



Standard Specification for Laboratory Glass Volumetric Apparatus¹

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This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification covers general requirements common to glass volumetric apparatus. Specific dimensions and tolerances for applicable instruments are given in other specifications as cited throughout this specification. Glass must conform to Specifications E438 and be calibrated in accordance with Practice E542.

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

1.1.2 *Class B*—General purpose instruments are of the same basic design as Class A. However, volumetric tolerances for Class B instruments shall be within twice the specified range allowed for Class A unless otherwise specified.

2. Referenced Documents

2.1 ASTM Standards:²

- C188 Test Method for Density of Hydraulic Cement
- E237 Specification for Laboratory Glass Microvolumetric Vessels (Volumetric Flasks and Centrifuge Tubes)
- E287 Specification for Laboratory Glass Graduated Burets
- E288 Specification for Laboratory Glass Volumetric Flasks
- E438 Specification for Glasses in Laboratory Apparatus
- E542 Practice for Calibration of Laboratory Volumetric Apparatus
- E671 Specification for Maximum Permissible Thermal Residual Stress in Annealed Glass Laboratory Apparatus
- E675 Specification for Interchangeable Taper-Ground Stopcocks And Stoppers
- E676 Specification for Interchangeable Taper-Ground Joints
- E788 Specification for Pipet, Blood Diluting

- E911 Specification for Glass Stopcocks with Polytetrafluoroethylene (PTFE) Plugs
- E969 Specification for Glass Volumetric (Transfer) Pipets
- E1045 Specification for Pipet, Sahli Hemoglobin
- E1272 Specification for Laboratory Glass Graduated Cylinders
- E1878 Specification for Laboratory Glass Volumetric Flasks, Special Use

3. General Requirements

3.1 *Units of Volume*—The unit of volume shall be the cubic centimetre (cm^3) or, in special cases, the cubic decimetre (dm^3) or cubic millimetre (mm^3).

NOTE 1—The term millilitre (mL) is commonly used as a special name for the cubic centimetre (cm^3) and, similarly the litre for the cubic decimetre (dm^3) and the microlitre (μL) for the cubic millimetre (mm^3), in accordance with the International System of Units (SI).

3.2 *Standard Temperature*—The standard reference temperature, that is, the temperature at which the article of volumetric glassware is intended to contain or deliver its nominal volume (nominal capacity), shall be 20°C.

NOTE 2—When it is necessary in tropical countries to work at an ambient temperature considerably above 20°C, and it is not desired to use the standard reference temperature of 20°C, it is recommended that a temperature of 27°C be adopted.

3.3 *Material and Annealing*—Volumetric glassware shall be constructed of glass of suitable chemical and thermal properties. It shall be as free as possible from visible defects and shall conform to Specification E671.

3.4 *Limit of Error*—On an article having multiple graduation lines, the limit of volumetric error may occur at any graduation line unless otherwise specified. For example, on a 100-mL graduated cylinder having a limit of error of ± 1.00 mL, the volume at 10 mL could range from 9.00 to 11.00 mL.

3.5 *Stability*—Vessels provided with a flat base shall stand firmly thereon without rocking when placed on a level surface and, unless specified otherwise, the axis of the graduated portion of the vessel should be vertical. Except for special cases, vessels shall not topple when placed empty and without a stopper on a surface inclined at an angle to the horizontal of 15° for sizes 25 cm^3 or greater and 10° for vessels less than 25

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.

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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.