlaying                   |        | <b>12-1</b>                       |            |
| Single J groove                                                                                                                                                                                                                                                                                                                                          |        | <b>4-1</b>                      |                                    | Keyhole weld                 |        | <b>13-1</b><br>and<br><b>13-2</b> |            |
| Single U groove                                                                                                                                                                                                                                                                                                                                          |        | <b>5-1</b>                      |                                    | Spot weld<br>Projection weld |        | <b>14-1</b>                       |            |
| Single V flare weld                                                                                                                                                                                                                                                                                                                                      |        | <b>6-1</b>                      |                                    | Seam weld                    |        | <b>15-1</b>                       |            |
| Single bevel flare weld                                                                                                                                                                                                                                                                                                                                  |        | <b>7-1</b>                      |                                    | Scarf joint                  |        | <b>16-1</b>                       |            |
| Edge weld                                                                                                                                                                                                                                                                                                                                                |        | <b>8-1</b><br>and<br><b>8-2</b> |                                    | Stud weld                    |        | <b>17-1</b>                       |            |
| Fillet weld <sup>a)</sup>                                                                                                                                                                                                                                                                                                                                |        | <b>9-1</b><br>to<br><b>9-4</b>  | <br>or<br>                         |                              |        |                                   |            |
| Notes <sup>a)</sup> As for the staggered intermittent fillet weld, a complementary symbol may be used.<br><sup>b)</sup> A complementary symbol may be used.<br>This symbol is going to be deleted at the time of next revision.<br><sup>c)</sup> A complementary symbol may be used.<br>This symbol is going to be deleted at the time of next revision. |        |                                 |                                    |                              |        |                                   |            |

### 5.3 Combined symbols

The combined symbols shall be as follows.

- a) If necessary, more than one elementary symbol shall be combined and used [see figure 4 a)].

When designating the weld sequence, it shall be described on the tail [see figure 4 b)].

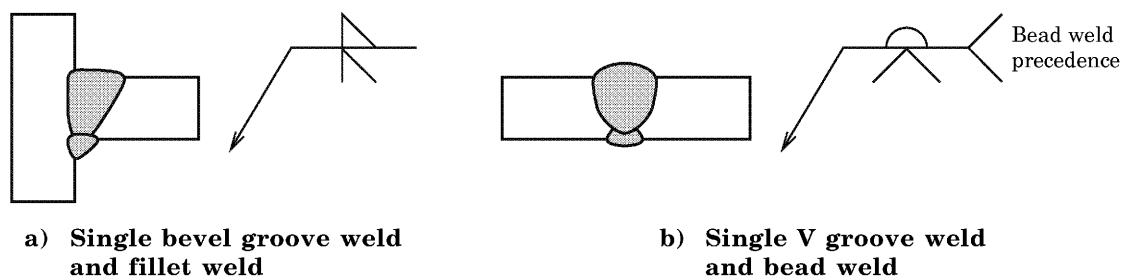


**Figure 4 Example of combined symbols**

b) Combined symbols for symmetrical welds shall be as given in table 2.

NOTE : The dotted line in the column of symbol of the table indicates the reference line.

**Table 2 Combined symbols for symmetrical welds**

| Designation         | Symbol | Example of use (informative) | Comple-<br>ment | Designation             | Symbol | Example of use (informative) | Comple-<br>ment |
|---------------------|--------|------------------------------|-----------------|-------------------------|--------|------------------------------|-----------------|
| Double V groove     |        | <b>2-5</b>                   |                 | Double U groove         |        | <b>5-2</b>                   |                 |
| Double bevel groove |        | <b>3-3</b>                   |                 | Double V flare weld     |        | <b>6-2</b>                   |                 |
| Double J groove     |        | <b>4-2</b>                   |                 | Double bevel flare weld |        | <b>7-2</b>                   |                 |

#### 5.4 Supplementary symbols

The supplementary symbols shall be as given in table 3.

NOTE : The dotted line in the column of symbol of the table indicates the reference line.

**Table 3 Supplementary symbols**

| Designation           | Symbol                                                                            | Example of use (informative) | Comple-ment | Designation       | Symbol                                                                              | Example of use (informative) | Comple-ment |
|-----------------------|-----------------------------------------------------------------------------------|------------------------------|-------------|-------------------|-------------------------------------------------------------------------------------|------------------------------|-------------|
| Penetration weld      |  | <b>2-3</b><br><b>8-2</b>     |             | Weld surface      |                                                                                     |                              |             |
| Backing <sup>a)</sup> |  | <b>2-1</b>                   |             | Flat finishing    |  | <b>20-1</b>                  |             |
| Peripheral weld       |  | <b>18-1</b>                  |             | Convex finishing  |  | <b>21-1</b>                  |             |
| Field or site weld    |  | <b>19-1</b>                  |             | Concave finishing |  | <b>22-1</b>                  |             |
|                       |                                                                                   |                              |             | Toe finishing     |  | <b>23-1</b>                  |             |
|                       |                                                                                   |                              |             | Finishing method  |                                                                                     |                              |             |
|                       |                                                                                   |                              |             | Chipping          | C                                                                                   | <b>22-1</b>                  |             |
|                       |                                                                                   |                              |             | Grinding          | G                                                                                   | <b>23-1</b>                  |             |
|                       |                                                                                   |                              |             | Machining         | M                                                                                   | <b>20-1</b>                  |             |
|                       |                                                                                   |                              |             | Polishing         | P                                                                                   | <b>21-1</b>                  |             |

Note <sup>a)</sup> When designating the material, removing or the like of backing, it shall be described on the tail.

