



Designation: E 969 – 02

Standard Specification for Glass Volumetric (Transfer) Pipets¹

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

1. Scope

1.1 This specification covers volumetric pipets of two classes. Class A, Precision Pipet and Class B, General Purpose.

NOTE 1—Specifications for micropipets are given in Specification E 193.

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:

- E 193 Specification for Micropipets²
- E 438 Specification for Glasses in Laboratory Apparatus²
- E 542 Practice for Calibration of Volumetric Apparatus²
- E 694 Specification for Laboratory Volumetric Apparatus²
- 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 for United States Government Procurements²
- E 1157 Specification for the Sampling and Testing of Reusable Laboratory Glassware²

3. General Requirements

3.1 *Borosilicate Glass*—Borosilicate glass for pipets shall conform to the glass requirements of Type 1, Class A or B of Specification E 438.

3.2 *Calibration*—Pipets shall be calibrated to deliver (symbol TD) the intended capacity at 20°C. The pipet shall be filled about 20 mm above the capacity line. The water is lowered slowly to the capacity line. Delivery of the contents into a

receiving vessel is made with the tip in contact with the wall of the vessel and no after-drainage period is allowed. Accuracy shall be within the limits specified in Table 1.

4. Design

4.1 *Shape*—The pipets shall consist in general of a suction tube and a delivery tube separated by a bulb; all three parts shall be permanently attached together. Any cross-section of the pipet taken in a plane perpendicular to the longitudinal axis shall be circular. The shape shall permit complete emptying and thorough cleaning.

4.1.1 *Bulb*—The shape shall permit complete emptying without any hold up, and easy cleaning.

4.2 *Dimensions*—The length of the suction tube shall be 150 to 190 mm and the minimum wall thickness of both suction and delivery tubes shall be 0.90 mm. Pipets must comply with the essential dimensions given in Table 1.

4.3 *Delivery Tips*—Delivery tips shall be made with a gradual taper of 1.5 to 3 cm. The end of the tip shall be perpendicular to the longitudinal axis of the tip. The outside edge of the tip may be bevelled slightly and the end and the bevel shall be ground or fire-polished. Sudden constriction at the orifice would impair smooth flow characteristics of the delivery stream and is not acceptable.

4.3.1 *Tempered Tips*—May be supplied at option of manufacturer. The tempered tip, when tested in index oil which matches the refractive index of the glass being used, shall have a temper between 75 and 220 nm (millimicrons).

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

4.4.1 *Capacity Line*—The capacity line shall be a sharply defined line of uniform width (maximum 0.6 mm) in a plane perpendicular to the vertical axis of the pipet. The line 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. The line shall completely encircle the tube except when the line is a stain fired into the glass without etching. If so stained, the line shall extend a minimum of 90 % of the way around the tube.

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 *Annual Book of ASTM Standards*, Vol 14.04.