International Standard

ISO 15613

Specification and qualification of welding procedures for metallic materials — Qualification based on a pre-production welding test

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques — Qualification sur la base d'un assemblage soudé de préproduction

Second edition
2025-08

Reference number
ISO 15613:2025(en)

© ISO 2025



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025
All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **2**
4 Preliminary welding procedure specification (pWPS) **2**
5 Qualification of the welding procedure **2**
6 Welding of test pieces **3**
7 Testing **3**
7.1 Fusion welding 3
7.2 Resistance welding 3
7.2.1 Spot, seam and projection welding 3
7.2.2 Upset (resistance butt) and flash welding 3
8 Range of qualification **3**
9 Validity **4**
10 Welding procedure qualification record (WPQR) **4**

© ISO 2025 – All rights reserved

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 15613:2004), which has been technically revised.

The main changes are as follows:

— the normative references have been updated and extensively revised;

— all parts of the document related to the changes in normative references have been updated accordingly;

— Tables have been added to Clause 4 and 5 to give the relevant standards for each welding process;

— Clause 5 has been revised to clarify the intent;

— the text of Clause 7 has been revised and refers to the standards in Table 2. All testing information has been deleted to avoid conflict with the relevant parts of the ISO 15614 series;

— the title of 7.2.1 has been updated to reflect the title of ISO 15614-12;

— Clauses 8 and 10 have been revised.

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.

© ISO 2025 – All rights reserved

Introduction

One of the methods for welding procedure qualification is based on a pre-production welding test as given in ISO 15607.

Qualification based on a pre-production welding test can be used where the shape and dimensions of the standard test pieces do not adequately represent the joint to be welded.

In such cases, one or more special test pieces can be made to simulate the production joint in all essential features, for example dimensions, restraint, heat sink effects and limited access.

This document is one of a number of standards dealing with specification and qualification of welding procedures. Details are given in ISO 15607.

© ISO 2025 – All rights reserved

Specification and qualification of welding procedures for metallic materials — Qualification based on a pre-production welding test

1 Scope

This document specifies how a preliminary welding procedure specification is qualified based on a pre-production welding test.

This document is applicable to arc welding, gas welding, beam welding, resistance welding, stud welding and friction welding of metallic materials.

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

ISO 15609-3, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 3: Electron beam welding*

ISO 15609-4, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 4: Laser beam welding*

ISO 15609-5, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 5: Resistance welding*

ISO 15609-6, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 6: Laser-arc hybrid welding*

ISO 15614-1, *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 15614-2, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 2: Arc welding of aluminium and its alloys*

ISO 15614-3, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 3: Fusion welding of non-alloyed and low-alloyed cast irons*

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

ISO 15614-6, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 6: Arc and gas welding of copper and its alloys*

© ISO 2025 – All rights reserved

ISO 15614-8, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 8: Welding of tubes to tube-plate joints*

ISO 15614-10, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 10: Hyperbaric dry welding*

ISO 15614-11, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 11: Electron and laser beam welding*

ISO 15614-12, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 12: Spot, seam and projection welding*

ISO 15614-13, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 13: Upset (resistance butt) and flash welding*

ISO 15614-14, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 14: Laser-arc hybrid welding of steels, nickel and nickel alloys*

ISO 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 15607 and the ISO 25901 series apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Preliminary welding procedure specification (pWPS)

A preliminary welding procedure specification shall be prepared in accordance with the appropriate standard given in Table 1:

Table 1 — Welding procedure specification standards

ISO standard	Welding process
ISO 15609-1	Arc welding
ISO 15609-2	Gas welding
ISO 15609-3	Electron beam welding
ISO 15609-4	Laser beam welding
ISO 15609-5	Resistance welding
ISO 15609-6	Laser-arc hybrid welding

5 Qualification of the welding procedure

Qualification of the welding procedure shall be carried out by an examiner or examining body in accordance with the relevant standard given in Table 2.

© ISO 2025 – All rights reserved

Table 2 — Welding procedure test standards

ISO standard	Welding process
ISO 15614-1	Arc and gas welding of steels and arc welding of nickel and nickel alloys
ISO 15614-2	Arc welding of aluminium and its alloys
ISO 15614-3	Fusion welding of non-alloyed and low-alloyed cast irons
ISO 15614-5	Arc welding of titanium, zirconium and their alloys
ISO 15614-6	Arc and gas welding of copper and its alloys
ISO 15614-8	Welding of tubes to tube-plate joints
ISO 15614-10	Hyperbaric dry welding
ISO 15614-11	Electron and laser beam welding
ISO 15614-12	Spot, seam and projection welding
ISO 15614-13	Upset (resistance butt) and flash welding
ISO 15614-14	Laser-arc hybrid welding of steels, nickel and nickel alloys

6 Welding of test pieces

Preparation and welding of the test pieces shall be carried out under the general conditions of production welding, which they shall represent with shapes and dimensions of the test piece simulating the actual welding conditions of the structure. This includes welding positions and other essential items, for example stress conditions, heating effects, limited access and edge condition.

When actual components are used, jigs and fixtures shall be those which will be used in production.

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

7 Testing

7.1 Fusion welding

As far as technically possible, test pieces shall be tested in accordance with appropriate standard given in Table 2. Where ISO 15614-1 is the reference standard, and unless otherwise specified, level 2 shall be the default.

7.2 Resistance welding

7.2.1 Spot, seam and projection welding

Actual components shall be used for the pre-production test.

As far as technically possible, test pieces shall be tested in accordance with ISO 15614-12.

7.2.2 Upset (resistance butt) and flash welding

Actual components shall be used for the pre-production test.

As far as technically possible, test pieces shall be tested in accordance with ISO 15614-13.

8 Range of qualification

Any qualification issued under this document shall be limited to the type of joint used in the pre-production test.

© ISO 2025 – All rights reserved