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Laboratory glassware — Beakers

Verrerie de laboratoire — Bêchers

[Revision of first edition (ISO 3819:1985)]

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This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

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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.

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

ISO 3819 was prepared by Technical Committee ISO/TC 48, *Laboratory equipment* and by Technical Committee CEN/TC 332, *Laboratory equipment* in collaboration.

This second edition cancels and replaces the first edition (ISO 3819:1985), which has been technically revised to include the following modifications.

- a) An additional series with thick-walled beakers has been added.
- b) Dimensions and tolerances have been adjusted to state of manufacturing.
- c) Beakers with a nominal capacity of 500 ml, 5 000 ml and 10 000 ml have been added.
- d) Thermal shock resistance has been modified.

Laboratory glassware — Beakers

1 Scope

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

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 718, *Laboratory glassware – Thermal shock and thermal shock endurance – Test methods*

ISO 3585, *Borosilicate glass 3.3 – Properties*

3 Types of beakers

Three types of beakers are specified:

- a) Low-form beaker with spout;
- b) Low-form beaker with spout, thick-walled;
- c) 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 – 500 – 600 – 800 – 1 000 – 2 000 – 3 000 – 5 000 – 10 000 ml;
- b) thick-walled low-form beakers: 150 – 250 – 400 – 600 – 1 000 – 2 000 – 5 000 ml;
- c) tall-form beakers: 50 – 100 – 150 – 250 – 400 – 500 – 600 – 800 – 1 000 – 2 000 – 3 000 – 5 000 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 shall be determined by one of the following relationships, either

- a) the overflow of capacity of a beaker shall exceed the nominal capacity by at least 5 %, or
- b) the distance between the levels corresponding to the nominal and overflow capacities shall be at least 10 mm.

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

6 Material

Beakers shall be made of borosilicate glass 3.3 in accordance with ISO 3585. The glass shall be reasonably free from residual strain and from visible glass defects which might impair the safety and performance of the beaker.

7 Dimensions

7.1 General

Low-form and tall-form beakers shall observe the dimensions specified in Table 1 and thick-walled beakers the dimensions specified in Table 2. The tolerances on the external diameter shall be $\pm 5\%$ of the value given in the tables.

NOTE This considerably large tolerance has been specified to enable beakers of different manufacturers around the world to comply with this International Standard. This tolerance is not intended as manufacturing tolerance which usually is much tighter.

7.2 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 10 % 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.

7.3 Wall thickness

Substantial local irregularities from the minimum values for wall thickness given in the tables shall be avoided. That means, the minimum wall thickness shall fall at no place below the values given in Table 1 and Table 2 and the beakers shall comply with the requirement for thermal shock endurance specified in 8.5.

Table 1 — Dimensions for low-form and tall-form beakers

Type	Nominal capacity ml	External diameter mm ± 5 %	Overall height mm max.	Wall thickness mm min.
Low-form	5	22	32	0,7
	10	26	37	0,7
	25	34	52	0,7
	50	42	62	0,8
	100	50	72	0,9
	150	60	82	1,0
	250	70	97	1,1
	400	80	113	1,2
	500	85	118	1,3
	600	90	128	1,3
	800	100	138	1,3
	1 000	105	148	1,3
	2 000	130	188	1,4
	3 000	150	214	1,7
	5 000	170	274	2,0
10 000	220	360	2,0	
Tall-form	50	38	72	0,8
	100	48	82	0,9
	150	54	97	1,0
	250	60	123	1,1
	400	70	133	1,2
	500	79	140	1,3
	600	80	153	1,3
	800	90	178	1,3
	1 000	95	183	1,3
	2 000	120	244	1,4
	3 000	135	284	1,7
5 000	160	324	2,0	

Table 2 — Dimensions of thick-walled beakers

Nominal capacity ml	External diameter mm ± 5 %	Overall height mm max.	Wall thickness mm min.
150	60	82	1,1
250	70	97	1,2
400	80	111	1,4
600	90	127	1,4
1 000	105	147	1,4
2 000	132	187	1,5
5 000	170	275	2,5

8 Details of construction

8.1 Base

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

8.2 Upper edge

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 horizontal base.

8.3 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.

8.4 Scale

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

8.5 Thermal shock resistance

Beakers shall have a thermal shock resistance of 160 °C when tested in accordance with ISO 718.

9 Marking

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 and/or vendor's name and/or mark;
- the type of glass, if not identifiable otherwise.