



**International
Standard**

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**

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

Partie 5: Soudage à l'arc sur titane, zirconium et leurs alliages

**Second edition
2024-02**

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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.

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.

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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 15614-5:2004), which has been technically revised.

The main changes are as follows:

- normative references updated;
- [Table 2](#) and [Table 3](#) revised using the same format as ISO 15614-1;
- reference to EN 439 replaced with ISO 14175;
- process numbers updated in accordance with ISO 4063;
- [Annex A](#) updated.

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

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>.

Introduction

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

Where additional tests have to be carried out to make a qualification technically equivalent, these should be done on a test piece which is made in accordance with this document.

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

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

1 Scope

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

This document specifies the conditions for the execution of welding procedure tests and the qualification range for welding procedures for all practical welding operations within the range of variables listed in [Clause 8](#).

This document specifies the required tests. Additional tests can be required by application standards.

This document applies to the arc welding of titanium, zirconium and their alloys in all product forms. Arc welding is covered by the following processes in accordance with ISO 4063:

131 – metal inert gas welding, MIG welding;

14 – tungsten inert gas welding, TIG welding;

15 – plasma arc welding.

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

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

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 6947, *Welding and allied processes — Welding positions*

ISO 9606-5, *Approval testing of welders — Fusion welding — Part 5: Titanium and titanium alloys, zirconium and zirconium alloys*

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

ISO 14732, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials*

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

ISO 15614-5:2024(en)

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

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

ISO 17636 (all parts), *Non-destructive testing of welds — Radiographic testing*

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

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

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 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 pWPS shall be prepared in accordance with ISO 15609-1.

5 Welding procedure test

The welding and testing of test pieces shall be in accordance with [Clauses 6](#) and [7](#).

A welder or welding operator who undertakes the welding procedure test satisfactorily in accordance with this document shall be considered qualified for the appropriate qualification range in accordance with ISO 9606-5 or ISO 14732, providing that the relevant testing requirements are met.

6 Test pieces

6.1 General

The welded joint to which the welding procedure will relate in production shall be represented by making a standardized test piece or pieces, as specified in [6.2](#). Where the production or joint geometry requirements do not represent the standardized test pieces as shown in this document, ISO 15613 shall be used.

6.2 Shape and dimensions of test pieces

6.2.1 General

The length or number of test pieces shall be sufficient to allow all required tests to be carried out.

Additional test pieces, or test pieces longer than the minimum size, may be prepared in order to allow for extra and/or for retesting specimens (see [7.7](#)).

For all test pieces, except branch connections (see [Figure 4](#)) and fillet welds (see [Figure 8](#)), the material thickness, t , shall be the same for both plates and pipes to be welded.

The thickness and/or outside pipe diameter of the test pieces shall be selected in accordance with [8.3.2.1](#) to [8.3.2.4](#).

The shape and minimum dimensions of the test pieces shall be as given in [6.2.2](#) to [6.2.5](#).

6.2.2 Butt joint in plate with full penetration

The test pieces shall be prepared in accordance with [Figure 1](#).

6.2.3 Butt joint in pipe with full penetration

The test pieces shall be prepared in accordance with [Figure 2](#).

NOTE The word “pipe”, alone or in combination, is used to mean “pipe”, “tube” or “hollow section”, except square or rectangular hollow section.

6.2.4 T-joint

The test pieces shall be prepared in accordance with [Figure 3](#). These can be used for fully penetrated butt welds or fillet welds.

