



Standard Specification for Laboratory Glass Beakers¹

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1. Scope

1.1 This specification provides standard dimensional requirements for glass beakers suitable for general laboratory use.

NOTE 1—For packaging standards, choose among the following standards: Specification E920; Specification E921, Practice E1133. For sampling and testing refer to Specification E1157.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

- E438 Specification for Glasses in Laboratory Apparatus
- E671 Specification for Maximum Permissible Thermal Residual Stress in Annealed Glass Laboratory Apparatus
- E920 Specification for Commercially Packaged Laboratory Apparatus
- E921 Specification for Export Packaged Laboratory Apparatus
- E1133 Practice for Performance Testing of Packaged Laboratory Apparatus for United States Government Procurements
- E1157 Specification for Sampling and Testing of Reusable Laboratory Glassware

3. Classification

3.1 Beakers shall be in the following types and sizes.

3.1.1 *Type I*—Low form with spout (Griffin):

- 3.1.1.1 *Size 1*—10 cm³,
- 3.1.1.2 *Size 2*—20 cm³,
- 3.1.1.3 *Size 3*—30 cm³,
- 3.1.1.4 *Size 4*—50 cm³,
- 3.1.1.5 *Size 5*—100 cm³,

- 3.1.1.6 *Size 6*—150 cm³,
- 3.1.1.7 *Size 7*—250 cm³,
- 3.1.1.8 *Size 8*—400 cm³,
- 3.1.1.9 *Size 9*—600 cm³,
- 3.1.1.10 *Size 10*—800 cm³,
- 3.1.1.11 *Size 11*—1000 cm³,
- 3.1.1.12 *Size 12*—1500 cm³,
- 3.1.1.13 *Size 13*—2000 cm³,
- 3.1.1.14 *Size 14*—3000 cm³, and
- 3.1.1.15 *Size 15*—4000 cm³.

3.1.2 *Type II*—Low form, with spout, heavy duty:

- 3.1.2.1 *Size 1*—150 cm³,
- 3.1.2.2 *Size 2*—250 cm³,
- 3.1.2.3 *Size 3*—400 cm³,
- 3.1.2.4 *Size 4*—600 cm³,
- 3.1.2.5 *Size 5*—1000 cm³,
- 3.1.2.6 *Size 6*—2000 cm³, and
- 3.1.2.7 *Size 7*—4000 cm³.

3.1.3 *Type III*—Tall form, with spout (Berzelius):

- 3.1.3.1 *Size 1*—100 cm³,
- 3.1.3.2 *Size 2*—200 cm³,
- 3.1.3.3 *Size 3*—300 cm³,
- 3.1.3.4 *Size 4*—400 cm³,
- 3.1.3.5 *Size 5*—500 cm³,
- 3.1.3.6 *Size 6*—600 cm³, and
- 3.1.3.7 *Size 7*—1000 cm³.

3.1.4 *Type IV*—Tall form, without spout (Berzelius):

- 3.1.4.1 *Size 1*—100 cm³,
- 3.1.4.2 *Size 2*—200 cm³,
- 3.1.4.3 *Size 3*—300 cm³,
- 3.1.4.4 *Size 4*—400 cm³, and
- 3.1.4.5 *Size 5*—500 cm³.
- 3.1.4.6 *Size 6*—600 cm³, and
- 3.1.4.7 *Size 7*—1000 cm³.

3.1.5 *Type V*—Electrolytic, without spout:

- 3.1.5.1 *Size 1*—180 cm³, and
- 3.1.5.2 *Size 2*—250 cm³.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

NOTE 2—The term millilitre (mL) is commonly used as a special name for the cubic centimeter (cm³) and similarly the liter (L) for 1 000 cubic centimeters, in accordance with the International System of Units (SI).

4. Material and Annealing

4.1 Beakers shall be made of borosilicate glass conforming to the requirement of Type I, Class A of Specification E438.

4.2 Maximum residual thermal stress shall be such as to conform to Specification E671.

5. Design

5.1 Types I and II beakers shall be constructed to have straight sides (the 1 000 through 4 000 cm³ sizes may have slightly tapered sides). Types III and IV beakers shall have slightly tapered sides (the 100 and 200 cm³ may be straight sided). Type V beakers may have slightly tapered or straight sides.

5.2 All styles may have a slightly concave bottom. The junction of the sides with the bottom shall be well rounded.

5.3 The beakers shall be symmetrically made and smoothly finished, the upper edge with a fire polished bead and may be flared outward. Type II beakers may have a tooled flare.

