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Resistance welding - Vocabulary - Part 1: Spot, projection and seam welding (ISO 17677-1:2021)

Widerstandsschweißen - Begriffe - Teil 1: Punkt-, Buckel- und Rollennahtschweißen (ISO 17677-1:2021)

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Soudage par résistance - Vocabulaire - Partie 1: Soudage par points, par bossages et à la molette (ISO 17677-1:2021)

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Resistance welding - Vocabulary - Part 1: Spot, projection and seam welding (ISO 17677-1:2021)

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Buckel- und Rollennahtschweißen (ISO 17677-1:2021)

This European Standard was approved by CEN on 28 February 2021.

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN ISO 17677-1:2021) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with Technical Committee CEN/TC 121 "Welding and allied processes" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2021, and conflicting national standards shall be withdrawn at the latest by September 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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Resistance welding — Vocabulary —

Part 1:

Spot, projection and seam welding

Soudage par résistance —

Vocabulaire —

Partie 1:

Soudage par points, par bossages et à

la molette

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Widerstandsschweißen — Begriffe —

Teil 1:

**Punkt-, Buckel- und
Rollennahtschweißen**



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Phone: +41 22 749 01 11
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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 6, *Resistance welding and allied mechanical joining*, 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 third edition cancels and replaces the second edition (ISO 17677-1:2019), of which it constitutes a minor revision. The main changes compared to the previous edition are as follows:

- the terms and definitions of ISO 14329 have been implemented;
- editorial changes have been made.

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>.

Resistance welding — Vocabulary —

Part 1: Spot, projection and seam welding

1 Scope

This document establishes a vocabulary of terms and definitions for resistance spot welding, projection welding and seam welding.

NOTE In addition to terms used in English and French, two of the three official ISO languages, this document gives the equivalent terms in German; these are published under the responsibility of the member body for Germany (DIN). However, only the terms and definitions given in the official languages can be considered as ISO terms and definitions.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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/>

3.1 Welding and testing procedures

3.1.1

chisel test

test in which a chisel is driven between the sheets near to adjacent welds until either fracture occurs or until the metal near the weld yields or bends

3.1.2

cross tension test

tensile test of a resistance welded specimen to determine the mechanical properties and failure mode of the weld

3.1.3

cross-wire welding

projection welding (3.1.11) of crossed wires or rods

3.1.4

direct welding

resistance welding secondary circuit variant in which welding current and *electrode force* (3.3.5) are applied to the workpieces by directly opposed *electrodes* (3.2.1) and only one weld is made by one welding operation

Note 1 to entry: See [Figure 12](#) for typical arrangements.

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3.1.5

indirect welding

resistance welding secondary circuit variant in which the welding current flows through the workpieces in locations away from, as well as at, the welds

Note 1 to entry: See [Figure 13](#) for typical arrangements.

3.1.6

multiple impulse welding

welding with more than one impulse

Note 1 to entry: See [Figures 4](#) to [7](#) for related time and *electrode force* ([3.3.5](#)) diagrams.

3.1.7

multiple spot welding

spot welding in which two or more welds are made simultaneously in one welding operation

Note 1 to entry: Examples are *parallel spot welding* ([3.1.8](#)) and *series spot welding* ([3.1.14](#)).

3.1.8

parallel spot welding

resistance welding secondary circuit variant in which the secondary current is divided in parallel electrical paths to make two or more welds simultaneously

Note 1 to entry: See [Figure 11 a](#)).

3.1.9

peel test

destructive test in which a resistance-welded lap joint is tested by applying a peel force which results in stresses mainly in the thickness direction of the weld

3.1.10

pillow test

destructive test in which internal pressure is applied in order to test for leaks and the strength of a seam weld

3.1.11

projection welding

resistance welding in which the resulting welds are localized at predetermined points by projections, embossments or intersections, concentrating force and current by their geometry

Note 1 to entry: The projections are raised on, or formed from, one or more of the *faying surfaces* ([3.3.16](#)) and collapse during welding.

3.1.12

resistance spot welding

resistance welding process producing a weld at the *faying surfaces* ([3.3.16](#)) between overlapping parts by the heat obtained from resistance to the flow of welding current through the workpieces from the *electrodes* ([3.2.1](#)) serving to concentrate the welding current and pressure at the weld area

3.1.13

seam welding

resistance welding in which force is applied continuously and current is applied continuously or intermittently to produce a linear weld, the workpieces being between two *electrode wheels* ([3.2.5](#)) or an electrode wheel and an electrode bar

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3.1.14**series spot welding**

resistance welding secondary circuit variant in which the secondary current is conducted through the workpieces and *electrodes* (3.2.1) in a series electrical path to simultaneously form multiple resistance spot, seam or projection welds

Note 1 to entry: See [Figures 1](#) and [11 b](#)).