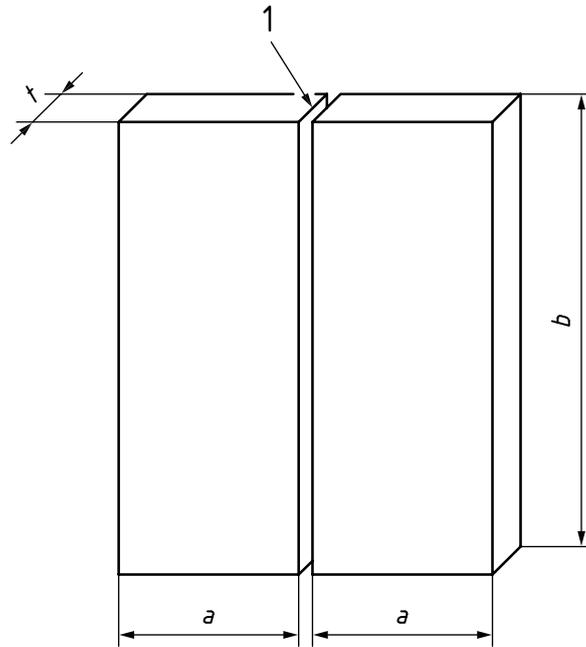
6.2.5 Branch connection

The test pieces shall be in accordance with [Figure 4](#). The angle α is the minimum to be used in production. These can be used for fully penetrated joints (set-on or set-in or set-through joint) and for fillet welds.

6.3 Welding of test pieces

Preparation and welding of test pieces shall be carried out in accordance with the pWPS and under the general conditions of welding in production which they shall represent. Welding positions and limitations for the angle of slope and rotation 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 in the test piece.

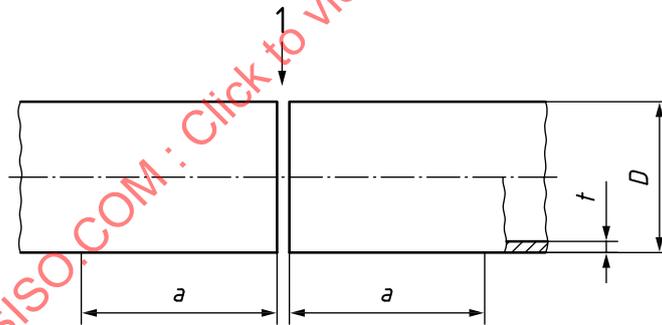
Welding and testing of the test pieces shall be witnessed by an examiner or examining body.



Key

- 1 joint preparation and fit-up as detailed in the pWPS
- a minimum value 150 mm
- b minimum value 300 mm
- t material thickness

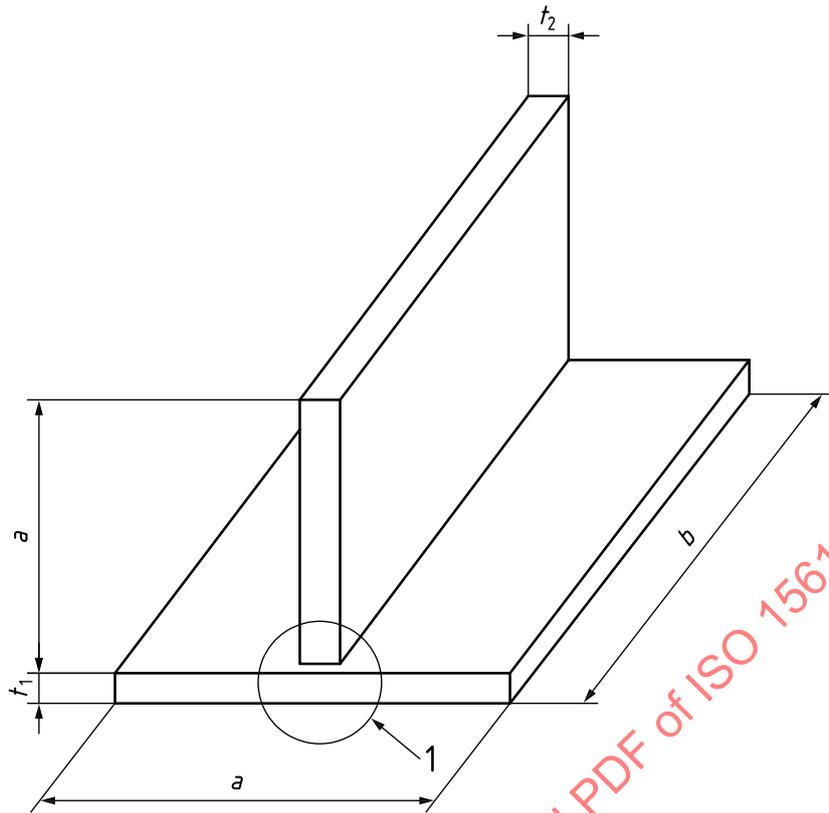
Figure 1 — Test piece for a butt joint in plate with full penetration



