



Standard Test Method for Softening Point of Pitches (Cube-in-Water Method)¹

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1. Scope

1.1 This test method covers the determination of the softening point of pitches below 176°F (80°C) by this method. Pitches of higher softening point should be tested by Test Method D 2319 or Test Method D 3104.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*

- D 140 Practice for Sampling Bituminous Materials²
- D 2319 Test Method for Softening Point of Pitch (Cube-in-Air Method)³
- D 3104 Test Method for Softening Point of Pitches (Mettler Softening Point Method)³
- E 1 Specification for ASTM Thermometers⁴

3. Summary of Test Method

3.1 Two cubes of pitch, supported on wire hooks, are heated at a controlled rate in water in a glass container. The softening point is defined as the mean of the temperatures at which the cubes sag downwards a distance of 25 mm.

4. Significance and Use

4.1 Pitch does not go through a solid-liquid phase change when heated, and therefore does not have a true melting point. As the temperature rises, pitch softens and becomes less viscous. The softening point is arbitrarily defined and must be established by a closely controlled method which must be carefully followed if test results are to be reproducible.

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

5. Apparatus

5.1 *Mold*—A mold suitable for forming two ½in. (12.7-mm) cubes of pitch, having cylindrical core pins 12 gage (2.05 mm) in diameter located in the base plate of the assembly to produce accurately centered suspension holes in the cubes. (See Fig. 1.)

5.2 *Hooks*—Two L-shaped hooks, made of 12-gage (2.05-mm) copper wire. The foot of the hook shall be 1 in. (25-mm) long and at a right angle to the upright portion for insertion into the center hole of the pitch cube.

5.3 *Container*—A glass vessel that can be heated, not less than 85 mm in diameter and 105 mm deep. (A standard 600-mL low-form beaker meets these requirements).

5.4 *Thermometer*—An ASTM Low Softening Point Thermometer having a range from 30 to 180°F (–2 to 80°C) and conforming to the requirements for Thermometer 15F (15C) as described in Specification E 1.

5.5 *Heat Source:*

5.5.1 *Electric Heater*—A hot plate or immersion heater provided with a variable transformer or other device suitable for regulating the temperature of the heating element.

5.5.2 *Gas Heater*—A bunsen-type burner, fitted with a chimney.

6. Sampling

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

6.2 If the presence of water is indicated by surface foam on heating, maintain the sample at a temperature of about 260°F (125°C) in an open container until the surface is free of foam. Take care not to overheat, and remove from the heat source as soon as the foam has subsided.

7. Test Specimens

7.1 Coat the inner surfaces and core pins of the mold very lightly with silicone oil or silicone grease. Form the pitch into truly shaped cubes either by pressing (7.2) or by pouring (7.4), the latter being preceded by melting (7.3) if the sample is solid. Use an excess of pitch in either case. Cool until firm and remove the surplus material by drawing the heated blade of a putty knife or spatula across the surface of the mold so that the cubes are pressed into the cavities. Then open the mold and

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² *Annual Book of ASTM Standards*, Vol 04.03.

³ *Annual Book of ASTM Standards*, Vol 05.01.

⁴ *Annual Book of ASTM Standards*, Vol 14.03.