

Welded, brazed and soldered joints — Symbolic representation on drawings

The European Standard EN 22553:1995 has the status of a
British Standard

UDC 621.791:744.44.003.62

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee WEE/1, Definitions and symbols for welding, upon which the following bodies were represented:

- Aluminium Federation
- Associated Offices Technical Committee
- British Institute of Non-destructive Testing
- British Iron and Steel Producers' Association
- City and Guilds of London Institute (Advisory Committee)
- Institute of Materials
- Institution of Structural Engineers
- National Association of Teachers in Further and Higher Education
- Railway Industry Association
- Society of Motor Manufacturers and Traders Ltd.
- Welding Institute
- Welding Manufacturers' Association (BEAMA Ltd.)

This British Standard, having been prepared under the direction of the Engineering Sector Board was published under the authority of the Standards Board and comes into effect on 15 May 1995

© BSI 10-1998

The following BSI references relate to the work on this standard:
Committee reference WEE/1
Draft announced in *BSI News* January 1995

ISBN 0 580 24141 6

Amendments issued since publication

Amd. No.	Date	Comments

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 22553:1995	5

National foreword

This British Standard has been prepared by Technical Committee WEE/1 and is the English language version of EN 22553:1994 *Welded, brazed and soldered joints — Symbolic representation on drawings*, published by the European Committee for Standardization (CEN).

EN 22553:1994 was produced as a result of international discussion in which the UK took an active part.

BS EN 22553:1995 supersedes BS 499-2:1980 which is withdrawn.

Cross-references

Publication referred to	Corresponding British Standard
EN 20544:1991 (ISO 544:1989)	BS EN 20544:1991 <i>Specification for sizes for filler metals for manual welding</i>
EN 24063:1991 (ISO 4063:1990)	BS EN 24063:1992 <i>Welding, brazing, soldering and braze welding of metals. Nomenclature of processes and reference numbers for symbolic representations on drawings</i>
EN 25817:1992 (ISO 5817:1992)	BS EN 25817:1992 <i>Arc-welded joints in steel. Guidance on quality levels for imperfections</i>
EN 28167:1992 (ISO 8167:1989)	BS EN 28167:1992 <i>Specification for projections for resistance welding</i>
EN 30042:1994 (ISO 10042:1992)	BS EN 30042:1994 <i>Arc-welded joints in aluminium and its weldable alloys. Guidance on quality levels for imperfections</i>

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 52, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

UDC 621.791:744.44.003.62

Descriptors: Drawings, technical drawings, welded joints, brazed and soldered joints, symbols, graphic symbols

English version

Welded, brazed and soldered joints — Symbolic representation on drawings

(ISO 2553:1992)

Joints soudés et brasés — Représentations
symboliques sur les dessins
(ISO 2553:1992)

Schweiß — und Löthähte — Symbolische
Darstellung in Zeichnungen
(ISO 2553:1992)

This European Standard was approved by CEN on 1994-05-12. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

© 1994 Copyright reserved to CEN members

Ref. No. EN 22553:1994 E

 **Documents**
Document Sharing Hub

Foreword

The text of the International Standard ISO 2553:1992 prepared by ISO/TC 44, Welding and allied processes, was submitted to the Unique Acceptance Procedure (UAP) and was approved as EN 22553 on 1994-05-12 without any modification.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 1994.

This European Standard has been prepared under a mandate given to CEN by the Commission of the European Communities and the European Free Trade Association, and supports essential requirements of EC Directive(s).

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

Endorsement notice

The text of the International Standard ISO 2553:1992 was approved by CEN as a European Standard with the modification of the design **B.2** in annex B.

NOTE Normative references to international publications are listed in annex ZA (normative).

