



Designation: D4957 – 18

Standard Test Method for Apparent Viscosity of Asphalt Emulsion Residues and Non-Newtonian Asphalts by Vacuum Capillary Viscometer¹

This standard is issued under the fixed designation D4957; 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 describes procedures primarily designed to determine the apparent viscosities of residues obtained by distilling asphalt emulsions according to Test Method [D6997](#). It is also recommended for use on non-Newtonian asphalts at any temperature within the capability of the apparatus. This test method is useful in characterizing rheological properties of non-Newtonian asphalts as a function of shear rate under the conditions of the test method. This test is run in straight open-end tube viscometers, normally at 60 °C, but is suitable for use at other temperatures. It is applicable over the range from 5 to 50 000 Pa·s.

NOTE 1—The precision for this test method is based on determinations made at 60 °C.

1.2 The values stated in SI units are to be regarded as the standard, except in reference to viscometer constant or calibration factor (K).

1.3 **Warning**—Mercury has been designated by the United States Environmental Protection Agency (EPA) and many state agencies as a hazardous material that can cause central nervous system, kidney, and liver damage. Mercury or its vapor may be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury-containing products. See the applicable product Material Safety Data Sheets (MSDS) for details and the EPA's website (www.epa.gov/mercury/faq.htm) for additional information. Users should be aware that selling mercury, mercury-containing products, or both, in your state may be prohibited by state law.

1.4 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.6 *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

[D2171](#) Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer

[D3666](#) Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

[D6997](#) Test Method for Distillation of Emulsified Asphalt

[E1](#) Specification for ASTM Liquid-in-Glass Thermometers

[E77](#) Test Method for Inspection and Verification of Thermometers

[E644](#) Test Methods for Testing Industrial Resistance Thermometers

[E1137/E1137M](#) Specification for Industrial Platinum Resistance Thermometers

[E2251](#) Specification for Liquid-in-Glass ASTM Thermometers with Low-Hazard Precision Liquids

3. Terminology

3.1 Definitions:

3.1.1 *apparent viscosity*—the determined viscosity obtained by the test method under description. Viscosity is the resistance to deformation or internal friction of a liquid expressed as the ratio of the shear stress to shear rate, whether this ratio is constant or not. The unit of viscosity obtained by dividing the shearing stress in N/m² by the rate of shear in reciprocal seconds is called the pascal second (Pa·s). The English unit of viscosity is the poise (P) with dimensions of 0.1N·s/m² (dynes/cm²/s), and is equivalent to 0.1 Pa·s.

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.