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Welding and allied processes — Symbolic representation on drawings — Welded, brazed and soldered joints

Soudage et techniques connexes — Représentations symboliques sur les dessins — Joints soudés et brasés

[Revision of third edition (ISO 2553:1992)]

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This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

ISO 2553 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 7, *Representation and terms*.

This fourth edition cancels and replaces the third edition (ISO 2553:1992) which has been technically revised.

Requests for official interpretations of any aspect of this standard should be directed to the Secretariat of ISO/TC 44/SC 7 via your national standards body, a complete listing of which can be found at www.iso.org.

Introduction

The symbols included in this standard are intended to facilitate communication between the designer, the fabrication shop and examination and inspection personnel. The symbols can be combined with other drawing symbols and may also be supplemented by additional information. However, the symbols cannot always provide all the information necessary in order to ensure that a fabrication is viable.

It is essential that throughout all stages of production, from product conception and design through to manufacture, that there is adequate interaction between all personnel and departments concerned. The designer should be familiar with the limitations of the joining and non-destructive testing processes and know how to specify adequate welded, brazed or soldered joint sizes. The fabrication and inspection personnel may advise the designer on joining processes and requirements for examination and testing. It may be that a designer wishes to place one or more welded, brazed or soldered joints in a particular position that the production personnel, for one reason or another, cannot produce. It may be that the positioning of the welded, brazed or soldered joints, as defined by the designer, may be cost prohibitive and may have to be moved elsewhere by changing the design.

It is important that all these issues are resolved before production starts in order to avoid costly redesign and/or rework.

As with all standards, training and familiarisation with the usage of the symbols in this document is paramount. It has been assumed, in the drafting of this International Standard, its usage shall be entrusted to appropriately qualified and experienced personnel.

Using an incorrect symbol can lead to confusion and delay whilst the drawing is checked. Similarly, personnel who are not familiar with the symbols may need to spend time checking on their meaning. In both instances, any incorrectly made welded, brazed or soldered joints may result in costly rework.

ISO 2553 recognizes that there are two somewhat different approaches in the global market to designate the arrow side and other side on drawings, and allows for either to be used in isolation, to suit a particular market need. Application of either approach identifies a welding symbol in accordance with this International Standard. The approach in accordance with system A is based on ISO 2553:1992. The approach in accordance with system B is based upon AWS A2.4.

D
R
A

Welding and allied processes — Symbolic representation on drawings — Welded, brazed and soldered joints

1 Scope

This International Standard defines the rules to be applied for symbolic representation of welded, brazed and soldered joints in metallic materials on technical drawings. This can include information about the geometry, manufacture, quality and testing of the welds.

This International standard is a combined specification that recognizes that there are two different approaches in the global market to designate the arrow side and other side on drawings. It should be noted that:

- Clauses, Tables and Figures which carry the suffix letter "A" are applicable only to the symbolic representation system based on the dual reference line from ISO 2553:1992;
- Clauses, Tables and Figures which carry the suffix letter "B" are applicable only to the symbolic representation system based on the single reference line from AWS A2.4;
- Clauses, Tables and Figures which do not have the suffix letter "A" or the suffix letter "B" are applicable to both systems.

Systems A and B should not be mixed and drawings shall clearly indicate which system is used as well as units of measurement in accordance with ISO 129-1 (see also 4.1).

The symbols shown in this International Standard can be combined with other symbols used on technical drawings for example to show surface finish requirements.

Clause 7 describes an alternative designation method which can be used to represent welded joints on drawings by specifying essential design information, e.g. weld dimensions, quality level etc. The joint preparation and welding process(es) are then determined by the production unit in order to meet the specified requirements.

NOTE Examples given in this International Standard, including dimensions, are illustrative only and are intended to demonstrate the proper application of principles. They are not intended to represent good design practices, or to replace code or specification requirements.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 128, *Technical drawings – General principles of presentation*

ISO 129-1, *Technical drawings – Indication of dimensions and tolerances – Part 1: General principles*

ISO 1302, *Geometrical Product Specifications (GPS) – Indication of surface texture in technical product documentation*

ISO 3098-2, *Technical product documentation – Lettering – Part 2: Latin alphabet, numerals and marks*

ISO 4063, *Welding and allied processes – Nomenclature of processes and reference numbers*

ISO 17659, *Welding — Multilingual terms for welded joints with illustrations*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17659, ISO/TR 25901:2007 and the following apply.

