
Nominal dimensions of cylindrical machined graphite electrodes with threaded sockets and nipples for use in electric arc furnaces

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[SIST EN 60239:2002](https://standards.iteh.ai/catalog/standards/sist/d52433a6-fde2-4d4f-93b1-8fb39aeac49c/sist-en-60239-2002)

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Descriptors: Electrodes, nipple, arc furnace, dimension

English version

Nominal dimensions of cylindrical machined graphite electrodes with threaded sockets and nipples for use in electric arc furnaces (IEC 60239:1997)

Dimensions nominales des électrodes cylindriques tournées avec logements et nipples filetés en graphite pour les fours à arc
(CEI 60239:1997)

Nennmaße von zylindrischen Graphitelektroden mit Gewindegewindesteinen und Nippeln für Lichtbogenöfen
(IEC 60239:1997)

This European Standard was approved by CENELEC on 1997-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 27/182/FDIS, future edition 3 of IEC 60239, prepared by IEC TC 27, Industrial electroheating equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60239 on 1997-07-01.

This European Standard supersedes HD 564 S1:1990.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 1998-04-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 1998-04-01

Annexes designated "informative" are given for information only.
In this standard, annex A is informative.

Endorsement notice

The text of the International Standard IEC 60239:1997 was approved by CENELEC as a European Standard without any modification.

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NOMINAL DIMENSIONS OF CYLINDRICAL MACHINED GRAPHITE ELECTRODES WITH THREADED SOCKETS AND NIPPLES FOR USE IN ELECTRIC ARC FURNACES

1 General

1.1 Scope

This standard applies to turned and threaded cylindrical graphite electrodes and to graphite nipples for use as full graphite columns on arc furnaces.

1.2 Object

This standard covers:

- the dimensions and tolerances on length and diameter of graphite electrodes;
- the dimensions and thread details for graphite electrode sockets and graphite nipples of tapered shape, used with the graphite electrodes.

The standardization of the above dimensional features is essential for the interchangeability of electrodes from different sources, and is a minimum standard.

NOTE – The standardization ensures that any electrode when cold can accept any nipple of appropriate dimensions.

However, the variety of raw material and production techniques may lead to different thermal behaviour of finished products. It is, therefore, not recommended that electrodes and nipples from different sources should be mixed in use.

1.3 System of measurement

The metric system is adopted as the standard of measurement.

NOTES

1 The currently used nominal diameter is the designation diameter resulting from an approximate conversion of former inches into millimetres. The real diameter is in millimetres.

2 The diameters and lengths of nipples are expressed in millimetres. The use of decimals has been deliberately limited to two digits after the decimal point.

2 Electrodes

2.1 Diameter of electrodes

The nominal electrode diameters, together with the tolerances, are specified in table 1. Graphite electrodes are machined in order to obtain the desired diameter over the whole electrode length.

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It may happen that part of the surface remains untouched by the tool when machining the electrode. This part is called a "low spot".

For a turned electrode with actual diameter D having a low spot, the measurement B (figure 1) shall be not less than the value given in table 1.

2.2 Length

The length of the electrodes (without nipple) is specified in table 1, and the length tolerances in table 2.

2.3 Threaded socket (dimensions)

Two types of thread can be used:

- those with 4 threads per 25,4 mm, (T4) for electrodes of nominal diameter 75 mm to 700 mm;
- those with 3 threads per 25,4 mm, (T3) for electrodes of nominal diameter 225 mm to 550 mm.

Two different socket depths (related to two different nipple lengths) can be used for threaded sockets T4 of electrodes of 400 mm to 700 mm nominal diameter.

The dimensions of threaded sockets of graphite electrodes are summarized in figure 2 and table 3 for sockets with 4 threads per 25,4 mm (T4).

The dimensions of threaded sockets of graphite electrodes are shown in figure 2 and table 4 for sockets with 3 threads per 25,4 mm (T3).

2.4 Designation

2.4.1 Threaded sockets are designated by the letter "S" for socket, the nominal diameter of the appropriate nipples, the letter "T" for taper thread, the number of threads per 25,4 mm and the letter "N" or "L" for short or deep socket, respectively.

Examples for short socket:

S 317 T4N
S 273 T3N

Examples for deep socket:

S 317 T4L

2.4.2 Electrodes are designated by the nominal diameter, the nominal length and the symbol for the threaded socket.

Examples for electrodes with short socket:

600 × 2100 × S 317 T4N
500 × 1800 × S 273 T3N

Example for electrodes with deep socket:

600 × 2100 × S 317 T4L

2.4.3 Connection systems for electrodes other than specified in this standard, that is without nipples, are presently used in certain areas. They should have a different designation, as shown in annex A.

