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Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination

Essais destructifs des soudures sur matériaux métalliques — Essai de flexion par choc — Position de l'éprouvette, orientation de l'entaille et examen

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 5, *Testing and inspection of welds*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 121, *Welding and allied processes*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 9016:2012), which has been technically revised.

The main changes are as follows:

— a column has been deleted from Table A.1.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Official interpretations of ISO/TC 44 documents, where they exist, are available from this page: https://committee.iso.org/sites/tc44/home/interpretation.html.

Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination

1 Scope

This document specifies the method to be used when describing test specimen location and notch orientation for the testing and reporting of impact tests on welded butt joints.

This document applies to impact tests on metallic materials in all forms of product made by any fusion and pressure welding process.

It is used in addition to the ISO 148 series and includes test specimen denomination and additional reporting requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Principle

Impact testing shall be in accordance with ISO 148-1. The test temperature, location, type and size of test specimen, and notch orientation shall be in accordance with the relevant application standard.

In addition to the requirements of ISO 148-1, the notch position may be located by macroetching.

5 Method of denomination

5.1 Lettering system

The denomination is based on a lettering system to describe the type, location and notch orientation and a numbering system to show the distance (in mm) of the notch from reference lines (RL). The method of denomination is shown in Tables 1 and 2. The test specimen shall be taken from the welded joint such that its longitudinal axes are at right angles to the weld length.

5.2 Characters

The denomination comprises the following characters:

— first character — U: Charpy U- notch.

V: Charpy V-notch.

— second character — W: notch in the weld metal; the reference line is the centre line of the weld at the position of the test specimen.

H: notch in the heat affected zone; the reference line is the fusion or the joint line (notch will include HAZ).

— third character — S: notched face parallel to the surface.

NOTE This orientation is equivalent to the denomination “surface notch” used in fracture mechanics testing.

T: notch through the thickness.

— fourth character — *a*: the distance of the centre of the notch from the reference line (if the centre of the notch is the welded metal and in its centre line, $a = 0$, which should be recorded).

— fifth character — *b*: the distance from the weld joint face side to the nearer face of the test specimen (if this face of the test specimen is the weld joint face side, $b = 0$, which should be recorded).

NOTE In the case of double V, K or similar welds, the face side is the side that contains the larger width of the weld or from which the welding energy was first applied.

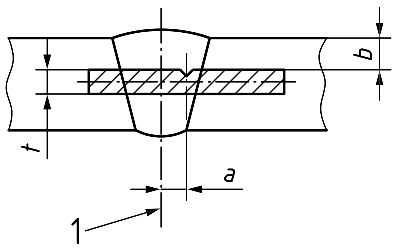
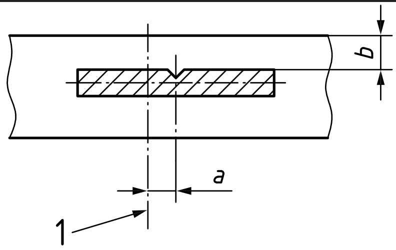
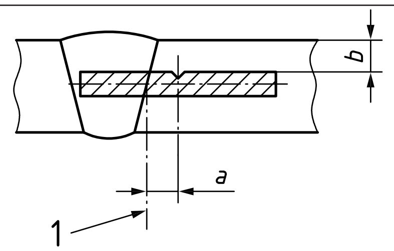
5.3 Additional information

In cases where this simple denomination does not sufficiently define the location or notch orientation, a sketch referring to the weld procedure should be provided.

6 Examples of denomination

Examples of denomination are given in Tables 1 and 2 and Figure 1.

