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Welding, brazing, soldering and cutting — Nomenclature of processes and reference numbers

Soudage, brasage et coupage — Nomenclature et numérotation des procédés

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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.

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This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 7, *Representation and terms*, 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).

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This fifth edition cancels and replaces the fourth edition (ISO 4063:2009), which has been technically revised.

The main changes are as follows:

— incorporation of processes and reference numbers for welding and thermal joining of plastics.

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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Welding, brazing, soldering and cutting — Nomenclature of processes and reference numbers

1 Scope

This document establishes a nomenclature for:

— welding;

— brazing, soldering and weld brazing;

— thermal cutting;

with each process identified by a reference number.

It covers the main processes (one digit), groups (two digits) and sub-groups (three digits). The reference number for any process has a maximum of three digits. This system is intended as an aid in computerization and the drafting of, for example, drawings, working papers and welding procedure specifications, and enables the uniform international designation of the processes.

This document does not cover all process variants. The process numbers can be supplemented with additional information for variants not listed.

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2 Normative references

There are no normative references in this document.

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3 Terms and definitions

No terms and definitions are listed in this document.

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 Designation

4.1 General

Where a full designation is required for a joining process, it shall have the following structure: the number of this document (i.e. “ISO 4063”), separated by a dash from the reference number of the process, as shown in these examples.

EXAMPLE 1 Process “Cold pressure welding” with reference number 48 is designated as:

ISO 4063 – 48

EXAMPLE 2 Process “Radio frequency welding” with reference number 62 is designated as:

ISO 4063 – 62

EXAMPLE 3 Process “Heated wedge welding with hot gas” with reference number 662-A is designated as:

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ISO 4063 – 662-A

4.2 Hybrid joining processes

When multiple processes are used simultaneously in one process area, the processes shall be described using the designations for each process separated by the symbol "+".

EXAMPLE Process "Gas laser welding" (reference number 522) together with process "Plasma arc welding" (reference number 15) is designated as:

ISO 4063 – 522 + 15

5 List of processes and reference numbers

5.1 General

The first designation listed is the preferred one and any subsequent designations are synonyms. Terms used in the United States of America (USA) are shown for information where there are differences.

Annex A provides supplementary options for process variants.

Annex B provides an overview for replaced and obsolete processes.

Annex C provides a list of commonly used acronyms and abbreviations for the welding processes in the United States of America included in this document.

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5.2 Welding

1 Arc welding

11 Metal arc welding without gas protection

111 Manual metal arc welding
Shielded metal arc welding, USA

112 Gravity welding
Gravity arc welding with covered electrode
Gravity feed welding, USA

114 Self-shielded tubular cored arc welding

12 Submerged arc welding

121 Submerged arc welding with solid wire electrode

122 Submerged arc welding with strip electrode

124 Submerged arc welding with metal powder addition

125 Submerged arc welding with tubular cored electrode

126 Submerged arc welding with cored strip electrode

13 Gas-shielded metal arc welding
Metal inert gas (MIG) welding/Metal active gas (MAG) welding
Gas metal arc welding (GMAW), USA

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131 MIG welding with solid wire electrode
GMAW using inert gas and solid wire electrode, USA

132 MIG welding with flux cored electrode
Gas shielded flux cored arc welding, USA

133 MIG welding with metal cored electrode
GMAW using inert gas and metal cored wire, USA

135 MAG welding with solid wire electrode
GMAW using active gas with solid wire electrode, USA

136 MAG welding with flux cored electrode
GMAW using active gas and flux cored electrode, USA

138 MAG welding with metal cored electrode
GMAW using active gas and metal cored electrode, USA

14 Gas-shielded arc welding with non-consumable tungsten electrode
Tungsten inert gas (TIG) welding/Tungsten active gas (TAG) welding
Gas tungsten arc welding (GTAW), USA

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141 TIG welding with solid filler material
GTAW using inert gas and solid filler material, USA

142 Autogenous TIG welding
Autogenous gas tungsten arc welding using inert gas, USA

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143 TIG welding with tubular cored filler material
GTAW using inert gas and tubular cored filler material, USA

145 TIG welding using reducing gas and solid filler material
GTAW using inert gas plus reducing gas additions and solid filler material, USA

146 TIG welding using reducing gas and tubular cored filler material
GTAW using inert gas plus reducing gas additions and tubular cored filler material, USA

