

# INTERNATIONAL STANDARD

**ISO**  
**12757-1**

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## **Ball point pens and refills —**

### **Part 1: General use**

*Stylos à pointe bille et recharges —*

*Partie 1: Utilisation générale*

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Reference number  
ISO 12757-1:1998(E)

## 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 voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 12757-1 was prepared by Technical Committee ISO/TC 10, *Technical drawings, product definition and related documentation*, Subcommittee SC 9, *Media and equipment for drawing and related documentation*.

ISO 12757 consists of the following parts, under the general title *Ball point pens and refills*:

- Part 1: *General use*
- Part 2: *Documentary use (DOC)*

Annex A of this part of ISO 12757 is for information only.

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## Introduction

This part of ISO 12757 is applicable to ball point pens for general use. Part 2 of ISO 12757 is applicable to ball point pens for documentary use.

For documentary use, some requirements, in addition to those for general use, are necessary

- a) to assure the legibility of lettering, and
- b) for the handling and storage of documents during long periods of time (these requirements are often discussed with the archivist).

An example of documentary use is the preparation of documents that are required as evidence.

Furthermore, pens which meet the requirements for documentary use produce lines which are more resistant to modification (e.g. attempts to falsify a document) than those for general use.

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# Ball point pens and refills —

## Part 1: General use

### 1 Scope

This part of ISO 12757 establishes minimum quality requirements for ball point pens (refillable or non-refillable) and refills for general use.

Additional requirements for ball point pens for documentary use are given in ISO 12757-2.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 12757. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 12757 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 105-A02:1993, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour.*

ISO 105-B02:1994, *Textiles — Tests for colour fastness — Part B02: Colour fastness to artificial light: Xenon arc fading lamp test.*

ISO 534:1988, *Paper and board — Determination of thickness and apparent bulk density or apparent sheet density.*

ISO 535:1991, *Paper and board — Determination of water absorptiveness — Cobb method.*

ISO 536:1995, *Paper and board — Determination of grammage.*

ISO 554:1976, *Standard atmospheres for conditioning and/or testing — Specifications.*

ISO 868:1985, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness).*

ISO 2144:1997, *Paper board and pulps — Determination of residue (ash) on ignition at 900 °C.*

ISO 8791-4:1992, *Paper and board — Determination of roughness/smoothness (air leak methods) — Part 4: Print-surf method.*

ISO 12756:1998, *Drawing and writing instruments — Ball point pens and roller ball pens — Vocabulary.*

### 3 Definitions

For the purposes of this part of ISO 12757, the definitions given in ISO 12756 apply.

4 Requirements

4.1 Tip classification

Tips shall be classified according to ball diameter (see table 1).

Table 1

Dimensions in millimetres

Tip classification (line width)	Tip code	Ball diameter
Extra fine	EF	$\varnothing < 0,65$
Fine	F	$0,65 \leq \varnothing < 0,85$
Medium	M	$0,85 \leq \varnothing < 1,05$
Broad	B	$1,05 \leq \varnothing$

4.2 Shapes and dimensions of refills

Refills shall be classified into types A, B, D, E, F, G and H. The shapes and dimensions of types A to G are given in figures 1 to 4 and tables 2 and 3. Refills with shapes and dimensions other than those specified in tables 2 and 3 and figures 1 to 4 are designated type H.

