



Standard Test Method for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer¹

This standard is issued under the fixed designation D7175; 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 dynamic shear modulus and phase angle of asphalt binders when tested in dynamic (oscillatory) shear using parallel plate geometry. It is applicable to asphalt binders having dynamic shear modulus values in the range from 100 Pa to 10 MPa. This range in modulus is typically obtained between 4 and 88°C at 10 rad/s. This test method is intended for determining the linear viscoelastic properties of asphalt binders as required for specification testing and is not intended as a comprehensive procedure for the full characterization of the viscoelastic properties of asphalt binders.

1.2 This standard is appropriate for unaged materials, material aged in accordance with Test Method D2872, material aged in accordance with Practice D6521, or material aged in accordance with both Test Method D2872 and Practice D6521. This procedure is limited to asphalt binders that contain particles with largest dimension less than 250 μm .

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard may involve hazardous materials, operations, and equipment. 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

C670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials

¹ This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.44 on Rheological Tests.

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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.

D140 Practice for Sampling Bituminous Materials

D2170 Test Method for Kinematic Viscosity of Asphalts (Bitumens)

D2171 Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer

D2872 Test Method for Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)

D6373 Specification for Performance Graded Asphalt Binder

D6521 Practice for Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)

E77 Test Method for Inspection and Verification of Thermometers

E563 Practice for Preparation and Use of an Ice-Point Bath as a Reference Temperature

E644 Test Methods for Testing Industrial Resistance Thermometers

E882 Guide for Accountability and Quality Control in the Chemical Analysis Laboratory

2.2 AASHTO Standards:³

M320 Standard Specification for Performance-Graded Asphalt Binder

R29 Practice for Grading or Verifying the Performance Grade of an Asphalt Binder

T315 Standard Test Method for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer

2.3 Deutsche Industrie Norm (DIN) Standard:⁴

43760 Standard for Calibration of Thermocouples

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *annealing, n*—the process of removing the effects of steric hardening by heating the binder until it is sufficiently fluid so that it can be easily poured.

³ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, <http://www.transportation.org>.

⁴ Available from Beuth Verlag GmbH (DIN-- DIN Deutsches Institut für Normung e.V.), Burggrafenstrasse 6, 10787, Berlin, Germany, <http://www.en.din.de>.