

## Symbolic Representation of Welds

**Introduction** This Japanese Industrial Standard which specifies the symbolic presentation of welds used in weld design and welding work has been revised this time in order to make it conform to the corresponding International Standard ISO 2553: 1992, *Welded, brazed and soldered joints - Symbolic representation on drawings*, from the viewpoint to promote the international conformity of the JISs concerning welds.

In the revision at this time, as a represent of the comparison with the corresponding International Standard ISO 2553, published in 1992 as the 3rd edition in which a difference in, for example, the basic symbols was found, ISO 2553:1992 was translated into Japanese and added, in the form of Annex 1 (informative) to this Standard without modifying the technical contents. The presentation form of this Standard is in accordance with JIS Z 8301: 2000.

The portions sidlined or underlined with dots in this Standard are the matters resulted from the modification of the contents in the original International Standard.

**1. Scope** This Japanese Industrial Standard specifies the symbolic representation of welds and its marking method.

**Remarks:** The International Standard corresponding to this Standard is as follows.

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**.

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

### Related standards

- JIS Z 8310 *Technical drawing — General code of drawing practice*  
 JIS Z 8313-5 *Technical product documentation — Lettering — Part 5: CAD lettering of the Latin alphabet, numerals and marks*  
 JIS Z 8315-2 *Technical drawings — Projection methods — Part 2: Orthographic representations*  
 JIS Z 8315-3 *Technical drawings — Projection methods — Part 3: Axonometric representations*  
 JIS Z 8315-4 *Technical drawings — Projection methods — Part 4: Central projection*  
 JIS Z 8316 *Technical drawings — General principles of presentation*  
 JIS Z 8317 *Technical drawings — Dimensioning — General principles, definitions, methods of execution and special indications*

**2. Normative references** The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard.

The most recent editions of the standards indicated below shall be applied (including the amendment.)

JIS Z 2300 *Glossary of terms used in nondestructive testing*

JIS Z 3001 *Welding terms*

**3. Definitions** For the purpose of this Standard, the definitions given in JIS Z 2300 and JIS Z 3001 apply.

### 4. Symbols for Welds

The symbols for welds shall consist of basic symbols and supplementary symbols as specified in Tables 1 and 2.

**4.1 Basic Symbols** The basic symbols shall represent the shapes of welds between two members, as a rule.

Table 1. Basic symbols

Shape of weld	Basic symbol	Remarks	No. of descriptive example
Double-flange		—	1
Single-flange		—	2
Square groove		Upset welds, flash welds, friction welds, etc. are included.	3
Single V groove and double V groove (X groove)		The X groove weld shall be represented by two figures of this symbol drawn symmetrically about the reference line of the explanatory line, hereinafter referred to as the "reference line". Upset welds, flash welds, friction welds, etc. are included.	4, 5
Single bevel groove and double bevel groove (K groove)		The K groove weld shall be represented by two figures of this symbol drawn symmetrically about the reference line. The vertical line in the symbol shall be drawn on the left side. Upset welds, flash welds, friction welds, etc. are included.	6, 7
Single J groove and double J groove		The double J groove weld shall be represented by two figures of this symbol drawn symmetrically about the reference line. The vertical line in the symbol shall be drawn on the left side.	8, 9
Single U groove and double U groove (H groove)		The H groove weld shall be represented by two figures of this symbol symmetrically drawn about the reference line.	10, 11
Flare single V groove and flare X groove		The flare X groove weld shall be represented by two figures of this symbol drawn symmetrically about the reference line.	12
Flare single bevel groove and flare K groove		The flare K groove weld shall be represented by two figures of this symbol drawn symmetrically about the reference line. The vertical line in the symbol shall be drawn on the left side.	13

Table 1 (concluded)

Shape of weld	Basic symbol	Remarks	No. of descriptive example
Fillet		The vertical line in the symbol shall be drawn on the left side. Parallel continual fillet welds shall be represented by this symbol drawn symmetrically about the reference line. However, in the case of staggered continuous fillet welds, the symbols shown on the right may be used.	14 to 16
Plug and slot		—	17
Bead and cladding		In the case of cladding by welding, two figures of this symbol shall be drawn side by side.	18, 19
Spot, projection, and seam		This symbol represents a weld made by resistance welding, arc welding, electron beam welding or the like in lap joints. However, fillet welds are excluded. Seam welds shall be represented by two figures of this symbol drawn side by side. In addition, if there is no problem in the representation, spot weld is represented by symbol  and seam weld by symbol	20, 21 Annex A Table A.1 24 to 27

4.2 Supplementary Symbols The supplementary symbols shown in Table 2 shall be used, as required.

Table 2. Supplementary Symbols

Division	Supplementary symbol	Remarks	No. of descriptive example
Shape of weld surface	Flat	—	20, 22, 23
	Convex		22
	Concave		22, 23, 25
Finishing method for weld	Chipping	C	23
	Grinding	G	23, 25
	Cutting	M	4, 23
	Not specified	F	In the case where the finishing method is not specified.
Field welding			24
All-round peripheral welding		This symbol may be omitted where it is obvious that all-round peripheral welding is employed.	24
Field all-round peripheral welding			24

Table 2 (concluded)

Division		Supplementary symbol	Remarks	No. of descriptive example	
Nondestructive test method	Radiograph test	General	RT	The category "general" is the case when only the method of each test such as the radiograph test and the like is shown and the content is not given.	26-1
		Double wall photographing	RT-W		
	Ultrasonic flaw detecting test	General	UT	An appropriate marking can be used, as required, for tests not represented by the symbols shown here. (Example) Leakage test    LT  Strain measuring test    ST  Visual test    VT  Acoustic emission test    AET  Eddy current test    ET	26-2
		Normal beam method	UT-N		
		Angle beam method	UT-A		
	Magnetic-particle testing	General	MT	26-3	
		Fluorescence detecting	MT-F		
	Penetrant testing	General	PT	26-3	
		Fluorescence detecting	PT-F		
		Nonfluorescence detecting	PT-D		
Whole test		○	These symbols shall be suffixed to each symbol of test.	26-1	
Partial test (sampling test)		△		26-1	

## 5. Method of Symbolic Representation of Welds

5.1 Explanatory Line The explanatory line shall be used for symbolically representing welds, and shall consist of a reference line, an arrow and a tail, and the tail may be omitted where not required [refer to Fig. 1 (a) and (b)].

5.1.1 The reference line shall normally be a horizontal line with an arrow attached to one of its ends.

5.1.2 The arrow shall be used to indicate the position of the weld, and shall preferably be a straight line at an angle of 60° against the reference line. However, in cases where it is necessary to indicate the surface of the grooved member in single bevel groove, K groove, single J groove, or double J groove weld, or to indicate the surface of the flared member in flare single bevel groove or flare K groove weld, the arrow shall be a broken line, with the arrowhead directed to the grooved or flared surface [refer to Fig. 1 (c)].

5.1.3 Two or more arrows may be drawn from one end of the reference line, if required. However, arrows shall not be attached to both ends of the reference line [refer to Fig. 1 (d)].

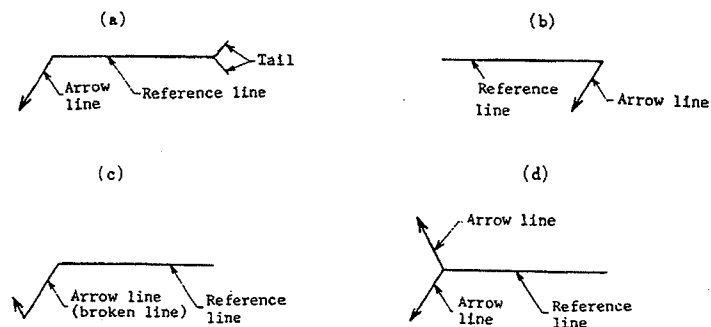
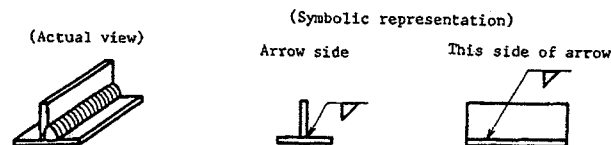


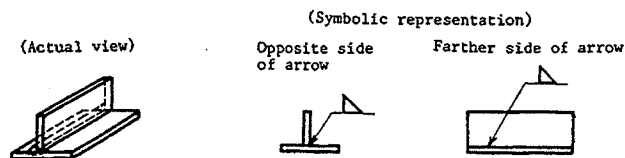
Fig. 1. Explanatory Line

5.2 **Methods of Describing Basic Symbols** The basic symbol shall be drawn closely contacting the lower side of the reference line when the welded side is on the arrow side or this side [see Fig. 2 (a)], or closely contacting the upper side of the reference line when the welded side is on the opposite side or farther side of the arrow [see Fig. 2 (b)].

Where the reference line cannot be drawn horizontally, it shall be drawn as in Fig. 3.



(a) Weld on the Arrow Side or This Side



(b) Weld on the Opposite Side or Farther Side of Arrow

Fig. 2. Upper and Lower Positional Relations of Basic Symbol to Reference Line

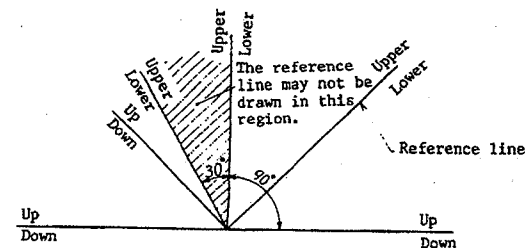


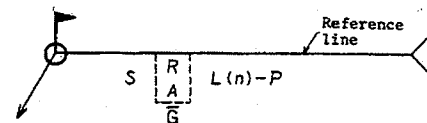
Fig. 3. Position of Reference Line and Its Upper and Lower Positional Relations

5.3 **Methods of Drawing Supplementary Symbols and Others** The details of welding work such as supplementary symbols, dimensions and strength shall be described on the same side as the basic symbol relative to the reference line, as shown in Fig. 4.

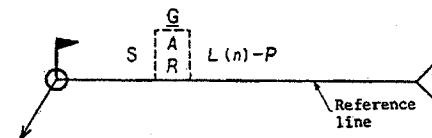
5.3.1 The supplementary symbols of surface form and finishing method shall be written close to the surface of the form symbol of weld.

5.3.2 The supplementary symbols of field welding, all-round peripheral welding and the like shall be positioned on the intersecting point of the reference line and the arrow.

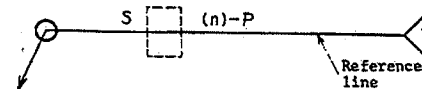
5.3.3 The supplementary symbol of nondestructive test shall be placed on the side of the tail.



(a) Welded Side on the Arrow Side or This Side




(b) Welded Side on the Opposite Side or Farther Side of Arrow



(c) For Resistance Welding (Spot Welding or the Like) of Lap Joint

Fig. 4. Methods of Describing Details of Welding Work

# Examples for Symbolic Representation of Details of Welding Work

: basic symbol

S: sectional dimensions or strength of weld (groove depth, legs of fillet, diameter of plug hole, width of slot groove, width of seam, diameter of nugget or strength of single spot in spot welding, etc.)

R: root gap

A: groove angle

L: weld length in intermittent fillet weld, groove length, or where required, weld length in slot weld

n: number of welds in intermittent fillet, plug, slot, spot or the like

P: pitch of weld in intermittent fillet, plug, slot, spot or the like

T: special items specified (root radius in J groove weld, U groove weld, etc., welding method, supplementary symbol of nondestructive test and others)

—: supplementary symbol for surface shape

G: supplementary symbol for finishing method

⊕: supplementary symbol for field all-round peripheral welding

○: supplementary symbol for all-round peripheral welding

5.3.4 Basic symbols may be used in combination if required (refer to Describing Examples 25).

5.3.5 The sectional dimensions in grooved welds indicate the following unless otherwise specified:

S: full-penetration grooved weld with groove depth of S.

⊙: partial-penetration grooved weld with groove depth of S. Where S is not specified, it shall mean a full-penetration grooved weld.

5.3.6 The sectional dimensions of fillet welds shall denote the legs.

For equal-legged fillet welds, only one leg shall be written. For unequal-legged fillet welds, the legs shall be written as (S<sub>1</sub> × S<sub>2</sub>), with the smaller leg (S<sub>1</sub>) preceding the larger leg (S<sub>2</sub>) (refer to Describing Examples 14).


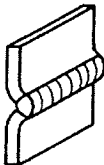
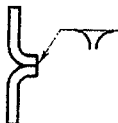
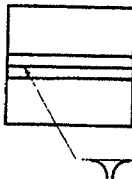
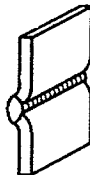
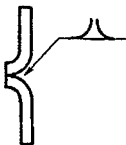
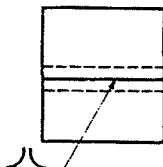
5.3.7 The sectional dimensions and the dimensions in the direction of the weld line in plug welds and slot welds shall be represented by the dimensions at the bottom of the hole. Where only the sectional dimensions are given, it shall indicate a filling weld, and in the case of partial filling welds, the dimensions shall be written like "diameter or width of hole bottom × welding depth", with the diameter or width of the hole bottom representing the sectional dimension preceding the welding depth (refer to Describing Examples 17).

5.3.8 The sectional dimensions of spot welds and projection welds shall be represented by the nugget diameter.

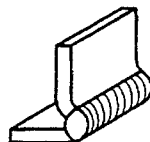

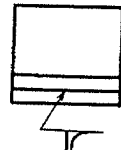
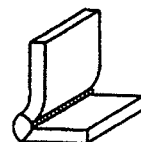
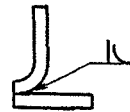
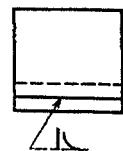
5.3.9 Where the dimensions to be described on both sides of the reference line are equal, the dimensions may be written only on the upper side of the reference line (refer to Describing Examples 15 and 16).