Key

- 1 joint preparation and fit-up as detailed in the pWPS
- a minimum value 150 mm
- D outside pipe diameter
- t material thickness

Figure 2 — Test piece for a butt joint in pipe with full penetration

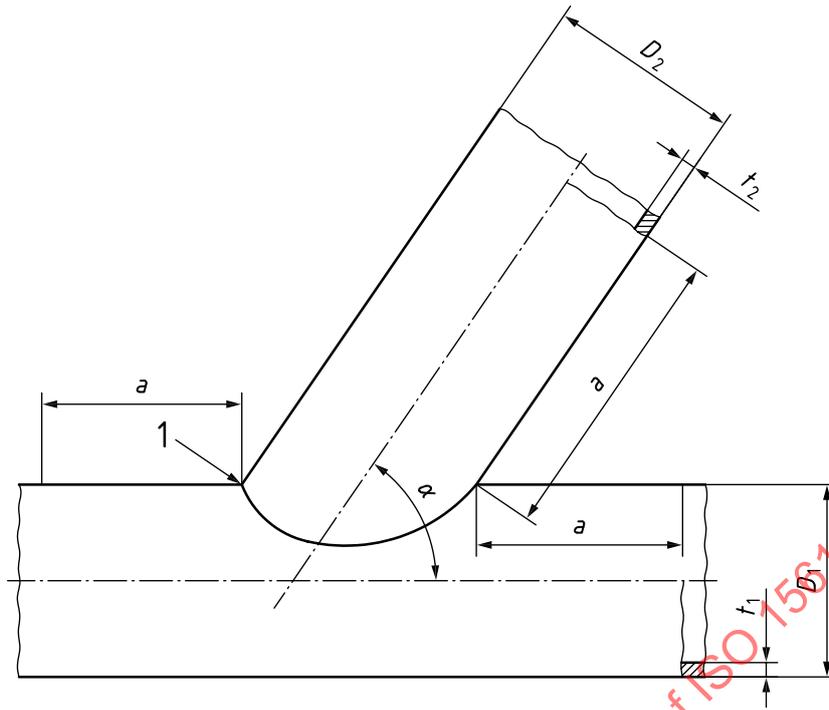


Key

- 1 joint preparation and fit-up as detailed in the pWPS
- a minimum value 150 mm
- b minimum value 350 mm
- t_1, t_2 material thickness

Figure 3 — Test piece for a T-joint

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Key

- | | | | |
|----------|--|-------|-------------------------------------|
| 1 | joint preparation and fit-up as detailed in the pWPS | D_2 | outside diameter of the branch pipe |
| α | branch angle | t_1 | main pipe material thickness |
| a | minimum value 150 mm | t_2 | branch pipe material thickness |
| D_1 | outside diameter of the main pipe | | |

Figure 4 — Test piece for a branch connection

7 Examination and testing

7.1 Extent of testing

Testing includes both non-destructive testing (NDT) and destructive testing, which shall be in accordance with the requirements of [Table 1](#).

An application standard can specify additional tests, such as:

- longitudinal weld tensile test;
- all weld metal bend test;
- hardness test;
- impact test;
- corrosion test;
- chemical analysis.

NOTE Specific service, material or manufacturing conditions can require more comprehensive testing than specified by this document in order to gain more information and to avoid repeating the welding procedure test at a later date just to obtain additional test data.

