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Resistance welding equipment — Electrode taper fits for spot welding equipment – Dimensions

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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 second edition cancels and replaces the first edition (ISO 1089:1980) which has been technically revised.

The main changes compared to the previous edition are as follows:

— this document has been updated to the latest ISO/IEC Directives, Part 2;

— to complete closer to publication.

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 equipment — Electrode taper fits for spot welding equipment – Dimensions

1 Scope

This document specifies the dimensions and tolerances of taper fits between the following:

— Straight electrodes and electrode holders;

— Electrode adapters connecting electrode caps, and electrode holders;

— Female electrode caps and electrode adapters;

— Male electrode caps and electrode adapters.

NOTE Electrode holders and electrode caps utilizing locking tapers are addressed in ISO 20168.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 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 apply.

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 https://www.electropedia.org/

4 Dimensions

The dimensions shall be in accordance with Figures and Tables as follows:

— For taper types A and B, Figure 1 and Table 1 and Table 2;

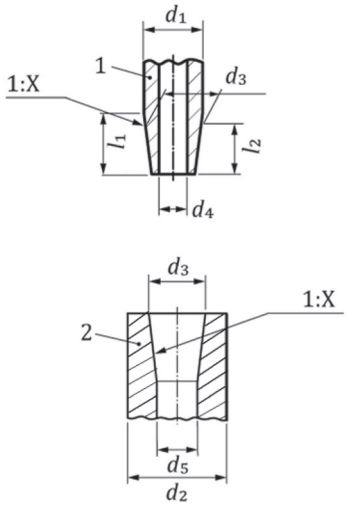
— For taper Type C, Figure 2 and Table 3 with Figure 3 showing a detail view of l_2, l_3 and l_4;

— For taper Type D, Figure 4 and Table 4.

Taper dimension tolerances are given in Table 5.

Tapers can be checked using taper plug gauges and taper ring gauges in accordance with ISO 5822.

Annex A gives information for alternative types of electrode taper fits with 1:9.6 tapers.



Key

1	male component (straight electrode or electrode adapter)	d_3	gauge diameter at datum line of taper – male component/electrode holder
2	electrode holder	d_4	cooling hole diameter – male component
d_1	outside diameter - male component	d_5	cooling hole diameter – electrode holder
d_2	outside diameter - electrode holder	l_1	taper length – male component
1:X	taper	l_2	effective taper length – male component

Figure 1 — Taper-details – Male component (straight electrode or electrode adaptor, either for straight thrust or eccentric loading) and electrode holder - Taper types A and B

Table 1 — Male components (straight electrodes or electrode adaptors) and electrode holders – Dimensions for straight thrust - Taper type A

Dimensions in millimetres

Electrode taper fit	Taper 1 : X	d_1	d_2	d_3	d_4	d_5	l_2	Electrode force[a] F_{max} kN
						Straight thrust		
A 10	1 : 10 (2°51’45”)	10	16 20 25	9,8	5,5	8,5	13	2,5
A 13		13	20 25 31,5 40	12,7	7,5	11	16	4
A 16		16	25 31,5 40	15,5	8,5	13,5	20	6,3
A 20		20	31,5 40	19	10,5	16,5	25	10
A 25		25	40	24,5	13,5	21,5	31,5	16

[a] For information only.

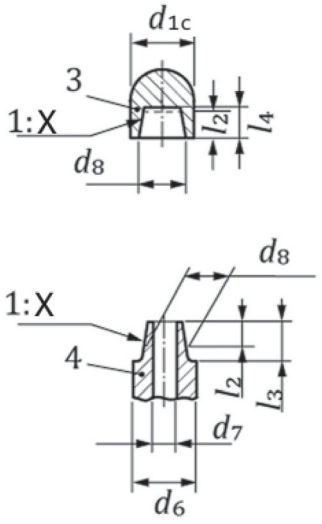
Table 1 *(continued)*

Electrode taper fit	Taper 1 : X	d_1	d_2	d_3	d_4	d_5	l_2	Electrode force[a] F_{max} kN
						Straight thrust		
A 32	1 : 5 (5°42’30”)	32	50	31	14	23	40	25
A 40		40	63	39	16	29	50	40
[a] For information only.								

