

SLOVENSKI STANDARD

SIST EN ISO 15614-1:2004

01-september-2004

Nadomešča:

SIST EN 288-3:1996

SIST EN 288-3:1996/A1:1999

Specifikacija in razvrščanje varilnih postopkov za kovinske materiale - Preskus postopka varjenja - 1. del: Obločno in plinsko varjenje jekel in obločno varjenje niklja in nikljevih zlitin (ISO 15614-1:2004)

Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2004)

(standards.iteh.ai)

Anforderung und Qualifizierung von Schweißverfahren für metallische Werkstoffe - Schweißverfahrensprüfung - Teil 1: Lichtbogen- und Gasschweißen von Stählen und Lichtbogenschweißen von Nickel und Nickellegierungen (ISO 15614-1:2004)

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques - Epreuve de qualification d'un mode opératoire de soudage - Partie 1: Soudage à l'arc et aux gaz des aciers et soudage à l'arc des nickels et alliages de nickel (ISO 15614-1:2004)

Ta slovenski standard je istoveten z: EN ISO 15614-1:2004

ICS:

25.160.10	Varilni postopki in varjenje	Welding processes
77.080.20	Jekla	Steels
77.120.40	Nikelj, krom in njune zlitine	Nickel, chromium and their alloys

SIST EN ISO 15614-1:2004

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 15614-1:2004](#)

<https://standards.iteh.ai/catalog/standards/sist/bb20ba22-0c4e-44ed-be05-2f873d749875/sist-en-iso-15614-1-2004>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 15614-1

June 2004

ICS 25.160.10

English version

Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2004)

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques - Epreuve de qualification d'un mode opératoire de soudage - Partie 1: Soudage à l'arc et aux gaz des aciers et soudage à l'arc des nickels et alliages de nickel (ISO 15614-1:2004)

Anforderung und Qualifizierung von Schweißverfahren für metallische Werkstoffe - Schweißverfahrensprüfung - Teil 1: Lichtbogen- und Gasschweißen von Stählen und Lichtbogenschweißen von Nickel und Nickellegierungen (ISO 15614-1:2004)

This European Standard was approved by CEN on 7 May 2003.

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.

<https://standards.iteh.ai/catalog/standards/sist/bb20ba22-0c4e-44ed-be05-1872d7f8751a/iso-15614-1:2004>

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	page
Foreword.....	3
Introduction	4
1 Scope	4
2 Normative references	5
3 Terms and definitions.....	6
4 Preliminary welding procedure specification (pWPS)	6
5 Welding procedure test.....	6
6 Test piece.....	6
6.1 General.....	6
6.2 Shape and dimensions of test pieces.....	6
6.3 Welding of test pieces	7
7 Examination and testing	10
7.1 Extent of testing.....	10
7.2 Location and taking of test specimens	12
7.3 Non-destructive testing.....	16
7.4 Destructive testing.....	16
7.5 Acceptance levels.....	19
7.6 Re-testing.....	19
8 Range of qualification	20
8.1 General.....	20
8.2 Related to the manufacturer	20
8.3 Related to the parent material	20
8.4 Common to all welding procedures	24
8.5 Specific to processes	26
9 Welding procedure qualification record (WPQR)	27
Annex A (informative) Welding Procedure Qualification Record form (WPQR)	28
Annex ZA (normative) Corresponding International and European Standards for which equivalents are not given in the text	31
Annex ZB (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU directives.....	32
Annex ZC (Informative) Clauses of this European Standard addressing essential requirements or other provisions of EU directives.....	33

Foreword

This document (EN ISO 15614-1:2004) has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS, in collaboration with Technical Committee ISO/TC 44 "Welding and allied processes".

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 December 2004, and conflicting national standards shall be withdrawn at the latest by December 2004.

This document replaces EN 288-3:1992.

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

For relationship with EU Directive(s), see informative annexes ZB and ZC, which are an integral part of this document.

