Designation: E1272 – 02 (Reapproved 2012)

Standard Specification for Laboratory Glass Graduated Cylinders[1]

This standard is issued under the fixed designation E1272; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers requirements for glass graduated cylinders for precision and general purpose grades suitable for laboratory purposes.

1.1.1 *Class A*—Each cylinder of precision grade shall be marked with the letter "A" to signify compliance with applicable construction and accuracy requirements. Cylinders may be marked with an identification number (serial number) at the option of the manufacturer.

1.1.2 *Class B*—General purpose cylinders are of the same basic design as Class A cylinders. However, volumetric tolerances for Class B cylinders shall be within twice the specified range allowed for Class A cylinders. These cylinders need not be marked with their class designation.

1.1.3 Product with a stated capacity not listed in this standard may be specified in class A tolerance when product conforms to the tolerance range of the next smaller volumetric standard product listed in Table 1.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E438 Specification for Glasses in Laboratory Apparatus

E542 Practice for Calibration of Laboratory Volumetric Apparatus

E675 Specification for Interchangeable Taper-Ground Stopcocks And Stoppers

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 Cylinders shall be in the following styles:

3.1.1 *Style I*—Beaded lip with pour spout,

3.1.2 *Style II*—Ground standard taper () neck, or

3.1.3 *Style III*—Beaded lip with pour spout and reinforcing bead near top.

4. Requirements

4.1 Style I cylinders shall be calibrated either "to deliver" or "to contain." Style II and Style III cylinders shall be calibrated "to contain." The cylinders shall be calibrated at 20°C and the volumetric tolerances shall be in accordance with Table 1. (See Practice E542 for calibration definitions and procedures.)

4.1.1 Cylinders shall be of borosilicate glass conforming to the requirements for Type I, Class A of Specification E438.

4.2 *Shape*—Cylinders shall be of one piece consisting in general of a top, a graduated portion of uniform diameter and a base. The shape shall permit complete emptying and thorough cleaning. The pour-out of Style I, in sizes of 1000 mL and below, shall be located in a vertical plane bisecting within ±5° one of the corners on the hexagonal base. For sizes 2000 mL and above, the pour-out shall bisect within ±5° the center of one of the flat section or one of the corners of the base. The pour-out of Style III shall not protrude beyond the glass reinforcing bead with construction such that, upon falling, the bead shall strike a flat surface before the pour-out or lip.

4.2.1 *Base*—The base shall be hexagonal and the construction shall be such that the empty cylinder (without stopper for Style II), in capacities above 10 mL, shall stand on a surface inclined 15° with the horizontal and, in capacities of 10 mL or less, shall stand on a surface inclined 10° with the horizontal.

4.3 *Dimensions*—The dimensions shall be as shown in Table 1 The glass stoppers of Style II shall conform to Specification E675.

4.4 *Graduation Markings*—Graduation markings shall be sharply defined lines of uniform width not more than 0.4 mm. Graduation markings shall be perpendicular to the vertical axis of the cylinder and parallel to each other. Adjacent graduation markings shall be spaced at least 1 mm from center to center. Markings shall be applied by one of the following methods: etched and filled with a permanent pigment; etched through a

[1] This specification is under the jurisdiction of ASTM Committee E41 on Laboratory Apparatus and is the direct responsibility of Subcommittee E41.01 on Apparatus.

Current edition approved Nov. 1, 2012. Published November 2012. Originally approved in 1989. Last previous edition approved in 2007 as E1272 – 02(2007). DOI: 10.1520/E1272-02R12.

[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.

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States

TABLE 1 Dimensions and Tolerances

Capacity, mL	Main	Graduations, Intermediate	Least[A]	Distance From Scale to Top, mm		Minimum Wall Thickness, mm	Maximum Inner Diameter, mm	Standard Taper () Stopper Number[B]	Tolerances to Contain or to Deliver ± mL	
				max	min[C]				Class A	Class B
5	1.0	0.5	0.1	50	20	0.9	11.2	9	0.05	0.10
10	1.0	0.5	0.1	60	20	1.0	15.2	9	0.10	0.20
10	1.0	...	0.2	60	20	1.0	15.2	13	0.10	0.20
25	2.0	1.0	0.2	80	20	1.1	18.5	13	0.17	0.34
25	5.0	1.0	0.5	60	20	1.1	19.3	13	0.17	0.34
50[D]	5.0 or 10.0	5.0	1.0	80	20	1.2	23	16	0.25	0.50
100	10.0	5.0	1.0	80	20	1.3	29.6	16 or 22	0.50	1.00
250	20.0	10.0	2.0	100	30	1.5	42.4	22 or 27	1.00	2.00
500	50.0	25.0	5.0	100	35	1.6	50.8	27 or 32	2.00	4.00
1000	100.0	50.0	10.0	110	45	2.0	63	32	3.00	6.00
2000	200.0	100.0	20.0	125	50	2.0	82.1	38	6.00	12.00
4000	500.0	250.0	50.0	130	50	2.2	110	...	14.50	29.00

[A] Lines below the first numbered line may be omitted.
[B] Applies to Style II only.
[C] For Style II, measurement is to bottom of stopper.
[D] Main graduations may be each 5 or 10 mL. If main graduations are each 5 mL, intermediate graduations do not apply.

vertical colored band fired into the glass; or by application of a stain which is fired into the glass without etching; or by application of enamel fired into the glass without etching; or by application of an enamel which is fired onto a vertical colored etched band which has been fired into the glass. Style III shall have graduation markings etched through a vertical red colored band fired into the glass. The value of all main graduations shall be suitably inscribed in Arabic numerals directly above the line referenced. Subdivision lines may be omitted between the base of the cylinder and the first numbered line.

4.5 *Length of Graduation Lines:*

4.5.1 *Class A:*

4.5.1.1 The length of the short lines shall be approximately but not less than 50 % of the circumference of the cylinder.

4.5.1.2 The length of the medium lines shall be approximately 65 % of the circumference of the cylinder and shall extend symmetrically at each end beyond the end of the short lines.

4.5.1.3 The long lines shall extend completely around the circumference of the cylinder, but a gap, not exceeding 10 % of the circumference, may be permitted.

4.5.2 *Class B:*

4.5.2.1 The length of the short lines shall not be less than 10 % and not more than 20 % of the circumference of the cylinder.

4.5.2.2 The length of the medium lines shall be approximately 1.5 times the length of the short lines and shall extend symmetrically at each end beyond the end of the short lines.

4.5.2.3 The long lines shall extend completely around the circumference of the cylinder, but a gap, not exceeding 10 % of the circumference, may be permitted.

4.6 *Identification Markings*—Each graduated cylinder shall be permanently and legibly marked with the manufacturer's name or trademark, the capacity and the temperature of calibration (20°C). Style I and Style II shall be marked either "To Deliver'' (TD) or "To Contain" (TC) and Style III shall be marked "To Contain" (TC). Optionally, cylinders may be additionally marked with the international symbol "EX" for "To Deliver" or "IN" for "To Contain."

5. Sampling and Testing

5.1 Refer to Specification E1157.

6. Packaging and Package Marking

6.1 Select from one of Specification E920, Specification E921, or Practice E1133.

7. Keywords

7.1 cylinders; glass; graduated; laboratory

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the ASTM website (www.astm.org/COPYRIGHT/).