INTERNATIONAL STANDARD 1042

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Laboratory glassware — One-mark volumetric flasks

Verrerie de laboratoire — Fioles jaugées à un trait

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 48 has reviewed ISO Recommendation R 1042 and found it technically suitable for transformation. International Standard ISO 1042 therefore replaces ISO Recommendation R 1042-1969 to which it is technically identical.

ISO Recommendation R 1042 was approved by the Member Bodies of the following countries :

Australia	Greece	Poland
Austria	Hungary	South Africa, Rep. of
Belgium	India	Spain
Brazil	Ireland	Switzerland
Canada	Israel	Turkey
Chile	Italy	United Kingdom
Colombia	Japan	U.S.A.
Czechoslovakia	Korea, Rep. of	U.S.S.R.
Egypt, Arab Rep. of	Netherlands	Yugoslavia
France	New Zealand	

No Member Body expressed disapproval of the Recommendation.

No Member Body disapproved the transformation of ISO/R 1042 into an International Standard.

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Laboratory glassware — One-mark volumetric flasks

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies requirements for an internationally acceptable series of one-mark volumetric flasks, suitable for general laboratory purposes.

The details specified are in conformity with ISO/R 384, *Principles of construction and adjustment of volumetric glassware.*

2 BASIS OF ADJUSTMENT

2.1 Unit of volume

The unit of volume shall be the cubic centimetre (cm^3), for which the name millilitre (ml) may be used.

NOTE — The term millilitre (ml) is commonly used as a special name for the cubic centimetre (cm^3), in accordance with a decision of the twelfth Conférence Générale des Poids et Mesures. The term millilitre is acceptable, in general, for references in International Standards to capacities of volumetric glassware and it is used, in particular, in the present text.

2.2 Reference temperature

The standard reference temperature, i.e. the temperature at which the volumetric flask is intended to contain its nominal volume (nominal capacity), shall be 20 °C.

NOTE — When the flask is required for use in a country which has adopted a standard reference temperature of 27 °C, this value shall be substituted for 20 °C.

3 CLASSES OF ACCURACY

Two classes of accuracy are specified :

Class A for the higher grade,

Class B for the lower grade.

4 SERIES OF CAPACITIES

The series of capacities of one-mark volumetric flasks is as follows :

5, 10, 25, 50, 100, 200, 250, 500, 1 000 and 2 000 ml.

All these flasks may be finished with a plain neck or be provided with a stopper.

NOTE — If volumetric flasks of capacities other than those listed above are required, it is recommended that they conform, as far as possible, to the essential requirements of this International Standard.

5 DEFINITION OF CAPACITY

The capacity of a volumetric flask is defined as the volume of water at 20 °C, expressed in millilitres, contained by the flask at 20 °C, when filled to the graduation line.

NOTE — Where, exceptionally, the reference temperature is 27 °C, this value shall be substituted for 20 °C.

Setting the meniscus shall be performed by one of the two methods detailed below :

a) The meniscus is set so that the plane of the top edge of the graduation line is horizontally tangential to the lowest point of the meniscus, the line of sight being in the same plane.

b) The meniscus is set so that the plane of the centre of the graduation line is horizontally tangential to the lowest point of the meniscus. The eye is raised towards the plane and observes the front and back portions of the line apparently meeting the lowest point of the meniscus simultaneously.

6 ACCURACY

The capacity of the flask shall not differ from the nominal capacity by more than the maximum permitted errors shown in table 1.

TABLE 1 — **Maximum permitted errors on capacity**

Values in millilitres

Nominal capacity	Maximum permitted errors	
	Class A	Class B
5	± 0,025	± 0,05
10	± 0,025	± 0,05
25	± 0,04	± 0,08
50	± 0,06	± 0,12
100	± 0,10	± 0,20
200	± 0,15	± 0,30
250	± 0,15	± 0,30
500	± 0,25	± 0,50
1 000	± 0,40	± 0,80
2 000	± 0,60	± 1,20

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7 CONSTRUCTION

7.1 Material

Volumetric flasks shall be constructed of glass of suitable chemical and thermal properties, shall be as free as possible from visible defects and shall be reasonably free from internal stress.

7.2 Wall thickness

Volumetric flasks shall be sufficiently robust in construction to withstand normal usage, and the wall thickness shall show no gross departures from uniformity.

7.3 Shape

The body of the flask should preferably be pear-shaped, as shown in the figure, so as to provide a large base on which the flask shall stand with its axis vertical without rocking or spinning. Flasks of capacity 25 ml and larger shall not topple, when placed empty (without stopper) on a surface inclined at an angle of 15° to the horizontal. Flasks of capacity below 25 ml shall not topple, when similarly tested at an angle of 10° to the horizontal.

