INTERNATIONAL STANDARD

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Second edition
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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

Reference number
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Foreword

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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).

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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 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.

Introduction

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

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[a]	—	—
0,35	0,35[b]	$0{,}35^{+0{,}04}_{+0{,}02}$
0,5	0,5	$0{,}5^{+0{,}08}_{+0{,}05}$
0,7	0,7	$0{,}7^{+0{,}03}_{-0{,}01}$
1	1[b]	$1^{-0{,}08}_{-0{,}12}$
1,4[a]	—	—
2	2	2 ± 0,05

[a] At present the corresponding leads are not available.

[b] 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 1	60 ± 1 or 90 ± 1 or 100 ± 1	F
		30 ± 1 or 45 ± 1	S
	2	25 ± 1[a] or 130 ± 1	L

[a] Length used for compasses.

6 Designation

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

a) "Black lead";

b) the number of this document (i.e. ISO 9177-2);

c) the type classification letter (i.e. P or C);

d) the nominal diameter, in millimetres;

e) the length, in millimetres.

The designation shall be clearly indicated on the packaging and, if possible, on the lead[1)].

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.

Bibliography

[1] ISO 20318-1, *Mechanical pencils and leads for general use — Classification, dimensions, quality and test methods — Part 1: Mechanical pencils*

[2] ISO 20318-2, *Mechanical pencils and leads for general use — Classification, dimensions, quality and test methods — Part 2: Black leads*