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Resistance welding — Locking tapers for electrode holders and electrode caps

Soudage par résistance

ICS: 25.160.20

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Reference number
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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 20168 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 6, *Resistance welding and allied mechanical joining*.

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Resistance welding — Locking tapers for electrode holders and electrode caps

1 Scope

This International Standard specifies the dimensions and tolerances for electrode holders and of spot welding electrode caps, where a locking taper is used.

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 5182, *Resistance welding — Materials for electrodes and ancillary equipment*

ISO 5821, *Resistance welding -- Spot welding electrode caps*

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

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

locking taper

taper allowing for a tight fit between an electrode holder and the electrode cap as their taper angles differ by $0^{\circ} 2' 60''$ ensuring the electrode cap engagement point is at the skirt of the cap and electrode holder – see Figure 1.

Note 1 to entry: Traditionally called Fisher taper.

Note 2 to entry: During welding, the electrode cap tightens further on the electrode holder.

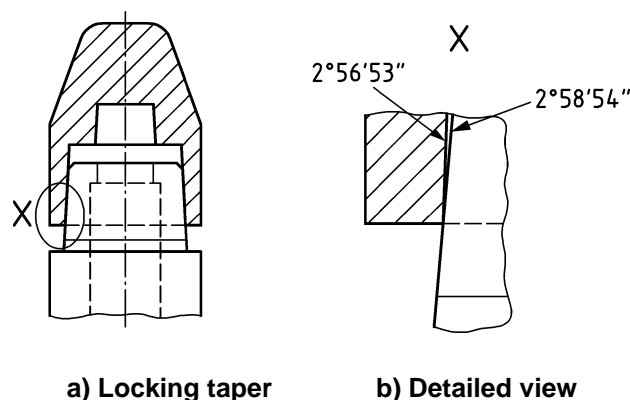


Figure 1 — Principle of a locking taper

4 Dimensions and tolerances

4.1 General

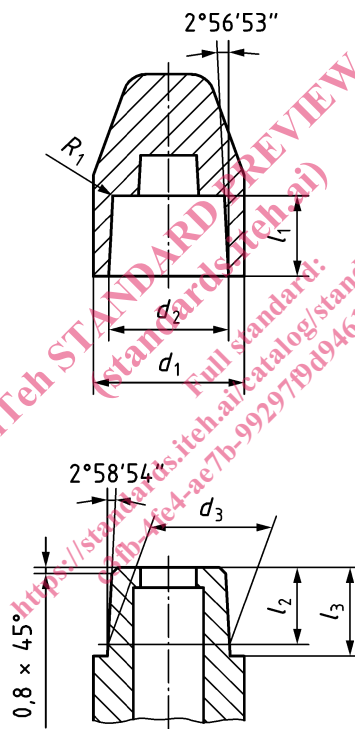
Table 1 gives the dimensions for three typically used electrode cap and holder sizes; 13 mm, 16 mm and 20 mm.

4.2 Electrode holders

The taper of the electrode holders shall be 2 degrees 58 minutes, 54 seconds in accordance with Figure 2.

4.3 Electrode Caps

The taper of the electrode caps shall be 2 degrees, 56 minutes, 53 seconds in accordance with Figure 2.



Key

- | | |
|--|---|
| L_1 – electrode cap locking taper length | D_1 – outside diameter of electrode cap |
| L_2 – electrode holder locking taper length | D_2 – inside diameter of electrode cap (at base of locking taper) |
| L_3 – total length of electrode holder taper | D_3 – diameter of electrode holder at base of locking taper |

Figure 2 — Dimensions for electrode holder and electrode cap with locking taper

Table 1 — Recommended maximum electrode force, F_E , depending on the hardness of the electrode caps, given for nominal diameter d_1

Dimensions in Millimetres

Nominal size of electrode cap and holder	D_1	D_2	D_3	R_1	L_1	L_2	L_3
	+0,05 -0,00	+0,05 -0,00	+0,00 -0,05		+0,5 -0,00	+0,5 -0,00	+0,5 -0,00
13	13	10,01	10,21	0,012	8,81	8,84	10,36
16	16	12,56	12,75	0,015	9,63	9,65	11,18
20	20	15,88	16,08	0,013	10,69	10,19	11,71

5 Designation

5.1 Electrode holders

Electrode holders shall be designated in accordance with this International Standard, ISO 20168 and nominal diameter, d_1 .

EXAMPLE A spot welding electrode holder, with nominal diameter 20 mm is designated as follows:

ISO 20168 – 20

5.2 Electrode caps

Electrode caps shall be designated in accordance with ISO 5821 except the number of this International Standard shall be used to indicate that the cap has a locking taper.

EXAMPLE A spot welding electrode cap type B0, width $d_1 = 16$ mm, length $l_1 = 20$ mm, $R_1 = 30$ mm, $d_2 = 8$ mm and $\alpha = 45^\circ$, is designated as follows:

ISO 20168 – B0 – 16 – 20 – 30 – 8 – 45

6 Material

The materials used shall be in accordance with ISO 5182.

7 Marking

The packaging shall be marked with the full designation and material used.

Bibliography

- [1] ISO 286-2, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts*
- [2] ISO 1119, *Geometrical Product Specifications (GPS) — Series of conical tapers and taper angles*
- [3] ISO 5822, *Spot welding equipment — Taper plug gauges and taper ring gauges*

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