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3 Nipples

3.1 Dimensions

The diameter and length of the nipple, depending on the nominal outside diameter of the appropriate electrode are shown in table 5 and figure 3, for thread type T4; and in table 6 and figure 4, for thread type T3, respectively.

3.2 Designations

Nipples are designated by the letter "N" for nipple, the nominal major diameter, the letter "T" for taper thread, the number of threads per 25,4 mm, and the letter "N" or "L" for short or long nipple, respectively.

Examples for short nipples:

N 317 T4N

N 273 T3N

Example for long nipples:

N 317 T4L

Table 1 – Diameters and lengths of machined and threaded graphite electrodes

Nominal diameter mm	Typical diameter mm	Diameter tolerances			Nominal length mm
		Maximum mm	Minimum mm	Low spot mm	
75	76	78	73	72	1 000/1 200/1 500
100	102	103	98	97	1 000/1 200/1 500
130	130	132	127	126	1 000/1 200/1 500
150	152	154	149	146	1 200/1 500/1 800
175	178	179	174	171	1 200/1 500/1 800
200	203	205	200	197	1 500/1 800
225	229	230	225	222	1 500/1 800
250	254	256	251	248	1 500/1 800
300	305	307	302	299	1 500/1 800/2 100
350	356	357	352	349	1 500/1 800/2 100
400	406	409	403	400	1 500/1 800/2 100
450	457	460	454	451	1 500/1 800/2 100/2 400
500	508	511	505	502	1 800/2 100/2 400
550	559	562	556	553	1 800/2 100/2 400
600	610	613	607	604	2 100/2 400/2 700
650	660	663	657	654	2 400/2 700
700	711	714	708	705	2 400/2 700

Table 2 – Length tolerances of machined and threaded graphite electrodes

Nominal length mm	Length tolerances on normal electrodes		Length tolerances on short electrodes	
	Maximum mm	Minimum mm	Maximum mm	Minimum mm
1 000	+50	-75	-75	-200
1 200	+50	-100	-100	-225
1 500	+50	-100	-100	-275
1 800	+75	-100	-100	-275
2 100	+75	-125	-125	-275
2 400	+75	-125	-125	-275
2 700	+150	-150	-150	-300

NOTE – The acceptable percentage of short-length electrodes per delivery is decided by agreement between supplier and user.

Table 3 – Dimensions of threaded sockets of graphite electrodes (type T4N and T4L)

Nominal diameter of electrode mm	Designation of socket	Pitch diameter d_2 mm	Minimum depth of socket l_1 mm	Total minimum length of thread l_2 mm
75	S 45 T4N	42,88	44,10	40,10
100	S 69 T4N	66,69	56,80	52,80
130	S 79 T4N	76,22	69,50	65,50
150	S 92 T4N	88,92	75,90	71,90
175	S 107 T4N	104,79	88,60	84,60
200	S 122 T4N	119,08	94,90	90,90
225	S 139 T4N	136,54	94,90	90,90
250	S 152 T4N	149,24	101,30	97,30
300	S 177 T4N	174,64	114,00	110,00
350	S 203 T4N	200,04	133,00	129,00
400	S 222 T4N	219,09	158,40	154,40
400	S 222 T4L	219,09	183,80	179,80
450	S 241 T4N	238,14	158,40	154,40
450	S 241 T4L	238,14	183,80	179,80
500	S 269 T4N	266,72	183,80	179,80
500	S 269 T4L	266,72	234,60	230,60
550	S 298 T4N	295,29	183,80	179,80
550	S 298 T4L	295,29	234,60	230,60
600	S 317 T4N	314,34	183,80	179,80
600	S 317 T4L	314,34	234,60	230,60
650	S 355 T4N	352,44	234,60	230,60
650	S 355 T4L	352,44	285,40	281,40
700	S 374 T4N	371,49	234,60	230,60
700	S 374 T4L	371,49	285,40	281,40

NOTE – Refer to figures 2 and 3. Designated diameter is nominal diameter. For actual dimensions, refer to table 1.

Table 4 – Dimensions of threaded sockets of graphite electrodes (type T3)

Nominal diameter of electrode mm	Designation of socket	Pitch diameter d_1 mm	Minimum depth of socket l_1 mm	Minimum total length of thread l_2 mm
225	S 139 T3N	135,49	107,60	103,60
250	S 155 T3N	151,36	116,00	112,00
300	S 177 T3N	172,95	141,50	137,50
350	S 215 T3N	211,69	158,40	154,40
400	S 215 T3N	211,69	158,40	154,40
400	S 241 T3N	237,09	175,30	171,30
450	S 241 T3N	237,09	175,30	171,30
450	S 273 T3N	268,84	183,80	179,80
500	S 273 T3N	268,84	183,80	179,80
550	S 298 T3N	294,24	192,20	188,20

NOTE – Refer to figures 2 and 4. Designated diameter is nominal diameter. For actual dimensions, refer to table 1.