
International Standard



2553

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Welds — Symbolic representation on drawings

Soudures — Représentation symbolique sur les dessins

Second edition — 1984-11-15

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Foreword

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Draft International Standards, adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 2553 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*.

ISO 2553 was first published in 1974. This second edition cancels and replaces the first edition, of which it constitutes a technical revision.

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Welds — Symbolic representation on drawings

1 Scope and field of application

This International Standard prescribes the rules to be applied for the symbolic representation of welds on drawings.

2 References

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

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

ISO 4063, *Welding, brazing, braze welding and soldering of metals — List of processes, for symbolic representation on drawings*.

3 General

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

3.2 The symbolic representation shall give clearly all necessary indications regarding the specific weld 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 and/or welding 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 and/or the welding procedures can be close to the symbol.

4 Symbols

4.1 Elementary symbols

The various categories of welds 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 pre-judge the process to be employed.

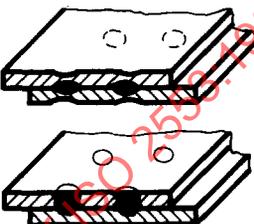
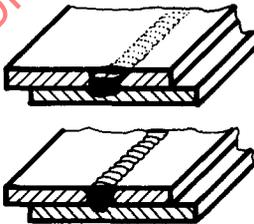
The elementary symbols are shown in table 1.

Table 1 – Elementary symbols

No.	Designation	Illustration	Symbol
1	Butt weld between plates with raised edges ¹⁾ ; 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)		
8	Single-J butt weld		
9	Backing run; back or backing weld /USA/		
10	Fillet weld		

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 table 4).

Table 1 — Elementary symbols (concluded)

No.	Designation	Illustration	Symbol
11	Plug weld; plug or slot weld /USA/		
12	Spot weld		
13	Seam weld		

4.2 Combinations of elementary symbols

When required, combinations of elementary symbols can be used.

Typical examples are given in table 6.

4.3 Supplementary symbols

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

The recommended supplementary symbols are given in table 2.

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 tables 3 and 7.

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

Table 2 — Supplementary symbols

Shape of weld surface	Symbol
a) flat (usually finished flush)	
b) convex	
c) concave	

Table 3 gives examples of application of the supplementary symbols.

Table 3 – Examples of application of supplementary symbols

Designation	Illustration	Symbol
Flat (flush) single-V butt weld		
Convex double-V butt weld		
Concave fillet weld		
Flat (flush) single-V butt weld with flat (flush) backing run		

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 (figure 1), which comprises in addition to the symbol (3) itself:

- an arrow line (1) per joint (see 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 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 according to 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.

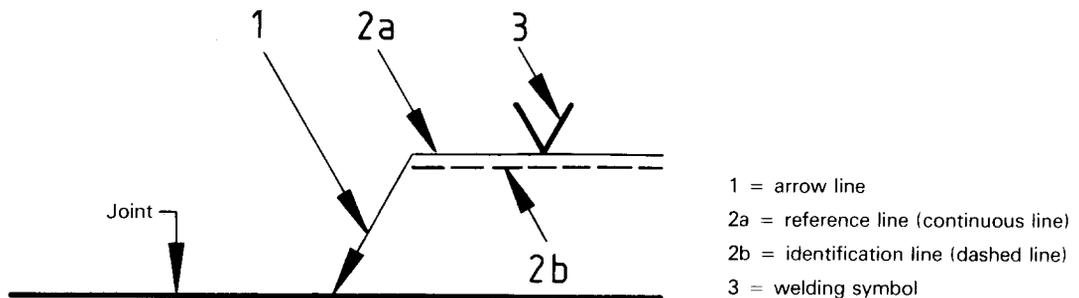


Figure 1 – Method of representation

5.2 Relation between the arrow line and the joint

The examples given in figures 2 and 3 explain the meaning of the terms

- "arrow side" of the joint;
- "other side" of the joint.