Table 1 — Examination and testing of the test pieces

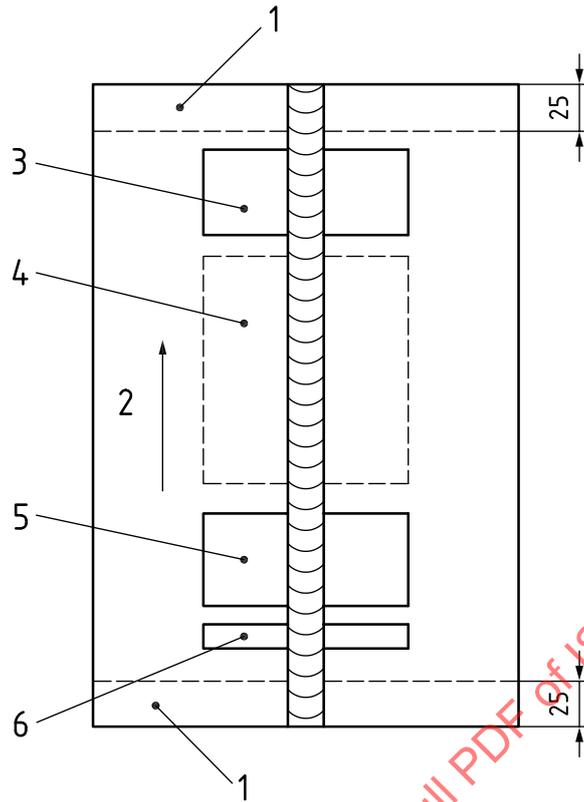
Test piece	Type of test	Extent of testing	Footnote
Butt joint with full penetration – Figure 1 and Figure 2	Visual testing (VT)	100 %	–
	Radiographic testing (RT)	100 %	–
	Penetrant testing (PT)	100 %	–
	Transverse tensile test	Two specimens	–
	Transverse bend test	Four specimens	a
	Macroscopic or microscopic examination	One specimen	b
T-joint with full penetration – Figure 3 Branch connection with full penetration – Figure 4	Visual testing (VT)	100 %	c
	Penetrant testing (PT)	100 %	c
	Radiographic testing (RT)	100 %	c
	Macroscopic or microscopic examination	Two specimens	b, c
Fillet welds – Figure 3 and Figure 4	Visual testing (VT)	100 %	c
	Penetrant testing (PT)	100 %	c
	Macroscopic or microscopic examination	Two specimens	b, c
<p>a For bend tests, see 7.4.3.</p> <p>b For microscopic examination, see 7.4.4.</p> <p>c Tests as detailed do not provide information on the mechanical properties of the joint. Where these properties are relevant to the application, an additional qualification shall also be held, e.g. a butt weld qualification.</p>			

7.2 Location and taking of test specimens

Test specimens shall be taken in accordance with [Figures 5](#) to [8](#).

Test specimens shall be taken after all non-destructive testing (NDT) has been carried out and the relevant acceptance criteria for the NDT method(s) used have been met.

It is acceptable to take the test specimens from locations avoiding areas which have imperfections within the acceptance limits for the NDT method(s) used.

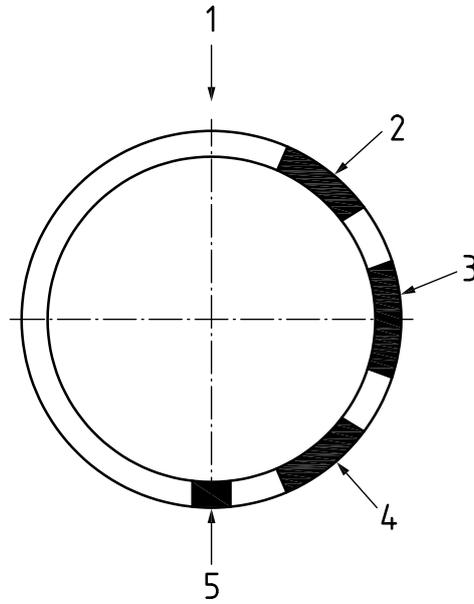


Key

- 1 discard 25 mm
- 2 welding direction
- 3 area for: one tensile test specimen and bend test specimens
- 4 area for: impact and additional test specimens if required
- 5 area for: one tensile test specimen and bend test specimens
- 6 area for: one macro test specimen

NOTE Figure not to scale.

