

# INTERNATIONAL STANDARD

**ISO**  
**9177-1**

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## Mechanical pencils —

### Part 1 :

Classification, dimensions, performance requirements  
and testing

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*Porte-mine —*

*Partie 1 : Classification, dimensions, caractéristiques de fonctionnement et essais*

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INTERNATIONAL

ISO



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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 9177-1 was prepared by Technical Committee ISO/TC 10, *Technical drawings*.

ISO 9177-1:1989

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

# Mechanical pencils —

## Part 1 :

## Classification, dimensions, performance requirements and testing

### 1 Scope and field of application

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

### 2 References

ISO 128, *Technical drawings — General principles of presentation*.

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

### 3 Definition

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For the purposes of this part of ISO 9177, the following definition applies.

**mechanical pencil** : Hand-held line-producing tool which holds and feeds out a lead, for draughting and/or writing.

### 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 1)	Mechanical pencil in which the lead, housed in a barrel, is fed out by actuating a push mechanism	1
	L 2)		2
Screw-type	S	Mechanical pencil in which the lead, housed in a barrel, is fed out by actuating a propelling screw mechanism	3

1) Mainly polymer leads having a nominal diameter of 0,35 to 1 mm.

2) Mainly ceramic leads having a nominal diameter of 2 mm (see ISO 9177-2).

- 1 Guide pipe
- 2 Lead retainer
- 3 Metal tip
- 4 Chuck
- 5 Chuck ring
- 6 Nipple
- 7 Spring
- 8 Lead tube
- 9 Lead
- 10 Barrel
- 11 Clip
- 12 Cleaning pin
- 13 Eraser
- 14 Eraser ferrule
- 15 Push button

