ICS 25.160.10 SLOVENSKÁ TECHNICKÁ NORMA December 2024

STN	**Stanovenie a schválenie postupov zvárania kovových materiálov Skúška postupu zvárania Časť 5: Oblúkové zváranie titánu, zirkónu a ich zliatin (ISO 15614-5: 2024)**	**STN EN ISO 15614-5** 05 0307

Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 5: Arc welding of titanium, zirconium and their alloys (ISO 15614-5:2024)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 11/24

Obsahuje: EN ISO 15614-5:2024, ISO 15614-5:2024

Oznámením tejto normy sa ruší
STN EN ISO 15614-5 (05 0307) z novembra 2004

139604

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 15614-5

September 2024

ICS 25.160.10

Supersedes EN ISO 15614-5:2004

English Version

Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 5: Arc welding of titanium, zirconium and their alloys (ISO 15614-5:2024)

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques - Épreuve de qualification d'un mode opératoire de soudage - Partie 5: Soudage à l'arc sur titane, zirconium et leurs alliages (ISO 15614-5:2024)

Anforderung und Qualifizierung von Schweißverfahren für metallische Werkstoffe - Schweißverfahrensprüfung - Teil 5: Lichtbogenschweißen von Titan, Zirkonium und ihren Legierungen (ISO 15614-5:2024)

This European Standard was approved by CEN on 6 February 2024.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN ISO 15614-5:2024 E

Contents

Page

European foreword

This document (EN ISO 15614-5:2024) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with Technical Committee CEN/TC 121 “Welding and allied processes” the secretariat of which is held by AFNOR.

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 March 2025, and conflicting national standards shall be withdrawn at the latest by March 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 15614-5:2004.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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

Endorsement notice

The text of ISO 15614-5:2024 has been approved by CEN as EN ISO 15614-5:2024 without any modification.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2014/68/EU (PED) aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/601 to provide one voluntary means of conforming to Essential Requirements of the New Approach Pressure Equipment Directive 2014/68/EU.

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZA.1 and application of the edition of the normatively referenced standards as given in Table ZA.2 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Annex I of the Directive 2014/68/EU (PED)

Essential Requirements of Directive 2014/68/EU (PED)	Clauses of this EN	Remarks/Notes
3.1.2, paragraphs 3, 4 and 5	5, 6, 7, 8 (except 8.4.1, paragraph 5), 9	Permanent joining. For pressure resistant components of pressure equipment in the categories II, III and IV the examiner/examining body is a competent third party.

Table ZA.2 — Applicable Standards to confer presumption of conformity as described in this Annex ZA

Column 1 Reference in Clause 2	Column 2 International Standard Edition	Column 3 Title	Column 4 Corresponding European Standard Edition
ISO 3452-1	ISO 3452-1:2021	*Non-destructive testing — Penetrant testing — Part 1: General principles*	EN ISO 3452-1:2021
ISO 4136	ISO 4136:2022	*Destructive tests on welds in metallic materials — Transverse tensile test*	EN ISO 4136:2022
ISO 5173	ISO 5173:2023	*Destructive tests on welds in metallic materials — Bend tests*	EN ISO 5173:2023
ISO 5817	ISO 5817:2023	*Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for*	EN ISO 5817:2023

Column 1 Reference in Clause 2	Column 2 International Standard Edition	Column 3 Title	Column 4 Corresponding European Standard Edition
		imperfections	
ISO 6947	ISO 6947:2019	*Welding and allied processes — Welding positions*	EN ISO 6947:2019
ISO 9606-5	ISO 9606-5:2000	*Approval testing of welders — Fusion welding — Part 5: Titanium and titanium alloys, zirconium and zirconium alloys*	EN ISO 9606-5:2000
ISO 14175	ISO 14175:2008	*Welding consumables - Gases and gas mixtures for fusion welding and allied processes*	EN ISO 14175:2008
ISO 14732	ISO 14732:2013	*Welding personnel - Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials*	EN ISO 14732:2013
ISO 15607	ISO 15607:2019	*Specification and qualification of welding procedures for metallic materials - General rules*	EN ISO 15607:2019
ISO 15609-1	ISO 15609-1:2019	*Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding*	EN ISO 15609-1:2019
ISO 15613	ISO 15613:2004	*Specification and qualification of welding procedures for metallic materials — Qualification based on pre-production welding test*	EN ISO 15613:2004
ISO 17636-1	ISO 17636-1:2022	*Non-destructive testing of welds — Radiographic testing — Part 1: X- and gamma-ray techniques with film*	EN ISO 17636-1:2022
ISO 17636-2	ISO 17636-2:2022 Corrected version 2023–02	*Non-destructive testing of welds — Radiographic testing — Part 2: X- and*	EN ISO 17636-2:2022