Annex A is informative.

iTeh STANDARD PREVIEW

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/b520ba22-0c4e-44ed-be05-2f873d749875/sist-en-iso-15614-1-2004>

EN ISO 15614-1:2004 (E)**Introduction**

All new welding procedure tests are to be carried out in accordance with this standard from the date of its issue.

However, this European Standard does not invalidate previous welding procedure tests made to former national standards or specifications or previous issues of this standard.

Where additional tests have to be carried out to make the qualification technically equivalent, it is only necessary to do the additional tests on a test piece which should be made in accordance with this standard.

1 Scope

This European Standard is part of a series of standards, details of this series are given in EN ISO 15607:2003, annex A.

This standard specifies how a preliminary welding procedure specification is qualified by welding procedure tests.

This standard defines the conditions for the execution of welding procedure tests and the range of qualification for welding procedures for all practical welding operations within the range of variables listed in clause 8.

Tests shall be carried out in accordance with this standard. Additional tests may be required by application standards.

This standard applies to the arc and gas welding of steels in all product forms and the arc welding of nickel and nickel alloys in all product forms.

Arc and gas welding are covered by the following processes in accordance with EN ISO 4063:

- 111 - manual metal arc welding (metal-arc welding with covered electrode);
- 114 - self-shielded tubular-cored arc welding;
- 12 - submerged arc welding;
- 131 - metal inert gas welding, MIG welding;
- 135 - metal active gas welding, MAG welding;
- 136 - tubular-cored metal arc welding with active gas shield;
- 137 - tubular-cored metal arc welding with inert gas shield;
- 141 - tungsten inert gas arc welding; TIG welding;
- 15 - plasma arc welding;
- 311 - oxy-acetylene welding.

The principles of this European Standard may be applied to other fusion welding processes.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies, including amendments (including amendments).

EN 439, *Welding consumables – Shielding gases for arc welding and cutting.*

EN 571-1, *Non destructive testing – Penetrant testing – Part 1: General principles.*

EN 875, *Destructive tests on welds in metallic materials - Impact tests - Test specimen location, notch orientation and examination.*

EN 895, *Destructive tests on welds in metallic materials – Transverse tensile test.*

EN 910, *Destructive tests on welds in metallic materials – Bend tests.*

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

EN 1011-1 *Welding –Recommendations for welding of metallic materials –Part 1: General guidance for arc welding*

EN 1043-1:1995, *Destructive tests on welds in metallic materials – Hardness testing – Part 1: Hardness test on arc welded joints.*

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

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

EN 1418, *Welding personnel - Approval testing of welding operators for fusion welding and resistance weld setters for fully mechanized and automatic welding of metallic materials.*

EN 1435, *Non destructive examination of welds – Radiographic examination of welded joints.*

EN 1714, *Non destructive examination of welds – Ultrasonic examination of welded joints.*

EN ISO 4063, *Welding and allied processes – Nomenclature of processes and reference numbers (ISO 4063:1998).*

EN ISO 6947, *Welds - Working positions - Definitions of angles of slope and rotation (ISO 6947:1993).*

prEN ISO 9606-1, *Qualification testing of welders - Fusion welding - Part 1: Steels (ISO/DIS 9606-1:2000).*

EN ISO 9606-4, *Approval testing of welders – Fusion welding – Part 4: Nickel and nickel alloys. (ISO 9606-4:1999).*

EN 12062, *Non-destructive examination of welds - General rules for metallic materials.*

EN ISO 15607:2003, *Specification and qualification of welding procedures for metallic materials - General rules (ISO 15607:2003).*

CR ISO 15608:2000 , *Welding - Guidelines for a metallic material grouping system (ISO/TR 15608:2000).*

prEN ISO 15609-1, *Specification and approval of welding procedures for metallic materials – Welding procedure specification – Part 1: Arc welding (ISO/DIS 15609-1:2000).*

EN ISO 15609-2, *Specification and qualification of welding procedures for metallic materials – Welding procedure specification – Part 2: Gas welding (ISO 15609-2:2001).*

EN ISO 15613, *Specification and qualification of welding procedure for metallic materials – Qualification based on pre-production welding test (ISO 15613:2003).*

EN ISO 15614-1:2004 (E)

EN 25817, *Arc-welded joints in steel - Guidance on quality levels for imperfections (ISO 5817:1992)*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 15607:2003 apply.

