## INTERNATIONAL STANDARD

ISO 669

Third edition 2016-02-15

# Resistance welding — Resistance welding equipment — Mechanical and electrical requirements

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

## iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>ISO 669:2016</u>

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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 <a href="www.iso.org/directives">www.iso.org/directives</a>).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is 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 (1802669:2000) 2 which has been technically revised. 4b88b9709bf8/iso-669-2016

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## 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<sup>1)</sup>, and
- flash welding<sup>2</sup>).

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. PREVIEW

The following types of power sources are included: iteh ai)

- single phase with alternating welding current;
- single phase with rectified welding current by rectification of the output of the welding transformer;
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- 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5826:2014, Resistance welding equipment — Transformers — General specifications applicable to all transformers

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

<sup>1)</sup> Often referred to by the non-preferred term, butt welding.

<sup>2)</sup> Often referred to by the non-preferred term, flash butt welding.

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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

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 the following apply.

## 3.1 Mechanical parts of spot, projection, and seam welding equipment

## 3.1.1

#### arm

device for transmitting the *electrode force* (3.1.16) which can also conduct the welding current or support a separate conductor

Note 1 to entry: See Figure 1 and Figure 3.

## 3.1.2

## welding head

device comprising the force generation and guiding system carrying an *electrode holder* (3.1.3), *platen* (3.1.5), or *seam welding head* (3.1.6) mounted to the upper arm or directly to the machine body

Note 1 to entry: See Figure 1.

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## 3.1.3

## electrode holder

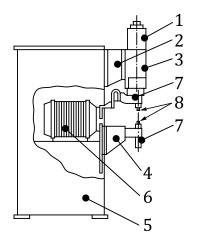
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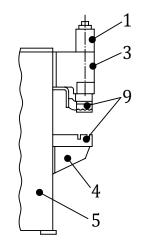
device holding a spot welding electrode (@lla4) or an electrode adaptor b23e-43ad-9cd2-

4b88b9709bf8/iso-669-2016

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

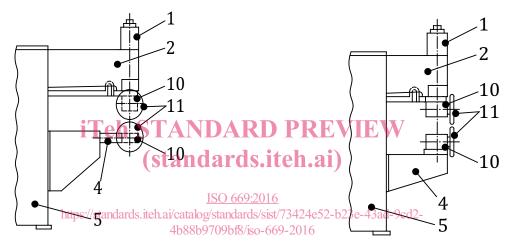
Note 1 to entry: See  $\underline{\text{Figure 1}}$ .





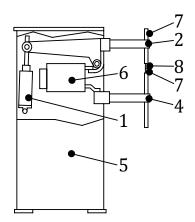
a) Spot welding equipment

b) Projection welding equipment

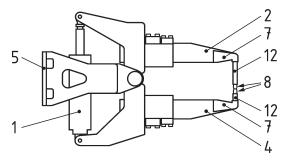


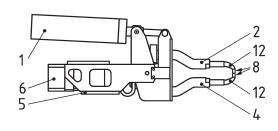
c) Longitudinal seam welding equipment

d) Transverse seam welding equipment

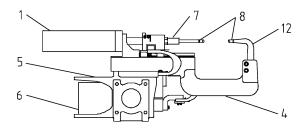


e) Rocker arm welding equipment





- f) Welding gun without transformer
- g) Manual gun with integrated transformer



h) Robot mount C-gun

## Key

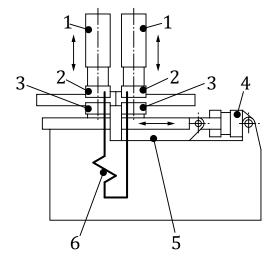
- force generation system 1
- 2 moveable arm
- 3 welding head
- 4 stationary arm

## VDARD 9Rplaten EW

- 10 seam welding head 11 electrode wheel
- 7
- spot welding electrode 12 electrode adapter

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



## Key

- clamping device 1
- 2 clamping die
- 3 current-carrying clamping die

- 4 slide drive
- 5 slide
- 6 welding transformer

Figure 2 — Elements of upset welding equipment

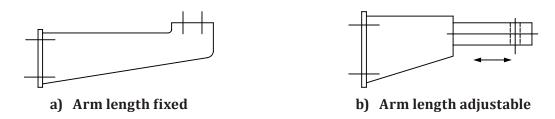


Figure 3 — Arms (lower arms)

## 3.1.4

## spot welding electrode

electrode designed for spot welding

[SOURCE: ISO 5184 and ISO 5821]

Note 1 to entry: See Figure 1eh STANDARD PREVIEW

## 3.1.5 **platen**

## (standards.iteh.ai)

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

[SOURCE: ISO 865] https://standards.iteh.ai/catalog/standards/sist/73424e52-b23e-43ad-9cd2-

4b88b9709bf8/iso-669-2016

Note 1 to entry: See Figure 1.