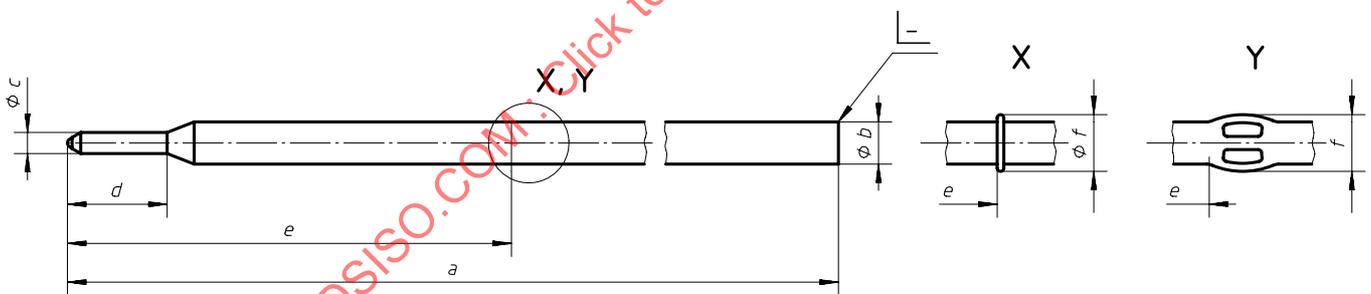


Figure 1

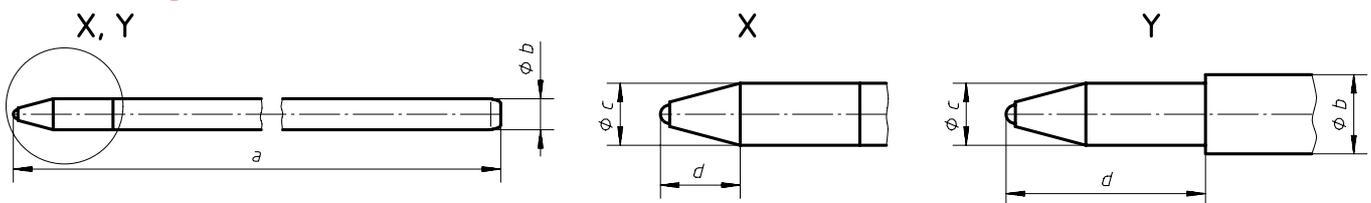


Figure 2

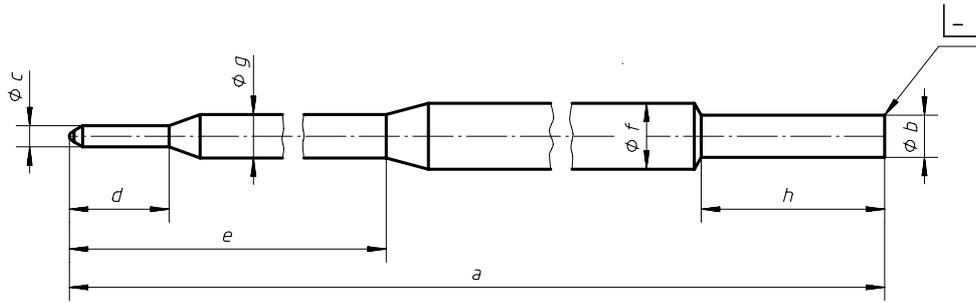


Figure 3

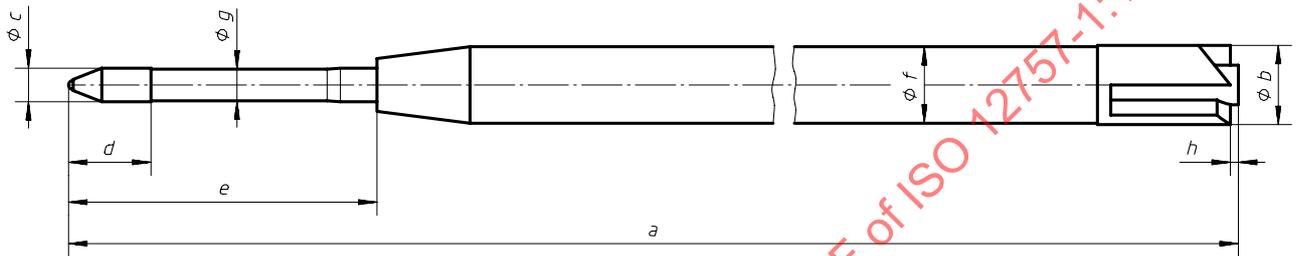


Figure 4

Table 2

Dimensions in millimetres

Type code	Figure	a	b	c	d	e	f
A1	1	106,8 ± 0,2	3,2 <sup>0</sup> <sub>-0,2</sub>	2,4 ± 0,02	10,2 ± 0,5	33,4 <sup>+0,5</sup> <sub>0</sub>	4,3 ± 0,2
A2	1	106,8 ± 0,2	3,2 <sup>0</sup> <sub>-0,2</sub>	1,6 ± 0,02	7,5 <sup>+0,5</sup> <sub>0</sub>	33,4 <sup>+0,5</sup> <sub>0</sub>	4,3 ± 0,2
B	1	98,2 ± 0,8	3 <sup>+0,2</sup> <sub>-0,1</sub>	2,28 ± 0,04	≥ 7	23 ± 2	4,5 ± 0,2
D	2X	67 <sup>+0,3</sup> <sub>0</sub>	2,35 <sup>0</sup> <sub>-0,05</sub>	2,35 <sup>+0,05</sup> <sub>0</sub>	3 ± 0,2	—	—
E	2Y	140 ± 2	3 <sup>+0,2</sup> <sub>-0,1</sub>	2,25 ± 0,03	7,5 ± 0,05	—	—
F	2Y	143 ± 2	3 <sup>+0,2</sup> <sub>-0,1</sub>	2,3 ± 0,03	8,5 ± 0,5	—	—

Table 3

Dimensions in millimetres

Type code	Figure	a	b	c	d	e	f	g	h
G1	3	106,8 ± 0,2	3,2 <sup>0</sup> <sub>-0,05</sub>	1,6 ± 0,02	7,5 <sup>+0,5</sup> <sub>0</sub>	30,5 ± 0,25	5 ± 0,05	3,3 <sup>0</sup> <sub>-0,1</sub>	13,8 ± 0,5
G2	4	98,1 <sup>+0,40</sup> <sub>-0,35</sub>	6 <sup>+0,1</sup> <sub>-0,2</sub>	2,54 <sup>+0,03</sup> <sub>-0,04</sub>	6,2 ± 0,2	23,2 ± 1	5,8 ± 0,1	2,4 ± 0,1	0,6 ± 0,2

### 4.3 Performance

#### 4.3.1 Writing performance

Smooth writing shall start within 20 cm and the writing distance shall be at least 300 m without obvious starving or fluctuation of line intensity when tested as specified in 6.3.1.

#### 4.3.2 Strike through

No strike through shall be evident to a trained eye when tested as specified in 6.3.2.

#### 4.3.3 Drying time

The line shall be found non-smearing when tested as specified in 6.3.3.

