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**Mechanical pencils for technical  
drawings —**

Part 1:  
**Classification, dimensions,  
performance requirements and testing**

*Porte-mines pour le dessin technique —*

*Partie 1: Classification, dimensions, exigences de performance et essais*

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# Contents

	Page
Foreword .....	iv
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Classification</b> .....	<b>1</b>
<b>5 Dimensions</b> .....	<b>5</b>
5.1 Nominal diameter .....	5
5.2 Bore size of guide pipe (mechanical pencils of push-type F and screw-type S) .....	5
5.3 Outer diameter of guide pipe .....	6
<b>6 Performance requirements</b> .....	<b>6</b>
6.1 General .....	6
6.2 Clamping force (mechanical pencils of push-types F and L) .....	6
6.3 Lead position relative to spiral clearance (mechanical pencils of screw-type S) .....	6
<b>7 Testing</b> .....	<b>6</b>
7.1 General .....	6
7.2 Clamping force (mechanical pencils of push-types F and L) .....	6
7.3 Lead position relative to spiral clearance (mechanical pencils of screw-type S) .....	7
<b>8 Designation</b> .....	<b>7</b>

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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 on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/TC 10, *Technical product documentation*.

This third edition cancels and replaces the second edition (ISO 9177-1:2011), of which it constitutes a minor revision.

ISO 9177 consists of the following parts, under the general title *Mechanical pencils for technical drawings*:

- *Part 1: Classification, dimensions, performance requirements and testing*
- *Part 2: Black leads — Classification and dimensions*
- *Part 3: Black leads — Bending strengths of HB leads*

# Mechanical pencils for technical drawings —

## Part 1: Classification, dimensions, performance requirements and testing

### 1 Scope

This part of ISO 9177 specifies classification, dimensions, performance requirements and testing for hand-held mechanical pencils used for technical drawings.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 128-20, *Technical drawings — General principles of presentation — Part 20: Basic conventions for lines*

ISO 9177-2, *Mechanical pencils — Part 2: Black leads — Classification and dimensions*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

##### **mechanical pencil**

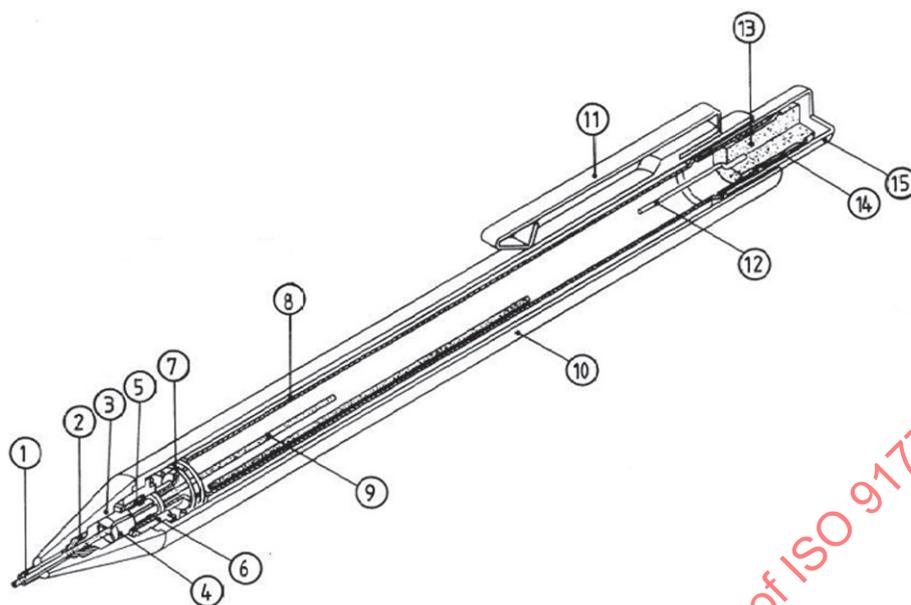
hand-held line-producing tool which holds and feeds out a lead, for technical drawings