4 Preliminary welding procedure specification (pWPS)

The preliminary welding procedure specification shall be prepared in accordance with prEN ISO 15609-1 or EN ISO 15609-2.

5 Welding procedure test

The welding and testing of test pieces shall be in accordance with clauses 6 and 7.

The welder or welding operator who undertakes the welding procedure test satisfactorily in accordance with this standard is qualified for the appropriate range of qualification according to prEN ISO 9606-1 or EN ISO 9606-4 or EN 1418, providing that the relevant testing requirements are met.

6 Test piece

iTeh STANDARD PREVIEW
(standards.iteh.ai)

6.1 General

The welded joint to which the welding procedure will relate in production shall be represented by making a standardized test piece or pieces, as specified in 6.2. Where the production/joint geometry requirements do not represent the standardized test pieces as shown in this standard, the use of EN ISO 15613 shall be required.

6.2 Shape and dimensions of test pieces

The length or number of test pieces shall be sufficient to allow all required tests to be carried out.

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 7.6).

For all test pieces except branch connections (see Figure 4) and fillet welds (see Figure 3) the material thickness, t , shall be the same for both plates/pipes to be welded.

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 8.3.2.3.

The shape and minimum dimensions of the test piece shall be as follows:

6.2.1 Butt joint in plate with full penetration

The test piece shall be prepared in accordance with Figure 1.

6.2.2 Butt joint in pipe with full penetration

The test piece shall be prepared in accordance with Figure 2.

NOTE The word "pipe", alone or in combination, is used to mean "pipe", "tube" or "hollow section".

6.2.3 T-joint

The test piece shall be prepared in accordance with Figure 3.

This may be used for fully penetrated butt welds or fillet welds.

6.2.4 Branch connection

The test piece shall be prepared in accordance with Figure 4. The angle α is the minimum to be used in production.

This may be used for fully penetrated joints (set-on or set-in or set-through joint) and for fillet welds.

6.3 Welding of test pieces

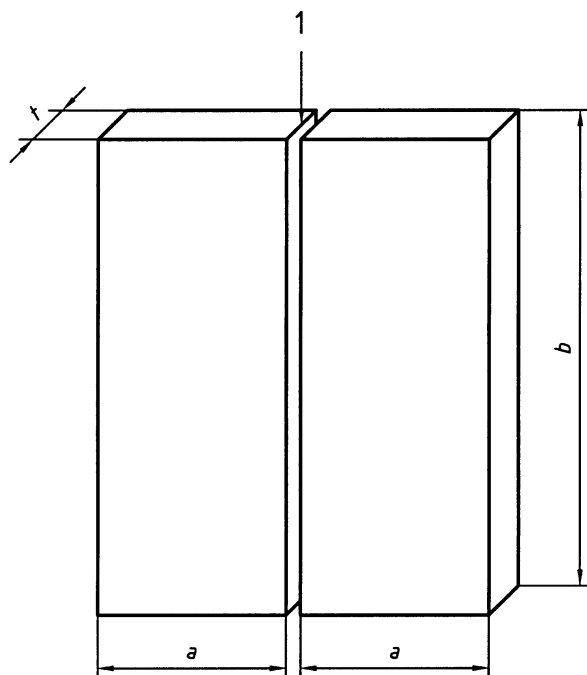
Preparation and welding of test pieces shall be carried out in accordance with the pWPS, and under the general conditions of welding in production which they shall represent. Welding positions and limitations for the angle of slope and rotation of the test piece shall be in accordance with EN ISO 6947.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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 15614-1:2004](https://standards.iteh.ai/catalog/standards/sist/bb20ba22-0c4e-44ed-be05-2f873d749875/sist-en-iso-15614-1-2004)