## 3.1.6

## seam welding head

device comprising an *electrode wheel bearing* (3.1.7) and mounted on the upper and lower arm for longitudinal and/or transversal seam welding

Note 1 to entry: See Figure 1.

## 3.1.7

## electrode wheel bearing

device guiding the *electrode wheel* (3.1.8) for force transfer and mostly for current transfer

### 3.1.8

## electrode wheel

electrode as a rotating disc

Note 1 to entry: See Figure 1.

Note 2 to entry: This device can be driven by a motor or moved by the workpiece (idler wheels). The driver can 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* (3.1.8) being single- or double-sided bevelled or radiused depending on the welding conditions and access

Note 1 to entry: See Figure 5.

## 3.1.10

## electrode wheel speed

<direct drive seam welding> rotational speed, n, of the electrode wheel (3.1.8)

Note 1 to entry: See <u>Figure 4</u>.

### 3.1.11

## electrode wheel speed

< knurl drive seam welding > linear tangential speed, v, of the *electrode wheel* (3.1.8) at the circumference

Note 1 to entry: See Figure 4.

## 3.1.12

## throat gap

е

<spot and seam welding equipment> usable distance between the arms (3.1.1) or the outer current
conducting parts of the welding circuit

Note 1 to entry: See Figure 6.

#### 3.1.13

## platen distance

e

Note 1 to entry: See Figure 6.

## Teh STANDARD PREVIEW

Note 2 to entry: See also die distance (3.2.11). (standards.iteh.ai)

## 3.1.14

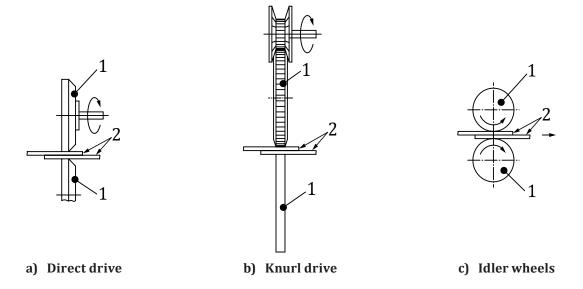
## throat depth

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usable distance from the centre of the *platens* (3.1.5) 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* (3.1.8) and that part of the equipment body located closest to it

Note 1 to entry: See Figure 6.

Note 2 to entry: This definition does not consider any offset of the electrode tips.



## Key

- 1 electrode wheel
- 2 workpieces to be welded

Figure 4 — Drive types of electrode wheels

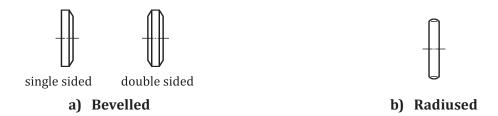
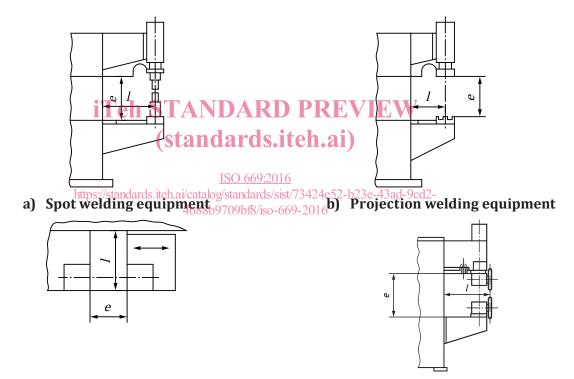


Figure 5 — Electrode wheel profiles



c) Upset welding equipment (top view)

d) Seam welding equipment

## Key

e throat gapl throat depth

Figure 6 — Main dimensions

## 3.1.15

## electrode stroke

С

physical displacement of electrodes during process function

Note 1 to entry: When the electrode is attached to the force generation system, the stroke of both the electrode and the driving cylinder is equal.