INTERNATIONAL STANDARD

ISO 9016

Second edition
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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

Reference number
ISO 9016:2012(E)

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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.

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.

ISO 9016 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 5, *Testing and inspection of welds*.

This second edition cancels and replaces the first edition (ISO 9016:2001), which has been technically revised.

Requests for official interpretations of any aspect of this International Standard should be directed to the Secretariat of ISO/TC 44/SC 5 via your national standards body. A complete listing of these bodies can be found at www.iso.org.

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

1 Scope

This International Standard specifies mainly 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 International Standard applies to impact tests on metallic materials in all forms of product made by any fusion welding process.

It is used in addition to ISO 148 (all parts) and includes test specimen denomination and additional reporting requirements.

2 Normative reference

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 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method*

3 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.

4 Method of denomination

4.1 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 millimetres) 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.

4.2 Characters

The denomination comprises the following characters:

— 1st character U: Charpy U- notch.

V: Charpy V-notch.

— 2nd 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).

— 3rd 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.

— 4th character *a*: the distance of the centre of the notch from the reference line (if *a* is at the centre line of the weld, *a* = 0 which should be recorded).

— 5th character *b*: the distance from the weld joint face side to the nearer face of the test specimen (if *b* is at the surface of the weld, *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.

4.3 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.

5 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)