Figure 5 — Location of test specimens for a butt joint on plates



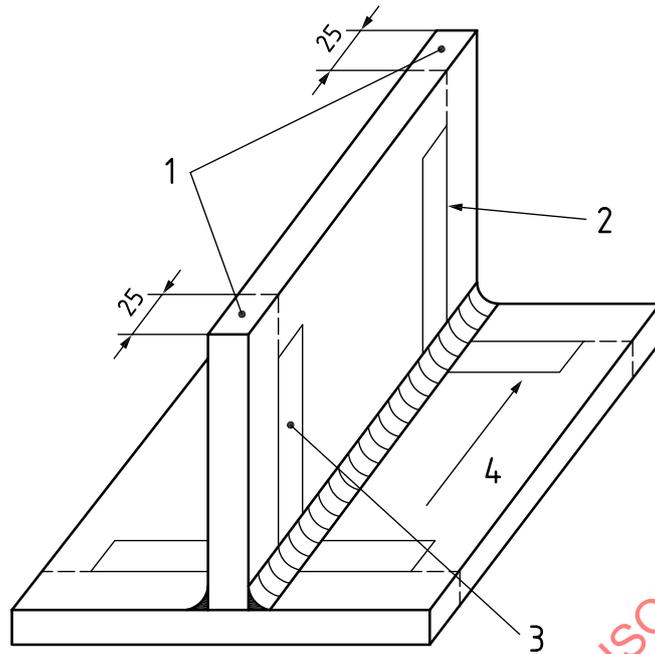
Key

- 1 top for fixed pipe
- 2 area for: one tensile test specimen and bend test specimens
- 3 area for: additional test; specimens if required
- 4 area for: one tensile test specimen and bend test specimens
- 5 area for: one macro or micro test specimen

NOTE Figure not to scale.

Figure 6 — Location of test specimens for a butt joint on pipes

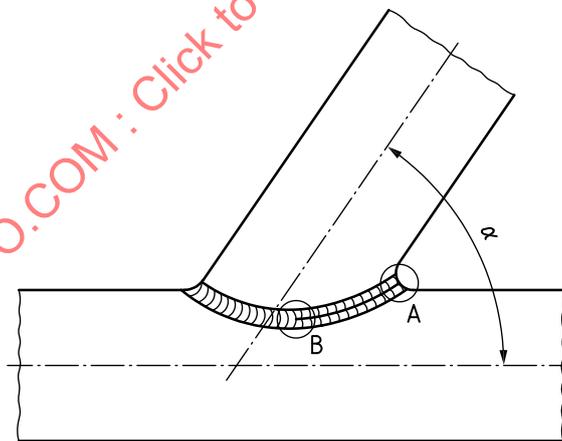
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Key

- 1 discard 25 mm
- 2 macro or micro test specimen
- 3 macro or micro test specimen
- 4 welding direction

Figure 7 — Location of test specimens in a T-joint



Key

- A macro test to be taken
- B macro test specimen to be taken
- α branch angle

Figure 8 — Location of test specimens for a branch connection or a fillet weld on pipes

7.3 Non-destructive testing

All non-destructive testing in accordance with 7.1 and Table 1 shall be carried out on the test pieces prior to cutting of the test specimens. Any post-weld heat treatment that is specified shall be completed prior to non-destructive testing.

Depending upon joint geometry, materials and the requirements for work, the non-destructive testing shall be carried out as required in Table 1 in accordance with ISO 17637 (visual testing), ISO 17636-1 or ISO 17636-2 (radiographic testing) and ISO 3452-1 (penetrant testing).

7.4 Destructive testing

7.4.1 General

The extent of destructive testing shall be in accordance with Table 1.

7.4.2 Transverse tensile test

Specimens and testing for transverse tensile testing for butt joints shall be in accordance with ISO 4136.

For pipes > 50 mm outside diameter, the excess weld metal shall be removed on both faces to give the test specimen a thickness equal to the wall thickness of the pipe.