5.3.10 Items required to be particularly specified, for example, the welding method, shall be stated at the tail of the reference line.

Describing Examples: 1

Double-Flange		symbol			Two quarter circles shall be drawn face-to-face.
Weld	Actual view		Symbolic representation		
Arrow side or this side					
Opposite side or farther side of arrow					


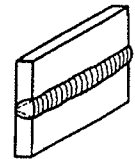
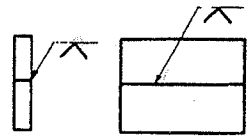
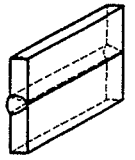
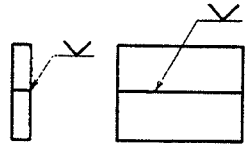
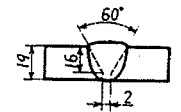
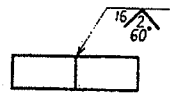
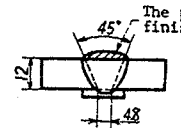
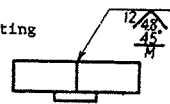
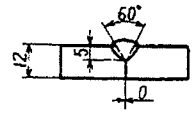
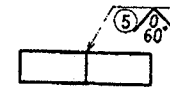
Describing Examples: 2

Single-Flange		Symbol	A quarter circle and a vertical straight line with a height equal to the radius of the quarter circle shall be drawn face-to-face.	
Weld	Actual view	Symbolic representation		
Arrow side or this side				
Opposite side or farther side of arrow				


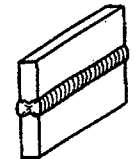
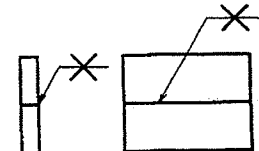
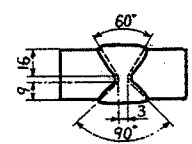
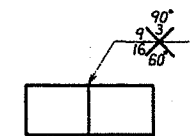
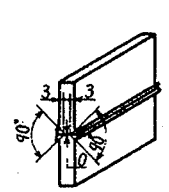
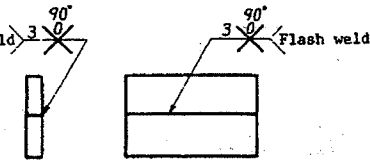
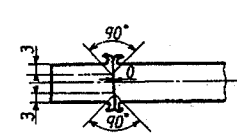
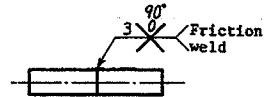
Describing Examples: 3

Square Groove	Symbol 	Two parallel lines shall be drawn normal to the reference line.	
Weld	Actual view	Symbolic representation	
Arrow side or this side			
Opposite side or farther side of arrow			
Both sides			
Root gap, 2 mm			
Root gap, 2 mm			
Flash weld	 	 	 
Friction weld			

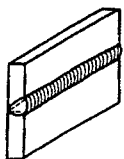
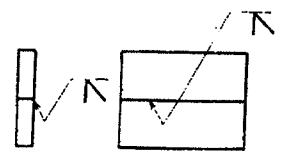
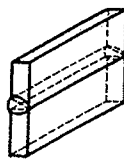
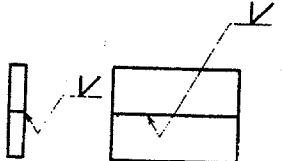
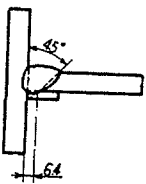
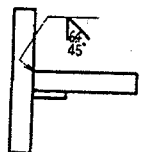
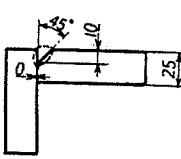
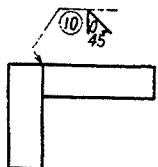
Describing Examples: 4

Single V Groove	Symbol		The angle of the symbol shall be 90 degrees.
Weld	Actual view		Symbolic representation
Arrow side or this side			
Opposite side or farther side of arrow			
Plate thickness, 19 mm Groove depth, 16 mm Groove angle, 60° Root gap, 2 mm			
Full penetration weld Plate thickness, 12 mm Backing used Groove angle, 45° Root gap, 4.8 mm Finished by cutting			
Partial penetration weld Plate thickness, 12 mm Groove depth, 5 mm Groove angle, 60° Root gap, 0 mm			

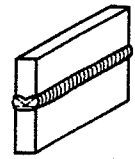
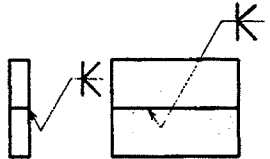
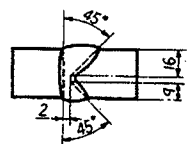
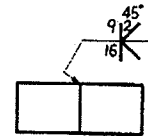
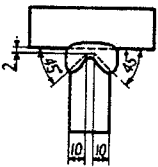
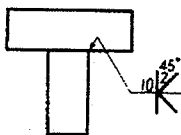
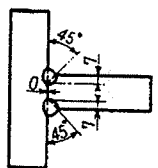
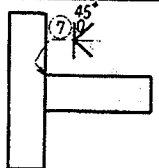
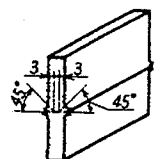
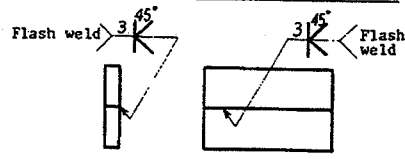
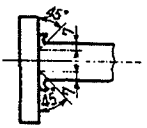
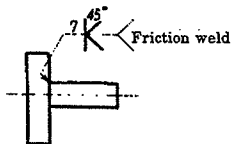
Describing Examples: 5

X Groove	Symbol		The angle of the symbol shall be 90 degrees.
Weld	Actual view		Symbolic representation
Both sides			
Groove depth: Arrow side, 16 mm Opposite side of arrow, 9 mm Groove angles: Arrow side, 50° Opposite side of arrow, 90° Root gap, 3 mm			
Flash weld Groove depth, 3 mm Groove angle, 90° Root gap, 0 mm			
Friction weld Groove depth, 3 mm Groove angle, 90° Root gap, 0 mm			

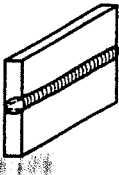
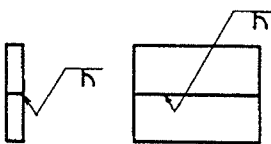
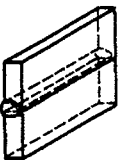
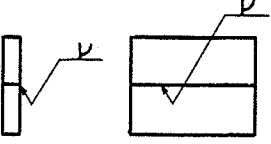
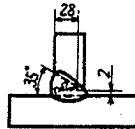
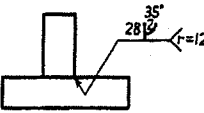
Describing Example: 6

Single Bevel Groove		Symbol	The symbol shall consist of a vertical straight line and a straight line joining it at an angle of 45 degrees at its bottom, the heads of these straight lines being on the same level.	
Weld	Actual view		Symbolic representation	
Arrow side or this side				
Opposite side or farther side of arrow				
T joint Backing metal used Groove angle, 45° Root gap, 6.4 mm				
Corner joint Partial penetration weld Plate thickness, 25 mm Groove depth, 10 mm Groove angle, 45° Root gap, 0 mm				

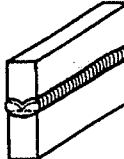
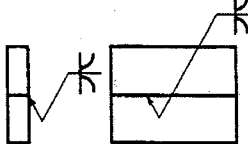
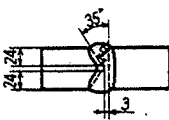
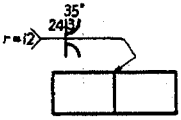
Describing Example: 7

K Groove		Symbol	Two V-shaped symbols shall be drawn symmetrically about the reference line.	
Weld	Actual view		Symbolic representation	
Both sides				
Arrow side Groove depth, 16 mm Groove angle, 45° Opposite side of arrow Groove depth, 9 mm Groove angle, 45° Root gap, 2 mm				
T joint Groove depth, 10 mm Groove angle, 45° Root gap, 2 mm				
T joint Partial penetration weld Groove depth, 7 mm Groove angle, 45° Root gap, 0 mm				
Flash weld Groove depth, 3 mm Groove angle, 45°				
Friction weld T joint Groove depth, 7 mm Groove angle, 45°				

Describing Example: 8

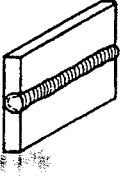
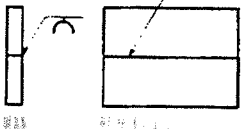
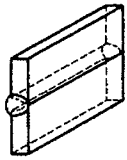
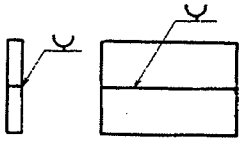

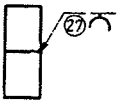

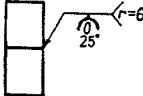
Single J Groove		Symbol	The symbol shall consist of a vertical straight line and a quarter circle with its one end joining the straight line halfway, the length of the leg of the straight line being one half of the radius of the quarter circle.	
Weld	Actual view		Symbolic representation	
Arrow side or this side				
Opposite side or farther side of arrow				
Groove depth, 28 mm Groove angle, 35° Root radius, 12 mm Root gap, 2 mm				

Describing Examples: 9

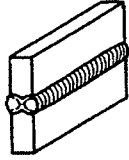
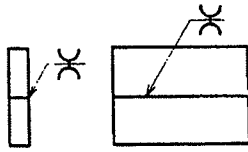
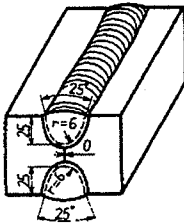
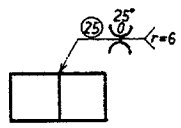
Double J Groove		Symbol	Two J-shaped symbols shall be drawn symmetrically about the reference line.	
Weld	Actual view		Symbolic representation	
Both sides				
Groove depth, 24 mm Groove angle, 35° Root radius, 12 mm Root gap, 3 mm				





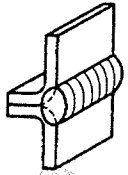
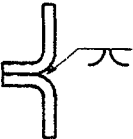
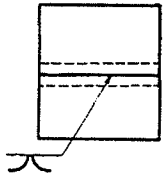
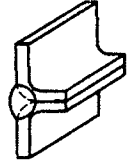
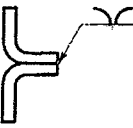
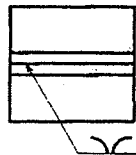
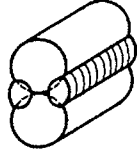
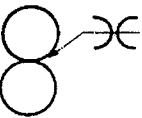
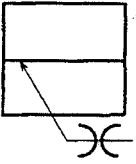
Describing Examples: 10

Single U Groove		Symbol	The symbol shall consist of a half circle and a leg, the length of the leg being one half of the radius of the half circle.	
Weld	Actual view		Symbolic representation	
Arrow side or this side				
Opposite side or farther side of arrow				
Partial penetration weld Groove depth, 27 mm				
Full penetration weld Groove angle, 25° Root radius, 6 mm Root gap, 0 mm				



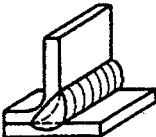


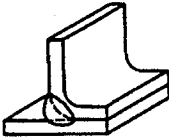
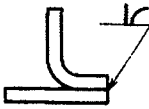
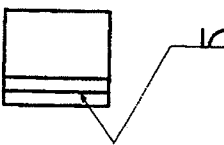
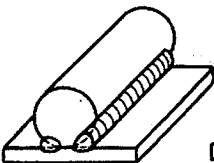


Describing Examples: 11

H Groove		Symbol	Two U-shaped symbols shall be drawn symmetrically about the reference line.	
Weld	Actual view		Symbolic representation	
Both sides				
Partial penetration weld Groove depth, 25 mm Groove angle, 25° Root radius, 6 mm Root gap, 0 mm				


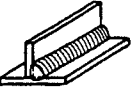
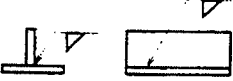
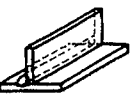
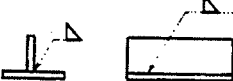
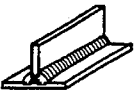
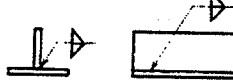
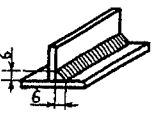
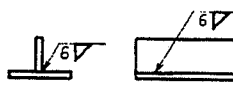
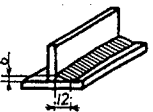
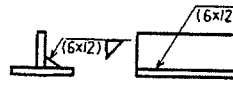
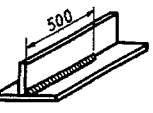
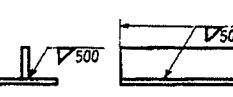
Describing Examples: 12

Flare Single V Groove Flare X Groove		Symbol	 	The flare single V groove weld shall be represented by two quarter circles drawn face-to-face. The flare X groove weld shall be represented by two half circles drawn face-to-face.	
Weld	Actual view		Symbolic representation		
Arrow side or this side					
Opposite side or farther side of arrow					
Both sides					


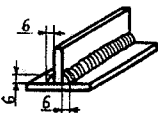
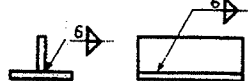
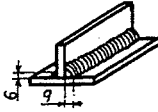
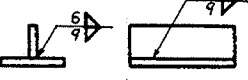
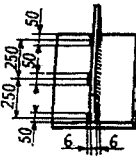
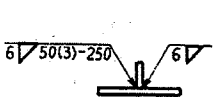
Describing Examples: 13

Flare Single Bevel Groove		Symbol		The flare single bevel groove weld shall be represented by a straight line and a quarter circle.	
Flare K Groove					The flare K groove weld shall be represented by a straight line and a half circle.
Weld	Actual view		Symbolic representation		
Arrow side or this side					
Opposite side or farther side of arrow					
Both sides					

Describing Examples: 14

Fillet	Continued on next page (1)	Symbol		The fillet weld shall be represented by a right-angled equilateral triangle.
Weld	Actual view		Symbolic representation	
Arrow side or this side				
Opposite side or farther side of arrow				
Both sides				
Leg, 6 mm				
In the case of a fillet weld with unequal legs, the dimension of the smaller leg shall precede that of the larger leg and shown in parentheses. In this case, the direction of the unequal legs shall be clearly shown.				
Weld length, 500 mm				

Describing Examples: 15

Fillet	Continued (2)	Symbol		The fillet weld shall be represented by a right-angled equilateral triangle.
Weld	Actual view		Symbolic representation	
Both legs, 6 mm				
Legs on opposite sides are different in length				
Continuous weld on one side and intermittent weld on the other side Both legs, 6 mm Intermittent weld Weld length, 50 mm Number of welds, 3 Pitch, 250 mm			The weld shall not be drawn in a side view.	