### 4 Classification

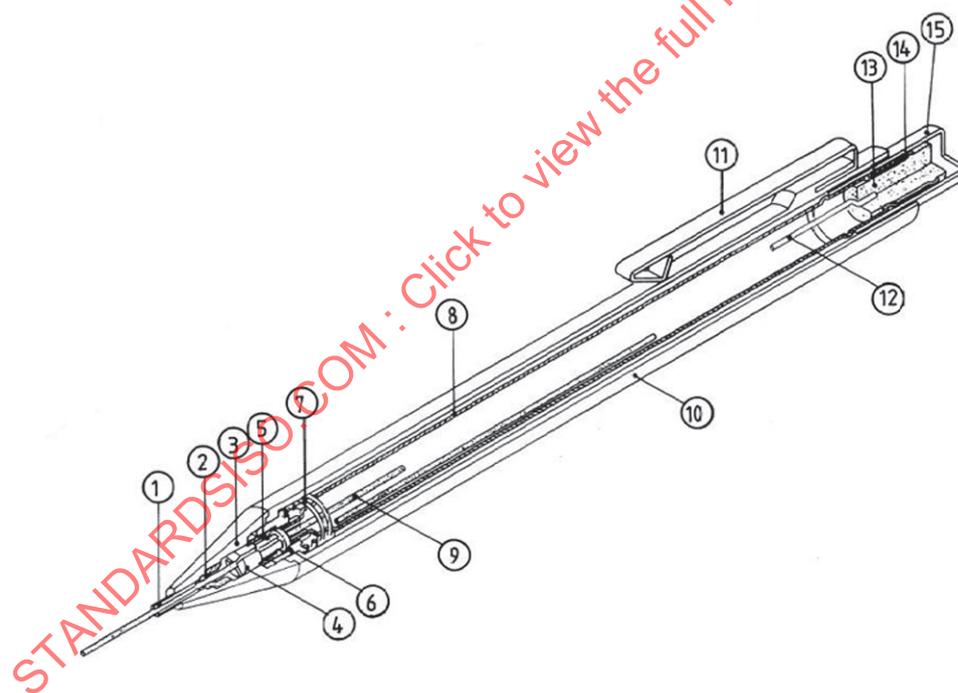
Mechanical pencils shall be classified according to the type of mechanism (see [Table 1](#)) and to the nominal diameter (see [Table 2](#)). For the classification and dimensions of the leads (diameter and length), see ISO 9177-2.

**Table 1 — Classification according to type of mechanism**

Mechanism	Type classification letter	Description	Relevant figure
Push-type	F <sup>a</sup>	Mechanical pencil in which the lead, housed in a barrel,	1
	L <sup>b</sup>	is fed out by actuating a push mechanism	2
Screw-type	S	Mechanical pencil in which the lead, housed in a barrel, is fed out by actuating a propelling screw mechanism	3
<sup>a</sup> Mainly polymer leads having a nominal diameter of 0,35 to 1 mm.			
<sup>b</sup> Mainly ceramic leads having a nominal diameter of 2 mm (see ISO 9177-2).			