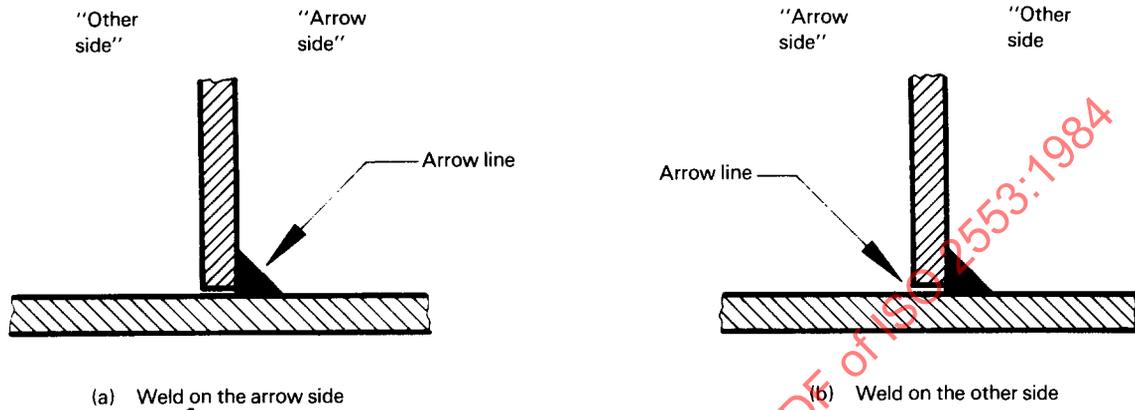


Figure 2 – T joint with one fillet weld

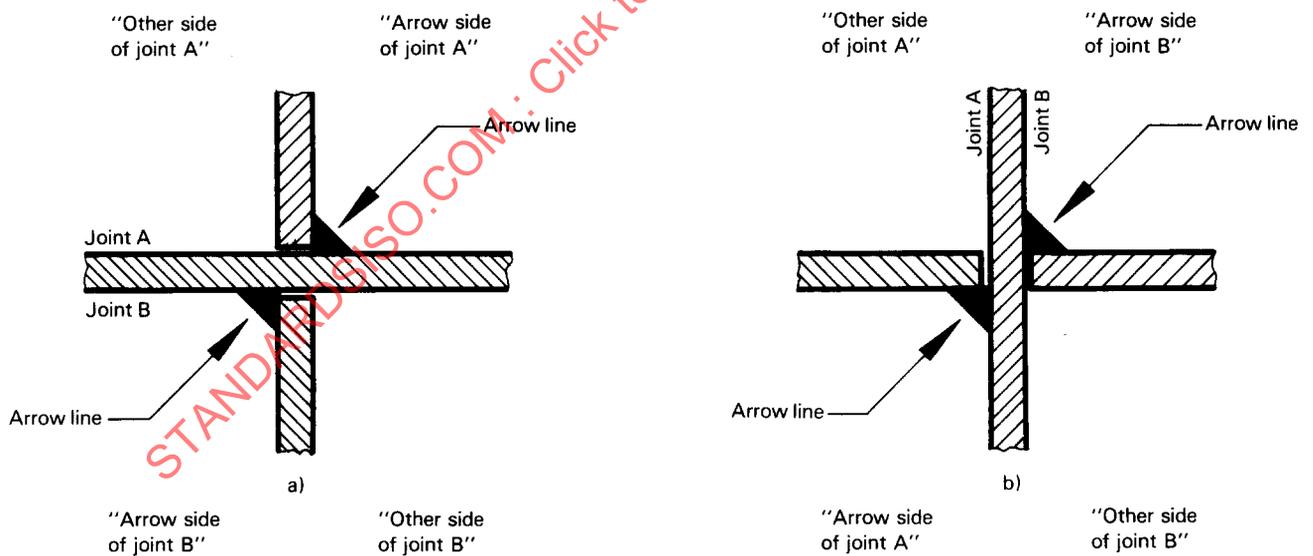


Figure 3 – Cruciform joint with two fillet welds

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

5.3 Position of the arrow line

The position of the arrow line with respect to the weld is generally of no special significance [(see figure 4 a) and b)]. However, in the case of welds of types 4, 6 and 8 (see table 1), the arrow line shall point towards the plate which is prepared [(see figure 4 c) and d)].

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.

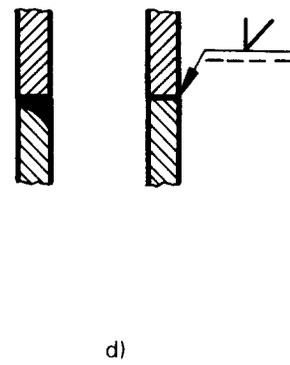
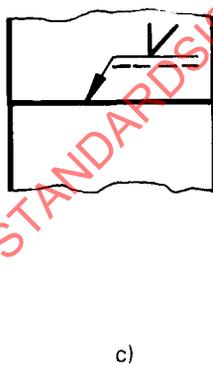
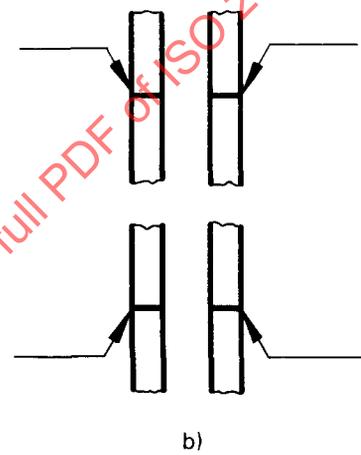
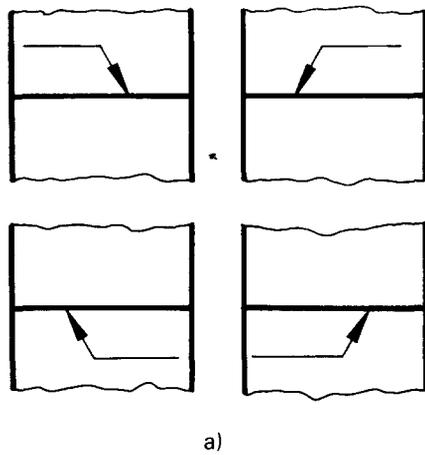


Figure 4 — Position of the arrow line

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.

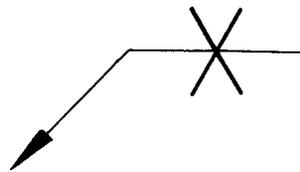
5.4 Position of the reference line

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

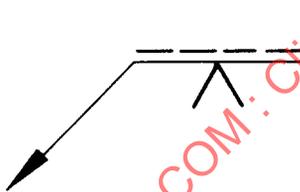
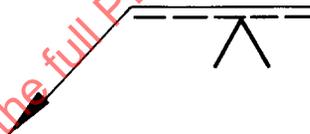
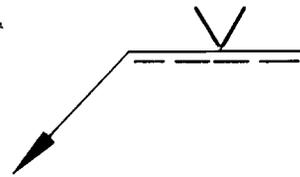
5.5 Position of the symbol with regard to the reference line

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

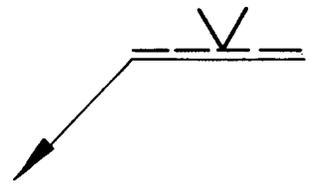
- The symbol is placed on the continuous line side of the reference line if the weld (weld face) is on the arrow side of the joint [see 5 a)].
- The symbol is placed on the dashed line side if the weld (weld face) is on the other side of the joint [see figure 5 b)].