<https://standards.iteh.ai/catalog/standards/sist/bb20ba22-0c4e-44ed-be05-2f873d749875/sist-en-iso-15614-1-2004>



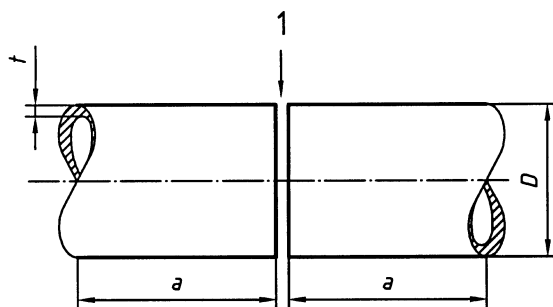
iTeh STANDARD PREVIEW (standards.iteh.ai)

Key

- 1 Joint preparation and fit-up as detailed in the preliminary Welding Procedure Specification (pWPS)
- a Minimum value 150 mm
- b Minimum value 350 mm
- t Material thickness

[SIST EN ISO 15614-1:2004
https://standards.iteh.ai/catalog/standards/sist/bb20ba22-0c4e-44ed-be05-2f873d749875/sist-en-iso-15614-1-2004](https://standards.iteh.ai/catalog/standards/sist/bb20ba22-0c4e-44ed-be05-2f873d749875/sist-en-iso-15614-1-2004)

Figure 1 — Test piece for a butt joint in plate with full penetration

**Key**

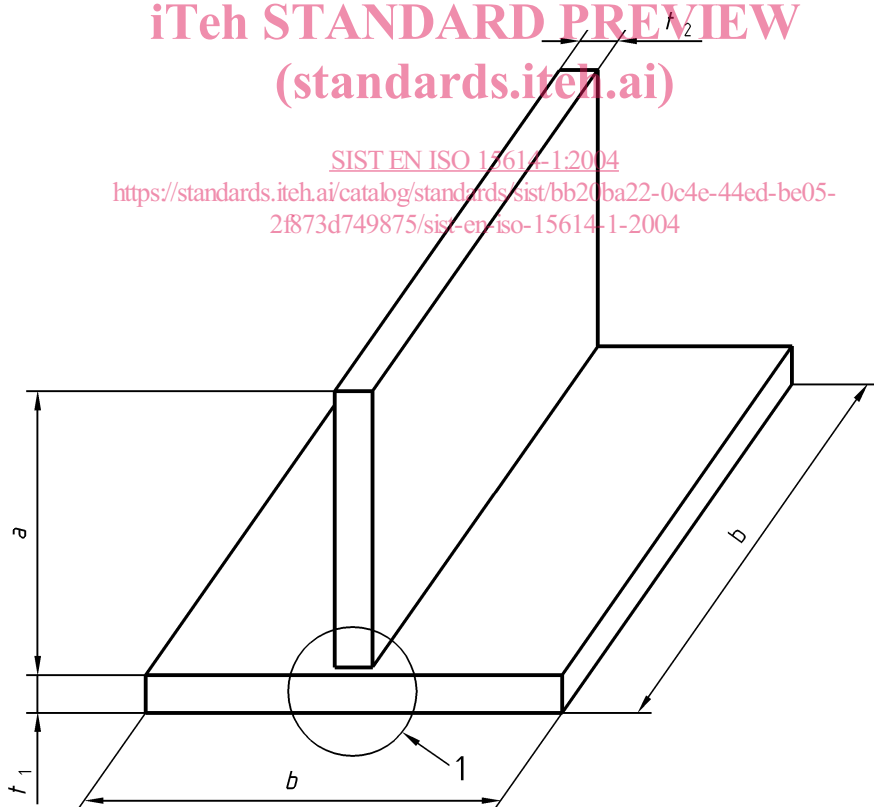
- 1 Joint preparation and fit-up as detailed in the preliminary Welding Procedure Specification (pWPS)
- a Minimum value 150 mm
- D Outside pipe diameter
- t Material thickness