3.1

welding symbol

symbol consisting of an arrow line and a reference line and which may also include elementary and supplementary symbols and/or tail, used on technical drawings to indicate welded brazed or soldered joint type, location and joint preparation

NOTE 1 See Clause 4.

3.2

basic welding symbol

symbol consisting of an arrow line, reference line and tail used when the joint is not specified and only to indicate that a welded, brazed or soldered joint is to be made

NOTE 1 See Figure 1.

NOTE 2 Often used to indicate the location of tack welds.

3.3

arrow line

element of the welding symbol that is used to indicate the joint that is to be welded, brazed or soldered, generally drawn at 135° to the reference line

NOTE 1 See 4.5.

NOTE 2 The arrow line may be drawn at 45° to the reference line where space does not permit use of 135°.

3.4

reference line

element of the welding symbol on which the elementary symbol is located, generally drawn parallel to the bottom edge of the drawing

NOTE See 4.6.

3.4.1

continuous line

solid element of the reference line

NOTE The continuous line is used in conjunction with a dashed line (system A) or alone (system B and system A symmetrical welds).

3.4.2

dashed line

component of the reference line used to identify the other side of the joint to where the arrow line is pointing and which can be drawn either above or below the continuous line

NOTE 1 The dashed line is ONLY used in accordance with system A and in conjunction with a continuous line.

NOTE 2 It is preferred that the dashed line be drawn below the continuous line.

3.5

tail

V shaped element added to the end of the continuous reference line away from the arrow line

NOTE See 4.7.

3.6

arrow side

the side of the joint to which the arrow line is pointing

NOTE See 4.6.2.1.

3.7

other side

the opposite side of the joint to which the arrow line is pointing

NOTE See 4.6.2.1.

3.8

elementary symbol

symbol forming part of the welding symbol and drawn on the reference line to indicate the type of weld and joint preparation

NOTE See 4.3.

3.9

supplementary symbol

symbol used in conjunction with elementary symbols to convey more information about the joint

NOTE See 4.4.

3.10

complementary information

non symbolic information, relevant to the welds being made, which may be included in the tail of the welding symbol

NOTE See 4.7.

3.11

intermittent weld

series of welds made at intervals along a joint [ISO/TR 25901:2007]

NOTE See 5.3.3.

3.11.1

chain intermittent weld

intermittent weld on both sides of a joint in which the welds on one side are approximately opposite those on the other side

NOTE See 5.3.3.2.

3.11.2

staggered intermittent weld

intermittent weld on both sides of a joint in which the welds on one side are alternated with respect to those on the other side

NOTE See 5.3.3.3.

3.12

offset

the distance between the start of welding on one side of a staggered intermittent weld made on both sides of the joint and the start of welding on the other side

NOTE 1 See 5.3.3.3, Table 3 and Table 6, No 2.6.

NOTE 2 If the centres of the welds on one side of the joint correspond with the centres of the gaps on the opposite side of the joint, offset need not be specified.

4 Welding symbol

4.1 General

The reference line and arrow line are required elements. Additional elements may be included to convey specific information.

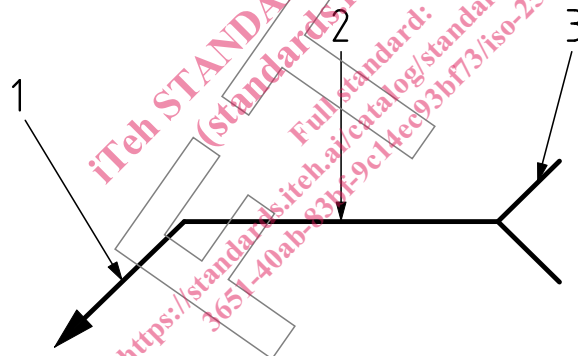
It is preferable that the welding symbol is shown on the same side of the joint that the weld is to be made, i.e. the arrow side (see 4.6).

The thickness of the arrow lines, reference line, weld symbols and lettering shall be in accordance with ISO 128 and ISO 3098-2.

NOTE In order not to overburden drawings, additional information should be conveyed by other means for example; by drawing notes or details; references to standards and welding procedure specifications (WPS's) or other drawings or instructions that eliminate the need to include the corresponding elements in the symbol – see Figure 6b.

