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**Gel ink ball pens and refills —**

**Part 1:  
General use**

*Stylos à bille à encre gel et recharges —*

*Partie 1: Utilisation générale*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

ISO 27668-1 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*.

ISO 27668 consists of the following parts, under the general title *Gel ink ball pens and refills*:

— *Part 1: General use*

— *Part 2: Documentary use (DOC)*

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## Introduction

This part of ISO 27668 is applicable to gel ink ball pens for general use.

Part 2 of ISO 27668 is applicable to gel ink ball 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 over 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.

The International Organization for Standardization (ISO) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning aqueous gel ink-filled ballpoint pens.

The holder of this patent right has assured ISO that he is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO. Information may be obtained from:

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Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. ISO shall not be held responsible for identifying any or all such patent rights.

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# Gel ink ball pens and refills —

## Part 1: General use

### 1 Scope

This part of ISO 27668 establishes minimum quality requirements for gel ink ball pens (refillable and non-refillable) and refills for general use.

Additional requirements for gel ink ball pens for documentary use are given in ISO 27668-2.

### 2 Normative references

The following referenced documents are indispensable for the application 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 105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

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

ISO 534, *Paper and board — Determination of thickness, density and specific volume*

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

ISO 536, *Paper and board — Determination of grammage*

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

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

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

ISO 5627, *Paper and board — Determination of smoothness (Bekk method)*

ISO 6588-1, *Paper, board and pulps — Determination of pH of aqueous extracts — Part 1: Cold extraction*

ISO 6588-2, *Paper, board and pulps — Determination of pH of aqueous extracts — Part 2: Hot extraction*

### 3 Terms and definitions

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

#### 3.1

##### **pen**

writing instrument equipped with a feeding system which deposits a writing fluid on a surface

NOTE It is available in refillable or non-refillable (disposable) form.

#### 3.2

##### **ball pen**

pen with a writing fluid feeding system based on a rotatable ball writing tip integrated either within the pen itself or within a refill

#### 3.3

##### **gel ink ball pen**

ball pen which deposits a writing fluid whose viscosity decreases markedly with rotation of the ball when writing and increases back to or near to the original viscosity in non-movement, i.e. when not writing

#### 3.4

##### **cartridge**

disposable container for the writing fluid, which is detached when empty and replaced by a (new) full container

NOTE Adapted from ISO 9175-1:1988, definition 3.4.

#### 3.5

##### **refill**

identifiable assembly of components, usually removable from a complete pen, with which it is possible to write independently of the complete pen, but which lacks either characteristics or components which would make it suitable for use as a pen

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#### 3.6

##### **write test machine**

device for mechanically generating a line with a pen or refill on a writing surface and which can be adjusted for

- a writing angle between 60° and 90°,
- writing load from 0,1 N to 5 N,
- writing speed between 1 m/min and 10 m/min, and
- line pitch between 1 mm and 5 mm,

with a continuous spiral line (100 mm circumference) and a fixed or rotating motion along the longitudinal axis of the pen or refill; the writing surface is to be placed on a polished stainless steel plate.

NOTE On request the ISO Central Secretariat will provide a list of suppliers of the write test machine.

[ISO 12756:1998, definition 3.7]



### 3.7

#### Test parameters

#### 3.7.1

##### Resistance to chemical influences including water

##### 3.7.1.1

###### water resistance

ability of a line written on specified testing paper to remain visible after immersion in distilled or de-ionized water for a specified length of time

##### 3.7.1.2

###### ethanol resistance

ability of a line written on specified testing paper to remain visible after immersion in a specified ethanol solution for a specified length of time

##### 3.7.1.3

###### hydrochloric acid resistance

ability of a line written on specified testing paper to remain visible after immersion in a specified hydrochloric acid solution for a specified length of time

##### 3.7.1.4

###### ammonium hydroxide resistance

ability of a line written on specified testing paper to remain visible after immersion in a specified ammonium hydroxide solution for a specified length of time

##### 3.7.1.5

###### bleaching resistance

ability of a line written on specified testing paper to remain visible after treatment in a specified bleaching solution for a specified length of time

#### 3.7.2

##### Resistance to physical influences

##### 3.7.2.1

###### erasure resistance

ability of a line written on specified testing paper to resist erasure using specified procedures with a specified rubber eraser without altering the surface of the testing paper

##### 3.7.2.2

###### light resistance

ability of a line written on specified testing paper to remain visible after exposure to specified light for a specified length of time

#### 3.7.3

##### Other parameters

##### 3.7.3.1

###### strike through

condition in which a writing fluid has penetrated through specified testing paper so as to appear on the opposite side of the paper from the written line

**3.7.3.2**

**drying time**

length of time required for a line drawn on specified testing paper to become non-smearing

NOTE The drying time test estimates the resistance to transference to skin and to superimposed paper, under specified conditions.