Figure 2 — Test piece for a butt joint in pipe with full penetration

iTeh STANDARD PREVIEW
(standards.iteh.ai)

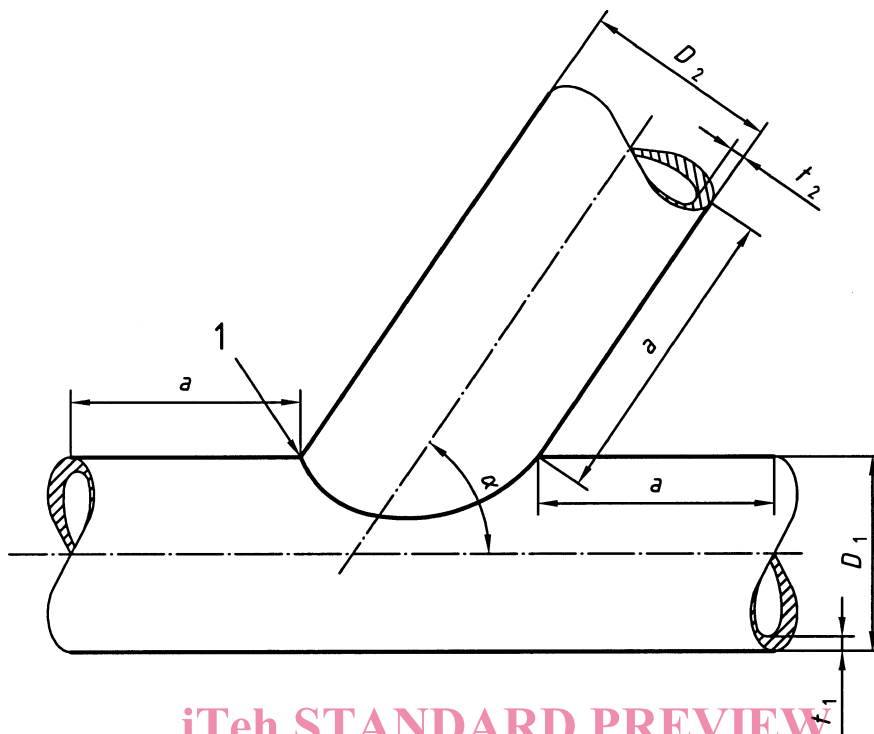
SIST EN ISO 15614-1:2004

<https://standards.iteh.ai/catalog/standards/sist/bb20ba22-0c4e-44ed-be05-2f873d749875/sist-en-iso-15614-1-2004>

**Key**

- 1 Joint preparation and fit-up as detailed in the preliminary Welding Procedure Specification (pWPS)
- a Minimum value 150 mm
- b Minimum value 350 mm
- t Material thickness

Figure 3 — Test piece for a T-joint



iTeh STANDARD PREVIEW
(standards.iteh.ai)

Key

- 1 Joint preparation and fit-up as detailed in the preliminary Welding Procedure Specification (pWPS)
 α Branch angle <https://standards.iteh.ai/catalog/standards/sist/bb20ba22-0c4e-44ed-be05-2f873d749875/sist-en-iso-15614-1-2004>
 a Minimum value 150 mm
 D_1 Outside diameter of the main pipe
 t_1 Main pipe material thickness
 D_2 Outside diameter of the pipe
 t_2 Branch pipe material thickness

Figure 4 — Test piece for a branch connection

7 Examination and testing

7.1 Extent of testing

Testing includes both non-destructive testing (NDT) and destructive testing which shall be in accordance with the requirements of Table 1.

An application standard may specify additional tests, e.g.:

- longitudinal weld tensile test;
- all weld metal bend test;
- corrosion tests;
- chemical analysis;