Table 2 — Male components (offset electrodes or offset electrode adaptors) and electrode holders – Dimensions for eccentric loading - Taper type B

Dimensions in millimetres

Electrode taper fit	Taper 1 : X	d_1	d_2	d_3	d_4	d_5	l_2	Electrode force[a] F_{max} kN
						Eccentric loading		
B 10	1 : 10 (2°51’45”)	10	16 20 25	9,8	5,5	8	20	2,5
B 13		13	25 31,5 40	12,7	7,5	10	25	4
B 16		16	25 31,5 40	15,5	8,5	12,5	31,5	6,3
B 20		20	31,5 40	19	10,5	15	40	10
B 25		25	40	24,5	13,5	19,5	50	16
B 32	1 : 5 (5°42’30”)	32	50	31	14	–	–	25
B 40		40	63	39	16	–	–	40
[a] For information only.								



Key

3	female electrode cap	d_7	cooling hole diameter – electrode adaptor
4	electrode adaptor	d_8	gauge diameter at datum line of taper – female electrode cap/ electrode adaptor
d_{1C}	outside diameter - electrode cap	l_2	effective taper length/depth – electrode adaptor/female electrode cap
d_6	outside diameter - electrode adaptor	l_3	length of reduced diameter –electrode adaptor
1:X	taper	l_4	total hole depth – female electrode cap

NOTE A round head type F female electrode cap is shown as an example.

Figure 2 — Taper details – Female electrode cap and male electrode adaptor - Taper type C

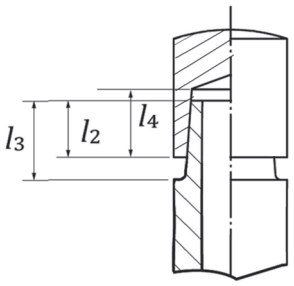


Figure 3 — Detail view of l_2, l_3 and l_4 – Example of female electrode cap and male electrode adaptor – Taper type C

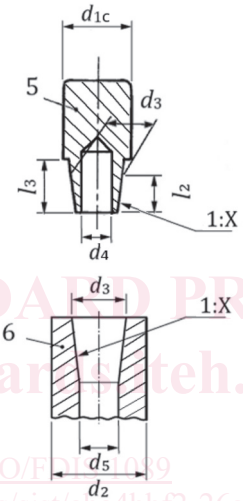
Table 3 — Female electrode caps and male adaptors – Dimensions – Taper Type C

Dimensions in millimetres

Electrode taper fit **1:10** (2°51'45")	d_{1C}[b]	d_6	d_7	d_8	l_2	l_3	l_4	Electrode force F_{max} kN
C 13	13	13	6,5	10	6,5	10	8	2,5
C 16	16	16	8	12	8	13	9,5	4
C 20	20	20	10,5	15	10	15	11,5	6,3

[a] For information only.

[b] Typical diameter. Other diameters can be used as well.



Key

5	male electrode cap	d_{1C}	outside diameter – male electrode cap
6	electrode adaptor	d_2	outside diameter – electrode adaptor
l_2	effective taper length	d_3	gauge diameter at datum line of taper – male electrode cap/electrode adaptor
l_3	taper length – male electrode	d_4	cooling hole diameter – male electrode cap
1:X	taper	d_5	cooling hole diameter – electrode adaptor

Figure 4 — Taper details – Male electrode cap and female electrode adaptor; Taper type D

Table 4 — Male electrode cap and female electrode adaptor - Dimensions; Taper type D

Dimensions in millimetres

Electrode taper fit **1:10** (2°51'45")	d_{1C}[b]	d_2	d_3	d_4	d_5	l_2	l_3	Electrode force[a] F_{max} kN
D 16	16	16	11,8	8	8	6	10	4

[a] For information only.

[b] Typical diameter. Other diameters can be used as well.

Table 5 — Taper Dimension Tolerances

Taper angle tolerance	d_3, d_8	l_1	l_3, l_4[a]
d°m's"	mm	mm	mm
+0/ -0°6'0"	+0/-0,1	±0,5	+0,5 0
[a] Includes any unevenness of the electrode skirt length.			

5 Designation

The designation shall include the following information in the order given:

— the number of this document (ISO 1089);

— electrode taper fit as mentioned in the first column of Table 1, Table 2, Table 3 and Table 4.

EXAMPLE Electrode taper fit of Type A and d_1 = 16 mm:

ISO 1089 — A16

6 Marking

Electrode holders with an electrode taper fit in accordance with this document shall be marked with the designation (without the number of this document), for example "A16".

Electrode adapters with an electrode taper fit for an electrode cap side in accordance with this document should be marked with the designation (without the number of this document), for example "C16".