Column 1 Reference in Clause 2	Column 2 International Standard Edition	Column 3 Title	Column 4 Corresponding European Standard Edition
		gamma-ray techniques with digital detectors	
ISO 17637	ISO 17637:2016	*Non-destructive testing of welds — Visual testing of fusion-welded joints*	EN ISO 17637:2016
ISO 17639	ISO 17639:2022	*Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds*	EN ISO 17639:2022
ISO 25901-2	ISO 25901-2:2022	*Welding and allied processes — Vocabulary — Part 2: Health and safety*	EN ISO 25901-2:2023

The documents listed in the Column 1 of Table ZA.2, in whole or in part, are normatively referenced in this document, i.e. are indispensable for its application. The achievement of the presumption of conformity is subject to the application of the edition of Standards as listed in Column 4 or, if no European Standard Edition exists, the International Standard Edition given in Column 2 of Table ZA.2.

WARNING 1 Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 Other Union legislation may be applicable to the products falling within the scope of this standard.

International Standard

ISO 15614-5

Second edition
2024-02

Specification and qualification of welding procedures for metallic materials — Welding procedure test —

Part 5: Arc welding of titanium, zirconium and their alloys

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

Partie 5: Soudage à l'arc sur titane, zirconium et leurs alliages

Reference number
ISO 15614-5:2024(en)

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Published in Switzerland

Contents

Page

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 10, *Quality management in the field of welding*, 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 second edition cancels and replaces the first edition (ISO 15614-5:2004), which has been technically revised.

The main changes are as follows:

— normative references updated;

— Table 2 and Table 3 revised using the same format as ISO 15614-1;

— reference to EN 439 replaced with ISO 14175;

— process numbers updated in accordance with ISO 4063;

— Annex A updated.

A list of all parts in the ISO 15614 series can be found on the ISO website.

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.

Introduction

All new welding procedure tests are intended to be carried out in accordance with this document. However, this document does not invalidate previous welding procedure tests made to former national standards or specifications or the previous edition of this document.

Where additional tests have to be carried out to make a qualification technically equivalent, these should be done on a test piece which is made in accordance with this document.

International Standard **ISO 15614-5:2024(en)**

Specification and qualification of welding procedures for metallic materials — Welding procedure test —

Part 5:
Arc welding of titanium, zirconium and their alloys

1 Scope

This document specifies how a preliminary welding procedure specification (pWPS) is qualified by welding procedure tests.

This document specifies the conditions for the execution of welding procedure tests and the qualification range for welding procedures for all practical welding operations within the range of variables listed in Clause 8.

This document specifies the required tests. Additional tests can be required by application standards.

This document 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 ISO 4063:

131 – metal inert gas welding, MIG welding;

14 – tungsten inert gas welding, TIG welding;

15 – plasma arc welding.

The principles of this document can be applied to other fusion welding processes.

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 3452-1, *Non-destructive testing — Penetrant testing — Part 1: General principles*

ISO 4136, *Destructive tests on welds in metallic materials — Transverse tensile test*

ISO 5173, *Destructive tests on welds in metallic materials — Bend tests*

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

ISO 6947, *Welding and allied processes — Welding positions*

ISO 9606-5, *Approval testing of welders — Fusion welding — Part 5: Titanium and titanium alloys, zirconium and zirconium alloys*

ISO 14175, *Welding consumables — Gases and gas mixtures for fusion welding and allied processes*

ISO 14732, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials*

ISO 15607, *Specification and qualification of welding procedures for metallic materials — General rules*

ISO 15609-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding*

ISO 15613, *Specification and qualification of welding procedures for metallic materials — Qualification based on pre-production welding test*

ISO 17636 (all parts), *Non-destructive testing of welds — Radiographic testing*

ISO 17637, *Non-destructive testing of welds — Visual testing of fusion-welded joints*

ISO 17639, *Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds*

ISO/TR 25901 (all parts), *Welding and allied processes — Vocabulary*