3.1.15**roll spot welding**

resistance welding process variant that produces intermittent spot welds using one or more rotating circular electrodes

Note 1 to entry: The rotation of the *electrodes* (3.2.1) may or may not be stopped during the making of a weld.

3.1.16**shunt weld**

first weld on a series of spot welds, which acts as a shunt

3.1.17**tensile shear test**

test in which a lap-welded specimen is subjected to a tensile force with the aim of determining the mechanical properties of the specimen

3.1.18**stitch welding**

spot welding in which successive welds overlap

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3.2 Hardware and tools**3.2.1****electrode****resistance welding electrode**

component of the electrical circuit that supplies electrical power and applies *electrode force* (3.3.5) to the workpiece

EXAMPLE Rotating wheel, rotating roll, bar, cylinder, plate, clamp, chuck, variations thereof.

3.2.1.1**angled electrode****bent electrode**

electrode for spot or *stitch welding* (3.1.18) whose *electrode working face* (3.2.6) is not normal to the mounting axis

3.2.1.2**contact electrode**

resistance welding electrode (3.2.1) designed to conduct secondary current through a workpiece without making a weld

3.2.1.3**offset electrode****eccentric electrode**

electrode for spot or *stitch welding* (3.1.18) whose *electrode working face* (3.2.6) is not concentric with the axis of the *electrode adaptor* (3.2.2)

3.2.2**electrode adaptor****shank**

device used to attach an *electrode* (3.2.1) to an *electrode holder* (3.2.4)

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3.2.3

electrode cap

replaceable *electrode* (3.2.1) tip used in *resistance spot welding* (3.1.12)

3.2.4

electrode holder

device holding a welding *electrode* (3.2.1)

3.2.5

electrode wheel**seam welding wheel**

rotating *resistance welding electrode* (3.2.1) of ring or disc shape

3.2.6

electrode working face

<resistance spot welding and projection welding> end of a *resistance welding electrode* (3.2.1) in contact with the workpiece

3.2.7

welding head

device comprising the force generation and guiding system, carrying an *electrode holder* (3.2.4), platen or *electrode wheel* (3.2.5)

3.3 Welding process and parameters

3.3.1

chill time**quench time**

period of time between the end of the weld current and the start of post-heat current during which no current flows and the weld is cooled by the *electrodes* (3.2.1)-1:2021

Note 1 to entry: See [Figure 5](#).

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3.3.2

cool time**pause time**

time interval between successive heat times in *multiple impulse welding* (3.1.6) or *seam welding* (3.1.13)

Note 1 to entry: See [Figures 4](#) and [7](#).

3.3.3

current delay time

time interval between reaching set force and initiation of current flow

Note 1 to entry: See [Figure 3](#).

3.3.4

current-off time

period of time between the cessation of current in one *welding cycle* (3.3.43) and the beginning of current in the next one

3.3.5

electrode force

force applied by the electrodes to the workpieces

Note 1 to entry: See *welding force* (3.3.44).

3.3.6

welding electrode force

electrode force applied during *weld time* (3.3.40)

3.3.7**forging electrode force
forge force**

electrode force applied in the forge force time

3.3.8**dynamic electrode force**

electrode force applied during the actual *welding cycle* (3.3.43)

3.3.9**static electrode force**

electrode force with no current flowing and no movement in the welding machine

3.3.10**theoretical electrode force**

force, neglecting friction and inertia, available at the electrodes of a resistance welding machine by virtue of the initial force and the theoretical mechanical properties of the system

3.3.11**electrode force programme**

predetermined sequence of changes of force during welding

3.3.12**electrode force and current programme**

predetermined sequence of changes of force and current during the *welding cycle* (3.3.43)

3.3.13**electrode movement during welding**

physical displacement of *electrodes* (3.2.1) due to thermal expansion, shrinkage and indentation during welding

3.3.14**electrode skidding**

lateral movement of the *electrodes* (3.2.1) relative to the surface of the workpieces during the welding process

3.3.15**electrode stroke**

physical movement of *electrodes* (3.2.1) in the electrode axis during the *welding cycle* (3.3.43)

3.3.16**faying surface**

mating surface of a workpiece in contact with another workpiece to which it is to be joined

3.3.17**force application time**

total time of the application of force by the *electrodes* (3.2.1) to the workpiece in a *welding cycle* (3.3.43)

Note 1 to entry: See [Figures 3](#) to [7](#).

3.3.18**force fall time**

time between the start of force decrease to zero force

Note 1 to entry: See [Figures 3](#) to [7](#).

3.3.19**force maintenance time**

time in the *welding cycle* (3.3.43) during which a force is maintained at a predetermined level, excluding the *force rise time* (3.3.20) and *force fall time* (3.3.18)

Note 1 to entry: See [Figures 3](#) to [7](#).