Contents

	Page
1 Scope	5
2 Normative references	5
3 General	5
4 Symbols	5
4.1 Elementary symbols	5
4.2 Combinations of elementary symbols	9
4.3 Supplementary symbols	10
5 Position of the symbols on drawings	12
5.1 General	12
5.2 Relationship between the arrow line and the joint	12
5.3 Position of the arrow line	13
5.4 Position of the reference line	13
5.5 Position of the symbol with regard to the reference line	14
6 Dimensioning of welds	14
6.1 General rules	14
6.2 Main dimensions to be shown	15
7 Complementary indications	21
7.1 Peripheral welds	21
7.2 Field or site welds	21
7.3 Indication of the welding process	21
7.4 Sequence of information in the tail of the reference mark	21
8 Examples for application of spot and seam joints	22
Annex A (informative) Examples of use of symbols	24
Annex B (informative) Guidance for converting drawings made in accordance with ISO 2553:1974 into the new system in accordance with ISO 2553:1991	52
Annex ZA (normative) Normative references to international publications with their relevant European publications	Inside back cover
Figure 1 — Method of representation	12
Figure 2 — T joint with one fillet weld	12
Figure 3 — Cruciform joint with two fillet welds	13
Figure 4 — Position of the arrow line	13
Figure 5 — Position of the symbol according to the reference line	14
Figure 6 — Examples of the principle	15
Figure 7 — Methods of indicating dimensions for fillet welds	15

	Page
Figure 8 — Methods of indicating dimensions for deep penetration of fillet welds	16
Figure 9 — Indication of peripheral weld	21
Figure 10 — Indication of field or site weld	21
Figure 11 — Indication of welding process	21
Figure 12 — Reference information	21
Figure 13 — Single-V butt weld with backing run	22
Figure 14 — Intermittent resistance seam welds	22
Figure 15 — Spot welds	23
Figure B.1 — Weld on arrow side	52
Figure B.2 — Weld on other side	52
Table 1 — Elementary symbols	6
Table 2 — Combined symbols for symmetrical welds (examples)	9
Table 3 — Supplementary symbols	10
Table 4 — Examples of application of supplementary symbols	11
Table 5 — Main dimensions	17
Table A.1 — Examples of the use of elementary symbols	24
Table A.2 — Examples of combinations of elementary symbols	38
Table A.3 — Examples of combinations of elementary and supplementary symbols	44
Table A.4 — Examples of exceptional cases	48

1 Scope

This International Standard 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 International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International 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 2560:1973, *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:—¹⁾, *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 International 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

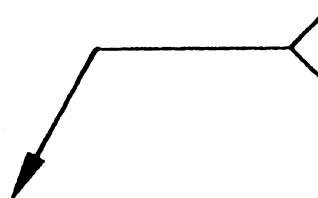
4.1 Elementary symbols

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 prejudge the process to be employed.

The elementary symbols are shown in 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:



¹⁾ To be published.

Table 1 — Elementary symbols

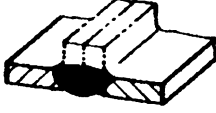
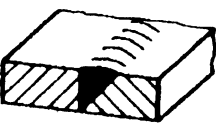
No.	Designation	Illustration	Symbol
1	Butt weld between plates with raised edges ^a ; edge flanged weld /USA/ (the raised edges being melted down completely)		
2	Square butt weld		
3	Single-V butt weld		
4	Single-bevel butt weld		
5	Single-V butt weld with broad root face		
6	Single-bevel butt weld with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

Table 1 — Elementary symbols

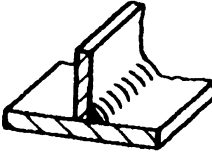
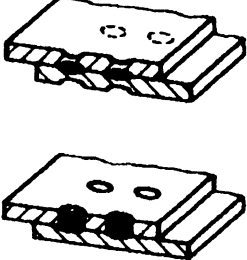
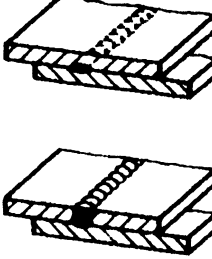
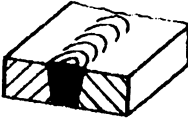
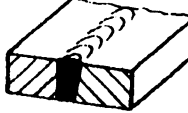
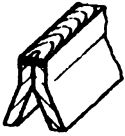
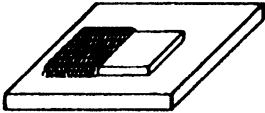
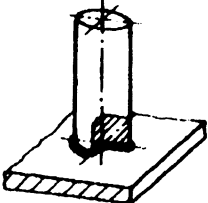
No.	Designation	Illustration	Symbol
9	Backing run; back or backing weld /USA/		
10	Fillet weld		
11	Plug weld; plug or slot weld /USA/		
12	Spot weld		
13	Seam weld		
14	Steep-flanked single-V butt weld		
15	Steep-flanked single-bevel butt weld		

Table 1 — Elementary symbols

No.	Designation	Illustration	Symbol
16	Edge weld		
17	Surfacing		
18	Surface joint		
			
19	Inclined joint		
20	Fold joint		
^a Butt welds between plates with raised edges (symbol 1) not completely penetrated are symbolized as square butt welds (symbol 2) with the weld thickness <i>s</i> shown (see Table 5).			