Table 1 — Notched face parallel to the surface of the test piece (S position)

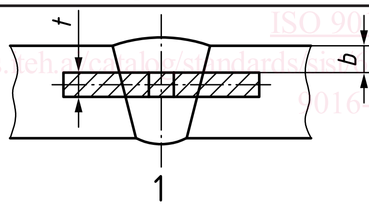
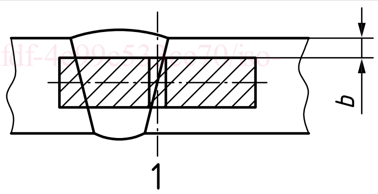
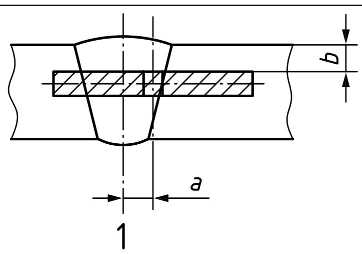
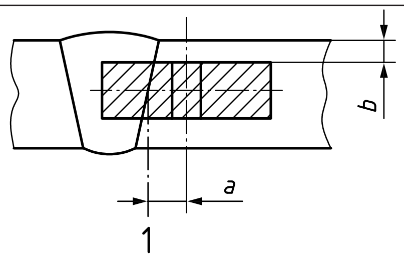
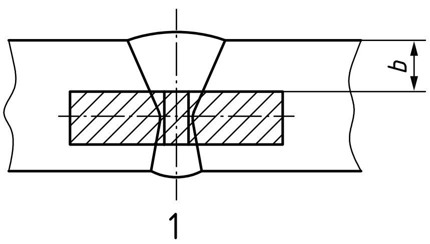
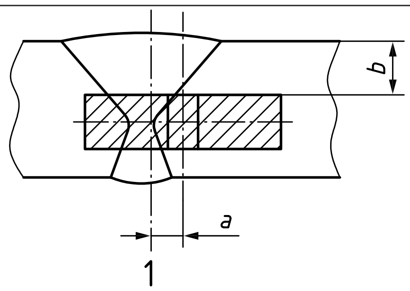
Denomination	Centre of the weld	Denomination	Fusion/joint line
	Representation		Representation
VWS a/b		VHS a/b (pressure weld)	
		VHS a/b (fusion weld)	

Key

1 reference line

t test specimen dimension in the cross section

Table 2 — Notched face perpendicular to the surface of the test piece (T position)

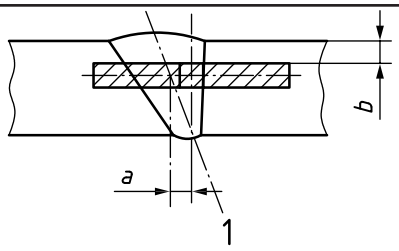
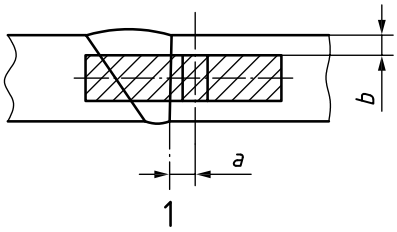
Denomination	Centre of the weld	Denomination	Fusion/joint line
	Representation		Representation
VWT 0/b		VHT 0/b	
VWT a/b		VHT a/b	
VWT 0/b		VHT a/b	