For pipes ≤ 50 mm outside diameter, and when full-section small-diameter pipes are used, the excess weld metal may be left undressed on the inside surface of the pipe.

The tensile strength of the test specimen shall not be less than the corresponding specified minimum value for the parent metal unless otherwise specified prior to testing.

For dissimilar joints the tensile strength shall not be less than the minimum value specified for the parent material having the lowest tensile strength.

7.4.3 Bend test

Specimens and testing for bend testing for butt joints shall be in accordance with ISO 5173, except for material groups 52, 53 and 54, for which the diameter of the former or the inner roller shall be $6 t_s$ (where t_s is the thickness of the bend test specimen).

For thicknesses < 12 mm, two root and two face bend test specimens shall be used. For thicknesses ≥ 12 mm, four side bend specimens are recommended instead of root and face bend tests.

For dissimilar metal joints or heterogeneous butt joints in plates, one root and one face longitudinal bend test specimen may be used instead of four transverse bend tests.

During testing, the test specimens shall not reveal any imperfection > 3 mm in any direction. Imperfections appearing at the corners of a test specimen during testing shall be ignored in the evaluation.

7.4.4 Macroscopic or microscopic examination

The test specimen shall be prepared and examined in accordance with ISO 17639 on one side to clearly reveal the fusion line, the HAZ and the build-up of the runs.

The macroscopic examination shall include unaffected parent material and shall be recorded by at least one macroscopic reproduction per procedure test.

The acceptance levels stated in 7.5 shall apply.

Care should be taken when etching certain alloys in order to avoid producing crack-like indications.

7.5 Acceptance levels

A welding procedure is qualified if the imperfections in the test piece are within the specified limits of quality level B of ISO 5817, except for the following imperfection types: excess weld metal, excess convexity, excess throat thickness and excessive penetration, for which quality level C of ISO 5817 shall apply.

NOTE The correlation between the quality levels of ISO 5817 and the acceptance levels of the different NDT techniques is given in ISO 17635.

7.6 Coloration

Accepted colours on the weld metal surface: silver and straw.

A narrow band of intensive colours close to the limits of the gas shielding is acceptable.

Darker brown, purple and blue colours and grey or flaky white are not acceptable.

7.7 Retesting

If the test piece fails to conform to any of the requirements for non-destructive testing specified in 7.5, one further test piece shall be welded and subjected to the same testing. If this additional test piece does not conform to the requirements, the welding procedure test has failed.

If any test specimens fail to conform to the requirements for destructive testing in accordance with 7.4 but only due to weld imperfections, two further test specimens shall be obtained for each one that failed. The additional test specimens can be taken from the same test piece if there is sufficient material available or from a new test piece. Each additional test specimen shall be subjected to the same tests as the initial test specimen that failed. If either of the additional test specimens does not conform to the requirements, the welding procedure test has failed.

If a tensile test specimen fails to meet the requirements of 7.4.2, two further test specimens shall be obtained for each one that failed. Both shall satisfy the requirements of 7.4.2.

8 Qualification range

8.1 General

Each of the conditions given in [Clause 8](#) shall be met in order to conform to this document.

Changes outside of the ranges specified shall require a new welding procedure test.

8.2 Requirements related to the manufacturer

A qualification of a pWPS by a welding procedure test in accordance with this document obtained by a manufacturer is valid for welding in workshops or sites under the same technical and quality control of the manufacturer.

Welding is under the same technical and quality control when the manufacturer who performed the welding procedure test retains complete responsibility for all welding carried out.

8.3 Requirements related to the parent material

8.3.1 Parent material grouping

8.3.1.1 General

In order to minimize the number of welding procedure tests, titanium, zirconium and their alloys can be grouped in accordance with ISO/TR 15608.

Separate welding procedure qualifications are required for each parent material or parent material combinations not covered by the grouping system.

If one parent material belongs to two material groups or sub-groups, then it shall always be classified in the lower material group or sub-group.

NOTE Minor compositional differences between similar grades arising from the use of national standards do not need requalification.

8.3.1.2 Titanium

The ranges of qualification for titanium are given in [Table 2](#).

