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Resistance welding — Resistance welding equipment — Mechanical and electrical requirements

Soudage par résistance — Matériel de soudage par résistance — Exigences mécaniques et électriques

[Revision of second edition (ISO 669:2000)]

ICS 25.160.30

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

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Foreword

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ISO 669 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 6, *Resistance welding and allied mechanical joining*.

This third edition cancels and replaces the second edition (ISO 669:2000).

Requests for official interpretations of any aspect of this standard should be directed to the Secretariat of ISO/TC 44/SC 6 via your national standards body, a complete listing of which can be found at www.iso.org.

Resistance welding — Resistance welding equipment — Mechanical and electrical requirements

1 Scope

This International Standard defines and specifies certain identified electrical and mechanical characteristics of equipment used for:

— Resistance spot welding;

— Projection welding;

— Resistance seam welding;

— Upset welding;

— Flash welding.

This International Standard specifies the information to be given in equipment specifications and the test methods to be used for measuring those characteristics.

Not all requirements apply to all types of equipment.

The following types of power sources are included:

— single phase with alternating welding current;

— single phase with rectified welding current by rectification of the output of the welding transformer;

— single phase with inverter welding transformer;

— three phase with rectified welding current by rectification of the output of the welding transformer;

— three phase with a current rectification in the input of the welding transformer (sometimes called frequency convertor);

— three phase with inverter welding transformers.

This International Standard does not apply to welding transformers that are separate from the equipment.

NOTE Safety requirements for resistance welding equipment are covered by IEC 62135-1.

2 Normative references

The following referenced documents are indispensable for the application 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 865, *Slots in platens for projection welding machines*

ISO 5184, *Straight resistance spot welding electrodes*

ISO 5821, *Resistance spot welding electrode caps*

ISO 5826, *Resistance welding equipment — Transformers — General specifications applicable to all transformers*

ISO 8430-1, *Resistance spot welding — Electrode holders — Part 1: Taper fixing 1:10*

ISO 8430-2, *Resistance spot welding — Electrode holders — Part 2: Morse taper fixing*

ISO 8430-3, *Resistance spot welding — Electrode holders — Part 3: Parallel shank fixing for end thrust*

ISO 17657-2, *Resistance welding – Welding current measurement for resistance welding – Part 2: Welding current meter with current sensing coil*

ISO 17657-5, *Resistance welding – Welding current measurement for resistance welding – Part 5: Verification of welding current measuring system*

ISO 17677-1, *Resistance welding — Vocabulary — Part 1: Spot, projection and seam welding*

ISO/PWI 17677-2, *Resistance welding — Vocabulary — Part 2: Flash and upset (resistance upset) welding*

IEC 60204-1, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 62135-1, *Resistance welding equipment — Part 1: Safety requirements for design, manufacture and installation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17677-1 and ISO/PWI 17677-2 and the following apply.

3.1 Mechanical parts of spot, projection and seam welding equipment

3.1.1
arm
device for transmitting the electrode force which may also conduct the welding current or support a separate conductor

See Figures 1 and 3.

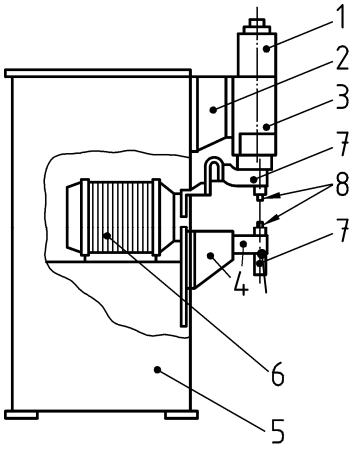
3.1.2
welding head
device comprising the force generation and guiding system carrying an electrode holder, platen or seam welding head mounted to the upper arm or directly to the machine body

See Figure 1.

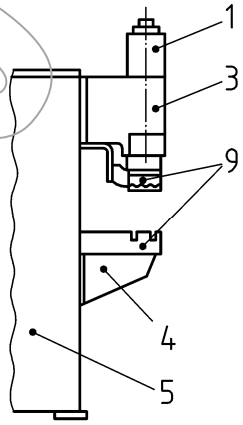
3.1.3
electrode holder
device holding a spot welding electrode or an electrode adaptor

[ISO 8430-1, ISO 8430-2 and ISO 8430-3]

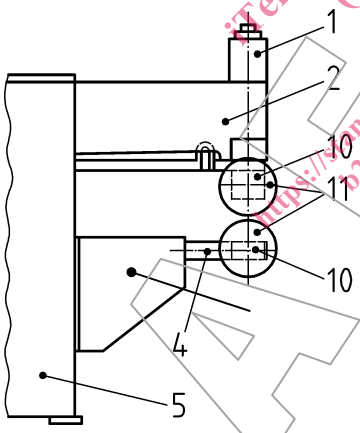
See Figure 1.