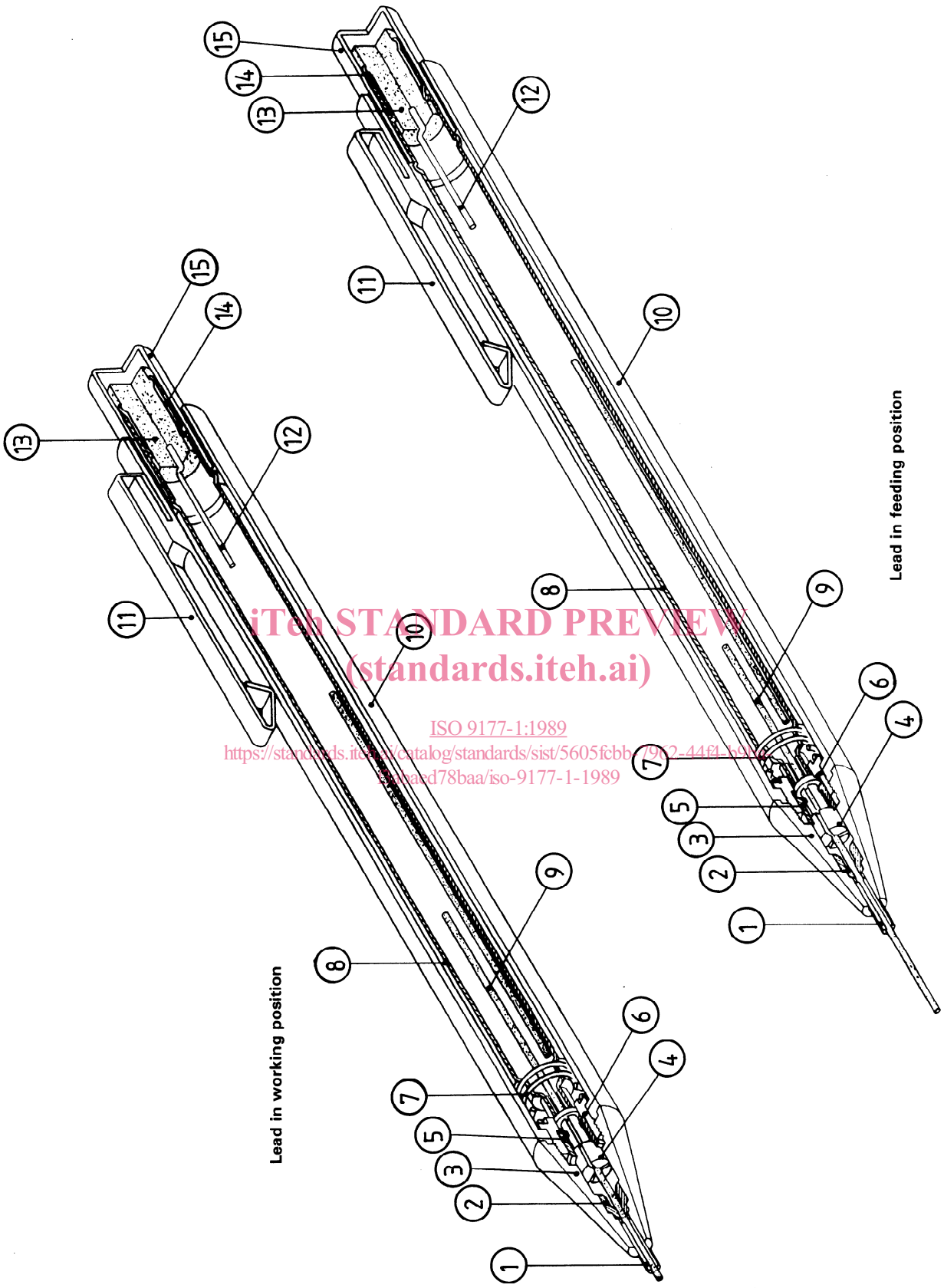


Figure 1 — Mechanical pencil of push-type F

- Key**
- ① Metal tip
  - ② Chuck
  - ③ Lead tube
  - ④ Barrel
  - ⑤ Push button
  - ⑥ Spring
  - ⑦ Clip
  - ⑧ Lead