For symmetrical welds only



a) To be welded on the arrow side



b) To be welded on the other side

Figure 5 — Position of the symbol according to the reference line

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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 figure 6:

- 1) the main dimensions relative to the cross-section are written on the left-hand side (that means before) of the symbol.
- 2) longitudinal dimensions are written on the right-hand side (that means after) of the symbol.

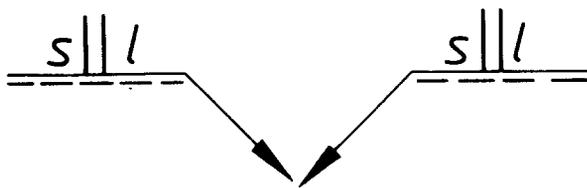


Figure 6 – Examples of the principle

The method of indicating the main dimensions is defined in table 4. The rules for setting down these dimensions are also given in this table.

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.

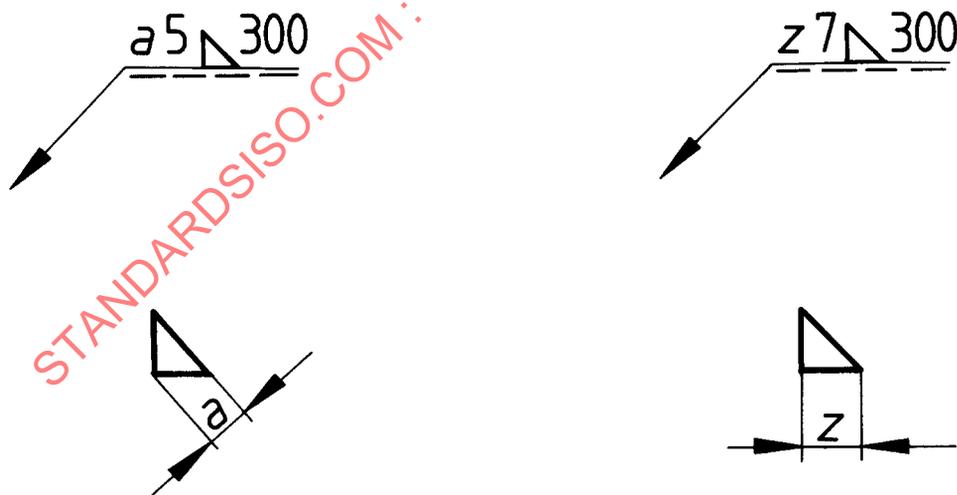
6.2.1 The absence of any indication following the symbol signifies that the weld is to be continuous over the whole length of the workpiece.

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 figure 7). Therefore, the letters *a* or *z* shall always be placed in front of the value of the corresponding dimension.



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.



