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**Mechanical pencils for technical  
drawings —**

Part 2:  
**Black leads — Classification and  
dimensions**

*Porte-mines pour le dessin technique —*

*Partie 2: Mines graphite — Classification et dimensions*

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CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://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.

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](http://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](http://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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 10, *Technical product documentation*.

This second edition cancels and replaces the first edition (ISO 9177-2:1989), of which it constitutes a minor revision. The changes are as follows:

- title revised for consistency with ISO 9177-1, with the addition of “for technical drawings”;
- Introduction added;
- references updated;
- minor editorial changes.

A list of all parts in the ISO 9177 series can be found on the ISO website.

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](http://www.iso.org/members.html).

## Introduction

This document was developed for mechanical pencils and their leads that are limited to technical drawing usage only.

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# Mechanical pencils for technical drawings —

## Part 2: Black leads — Classification and dimensions

### 1 Scope

This document specifies a classification and dimensions for black leads used for mechanical pencils for technical drawings.

Two types of black leads are available:

- polymer leads (designated by the letter “P”);
- ceramic leads (designated by the letter “C”).

### 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 128-2, *Technical product documentation (TPD) — General principles of representation — Part 2: Basic conventions for lines*

ISO 9177-1, *Mechanical pencils for technical drawings — Part 1: Classification, dimensions, performance requirements and testing*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9177-1 and the following apply.

ISO and IEC maintain terminology 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/>

#### 3.1 black lead

solid writing material which consists of carbon (e.g. graphite) and a binding agent

Note 1 to entry: The lead generates black lines which are erasable.

#### 3.1.1 polymer lead

black lead in which the binding agent is an organic polymer

#### 3.1.2 ceramic lead

black lead in which the binding agent is clay

**3.2 hardness degree**

classification indicating increasing hardness from 6B to 9H and increasing line density from 9H to 6B

Note 1 to entry: The median hardness degree is HB.

Note 2 to entry: A scientific definition of hardness degree is not yet available.

**4 Classification**

Leads shall be classified according to the hardness degree (see [Table 1](#)), the nominal diameter (see [Clause 5](#)) and the type of black lead (i.e. polymer or ceramic).

**Table 1 — Classification according to hardness degree**

Nominal diameter mm	Hardness degree
0,35 0,5 0,7 1	6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B
2	9H, 8H, 7H, 6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B, 5B, 6B

**5 Dimensions**

**5.1 Diameters**

Lead diameters shall be as specified in [Table 2](#).

NOTE [Table 2](#) is identical to Table 2 in ISO 9177-1.

**Table 2 — Diameters**

Dimensions in millimetres

Line thickness according to ISO 128-2	Lead diameter	
	Nominal diameter	Actual diameter and tolerance of the mechanical pencil lead
0,25 <sup>a</sup>	—	—
0,35	0,35 <sup>b</sup>	0,35 <sup>+0,04</sup> <sub>+0,02</sub>
0,5	0,5	0,5 <sup>+0,08</sup> <sub>+0,05</sub>
0,7	0,7	0,7 <sup>+0,03</sup> <sub>-0,01</sub>
1	1 <sup>b</sup>	1 <sup>-0,08</sup> <sub>-0,12</sub>
1,4 <sup>a</sup>	—	—
2	2	2 ± 0,05

<sup>a</sup> At present the corresponding leads are not available.

<sup>b</sup> Current practice is to label or mark mechanical pencils and boxes 0,3 and 0,9 as applicable. Leads with new standardized designations apply perfectly well to pencils with the old designations and vice versa, i.e. 0,35 and 1 correspond respectively to 0,3 and 0,9.

## 5.2 Lengths

Lead lengths shall be as specified in [Table 3](#).

**Table 3 — Lengths**

Dimensions in millimetres

Lead type	Nominal diameter	Length	Type of mechanism of mechanical pencil (see ISO 9177-1)
P or C	0,35 0,5 0,7	60 ± 1 or 90 ± 1 100 ± 1	F
		30 ± 1 or 45 ± 1	S
	2	25 ± 1 <sup>a</sup> or 130 ± 1	L

<sup>a</sup> Length used for compasses.

## 6 Designation

The designation of black leads for mechanical pencils shall comprise, in the order given, the following elements:

- “Black lead”;
- the number of this document (i.e. ISO 9177-2);
- the type classification letter (i.e. P or C);
- the nominal diameter, in millimetres;
- the length, in millimetres.

The designation shall be clearly indicated on the packaging and, if possible, on the lead<sup>1)</sup>.

Designation examples:

A polymer lead conforming with the requirements of this document and having a nominal diameter of 0,5 mm and a length of 60 mm shall be designated as follows:

**Black lead ISO 9177-2-P-0,5-60**

A ceramic lead conforming with the requirements of this document and having a nominal diameter of 2 mm and a length of 130 mm shall be designated as follows:

**Black lead ISO 9177-2-C-2-130**

1) Where there is lack of space, only the number of this document (i.e. ISO 9177-2) should be shown.