#### 4.3.4 Reproducibility

The reproduced line shall be visible when tested as specified in 6.3.4.

#### 4.3.5 Water resistance

The line shall remain visible when tested as specified in 6.3.5.

#### 4.3.6 Light resistance

The line shall remain visible when tested as specified in 6.3.6.

#### 4.3.7 Shelf life

The ball point pen or refill shall conform with 4.3.1 when tested as specified in 6.3.7.

## 5 Test equipment and accessories

### 5.1 Write test machine

The write test machine (see ISO 12756) shall be set to each of the following conditions when performing the machine writing test:

- a) point load:  $1,5 \text{ N} \pm 0,1 \text{ N}$ ;
- b) writing angle: test write a sample at  $75^\circ \pm 5^\circ$ , determine at which angle the trace is most consistent and select this angle;
- c) writing speed:  $4,5 \text{ m/min} \pm 0,5 \text{ m/min}$ ;
- d) writing pattern: continuous spiral line (100 mm circumference) with a pitch between 1 mm and 5 mm.

## 5.2 Performance testing paper specifications<sup>1)</sup>

The performance testing paper shall conform to the specifications given in table 4.

**Table 4**

Specification		Reference International Standard
Grammage:	80 g/m <sup>2</sup> ± 5 g/m <sup>2</sup>	ISO 536
Smoothness <sup>1)</sup> :	3 µm ± 0,25 µm	ISO 8791-4
Residue after incineration:	(11 ± 1) % residue (ash) at 900 °C	ISO 2144
Cobb value:	18 g/m <sup>2</sup> ± 2 g/m <sup>2</sup> (45'') ( ≡ Cobb <sub>60</sub> = 20 g/m <sup>2</sup> ± 3 g/m <sup>2</sup> )	ISO 535
Thickness:	80 µm ± 5 µm	ISO 534
Colour:	white	
Composition:	100 % wood cellulose fibre, bleached	

1) Soft backing side used for testing, clamping pressure 1 MPa.

## 5.3 Eraser

Rubber eraser without abrasive and with a hardness of 45 ± 5 Shore A, in accordance with ISO 868.

