



Standard Test Method for Foaming Tendencies of Engine Coolants in Glassware¹

This standard is issued under the fixed designation D 1881; 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.

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

1. Scope

1.1 This test method covers a simple glassware test for evaluating the tendency of engine coolants to foam under laboratory-controlled conditions of aeration and temperature.

1.2 *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.*

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are approximate equivalents provided for information purposes only.

2. Referenced Documents

2.1 ASTM Standards:

- D 1176 Test Method for Sampling and Preparing Aqueous Solutions of Engine Coolants or Antirusts for Testing Purposes²
- D 1193 Specification for Reagent Water³
- D 3585 Specification for ASTM Reference Fluid for Coolant Tests²
- E 1 Specification for ASTM Thermometers⁴
- E 128 Test Method for Maximum Pore Diameter and Permeability of Rigid Porous Filters for Laboratory Use⁵

3. Terminology

3.1 Definitions:

3.1.1 *break time, n*—the time required for the foam to collapse (after the air supply has been shut off) to the first appearance of an “eye” on the surface of the test solution.

3.1.2 *eye, n*—the appearance of foam free area on the surface of the test coolant surrounded by a ring of foam clinging to the cylinder walls.

4. Summary of Test Method

4.1 A solution of coolant and ASTM Type II water is blown

with air at a constant rate for 5 min, while maintained at a constant temperature of $88 \pm 1^\circ\text{C}$ ($190 \pm 2^\circ\text{F}$) by means of a suitable temperature bath. The volume of foam, and the time for such foam to break, are measured.

5. Significance and Use

5.1 The test method generally will distinguish coolants that have a tendency to foam excessively from those that are suitable for further evaluation to determine performance in actual service.

NOTE 1—In use, the foaming tendency of a coolant solution may be increased by service aging or contamination. A properly functioning pressure cap will tend to suppress foaming in coolant solutions.

6. Apparatus

6.1 *Container*—A 500-mL graduated container of heat-resistant glass, having a diameter of 45 to 50 mm and a length of 380 mm.

6.2 *Temperature Bath*—A heat resistant glass container large enough to permit immersion of the graduated container at least to the 350 mL graduation mark. A 4000-mL beaker is satisfactory.

6.3 *Heat Source*—Any heating system capable of maintaining a uniform bath temperature $\pm 1^\circ\text{C}$ ($\pm 2^\circ\text{F}$). A 750-watt electric hot-plate is satisfactory.

6.4 *Aerator Tube*—A 25.4-mm (1-in.) diameter spherical gas-diffuser stone⁶ made of fused crystalline alumina grain which meets the following specifications when tested in accordance with the method given in Annex A1:

Maximum pore diameter, μm	Not greater than 80
Permeability at a pressure of 2.45 kPa, mL of air/min	3000 to 6400

6.5 *Thermometer*—An ASTM Partial Immersion Thermometer having a range from -20 to $+150^\circ\text{C}$ (0 to 302°F) and conforming to the requirements for Thermometer 1F as prescribed in Specification E 1.

6.6 *Air Supply*—A clean and dry source, free from grease and other contaminants, capable of maintaining the prescribed flow rate through the diffuser stone.

6.7 *Timer*—A stop watch or suitable timing device, accurate to ± 0.2 s.

6.8 *Vent*—A three-way stopcock inserted in the metered air

¹ This test method is under the jurisdiction of ASTM Committee D-15 on Engine Coolants and is the direct responsibility of Subcommittee D15.06 on Glassware Performance Tests.

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² Annual Book of ASTM Standards, Vol 15.05.

³ Annual Book of ASTM Standards, Vol 11.01.

⁴ Annual Book of ASTM Standards, Vol 14.03.

⁵ Annual Book of ASTM Standards, Vol 14.02.

⁶ For information on aerator supplier and specifications contact ASTM Subcommittee D15.06 through ASTM Headquarters.