a) Lead in working position

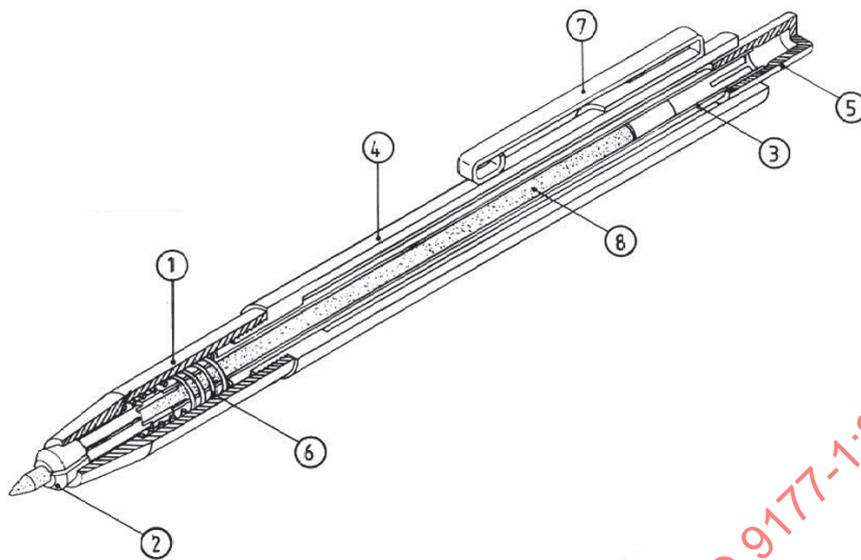


b) Lead in feeding position

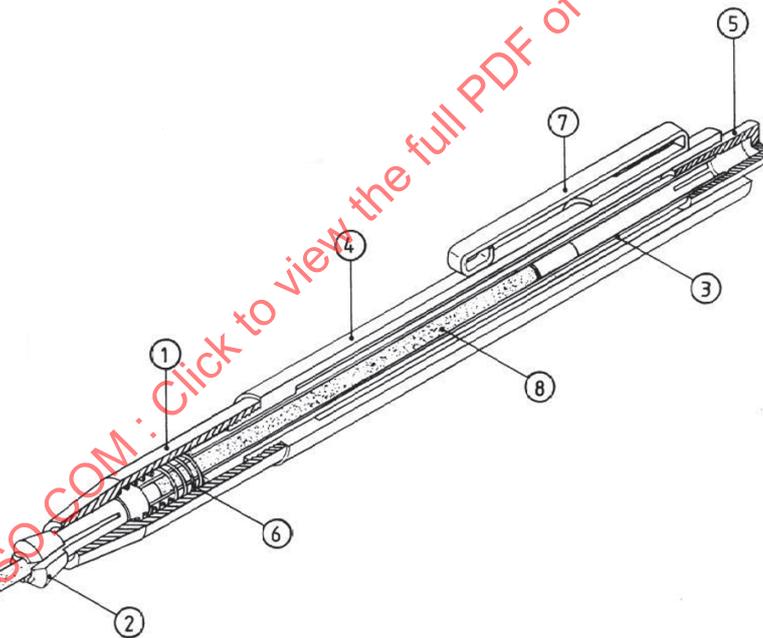
**Key**

1	guide pipe	6	nipple	11	clip
2	lead retainer	7	spring	12	cleaning pin
3	metal tip	8	lead tube	13	eraser
4	chuck	9	lead	14	eraser ferrule
5	chuck ring	10	barrel	15	push button