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

Figure 7 – Methods of indicating dimensions for fillet welds

Table 4 — Main dimensions

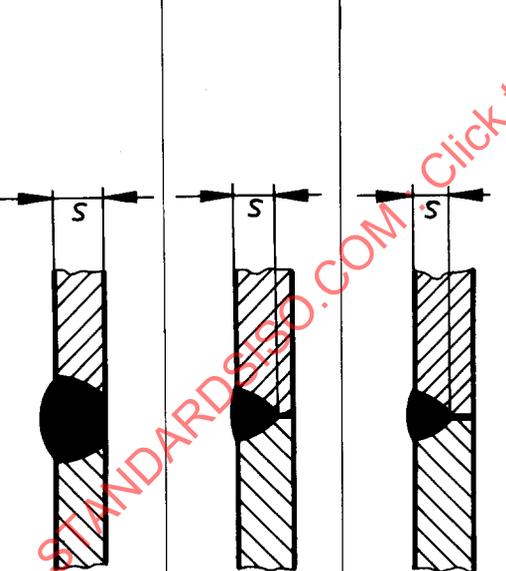
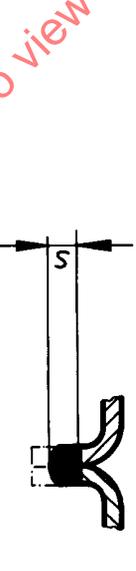
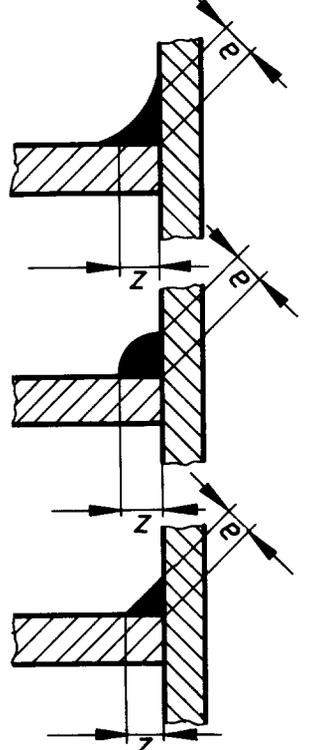
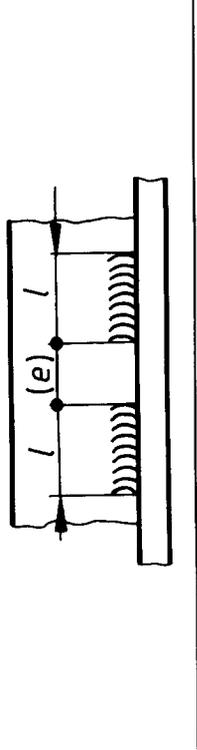
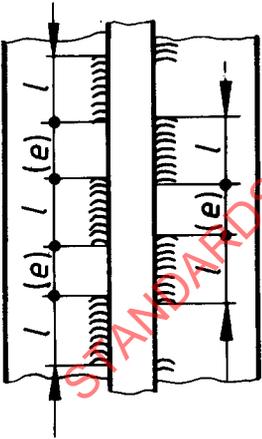
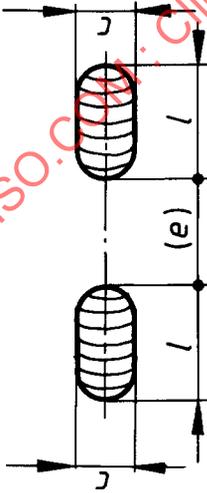
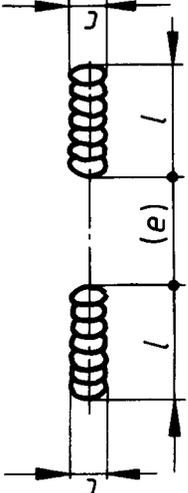
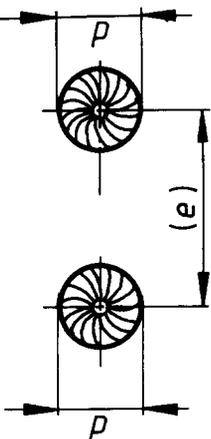
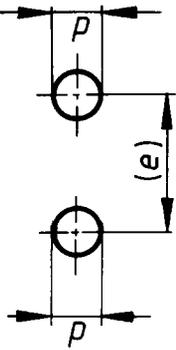
No.	Designation of welds	Definition	Inscription
1	Butt weld	 <p>s : minimum distance from the surface of the part to the bottom of the penetration, which cannot be greater than the thickness of the thinner part.</p>	 (see 6.2.1 and 6.2.2)  (see 6.2.1)
2	Butt weld between plates with raised edges	 <p>s : minimum distance from the external surface of the weld to the bottom of the penetration.</p>	 (see 6.2.1 and footnote 1) to table 1)
3	Continuous fillet weld	 <p>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.</p>	  (see 6.2.1 and 6.2.3)
4	Intermittent fillet weld	 <p>l : length of weld (without end craters). (e) : distance between adjacent weld elements. n : number of weld elements.</p>	 $n \times l (e)$  $n \times l (e)$ (see 6.2.3)

Table 4 — Main dimensions (concluded)

No.	Designation of welds	Definition	Inscription
5	Staggered intermittent fillet weld		$\frac{a}{a} \frac{n \times l}{n \times l} \left[\frac{(e)}{(e)} \right]$ $\frac{z}{z} \frac{n \times l}{n \times l} \left[\frac{(e)}{(e)} \right]$ <p>(see 6.2.3)</p>
6	Plug or slot weld		$c \left[\frac{n \times l}{n \times l} \right] (e)$ <p>(see 6.2.4)</p>
7	Seam weld		$c \left[\frac{n \times l}{n \times l} \right] (e)$
8	Plug weld		$d \left[\frac{n \times l}{n \times l} \right] (e)$
9	Spot weld		$d \left[\frac{n \times l}{n \times l} \right] (e)$

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 figure 8.

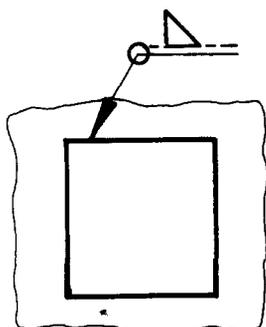


Figure 8 – Indication of peripheral weld

7.2 Field or site welds

A flag is to be used to indicate the field or site weld, as shown in figure 9.

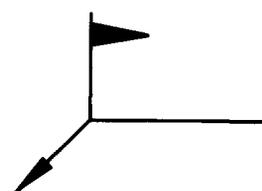


Figure 9 – Indication of field or site weld

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.

Figure 10 gives an example of its use.

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

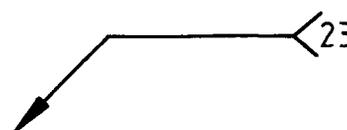


Figure 10 – Indication of welding process

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Annex A

Examples of use of symbols

Tables 5 to 8 give some examples of the use of symbols. The representations shown are given simply for explanation and are not obligatory.

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Table 5 — Examples of the use of elementary symbols