Table 2 — Qualification range for titanium groups

Material group(s) of test piece A	Material group(s) of test piece B			
	51	52	53	54
51	51 to 51	-	-	-
52	51 to 51 51 to 52	52 to 52	-	
53	51 to 53 51 to 51	52 to 53 52 to 52	53 to 53	-
54	51 to 54 51 to 51	52 to 54 52 to 52	53 to 54 53 to 53	54 to 54

8.3.1.3 Zirconium

The ranges of qualification for zirconium are given in [Table 3](#).

Table 3 — Qualification range for zirconium groups

Material group(s) of test piece A	Material group(s) of test piece B	
	61	62
61	61 to 61	-
62	61 to 61 61 to 62	62 to 62

8.3.2 Material thickness and pipe diameter

8.3.2.1 General

For single process qualification the material thickness, *t*, shall have the following meanings:

- a) For a butt joint: the parent material thickness.
- b) For a fillet weld: the parent material thicknesses. For each thickness range qualified in accordance with [Table 4](#) there is also an associated qualification range for throat thicknesses, *a*, for single-run fillet welds as given in [8.3.2.3](#).
- c) For a set-on branch connection: the parent material thicknesses.
- d) For a set-in or set-through branch connection: the parent material thicknesses.
- e) For a T-joint in plate with full penetration: the parent material thicknesses.

For multi-process procedures, the deposited metal thickness of each process shall be used as a basis for the qualification range for the individual welding process.

8.3.2.2 Qualification range for butt joints, T-joints and branch connections

The qualification of a welding procedure test on material thickness t shall include qualification for thickness in the ranges given in Table 4.

Table 4 — Qualification range for material thickness

Dimensions in mm

Material thickness of the test piece t^a	Qualification range ^b	
	Butt, T-joint and branch connections for single run or single run from both sides	Butt, T-joint and branch connections ^b for multi-run welding and all fillet welds ^b
$t \leq 3$	0,7t to 1,5t	0,7t to 2t
$3 < t \leq 12$	0,7t to 1,3t	3t to 2t
$12 < t$	0,7t to 1,1t	0,5t to 2t

^a For multi-process procedures, the deposited metal thickness of each process shall be used as a basis for the qualification range for the individual welding process.

^b For fillet welds and branch connections, the qualification range shall be applied to both parent materials independently.

8.3.2.3 Qualification range for throat thickness of single-run fillet welds

In addition to the requirements of Table 4, the qualification range of the throat thickness “a” shall be “0,75a” to “1,5a”.

Where a fillet weld is qualified by means of a butt weld test, the throat thickness range qualified shall be based on the thickness of the deposited weld metal.

8.3.2.4 Qualification range for the diameter of pipes and branch connections

The qualification of a welding procedure test on diameter D shall include qualification for diameters in the ranges given in Table 5.

Qualification given for plates also covers pipes when the outside pipe diameter is > 500 mm or when the diameter is > 150 mm welded in the PA or PC rotated position in accordance with ISO 6947.

Table 5 — Qualification range for pipe and branch connection diameters

Diameter of the test piece D^a mm	Qualification range
$D \leq 25$	0,5D to 2D
$D > 25$	$\geq 0,5D$ (25 mm min.)

^a D is the outside pipe diameter or outside diameter of the branch pipe.

8.3.3 Angle of branch connection

A welding procedure test shall be carried out on a branch connection with angle α (see Figure 4). A test piece made with a branch angle (α) between 60° and 90° in the procedure test qualifies the angle $60^\circ \leq \alpha < 90^\circ$. An angle $\alpha < 60^\circ$ requires a separate test piece and qualifies angles from α up to 90°.

8.4 Requirements common to all welding procedures

8.4.1 Welding process

Each degree of mechanization shall be qualified independently (manual, partly mechanized, fully mechanized and automatic).

The qualification is only valid for the welding process(es) used in the welding procedure test.

For multi-process procedures the welding procedure qualification may be carried out with separate welding procedure tests for each welding process.

