
Standard Method of Test for

Density of Solid Pitch and Asphalt (Displacement Method)

AASHTO Designation: T 229-97 (2000)

ASTM Designation: D 71-94 (1999)



AASHTO T 229-97 (2000) is identical to ASTM D 71-94 (1999) except for the following provisions:

1. All references to ASTM Standard D 140 contained in ASTM D 71-94 (1999) shall be replaced with AASHTO Standard T 40.
2. Add Section 6.2 to Section 6 of ASTM D 71-94 (1999) as follows:
6.2 Balance—A balance conforming to the requirements of M 231, Class B.
3. Add Note 2 to Section 9.2 of ASTM D 71-94 (1999) as follows:
Note 2—For the purpose of this test, distilled, demineralized, or deionized water may be used.



Designation: D 71 – 94 (Reapproved 1999)

Standard Test Method for Relative Density of Solid Pitch and Asphalt (Displacement Method)¹

This standard is issued under the fixed designation D 71; 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 the determination of relative density by water displacement of hard pitches and asphalts with softening points above 70°C.

1.2 The relative density of hard pitch and asphalt shall be determined, whenever possible, on homogeneous natural fragments free of cracks. The use of cast cubes is not recommended due to the difficulty of avoiding incorporation of air bubbles.

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.*

2. Referenced Documents

2.1 ASTM Standards:

- D 61 Test Method for Softening Point of Pitches (Cube-in-Water Method)²
- D 140 Practice for Sampling Bituminous Materials³
- D 4296 Practice for Sampling Pitch⁴

3. Terminology

3.1 Definition:

3.1.1 *relative density*—the ratio of a given volume of material at 25°C to the weight of an equal volume of water at the same temperature (specific gravity).

4. Summary of Test Method

4.1 The sample is suspended from a thin wire and weighed, first in air, then submerged in water at 25.0°C. The relative density is calculated from these weights.

5. Significance and Use

5.1 This test method is useful in characterizing pitches and asphalts as one element in establishing uniformity of shipments

and sources of supply.

6. Apparatus

6.1 *Pan Straddle*, suitable for use with an analytical balance.

6.2 *Analytical Balance*, equipped with a hook above the pan and capable of weighing a 20-g specimen to 1 mg.

6.3 *Water Bath*, maintained at $25.0 \pm 0.2^\circ\text{C}$ and provided with mechanical stirring/circulation.

6.4 *Thermometer*, capable of measuring water temperature of $25.0 \pm 0.2^\circ\text{C}$ (or other suitable temperature measuring instrument).

6.5 *Nichrome Wire*, 0.127-mm (5-mL) diameter or monofilament nylon fishing line of about the same diameter for attaching specimen to the balance pan hook.

7. Bulk Sampling

7.1 Samples from shipments shall be taken in accordance with Practice D 140 or D 4296, and shall be free of foreign substances. Thoroughly mix the sample before removing a representative portion for the determination.

8. Test Specimens

8.1 Select two fragments of the bulk sample weighing between 5 and 20 g each. Inspect the fragments carefully to ensure the use of specimens free of cracks and other surface defects.

8.2 If the nature of the material is such that specimens can be cast without incorporation of air bubbles, follow the preparation and casting directions in Test Method D 61. Cube molds measuring a minimum of 12.7 mm ($\frac{1}{2}$ in.) per side or larger can be used. Assemble the cube molds so that solid cubes with no perforations can be cast. A softening point cube mold base plate can be inverted to provide the required flat surface on which to assemble the cube mold before pouring.

9. Procedure

9.1 Tare the balance with a piece of 0.127-mm (5-mL) Nichrome wire or monofilament nylon line sufficiently long to reach from the hook on the pan support to the straddle when the latter is in position across the pan. Attach the test specimen to the wire or line so that it is suspended 20 to 30 mm above the straddle when the other end of the wire is attached to the hook.

¹ This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.05 on Industrial Pitches.

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² Annual Book of ASTM Standards, Vol 05.01.

³ Annual Book of ASTM Standards, Vol 04.03.

⁴ Annual Book of ASTM Standards, Vol 05.02.