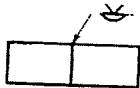

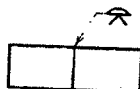
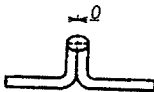

Describing Examples: 16

Fillet	Intermittent	Symbol	Staggered Parallel	$\triangle L(n)-P$	The symbol shall be a right-angled equilateral triangle with $L$ (weld length), $n$ (number of welds), and $P$ (pitch) attached.
				$\triangle L(n)-P$	Where the shapes and dimensions of the fillets on both sides are equal, the symbol may be used.
Weld	Actual view	Symbolic representation			
Arrow side or this side					
Opposite side or farther side of arrow					
Both sides					
Parallel weld Weld length, 50 mm Number of welds, 3 Pitch, 150 mm					
Staggered weld Leg on this side, 6 mm Leg on farther side, 9 mm Weld length, 50 mm Number of welds, 2 Arrow side, 2 Opposite side, 2 Pitch, 300 mm					
Staggered weld Legs on both sides, 6 mm Weld length, 50 mm Number of welds, 3 Arrow side, 2 Opposite side, 2 Pitch, 300 mm					

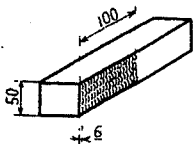
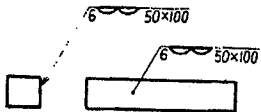
Describing Examples: 17

Plug and Slot	Symbol	The length of the vertical lines shall be half that of the upper side.
Weld	Actual view	Symbolic representation
Plug weld		
Slot weld		
Plug weld		
Slot weld		

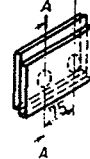
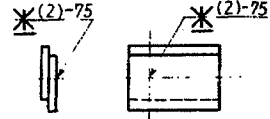
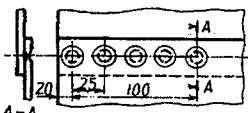
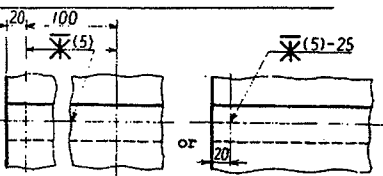
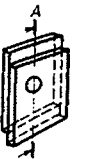
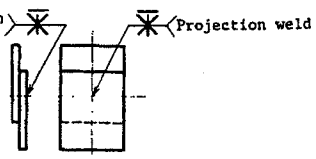

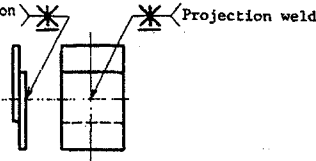
Describing Examples: 18

Bead		Symbol		The height of the arc shall be half the radius.
Weld		Actual view	Symbolic representation	
Arrow side or this side				
Opposite side or farther side of arrow				
Root gap, 0 mm				

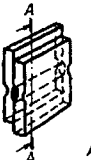
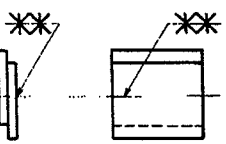
Describing Examples: 19

Cladding		Symbol		Two arcs shall be drawn side by side, with the height of the arcs being half the radius.
Weld		Actual view	Symbolic representation	
Thickness of cladding, 6 mm Width, 50 mm Length, 100 mm				


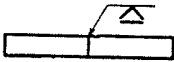
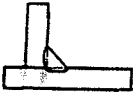


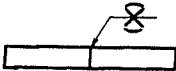



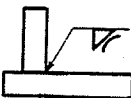
Describing Examples: 20

Spot and Projection		Symbol		A straight line intersecting the reference line at an angle of 90° shall be drawn, and in addition, two straight lines intersecting the said straight line at an angle of 45° shall be drawn.
Weld		Actual view	Symbolic representation	
Spot weld	Where an electrode with a flat surface is used on the arrow side or this side Pitch 75 mm Number of spots, 2			
Spot weld	Where an electrode with a flat surface is used on the opposite side or the farther side of the arrow Pitch, 25 mm Number of spots, 5			
Projection weld	Arrow side or this side			
Projection weld	Opposite side or farther side of arrow			

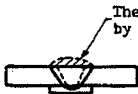

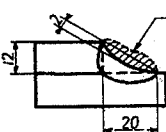
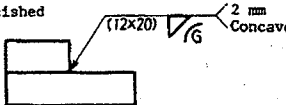
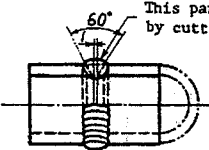
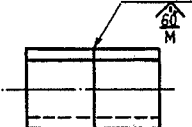
Describing Examples: 21

Seam		Symbol		Two figures of the symbol for a spot weld shall be drawn side by side.
Weld		Actual view	Symbolic representation	
Seam weld				

Describing Examples: 22

Shapes of Weld Surface	Flat	Symbol	—	
	Convex		( )	
	Concave		( )	
Weld	Actual view		Symbolic representation	
Where the shape of the surface of a butt weld or fillet weld is flat				
				
Where the shape of the surface of a butt weld or fillet weld is convex				
				
Where the shape of the surface of a fillet weld is concave				

Describing Examples: 23

Finishing Method for Welds	Chipping	Symbol	C	
	Grinding		G	Grinder finish
	Cutting		M	Machine finish
Weld	Actual view		Symbolic representation	
Butt weld being finished by chipping				
Unequal-legged fillet weld being finished by grinding to a surface of 2 mm concave				
Example of a butt weld of cylinders made by all-round peripheral welding and finished by cutting, the supplementary symbol being omitted				

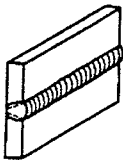
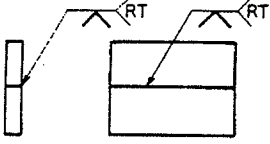
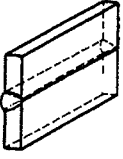
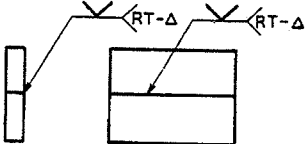
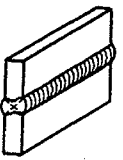
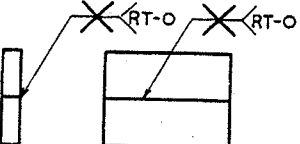
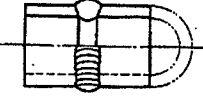
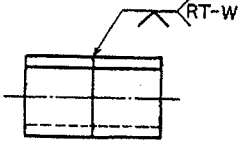
Describing Examples: 24

Field Welding	Symbol		
All-Round Peripheral Welding			
Field All-Round Peripheral Welding			
Weld	Actual view	Symbolic representation	
Field continuous fillet weld			
All-round peripheral continuous fillet weld of cylinders			
Field all-round peripheral continuous fillet weld			

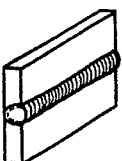
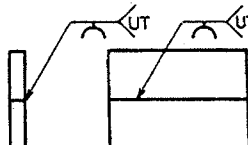
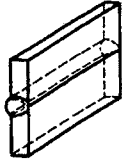
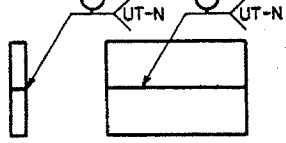
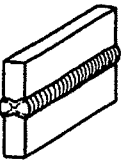
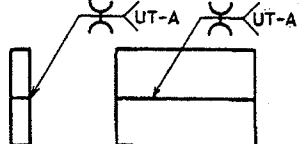
Describing Examples: 25

Combination of Symbols			
Weld	Actual view	Symbolic representation	
Combination of single bevel groove weld and bead weld			
Combination of K groove weld and fillet weld			
Combination of single bevel groove weld and fillet weld			
Combination of single J groove weld, fillet weld, and bead weld			
Combination of double J groove weld, fillet weld, grinding finish, and symbol for concave weld surface			

Describing Examples 26-1

Radiograph Test	General Partial test Whole line test Double wall photographing	Symbol	RT RT-Δ RT-O RT-W	
Content of test	Actual view	Symbolic representation		
General case of radiograph test				
Case of a partial (sampling) radiograph test				
Case where a radiograph test is carried out throughout the whole length				
Case where a radiograph test is carried out on the butt weld of a cylinder by a double wall photographing				

Describing Examples: 26-2

Ultrasonic Flaw Detecting Test	General Normal beam method Angle beam method	Symbol	UT UT-N UT-A	
Content of test	Actual view	Symbolic representation		
General case of an ultrasonic flaw detecting test of butt weld				
Case of normal beam method of an ultrasonic flaw detecting test of butt weld				
Case of angle beam method of an ultrasonic flaw detecting test of butt weld				



Describing Examples: 26-3

Content of test	Actual view	Symbolic representation
Magnetic particle testing		<div> <div>General, Fluorescence detection</div> <div>Symbol</div> <div>MT</div> <div>MT-F</div> </div>
Penetrant testing		<div> <div>General, Fluorescence detection</div> <div>Nonfluorescence detection</div> <div>PT</div> <div>PT-F</div> <div>PT-D</div> </div>
General case of magnetic particle testing		
Case of fluorescence detection of magnetic particle testing		
General case of penetrant testing		
Case of fluorescence detection of a penetrant testing		
Case of non-fluorescence detection of a penetrant testing		

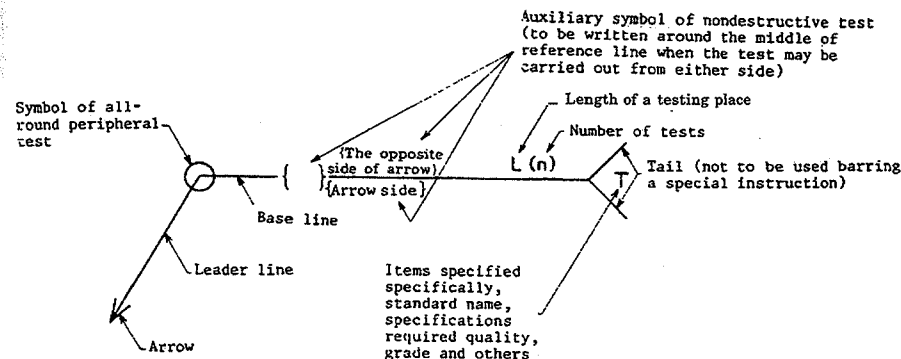
Informative Reference

Cases Where only Nondestructive Test Symbol Shows the Welded Side

Case where only the symbols for nondestructive tests are required independently of the symbols of weld shall be as follows:

a) Describing method

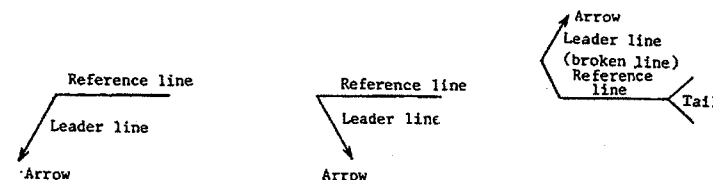
1) The Reference Figure 1 shall apply to the describing method of the symbols of nondestructive tests in accordance with the describing methods of the symbols of weld.



Reference Figure 1

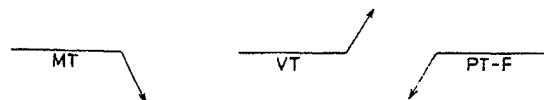
2) The reference line shall generally be horizontal and the tail can be appended as required.

3) The leader line, indicating the test part, shall be a straight line (or broken line) having an angle of approximately 60° to the base line and shall be accompanied by an arrow on the side the leader line is pulled out.

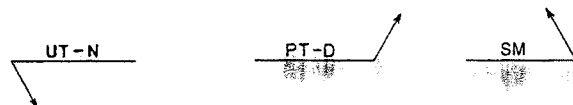


4) The symbol shall be entered, as shown in the following, on the lower side of base line when the test side is on the side of arrow and on the upper side of base line when the test side is on the opposite side of arrow.

