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Laboratory glassware — Beakers

Verrerie de laboratoire — Béchers

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword ..... **iv**

1 Scope **1**

2 Normative references **1**

3 Types of beakers **1**

4 Series of beakers **1**

5 Capacity **1**

6 Material **2**

7 Dimensions **2**
7.1 General 2
7.2 Radius at base 2
7.3 Wall thickness 2

8 Details of construction **3**
8.1 Base 3
8.2 Upper edge 3
8.3 Spout 3
8.4 Scale 4
8.5 Thermal shock resistance 4

9 Marking **4**

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information.

The committee responsible for this document is ISO/TC 48, *Laboratory equipment* in collaboration with CEN/TC 332, *Laboratory equipment*.

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

— additional series with thick-walled beakers has been added;

— dimensions and tolerances have been adjusted to state of manufacturing;

— beakers with a nominal capacity of 500 ml, 5 000 ml, and 10 000 ml have been added;

— 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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

The following 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 ml – 10 ml – 25 ml – 50 ml – 100 ml – 250 ml – 400 ml – 500 ml – 600 ml – 800 ml – 1 000 ml – 2 000 ml – 3 000 ml – 5 000 ml – 10 000 ml;

b) thick-walled low-form beakers: 150 ml – 250 ml – 400 ml – 600 ml – 1 000 ml – 2 000 ml – 5 000 ml;

c) tall-form beakers: 50 ml – 100 ml – 150 ml – 250 ml – 400 ml – 500 ml – 600 ml – 800 ml – 1 000 ml – 2 000 ml – 3 000 ml – 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 either one of the following relationships:

a) overflow of capacity of a beaker shall exceed the nominal capacity by at least 5 %;

b) 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 specifed in Table 2. The tolerances on the external diameter shall be ±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

Table 1 *(continued)*

Type	Nominal capacity ml	External diameter mm ±5 %	Overall height mm max.	Wall thickness mm min.
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:

a) nominal capacity of the beaker, for example “100 ml” (or 100), and the scale, if marked on the beaker;

b) maker’s and/or vendor’s name and/or mark;

c) type of glass, if not identifiable otherwise.

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