

# TECHNICAL REPORT

**IEC**  
**TR 62157**

First edition  
2001-06

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## **Cylindrical machined carbon electrodes – Nominal dimensions**

*Electrodes cylindriques en carbone usiné –  
Dimensions nominales*



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International Electrotechnical Commission

Telefax: +41 22 919 0300

3, rue de Varembé Geneva, Switzerland

e-mail: [inmail@iec.ch](mailto:inmail@iec.ch)

IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale  
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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

## CYLINDRICAL MACHINED CARBON ELECTRODES – NOMINAL DIMENSIONS

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Technical reports do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful by the maintenance team.

IEC 62157, which is a technical report, has been prepared by IEC technical committee 27: Industrial electroheating equipment.

The text of this technical report is based on the following documents:

|               |                  |
|---------------|------------------|
| Enquiry draft | Report on voting |
| 27/246/CDV    | 27/264/RVC       |

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

This document which is purely informative is not to be regarded as an International Standard.

A bilingual version of this publication may be issued at a later date.

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## **CYLINDRICAL MACHINED CARBON ELECTRODES – NOMINAL DIMENSIONS**

### **1 Scope and object**

This technical report applies to cylindrical carbon electrodes, manufactured from upgraded coal, for use in electric direct-arc and submerged-arc furnaces, for melting silicium and carbide and for other purposes.

This technical report covers

- dimensions and tolerances on the length and diameter of carbon electrodes;
- dimensions and thread details for carbon electrode heads and sockets.

### **2 Designation**

Cylindrical carbon electrode with a diameter of 700 mm and a length of 2 400 mm; carbon electrode 700 mm × 2 400 mm.

### **3 Specific characteristics**

#### **3.1 Electrode surface**

The surface of the electrode has to be machined.

#### **3.2 Electrode structure**

An electrode punched with a 200 g steel hammer should develop a clear tone, close to a metallic one. Places with attenuated tone are allowed at a distance of not less than 200 mm from the socket bottom or the bottom surface of the electrode head.

### **4 Dimensions**

#### **4.1 Electrode dimensions**

Table 1 indicates tolerances in relation to the range of electrode dimensions.

Carbon electrodes are machined in order to obtain the desired diameter over the whole electrode length. It may happen that part of the surface remains untouched by the tool when machining the electrodes. This part is called a “low spot”. The depth of the low spot shall not be greater than the value given in table 1.

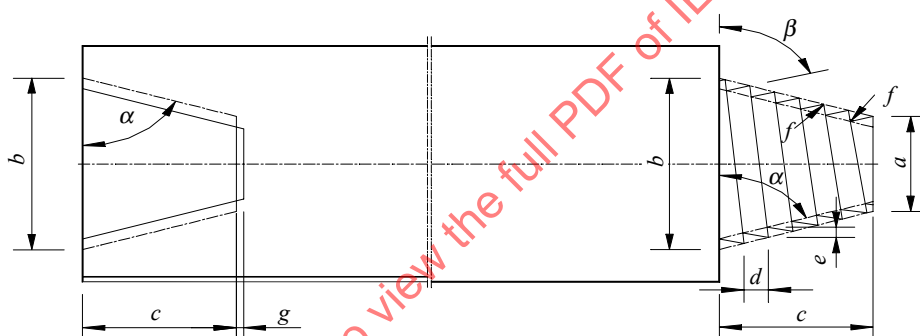
**Table 1 – Tolerances of electrode dimensions**

| Electrode diameter<br>mm | Diameter tolerances<br>mm | Electrode length<br>mm | Length tolerances<br>mm | Admissible oval<br>(low spot)<br>mm |
|--------------------------|---------------------------|------------------------|-------------------------|-------------------------------------|
| 200 – 500                | $\pm 2$                   | 2 000 – 3 000          | +40<br>–150             | 1                                   |
| 550 – 750                | $\pm 3$                   |                        |                         | 2                                   |
| 800 – 1 500              | $\pm 4$                   |                        |                         | 2                                   |

NOTE The length of the electrode is subject to agreement between manufacturer and user. Electrodes which are 10 % shorter are allowed in the lot but they should not be shorter than 1 500 mm.

#### 4.2 Dimensions of the socket and conical head of cylindrical electrodes

The shape and standardized dimensions of sockets and cylindrical heads are shown in figure 1. The particular dimensions are given in table 2.