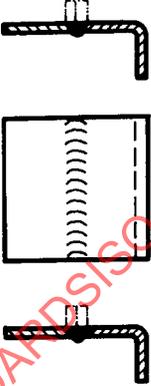
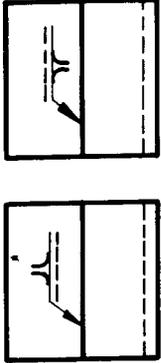
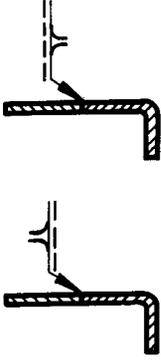
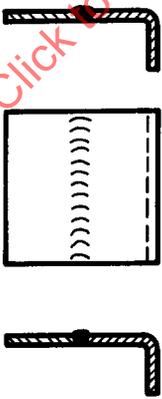
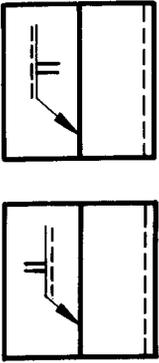
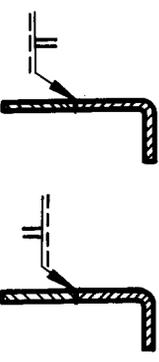
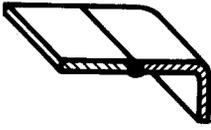
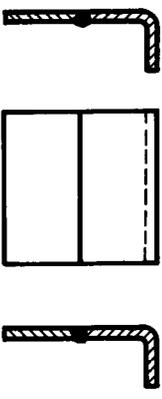
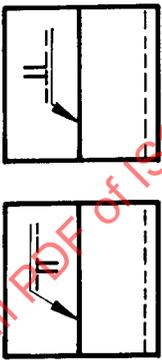
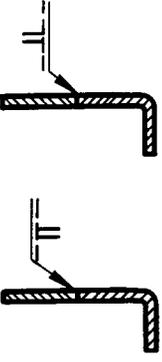
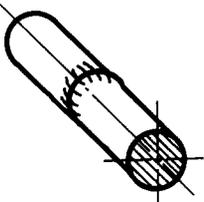
No.	Designation Symbol (Numbers refer to table 1)	Illustration	Representation	Symbolization	or
1	Butt weld between plates with raised edges 				
2					
3	Square butt weld 				
4					

Table 5 — Examples of the use of elementary symbols (continued)

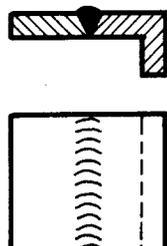
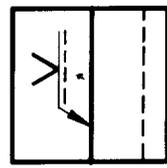
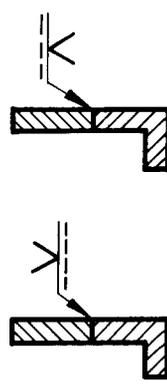
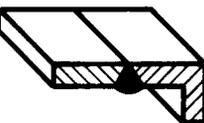
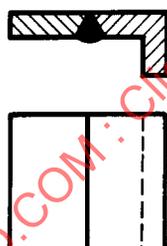
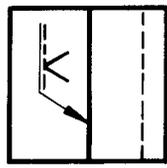
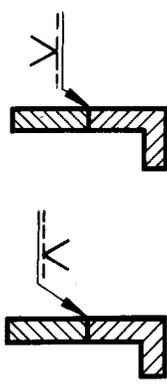
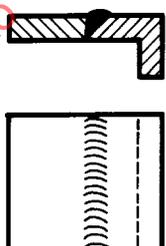
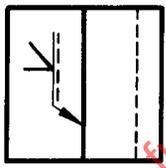
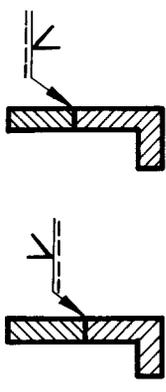
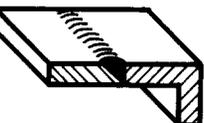
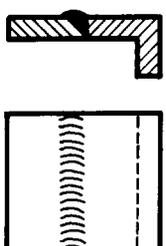
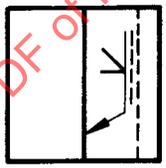
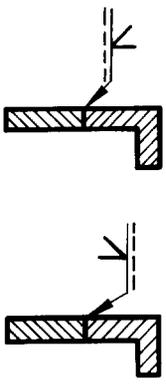
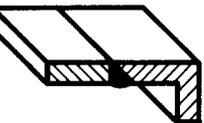
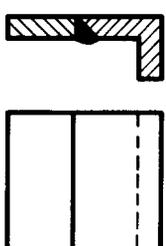
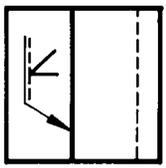
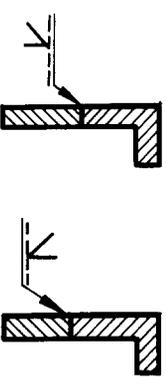
No.	Designation Symbol (Numbers refer to table 1)	Illustration	Representation	either	or
5	 Single-V butt weld				
6	 3				
7	 3				
8	 4				
9	 4				

Table 5 — Examples of the use of elementary symbols (continued)

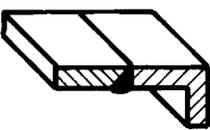
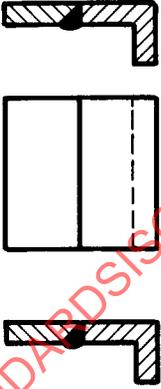
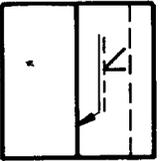
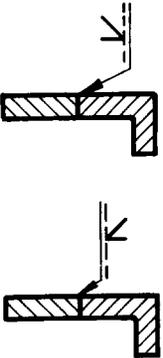
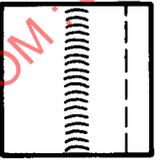
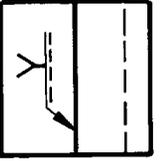
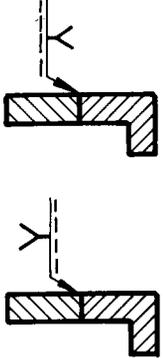
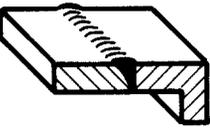
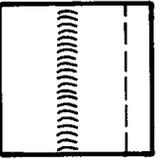
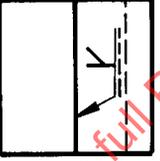
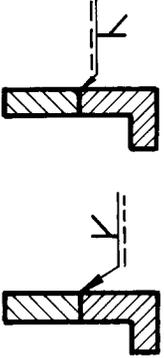
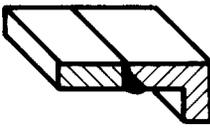
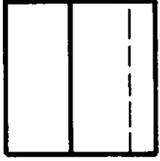
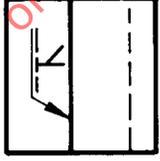
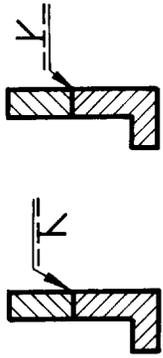
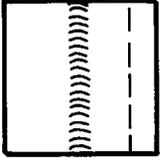
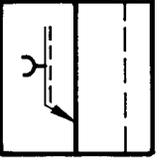
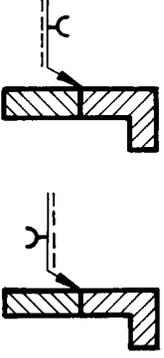
No.	Designation Symbol (Numbers refer to table 1)	Illustration	Representation	either	or
10	Single-bevel butt weld 				
11	Single-V butt weld with broad root face 				
12	Single-bevel butt weld with broad root face 				
13					
14	Single-U butt weld 				

