



Standard Test Methods for Softening Point of Resins Derived from Pine Chemicals and Hydrocarbons, by Ring-and-Ball Apparatus¹

This standard is issued under the fixed designation E28; 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 U.S. Department of Defense.

1. Scope

1.1 These test methods are intended for determining the softening point of resins (including rosin and terpene resins) and similar materials by means of the ring-and-ball apparatus.

NOTE 1—For testing asphalts, tars, and pitches, see Test Method D36.

1.1.1 Test method using the automated ring and ball softening point apparatus is the reference method and

1.1.2 Test method using the manual ring and ball softening point apparatus is an alternative method.

1.2 The values stated in SI units are to be regarded as the standard. The values given 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:²

D36 Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)

E1 Specification for ASTM Liquid-in-Glass Thermometers

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Significance and Use

3.1 In general, with materials of these types, softening does not take place at a definite temperature. As the temperature

rises, these materials gradually change from brittle or exceedingly thick and slow-flowing materials to softer and less viscous liquids. For this reason, the determination of the softening point must be made by a fixed, arbitrary, and closely defined method if the results obtained are to be comparable.

3.2 In these test methods, the softening point is defined as the temperature at which a disk of the sample held within a horizontal ring is forced downward a distance of 25.4 mm (1 in.) under the weight of a steel ball as the sample is heated at 5°C/min in a water, glycerin, silicone oil, ethylene glycol/water or glycerin/water bath.

3.3 The automatic method was chosen to be the reference method because a round robin demonstrated that it gave more precise results than the manual method.

4. Sample Preparation

4.1 Preparation of Sample by the Pour Method:

4.1.1 This procedure is suitable for materials that can be heated and poured without adverse effects on the softening point.

4.1.2 Select a sample representative of the material to be tested. The sample should consist of flakes, pastilles, or freshly broken lumps free of oxidized surfaces. Avoid inclusion of finely divided material or dust.

4.1.3 Select a quantity at least twice that necessary to fill the desired number of rings, and melt it immediately in a clean container, using an oven, hot plate, sand bath or oil bath to prevent local overheating. Take care to avoid incorporating air bubbles in the sample. Melt the sample completely, but do not heat it above a temperature necessary to pour the material readily. The time from the beginning of heating to the pouring of the sample should not exceed 15 min.

NOTE 2—For materials that may be heat sensitive, continuously inert the flask containing the test specimen with nitrogen (N_2) during the remelting procedure.

4.1.4 For materials that tend to crack or shrink in the ring on cooling, immediately before filling the ring, preheat the ring to approximately the temperature at which the material is to be poured. The ring, while being filled, should rest bottom down on a suitable metal surface. Pour the sample into the ring so as

¹ These test methods are under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D01.34 on Pine Chemicals and Hydrocarbon Resins.

Current edition approved July 1, 2014. Published August 2014. Originally approved in 1936. Last previous edition approved in 2009 as E28 – 99 (2009). DOI: 10.1520/E0028-14.

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.