5.4 Types I, II and III beakers shall have well defined spouts such that the stream of water poured from the lip of the beaker shall pour evenly, and shall not cling to the outside of the beaker and flow off the bottom when tilting the nearly full beaker at a 45° angle.

6. Capacity and Dimensions

6.1 Beakers shall conform to the requirements of Table 1,

Table 2, Table 3, and Table 4.

TABLE 4 Capacity and Dimensions of Type V Beakers

| Size | Capacity, cm ³ | Max. Body OD, mm | Max Height, mm |
|------|---------------------------|------------------|----------------|
| 1 | 180 | 52 | 120 |
| 2 | 250 | 60 | 135 |

7. Markings

7.1 Each beaker shall be permanently marked with the name or known trademark of the manufacturer and the nominal capacity, as well as approximate graduation markings that have a limit of error of ±5 % of full capacity. The graduation intervals shall comply with the tables.

7.2 There shall be an area on one side of the beaker, roughened by sand blasting or suitably decorated to provide for marking with pencil.

8. Keywords

8.1 beakers; glass; laboratory

TABLE 1 Capacity and Dimensions of Type I Beakers

| Size | Capacity, cm ³ | Body OD, mm | Max Height, mm | Min Graduated Range, cm ³ | Max Graduated Subdivision, cm ³ |
|------|---------------------------|-------------|----------------|--------------------------------------|--|
| 1 | 10 | 25 ± 2 | 35 | ... | ... |
| 2 | 20 | 32 ± 2 | 45 | 5 to 15 | 10 |
| 3 | 30 | 35 ± 2 | 55 | 5 to 25 | 10 |
| 4 | 50 | 41 ± 2 | 60 | 10 to 40 | 10 |
| 5 | 100 | 50 ± 2 | 75 | 20 to 80 | 10 |
| 6 | 150 | 57 ± 2 | 90 | 20 to 140 | 20 |
| 7 | 250 | 68 ± 2 | 100 | 25 to 200 | 25 |
| 8 | 400 | 77 ± 2 | 120 | 50 to 325 | 25 |
| 9 | 600 | 88 ± 3 | 135 | 100 to 500 | 50 |
| 10 | 800 | 98 ± 3 | 145 | 100 to 750 | 50 |
| 11 | 1 000 | 108 ± 3 | 160 | 100 to 900 | 50 |
| 12 | 1 500 | 120 ± 3 | 180 | 200 to 1 400 | 200 |
| 13 | 2 000 | 130 ± 3 | 200 | 200 to 1 800 | 200 |
| 14 | 3 000 | 146 ± 3 | 225 | 250 to 2 500 | 250 |
| 15 | 4 000 | 161 ± 4 | 260 | 500 to 3 500 | 500 |

TABLE 2 Capacity and Dimensions of Type II Beakers

| Size | Capacity, cm ³ | Body OD, mm | Max Height, mm | Min Graduated Range, cm ³ | Max Graduated Subdivision, cm ³ |
|------|---------------------------|-------------|----------------|--------------------------------------|--|
| 1 | 150 | 57 ± 2 | 90 | 20 to 140 | 20 |
| 2 | 250 | 67 ± 2 | 100 | 25 to 200 | 25 |
| 3 | 400 | 77 ± 2 | 120 | 50 to 325 | 25 |
| 4 | 600 | 88 ± 3 | 135 | 100 to 500 | 50 |
| 5 | 1 000 | 108 ± 3 | 160 | 100 to 900 | 50 |
| 6 | 1 200 | 130 ± 3 | 200 | 200 to 1 800 | 200 |
| 7 | 4 000 | 161 ± 4 | 260 | 500 to 3 500 | 500 |

TABLE 3 Capacity and Dimensions of Types III and IV Beakers

| Size | Capacity, cm ³ | Body OD, mm | Max Height, mm | Min Graduated Range, cm ³ | Max Graduated Subdivision, cm ³ |
|------|---------------------------|-------------|----------------|--------------------------------------|--|
| 1 | 100 | 50 ± 2 | 85 | 20 to 80 | 10 |
| 2 | 200 | 56 ± 2 | 110 | 25 to 150 | 25 |
| 3 | 300 | 64 ± 2 | 125 | 25 to 250 | 25 |
| 4 | 400 | 70 ± 2 | 135 | 50 to 325 | 25 |
| 5 | 500 | 75 ± 2 | 145 | 100 to 400 | 50 |
| 6 | 600 | 80 ± 3 | 160 | 100 to 500 | 50 |
| 7 | 1 000 | 90 ± 3 | 195 | 100 to 900 | 50 |

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