



Designation: D4989/D4989M – 90a (Reapproved 2021)

Standard Test Method for Apparent Viscosity (Flow) of Roofing Bitumens Using the Parallel Plate Plastometer¹

This standard is issued under the fixed designation D4989/D4989M; 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 measurement of apparent viscosity of roofing bitumen by means of a parallel plate plastometer. This test method is applicable for a viscosity range from 10^2 to 10^9 Pa·s [10^3 to 10^{10} poises]. See **Note 1**.

NOTE 1—This relatively simple test method of measuring viscosity uses predetermined, arbitrary shear stress levels. Since roofing bitumens are non-Newtonian, other viscosity test methods may give different results.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the 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/D140M Practice for Sampling Asphalt Materials
D312/D312M Specification for Asphalt Used in Roofing
D450/D450M Specification for Coal-Tar Pitch Used in

¹ This test method is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.03 on Surfacing and Bituminous Materials for Membrane Waterproofing and Built-up Roofing.

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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.

Roofing, Dampproofing, and Waterproofing

D2171/D2171M Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer

D3205 Test Method for Viscosity of Asphalt with Cone and Plate Viscometer (Withdrawn 2000)³

3. Terminology

3.1 **Definitions**—See definitions of viscosity given in Test Methods **D2171/D2171M** and **D3205**.

4. Summary of Test Method

4.1 The sample is molded into a disc of specified dimensions, heated to the selected temperature, placed between the plates of the pre-heated apparatus, and pressed under standard conditions for a measured time. The apparent viscosity is calculated from the final diameter of the pressed specimen disc.

5. Apparatus

5.1 **Parallel Plate Plastometer**—A modified form of Williams' plastometer as shown in **Figs. 1 and 2**. Mass of Platen A is 5000 ± 50 g [11.02 ± 0.11 lb].

5.2 **Ring Molds**, with an inside diameter of 25.40 ± 0.01 mm [1.0000 ± 0.0025 in.] and a height of 12.70 ± 0.01 mm [0.5000 ± 0.0025 in.] cut from copper or brass tubing.

5.3 **Constant-Temperature Oven**, capable of maintaining test temperature within ± 0.1 °C [± 0.2 °F].

5.4 **Scale**, linearly graduated in millimeters over at least 150 mm [6 in.] and accurate to ± 0.5 mm [± 0.02 in.].

6. Sampling

6.1 Sample the material to be tested in accordance with Practice **D140/D140M**.

7. Test Specimens

7.1 Prepare two molds by coating with a pasty mixture of talc in glycerine as a mold release agent. Coat all surfaces of

³ The last approved version of this historical standard is referenced on www.astm.org.