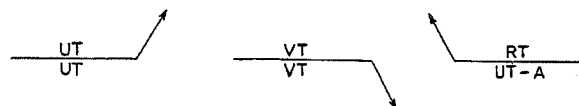
4.1) The Side of Arrow



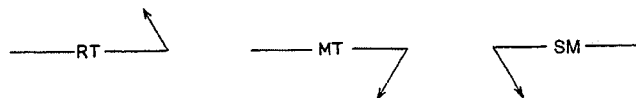
4.2) The Opposite Side of Arrow



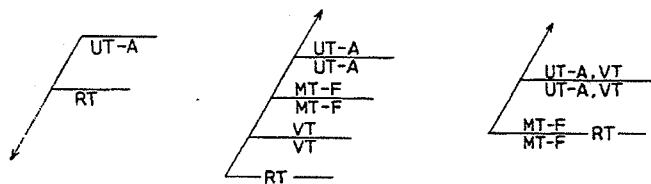
5) When carrying out the tests from both sides, the symbols shall be shown on both sides as follows:



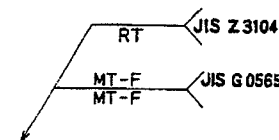
6) When the test may be carried out on either side, the symbols shall be on the base line as follows:



7) When two or more tests are performed, the symbols shall be described as follows:



8) The specifically designated items, standard name, specifications, required quality, grade and the like shall be shown as the tail as follows:



9) The length of an individual portion to be tested and the number of test places shall be entered as follows:



Select three places (each 150 mm long) situated on the test line on the arrow side and carry out the fluorescent magnetic particle testings.

Select ten places (each 250 mm long) situated on the test line on the opposite side of arrow and carry out the radiograph tests.

10) When it is necessary to specify the test method describe as follows:



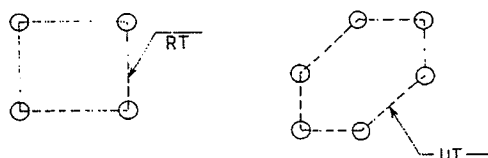
Ultrasonic testing using angle beam method from both sides ( $a$ ,  $a'$ ) of the weld line of the upper surface  
(No illustration for  $a$  and  $a'$  here.)

Ultrasonic testing of Tee joint weld, normal beam method from points of  $a$  and  $a'$   
Angle beam method from  $b$  and  $b'$   
(No illustration for  $a$ ,  $a'$  and  $b$ ,  $b'$  here.)

11) The all-round peripheral test shall be shown as follows:



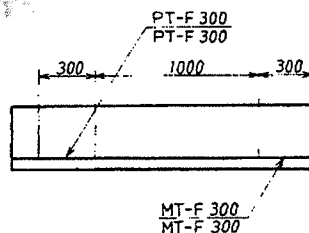
12) To specify a test part (area), enclose it with an angular contour of a dotted line with a  $\odot$  mark on each of its corners as follows:



b) Examples of Description

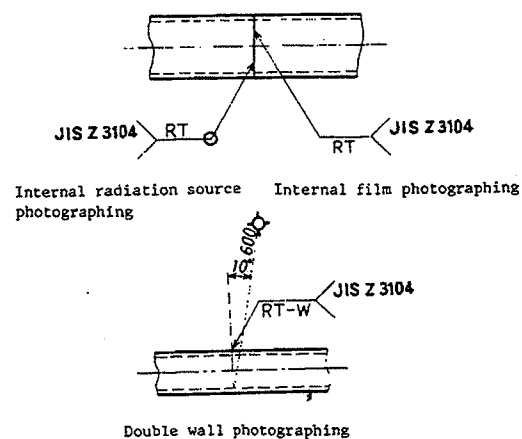
1) Example Showing the Test Position

Unit: mm



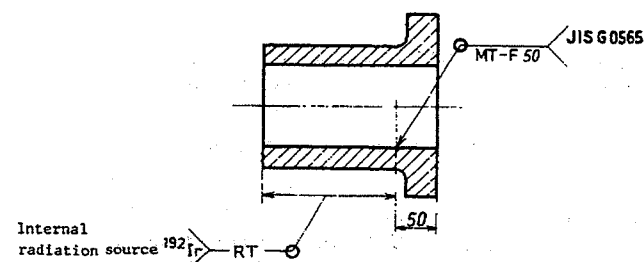
This example shows a fluorescence penetrant testing (left) and a fluorescence magnetic particle testing (right) being carried out at two places each 300 mm in length on the left side and the right side.

2) Example of Photographing of Pipe



Photographing conducted taking the angle of incidence as  $10^\circ$ , and the distance between film and radiation source as 600 mm by using the radiation source iridium ( $^{192}\text{Ir}$ ).

3) Full Circled Test



Photographing by  $^{192}\text{Ir}$  internal radiation source.

Full circled fluorescence magnetic particle test within 50 mm from the end face of flange.

## Annex 1 (informative) Welded, brazed and soldered joints — Symbolic representation on drawings

**Introduction** This Annex 1 (informative) has been prepared by translating ISO 2553, *Welded, brazed and soldered joints — Symbolic representation on drawings*, the revision in 1992 of the 1st edition published in 1974 into Japanese without modifying the technical contents.

This Annex 1 (informative) consists of the following annexes:

Annex A (informative) Example of use of symbolic representation

Annex B (informative) Guide for making the drawings, made already in accordance with ISO 2553: 1974, in accordance with the new system in compliance with ISO 2553:1992

### 1 Scope

This Annex prescribes the rules to be applied for the symbolic representation of welded, brazed and soldered joints on drawings.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Annex. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 128:1982, *Technical drawings — General principles of presentation*.

ISO 544:1989, *Filler materials for manual welding — Size requirements*.

ISO 1302:1978, *Technical drawings — Method of indicating surface texture on drawings*.

ISO 2580:1973, *Covered electrodes for manual arc welding of mild steel and low alloy steel — Code of symbols for identification*.

ISO 3098-1:1974, *Technical drawings — Lettering — Part 1: Currently used characters*.

ISO 3581:1976, *Covered electrodes for manual arc welding of stainless and other similar high alloy steels — Code of symbols for identification*.

ISO 4063:1990, *Welding, brazing, soldering and braze welding of metals — Nomenclature of processes and reference numbers for symbolic representation on*

drawings.

ISO 5817:1992, *Arc-welded joints in steel — Guidance on quality levels for imperfections*.

ISO 6947:1990, *Welds — Working positions — Definitions of angles of slope and rotation*.

ISO 8167:1989, *Projections for resistance-welding*.

ISO 10042:1992, *Arc-welded joints in aluminium and its weldable alloys — Guidance on quality levels for imperfections*.

### 3 General

3.1 Joints may be indicated with the general recommendations for technical drawings. However, for the purpose of simplification, it is advisable to adopt, for usual joints, the symbolic representation described in this Standard.

3.2 The symbolic representation shall give clearly all necessary indications regarding the specific joint to be obtained without over-burdening the drawing with notes or showing an additional view.

3.3 This symbolic representation includes an elementary symbol which may be completed by

— a supplementary symbol;

— a means of showing dimensions;

— some complementary indications (particularly for workshop drawings).

3.4 In order to simplify the drawings as much as possible it is recommended that references be made to specific instructions or particular specifications giving all details of the preparation of edges to be

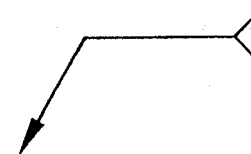
welded, brazed and soldered and/or welding, brazing and soldering procedures, rather than showing these indications on the drawings of the welded parts.

If there are no such instructions, the dimensions relating to the preparation of the edges to be welded, brazed and soldered and/or welding, brazing and soldering procedures can be close to the symbol.

### 4 Symbols

#### 4.1 Elementary symbols

The various categories of joints are characterized by a symbol which, in general, is similar to the shape of the weld to be made.



The symbol shall not be taken to prejudice the process to be employed.

The elementary symbols are shown in Annex 1 Table 1.

If the joint should not be specified but only be represented that the joint will be welded, brazed or soldered, the following symbol shall be used:

Annex 1 Table 1 Elementary symbols

No.	Designation	Illustration	Symbol
1	Butt weld between plates with raised edges <sup>1)</sup> ; edge flanged weld /USA/ (the raised edges being melted down completely)		
2	Square butt weld		
3	Single-V butt weld		
4	Single-bevel butt weld		
5	Single-V butt weld with broad root face		
6	Single-bevel butt weld with broad root face		
7	Single-U butt weld (parallel or sloping sides)		

No.	Designation	Illustration	Symbol
8	Single-J butt weld		
9	Backing run; back or backing weld /USA/		
10	Fillet weld		
11	Plug weld; plug or slot weld /USA/		
12	Spot weld		
13	Seam weld		
14	Steep-flanked single-V butt weld		
15	Steep-flanked single-bevel butt weld		

No.	Designation	Illustration	Symbol
16	Edge weld		
17	Surfacing		
18	Surface joint		
19	Inclined joint		
20	Fold joint		

1) Butt welds between plates with raised edges (symbol 1) not completely penetrated are symbolized as square butt welds (symbol 2) with the weld thickness  $s$  shown (see Annex 1 Table 5)

## 4.2 Combinations of elementary symbols

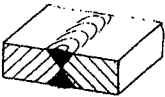

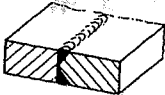

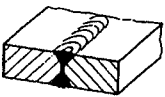

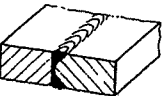



When required, combinations of elementary symbols can be used.

The elementary symbols are to be combined for welding from both sides in such a manner arranging the applicable elementary symbols symmetrical to the reference line. Typical examples are given in

Annex 1 Table 2 and applications for symbolic representation in Annex A Table A.2.

**NOTE** Annex 1 Table 2 gives a collection of combinations of elementary symbols for symmetrical welds. For the symbolic representation the elementary symbols are arranged symmetrical at the reference line (see Annex A Table A.2). For the use of symbols out of symbolic representation the symbols may be represented with the reference line.

Annex 1 Table 2 Combined symbols for symmetrical welds (examples)

Designation	Illustration	Symbol
Double-V butt weld (X weld)		
Double-bevel butt weld		
Double-V butt weld with broad root face		
Double-bevel butt weld with broad root face		
Double-U butt weld		

## 4.3 Supplementary symbols

Supplementary symbols may be completed by a symbol characterizing the shape of the external surface or the shape of the weld.







The recommended supplementary symbols are given in Annex 1 Table 3.

The absence of a supplementary symbol means that the shape of the weld surface does not need to be indicated precisely.

Examples of combinations of elementary and supplementary symbols are given in Annex 1 Table 4 and Annex A Table A.3.

**NOTE** Although it is not forbidden to associate several symbols, it is better to represent the weld on a separate sketch when symbolization becomes too difficult.

Annex 1 Table 3 Supplementary symbols

Shape of weld surface or weld	Symbol
a) Flat (usually finished flush)	
b) Convex	
c) Concave	
d) Toes shall be blended smoothly	
e) Permanent backing strip used	
f) Removable backing strip used	

Annex 1 Table 4 gives examples of application of the supplementary symbols.

Annex 1 Table 4 Examples of application of supplementary symbols

Designation	Illustration	Symbol
Flat (flush) single-V butt weld		
Convex double-V weld		
Concave fillet weld		
Flat (flush) single-V butt weld with flat (flush) backing run		
Single-V butt weld with broad root face and backing run		
Flush finished single-V butt weld		
Fillet weld with smooth blended face		

<sup>2)</sup> Symbol in accordance with ISO 1302; instead of this symbol the main symbol  $\sqrt{\quad}$  can be used.

## 5 Position of the symbols on drawings

### 5.1 General

The symbols covered by these rules form only part of the complete method of representation (see Annex 1 Figure 1), which comprises in addition to the symbol (3) itself:

- an arrow line (1) per joints (see Annex 1 Figures 2 and 3);
- a dual reference line, consisting of two parallel lines, one continuous and one dashed (2) (exception, see note 1);
- a certain number of dimensions and conventional signs.

#### NOTES

1 The dashed line can be drawn either above or beneath the continuous line (see also 5.5 of Annex 1 and Annex B).

For symmetrical welds, the dashed line is unnecessary and should be omitted.

2 The thickness of lines for arrow line, reference line, symbol and lettering shall be in accordance with the thickness of line for dimensioning in accordance with ISO 128 and ISO 3098-1, respectively.

The purpose of the following rules is to define the location of welds by specifying

- the position of the arrow line;
- the position of the reference line;
- the position of the symbol.

The arrow line and the reference line form the complete reference mark. If details are given, e.g. for processes, acceptance levels, position, filler and auxiliary materials (see clause 7), a tail shall be added at the end of the reference line.

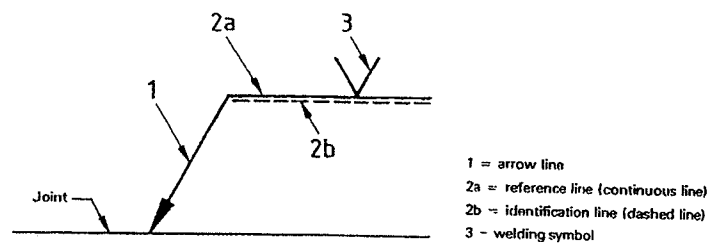
### 5.2 Relationship between the arrow line and the joint

The examples given in Annex 1 Figure 2 and Annex 1 Figure 3 explain the meaning of the terms

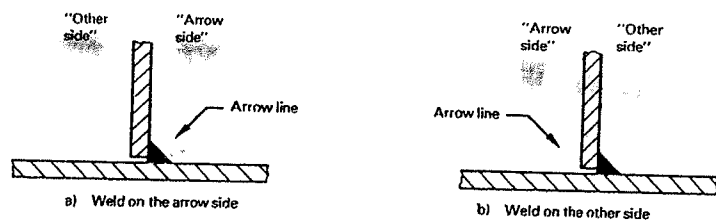
- "Arrow side" of the joint;
- "Other side" of the joint.

NOTE 1 The position of the arrow in these figures is chosen for purposes of clarity. Normally, it would be placed immediately adjacent to the joint.