147 Gas-shielded arc welding with non-consumable tungsten electrode using active gas
TAG welding
GTAW using active gas, USA

15 Plasma arc welding

151 Plasma MIG welding

152 Powder plasma arc welding

153 Plasma welding with transferred arc

154 Plasma arc welding with non-transferred arc

155 Plasma arc welding with partially transferred arc

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18 Other arc welding processes

185 Magnetically impelled arc welding

2 Resistance welding

21 Resistance spot welding

211 Indirect spot welding

212 Direct spot welding

22 Resistance seam welding

221 Lap seam welding

222 Mash seam welding

223 Prep-lap seam welding

224 Wire seam welding

225 Foil butt-seam welding

226 Seam welding with strip

23 Projection welding

231 Indirect projection welding

232 Direct projection welding

24 Flash welding

241 Flash welding with preheating

242 Flash welding without preheating

25 Resistance butt welding
Upset welding, USA

26 Resistance stud welding

27 HF resistance welding
High-frequency resistance welding
High-frequency upset welding, USA

29 Other resistance welding processes

3 Gas welding
Oxyfuel gas welding, USA

31 Oxyfuel gas welding

311 Oxyacetylene welding

312 Oxypropane welding

313 Oxyhydrogen welding

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4 Welding with pressure

41 Ultrasonic welding

411 Ultrasonic hot welding

412 Ultrasonic spot welding

413 Ultrasonic seam welding

414 Ultrasonic torsion welding

42 Friction welding

421 Direct drive friction welding

422 Inertia friction welding

423 Friction stud welding

424 Linear friction welding (generally referred to as “vibration welding” when the base materials are plastics)

425 Radial friction welding

426 Orbital friction welding

43 Friction stir welding

431 Friction stir spot welding

432 Refill friction stir spot welding

433 Stitch friction stir spot welding

434 Swept friction stir spot welding

435 Swing friction stir spot welding

44 Impact welding (referred to as shock welding in ISO/TR 25901-3:2016, 2.2.1.6.10)

441 Explosion welding

442 Magnetic pulse welding

45 Diffusion welding

451 Hot isostatic pressure welding

47 Oxyfuel gas pressure welding
Pressure gas welding, USA

48 Cold pressure welding
Cold welding, USA

481 Cold pressure extrusion welding

49 Hot pressure welding

491 Hot nozzle welding

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492 Nail head welding

493 Coextrusion welding

5 Beam welding

51 Electron beam welding

511 Electron beam welding in vacuum

512 Electron beam welding in atmosphere

513 Electron beam welding with addition of shielding gases

52 Laser welding
Laser beam welding, USA

521 Solid state laser welding

522 Gas laser welding

523 Diode laser welding
Semi-conductor laser welding, USA

6 Plastics-specific welding processes

61 Resistive implant welding

611 Electrofusion welding

62 Radio frequency welding
High-frequency welding
Dielectric welding

63 Solvent welding

631 Solvent cement welding

64 Hot gas welding

641 Hot gas speed welding

642 Hot gas round nozzle welding

643 Hot gas manual welding without welding rod

644 Hot gas machine welding without welding rod

645 Hot gas machine welding with welding rod

646 Hot gas convection welding

647 Extrusion welding

65 Heat sealing

651 Impulse welding

652 Hot bar welding

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66 Heated tool welding

661 Hot plate welding

662 Heated wedge welding

663 Socket fusion welding

664 Saddle fusion welding

67 Flash-free welding

671 Flow fusion welding

69 Other plastics-specific welding processes

691 Microwave welding

692 Staking

7 Other welding processes

71 Aluminothermic welding
Thermite welding, USA

72 Electroslag welding

721 Electroslag welding with strip electrode

722 Electroslag welding with wire electrode

73 Electrogas welding

74 Induction welding

741 Induction butt welding
Induction upset welding, USA

742 Induction seam welding

743 High frequency induction welding

75 Light radiation welding

753 Infrared welding

78 Arc stud welding

783 Drawn arc stud welding with ceramic ferrule or shielding gas

784 Short-cycle drawn arc stud welding

785 Capacitor discharge drawn arc stud welding

786 Capacitor discharge stud welding with tip ignition

5.3 Thermal cutting

8 Cutting and gouging

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