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## Standard Specification for Laboratory Glass Microvolumetric Vessels (Volumetric Flasks and Centrifuge Tubes)<sup>1</sup>

This standard is issued under the fixed designation E 237; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification covers volumetric flasks and four types of centrifuge tubes, widely used in microchemistry.

NOTE 1—Specifications for several items listed below were developed by the Committee on Microchemical Apparatus, Division of Analytical Chemistry, American Chemical Society.<sup>2</sup>

1.2 Product with a stated capacity not listed in this standard may be specified 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:*<sup>3</sup>

E 438 Specification for Glasses in Laboratory Apparatus

E 542 Practice for Calibration of Laboratory Volumetric Apparatus

E 671 Specification for Maximum Permissible Thermal Residual Stress in Annealed Glass Laboratory Apparatus

E 694 Specification for Laboratory Glass Volumetric Apparatus

E 920 Specification for Commercially Packaged Laboratory Apparatus

E 921 Specification for Export Packaged Laboratory Apparatus

E 1133 Practice for Performance Testing of Packaged Laboratory Apparatus for United States Government Procurements

E 1157 Specification for Sampling and Testing of Reusable Laboratory Apparatus<sup>3</sup>Glassware

### 3. Volumetric Flasks

3.1 The volumetric flasks shall be of either Style I or Style II of Fig. 1 and shall conform to the requirements of Fig. 1 and Table 1. Each flask shall be marked with the symbol "TC" (or "IN"), the capacity, "20°C", and a 16 mm<sup>2</sup> marking area. (All in an optional location on the flask.)

### 4. Centrifuge Tubes

4.1 Centrifuge tubes of four types shall conform to the requirements prescribed in Tables 2-4 and Figs. 2-5. The types shown fit into the metal shields supplied with commercially available centrifuges. Removal of the glass stoppers from the centrifuge tubes shown in Fig. 3 and Fig. 4 is advisable before centrifugation. The four types of centrifuge tubes specified are as follows:

4.1.1 Conical bottom, plain (Fig. 2).

4.1.2 Conical bottom, stoppered (Fig. 3).

4.1.3 Conical bottom, stoppered and graduated (Fig. 4).

4.1.4 Cylindrical bottom, plain (Fig. 5).

### 5. Sampling and Testing

5.1 Refer to Specification E 1157.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee E-41 on Laboratory Apparatus and is the direct responsibility of Subcommittee E41.07 on Microchemical Apparatus.

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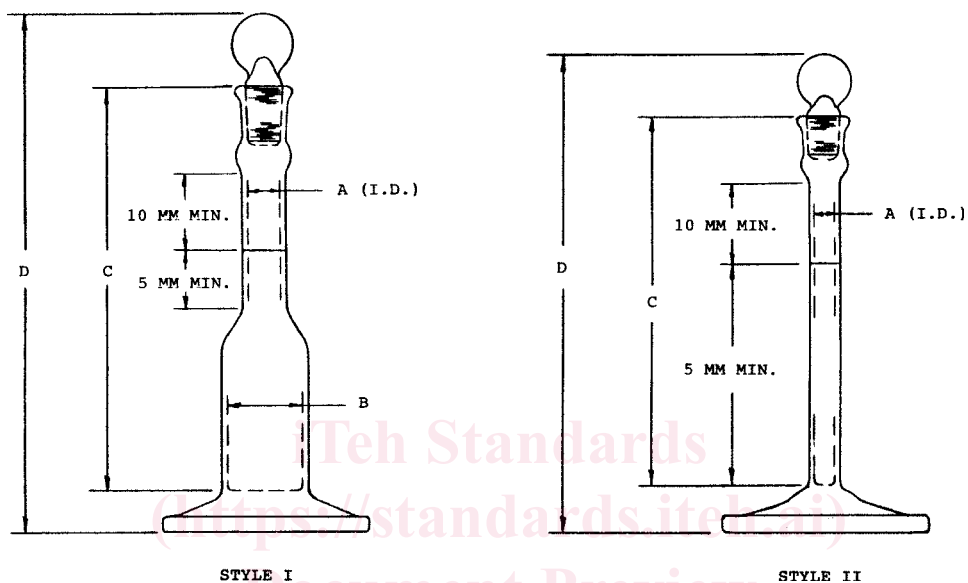
<sup>2</sup> This specification is under the jurisdiction of ASTM Committee E41 on Laboratory Apparatus and is the direct responsibility of Subcommittee E41.01 on Apparatus. Current edition approved Nov. 1, 2007. Published December 2007. Originally approved in 1964. Last previous edition approved in 2002 as E 237 - 02.