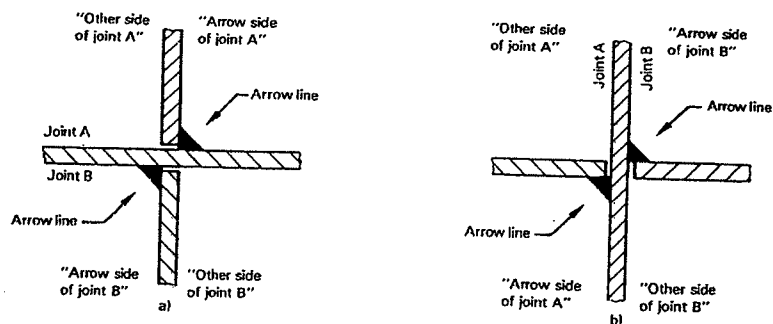
NOTE 2 See Annex 1 Figure 2.



Annex 1 Figure 1 Method of representation



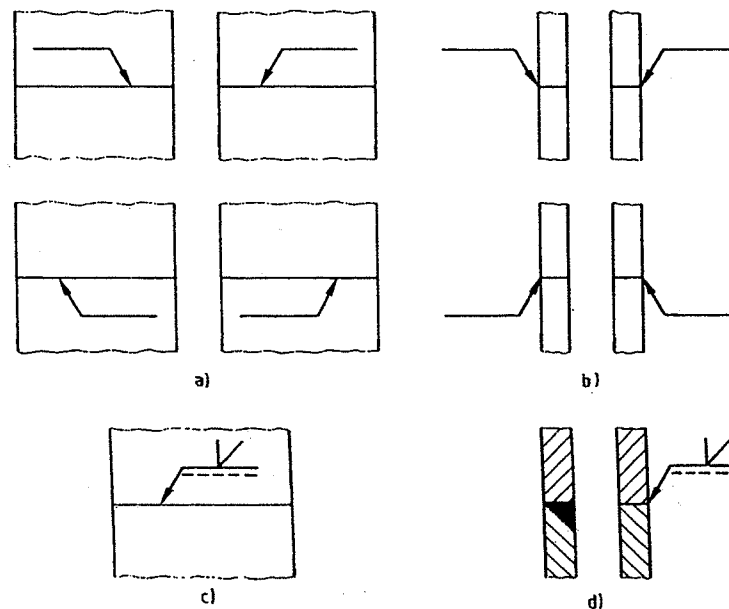
Annex 1 Figure 2 T joint with one fillet weld



Annex 1 Figure 3 Cruciform joint with two fillet welds

### 3.3 Position of the arrow line

The position of the arrow line with respect to the weld is generally of no special significance [see Annex 1 Figures 3 a) and 4 b)]. However, in the case of welds of types 4, 5 and 8 (see Annex 1 Table 1), the arrow line shall point towards the plate which is prepared [see Annex 1 Figures 3 c) and 4 d)].



Annex 1 Figure 4 Position of the arrow line

### The arrow line

- joins one end of the continuous reference line such that it forms an angle with it;
- shall be completed by an arrow head.

### 5.4 Position of the reference line

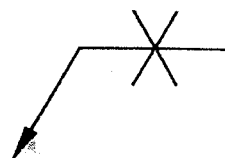
The reference line shall preferably be drawn parallel to the bottom edge of the drawing, or if impossible perpendicular.



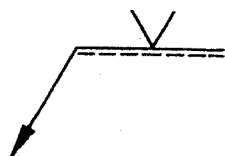
## 5.5 Position of the symbol with regard to the reference line

The symbol is to be placed either above or beneath the reference line, in accordance with the following regulation:

- The symbol is placed on the continuous line side of the reference line if the weld (weld face) is on the arrow side of the joint [see Annex 1 Figure 5 a)].



For symmetrical welds only



a) To be welded on the arrow side



b) To be welded on the other side

Annex 1 Figure 5 Position of the symbol according to the reference line

## 6 Dimensioning of welds

### 6.1 General rules

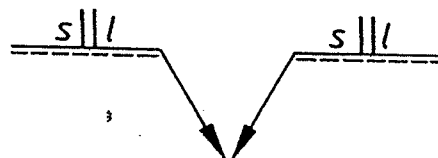
Each weld symbol may be accompanied by a certain number of dimensions.

These dimensions are written as follows, in accordance with Annex 1 Figure 6:

- a) the main dimensions relative to the cross-section are written on the left-hand side of (i.e. before) the symbol;

- b) longitudinal dimensions are written on the right-hand side of (i.e. after) the symbol.

The method of indicating the main dimensions is defined in Annex 1 Table 5. The rules for setting down these dimensions are also given in this table.



Annex 1 Figure 6 Examples of the principle

- The symbol is placed on the dashed line side if the weld (weld face) is on the other side of the joint [see Annex 1 Figure 5 b)].

NOTE In the case of spot welds made by projection welding, the projection surface is to be considered as the external surface of the weld.

Other dimensions of less importance may be indicated if necessary.

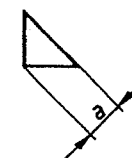
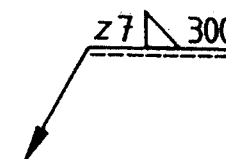
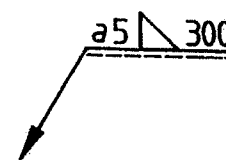
## 6.2 Main dimensions to be shown

The dimension that locates the weld in relation to the edge of the sheet shall not appear in the symbolization but on the drawing.

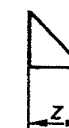
- 6.2.1 The absence of any indication following the symbol signifies that the weld is to be continuous over the whole length of the workpiece.

- 6.2.2 In the absence of any indication to the contrary, butt welds are to have complete penetration.

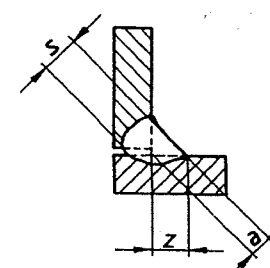
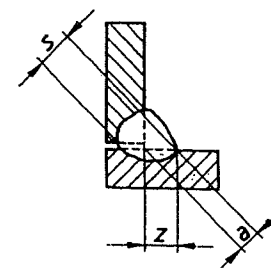
- 6.2.3 For the fillet welds there are two methods to indicate dimensions (see Annex 1 Figure 7a). Therefore, the letters a or z shall always be placed in front of the value of the corresponding dimension (see Annex 1 Figure 7b).



$$z = a\sqrt{2}$$

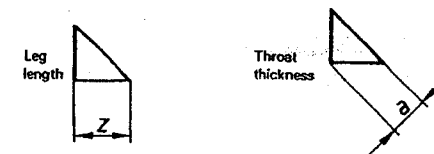


Annex 1 Figure 7a Method of indicating dimensions for fillet welds



NOTE — For deep penetration of fillet welds, the dimensions are indicated as  $\sqrt{2}a$  or  $\sqrt{2}z$ , for example.

Annex 1 Figure 8 Methods of indicating dimensions for deep penetration of fillet welds

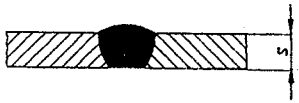
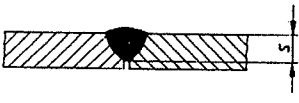

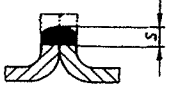
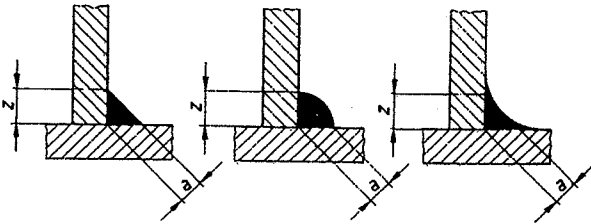
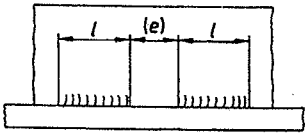










Annex 1 Figure 7b Disposition of the letters a or z

To indicate deep penetration of fillet welds the throat thickness is  $x$ , see Annex 1 Figure 8.

- 6.2.4 In the case of plug or slot welds with bevelled edges, it is the dimension at the bottom of the hole which shall be taken into consideration.

Annex 1 Table 5 Main dimensions

No.	Designation of welds	Illustration
1	Butt weld	
		
		
2	Butt weld between plates with raised edges	
3	Continuous fillet weld	
4	Intermittent fillet weld	

Definition	Inscription
$s$ : minimum distance from the surface of the part to the bottom of the penetration, which cannot be greater than the thickness of the thinner part.	 (see 6.2.1 and 6.2.2)
	 (see 6.2.1)
	 (see 6.2.1)
$s$ : minimum distance from the external surface of the weld to the bottom of the penetration.	 [see 6.2.1 and footnote 1) to Annex 1 Table 1]
$a$ : height of the largest isosceles triangle that can be inscribed in the section.	
$z$ : side of the largest isosceles triangle that can be inscribed in the section.	 (see 6.2.1 and 6.2.3)
$l$ : length of weld (without end craters). $(e)$ : distance between adjacent weld elements. $n$ : number of weld elements.	 $n \times l(e)$
$a$ : $z$ : } (see No. 3)	 $n \times l(e)$ (see 6.2.3)

Annex 1 Table 5 Main dimensions (concluded)

No.	Designation of welds	Illustration
5	Staggered intermittent fillet weld	
6	Plug or slot weld	
7	Seam weld	
8	Plug weld	
9	Spot weld	

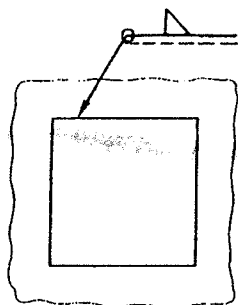
Definition	Inscription
<p>(see No. 4)</p> <p>(see No. 3)</p>	$\frac{a}{a} \triangleright \frac{n \times l}{n \times l} \left[ \begin{matrix} (e) \\ (e) \end{matrix} \right]$ $\frac{z}{z} \triangleright \frac{n \times l}{n \times l} \left[ \begin{matrix} (e) \\ (e) \end{matrix} \right]$ <p>(see 6.2.3)</p>
<p>(see No. 4)</p> <p>width of slot</p>	$c \sqcap n \times l (e)$ <p>(see 6.2.4)</p>
<p>(see No. 4)</p> <p>width of weld</p>	$c \ominus n \times l (e)$
<p>(see No. 4)</p> <p>spacing</p> <p>diameter of hole</p>	$d \sqcap n (e)$
<p>(see No. 4)</p> <p>spacing</p> <p>diameter of spot</p>	$d \bigcirc n (e)$

## 7 Complementary indications

Complementary indications may be necessary in order to specify some other characteristics of welds. For example:

### 7.1 Peripheral welds

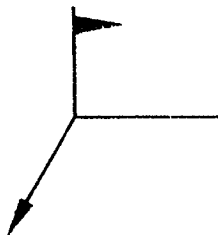
When the weld is to be made all around a part, the symbol is a circle, as shown in Annex 1 Figure 9.



Annex 1 Figure 9 Indication of peripheral weld

### 7.2 Field or site welds

A flag is to be used to indicate the field or site weld, as shown in Annex 1 Figure 10.



Annex 1 Figure 10 Indication of field or site weld

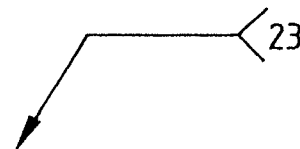
### 7.3 Indication of the welding process

If required, the welding process is to be symbolized by a number written between the two branches of a

fork, at the end of the reference line remote from the reference line.

Annex 1 Figure 11 gives an example of its use.

The list giving the correspondance between numbers and the process is given in ISO 4063.



Annex 1 Figure 11 Indication of welding process

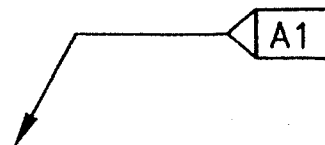
### 7.4 Sequence of information in the tail of the reference mark

The information for joints and the dimensions can be supplemented by further information in the tail, in the following order:

- process (e.g. in accordance with ISO 4063);
- acceptance level (e.g. in accordance with ISO 5817 and ISO 10042);
- working position (e.g. in accordance with ISO 6947);
- filler materials (e.g. in accordance with ISO 544, ISO 2560, ISO 3581).

The individual items are to be separated by / (solidus).

In addition, a closed tail is possible which indicates specific instruction (e.g. procedure sheet) by a reference sign, see Annex 1 Figure 12.

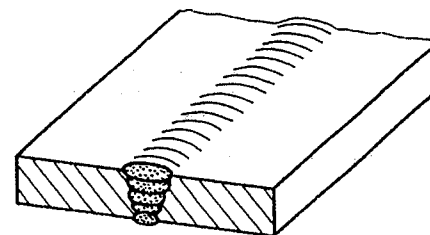


Annex 1 Figure 12 Reference information

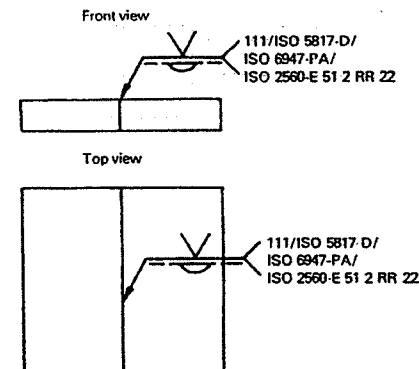
## EXAMPLE

Single-V butt weld with backing run (see Annex 1 Figure 13) produced by manual metal-arc welding (reference number 111 in accordance with ISO 4063), required acceptance level in accordance with ISO 5817, flat position PA in accordance with ISO 6947, covered electrode ISO 2560-E 51 2 RR 22.

### Illustration



### Symbolic representation

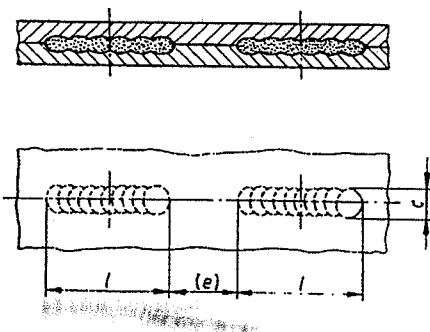


Annex 1 Figure 13 Single-V butt weld with backing run

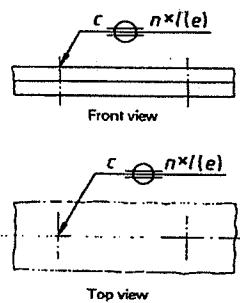
## 8 Examples for application of spot and seam joints

In the case of seam and spot joints (welded, brazed or soldered), joints are made at the interface between the two lapped parts or by melt-through of one of the two parts (see Annex 1 Figures 14 and 15).

