INTERNATIONAL STANDARD

ISO 9956-3

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AMENDMENT 1
1998-11-01

Specification and approval of welding procedures for metallic materials —

Part 3:
Welding procedure tests for arc welding of steels

AMENDMENT 1

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques

Partie 3: Épreuve de qualification d'un mode opératoire de soudage à l'arc sur acier

AMENDEMENT 1

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 3.

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.

Amendment 1 to International Standard ISO 9956-3:1995 was prepared by ISO Technical Committee ISO/TC 44 *Welding and allied processes*, Subcommittee SC 10 *Unification of requirements in the field of welding*. It is based on – and equivalent to – EN 288-3:1992/A 1:1997.

This amendment was prepared with the aim of not changing the content technically, but of clarifying the existing standard by modifications brought about by experience gathered during application.

It is intended and under discussion to revise ISO 9956-3 technically, applying the parallel procedure according to the Vienna agreement under leadership of CEN/TC 121/SC 1. After the technical revision, the number of this International Standard will be changed to ISO 15614-1, and EN ISO 15614-1.

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Specification and approval of welding procedures for metallic materials —

Part 3:
Welding procedure tests for arc welding of steels

AMENDMENT 1

Page 1, clause 1

Amend the list of processes as follows:

Arc welding is covered by the following processes in accordance with ISO 4063:

111 — metal-arc welding with covered electrode;

114 — flux-cored metal-arc welding without gas shield;

121 — submerged arc welding with wire electrode;

122 — submerged arc welding with strip electrode;

131 — metal-arc inert gas welding, MIG welding;

135 — metal-arc active gas welding, MAG welding;

136 — flux-cored wire metal-arc welding with active gas shield;

137 — flux-cored wire metal-arc welding with inert gas shield;

141 — tungsten inert gas welding, TIG welding;

15 — plasma arc welding.

Page 2, clause 2

Delete the text of clause 2 and replace by the following:

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 9956. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 9956 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3452:1984, *Non-destructive testing — Penetrant inspection — General principles.*

ISO 4136:—[1], *Destructive tests on welds in metallic materials – Transverse tensile test.*

ISO 5173:—[2], *Destructive tests on welds in metallic materials – Bend test.*

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 9015:—[3], *Destructive tests on welds in metallic materials — Hardness testing — Hardness test on arc welded joints.*

ISO 9016:—[3], *Destructive tests on welds in metallic materials – Impact tests – Test specimen location, notch orientation and examination.*

ISO 9606-1:1994, *Approval testing of welders – Fusion welding – Part 1: Steels.*

ISO 9956-2:1995, *Specification and approval of welding procedures for metallic materials – Part 2: Welding procedure specification for arc welding.*

EN 970:1997, *Non-destructive examination of fusion welds — Visual examination.*

EN 1290:1997, *Non-destructive examination of welds — Magnetic particle examination of welds.*

EN 1321:1996, *Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds.*

EN 1435:1997, *Non-destructive examination of welds — Radiographic examination of welded joints.*

EN 1714:1997, *Non destructive examination of welds — Ultrasonic examination of welded joints.*

Page 3, clause 4

Delete the text of clause 4 and replace by the following:

The preliminary welding procedure specification shall be prepared in accordance with ISO 9956-2. It shall specify the tolerance for all the relevant parameters.

Page 3, subclause 6.2

Delete the text of 6.2 and replace by the following:

The test pieces shall be of a size sufficient to ensure reasonable heat distribution.

In figures 1 to 5 "t" is the thickness of the thicker component part from t_1 and t_2

If t > 100 mm, test piece dimensions a and b may be reduced by agreement.

Additional test pieces, or longer test pieces than the minimum size, may be prepared in order to allow for extra and/or for re-testing specimens (see 7.5).

If required by the application standard, the direction of plate rolling shall be marked on the test piece when impact tests are required to be taken in the Heat Affected Zone (HAZ).

The thickness and/or pipe outside diameter of the test pieces shall be selected in accordance with 8.3.2.1 to 8.3.2.4.

Unless otherwise agreed, the shape and minimum dimensions of the test piece shall be as follows.