It is also possible to make the welding procedure test as a multi-process procedure test. The qualification of such a test is only valid for the process sequence carried out during the multi-process procedure test.

The use of a multi-process procedure test to qualify any single process should be avoided unless the test carried out on the process conforms to this document.

8.4.2 Welding positions

Welding of a test in any position (pipe or plate) qualifies for welding in all positions (pipe or plate) except for PG and J-L045, where a separate welding procedure is required.

8.4.3 Type of joint and weld

The qualification range for the type of welded joints is as used in the welding procedure test subject to limitations given in other clauses (e.g. diameter, thickness) and additionally:

- a) butt welds qualify fully and partial penetration butt welds and fillet welds; fillet weld tests shall be used where this is the predominant form of production welding;
- b) butt joints in pipe also qualify branch connections with an angle $\geq 60^\circ$;
- c) T-joints butt welded only qualify T-joints butt welded and fillet welds (see [8.4.3 a\)](#));
- d) welds made from one side without backing qualify welds made from both sides and welds with backing;
- e) welds made with backing qualify welds made from both sides;
- f) fillet welding qualifies fillet welding only;
- g) it is not permitted to change a multi-run deposit into a single run (or single run on each side) or vice versa for a given welding process.

8.4.4 Filler material, designation

Filler materials cover other filler materials as long as they have equivalent mechanical properties and the same nominal composition in accordance with the designation in the appropriate standards for the filler material concerned.

8.4.5 Type of current

The qualification is given for the type of current [alternating current (a.c.), direct current (d.c.), pulsed current] and polarity used in the welding procedure test.

8.4.6 Interpass temperature

The upper limit of qualification is the highest interpass temperature reached in the welding procedure test.

8.4.7 Post-weld heat treatment

Addition or deletion of post-weld heat treatment is not permitted.

The temperature range validated is the holding temperature used in the welding procedure test $\pm 20^\circ\text{C}$ unless otherwise specified. Where required, heating rates, cooling rates and holding time shall be related to the product.

8.4.8 Backing gas

Welding without backing gas qualifies for welding with backing gas, but not vice versa.

8.4.9 Welding in a chamber

Welding outside a chamber qualifies for welding in a chamber, but not vice versa.

8.5 Requirements specific to welding processes

8.5.1 Process 131

The qualification given to the shielding, trailing and backing gas shall be restricted to the main group of the classification of the gas in accordance with ISO 14175. Shielding gases not covered by ISO 14175 are restricted to the nominal composition used in the test.

The qualification given is restricted to the wire system used in the welding procedure test (e.g. single-wire or multiple-wire system).

For solid wires, the qualification using short-circuiting transfer (dip) qualifies only short-circuiting transfer (dip). Qualification using spray or globular transfer qualifies both spray and globular transfer.

8.5.2 Process 14

The qualification given to the shielding, trailing and backing gas shall be restricted to the main group of the classification of the gas in accordance with ISO 14175. Shielding gases not covered by ISO 14175 are restricted to the nominal composition used in the test.

Welding with filler material does not qualify for welding without filler material or vice versa.

8.5.3 Process 15

The qualification given is restricted to the plasma gas composition used in the welding procedure test.

The qualification given to the shielding, trailing and backing gas shall be restricted to the main group of the gas classification in accordance with ISO 14175. Shielding gases not covered by ISO 14175 are restricted to the nominal composition used in the test.

Welding with filler material does not qualify for welding without filler material or vice versa.

9 Welding procedure qualification record (WPQR)

The welding procedure qualification record (WPQR) is a statement of the results of assessing each test piece, including retests.

The relevant items listed for the WPS in ISO 15609-1 shall be included, together with details of any features that would be rejectable according to the requirements of [Clause 7](#).

If no rejectable features or unacceptable test results are found, a WPQR detailing the welding procedure test piece results is qualified and shall be signed and dated by the examiner or the examining body.

A WPQR format shall be used to record details for the welding procedure and the test results, in order to facilitate uniform presentation and assessment of the data.

An example of WPQR format is shown in [Annex A](#).