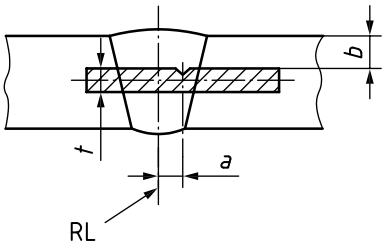
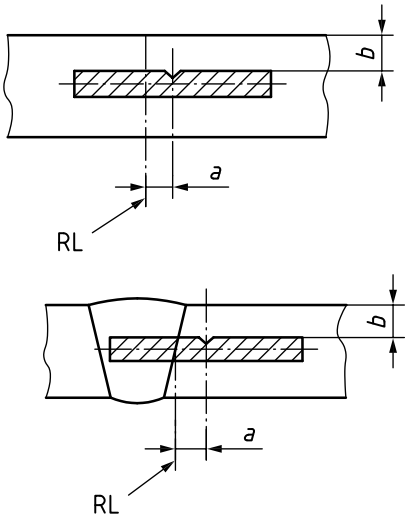
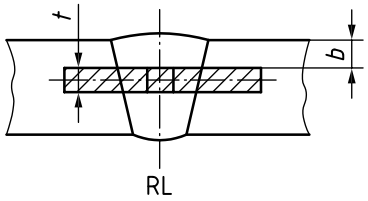
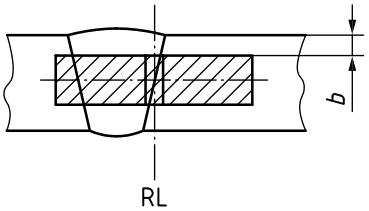
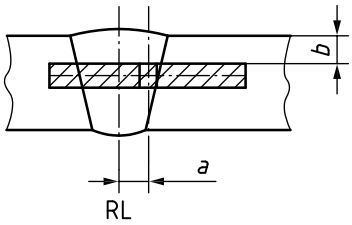
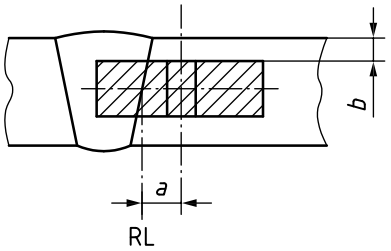
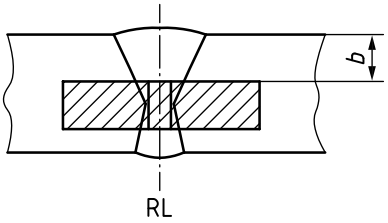
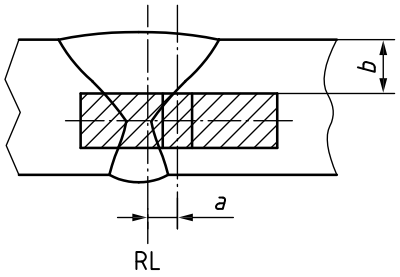
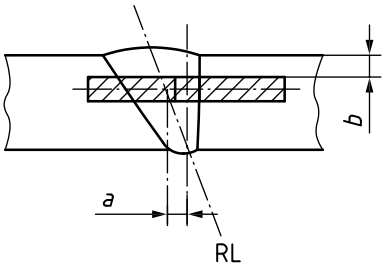
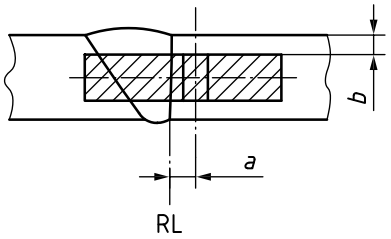
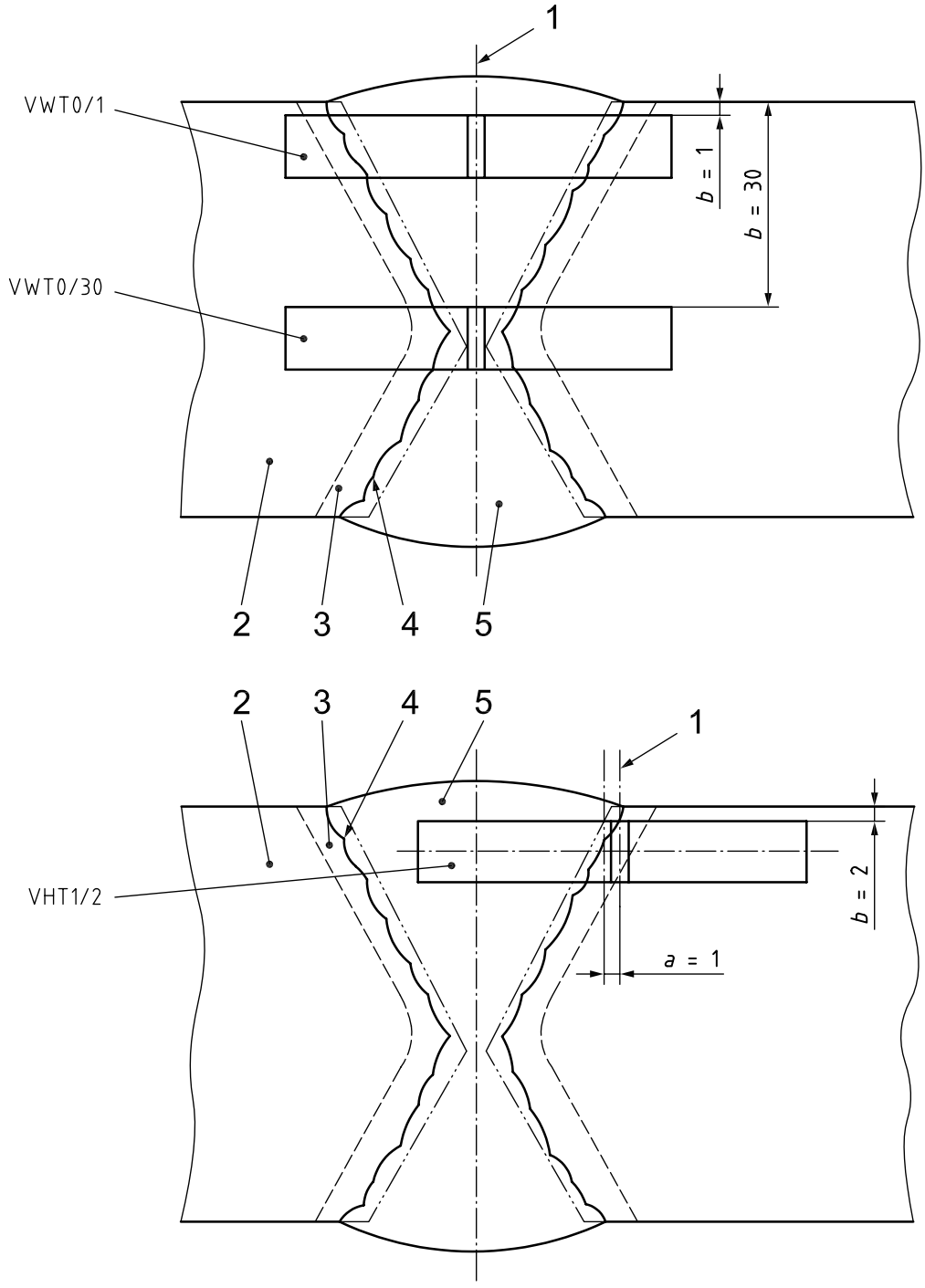
Denomination	Centre of the weld	Denomination	Fusion/joint line
	Representation		Representation
VWS *a*/*b*		VHS *a*/*b* (pressure weld) VHS *a*/*b* (fusion weld)	

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

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

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

6 Examination

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

7 Test report

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

a) reference to this International Standard, i.e. ISO 9016;

b) test specimen denomination;

c) sketch if required;

d) type and dimensions of imperfections observed;

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.

Annex A
(informative)

Example of a test report

No. .....

According to pWPS .....

According to test result "tensile test"

test result " ....."

Manufacturer: .....

Purpose of the examination: .....

Form of product: .....

Parent metal: .....

Filler metal: .....

Table A.1 — Impact test in accordance with ISO 9016

Test specimen No.	Denomination	Type and dimension mm	Test temperature °C	Impact toughness J/cm²	Impact absorbed energy J	Remarks		
						Location of fracture [a]	Type of fracture [a]	Type and size of imperfection

[a] If required.

Examiner or test body:

.....

(name, date and signature)

Certified by:

.....

(name, date and signature)

Bibliography

[1] ISO 148-2, *Metallic materials — Charpy pendulum impact test — Part 2: Verification of testing machines*

[2] ISO 148-3, *Metallic materials — Charpy pendulum impact test — Part 3: Preparation and characterization of Charpy V-notch test pieces for indirect verification of pendulum impact machines*

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