Illustration



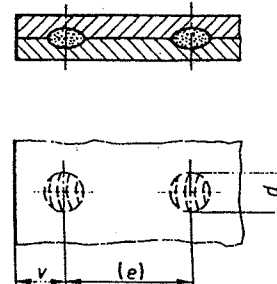
Symbolic representation



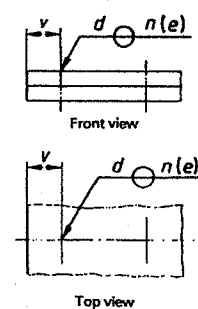
$c$  = width of seam weld  
 $l$  = length of seam weld  
 $e$  = weld distance

Annex 1 Figure 14 Intermittent resistance seam welds

Illustration

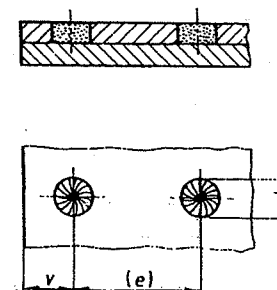


Symbolic representation

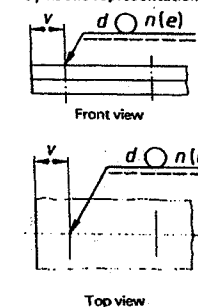


a) Resistance spot welds

Illustration

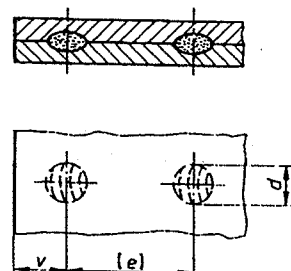


Symbolic representation

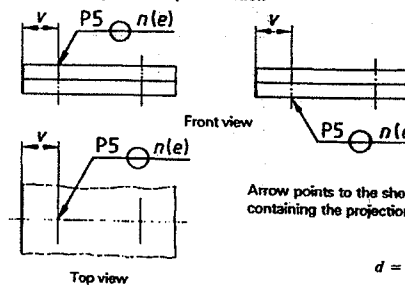


b) Fusion-welded spot welds

Illustration



Symbolic representation



Arrow points to the sheet containing the projection

$d$  = spot diameter  
 $v$  = end distance  
 $e$  = pitch

NOTE — This is an example for the representation of a projection in accordance with ISO 8167 (P) with a projection diameter  $d = 5$  mm,  $n$  weld elements with distance  $e$  between them.

c) Projection welds


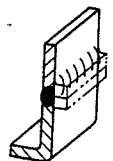
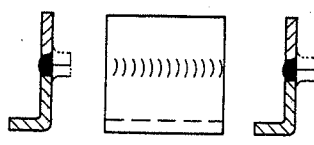
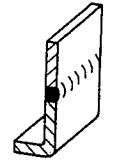
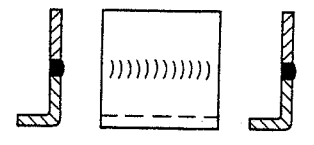

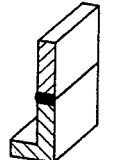
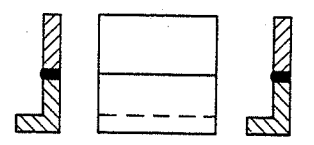
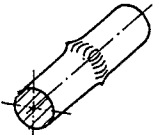

Annex 1 Figure 15 Spot welds

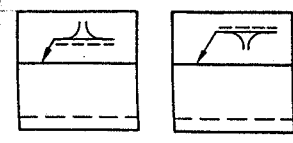
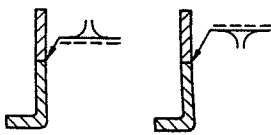
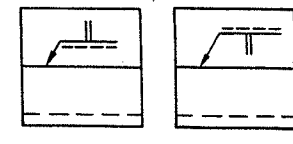
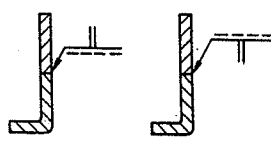
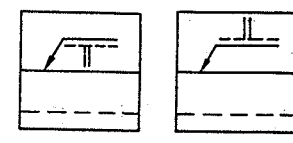
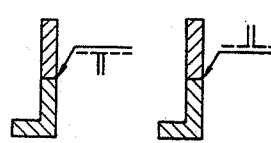
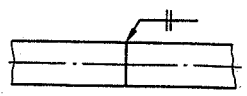
# Annex A (informative) Examples of use of symbols

This Annex A (informative) gives examples of the use of symbols shown in Annex A (informative) of ISO 2553:1987. Welded, brazed and soldered joints — Symbolic representation on drawings and does not constitute a part of the provisions.

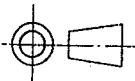
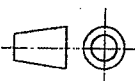

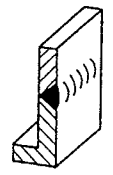
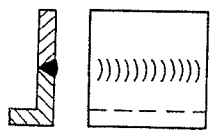
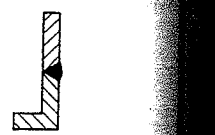
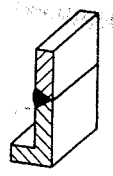
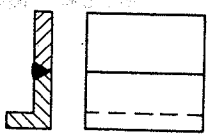


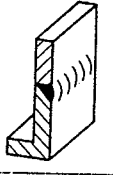
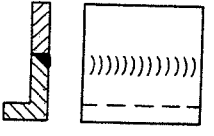
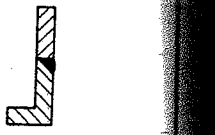
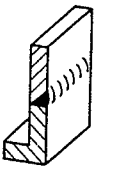
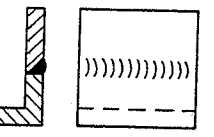
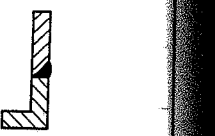
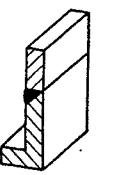
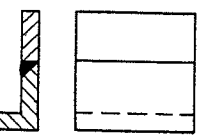
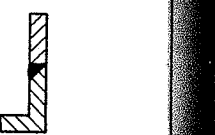
A.1 Annex A Tables A.1 to A.4 give some examples of the use of symbols. The representations shown are given simply for explanation.

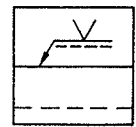
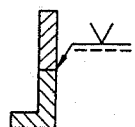

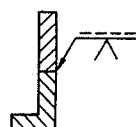
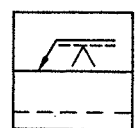
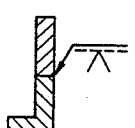
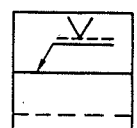
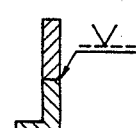
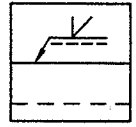
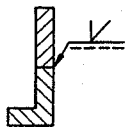
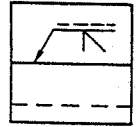
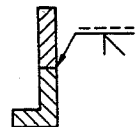
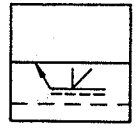
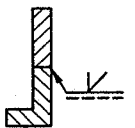
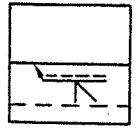
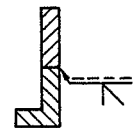
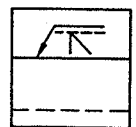
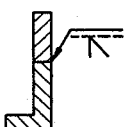
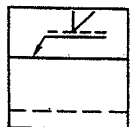
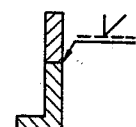
Annex A Table A.1 Examples of the use of elementary symbols

No.	Designation Symbol (Numbers refer to Annex 1 Table 1)	Illustration	Representation
1	Butt weld between plates with raised edges 		
2			
3	Square butt weld 		
4			

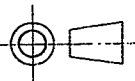
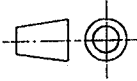

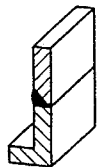
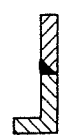
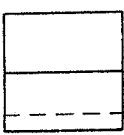

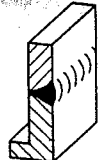

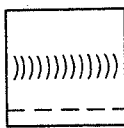
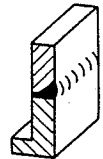

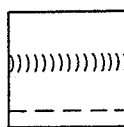

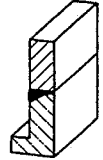

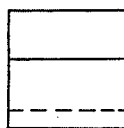

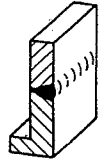

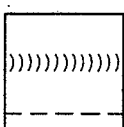
Symbolization	
a	b
	
	
	
	

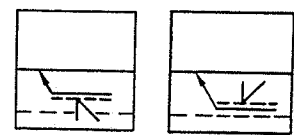
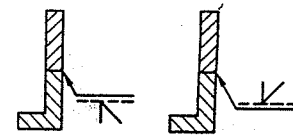
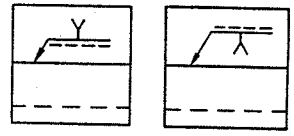
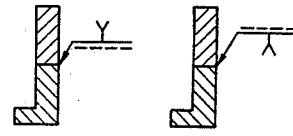
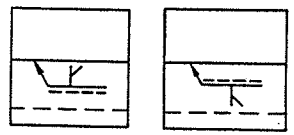
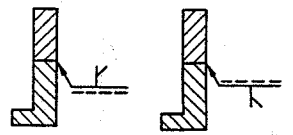
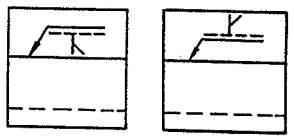
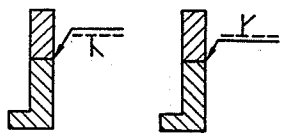
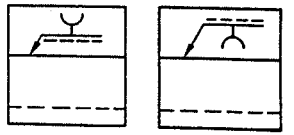
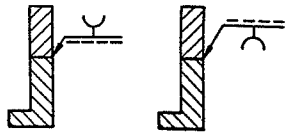
Annex A Table A.1 Examples of the use of elementary symbols (continued)

No.	Designation Symbol (Numbers refer to Annex 1 Table 1)	Illustration	Representation	
				
5	Single-V butt weld 			
6				
7	Single-bevel butt weld 			
8				
9				

Symbolization	
a	b
	
	
	
	
	
	
	
	
	
	

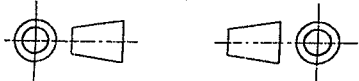

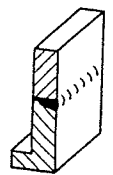
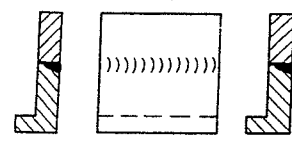
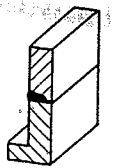
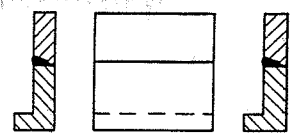

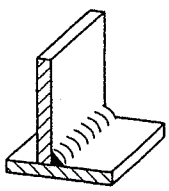
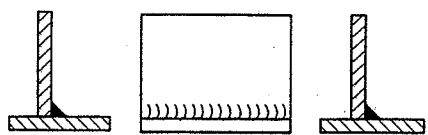
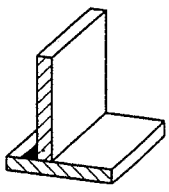
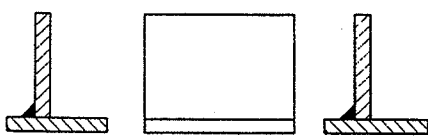
Annex A Table A.1 Examples of the use of elementary symbols (continued)

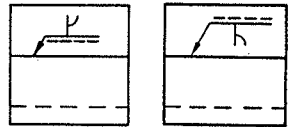
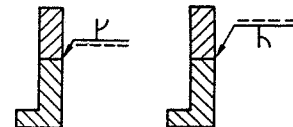
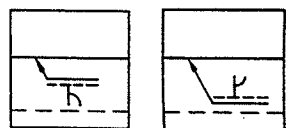

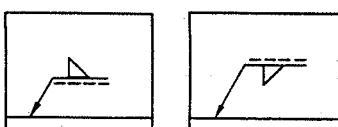
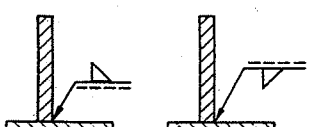
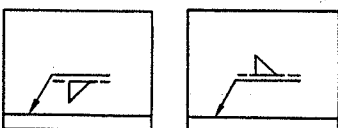
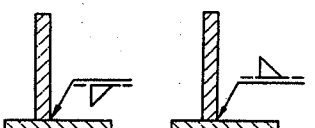
No.	Designation Symbol (Numbers refer to Annex 1 Table 1)	Illustration	Representation	
				
10	Single-bevel butt weld 			
11	Single-V butt weld with broad root face 			
12	Single-bevel butt weld with broad root face			
13				
14	Single-U butt weld 			

Symbolization	
a	b
	
	
	
	
	

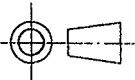
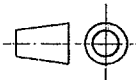

