

International Standard



6706

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Plastics laboratory ware — Graduated measuring cylinders

Matériel de laboratoire en plastique — Éprouvettes graduées cylindriques

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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.

International Standard ISO 6706 was developed by Technical Committee ISO/TC 48, *Laboratory glassware and related apparatus*, and was circulated to the member bodies in October 1979.

It has been approved by the member bodies of the following countries :

Australia	Italy	Romania
Brazil	Korea, Rep. of	South Africa, Rep. of
Canada	Libyan Arab Jamahiriya	Spain
France	Mexico	United Kingdom
Germany, F. R.	Netherlands	USSR
Hungary	Poland	
India	Portugal	

No member body expressed disapproval of the document.

Plastics laboratory ware — Graduated measuring cylinders

1 Scope and field of application

This International Standard specifies requirements for a series of plastics cylinders having a graduated volumetric scale and a pouring spout.

NOTE — Cylinders may also be provided with two scales.

2 References

ISO 384, *Laboratory glassware — Principles of design and construction of volumetric glassware*.

ISO 649/2, *Laboratory glassware — Density hydrometers for general purposes — Part 2 : Test methods and use*.¹⁾

IEC Publication 335/1, *Safety of household and similar electrical appliances — Part 1 : General requirement*.

3 Basis of adjustment

3.1 Unit of volume

The unit of volume shall be the cubic centimetre (cm³), 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 (cm³), in accordance with the International System of Units (SI).

3.2 Reference temperature

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

NOTE — When the cylinder is required for use in a country which has adopted a standard reference temperature of 27 °C (the alternative recommended in ISO 384 for tropical use), this figure shall be substituted for 20 °C.

4 Series of nominal capacities

The series of nominal capacities of graduated measuring cylinders shall be as shown in table 1.

Table 1 — Series of capacities, divisions and tolerances

Nominal capacity	Smallest division	Maximum permitted error	Maximum ungraduated capacity at base
ml	ml	ml	ml
10	0,1	± 0,1	1
10	0,2	± 0,2	1
25	0,5	± 0,5	2,5
50	1	± 1	5
100	1	± 1	10
250	2	± 2	24
500	5	± 5	50
1 000	10	± 10	100
2 000	20	± 20	200
4 000	50	± 50	400

5 Definition of capacity

The capacity corresponding to any graduation line shall be defined as the volume of water at 20 °C, expressed in millilitres, contained by the cylinder at 20 °C when filled to that graduation line in accordance with the procedure given in clause A.1 of annex A.

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

6 Accuracy

There shall be one class of accuracy.

When tested in accordance with annex A, the errors in capacity shall not exceed the maximum permitted errors shown in table 1. The error represents the maximum permissible error at any point and also the maximum permissible difference between the errors at any two points.

1) At present at the stage of draft. (Revision of ISO/R 649.)

7 Material

7.1 General

Cylinders shall be rigid and shall be constructed of generally non-brittle translucent or transparent plastics material of suitable chemical and thermal properties and shall be as free as possible from moulding defects and stress.

7.2 Resistance to extraction of ionic material by water at 20 °C

When tested in accordance with the procedure given in annex B, the cylinder shall give an aqueous extract, free of suspended matter, and the difference between its conductivity and that of the original water used for the extraction shall not exceed the values given in table 4.

NOTE — The equivalent to the conductivity of water containing approximately 1 mg/l of sodium chloride is 200 µS/m.

8 Construction (see figure 1)

8.1 Stability

The cylinder shall stand vertically without rocking or spinning when placed on a level surface. It shall not topple when placed empty on a non-slip surface inclined at an angle of $12 \pm 1^\circ$ to the horizontal.

8.2 Base

The base shall be of a suitable plastics material and may or may not be integral with the body. It may be either polygonal with five or more equal sides or circular.

8.3 Spout

The spout shall be so formed as to enable the contents of the cylinder to be poured out in a narrow stream without spilling or running down the outside of the cylinder.

8.4 Dimensions

8.4.1 Cylinders shall comply with the dimensional requirements shown in table 2.

8.4.2 The wall thickness shall be such that when tested for flexibility in accordance with the procedure specified in annex C, the diameter of the cylinder shall not decrease by more than 10 % and the change in indication arising from any permanent distortion caused by the test procedure shall not result in the maximum permitted error given in table 1 being exceeded.

8.5 Translucency

The cylinder shall be constructed in such a manner that when containing transparent liquids, the meniscus can be seen through the cylinder wall.

Table 2 — Dimensions

Nominal capacity	Internal height to highest graduation line	Overall height	Distance from highest graduation line to top of cylinder
	min.		min.
ml	mm	mm	mm
10	90	150	20
25	90	170	20
50	115	200	25
100	145	260	25
250	200	340	35
500	250	390	40
1 000	315	470	40
2 000	400	570	60
4 000	460	585	75

9 Graduation and figuring (see figures 2 and 3)

9.1 Graduation lines

Graduation lines shall be clean, durable, uniform lines of thickness not exceeding 0,3 mm for capacities up to and including 250 ml, not exceeding 0,7 mm for capacities of 500 ml and 1 000 ml, and not exceeding 1 mm for capacities of 2 000 ml and 4 000 ml.

9.2 Spacing of graduation lines

There shall not be evident irregularity in the spacing of the graduation lines.

9.3 Length of graduation lines

9.3.1 The length of the short lines shall be between 10 % and 12,5 % of the circumference of the cylinder.

9.3.2 The length of the medium lines shall be approximately 1,5 times the length of the short lines.

9.3.3 The length of the long lines shall be not less than twice the length of the short lines.

9.3.4 The medium and long lines shall extend symmetrically at each end beyond the ends of the short lines.

9.4 Sequence of graduation lines

9.4.1 On cylinders of capacity 10 ml divided in 0,1 ml, capacities 50 ml and 100 ml divided in 1 ml, and capacity 1 000 ml divided in 10 ml :

- a) every tenth graduation line shall be a long line;