IEC 645/01

**Figure 1 – Electrode shape and dimensions of the sockets and conical heads**

**Table 2 – Particular dimensions of the sockets and conical heads according to figure 1**

| <i>D</i><br>mm | $\alpha$  | <i>a</i><br>mm | <i>b</i><br>mm | <i>c</i><br>mm | <i>d</i><br>mm | <i>e</i><br>mm | <i>f</i><br>mm | <i>g</i><br>mm | $\beta$ |
|----------------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------|
| 200            | 70°       | 70             | 150            | 110            | 25             | 16             | 3              | 4              | 75°     |
| 225            | 70°       | 75             | 170            | 130            | 25             | 16             | 3              | 4              | 75°     |
| 250            | 70°       | 81             | 190            | 150            | 30             | 19             | 3              | 4              | 75°     |
| 285            | 70°       | 92             | 220            | 175            | 30             | 19             | 3              | 4              | 75°     |
| 300            | 70°       | 92             | 220            | 175            | 30             | 19             | 3              | 4              | 75°     |
| 325            | 70°       | 110            | 245            | 185            | 30             | 19             | 3              | 4              | 75°     |
| 350            | 70°       | 110            | 245            | 185            | 30             | 19             | 3              | 4              | 75°     |
| 360            | 70°       | 110            | 245            | 185            | 30             | 19             | 3              | 4              | 75°     |
| 400            | 70°       | 136            | 300            | 225            | 40             | 25             | 4              | 4              | 75°     |
| 450            | 70°       | 149            | 320            | 235            | 40             | 25             | 4              | 4              | 75°     |
| 500            | 70°       | 179            | 375            | 270            | 40             | 25             | 4              | 4              | 75°     |
| 550            | 70°       | 179            | 375            | 270            | 40             | 25             | 4              | 4              | 75°     |
| 600            | 70°       | 206            | 435            | 315            | 50             | 32             | 5              | 4              | 75°     |
| 650            | 70°       | 206            | 435            | 315            | 50             | 32             | 5              | 4              | 75°     |
| 700            | 70°       | 289            | 500            | 290            | 50             | 32             | 5              | 4              | 75°     |
| 750            | 70°       | 289            | 500            | 290            | 50             | 32             | 5              | 4              | 75°     |
| 800            | 70°       | 317            | 550            | 320            | 50             | 32             | 5              | 4              | 75°     |
| 850            | 70°       | 317            | 550            | 320            | 50             | 32             | 5              | 4              | 75°     |
| 900            | 70°       | 342            | 590            | 340            | 50             | 32             | 5              | 4              | 75°     |
| 950            | 70°       | 343            | 590            | 340            | 50             | 32             | 5              | 4              | 75°     |
| 1 000          | 70°       | 368            | 630            | 360            | 50             | 32             | 5              | 4              | 75°     |
| 1 100          | 70°       | 443            | 720            | 380            | 50             | 32             | 5              | 4              | 75°     |
| 500            | 55°18'13" | 151            | 416            | 191            | 30             | 31,6           | 3              | 4              | 70°     |
| 550            | 55°18'13" | 151            | 416            | 191            | 30             | 31,6           | 3              | 4              | 70°     |
| 600            | 55°18'13" | 191            | 510            | 230            | 30             | 31,6           | 3              | 4              | 70°     |
| 650            | 55°18'13" | 191            | 510            | 230            | 30             | 31,6           | 3              | 4              | 70°     |
| 700            | 55°18'13" | 208            | 600            | 283            | 50             | 52,8           | 5              | 4              | 70°     |
| 750            | 55°18'13" | 208            | 600            | 283            | 50             | 52,8           | 5              | 4              | 70°     |
| 800            | 55°18'13" | 228            | 685            | 330            | 50             | 52,8           | 5              | 4              | 70°     |
| 850            | 55°18'13" | 228            | 685            | 330            | 50             | 52,8           | 5              | 4              | 70°     |
| 900            | 55°18'13" | 247            | 770            | 378            | 50             | 52,8           | 5              | 4              | 70°     |
| 950            | 55°18'13" | 247            | 770            | 378            | 50             | 52,8           | 5              | 4              | 70°     |
| 1 000          | 55°18'13" | 346            | 900            | 400            | 50             | 52,8           | 5              | 4              | 70°     |
| 1 050          | 55°18'13" | 346            | 900            | 400            | 50             | 52,8           | 5              | 4              | 70°     |
| 1 100          | 55°18'13" | 277            | 900            | 450            | 50             | 52,8           | 5              | 4              | 70°     |
| 1 200          | 55°18'13" | 408            | 1 100          | 500            | 50             | 52,8           | 5              | 4              | 70°     |
| 1 300          | 55°18'13" | 408            | 1 100          | 500            | 50             | 52,8           | 5              | 4              | 70°     |
| 1 400          | 55°18'13" | 388            | 1 150          | 550            | 50             | 52,8           | 5              | 4              | 70°     |
| 1 500          | 55°18'13" | 419            | 1 250          | 600            | 50             | 52,8           | 5              | 4              | 70°     |
| 700            | 55°18'18" | 143            | 600            | 330            | 50             | 52,8           | 5              | 4              | 70°     |
| 750            | 55°18'18" | 143            | 600            | 330            | 50             | 52,8           | 5              | 4              | 70°     |
| 850            | 55°18'18" | 181,5          | 770            | 425            | 50             | 52,8           | 5              | 4              | 70°     |
| 900            | 55°18'18" | 271,5          | 770            | 360            | 50             | 52,8           | 5              | 4              | 70°     |
| 1 050          | 55°18'18" | 276,9          | 900            | 450            | 50             | 52,8           | 5              | 4              | 70°     |
| 850            | 55°18'18" | 323,8          | 670            | 250            | 40             | 52,7           | 5              | 50             | 58°     |
| 900            | 55°18'18" | 365            | 750            | 278            | 40             | 52,7           | 5              | 50             | 58°     |
| 1 050          | 55°18'18" | 404,6          | 820            | 300            | 40             | 52,7           | 5              | 50             | 58°     |