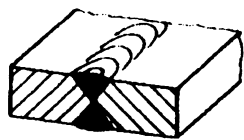
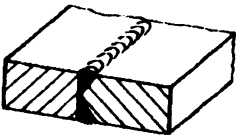
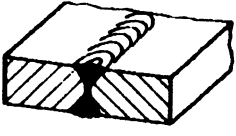
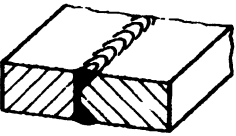
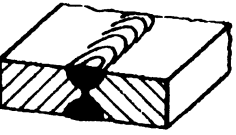
4.2 Combinations of elementary symbols

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

NOTE 1 Table 2 gives a collection of combinations of elementary symbols for symmetrical welds. For the symbolic representation the elementary symbols are arranged symmetrically at the reference line (see Table A.2). For the use of symbols out of symbolic representation the symbols may be represented without the reference line.

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

Elementary 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 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 Table 4 and Table A.3.

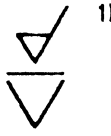
NOTE 2 Although it is not forbidden to associate several symbols, it is better to represent the weld on a separate sketch when symbolization becomes too difficult.

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	

Table 4 gives examples of application of the supplementary symbols.

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		

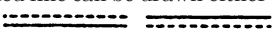
¹⁾ Symbol in accordance with ISO 1302; instead of this symbol the main symbol $\sqrt{}$ can be used.

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

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

NOTE 3 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.

NOTE 4 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 Figure 2 and Figure 3 explain the meaning of the terms

- “Arrow side” of the joint;
- “Other side” of the joint.

NOTE 5 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 6 See Figure 2.

