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# International Standard



# 3819

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Laboratory glassware — Beakers

*Verrerie de laboratoire — Béchiers*

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**Descriptors** : laboratory equipment, laboratory glassware, beakers, specifications, dimensions.

## 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.

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 3819 was prepared by Technical Committee ISO/TC 48, *Laboratory glassware and related apparatus*.

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.

# Laboratory glassware — Beakers

## 0 Introduction

The dimensions specified for beakers in this International Standard are close to the average dimensions of current production in most manufacturing countries.

Considerably large dimensional tolerances are specified, but they are not intended to be manufacturing tolerances. The main part of current production, however, is now manufactured within the limits specified in this International Standard.

## 1 Scope and field of application

This International Standard specifies requirements for an internationally acceptable series of glass beakers for laboratory use.

## 2 References

ISO 718, *Laboratory glassware — Methods for thermal shock tests*.

ISO 719, *Glass — Hydrolytic resistance of glass grains at 98 °C — Method of test and classification*.

ISO 3585, *Glass plant, pipeline and fittings — Properties of borosilicate glass 3.3*

## 3 Types of beaker

Two types of beaker are specified:

- a) low-form beaker with spout;
- b) tall-form beaker with spout.

## 4 Series of beakers

The series of beakers covered by this International Standard and defined by type and nominal capacity shall be as follows:

- a) low-form beakers: 5 — 10 — 25 — 50 — 100 — 250 — 400 — 600 — 800 — 1 000 — 2 000 — 3 000 — 5 000 ml;
- b) tall-form beakers: 50 — 100 — 150 — 250 — 400 — 600 — 800 — 1 000 — 2 000 — 3 000 ml.

## 5 Capacity

The design of the beaker shall provide for the difference in volume between nominal capacity and overall capacity.

The capacity of the beaker is determined by one of the following relationships, either

- the overflow capacity of a beaker shall exceed the nominal capacity by 10 %, or
- the distance between the levels corresponding to the nominal and overflow capacities shall be not less than 10 mm.

Whichever of these two relationships produces the greater differential in capacity shall apply.

## 6 Material

### 6.1 General

Beakers shall be made of borosilicate glass of suitable chemical and thermal properties, preferably of borosilicate glass 3.3 in accordance with ISO 3585.

The glass shall be free from visible defects and from internal stress which would impair the performance of the beaker.

## 6.2 Hydrolytic resistance

When tested in accordance with the procedure and using the classification laid down in ISO 719, the glass from which the beaker is made shall comply with the requirements of class HGB 1.

## 6.3 Thermal shock resistance

The glass used shall have a coefficient of linear thermal expansion of  $5,6 \times 10^{-6} \text{ }^{\circ}\text{C}^{-1}$  over the temperature range from 20 to 300 °C.

NOTE — Where information is required by the purchaser on the thermal shock resistance of particular sizes and wall thicknesses of beakers, a test may be carried out in accordance with ISO 718, the temperature differential and any necessary amendments in procedure resulting from the size of the beaker being the subject of agreement between the purchaser and the vendor.

## 7 Details of construction

### 7.1 Base

The design of the base shall enable the beaker to stand vertically on a plane horizontal surface without spinning or rocking.

### 7.2 Side

The side of the beaker shall be slightly flared near the brim in a smooth and regular curve. The diameter of the brim shall be of the order of 5 to 15 % greater than the diameter of the body. The edge of the brim shall be finished in a plane parallel with that of the base.

### 7.3 Spout

The spout shall be shaped so that, when the beaker is filled with water, the water may be poured in a regular stream clear of the side of the beaker. When the beaker is placed on a horizontal surface and filling is continued beyond its overflow capacity, the water shall first overflow from the spout and not from any other part of the brim.

### 7.4 Scale

Beakers may be provided with a scale, which should approximately indicate the volume contained in the beaker.

## 8 Dimensions

### 8.1 Basic dimensions

Basic dimensions for beakers are given in the table.

### 8.2 Tolerances

Tolerances on external diameter and overall height shall be  $\pm 5 \%$  (see clause 0).

Table — Basic dimensions for beakers

Type	Nominal capacity	External diameter	Overall height	Minimum wall thickness
	ml	mm	mm	mm
Low-form	5	22	30	0,7
	10	26	35	0,7
	25	34	50	0,7
	50	42	60	0,8
	100	50	70	0,9
	150	60	80	1,0
	250	70	95	1,1
	400	80	110	1,2
	600	90	125	1,3
	800	100	135	1,3
	1 000	105	145	1,3
	2 000	130	185	1,4
3 000	150	210	1,7	
5 000	170	270	2,0	
Tall-form	50	38	70	0,8
	100	48	80	0,9
	150	54	95	1,0
	250	60	120	1,1
	400	70	130	1,2
	600	80	150	1,3
	800	90	175	1,3
	1 000	95	180	1,3
	2 000	120	240	1,4
	3 000	135	280	1,7

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### 8.3 Radius at base

Beakers having a nominal capacity of 250 ml or greater shall have an external radius at the junction between the base and the side of 15 to 20 % of the external diameter.

Beakers having a nominal capacity less than 250 ml shall have a minimum radius at the junction between the base and the side of 5 % of the external diameter.

### 8.4 Wall thickness

Recommended minimum values for wall thickness are given in the table.

NOTE — Substantial local irregularities should be avoided.

## 9 Inscriptions

The following inscriptions shall be permanently and legibly marked on all beakers:

- the nominal capacity of the beaker, for example "100 ml" (or 100), and the scale if marked on the beaker;
- the maker's or vendor's name or mark;
- the type of glass, if not identifiable otherwise.

In addition, each beaker shall bear an area with a surface suitable for marking with pencil.