**3.7.3.3**

**reproducibility**

ability of an original written line to be reproduced by a specified photocopier, microfilm processor or telefacsimile machine

**3.7.3.4**

**shelf life**

minimum expected storage life, measured from the date of manufacture, during which the product maintains its specified performance when stored under specified conditions, and during which the pen or refill is unused

**3.7.3.5**

**cap-off time**

length of time during which unused roller ball pen and gel ink ball pen maintain their writing ability when stored horizontally without their cap after writing

**3.7.3.6**

**writing speed**

rate of line generation

**3.7.3.7**

**point load**

vertical component of force applied to a writing tip during line generation

**3.7.3.8**

**writing angle**

included angle measured from the plane of the writing surface to the longitudinal axis of a pen or refill when in writing position

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**4 Requirements**

**4.1 Tip classification**

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

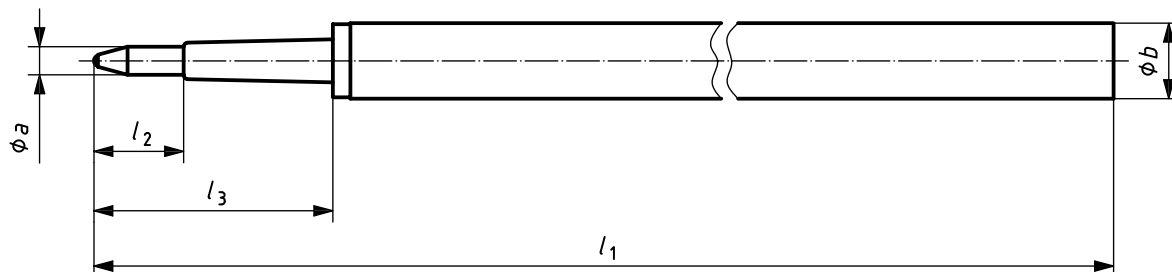
**Table 1 — Tip classification**

Dimensions in millimetres

Tip classification (line width)	Tip code	Ball diameter
Ultra fine	UF	$\varnothing < 0,40$
Extra fine	EF	$0,40 \leq \varnothing < 0,55$
Fine	F	$0,55 \leq \varnothing < 0,75$
Medium	M	$0,75 \leq \varnothing < 1,00$
Broad	B	$\varnothing \geq 1,00$

### 4.2 Shapes and dimensions of refills

Refills shall be classified into types J, K, L, G2 and N. The shapes and dimensions of types J, K, L and G2 are given in Figure 1 and Figure 2. Refills with shapes and dimensions other than those specified in Figure 1 and Figure 2 are designated type N.



Dimensions in millimetres

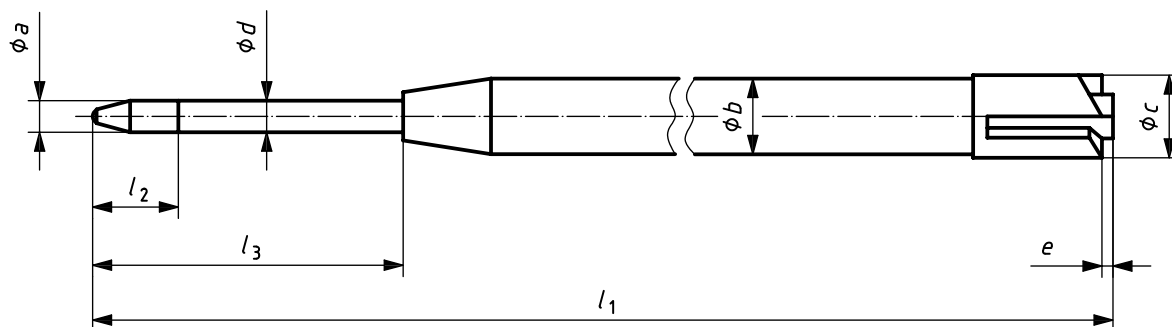
Type	$l_1$	$l_2$ min	$l_3$	$a$	$b$
J	$111 \pm 1,0$	7,7	$21 \pm 1,5$	$2,3 \pm 0,05$	$5,5 \pm 0,15$
K	$111 \pm 1,0$	7,7	$20 \pm 1,5$	$2,3 \pm 0,05$	$6,1 \pm 0,15$
L	$111 \pm 1,0$	8,9	$20 \pm 1,5$	$2,5 \pm 0,05$	$6,0 \pm 0,15$

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Figure 1 — Refill types J, K and L

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Dimensions in millimetres

Type	$l_1$	$l_2$	$l_3$	$a$	$b$	$c$	$d$	$e$
G2	$98,1^{+0,40}_{-0,35}$	$6,2 \pm 0,2$	$23,2 \pm 1$	$2,54^{+0,03}_{-0,04}$	$5,8 \pm 0,1$	$6^{+0,1}_{-0,2}$	$2,4 \pm 0,1$	$0,6 \pm 0,2$

Figure 2 — Refill type G2