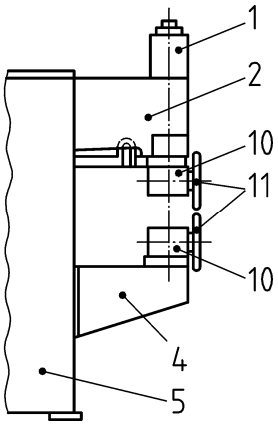
a) spot welding equipment



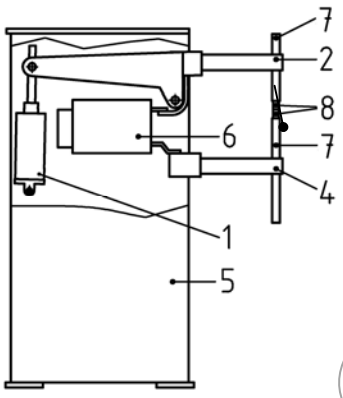
b) projection welding equipment



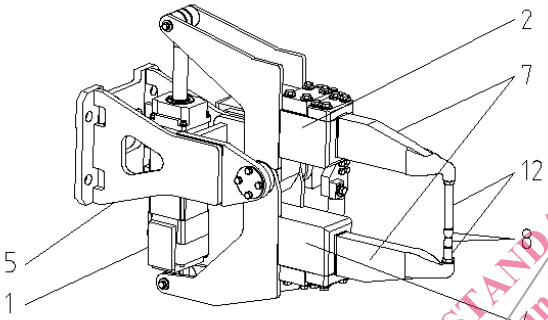
c) longitudinal seam welding equipment



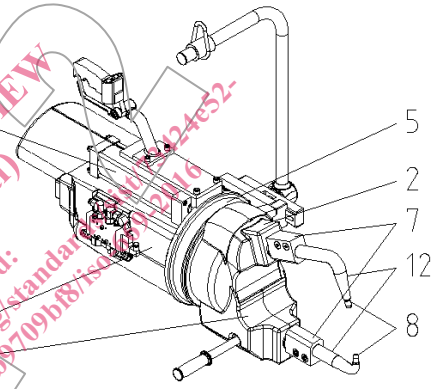
d) transverse seam welding equipment



e) rocker arm welding equipment



f) welding gun without transformer

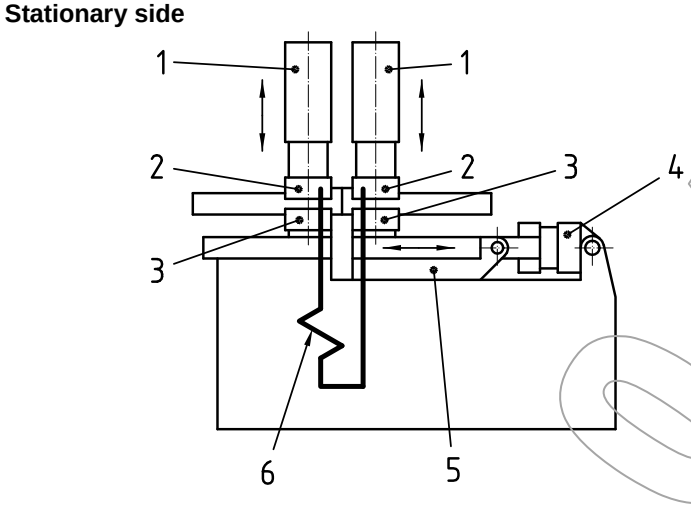


g) manual gun with integrated transformer

Key

1	Force generation system	5	Frame	9	Platen
2	Moveable arm	6	Transformer	10	Wheel head
3	Welding head	7	Electrode holder	11	Electrode wheel
4	Stationary arm	8	Electrode	12	Electrode adapter

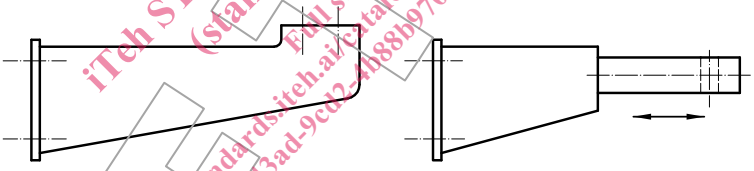
Figure 1 — Elements of spot, projection and seam welding equipment



Key

1 Clamping device
2 Clamping die
3 Current-carrying clamping die
4 Slide drive
5 Slide
6 Welding transformer

Figure 2 — Elements of upset welding equipment



a) non-adjustable b) adjustable

Figure 3 — Arms (lower arms)

3.1.4
spot welding electrode
electrode designed for spot welding

[ISO 5184 and ISO 5821]

See Figure 1.

3.1.5
platen
device normally having tee slots and carrying projection welding electrodes or welding tools

[ISO 865]

See Figure 1.

3.1.6
seam welding head
device comprising an electrode wheel bearing and mounted on the upper and lower arm for longitudinal and/or transversal seam welding

See Figure 1.

3.1.7
electrode wheel bearing
device guiding the electrode wheel for force transfer and mostly for current transfer

3.1.8
electrode wheel
electrode as a rotating disc

See Figure 1.

NOTE This device may be driven by a motor or moved by the workpiece (idler wheels). The driver may be direct to the electrode shaft or to its circumference (knurl drive), see Figure 6.

3.1.9
electrode wheel profile
form of the electrode wheel being single or double sided bevelled, or radiused depending on the welding conditions and access

See Figure 5.

3.1.10
electrode wheel speed
⟨direct drive⟩ the speed of rotation *n*

3.1.11
electrode wheel speed
⟨knurl drive⟩ the tangential speed *v*

3.1.12
throat gap
e
⟨spot and seam welding equipment⟩ usable distance between the arms or the outer current conducting parts of the welding circuit
See Figure 6.

3.1.13
throat gap
e
⟨projection welding equipment⟩ clamping distance between the platens
See Figure 6.
NOTE See also die distance, *e*, 3.2.11.

3.1.14
throat depth
l
usable distance from the centre of the platens or the axes of the electrodes or, in the case of oblique electrodes, the point of intersection of the electrode axes in the working position or the contact line of electrode wheels and that part of the equipment body located closest to it

See Figure 6.

NOTE This definition does not consider any offset of the electrode tips.