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Brazing — Qualification testing of brazers and brazing operators

Brasage fort — Essais de qualification des braseurs et des opérateurs braseurs en brasage fort

Reference number
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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).

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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 11, *Qualification requirements for welding and allied processes personnel*.

This second edition cancels and replaces the first edition (ISO 13585:2012), which has been technically revised.

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

— brazing processes, in accordance with ISO 4063:2009, covered by this document, have been moved to the scope;

— Clause 3 has been updated and additional terms have been defined;

— additional symbols and abbreviated terms have been added to Clause 4;

— Clause 5 has been significantly revised and updated including clarifications on brazing operator qualification;

— material grouping has been moved to new Annex E;

— Clause 6 has been updated to refer to ISO or technically equivalent standards;

— the period of validity and prolongation of qualifications has been revised to 5 years in Clause 9.

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.

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Brazing — Qualification testing of brazers and brazing operators

1 Scope

This document specifies requirements for qualification testing of brazers and brazing operators for metallic materials.

This document gives general provisions on quality requirements for brazing (see Annex A).

This document applies to the following brazing processes according to ISO 857-2 and ISO 4063:2009 with local and global heating:

— 911 Infrared brazing;

— 912 Flame brazing, torch brazing;

— 913 Laser beam brazing;

— 914 Electron beam brazing;

— 916 Induction brazing;

— 918 Resistance brazing;

— 919 Diffusion brazing;

— 921 Furnace brazing;

— 922 Vacuum brazing;

— 923 Dip-bath brazing;

— 924 Salt-bath brazing;

— 925 Flux bath brazing;

— 926 Immersion brazing;

— 972 Arc weld brazing.

This document is not applicable to personnel operating brazing equipment who do not have any direct influence on the quality of the brazed joint, for example, personnel performing exclusively loading/unloading the brazing unit or just initiating the brazing cycle in automatic brazing.

The principles of this document can be applied to other brazing processes and brazing of materials not listed.

This document does not apply to brazing for aerospace applications covered by ISO 11745.

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 857-2, *Welding and allied processes — Vocabulary — Part 2: Soldering and brazing processes and related terms*

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ISO 4063:2009, *Welding and allied processes — Nomenclature of processes and reference numbers*

ISO 17672, *Brazing — Filler metals*

ISO 17779, *Brazing — Specification and qualification of brazing procedures for metallic materials*

ISO 18279:2003, *Brazing — Imperfections in brazed joints*

ISO/TR 25901-1, *Welding and allied processes — Vocabulary — Part 1: General terms*

EN 12797, *Brazing — Destructive tests of brazed joints*

EN 12799, *Brazing — Non-destructive examination of brazed joints*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 857-2, ISO/TR 25901-1 and the following 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/

3.1
brazing
joining process using *filler metal* (3.12) with a liquidus temperature above 450 °C

[SOURCE: ISO 857-2:2005, 3.1.2.]

3.2
brazer
person who holds and manipulates the device for heating the brazing area by hand

Note 1 to entry: The brazer verifies compliance with the pBPS or BPS prior to and during brazing.

3.3
brazing operator
person who controls or adjusts brazing parameters for *mechanized brazing* (3.5) or sets up brazing parameters for *automatic brazing* (3.6)

Note 1 to entry: The brazing operator verifies compliance with the pBPS or BPS prior to and during the brazing cycle.

3.4
manual brazing
brazing (3.1) where the required brazing conditions are maintained by hand

3.5
mechanized brazing
brazing (3.1) where the required brazing conditions are maintained by mechanical or electronic means but can be manually varied during the process

3.6
automatic brazing
brazing (3.1) in which all operations are performed without *brazing operator* (3.3) intervention during the process

Note 1 to entry: Manual adjustment of brazing variables by the brazing operator during brazing is not possible.

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3.7
brazing procedure specification
BPS
document that has been qualified and provides the required variables of the brazing procedure to ensure repeatability during production brazing

3.8
preliminary brazing procedure specification
pBPS
document containing the required variables of the brazing procedure which is not yet qualified

3.9
manufacturer
workshop or site (or both) which is (are) under the same technical and quality management

3.10
examiner
person who has been appointed to verify compliance with the applicable standard

Note 1 to entry: In certain cases, an external independent examiner can be required.

[SOURCE: ISO/TR 25901-1:2016, 2.5.29]

3.11
examining body
organization that has been appointed to verify compliance with the applicable standard

Note 1 to entry: In certain cases, an external independent examining body can be required.

[SOURCE: ISO/TR 25901-1:2016, 2.5.30]

3.12
filler metal
added metal applied to brazed joints

Note 1 to entry: Filler metal can be in the form of wire, inserts, powder, pastes, foil, etc.

3.13
flux
non-metallic material which, when molten, promotes wetting by removing existing oxide or other detrimental films from the surfaces to be joined and prevents their re-formation during the joining operation

[SOURCE: ISO 857-2:2005, 3.2.2]

3.14
test piece
brazed assembly which is used for testing purposes

3.15
test specimen
part or portion cut from the *test piece* (3.14) in order to perform specified destructive testing

[SOURCE: ISO/TR 25901-1:2016, 2.2.1.6]

4 Symbols and abbreviated terms

t material thickness

L overlap length

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