4.2 Basic welding symbol

If joint details are not specified and the only requirement is to indicate that a joint is to be welded, the basic symbol shown in Figure 1 can be used. In this case, a dual reference line is not required for system A (see 4.6.1A) as no details concerning the weld are being conveyed.



Key

- 1 Arrow line
- 2 Reference line
- 3 Tail

Figure 1 — Basic welding symbol (joint details and type not specified)

NOTE 1 A tail, without additional information, is added to the basic welding symbol to clarify that a weld is to be made.

NOTE 2 This symbol is often used to indicate the location of tack welds.

Examples of comprehensive welding symbols showing the location of elements are given in Figure A.1.

4.3 Elementary symbols

4.3.1 General

Elementary symbols, in accordance with Table 1, can be added to the reference line in both Systems A and B to indicate the type of joint to be made.

Elementary symbols form part of the welding symbol and shall be drawn on the reference line (i.e. attached) generally at the mid-point.

Elementary symbols can be complemented by:

- supplementary symbols (see 4.4 and Table 3);
- dimensions (see Clause 5);
- complementary information.

Elementary symbols cannot be used alone to define the joining process to be used.

When the angle between the fusion faces is such that identification of the weld type and weld symbol are unclear, reference should be made to ISO 17659 and ISO/TR 25901 (see also Annex B). Otherwise, information concerning the desired joint and weld configuration shall be shown on the drawing or elsewhere.

NOTE In general, elementary symbols are similar in shape/geometry to the shape of the actual joint. They can also indicate the type of joint prior to welding, for example V butt weld.

Table 1 — Elementary symbols





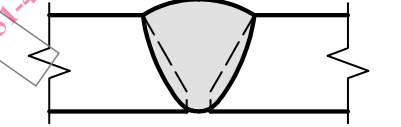

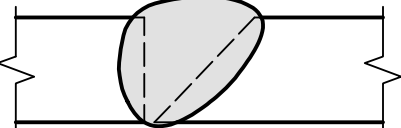
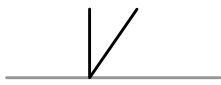
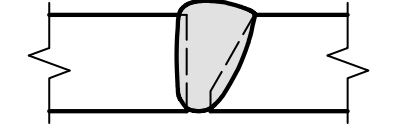
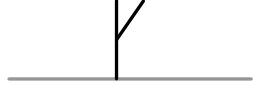
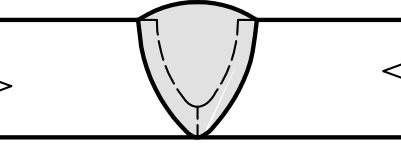
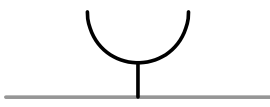
No.	Weld Preparation and type	Illustration of Weld (dashed lines show joint preparation prior to welding)	Symbol ^a
1	Square butt ^b		
2	Single-V butt ^b		
3	Single-V butt with broad root face (see ISO 9692) ^b		
4	Single-bevel butt ^b		
5	Single-bevel butt with broad root face ^b		
6	Single-U butt ^b		

Table 1 (continued)

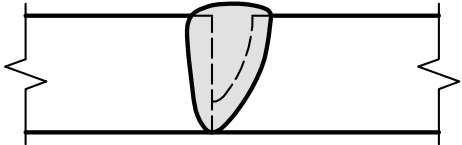
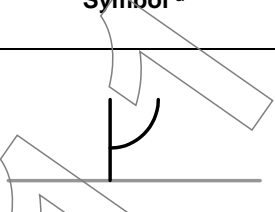
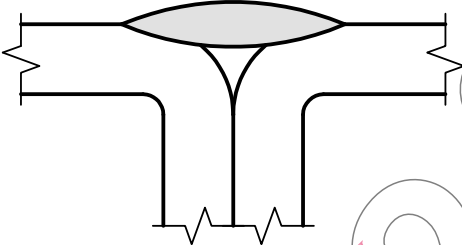

