



Standard Specification for Glass Measuring Pipets¹

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1. Scope

1.1 This specification covers requirements for glass measuring pipets of precision and general purpose grades, used in measuring volumes of liquids.

2. Referenced Documents

2.1 ASTM Standards:

- E 438 Specification for Glasses in Laboratory Apparatus²
- E 542 Practice for Calibration of Volumetric Apparatus²
- E 671 Specification for Maximum Permissible Thermal Residual Stress in Annealed Glass Laboratory Apparatus²
- E 694 Specification for Volumetric Ware²
- E 920 Specification for Commercially Packaged Laboratory Apparatus²
- E 921 Specification for Export Packaged Laboratory Apparatus²
- E 1133 Practice for Performance Testing of Packaged Laboratory Apparatus United States Government Procurement²
- E 1157 Specification for Sampling and Testing Reusable Laboratory Glassware²
- E 1273 Specification for Color Coding of Reusable Laboratory Pipets²

3. Classification

3.1 *Style, Class and Capacity*—Pipets covered by this specification shall be of the following styles, classes, and capacities:

3.1.1 Style 1—Standard taper tip.

3.1.1.1 *Class A*—Each pipet of precision grade shall be marked with the letter “A” to signify compliance with applicable construction and accuracy requirements in Table 1. Each pipet may be marked with a permanent serial number at the option of the manufacturer.

3.1.1.2 *Class B*—General purpose pipets are of the same basic design as Class A pipets. Volumetric tolerances for Class B pipets shall be within twice the specified range allowed for Class A pipets. These pipets need not be marked with their

class designation or serial number. See Table 1 for tolerances and dimensional requirements.

3.1.2 Style 2—Long taper tip (Class B only).

3.1.3 Capacities, (mL)—0.1, 0.2, 0.5, 1, 2, 5, 10, 25, and 50.

4. Design

4.1 *Shape*—The pipets shall be straight and of one-piece construction. Any cross section of a pipet taken in a plane perpendicular to the longitudinal axis shall be circular.

4.2 *Delivery Tips*—Delivery tips of Style 1 pipets shall be made with a gradual taper of 15 to 30 mm for capacities up to 5 mL inclusive, and 20 to 40 mm for 10 to 50 mL capacity pipets. Style 2 pipets shall have a taper at a distance of 50 to 65 mm from the tip end. The end of the tip shall be perpendicular to the longitudinal axis of the pipet. A sudden constriction at the orifice shall not be acceptable. The outside edge of the tip shall be beveled slightly at the end, and the bevel shall be ground or firepolished.

4.3 *Zero Graduation Line Position*—The distance from the top end to the top graduation of all pipets (except for 0.5 mL pipets) shall be not less than 90 mm; for 0.5 mL pipets this distance shall be not less than 80 mm.

4.4 *Dimensions and Outflow Times*—The limiting dimensions and outflow times are shown in Table 1. Outflow times shall be determined on unplugged pipets using distilled water at $25 \pm 5^\circ\text{C}$ and by means of a stopwatch. Outflow time shall be determined by the unrestricted outflow of the water from the zero mark to base mark and until the water has ceased to flow.

4.5 *Markings*—All markings shall be permanent and legible.

4.5.1 *Graduation Markings*—Graduation lines shall not exceed 0.4 mm in thickness and shall be in a plane perpendicular to the vertical axis of the pipet. The lines and other markings shall be applied by one of the following methods: etched and filled with a permanent pigment; etched through a vertical colored stripe fused into the glass; by application of a stain fired into the glass without etching; or by application of an enamel fired onto the glass without etching.

4.5.1.1 *Style 1, Class A pipets*—Shall comply with the lengths of lines, numbering and Graduation Pattern 1 specified in Specification E 694.

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

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² *Annual Book of ASTM Standards*, Vol. 14.04.