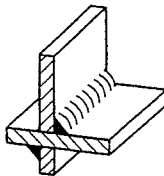
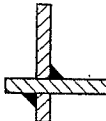
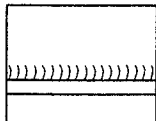
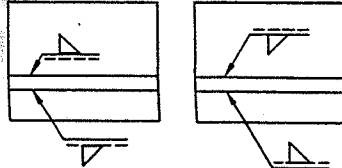
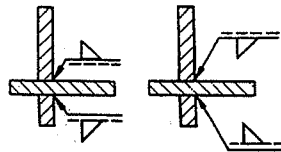
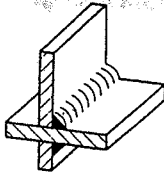
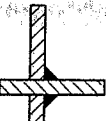
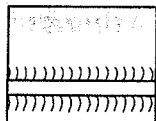
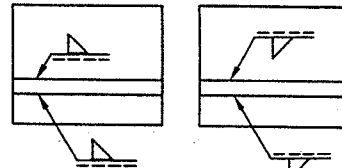
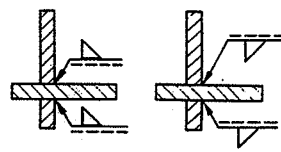
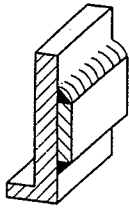

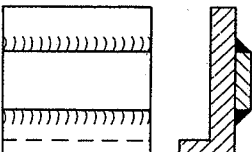
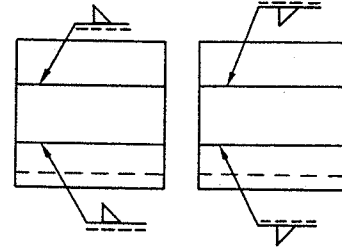
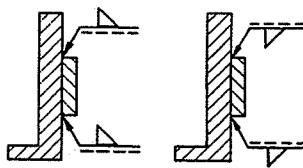


Annex A Table A.1 Examples of the use of elementary symbols (continued)

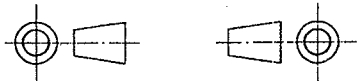
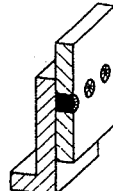
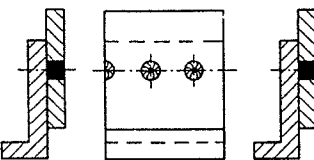
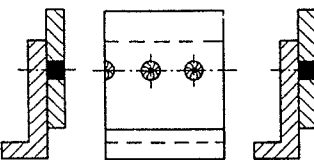
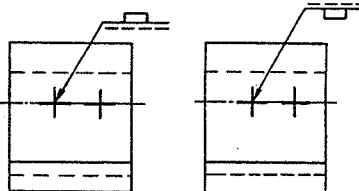
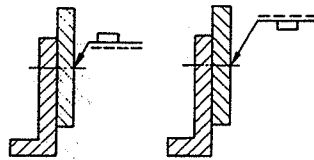
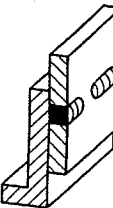
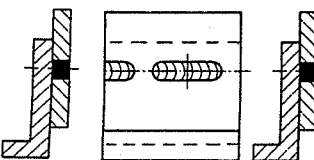
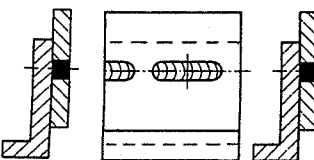
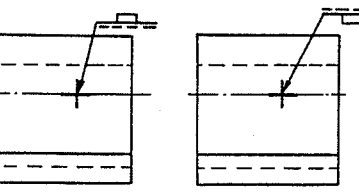
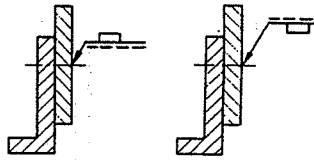
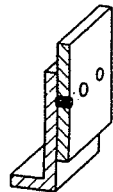
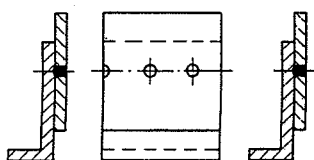
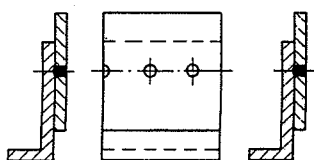
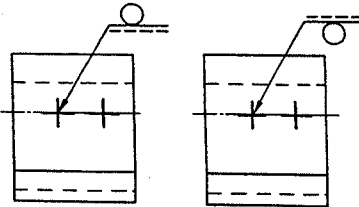
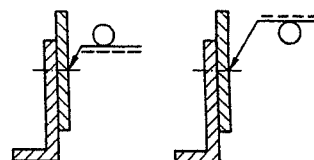
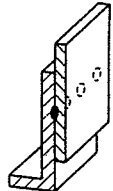
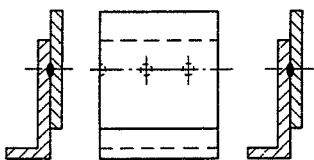
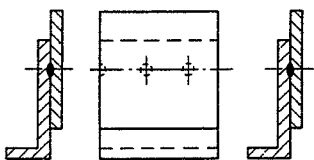
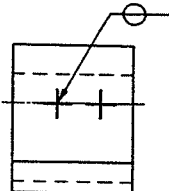
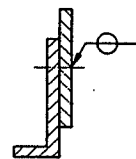
No.	Designation Symbol (Numbers refer to Annex 1 Table 1)	Illustration	Representation	
				
15	Single-J butt weld  8			
16				
17	Fillet weld  10			
18				

Symbolization	
a	b
	
	
	
	


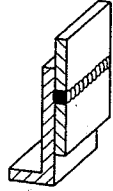
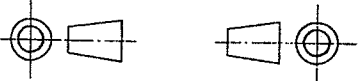
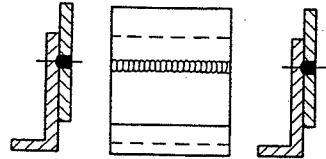
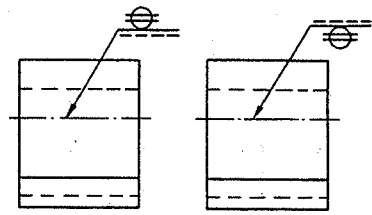
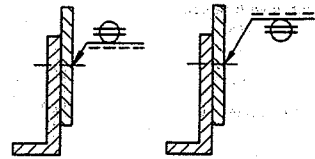
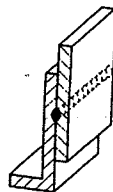
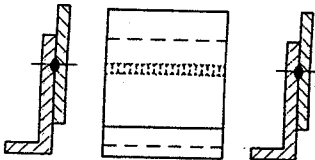
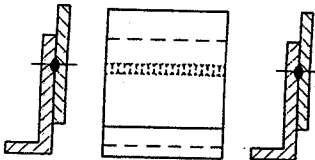
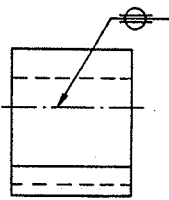
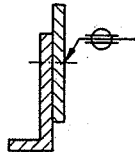
Annex A Table A.1 Examples of the use of elementary symbols (continued)

No.	Designation Symbol (Numbers refer to Annex 1 Table 1)	Illustration	Representation		Symbolization	
					a	b
19	Fillet weld 					
20						
21						

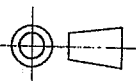
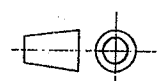


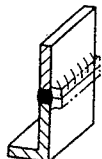
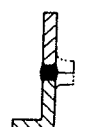
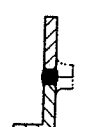

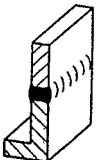
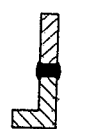
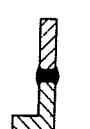

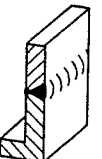
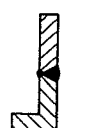
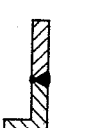

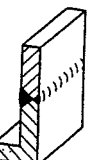
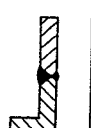
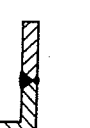

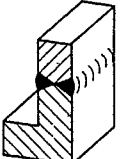
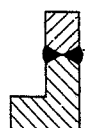
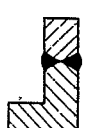
Annex A Table A.1 Examples of the use of elementary symbols (continued)

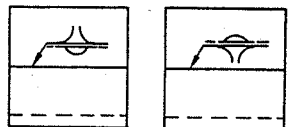
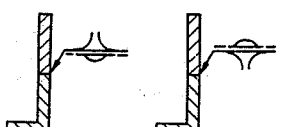
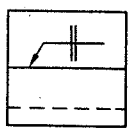
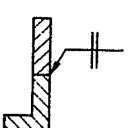
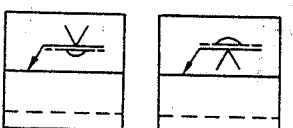
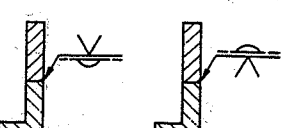
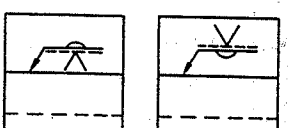
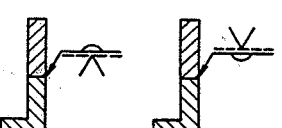
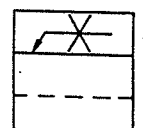
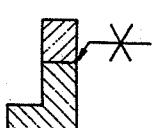
No.	Designation Symbol (Numbers refer to Annex 1 Table 1)	Illustration	Representation		Symbolization	
					a	b
22	Plug weld 11					
23						
24	Spot weld 12					
25						

Annex A Table A.1 Examples of the use of elementary symbols (*concluded*)

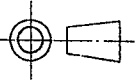
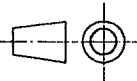
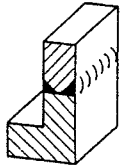
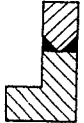
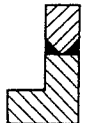
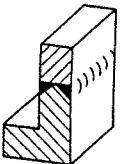
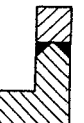
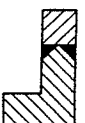
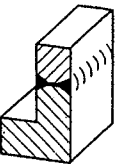
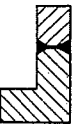
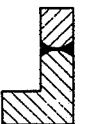
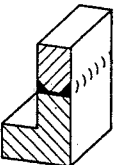
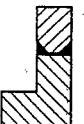
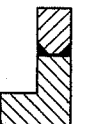
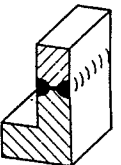
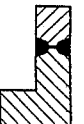
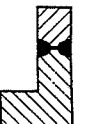
No.	Designation Symbol (Numbers refer to Annex 1 Table 1)	Illustration	Representation		Symbolization	
					a	b
26	Seam weld  13					
27						

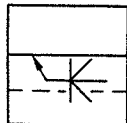
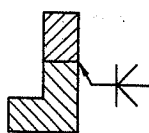
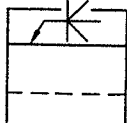
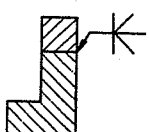
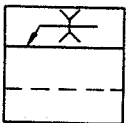
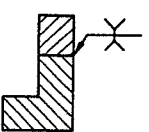
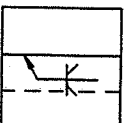
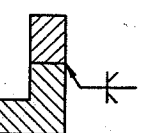
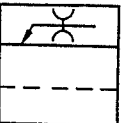
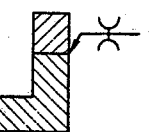
Annex A Table A.2 Examples of combinations of elementary symbols

No.	Designation Symbol (Numbers refer to Annex 1 Table 1)	Illustration	Representation	
				
1	Butt weld between plates with raised edges  and backing run  1-9			
2	Square butt weld  welded from both sides 2-2			
3	Single-V butt weld  and backing run			
4	 3-9			
5	Double-V butt weld  (X weld) 3-3			


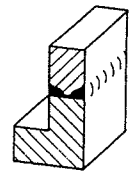
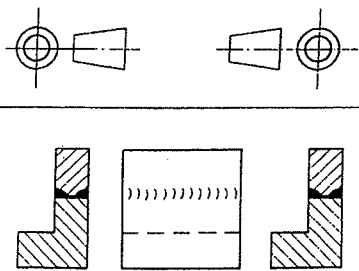


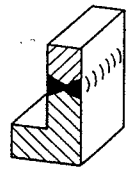
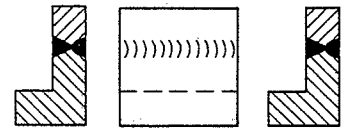

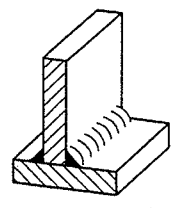
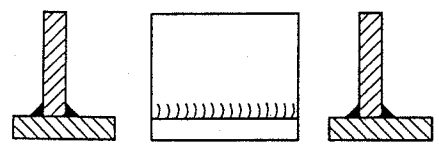

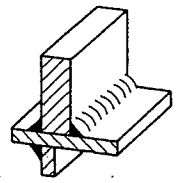
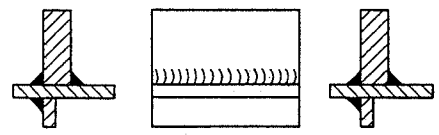
Symbolization	
a	b
	
	
	
	
	

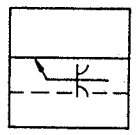
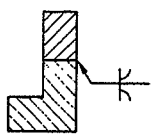
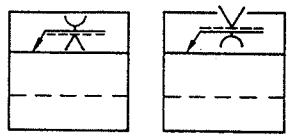
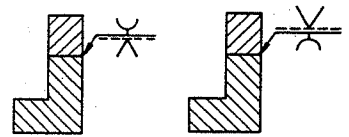
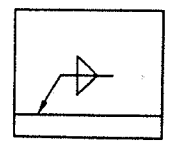
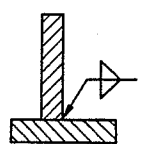
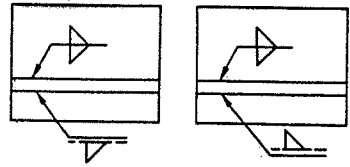
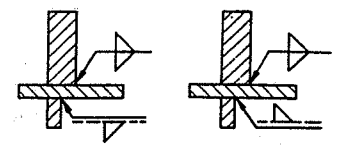
Annex A Table A.2 Examples of combinations of elementary symbols (continued)