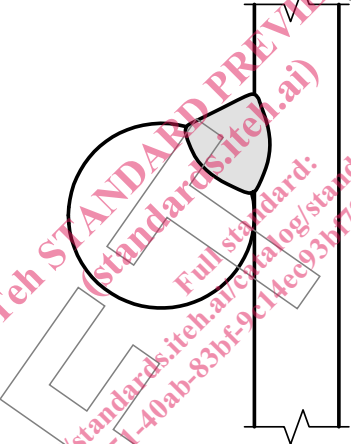

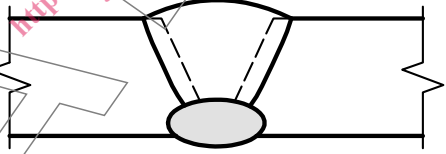

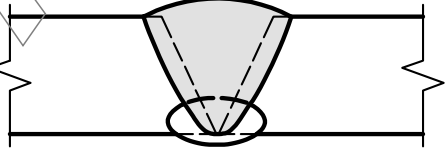
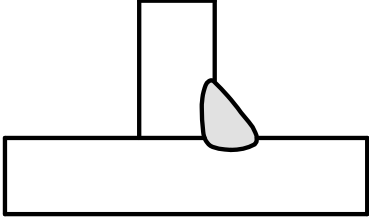
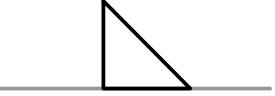
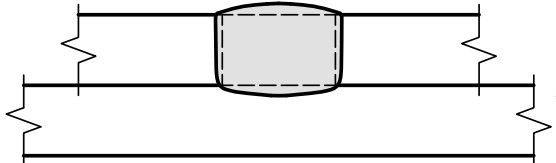
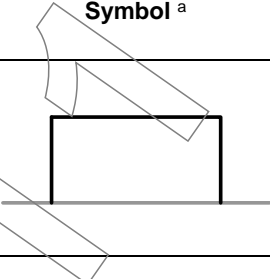
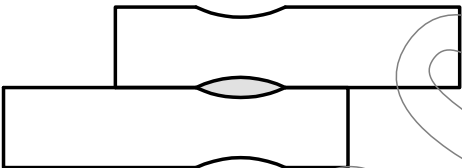
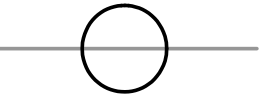
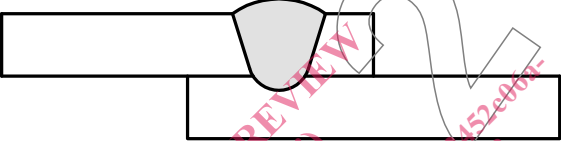
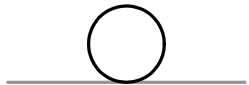

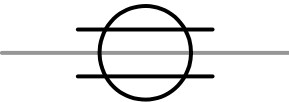
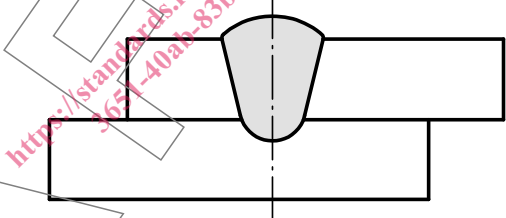
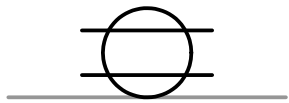
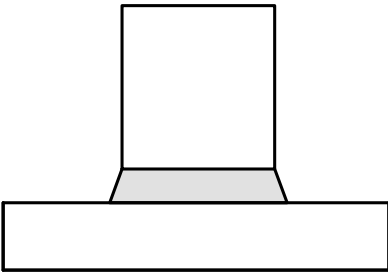

No.	Weld Preparation and type	Illustration of Weld (dashed lines show joint preparation prior to welding)	Symbol ^a
7	Single-J butt ^b		
8	Flare V		
9	Flare Bevel		
10	a) Back weld/ sealing run/UK ^c (made after the single-V butt weld)		
	b) Backing weld ^c (made before the single- V butt weld)		
11	Filler		

Table 1 (continued)

No.	Weld Preparation and type	Illustration of Weld (dashed lines show joint preparation prior to welding)	Symbol ^a
12	Plug or slot		
13	Resistance Spot (including projection)		
14	Fusion spot		
15	Resistance seam		
16	Fusion seam		
17	Stud		
18	Steep-flanked Single-V butt ^b	