Table 5 — Examples of the use of elementary symbols (continued)

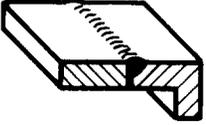
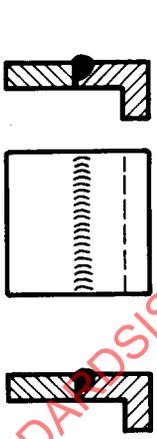
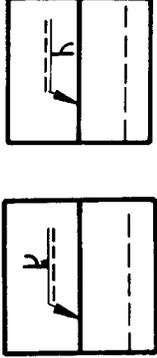
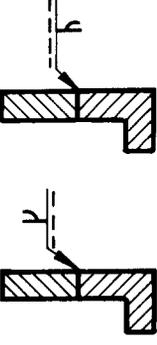
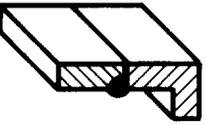
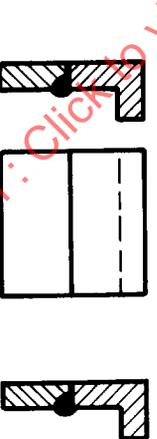
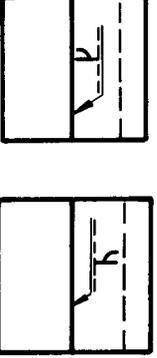
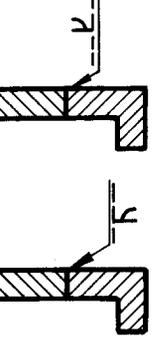
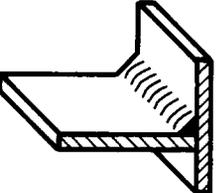
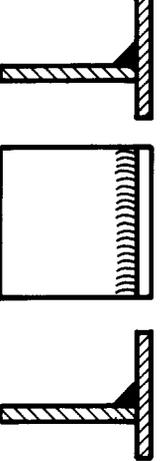
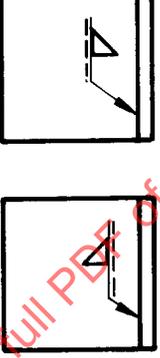
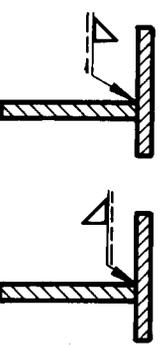
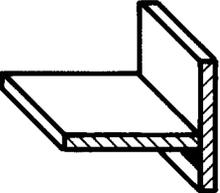
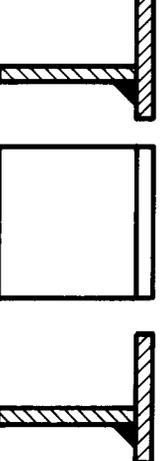
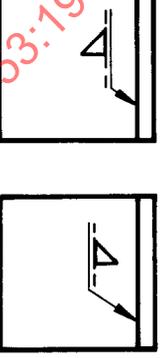
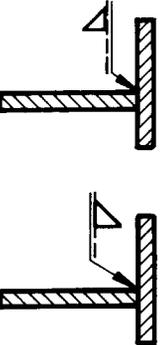
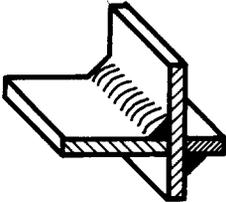
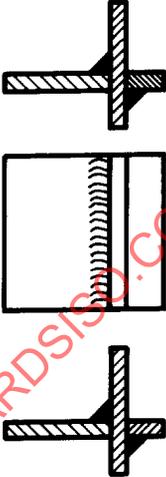
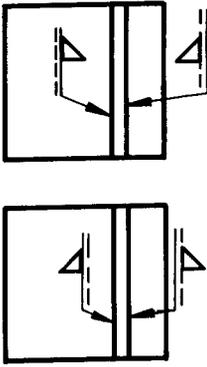
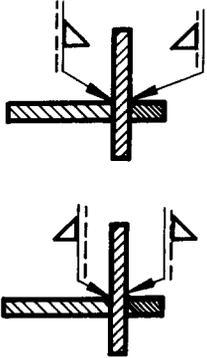
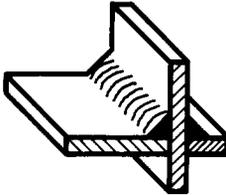
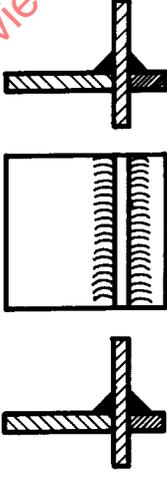
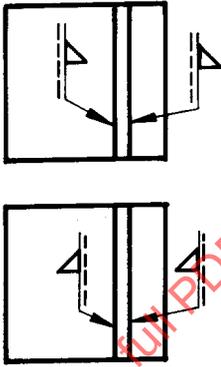
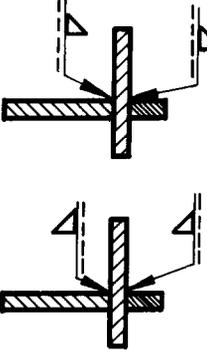
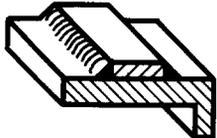
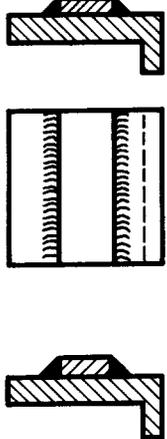
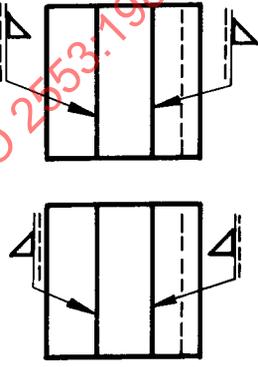
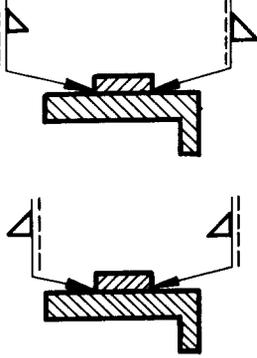
No.	Designation Symbol (Numbers refer to table 1)	Illustration	Representation	either	or
15	Single-J butt weld 				
16	8				
17	Fillet weld 				
18	10				

