

METALLIDE KEEVITUSPROTSEDUURIDE SPETSIFITSEERIMINE JA KVALIFITSEERIMINE

Keevitusprotseduuri katse

Osa 1: Teraste kaar- ja gaaskeevitus ning nikli ja niklisulamite kaarkeevitus

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 15614-1:2017, Corrected version 2017-10-01 +
ISO 15614-1:2017/Amd 1:2019)**

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

<p>See Eesti standard EVS-EN ISO 15614-1:2017+A1:2019 sisaldab Euroopa standardi EN ISO 15614-1:2017 ingliskeelset teksti ja selle muudatuse A1:2019 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 21.06.2017, muudatus A1 21.08.2019.</p> <p>Muudatusega A1 lisatud või muudetud teksti algus ja lõpp on tekstis ära märgitud märgenditega A1 A1.</p> <p>Standard on kättesaadav Eesti Standardikeskusest.</p>	<p>This Estonian standard EVS-EN ISO 15614-1:2017+A1:2019 consists of the English text of the European standard EN ISO 15614-1:2017 and its amendment A1:2019.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.</p> <p>Date of Availability of the European standard is 21.06.2017, for A1 21.08.2019.</p> <p>The start and finish of text introduced or altered by amendment A1 is indicated in the text by symbols A1 A1.</p> <p>The standard is available from the Estonian Centre for Standardisation.</p>
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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 15614-1:2017, Corrected version
2017-10-01+ ISO 15614-1:2017/Amd 1:2019)

Descriptif et qualification d'un mode opératoire de
soudage pour les matériaux métalliques - Épreuve de
qualification d'un mode opératoire de soudage - Partie
1: Soudage à l'arc et aux gaz des aciers et soudage à
l'arc du nickel et des alliages de nickel (ISO 15614-
1:2017, Version corrigée 2017-10-01
+ ISO 15614-1:2017/Amd 1:2019)

Anforderung und Qualifizierung von Schweißverfahren
für metallische Werkstoffe -
Schweißverfahrensprüfung - Teil 1: Lichtbogen- und
Gasschweißen von Stählen und Lichtbogenschweißen
von Nickel und Nickellegierungen (ISO 15614-1:2017,
korrigierte Fassung 2017-10-01
+ ISO 15614-1:2017/Amd 1:2019)

This European Standard was approved by CEN on 17 April 2017. Amendment A1 was approved by CEN on 16 December 2018.

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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

European foreword

This document (EN ISO 15614-1:2017) 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 DIN.

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 2017 and conflicting national standards shall be withdrawn at the latest by December 2017.

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 15614-1:2004.

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 ZA and ZB, which is an integral part of this document.

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Endorsement notice

The text of ISO 15614-1:2017, Corrected version 2017-10-01 has been approved by CEN as EN ISO 15614-1:2017 without any modification.

A1 Amendment A1 European foreword

This document (EN ISO 15614-1:2017/A1:2019) 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 DIN.

This Amendment to the European Standard ISO 15614-1:2017 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2020, and conflicting national standards shall be withdrawn at the latest by February 2020.


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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.

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 documents 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).

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This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 10, *Quality management in the field of welding*.

This second edition cancels and replaces the first edition (ISO 15614-1:2004), which has been technically revised. It also incorporates the Amendments ISO 15614-1:2004/Amd 1:2008 and ISO 15614-1:2004/Amd 2:2012 and the Technical Corrigendum ISO 15614-1:2004/Cor. 1:2005.

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

Requests for official interpretations of any aspect of this document should be directed to the Secretariat of ISO/TC 44/SC 10 via your national standards body. A complete listing of these bodies can be found at www.iso.org.

This corrected version of ISO 15614-1:2017 incorporates the following corrections:

- in Table 5, the value “10-5” has been added for test piece material A of group 10 for test piece material B of group 5;
- Figure 6 has been updated to match the Key.

A1 Amendment A1 Foreword

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Official interpretations of TC 44 documents, where they exist, are available from this page: <https://committee.iso.org/sites/tc44/home/interpretation.html>.

A list of all parts in the ISO 15614 series can be found on the ISO website. **A1**

Introduction

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

Two levels of welding procedure tests are given in order to permit application to a wide range of welded fabrication. They are designated by levels 1 and 2.

Level 1 is based on requirements of ASME Section IX and level 2 is based on the previous issues of this document.

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

1 Scope

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

This document applies to production welding, repair welding and build-up welding.

This document 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 qualification of this document.

The primary purpose of welding procedure qualification is to demonstrate that the joining process proposed for construction is capable of producing joints having the required mechanical properties for the intended application.

Two levels of welding procedure tests are given in order to permit application to a wide range of welded fabrication. They are designated by levels 1 and 2. In level 2, the extent of testing is greater and the ranges of qualification are more restrictive than in level 1.

Procedure tests carried out to level 2 automatically qualify for level 1 requirements, but not vice-versa.

When no level is specified in a contract or application standard, all the requirements of level 2 apply.

This document 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 ISO 4063.

111 — manual metal arc welding (metal-arc welding with covered electrode);

114 — self-shielded tubular-cored arc welding;

12 — submerged arc welding;

13 — gas-shielded metal arc welding;

14 — gas-shielded arc welding with non-consumable electrode;

15 — plasma arc welding;

311 — oxy-acetylene welding.

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

NOTE A former process number does not require a new qualification test according to this document.

Specification and qualification of welding procedures that were made in accordance with previous editions of this document may be used for any application for which the current edition is specified. In this case, the ranges of qualification of previous editions remain applicable.

It is also possible to create a new WPQR (welding procedure qualification record) range of qualification according to this edition based on the existing qualified WPQR, provided the technical intent of the testing requirements of this document has been satisfied. Where additional tests have to be carried out to make the qualification technically equivalent, it is only necessary to perform the additional test on a test piece.

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

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

ISO 4063, *Welding and allied processes — Nomenclature of processes and reference numbers*

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 6520-1, *Welding and allied processes — Classification of geometric imperfections in metallic materials — Part 1: Fusion welding*

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

ISO 9015-1, *Destructive tests on welds in metallic materials — Hardness testing — Part 1: Hardness test on arc welded joints*

ISO 9016, *Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination*

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

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

ISO 15609-2, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 2: Gas welding*

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

ISO 17636-1, *Non-destructive testing of welds — Radiographic testing — Part 1: X- and gamma-ray techniques with film*

ISO 17636-2, *Non-destructive testing of welds — Radiographic testing — Part 2: X- and gamma-ray techniques with digital detectors*

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

ISO 17638, *Non-destructive testing of welds — Magnetic particle testing*

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

ISO 17640, *Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels, and assessment*

ISO/TR 15608, *Welding — Guidelines for a metallic materials grouping system*

ISO/TR 17671-1, *Welding — Recommendations for welding of metallic materials — Part 1: General guidance for arc welding*

ISO/TR 18491, *Welding and allied processes — Guidelines for measurement of welding energies*

ISO/TR 20172, *Welding — Grouping systems for materials — European materials*

ISO/TR 20173, *Welding — Grouping systems for materials — American materials*

ISO/TR 20174, *Welding — Grouping systems for materials — Japanese materials*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 25901 (all parts) and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

run out length

length of a run produced by the melting of a covered electrode

Note 1 to entry: See ISO/TR 17671-2.

3.2

build-up welding

addition of weld metal to obtain or restore required dimensions

4 Preliminary welding procedure specification (pWPS)

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

5 Welding procedure test

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