

SLOVENSKI STANDARD
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Specifikacija in kvalifikacija varilnih postopkov za kovinske materiale - Preskus varilnega postopka - 1. del: Obločno in plamensko varjenje jekel in obločno varjenje niklja in nikljevih zlitin (ISO/DIS 15614-1:2013)

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/DIS 15614-1:2013)

Anforderung und Qualifizierung von Schweißverfahren für metallische Werkstoffe - Schweißverfahrensprüfung - Teil 1: Lichtbogen- und Gasschweißen von Stählen und Lichtbogenschweißen von Nickel und Nickellegierungen (ISO/DIS 15614-1:2013)

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 des nickels et alliages de nickel (ISO/DIS 15614-1:2013)

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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

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 des nickels et alliages de nickel

[Revision of first edition (ISO 15614-1:2004) and ISO 15614-1:2004/Cor.1:2005 and ISO 15614-1:2004/Amd.1:2008]

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ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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

ISO 15614-1 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 10, and by Technical Committee CEN/TC 121, *Welding* in collaboration.

This second/third/... edition cancels and replaces the first/second/... edition (ISO 15614-1:2004), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

ISO 15614 consists of the following parts, under the general title *Specification and qualification of welding procedures for metallic materials — Welding procedure test*:

ISO 15614 consists of the following parts, under the general title *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

Part 2: Arc welding of aluminium and its alloys

Part 3: Fusion welding of non-alloyed and low-alloyed cast iron

Part 4: Finishing welding of aluminium castings

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

Part 6: Arc and gas welding of copper and its alloys

Part 7: Overlay welding

Part 8: Welding of tubes to tube-plate joints

Part 9: Arc underwater hyperbaric wet welding

Part 10: Hyperbaric dry welding

Part 11: Electron and laser beam welding

Part 12: Spot, seam and projection welding

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Part 13: Resistance butt and flash welding

Part 14: Laser-arc hybrid welding of steels, nickel and nickel alloys

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Introduction

Requests for official interpretations of technical aspects of this International Standard should be directed to the Secretariat of ISO/TC 44/SC 10 via your national standards body; a listing of these bodies can be found at www.iso.org.

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

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 the ASME Section IX and level 2 is based on the previous issues of this standard.

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

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

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.

The primary purpose of welding procedure qualification is to demonstrate the mechanical properties of the weldment.

Two levels of welding procedure tests are given in order to permit application to a wide range of welded fabrication. They are designated by numbers 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 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 ISO 4063:2011. The sub-groups of the individual processes may be considered.

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 standard may be applied to other fusion welding processes.

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

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2 Normative references

The following referenced documents are indispensable for the application 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, *Non-destructive testing — Penetrant testing*

ISO 4136, *Destructive tests of welds in metallic materials — Traverse 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 9016, *Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination*

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

ISO 14175:2009, *Welding consumables — Shielding gases for arc welding and cutting*

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

ISO 15609-1:2004, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding*

ISO 15609-2:2001, *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 17635, *Non-destructive examination of welds — General rules for metallic materials*

ISO 17636, *Non-destructive testing of welds — Radiographic testing of fusion-welded joints*

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 of welded joints*

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

ISO/TR 17671-2, *Welding — Recommendations for welding of metallic materials — Part 2: Arc welding of ferritic steels*

ISO/TR 25901:2007, *Welding and related processes — Vocabulary*

ISO 4063:2010, *Welding and allied processes- Nomenclature of processes and reference numbers*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 25901:2007 and the following apply.

3.1

Run out length

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

NOTE See ISO/TR 17671-2.

3.2

Initial heat treatment

parent metal heat treatment before welding

3.3

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.

The welder or welding operator who undertakes the welding procedure test satisfactorily in accordance with this standard is qualified according to the relevant national/international standard being applied, providing that the relevant testing requirements of that standard are met.

6 Test piece

6.1 General

The welded joint to which the welding procedure will relate in production shall be represented by making a standard test piece or pieces, as specified in 6.2.

For Level 1: Qualifications, any butt weld test qualifies all joint configurations.

For Level 2: Where the production/joint geometry requirements are not represented by the standard test pieces as shown in this standard, the use of ISO 15613 shall be required in place of this standard test piece.

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 testing and/or for re-testing specimens (see 7.6).

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