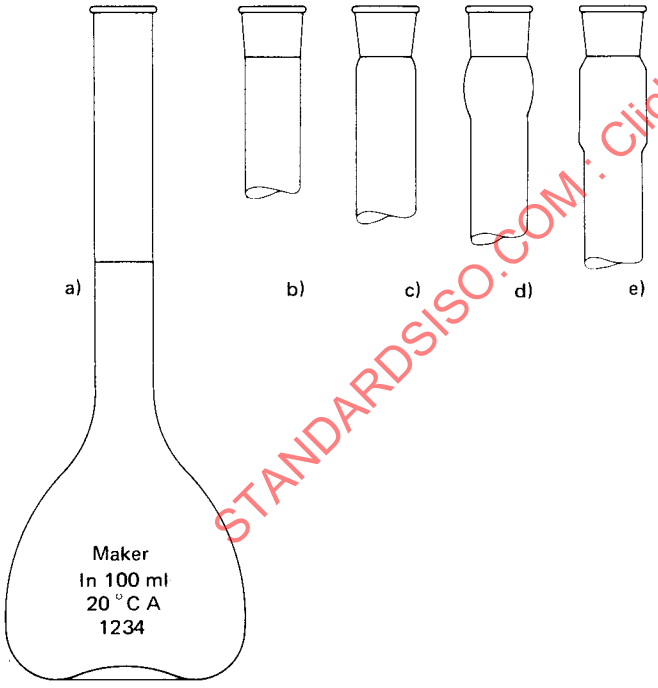

FIGURE – **One-mark volumetric flask with alternative forms of neck**

7.4 Neck

The neck of the flask, excluding the socket and bulge if present, shall be approximately cylindrical and there shall be no undue variation in internal diameter or wall thickness. The axis of the neck shall be perpendicular to the plane of the base of the flask. The top of the neck of a plain neck flask shall be finished with a strengthening flange, as shown in a) on the figure. Other forms of neck suitable for stoppers are shown in b), c), d) and e) on the figure. Such a neck shall be ground, preferably to a suitable socket size complying with the provisions of ISO/R 383, *Interchangeable conical ground glass joints*, and should be selected, preferably, from the *k*4 series.

7.5 Stopper

The stopper, if provided, shall be a good fit in the flask neck and may be of glass, solid or hollow blown, or of a suitably inert plastics material.

7.6 Dimensions

Volumetric flasks shall comply with the dimensions shown in table 2, these dimensions being considered to be essential for accuracy and convenience in use. The recommended dimensions listed in table 3 are only approximate and provide guidance as they have proved satisfactory in use. The graduation line shall be placed in the lower two-thirds of the neck of the flask, and shall be not less than the stated minimum distance from any point at which the neck begins to change in diameter.

TABLE 2 – **Essential dimensions**

Dimensions in millimetres

Nominal capacity	Internal diameter of neck at graduation line	Minimum distance of graduation line from any point of change of internal diameter of neck
ml	Class A and Class B	Classes A and B
5	6 – 8	5
10	6 – 8	5
25	8 – 10	5
50	10 – 12	10
100	12 – 14	10
200	14 – 17	10
250	14 – 17	10
500	17 – 21	15
1 000	21 – 25	15
2 000	25 – 30	15

8 GRADUATION LINE

The graduation line shall be a clean, permanent, uniform line, of thickness not exceeding 0,4 mm, completely encircling the neck of the flask and lying in a plane parallel to the base of the flask.

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TABLE 3 – **Recommended dimensions**

Dimensions in millimetres

Nominal capacity	Overall height (without stopper)	Bulb diameter	Base diameter
ml			
5	70	22	15
10	90	27	18
25	110	40	25
50	140	50	35
100	170	60	40
200	210	75	50
250	220	80	55
500	260	100	70
1 000	300	125	85
2 000	370	160	110

9 INSCRIPTIONS

9.1 The following inscriptions shall be permanently marked on each volumetric flask :

a) A number indicating the nominal capacity.

b) The symbol "cm^3" or the symbol "ml" to indicate the unit of volume (see note to 2.1).

NOTE – The 1 000 ml and 2 000 ml flasks may, if desired, be inscribed in terms of the litre in place of the millilitre.

c) The inscription "20 °C" to indicate the standard reference temperature.

NOTE – Where, exceptionally, the reference temperature is 27 °C, this value shall be substituted for 20 °C.

d) A suitable abbreviation to indicate that the flask has been adjusted to contain its indicated capacity. In order to obviate language difficulties, it is recommended that the letters "In" should be used for this purpose.

e) The letter "A" or (where considered necessary) "B" to indicate the class of accuracy of the volumetric flask.

f) The marker's or vendor's name or mark.

g) In the case of a flask with an interchangeable stopper, the size number of the joint shall be marked on the flask neck and on the stopper.

9.2 An identification number shall be permanently marked on each class A volumetric flask intended for official verification or certification; it should preferably be marked on other class A flasks and may also be used, if desired, on class B flasks. In the case of a flask with a non-interchangeable glass stopper, this number shall also be marked on the stopper.

10 VISIBILITY OF GRADUATION LINE, FIGURES AND INSCRIPTIONS

10.1 All figures and inscriptions shall be of such size and form as to be clearly legible under normal conditions of use.

10.2 The graduation line, the figures and the inscriptions shall be clearly visible and permanent.

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