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

FDIS stage

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Foreword

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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).

Field Code Changed

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.

Field Code Changed

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).

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

The main ~~change compared to the previous edition is~~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.

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, ~~etc~~ 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.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain ~~terminological~~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 ~~hyphen~~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:

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 ~~designation~~designations are synonyms. Terms used in the United States of America (USA) are shown for information where there are differences.

Annex A~~Annex A~~ provides supplementary options for process variants.

Annex B~~Annex B~~ provides an overview for replaced and obsolete processes.

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

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**
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**
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
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
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
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[2]~~welding
422	Inertia friction ~~welding[2]~~welding
423	Friction stud welding
424	Linear friction welding[1] (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[2]** (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**

[1] ~~Reference number 424 is generally referred to as "vibration welding" when the base materials are plastics.~~
[2] ~~Impact welding is referred to as shock welding in ISO/TR 25901-3:2016.~~

491	Hot nozzle welding
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
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**