Table 5 — Examples of the use of elementary symbols (continued)

No.	Illustration	Representation	either	or
19				
20				
21				

Fillet weld
 10

Table 5 — Examples of the use of elementary symbols (continued)

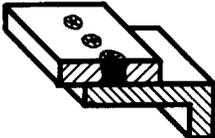
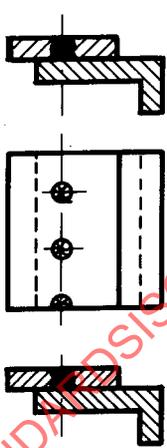
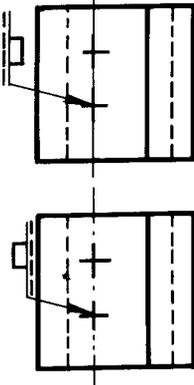
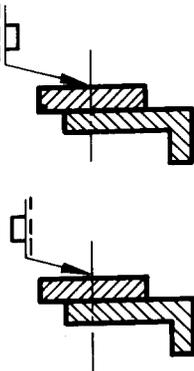
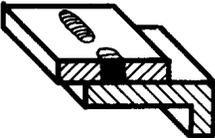
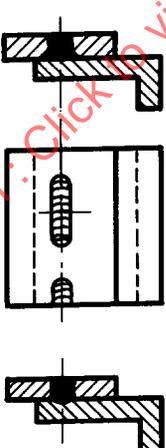
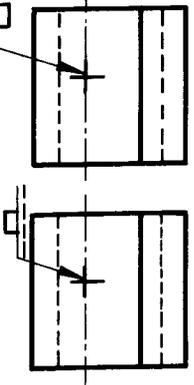
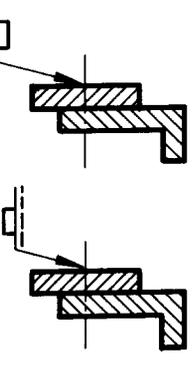
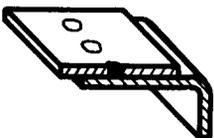
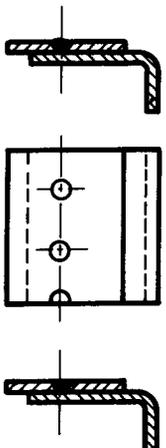
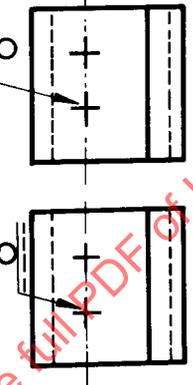
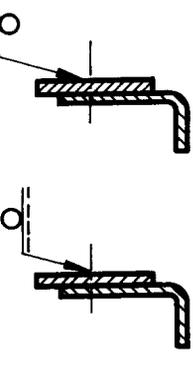
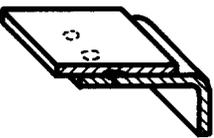
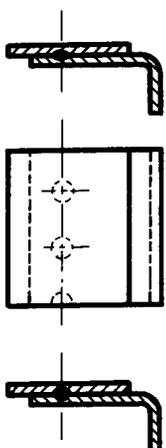
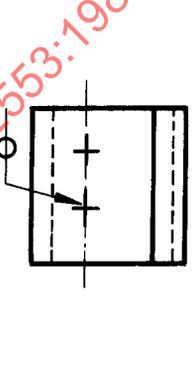
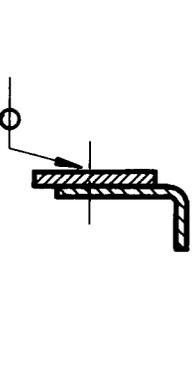
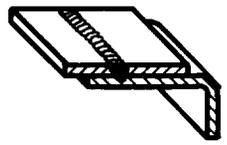
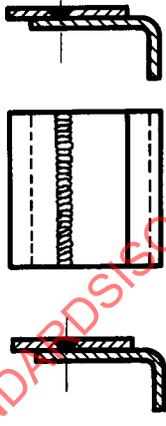
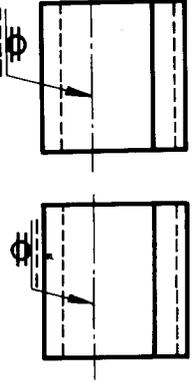
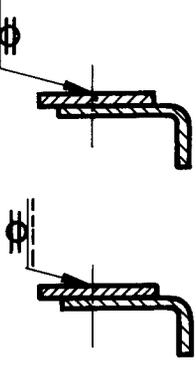
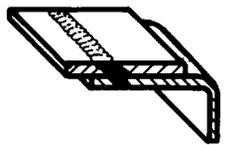
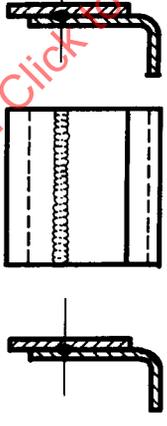
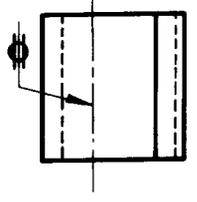
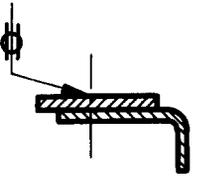
No.	Designation Symbol (Numbers refer to table 1)	Illustration	Representation	Symbolization either	or
22	Plug weld 				
23	11				
24	Spot weld				
25	12				