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[1] To be published. (Revision of ISO 4136:1989)

[2] To be published. (Revision of ISO 5173:1981)

[3] To be published.

Page 3, subclause 6.2.3

Delete the text of 6.2.3 and replace by the following:

A T-butt joint is considered as a fully penetrated joint.

Page 3, subclause 6.2.5

Amend the title to "Fillet weld in plate or pipe".

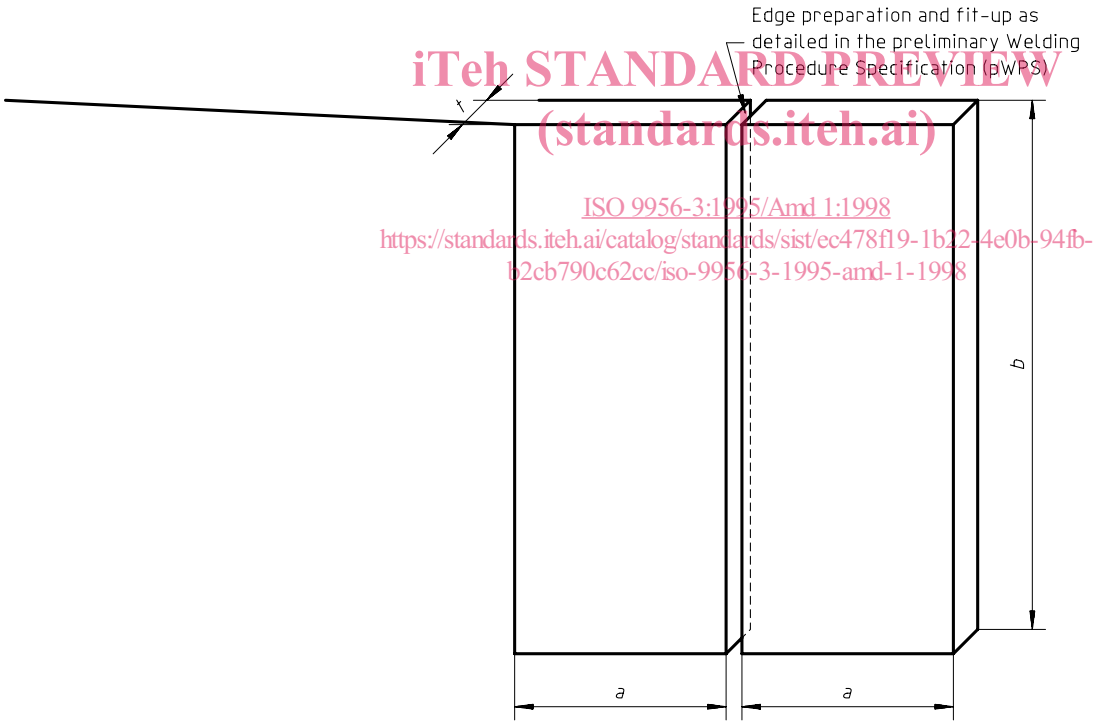
Delete the text of 6.2.5 and replace by the following:

The test piece shall be in accordance with figure 4 or 5.

These may also be used for partial penetration joints (with or without edge preparation).

Page 4, figure 1

Amend as follows:



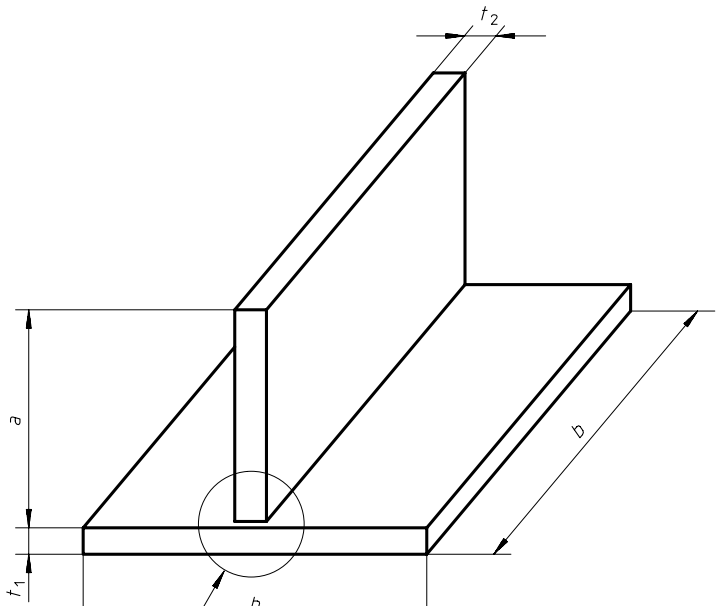
a = 3t; minimum value 150 mm

b = 6t; minimum value 350 mm

Figure 1 — Test piece for a butt weld in plate

Page 5, figure 3

Amend as follows:



a = 3t; minimum value 150 mm

b = 6t; minimum value 350 mm

Figure 3 — Test piece for a T-butt joint

Page 7, subclause 6.3

Delete the text of 6.3 and replace by the following:

Preparation and welding of test pieces shall be carried out in accordance with the pWPS, and under the general conditions of welding in the production which they shall represent. Welding positions and limitations for the angle of slope and rotation of the test piece shall be in accordance with ISO 6947.

If tack welds are to be fused into the final joint they shall be included in the test piece.

Welding and testing of the test pieces shall be witnessed by an examiner or examining body.

Page 8, table 1

Amend as follows:

Table 1 — Examination and testing of the test pieces

Test piece	Type of test	Extent of testing	Footnote
Butt-weld	Visual	100 %	–
figures 1 and 2	Radiographic or ultrasonic	100 %	d
	Surface crack detection	100 %	a
	Transverse tensile test	2 specimens	–
	Transverse bend test	2 root and 2 face specimens	b
	Impact test	2 sets	f
	Hardness test	required	c
	Macro-examination	1 specimen	–
T-butt joint [e]	Visual	100 %	–
figure 3	Surface crack detection	100 %	a
Branch connection [e]	Ultrasonic or radiographic	100 %	d and g
figure 4	Hardness test	required	c
	Macro-examination	2 specimens	–
Fillet weld on plate [e]	Visual	100 %	–
figure 5	Surface crack detection	100 %	a
Fillet weld on pipe [e]	Macro-examination	2 specimens	–
figure 4	Hardness test	required	c

a Penetrant testing or magnetic particle testing.

For non-magnetic materials, penetrant testing.

b 2 root and 2 face bend test specimens may preferably be substitued by 4 side bend test specimens for $t \geqslant 12$ mm.

c Not required for parent metals:

— ferritic steels with $R_m \leqslant 430$ N/mm^2 ($R_e \leqslant 275$ N/mm^2);
— group 9 steels.

R_e is defined in the relevant product standard.

d Ultrasonic testing is only applicable for ferritic steels and for $t > 8$ mm.

e Testing as detailed does not provide information on the mechanical properties of the joint. Where these properties are relevant to the application an additional approval shall also be held e.g. a butt weld approval.

f One set in the weld metal and one set in the HAZ. Required only for $t \geqslant 12$ mmn and only for parent metals having specified impact properties or when required by the application standard. If a testing temperature has not been specified, testing shall be performed at room temperature. See also 7.4.4.

g For outside diameter $\leqslant 50$ mm no ultrasonic test is required.

For outside diameter > 50 mm and where it is not technically possible to carry out ultrasonic examination, a radiographic examination shall be carried out provided that the joint configuration will allow meaningful results.

Page 8, subclause 7.3.1

Delete the text of 7.3.1 and replace by the following:

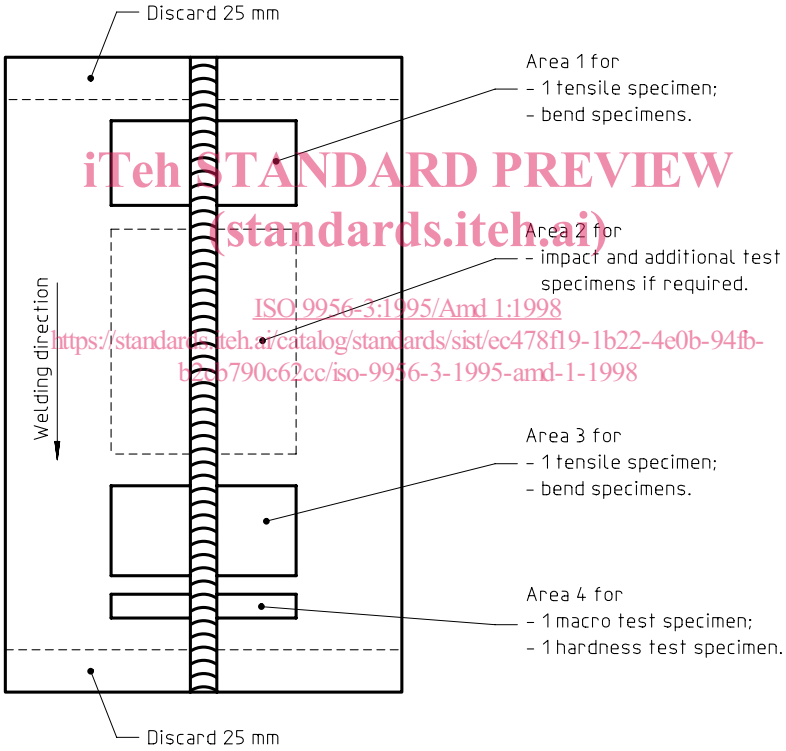
After any required post-weld heat treatment and prior to the cutting of test specimens, all test pieces shall be examined visually and non-destructively in accordance with 7.1.

For non-post-weld heat treated test pieces, account should be taken of the materials that are susceptible to hydrogen-induced cracking and consequently the NDE should be delayed.

Depending upon joint geometry, materials and the requirements for work, the NDE shall be carried out in accordance with EN 970 (visual examination), EN 1435 (radiographic examination), EN 1714 (ultrasonic examination), ISO 3452 (penetrant testing) and EN 1290 (magnetic testing).

Page 9, figure 6

Amend the notes on the figure as follows:



NOTE Not to scale.

Figure 6 — Location of test specimens for a butt weld in plate

Page 9, figure 7

Amend the notes on the figure as follows:

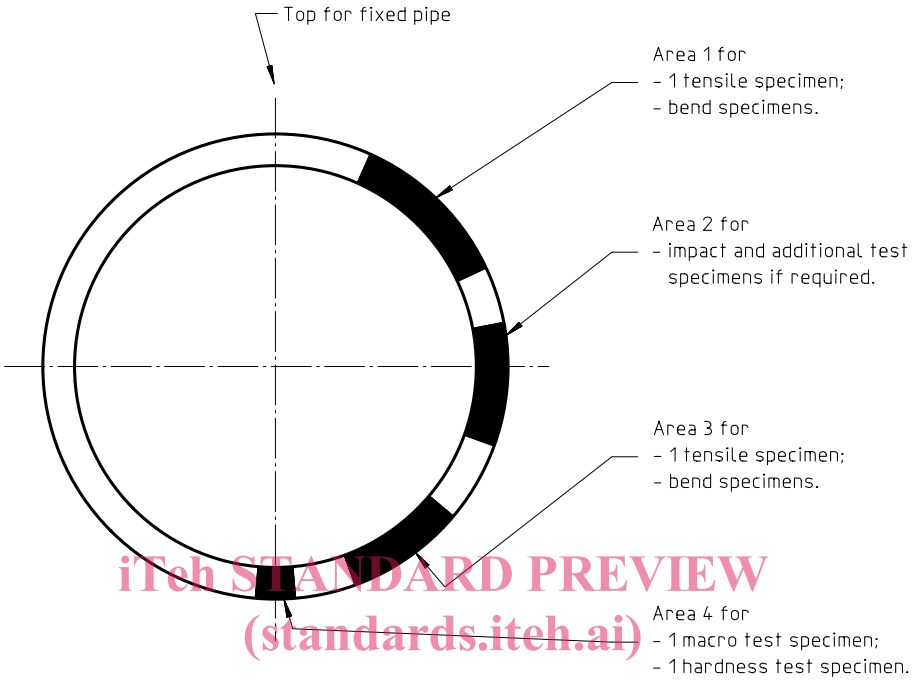


Figure 7 — Location of test specimens for a butt weld in pipe