



Designation: D61 – 15 (Reapproved 2019)

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

This standard is issued under the fixed designation D61; 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 determination of the softening point of pitches below 176 °F (80 °C). Pitches of higher softening point should be tested by Test Method [D2319](#) or Test Method [D3104](#).

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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

1.4 *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

[D140 Practice for Sampling Asphalt Materials](#)

[D2319 Test Method for Softening Point of Pitch \(Cube-in-Air Method\)](#)

[D3104 Test Method for Softening Point of Pitches \(Mettler Softening Point Method\)](#)

[E1 Specification for ASTM Liquid-in-Glass Thermometers](#)

[E563 Practice for Preparation and Use of an Ice-Point Bath as a Reference Temperature](#)

[E1137 Specification for Industrial Platinum Resistance Thermometers](#)

¹ This test method is under the jurisdiction of ASTM Committee [D02](#) on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee [D02.05](#) on Properties of Fuels, Petroleum Coke and Carbon Material.

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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.

[E2251 Specification for Liquid-in-Glass ASTM Thermometers with Low-Hazard Precision Liquids](#)
[E2877 Guide for Digital Contact Thermometers](#)

3. Terminology

3.1 *Definitions:*

3.1.1 *Digital Contact Thermometer (DCT), n*—an electronic device consisting of a digital display and associated temperature sensing probe.

3.1.1.1 *Discussion*—This device consists of a temperature sensor connected to a measuring instrument; this instrument measures the temperature-dependent quantity of the sensor, computes the temperature from the measured quantity, and provides a digital output or display, or both, of the temperature. The temperature sensing probe is in contact with the material whose temperature is being measured. This device is sometimes referred to as a *digital thermometer*.

NOTE 1—Portable electronic thermometers (PET) is an acronym sometimes used to refer to a subset of the devices covered by this definition.

4. Summary of Test Method

4.1 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.

5. Significance and Use

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

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

6. Apparatus

6.1 *Mold*—A mold suitable for forming two ½ in. (12.7 mm) cubes of pitch, having cylindrical core pins 12 gauge (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](#).)

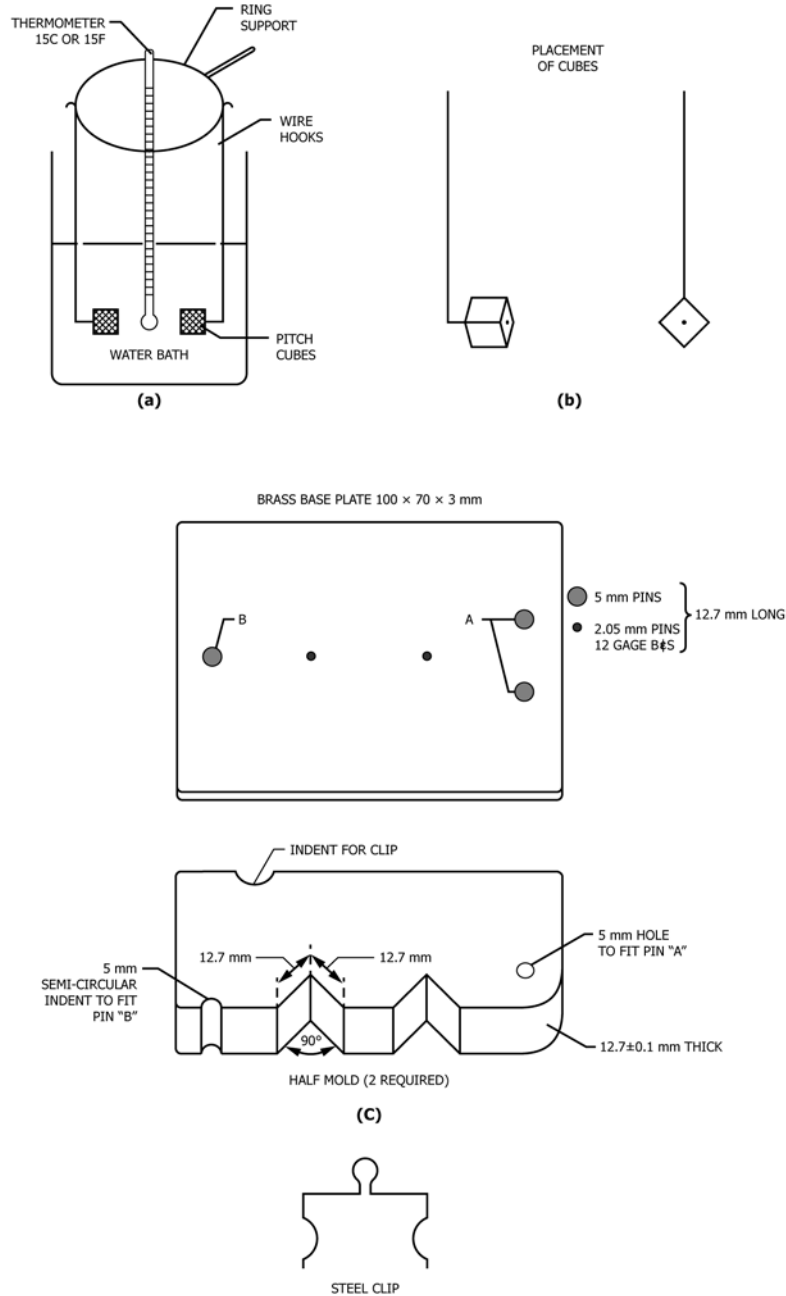


FIG. 1 Apparatus for Cube-in-Water Method

6.2 *Hooks*—Two L-shaped hooks, made of 12 gauge (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.

6.3 *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).

6.4 *Temperature Measuring Device*—Use either a calibrated DCT meeting the requirements described in 6.4.1 or liquid-in-

glass thermometers described in 6.4.2. A DCT or calibrated liquid-in-glass thermometer shall be used as the thermometer for temperature measurement independent of the instrument's temperature control, and shall be located in the thermowell.

NOTE 2—The display device and sensor must be correctly paired. Incorrect pairing will result in temperature measurement errors and possibly irreversible damage to the electronics of the display.