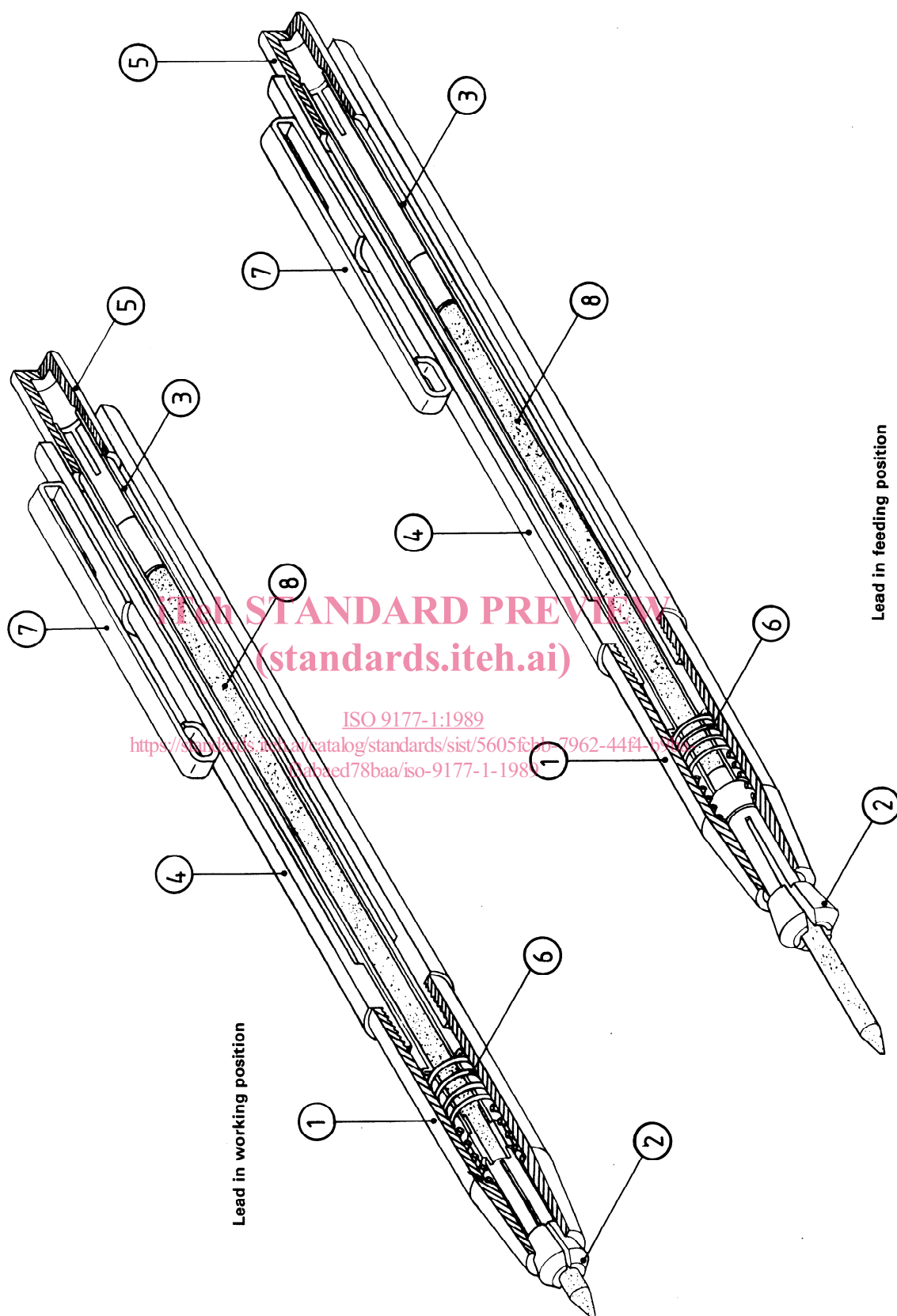


Figure 2 — Mechanical pencil of push-type L

- ① Lead
- ② Guide pipe
- ③ Metal tip
- ④ Nipple
- ⑤ Bushing
- ⑥ Lower barrel
- ⑦ Spiral
- ⑧ Spiral stop
- ⑨ Spiral cover
- ⑩ Sleeve holder
- ⑪ Sleeve
- ⑫ Upper barrel
- ⑬ Eraser ferrule
- ⑭ Lead tube (with guide)
- ⑮ Ejector
- ⑯ Slit tube
- ⑰ Eraser

