



Standard Test Method for Foam In Aqueous Media (Bottle Test)¹

This standard is issued under the fixed designation D3601; 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 test method covers the measurement of the increase in volume of a low-viscosity aqueous liquid (less than 3 cSt at 40°C) due to its tendency to foam under low shear conditions.

NOTE 1—Foam under high shear is covered by Test Method D3519 which uses a commercial blender.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific safety information, see 7.13.

2. Referenced Documents

2.1 *ASTM Standards*:²

D1126 Test Method for Hardness in Water

D3519 Test Method for Foam in Aqueous Media (Blender Test)

3. Summary of Test Method

3.1 The increase in volume is determined by the increase in total height of the test fluid, including foam, after vigorous shaking of the emulsion at $25 \pm 1^\circ\text{C}$ ($77 \pm 1.8^\circ\text{F}$).

NOTE 2—Water that is normally used to reduce the concentrate to a working consistency can be used. However, if this type of water is not desirable or available, two other types of water may be used to prepare the test liquid: (1) distilled water or (2) distilled water with a subsequent seeding of the test liquid with synthetic hard water.

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.L0.01 Metal Removal Fluids and Lubricants.

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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.



FIG. 1 Boston Round Bottle.

4. Significance and Use

4.1 The results obtained by this test method are useful as guides in determining the tendency of a water-based metalworking coolant to produce foam under low shear conditions. No correlation with changes in heat transfer, pumpability, or other factors affected by foam is intended. The foam generated by any given industrial process depends on the method by which the foam is generated and may not be directly proportional to that produced by this controlled laboratory test method. Further, the foam generated at the specified test temperature will not necessarily predict the foaming tendency of the liquid (that is, metalworking coolant) at some other use temperature.

5. Apparatus

5.1 *Water Bath*, constant-temperature, suitable to hold several bottled emulsions at $25 \pm 1^\circ\text{C}$ ($77 \pm 1.8^\circ\text{F}$) for 1 to 2 h.

NOTE 3—A common household dishpan is satisfactory when the test temperature is close to room temperature.

5.2 *Stop Watch or Timer*, capable of measuring $5 \text{ min} \pm 0.2 \text{ s}$.

5.3 *Bottles*, clean or new, clear glass, 16-oz (narrow mouth), with screw neck.³ The 16-oz bottle is $6\frac{1}{4}$ in. (169 mm) tall

³ 16-oz Round Packer, Brockway Glass Co., Mold No. 1094 or 16-oz Boston Round, as shown in Fig. 1 is suitable for this purpose. Bottle takes Cap No. 28. Standard Glass Container Series No. 80 specifies approximate weight of glass, etc., on drawing No. C-8010 obtainable from Glass Container Manufacturers' Institute Inc., 330 Madison Ave., New York, NY 10017.