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An American National Standard
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Standard Test Method for Cone Penetration of Petrolatum¹

This standard is issued under the fixed designation D 937; 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 test method was adopted as a joint ASTM-IP Standard in 1965.

This test method has been adopted for use by government agencies to replace Method 312 of Federal Test Method Standard No. 791b, and Method 4273 of Federal Test Method Standard No. 141A.

1. Scope

1.1 This test method covers measuring with a penetrometer the penetration of petrolatum as an empirical measure of consistency.

1.2 The values stated in SI units are to be regarded as the standard. The values in parentheses are for information only.

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 217 Test Methods for Cone Penetration of Lubricating Grease²

3. Terminology

3.1 Definitions:

3.2 *penetration of petrolatum*—the depth, in tenths of a millimetre, that a standard cone will penetrate the sample under fixed conditions of mass, time, and temperature.

3.3 *penetrometer, n*—an instrument that measures the consistency or hardness of semiliquid to semisolid materials by measuring the depth to which a specified cone or needle under a given force falls into the material.

3.3.1 *Discussion*—In this test method, a standard penetrometer cone (see Test Methods D 217) is used to determine the consistency of petrolatum. The penetration force is determined by the total mass of the cone and shaft.

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 D 02.10 on Properties of Petroleum Wax.

In the IP, this test method is under the jurisdiction of the Standardization Committee.

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² *Annual Book of ASTM Standards*, Vol 05.01.

4. Summary of Test Method

4.1 The sample is melted, heated to 82°C (180°F), and then cooled under controlled conditions to 25°C (77°F). The penetration is measured with the cone and the sample at this temperature using a penetrometer by means of which a standard cone is applied to the sample for 5 s under a load of 150 g.

5. Significance and Use

5.1 Petrolatum is a purified mixture of semi-solid hydrocarbons obtained from petroleum and is often described as an unctuous mass. Cone penetration is a means of measuring the firmness or consistency of petrolatum. Such measurements are useful for selecting or specifying, or both, a petrolatum of a particular consistency or firmness. Cone penetration values may or may not correlate with end-use functional properties.

6. Apparatus

6.1 *Penetrometer and Cone*, as specified in Test Method D 217.

6.2 *Oven*, capable of maintaining a temperature of $82 \pm 2^\circ\text{C}$ ($180 \pm 5^\circ\text{F}$) for melting the petrolatum samples.

6.3 *Water Bath*, constant-temperature, regulated to $25 \pm 0.5^\circ\text{C}$ ($77 \pm 1^\circ\text{F}$).

6.4 *Sample Containers*, cylindrical, having a flat bottom 100 ± 6 mm ($4 \pm \frac{1}{4}$ in.) in diameter and 65 mm ($2\frac{1}{2}$ in.) or more in depth, constructed of at least 1.6-mm (16-gage) metal and provided with a well fitting water-tight cover.

NOTE 1—Containers of the “ointment box” type having somewhat flexible sides should not be used, for these permit slight working of the petrolatum, due to flexing of the sides in handling.

7. Preparation of Sample

7.1 Test all samples of petrolatum for original consistency after melting and cooling to the temperature of the test as described in 7.3.

7.2 If the penetration of the sample is over 200, three separate test samples are required.