<sup>3</sup> Committee on Microchemical Apparatus, Division of Analytical Chemistry, American Chemical Society, "Report on Recommended Specifications for Microchemical Apparatus. Volumetric Glassware: Flasks, Pipets, and Centrifuge Tubes," *Analytical Chemistry*, Vol 28, 1956, p. 1993.

<sup>4</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards*, Vol 14.04, volume information, refer to the standard's Document Summary page on the ASTM website.

TABLE 1 Volumetric Flask (see Fig. 1)

Style	Capacity, mL	Class A/ Tolerance, ± mL	A, ID, max/mm	B, ID, ref/mm	C, max/mm	D, max/mm	Stopper No.
I	1	0.010	5.3	8.25	70	100	8
II	1	0.010	5.3	—	95	125	8
I	2	0.015	6.4	10.75	70	100	8
I	3	0.015	6.4	13.50	72	100	8
I	4	0.020	7.3	14.00	75	100	8
I	5	0.020	7.3	15.75	75	100	8
I	10	0.020	8.25	18.00	110	135	9
I	25	0.030	8.7	26.00	140	165	9



NOTE 1—The shape of the base may be either round or hexagonal  
**FIG. 1 Volumetric Flasks (see Table 1)**

TABLE 2 Centrifuge Tubes, Conical Bottom, Plain (see Fig. 2)

Nominal Capacity, mL	A, Height, mm	B, OD Cylindrical Portion, mm	C, OD Top Finish, mm	D, Length of Taper, mm	E, OD at Bottom, mm
0.5	58 ± 2	6.0 ± 0.25	13.0 ± 1.0	30 ± 2	3.5 ± 0.5
1	61 ± 2	8.25 ± 0.25	13.0 ± 1.0	30 ± 2	3.5 ± 0.5
2	66 ± 2	10.75 ± 0.25	13.5 ± 1.0	30 ± 2	4.0 ± 0.5
3	74 ± 2	10.75 ± 0.25	13.5 ± 1.0	30 ± 2	4.0 ± 0.5
5	101 ± 2	13.00 ± 0.50	16.25 ± 0.75	40 ± 2	4.0 ± 0.5

TABLE 3 Centrifuge Tubes, Conical Bottom, Stoppered (see Fig. 3)

Nominal Capacity, mL	A, Height, mm	B, OD Cylindrical Portion, mm	C, OD Top Finish, mm	D, Length of Taper, mm	E, OD at Bottom, mm	F, Stopper No.
0.5	66 ± 2	6.0 ± 0.25	13.0 ± 1.0	30 ± 2	3.5 ± 0.5	detail G
1	69 ± 2	8.25 ± 0.25	13.0 ± 1.0	30 ± 2	3.5 ± 0.5	detail H
2	80 ± 2	10.75 ± 0.25	13.5 ± 1.0	30 ± 2	4.0 ± 0.5	9
3	88 ± 2	10.75 ± 0.25	13.5 ± 1.0	30 ± 2	4.0 ± 0.5	9
5	115 ± 2	13.0 ± 0.50	13.5 ± 1.0	40 ± 2	4.0 ± 0.5	9

**6. Calibration**

6.1 Flasks and graduated tubes shall be calibrated in accordance with Practice E 542 and conform to applicable requirements of Specification E 694. Glass shall be Type I, Class A of Specification E 438 and annealing shall be in accordance with Specification E 671.

**7. Packaging**

7.1 Select from Specification E 920, Specification E 921, or Practice E 1133.