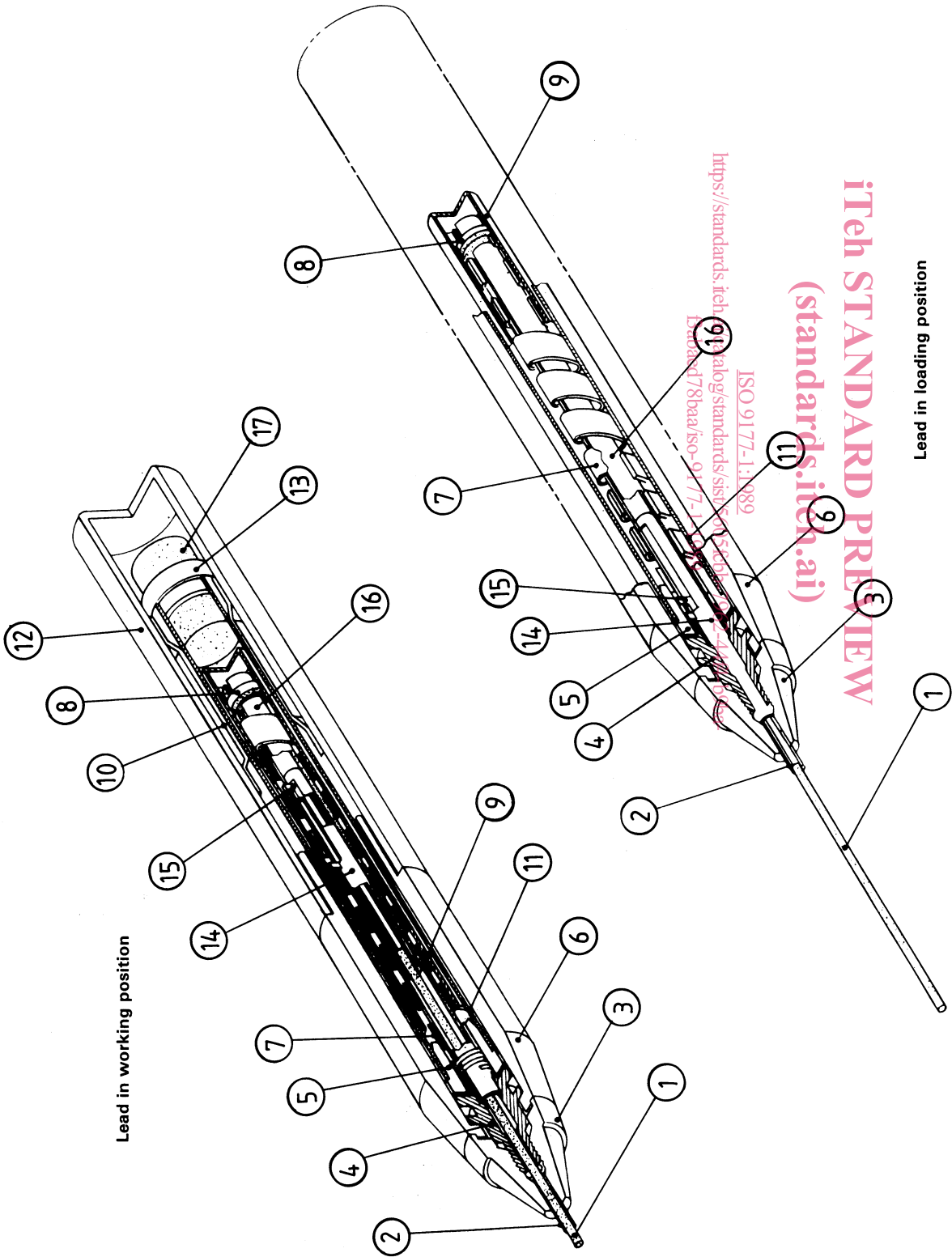


Figure 3 — Mechanical pencil of screw-type S

## 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	Lead diameter	
	Nominal diameter	Actual diameter and tolerance of the mechanical pencil lead (see ISO 9177-2)
0,25 <sup>1)</sup>	—	—
0,35	0,35 <sup>2)</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>2)</sup>	1 $-0,08$ $-0,12$
1,4 <sup>1)</sup>	—	—
2	2	2 $\pm 0,05$

1) At present the corresponding leads are not available.

2) 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 $-0,03$ $-0,07$

### 5.3 Outer diameter of guide pipe

The outer diameter of the guide pipe refers to the slot widths of templates and shall be as specified in table 4.

Table 4 — Outer diameter of guide pipe

Dimensions in millimetres

Nominal diameter	Outer diameter of guide pipe
0,35	0,84 $^0$ $-0,03$
0,5	0,95 $^0$ $-0,03$
0,7	1,12 $^0$ $-0,04$
1	1,3 $^0$ $-0,04$

## 6 Performance requirements

### 6.1 General

Mechanical pencils shall be tested for performance in accordance with clause 7 and shall satisfy the requirements specified in 6.2 or 6.3 as applicable.

### 6.2 Clamping force (mechanical pencils of push-types F and L)

Under the test conditions specified in 7.2, the lead shall neither retract into the guide pipe nor slide through the chuck clutching it.

### 6.3 Lead position relative to spiral clearance (mechanical pencils of screw-type S)

Under the test conditions specified in 7.3, the lead shall not retract by more than 0,7 mm.

## 7 Testing

### 7.1 General

Mechanical pencils shall be tested for the relative position of the lead with respect to the barrel when the mechanism is not actuated and when a force as specified in 7.2 or 7.3, as applicable, is applied.

### 7.2 Clamping force (mechanical pencils of push-types F and L)

Place the mechanical pencil vertically with the lead protruding by approximately 1 mm. Apply a vertical compressive load to the lead.

The vertical compressive load applied shall be 5 N for a nominal diameter of 0,35 mm and 8 N for a nominal diameter of 0,5 mm or over.

### 7.3 Lead position relative to spiral clearance (mechanical pencils of screw-type S)

Place the mechanical pencil vertically and rotate the barrel until the lead protrudes by not less than 2,5 mm. Then, by rotating in the opposite direction, retract the lead until it protrudes by 1,3 mm. Apply a vertical compressive load of 4 N to the lead.

## 8 Designation

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

- a) "mechanical pencil";
- b) the number of this part of ISO 9177 (i.e. ISO 9177-1);
- c) the type classification letter (i.e. F, L or S);
- d) the nominal diameter, in millimetres.

The designation shall be clearly indicated on the barrel of the mechanical pencil<sup>1)</sup>.

#### *Designation examples :*

A mechanical pencil, of push-type F, complying with the requirements of this part of ISO 9177 and having a nominal diameter of 0,5 mm shall be designated as follows :

#### **Mechanical pencil ISO 9177-1-F-0,5**

A mechanical pencil, of push-type L, complying with the requirements of this part of ISO 9177 and having a nominal diameter of 2 mm shall be designated as follows :

#### **Mechanical pencil ISO 9177-1-L-2**

A mechanical pencil, of screw-type S, complying with the requirements of this part of ISO 9177 and having a nominal diameter of 0,7 mm shall be designated as follows :

#### **Mechanical pencil ISO 9177-1-S-0,7**

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

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**Descriptors :** drawing equipment, pencils, propelling pencils, classification, specifications, dimensions, tests, designation.

Price based on 6 pages

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