

SLOVENSKI STANDARD
SIST EN ISO 15614-5:2004**01-september-2004**

Popis in kvalifikacija varilnih postopkov za kovinske materiale - Preskus postopka varjenja - 5. del: Obločno varjenje titana, cirkonija in njihovih zlitin (ISO 15614-5:2004)

Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 5: Arc welding of titanium, zirconium and their alloys (ISO 15614-5:2004)

Anforderung und Qualifizierung von Schweißverfahren für metallische Werkstoffe - Schweißverfahrensprüfung - Teil 5: Lichtbogenschweißen von Titan, Zirkonium und ihren Legierungen (ISO 15614-5:2004)

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Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques - Epreuve de qualification d'un mode opératoire de soudage - Partie 5: Soudage à l'arc sur titane, zirconium et leurs alliages (ISO 15614-5:2004)

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SIST EN ISO 15614-5:2004**en**

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EUROPEAN STANDARD
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Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 5: Arc welding of titanium, zirconium and their alloys (ISO 15614-5:2004)

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This European Standard was approved by CEN on 3 November 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.

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EN ISO 15614-5:2004 (E)

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Foreword

This document (EN ISO 15614-5:2004) has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DIN, 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 September 2004, and conflicting national standards shall be withdrawn at the latest by September 2004.

Annex A is informative.

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 annex ZB which is an integral part of this document.

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.

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EN ISO 15614-5:2004 (E)**Introduction**

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

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

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.

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1 Scope

This standard is part of a series of standards, details of this series are given in prEN ISO 15607:2000, 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 welding of titanium, zirconium and their alloys in all product forms.

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

131 - metal inert gas welding, MIG welding

141 - tungsten inert gas welding, TIG welding

15 – plasma arc welding

The principles of this 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).

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

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

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 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 ISO 5817, *Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels for imperfections (ISO 5817:2003).*

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

EN ISO 9606-5, *Approval testing of welders - Fusion welding - Part 5: Titanium and titanium alloys, zirconium and zirconium alloys (ISO 9606-5:2000).*

prEN ISO 15607:2000, *Specification and approval of welding procedures for metallic materials – General rules. (ISO/DIS 15607:2000).*

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CR ISO 15608, *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)*.

prEN ISO 15613, *Specification and approval of welding procedure for metallic materials - Approval by a pre-production test (ISO/DIS 15613:2000)*.

3 Terms and definitions

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

4 Preliminary welding procedure specification (pWPS)

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

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 EN ISO 9606-5 or EN 1418 providing that the relevant testing requirements are met.

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6 Test piece

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6.1 General <https://standards.iteh.ai/catalog/standards/sist/001da2a6-2054-4172-910d-09cbeb4c8f5f/sist-en-iso-15614-5-2004>

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**6.2.1 General**

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 7.7).

For all test pieces except branch connections (see Figure 4) and fillet welds (see Figure 8) the material thickness, t , shall be the same for both plates/pipes to be welded.

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

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

6.2.2 Butt joint in plate with full penetration

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

6.2.3 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".

6.2.4 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.

6.2.5 Branch connection

The test piece shall be 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

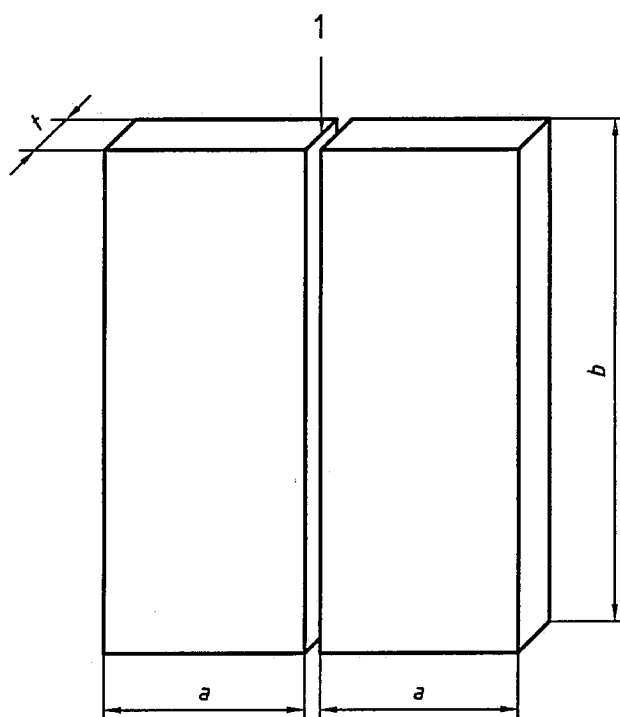
Preparation and welding of test pieces shall be carried out in accordance with the pWPS, and under the general conditions of welding in production which they shall represent. Welding positions and limitations for the angle of slope and rotation of the test piece shall be in accordance with EN ISO 6947.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

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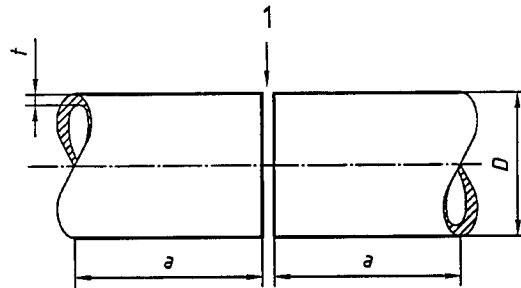
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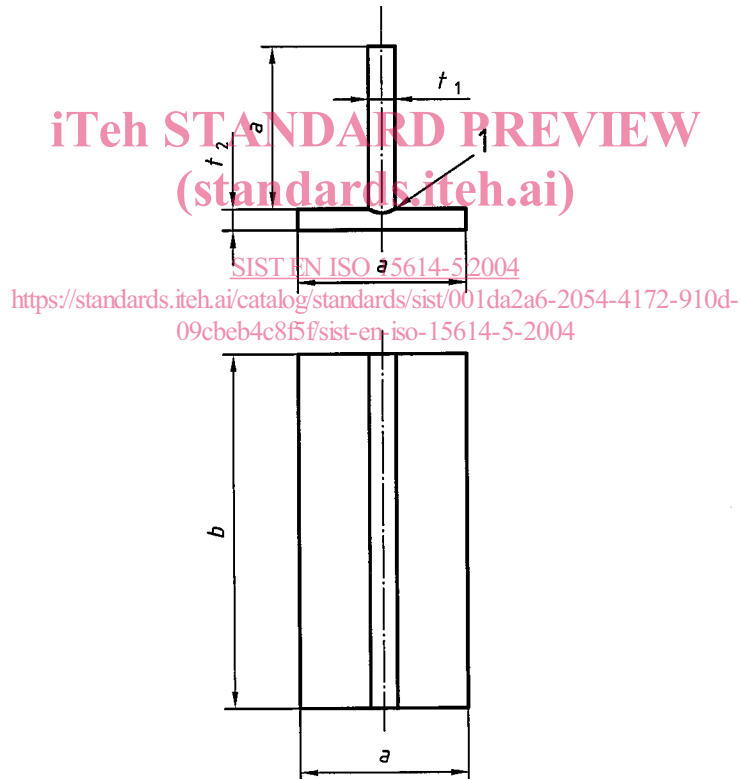
- 1 Joint preparation and fit-up as detailed in the preliminary Welding Procedure Specification (pWPS)
- a* Minimum value 150 mm
- b* Minimum value 300 mm
- t* Material thickness

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

**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