

# INTERNATIONAL STANDARD

**ISO**  
**14145-2**

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## **Roller ball pens and refills —**

### **Part 2: Documentary use (DOC)**

*Stylos rollers et recharges —  
Partie 2: Utilisation documentaire (DOC)*

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Reference number  
ISO 14145-2:1998(E)

## Foreword

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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 14145-2 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 14145 consists of the following parts, under the general title *Roller ball pens and refills*:

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

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## Introduction

This part of ISO 14145 is applicable to roller ball pens for documentary use. Part 1 of ISO 14145 is applicable to roller ball pens for general 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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# Roller ball pens and refills —

## Part 2: Documentary use (DOC)

### 1 Scope

This part of ISO 14145 establishes minimum quality requirements for roller ball pens (refillable or non-refillable) and refills for documentary use.

Basic requirements for roller ball pens for general use are given in ISO 14145-1.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 14145. 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 14145 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 12756:1998, *Drawing and writing instruments — Ball point pens and roller ball pens — Vocabulary.*

ISO 14145-1:1998, *Roller ball pens and refills — Part 1: General use.*

### 3 Definitions

For the purposes of this part of ISO 14145, the definitions given in ISO 12756 apply.

### 4 Requirements

#### 4.1 General requirements

See the general requirements given in ISO 14145-1:1998 (4.1 to 4.3.4, 4.3.7 and 4.3.8).

#### 4.2 Erasure resistance

The surface of the testing paper shall show clear evidence of damage before the line is rendered invisible when tested as specified in 6.2.1.

### 4.3 Ethanol resistance

The line shall remain visible when tested as specified in 6.2.2.

### 4.4 Hydrochloric acid resistance

The line shall remain visible when tested as specified in 6.2.3.

### 4.5 Ammonium hydroxide resistance

The line shall remain visible when tested as specified in 6.2.4.

### 4.6 Bleaching resistance

The line shall remain visible when tested as specified in 6.2.5.

### 4.7 Water resistance

The line shall remain visible when tested as specified in 6.2.6.

### 4.8 Light resistance

The line shall remain visible when tested as specified in 6.2.7.

## 5 Test equipment, accessories and solutions

### 5.1 Test equipment and accessories

See ISO 14145-1.

### 5.2 Test solutions

**5.2.1 Ethanol solution**, 50 % aqueous solution (volume fraction).

**5.2.2 Hydrochloric acid solution**, 10 % aqueous solution (mass fraction).

**5.2.3 Ammonium hydroxide solution**, 10 % aqueous solution (mass fraction).

**5.2.4 Bleaching solution**, 3 % freshly made aqueous solution of chloramin T<sup>1)</sup> (mass fraction).

## 6 Testing

### 6.1 General test

#### 6.1.1 Sampling

See ISO 14145-1:1998, 6.1.

#### 6.1.2 Climatic conditions

See ISO 14145-1:1998, 6.2.

#### 6.1.3 General test procedure

See ISO 14145-1:1998, 6.3.

1) Standard designation: *N*-chloro-*p*-toluene sulfonamide sodium salt.  
IUPAC designation: *N*-chloro-4-methyl-benzene sulfonamide sodium salt.

## 6.2 Additional tests

### 6.2.1 Erasure resistance test

Keep a fresh machine-written test piece approximately 5 cm long from the sheet provided in 6.1.3 under the climatic conditions specified in 6.1.2 for 10 min (to allow to dry), and then erase a portion of line with the eraser specified in ISO 14145-1:1998, 5.3. Examine the surface of the erased section of the paper for compliance with 4.2.

### 6.2.2 Ethanol resistance test

Keep a machine-written test piece approximately 5 cm long from the sheet provided in 6.1.3 under the climatic conditions specified in 6.1.2. for 1 h (to allow to dry), and then immerse in the ethanol solution specified in 5.2 for 10 min. Remove and allow to air dry. Examine the written line of the test piece for compliance with 4.3.

### 6.2.3 Hydrochloric acid resistance test

Keep a machine-written test piece approximately 5 cm long from the sheet provided in 6.1.3 under the climatic conditions specified in 6.1.2 for 1 h (to allow to dry), then immerse in the hydrochloric acid solution specified in 5.3 for 24 h. Remove and immerse in distilled water or de-ionized water for 10 min and allow to air dry. Examine the written line of the test piece for compliance with 4.4.

### 6.2.4 Ammonium hydroxide resistance test

Keep a machine-written test piece approximately 5 cm long from the sheet provided in 6.1.3 under the climatic conditions specified in 6.1.2 for 1 h (to allow to dry), then immerse in the ammonium hydroxide solution specified in 5.4 for 24 h. Remove and immerse in distilled water or de-ionized water for 10 min and allow to air dry. Examine the written line of the test piece for compliance with 4.5.

### 6.2.5 Bleaching resistance test

Keep a machine-written test piece approximately 5 cm long from the sheet provided in 6.1.3 under the climatic conditions specified in 6.1.2 for 10 min (to allow to dry), then immerse in the bleaching solution specified in 5.5 for 5 min. Remove and immerse in distilled water or de-ionized water for 10 min and allow to air dry. Examine the written line of the test piece for compliance with 4.6.

### 6.2.6 Water resistance test

Keep a machine-written test piece approximately 5 cm long from the sheet provided in 6.1.3 under the climatic conditions specified in 6.1.2 for 2 h (to allow to dry), then immerse in distilled water or de-ionized water for 24 h. Remove and allow to air dry. Examine the written line of the test piece for compliance with 4.7.

### 6.2.7 Light resistance test

Expose a machine-written test piece approximately 5 cm long from the sheet provided in 6.1.3 to the light source of the apparatus specified in ISO 14145-1:1998, 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 5 becomes equal to grey scale grade 4 specified in ISO 105-A02. Examine the written line of the test piece for compliance with 4.8.

## 7 Designation and marking

### 7.1 Designation

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

- a) the description block (e.g. "roller ball pen" or "roller ball refill");
- b) the number of this part of ISO 14145 (i.e. ISO 14145-2);
- c) the type classification code for refills (see 4.2 of ISO 14145-1:1998);

- d) the tip classification code (EF, F, M or B; see table 1 of ISO 14145-1:1998); and
- e) an additional indicator for documentary use (DOC).

#### EXAMPLES

A disposable roller ball pen complying with the requirements of this part of ISO 14145 with a medium sized tip (M), shall be designated as follows:

**Roller ball pen ISO 14145-2 M DOC**

A roller ball refill complying with the requirements of this part of ISO 14145, type B, with a broad sized tip (B), shall be designated as follows:

**Roller ball refill ISO 14145-2 B B DOC**

## 7.2 Marking

For identification, disposable roller ball 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 14145;
- b) the date and place of test;
- c) precise identification of the samples (see 7.2);
- d) identification of the following variable or optional requirements:
  - test atmosphere (see 6.2 of ISO 14145-1:1998),
  - writing angle and writing pitch (see 5.1 of ISO 14145-1:1998),
  - reproducibility apparatus (see 5.4 of ISO 14145-1:1998), and
  - light test apparatus (see 5.5 of ISO 14145-1:1998);
- e) the results in accordance with this part of ISO 14145, as well as a confirmation of permitted application for documentary use;
- f) any deviations from the specified procedures (see clauses 5 and 6); and
- g) the identification and signature of the tester.