**Figure 1 — Mechanical pencil of push-type F**



a) Lead in working position

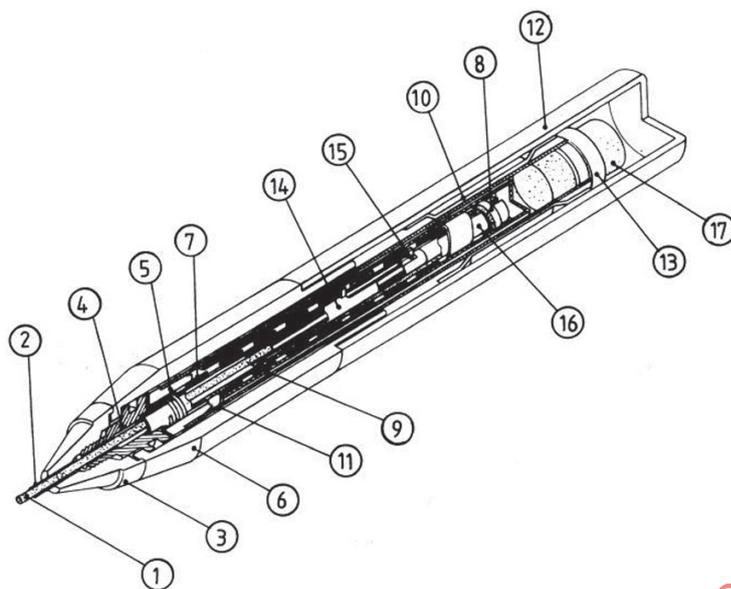


b) Lead in feeding position

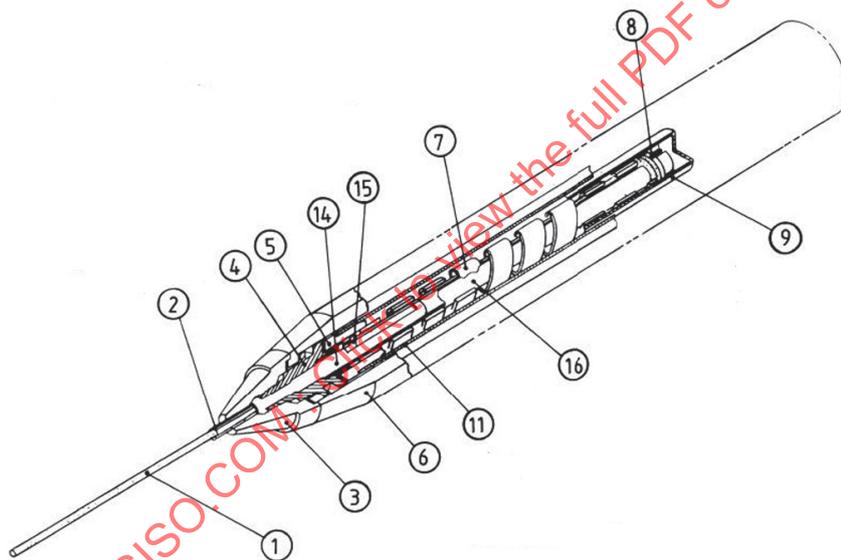
**Key**

- |             |               |
|-------------|---------------|
| 1 metal tip | 5 push button |
| 2 chuck     | 6 spring      |
| 3 lead tube | 7 clip        |
| 4 barrel    | 8 lead        |

**Figure 2 — Mechanical pencil of push-type L**



a) Lead in working position



b) Lead in loading position

**Key**

- |   |              |    |                        |
|---|--------------|----|------------------------|
| 1 | lead         | 10 | sleeve holder          |
| 2 | guide pipe   | 11 | sleeve                 |
| 3 | metal tip    | 12 | upper barrel           |
| 4 | nipple       | 13 | eraser ferrule         |
| 5 | bushing      | 14 | lead tube (with guide) |
| 6 | lower barrel | 15 | ejector                |
| 7 | spiral       | 16 | slit tube              |
| 8 | spiral stop  | 17 | eraser                 |
| 9 | spiral cover |    |                        |

**Figure 3 — Mechanical pencil of screw-type S**

## 5 Dimensions

### 5.1 Nominal diameter

The nominal diameter of mechanical pencils, which corresponds to the nominal lead diameter, shall be as specified in [Table 2](#).

**Table 2 — Nominal diameter**

Dimensions in millimetres

Line thickness according to ISO 128-20	Leads diameter	
	Nominal diameter	Actual diameter and tolerance of the mechanical pencil lead (see ISO 9177-2)
0,35	0,35 <sup>a</sup>	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 <sup>a</sup>	1 $-0,08$ $-0,12$
2	2	2 $\pm 0,05$

<sup>a</sup> Current practice is to label or mark mechanical pencils and boxes 0,3 and 0,9 as applicable. The user should note that 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 Bore size of guide pipe (mechanical pencils of push-type F and screw-type S)

The bore size of the guide pipe for mechanical pencils of push-type F and screw-type S shall be as specified in [Table 3](#). The bore refers to the inside diameter of the guide pipe through which the lead emerges.

The minimum length of the guide pipe shall be 3 mm.

**Table 3 — Bore size of guide pipe (push-type F and screw-type S)**

Dimensions in millimetres

Nominal diameter	Actual diameter and tolerance of bore of guide pipe
0,35	0,35 $+0,09$ $+0,05$
0,5	0,5 $+0,13$ $+0,09$
0,7	0,7 $+0,08$ $+0,04$
1	1 $-0,03$ $-0,07$