Table 5 — Examples of the use of elementary symbols (concluded)

No.	Designation Symbol (Numbers refer to table 1)	Illustration	Representation	either	or
26	Seam weld 				
27	13 				

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Table 6 — Examples of combinations of elementary symbols

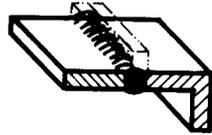
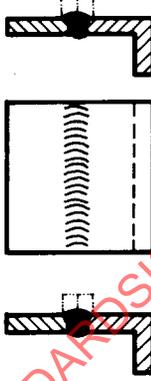
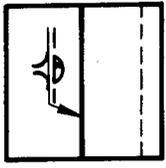
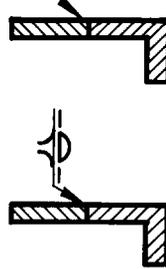
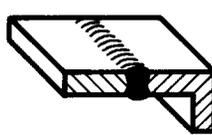
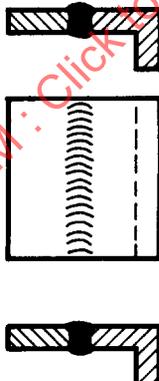
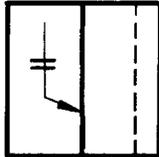
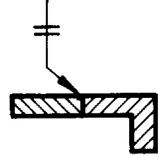
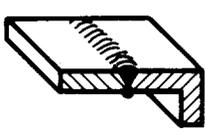
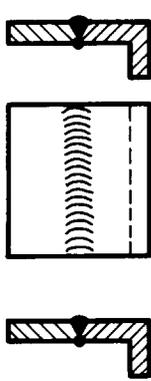
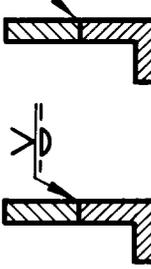
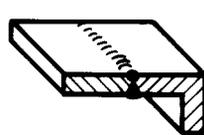
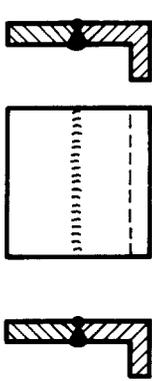
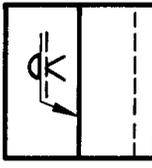
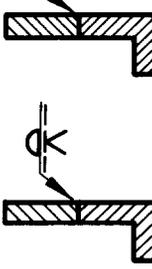
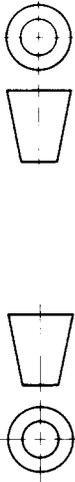
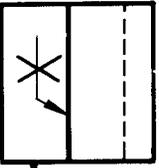
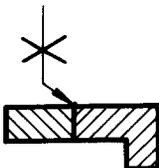
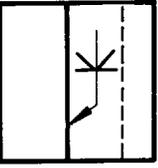
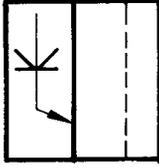
No.	Designation Symbol (Numbers refer to table 1)	Illustration	Representation	either	or
1	Butt weld between plates with raised edges  and backing run  1-9				
2	Square butt weld  welded from both sides 2-2				
3	Single-V butt weld  and backing run  3-9				
4	Single-V butt weld  and backing run  3-9				

Table 6 — Examples of combinations of elementary symbols (continued)

No.	Designation Symbol (Numbers refer to table 1)	Illustration	Representation	Symbolization
5	Double-V butt weld  (X weld) 3-3			either  or 
6	Double-bevel butt weld  (K weld) 4-4			
7	Double-V butt weld with broad root face  5-5			
8	Double-bevel butt weld with broad root face  6-6			