



## Standard Test Method for Shear Viscosity of Coal-Tar and Petroleum Pitches<sup>1</sup>

This standard is issued under the fixed designation D5018; 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.

---

<sup>ε1</sup> NOTE—SI units formatting was corrected editorially in May 2015.

---

### 1. Scope

1.1 This test method covers the determination of the apparent shear viscosity of coal-tar and petroleum-based pitches having a Mettler softening point (SP) range of approximately 95 °C to 120 °C.

1.2 This test method is applicable only for rotational viscometers.

1.3 Since this test method is based on theoretical grounds, strict adherence to details of the procedure is necessary to comply with the theoretical requirements.

1.4 The values stated in SI units are to be regarded as standard.

1.4.1 *Exception*—The values stated in conventional units (centipoise) are to be regarded as the standard for viscosity measurement only. The SI unit is the pascal second (Pa·s) and one millipascal second (mPa·s) = one centipoise (cps); centipoise is in cgs units.

1.5 *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.* Specific hazard statements are given in Section 7.

---

<sup>1</sup> 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.

Current edition approved April 1, 2015. Published May 2015. Originally approved in 1989. Last previous edition approved in 2009 as D5018 – 89 (2009). DOI: 10.1520/D5018-89R15E01.

### 2. Referenced Documents

2.1 *ASTM Standards*:<sup>2</sup>

D4296 Practice for Sampling Pitch

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

### 3. Summary of Test Method

3.1 The viscosity of a pitch, over the temperature range of about 40 °C to 100 °C above the SP of the material, is determined using a rotational viscometer.

3.2 The recommended specifications herein are for measuring the apparent shear viscosity of binder pitches via a concentric cylinder viscometer. Apparent shear viscosity is the ratio of shear stress to shear rate in a unidirectional simple shear flow field at steady state conditions. A concentric cylinder viscometer is useful for measuring the apparent shear viscosity, provided the sample temperature is adequately controlled, the “end-effects” are negligible, and the gap between rotor/cup is small and remains constant during the test. The extrapolated value of apparent shear viscosity at “zero” shear rate is called shear viscosity.

### 4. Significance and Use

4.1 This test method is useful as one element in establishing the uniformity of shipments.

4.2 Viscosity is also valuable for rheological characterization of binder pitches. Binder pitch imparts consistency to

---

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.