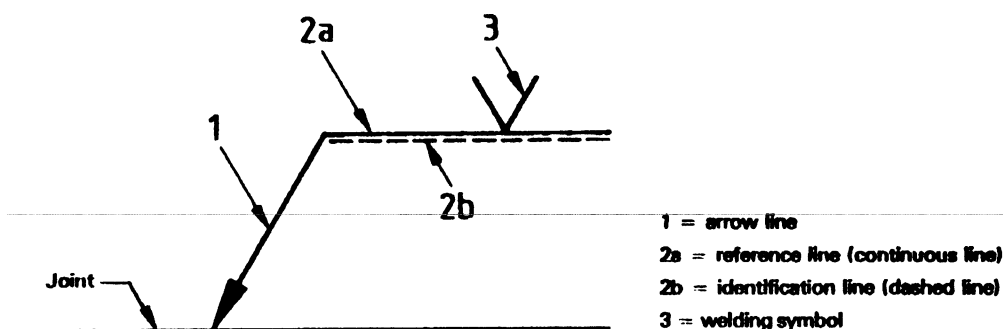


Figure 1 — Method of representation

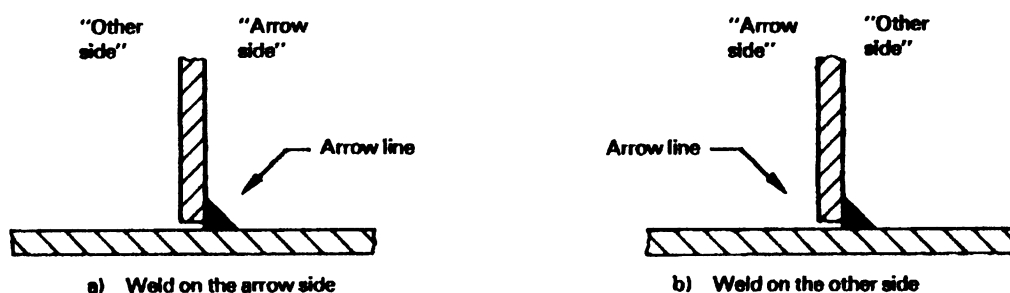


Figure 2 — T joint with one fillet weld

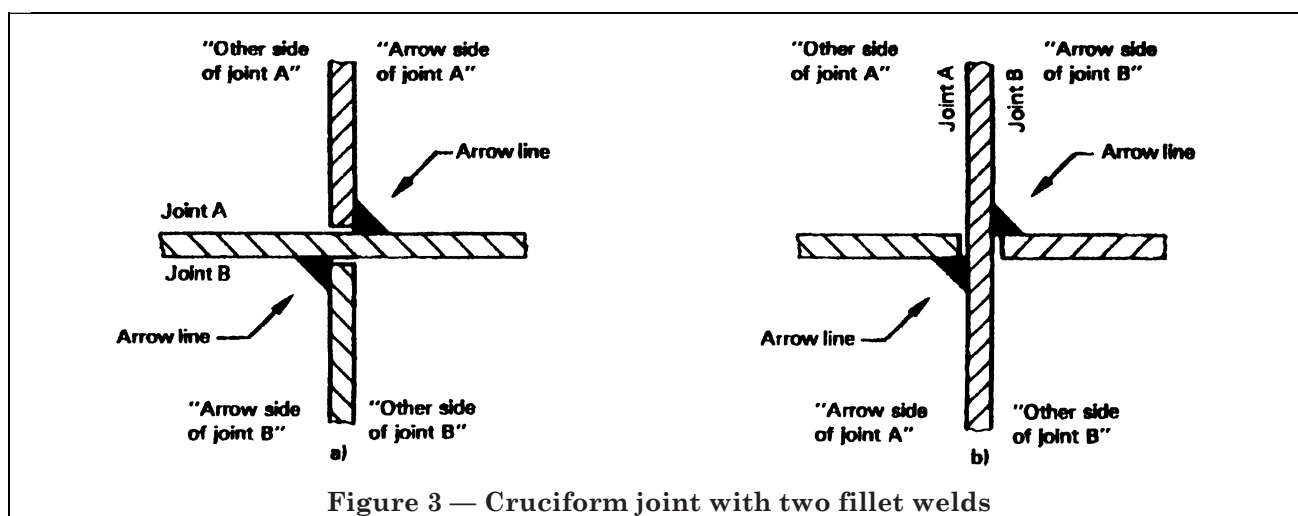


Figure 3 — Cruciform joint with two fillet welds

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 Figures 4 a) and 4 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 Figures 4 c) and 4 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.

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.