No.	Designation Symbol (Numbers refer to Annex 1 Table 1)	Illustration	Representation	
				
6	Double bevel butt weld			
7	$\nabla 4$ (K weld) 4-4			
8	Double V butt weld with broad root face $\nabla 5$ 5-5			
9	Double bevel butt weld with broad root face $\nabla 6$ 6-6			
10	Double U butt weld $\nabla 7$ 7-7			

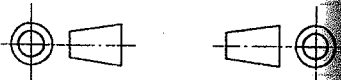

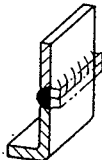
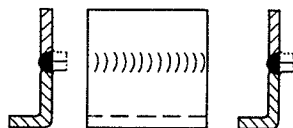

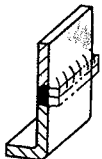


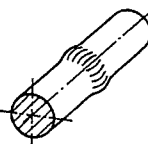


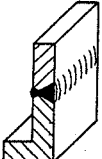


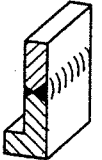
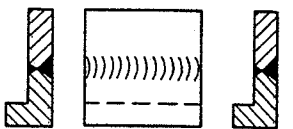
Symbolization	
a	b
	
	
	
	
	

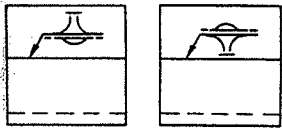
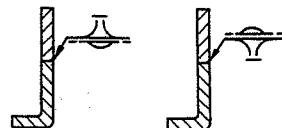
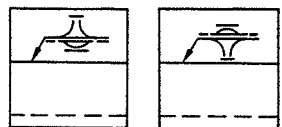
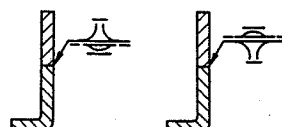
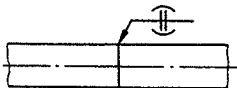
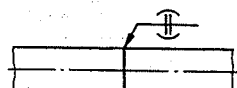
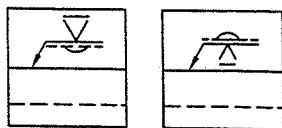
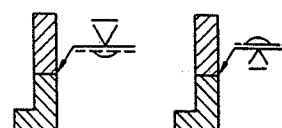
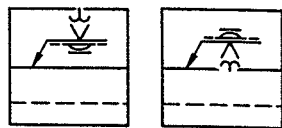
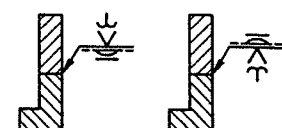
Annex A Table A.2 Examples of combinations of elementary symbols (concluded)

No.	Designation Symbol (Numbers refer to Annex 1 Table 1)	Illustration	Representation
11	Double J butt weld  8 8-8		
12	Single V butt weld  3 and single U butt weld  7 3-7		
13	Fillet weld  10 and fillet weld		
14	 10 10-10		

Symbolization	
a	b
	
	
	
	

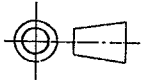
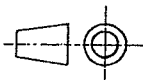

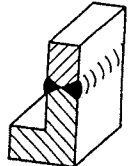
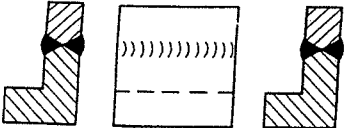

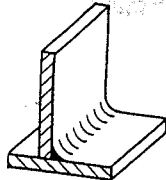
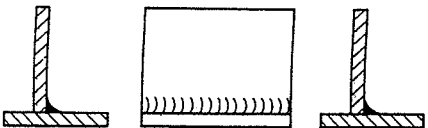

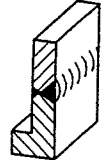
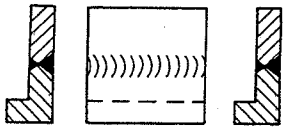
Annex A Table A.3 Examples of combinations of elementary and supplementary symbols

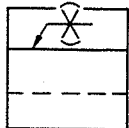
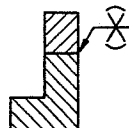
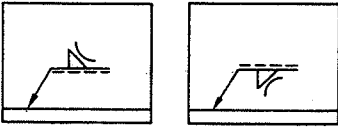
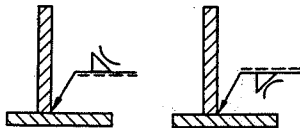
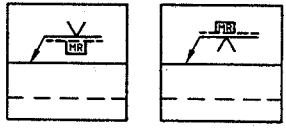
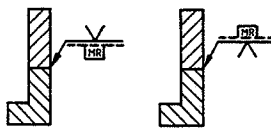
No.	Symbol	Illustration	Representation	
				
1				
2				
3				
4				
5				

Symbolization	
a	b
	
	
	
	
	


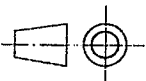
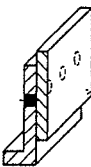
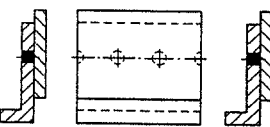

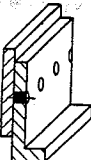
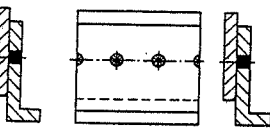

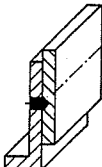
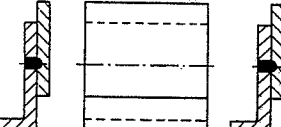

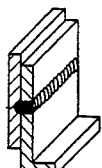
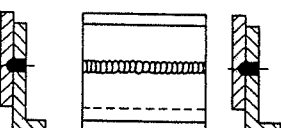

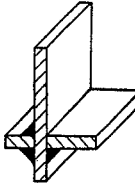
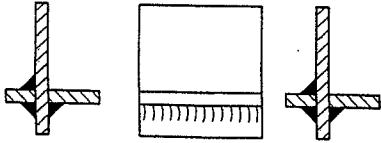
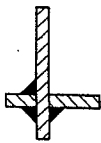



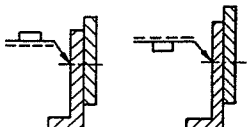
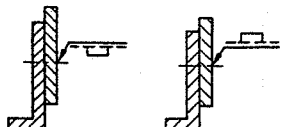
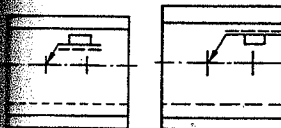
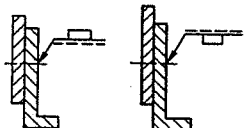
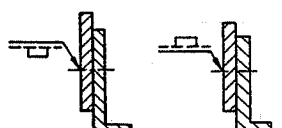

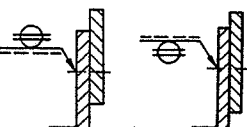
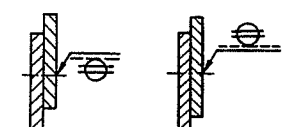
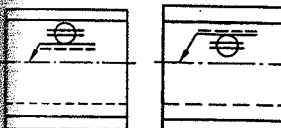
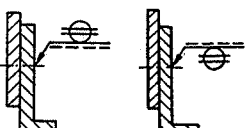
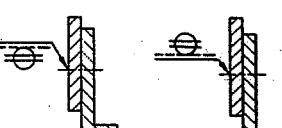
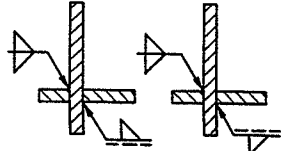
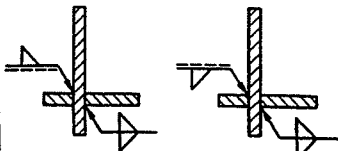
Annex A Table A.3 Examples of combinations of elementary and supplementary symbols (concluded)

No.	Symbol	Illustration	Representation	
				
6				
7				
8				

Symbolization	
a	b
	
	
	

Annex A Table A.4 Examples of exceptional cases

No.	Illustration	Representation	
			
1			
2			
3			
4			
5			

Symbolization		
a	b	incorrect
		
		
		
		
not recommended		

Annex A Table A.4 Examples of exceptional cases (concluded)

No.	Illustration	Representation
6		
7		
8		

NOTE When the arrow cannot point to a joint, symbolization cannot be used.

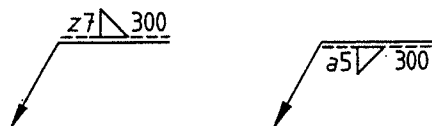
Symbolization		
a	b	incorrect
not recommended		
not recommended		

## Annex B (informative)

**Guidance for converting drawings made in accordance with ISO 2553:1974 into the new system in accordance with ISO 2553:1991**

As an interim solution for converting old drawings made in accordance with ISO 2553:1974, *Welds -- Symbol representation on drawings*, the following examples show acceptable methods. This shall, however, be considered as a provisional solution only during the change-over period.

B.1 For new drawings, the dual-reference line ----- shall always be used.



NOTE When converting drawings made to one of the methods E or A in ISO 2553:1974 into this new system, it is especially important for fillet welds to add the letter *a* or *z* in front of that dimension as the use of dimensioning leg length (*z*) or throat thickness (*a*) has been connected with the position of weld symbol on the reference line.

**Annex 2 (informative) Comparison table between JIS and corresponding International Standard**

JIS Z 3021:2000 Symbolic Representation of Welds				ISO 2553:1992 Welded, brazed and soldered joints — Symbolic representation on drawings		JIS Z 3021:2000 Symbolic Representation of Welds	
(1) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: Indication method:	(V) Justification for the technical deviation and future measures	
Clause	Content		Clause	Content			
1	Scope	ISO 2553	1	Scope	Classification by clause by clause IDT — — JIS are added.	JIS are added for the systematic sake.	
2	Normative references		2	Normative references			
3	Definitions		3	General			
4	Symbols for welds		4	Symbols			
<p>a) The number of basic symbols is larger in ISO.</p> <p>b) The basic symbols are different between V shape of large root face and the basic symbol for V groove.</p> <p>c) the "combinations of elementary symbols" specified in ISO are not included in JIS.</p>						<p>① JIS Z 3021 Welding symbols which was developed in 1955 on the basis of JIS No. 353 (Electric arc welding joint and symbols) that was to say it was developed in accordance with AWS A2.4 Symbols for welding and nondestructive testing.</p>	

JIS Z 3021:2000 Symbolic Representation of Welds				ISO 2553:1992 Welded, brazed and soldered joints — Symbolic representation on drawings	
(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard	(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: Indication method:	(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	
4 (concluded)	Symbols for welds	ISO 2553	4	Symbols	<p>② In the revision in 1981, a part of ISO 2553:1974 was taken but, by reason of the under-mentioned ③, the following particulars are different:</p> <ul style="list-style-type: none"> <li>The number of basic symbols and supplementary symbols;</li> <li>the symbols for spot welding and seam welding</li> <li>the angle made by the reference line and the arrow;</li> <li>the methods of representation of symbols.</li> </ul> <p>③ JIS welding symbols have been applied to the national welding design and welding work and management for a long time since its development and, therefore, their hasty conformity is considered to bring about confusion between the designer and the operators in the light of their using results and popularity.</p>
5	Method of symbolic representation of welds		5	Position of the symbols on drawings	
5.1	Explanatory line		6	Dimensioning of welds	

JIS Z 3021:2000 Symbolic Representation of Welds				ISO 2553:1992 Welded, brazed and soldered joints — Symbolic representation on drawings	
(I) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard	(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: Indication method:	(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content	
5.3	Method of drawing supplementary symbols and others	ISO 2553	7	Complementary indications	<p>④ JIS welding symbols many parts of which are based on AWS are scheduled to be promoted in conformity in the future as well taking the international trend into account.</p> <p>⑤ JIS welding symbols are of importance as the basic standards as well as JIS welding terms, so that, in the revision at this time, ISO 2553:1992 has been translated into Japanese and added to this Standard as the Annex 1 (informative).</p>
—	—		8	Examples for application of spot and seam joints	

JIS Z 3021:2000 Symbolic Representation of Welds				ISO 2553:1992 Welded, brazed and soldered joints — Symbolic representation on drawings		
(1) Requirements in JIS		(II) International Standard number	(III) Requirements in International Standard		(IV) Classification and details of technical deviation between JIS and the International Standard by clause Location of deviation: Indication method:	(V) Justification for the technical deviation and future measures
Clause	Content		Clause	Content		
6	Case where only non-destructive test symbol shows the welded side	ISO 2553	—	—	—	⑥ The symbols for point welding and seam welding have been directed toward a conformity in early time by additionally describing, in the column of Remarks in Table 1 in the body of JIS, on the premise to "describe" that no problem arises there between them and the all-round peripheral welding about the representation.  ⑦ ISO 2553 has been translated and added as the Annex 1 (informative) for the time being and, on the precise of the revision in the next time, it is expected to supply the information on ISO symbols and make efforts for promoting its popularization and serve in the intranational conformation.

Designated degree of correspondence between JIS and International Standard: MOD

Remarks 1. Symbols in sub-columns of classification by clause in the above table indicate as follows:

- IDT: Identical in technical contents
- MOD/addition: Adds the specification item(s) or content(s) which are not included in International Standard.
- MOD/alteration: Alters the specification content(s) which are included in International Standard.
- MOD/selection: Parallel requirement(s) for specification content(s).

2. Symbols in column of designated degree of correspondence between JIS and International Standard in the above table indicate as follows:

- MOD: Modifies International Standard.