



Designation: D139 – 23

Standard Test Method for Float Test for Asphalt Materials¹

This standard is issued under the fixed designation D139; 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 float test for asphalt materials.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 **Warning**—Mercury has been designated by EPA and many state agencies as a hazardous material that can cause central nervous system, kidney, and liver damage. Mercury, or its vapor, may be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury-containing products. See the applicable product Material Safety Data Sheet (MSDS) for details and EPA's website (<http://www.epa.gov/mercury/faq.htm>) for additional information. Users should be aware that selling mercury or mercury-containing products, or both, in your state may be prohibited by state law.

1.4 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

C670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials
D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
D6997 Test Method for Distillation of Emulsified Asphalt
E1 Specification for ASTM Liquid-in-Glass Thermometers
E230/E230M Specification for Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples
E879 Specification for Thermistor Sensors for General Purpose and Laboratory Temperature Measurements
E1137/E1137M Specification for Industrial Platinum Resistance Thermometers

2.2 IEC Standards:³

IEC 60584 Thermocouples—Part 1: EMF Specifications and Tolerances
IEC 60751 Industrial Platinum Resistance Thermometers and Platinum Temperature Sensors

3. Summary of Test Method

3.1 A plug of asphalt is cast in a tapered collar. The assembled float and collar is then floated in the testing bath at the specified temperature. The time, in seconds, between placing the apparatus on the water and the water breaking through the material shall be taken as a measure of the consistency of the material under examination.

4. Significance and Use

4.1 The float test characterizes the flow behavior or consistency of certain asphalt materials.

4.2 This test method is useful in determining the consistency of asphalt as one element in establishing the uniformity of certain shipments or sources of supply.

¹ This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.44 on Rheological Tests.

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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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

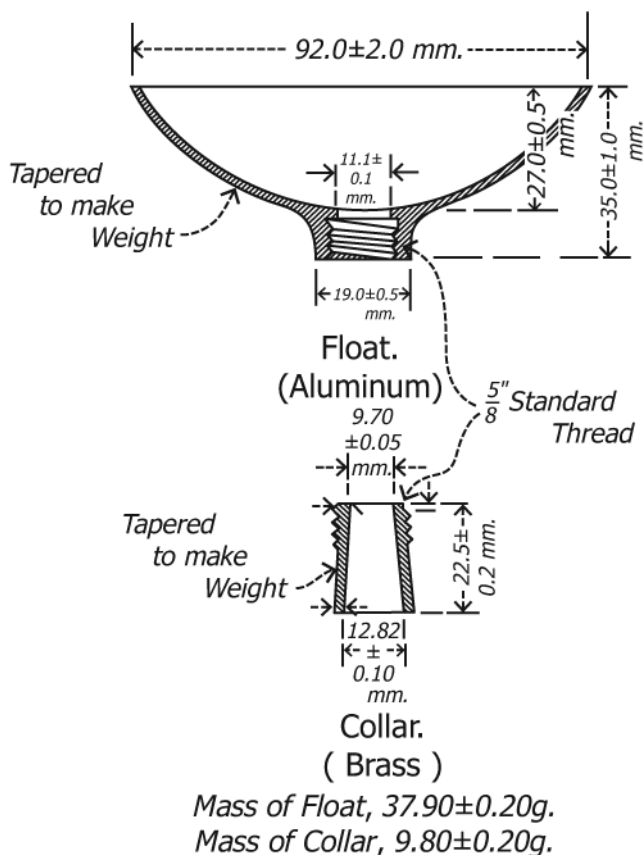


FIG. 1 Float Test Apparatus

NOTE 1—The quality of results produced by this standard is dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of Specification D3666 are generally considered capable of competent and objective testing, sampling, inspection, etc. Users of this standard are cautioned that compliance with Specification D3666 alone does not completely ensure reliable results. Reliable results depend on many factors; following the suggestions of Specification D3666 or some similar acceptable guidance provides a means of evaluating and controlling some of those factors.

