Designation: D2556 – 14 (Reapproved 2018)

Standard Test Method for Apparent Viscosity of Adhesives Having Shear-Rate-Dependent Flow Properties Using Rotational Viscometry[1]

This standard is issued under the fixed designation D2556; 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 This test method covers the measurement of the apparent viscosity of shear-rate-dependent adhesives using a rotational viscometer.

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

D907 Terminology of Adhesives

3. Terminology

3.1 *Definitions:*

3.1.1 Many terms in this test method are defined in Terminology D907.

3.1.2 *Newtonian behavior, n*—the property of a liquid in which its viscosity is constant over a stated range of strain rates. (Compare *non-Newtonian behavior*.)

3.1.3 *non-Newtonian behavior, n*—the property of a liquid in which its viscosity is not constant over a stated range of strain rates.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *apparent viscosity, n*—resistance to shear at a given rate of shear, expressed as viscosity in mPa·s.

NOTE 1—The SI unit of mPa·s is equivalent to cP.

3.2.2 *thixotropic index, n*—the ratio of apparent viscosities at two rotational speeds.

4. Significance and Use

4.1 The principle of measurement is based upon a reversible isothermal change in apparent viscosity with change in rate of shear produced by a change in rotational speed.

4.2 Measurement is performed with a rotational viscometer under standardized conditions with rigid control of the time intervals of measurement. Viscosity readings are obtained at the end of 1 min for each rotational speed. Changes from the lowest speed to the highest speed, and return to the lowest speed, are made without stopping the instrument.

5. Apparatus

5.1 *Rotational Viscometer*—The essential instrumentation required providing the minimum rotational viscometer analytical capabilities include:

5.1.1 A *drive* motor, to apply a unidirection rotational displacement to the specimen at a rate of 0.2 revolutions per minute to 60 rev/min constant to within ±1%.

5.1.2 A *force sensor* to measure the torque developed by the specimen to within ±1%.

5.1.3 A *coupling* shaft or other means to transmit the rotational displacement from the motor to the specimen.

5.1.4 A *spindle, geometry, tool, or rotational element* to fix the specimen between the drive shaft and a stationary position.

NOTE 2—Each rotational element typically covers a range of 1.5 decades of viscosity. The rotational element may be a spindle, disk, T-bar, coaxial cylinder of other configuration selected by mutual agreement among the parties involved.

NOTE 3—Do not use a scored, warped, or otherwise damaged rotational element.

[1] This test method is under the jurisdiction of ASTM Committee D14 on Adhesives and is the direct responsibility of Subcommittee D14.10 on Working Properties.

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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.