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

**Part 10:
Hyperbaric dry welding**

iTeh STANDARD PREVIEW
*Descriptif et qualification d'un mode opératoire de soudage pour les
matériaux métalliques — Épreuve de qualification d'un mode
opératoire de soudage —*
(standard.iteh.ai)

Partie 10: Soudage hyperbare en caisson

ISO 15614-10:2005

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Published in Switzerland

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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 15614-10 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*.

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*

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— *Part 3: Arc welding of cast iron*

— *Part 4: Finishing welding of aluminium castings*

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

— *Part 6: Arc 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*

— *Part 13: Resistance butt and flash welding*

Introduction

All new welding procedure qualifications are to be carried out in accordance with this part of ISO 15614 from the date of publication.

This part of ISO 15614 does not invalidate previously qualified welding procedures in accordance with other standards or specifications, providing the technical requirements are satisfied and the previous qualifications are relevant to the application and production work on which they are to be employed.

Where additional tests have to be carried out to make the qualification technically equivalent, it is only necessary to do the additional tests in accordance with this part of ISO 15614.

Requested for official interpretations of any aspect of this standard should be directed to the Secretariat of ISO/TC 44 via your national standards body, a complete listing of which can be found at www.iso.org.

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

Part 10: Hyperbaric dry welding

1 Scope

This part of ISO 15614 specifies how to qualify welding procedure specifications for welding in hyperbaric dry environments.

It also specifies the minimum testing requirements necessary for qualification of welding procedures.

This part of ISO 15614 may be used to qualify welding procedures using mechanized and automated welding.

NOTE This part of ISO 15614 is part of a series of standards, details of this series are given in ISO 15607:2003, Annex A.

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2 Normative references

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

ISO 6947, *Welds — Working positions — Definitions of angles of slope and rotation*

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

ISO 15607:2003, *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 15618-2, *Qualification testing of welders for underwater welding — Part 2: Diver-welders and welding operators for hyperbaric dry welding*

EN 288-9, *Specification and approval of welding procedures for metallic materials — Part 9: Welding procedure test for pipeline welding on land and offshore site butt welding of transmission pipelines*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15607 and ISO 15618-2, and the following, apply.

3.1

repair

any operation which involves welding to rectify the weld, outside the normal welding cycle

3.2

full penetration repair

weld repair through the whole thickness of the qualification joint

3.3

internal repair

weld applied to rectify a weld from the inside surface or the root side of a weld, after excavation and re-preparation, using either a single or a multi-pass weld deposition sequence

3.4

make

specific trade or brand name of the consumable, but not its designation

3.5

examiner

person who has been appointed to verify compliance with the applicable standard

NOTE In certain cases, an external independent examiner may be required.

[ISO 15607:2003, definition 3.24¹]

3.6

examining body

organization that has been appointed to verify compliance with the applicable standard

NOTE In certain cases, an external independent examining body may be required.

[ISO 15607:2003, definition 3.25¹]

4 Preliminary welding procedure specification (pWPS)

The preliminary welding procedure specification shall be prepared in accordance with ISO 15609-1. It shall specify all relevant parameters and tolerances, including the following additional items if applicable:

- water depth at which welding is to be carried out;
- gas composition in the hyperbaric chamber or habitat;
- partial pressure of oxygen;
- temperature range in the hyperbaric chamber or habitat;
- relative humidity;
- method of measuring heat input and/or weld deposition rate;

1) This term and definition have been reproduced for clarity.

- material grade and supply condition;
- number and location of welder-divers (for pipelines);
- partially completed joint;
- type of line-up clamp (for pipelines);
- time of clamp removal (for pipelines);
- preheating procedure;
- post-weld heat-treatment procedure;
- consumables handling and control procedure.

The pWPS should detail the precautions to be taken to prevent damage, corrosion and/or contamination of the consumables due to humidity or other environmental influences.

5 Welding procedure test

Welding shall be performed under simulated or actual site conditions at the appropriate water depth.

The test pieces shall represent the type of welding used in production and shall be prepared and tested in accordance with Clauses 6 and 7.

NOTE The welder-diver or hyperbaric welding operator who undertakes the welding procedure test satisfactorily in accordance with this part of ISO 15614 is qualified for the appropriate range of qualification given in ISO 15618-2.

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6 Test piece

6.1 General

The welded assembly, to which the welding procedure will relate to in production, shall be represented by making a standardized test piece or pieces, as specified in 6.2 (see also 8.4.3).

6.2 Shape and dimensions of test pieces

The shape and dimensions for steel test pieces shall be in accordance with ISO 15618-2, except for pipelines where the test welds shall be made between two short sections of pipe (≥ 500 mm).

6.3 Welding of test pieces

Preparation and welding of test pieces shall be carried out in accordance with the pWPS, with removal of line-up clamps, partial completion and recommencement of welding, where applicable. Welds shall be made under the same production conditions which they represent. Welding positions and limitations for the angle of slope of the test piece shall be in accordance with ISO 6947.

If tack welds are to be fused into the final joint, they shall be included as part of the test piece.

Welding and testing of the test pieces shall be witnessed by an examiner or an examining body.

NOTE In some cases, it may be necessary to carry out a preliminary welding test to provide the information to select the welding conditions for the pWPS.