## 5.4 Reproducibility apparatus

Photocopier, microfilm processor or telefacsimile machine.

## 5.5 Light test apparatus

Fade-o-meter, xenotest or technical equivalent.

## 6 Testing

### 6.1 Sampling

Ball point pen and refill samples shall be tested within six months after manufacture, except for the shelf life test (see 6.3.7).

### 6.2 Climatic conditions for testing

The test shall be carried out under standard test atmosphere of either 23/50 or 27/65 in accordance with ISO 554 and according to conditions at the place of testing. Ordinary tolerances are to be applied.

1) On request the ISO Central Secretariat will provide a list of suppliers of testing paper.

### 6.3 Procedure

#### 6.3.1 Writing performance test

Take a quantity of at least 10 ball point pens and/or refills at random. Generate a continuous 5 m line on the testing paper specified in 5.2 by the write test machine specified in 5.1 under the climatic conditions specified in 6.2. Lift the pens off the paper and allow to rest for 3 h.

Generate 300 m of writing and examine for compliance with 4.3.1. Use this machine-written test sheet for the following tests, except for 6.3.3 (drying time test) and 6.3.7 (shelf life test).

#### 6.3.2 Strike through test

Prepare a machine-written test piece approximately 5 cm long, without the beginning and end of a written line, from the test sheet provided in 6.3.1 and keep it under the climatic conditions specified in 6.2 for 24 h.

Examine the back of the test paper for compliance with 4.3.2.

#### 6.3.3 Drying time test

Draw a straight line in accordance with 5.1 a), b) and c) on the testing paper specified in 5.2.

After 20 s, rub once perpendicularly across the written line with the eraser specified in 5.3.

Examine the line for compliance with 4.3.3.

#### 6.3.4 Reproducibility test

Reproduce the written line from a machine-written test piece approximately 5 cm long from the test sheet provided in 6.3.1 using the apparatus specified in 5.4.

Examine the reproduced line for compliance with 4.3.4.

#### 6.3.5 Water resistance test

Keep a machine-written test piece approximately 5 cm long from the test sheet provided in 6.3.1 under the climatic conditions specified in 6.2 for 2 h, then immerse in distilled water or de-ionized water for 1 h. Remove and allow to air dry.

Examine the written line of the test piece for compliance with 4.3.5.

#### 6.3.6 Light resistance test

Expose a machine-written test piece approximately 5 cm long from the test sheet provided in 6.3.1 to the light source of the apparatus specified in 5.5, together with the blue wool references specified in ISO 105-B02, until the contrast between the unexposed and the exposed blue wool reference 3 becomes equal to grey scale grade 4 specified in ISO 105-A02.

Examine the written line of the test piece for compliance with 4.3.6.

### 6.3.7 Shelf life test

Select a quantity of at least 10 recently manufactured and unused ball point pens and/or refills. Store horizontally at a temperature of  $(40 \pm 2)$  °C and at a relative humidity of  $(55 \pm 5)$  % for 90 days.

Test in accordance with 6.3.1 and examine for compliance with 4.3.7.

## 7 Designation and marking

### 7.1 Designation

The designation of a ball point pen or refill shall comprise, in the given order, the following elements:

- a) the description block (e.g. "ball point pen" or "ball point refill");
- b) the number of this part of ISO 12757 (i.e. ISO 12757-1);
- c) the type classification code for refills (see 4.2); and
- d) the tip classification code (EF, F, M or B; see table 1).

#### EXAMPLES

A disposable ball point pen complying with the requirements of this part of ISO 12757 with a medium sized tip (M), shall be designated as follows:

**Ball point pen ISO 12757-1 M**

A ball point refill complying with the requirements of this part of ISO 12757, type B, with a broad sized tip (B), shall be designated as follows:

**Ball point refill ISO 12757-1 B B**

### 7.2 Marking

For identification, disposable ball point pens or refills shall be marked as follows:

- a) the name of the manufacturer, supplier or trademark;
- b) the designation in accordance with 7.1 [except 7.1 a), which is optional]; and
- c) the date of manufacture (year/month, in full or coded) or the batch number.

## 8 Test report

The test report shall include the following information:

- a) reference to this part of ISO 12757;
- b) the date and place of test;
- c) precise identification of the samples (see 7.2);