INTERNATIONAL STANDARD

ISO 15609-2

Second edition
2019-08

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

Part 2: Gas welding

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

Partie 2: Soudage aux gaz

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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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.*

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

This second edition cancels and replaces the first edition (ISO 15609-2:2001), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Clause 2 has been updated;

— editorial changes have been made;

— surface conditions have been added in 4.4.4;

— new Subclauses 4.4.6, 4.4.7 and 4.4.10 have been added;

— Subclause 4.4.11 (former 4.4.9) regarding pre-heat temperature has been technically revised;

— Annex A has been revised.

A list of all parts in the ISO 15609 series can be found on the ISO website.

Introduction

All new welding procedure specifications need to be prepared in accordance with this document from the date of its publication. However, this document does not invalidate previous welding procedure specifications made to former standards or specifications, or previous editions of this document.

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

Part 2: Gas welding

1 Scope

This document specifies requirements for the content of welding procedure specifications for gas welding processes.

Details of the ISO 15609 series are given in ISO 15607. The variables listed in this document are those influencing the quality of the welded joint.

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

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

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

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 15607 and ISO/TR 25901 (all parts) apply.

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

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

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

4 Technical content of Welding Procedure Specification (WPS)

4.1 General

A preliminary welding procedure specification/welding procedure specification (pWPS/WPS) shall provide all the necessary information required to make a weld. The information required in a pWPS/WPS is given in 4.2 to 4.4.

For some applications, it can be necessary to supplement or reduce the list.

Welding procedure specifications cover all certain range of the necessary information to make a weld. Some manufacturers prefer additionally to prepare work instructions for each specific job as part of detailed production planning.

Ranges and tolerances, according to the relevant standard (see ISO 15607) and to the manufacturer's experience, shall be specified where appropriate.

An example of the WPS-format is shown in Annex A.

4.2 Information related to the manufacturer

— Identification of the manufacturer.

— Identification of the WPS.

— Reference to the welding procedure qualification record (WPQR) or other documents as required (see ISO 15607).

4.3 Information related to the parent material

4.3.1 Parent material type

— Designation of the material(s), and reference standard(s).

— Number(s) of the group(s) as given in ISO/TR 15608.

A WPS may cover more than one group of materials.

4.3.2 Material dimensions

— Thickness ranges of the materials.

— Outside diameter ranges for pipes.

4.4 Information common to all welding procedures

4.4.1 Welding process

The welding process(es) in accordance with ISO 4063.

4.4.2 Joint design

— A sketch of the joint design/configuration and dimensions or reference which provide such information.

— Weld run sequence given on the sketch, if essential for the properties of the weld.

4.4.3 Welding position

Applicable welding positions in accordance with ISO 6947.

4.4.4 Joint preparation

— Surface condition, cleaning, degreasing, including methods to be used.

— Jigging, fixtures and tack welding.

4.4.5 Welding technique

— Leftward or rightward welding.

— Blowpipe and/or wire/strip angle (if required).

4.4.6 Back gouging

— The method to be used.

— Depth and shape.

4.4.7 Backing

The type of backing, backing material design/configuration and dimensions.

4.4.8 Welding consumables

— Designation, make (manufacturer and trade name).

— Dimensions (size).

— Handling.

4.4.9 Flame parameters

— Nozzle size.

— Fuel gas type and pressure.

— O_2 pressure.

— Type of flame.

4.4.10 Mechanized and automatic welding

— Travel speed range.

— Wire/strip feed speed range.

If the equipment does not permit control of one of either variable, the machine settings shall be specified instead. The range of application for the WPS shall then be limited to equipment of that particular type. This applies to 4.4.9 and 4.4.10.

4.4.11 Pre-heat temperature

4.4.11.1 General

The minimum temperature applied the start of welding and during welding.

4.4.11.2 Work piece temperature

If pre-heating is not required, the lowest work piece temperature prior to welding.

4.4.12 Interpass temperature

Maximum and, if necessary, minimum interpass temperature.

4.4.13 Pre-heat maintenance temperature

— The minimum temperature in the weld zone which shall be maintained if welding is interrupted.

— See ISO 13916 for application of 4.4.11, 4.4.12 and 4.4.13.

4.4.14 Post-weld heat-treatment

The minimum time and temperature range for post-weld heat treatment or ageing shall be specified or reference shall be made to other standards which specify this information.

Annex A
(informative)

Welding Procedure Specification (WPS)

The user of this form is allowed to copy this present form.

Welding procedure

Reference No.:

WPQR No.:

Manufacturer:

Welding process:

Joint type:

Weld preparation details (Sketch)

Method of preparation and cleaning:

Parent material designation(s):

Parent material group:

Material thickness (mm)[1]:

Outside diameter (mm)[1]:

Welding position:

Joint design	**Welding sequences**

Welding details

Run	**Process**	**Welding technique**	**Welding data**					**Welding consumables**	
			Nozzle size	**Fuel gas type**	**Fuel gas pressure[1]**	**O_2 pressure[1]**	**Type of flame**	**Designation**	**Dimension**

Post-weld heat treatment:

Time, temperature, method:

Heating and cooling rates[2]:

Remarks:

Manufacturer

(name, signature, date)

[1] Range.

[2] If necessary.