## 6 Indication of symbolic representation of welding

### 6.1 Reference line

The reference line shall be the horizontal line; however, when it is impracticable, it shall be as given in figure 5.

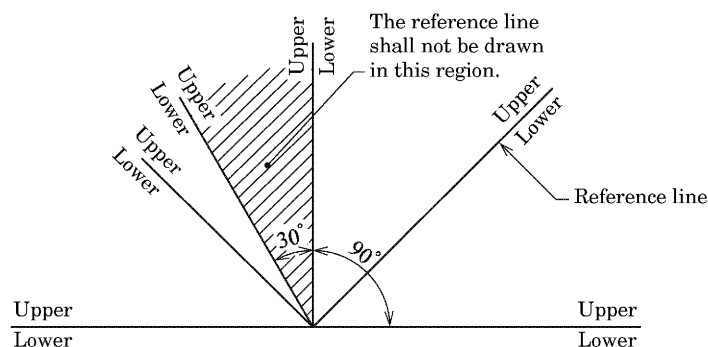


**Figure 5 Position of reference line, and upper and lower of reference line**

### 6.2 Position of welding symbol

The position of welding symbol shall be according to the projection method of the drawing on which the welding symbol is drawn, and shall be as follows.

#### a) In the case of method A (third angle projection method)

- 1) The symbol shall be drawn on the lower side of the reference line when the welding side is on the arrow line side or this side [see figure 6 a)].

- 2) The symbol shall be drawn on the upper side of the reference line when the welding side is on the opposite side or farther side of the arrow line [see figure 6 b)].

**b) In the case of method E (first angle projection method)**

- 1) The symbol shall be drawn on the upper side of the reference line when the welding side is on the arrow line side or this side [see figure 6 c)].
  - 2) The symbol shall be drawn on the lower side of the reference line when the welding side is on the opposite side or farther side of the arrow line [see figure 6 d)].
- c) When the weld is formed on the contact face, it shall be drawn by crossing the reference line [see figure 6 e)].

NOTE 1 In this Standard, all other than c) and d) of figure 6 are according to the method A (third angle projection method).

NOTE 2 In the case of the projection weld, the surface protrusion is regarded as exterior surface.

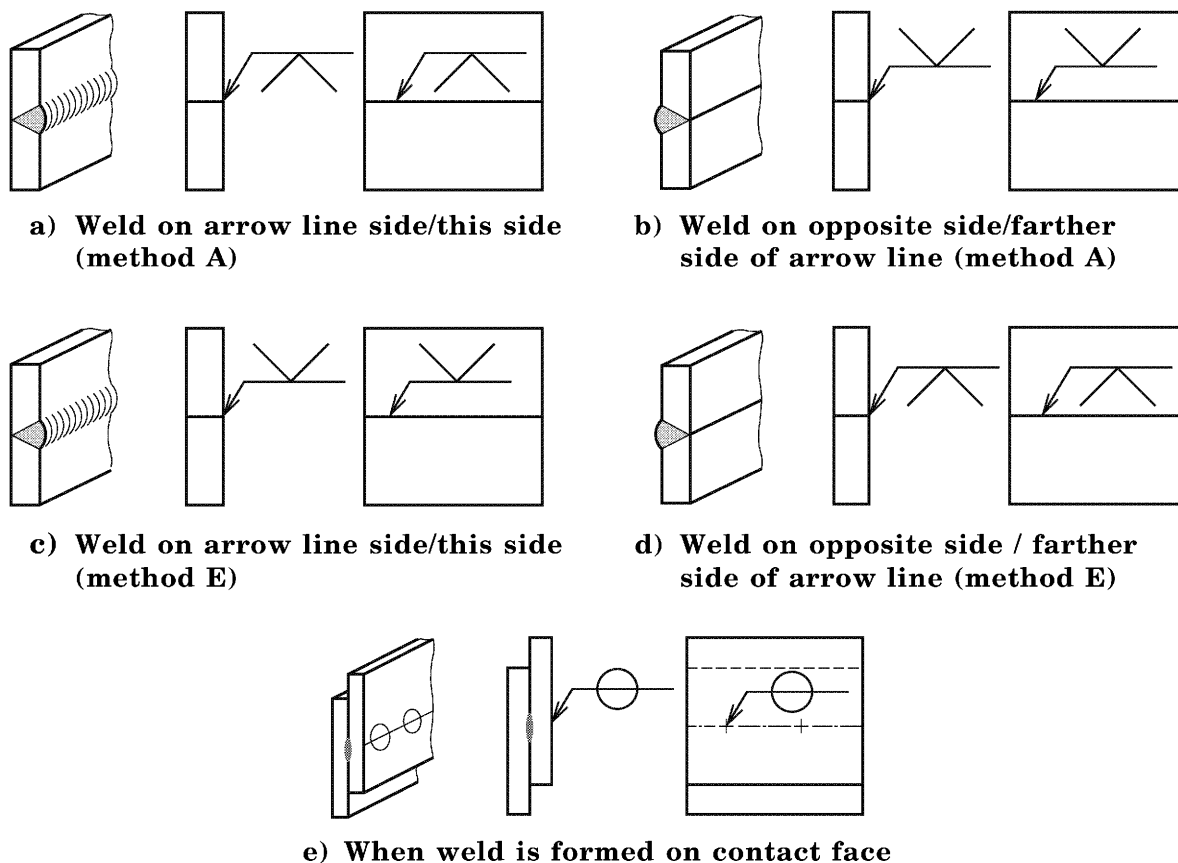


**Figure 6 Position of welding symbol to reference line**

### 6.3 Arrow line

The arrow line shall be as follows.