5. Apparatus

5.1 *Float*—The float (Fig. 1) shall be made of aluminum or aluminum alloy and shall be in accordance with the following requirements:

	Min	Normal	Max
Mass of float, g	37.70	37.90	38.10
Total height of float, mm	34.0	35.0	36.0
Height of rim above lower side of shoulder, mm	26.5	27.0	27.5
Diameter of opening, mm	11.0	11.1	11.2

5.2 *Collar*—The collar (Fig. 1) shall be made of brass and shall be in accordance with the following requirements:

	Min	Normal	Max
Mass of collar, g	9.60	9.80	10.00
Overall height of collar, mm	22.3	22.5	22.7
Inside diameter at bottom, mm	12.72	12.82	12.92
Inside diameter at top, mm	9.65	9.70	9.75

The top of the collar shall screw up tightly against the lower side of the shoulder.

5.3 *Verification of Assembly*—The assembled float and collar, with the collar filled flush with asphalt and weighted to

an approximate total mass of 53.2 g, shall float upon water with the rim 8.5 ± 1.5 mm above the surface of the water. This adjustment of the total mass of the assembly is for the purpose of verifying the depth of immersion in the testing bath and shall be verified when a new float/collar set is placed into service.

NOTE 2—Sand or other similar materials may be added to the filled asphalt collar to achieve the total mass specified in 5.3.

5.4 *Thermometers*—Thermometers shall be used to measure temperature in the ranges of use and with accuracies as defined for each test parameter.

5.4.1 The thermometer for measuring the temperature of the water bath shall have a temperature range of at least 0 to 80 °C and an accuracy of ± 0.25 °C.

NOTE 3—Thermometer types suitable for use include Specification E1 mercury thermometers; Specification E879 thermistor thermometer; Specification E1137/E1137M Pt-100 RTD platinum resistance thermometer, Class A; or IEC 60751 Pt-100 RTD platinum resistance thermometer, Class AA.

5.4.2 The thermometer for measuring the temperature of the sample, per 6.4, shall have a temperature range of at least 0 to 260 °C and an accuracy of ± 1.0 °C.

NOTE 4—Thermometer types suitable for use include Specification E1 mercury thermometers; Specification E230/E230M thermocouple thermometer, Type T, Special Class; or IEC 60584 thermocouple thermometer, Type T, Class 1.

5.5 *Testing Bath*—A circular or rectangular bath of at least 150 mm in diameter or width respectively. The depth of the bath shall be at least 150 mm, allowing for the depth of the water to be at least 110 mm and the height of the surface of the bath above the water to be at least 40 mm. The bath shall be able to maintain the specified test temperature within ± 0.5 °C. A stand or other suitable support shall be available to hold the thermometer in the proper position (40 ± 2 mm) in the bath during the test as stated in 6.1.

5.6 *Water Bath at 5 °C*—A water bath of suitable dimensions to submerge the assembled float apparatus maintained at 5.0 ± 1.0 °C which may be accomplished by means of melting ice.

5.7 *Pouring Plate*—A flat, smooth metal plate.

5.8 *Release Agent*—Mixtures such as USP grade glycerin and USP grade talc, USP grade glycerin and kaolin (china clay), or a 1:100 mixture of resin and castor oil have been found acceptable for this purpose. The mixture shall be of such proportion that a thin coat can be readily brushed on the pouring plate. Other materials may be used for this purpose if they have been shown not to affect the physical properties of the test specimen.

5.9 *Trimming Tool*—A straight-edged putty knife or spatula wider than the specimen for trimming.

5.10 *Timing Device*—Readable to the nearest second.

6. Procedure

6.1 Heat the water in the testing bath to the temperature at which the test is to be made. This temperature shall not vary throughout the test more than 0.5 °C from the temperature specified, without stirring. Determine the temperature by