Key

1 reference line

t test specimen dimension in the cross section

Table 2 *(continued)*

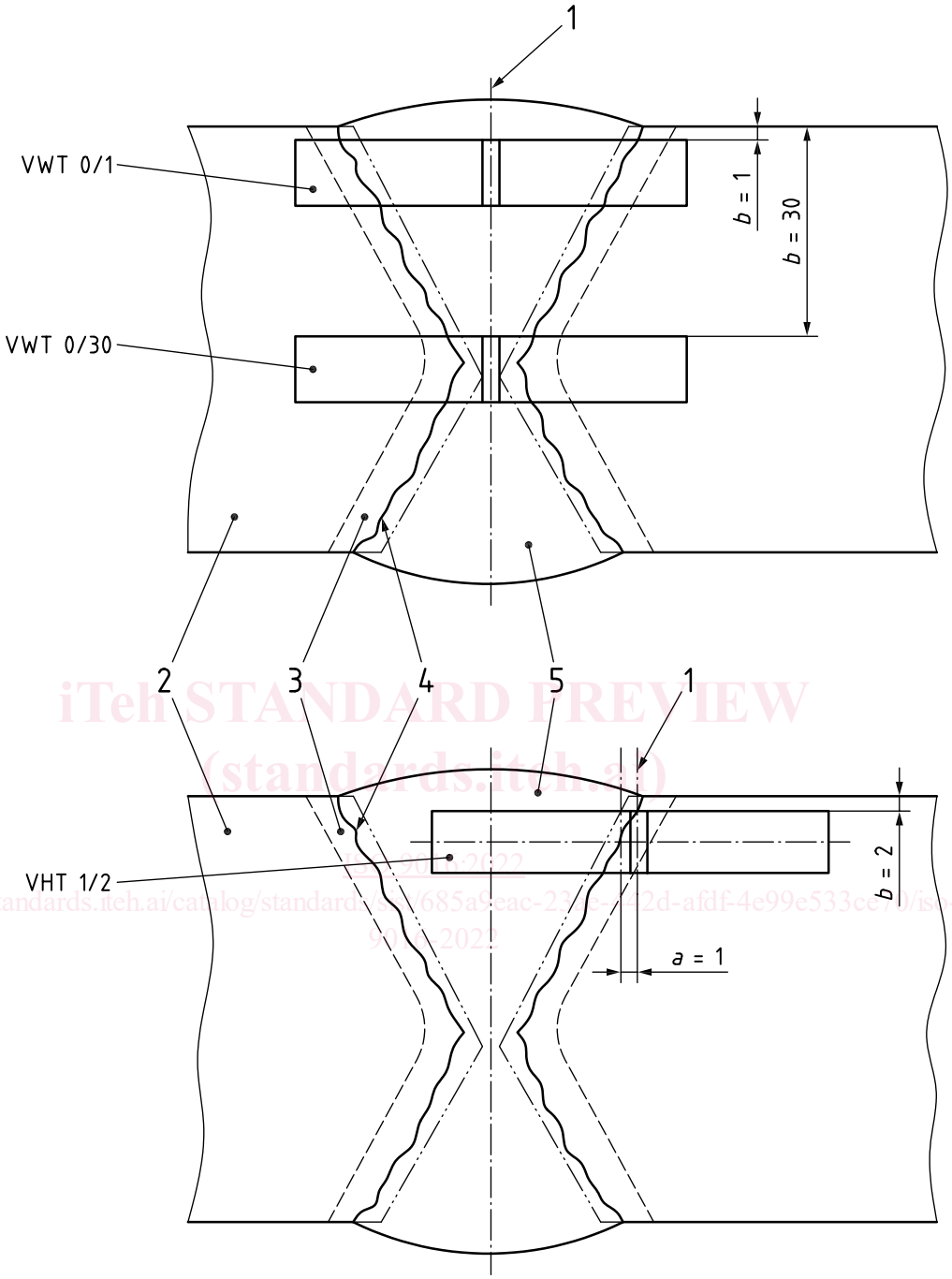
Denomination	Centre of the weld Representation	Denomination	Fusion/joint line Representation
VWT a/b		VHT a/b	

Key

1 reference line

t test specimen dimension in the cross section

Dimensions in millimetres



Key

1 axis of the notch
2 parent metal
3 heat affected zone
4 fusion line
5 weld metal

Figure 1 — Typical examples of denomination

7 Examination

The test specimens designated by this document shall be tested in accordance with ISO 148-1.

8 Test report

The test report shall include the following information in addition to that given in ISO 148-1:

a) a reference to this document, i.e. ISO 9016:2022;

b) the test specimen denomination;

c) the type and dimensions of observed imperfections, if any;

d) a sketch if required;

e) other information as required by the application standard and/or by agreement between the contracting parties.

An example of a typical test report is given in Annex A.