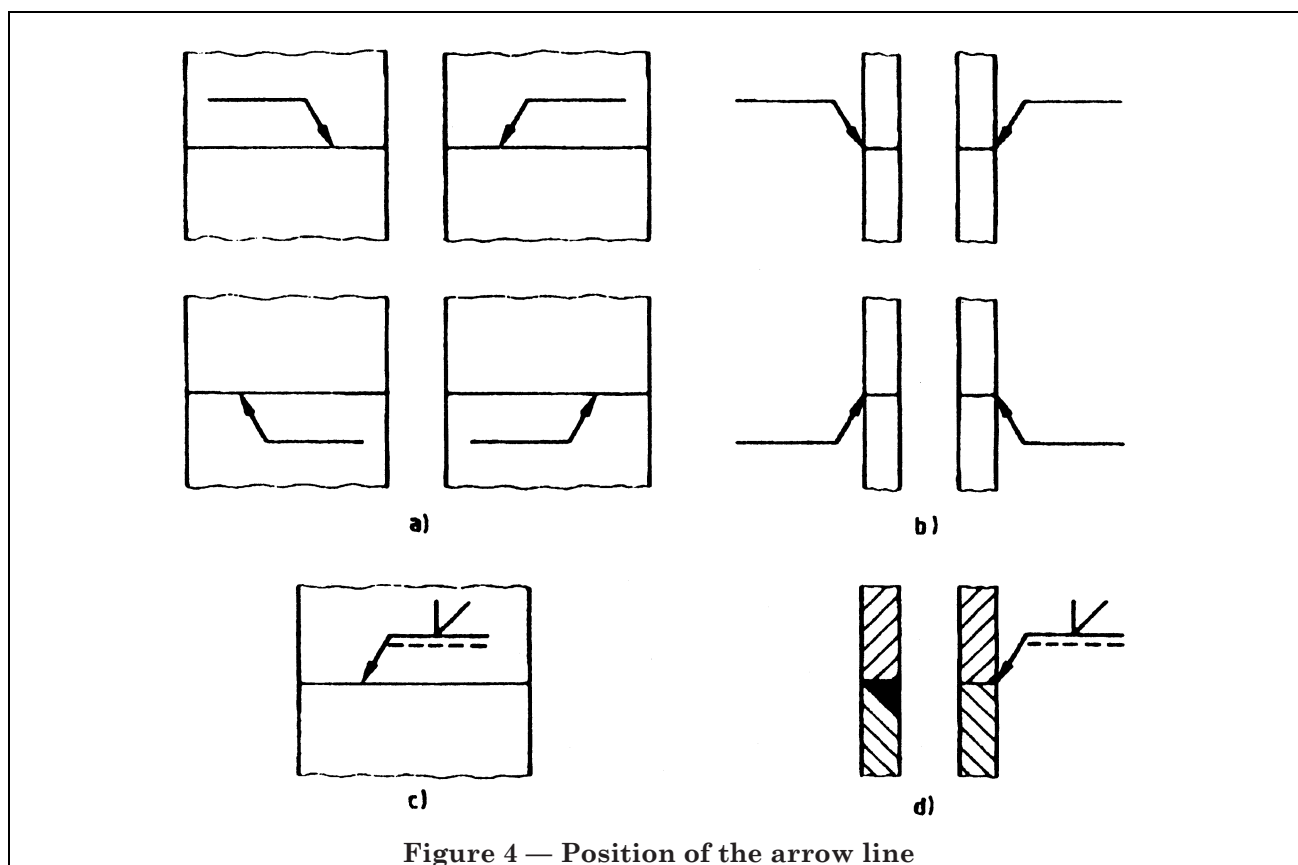


Figure 4 — Position of the arrow line

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 Figure 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)].

NOTE 7 In the case of spot welds made by projection welding, the projection surface is to be considered as the external surface of the weld.

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:

- 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 Table 5. The rules for setting down these dimensions are also given in this table.

Other dimensions of less importance may be indicated if necessary.

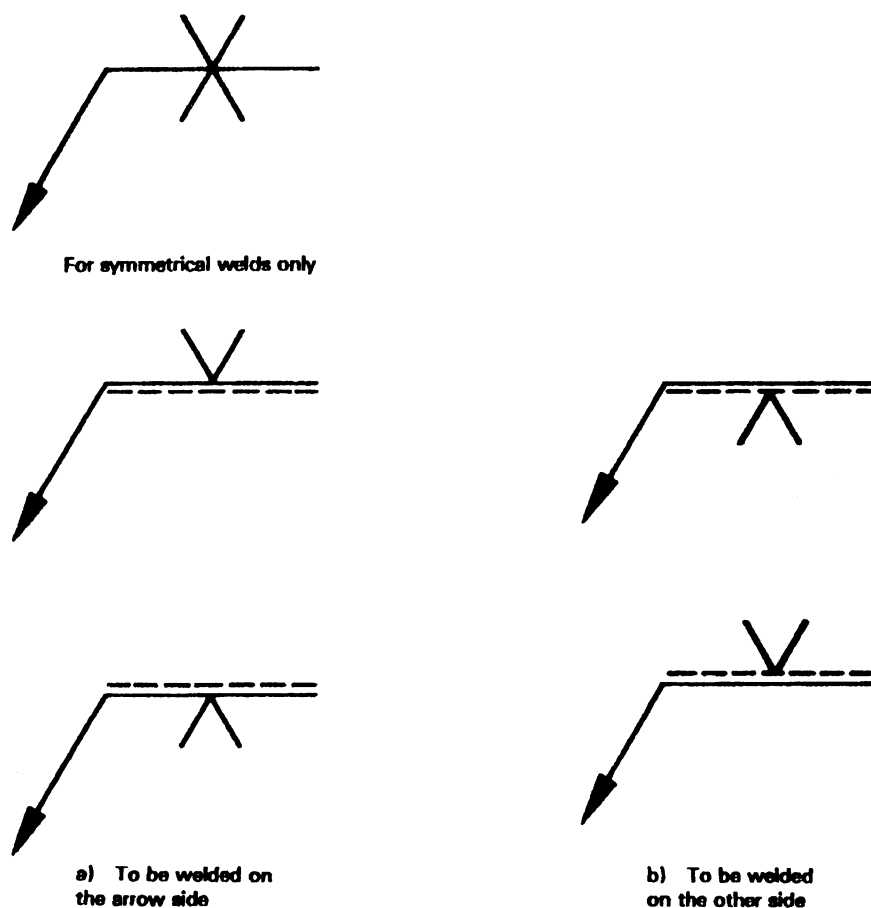


Figure 5 — Position of the symbol according to the reference line