



Designation: D8162 – 20a

Standard Test Method for Determination of the Apparent Viscosity of Thermoplastic Pavement Marking Materials using a Rotational Viscometer with Temperature Control Heating Unit¹

This standard is issued under the fixed designation D8162; 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 sample preparation and testing procedure needed to determine the apparent viscosity of a thermoplastic pavement marking formulation at elevated temperatures to the specimen.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are customary units and are provided as a courtesy to the user.

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

D883 Terminology Relating to Plastics

D7307 Practice for Sampling of Thermoplastic Traffic Marking Materials

D7308 Practice for Sample Preparation of Thermoplastic Pavement Marking Materials

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E284 Terminology of Appearance

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.44 on Traffic Coatings.

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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.

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

E2975 Test Method for Calibration or Calibration Verification of Concentric Cylinder Rotational Viscometers

3. Terminology

3.1 The terms and definitions in Terminology D883 and Terminology E284 apply to this test method.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *apparent viscosity, n* —the viscosity determined by this test method can be expressed in millipascal seconds, Centipoise, and Poise. Common viscosity units of Poise (P) are related to the SI units by the equivalency 1 cP = 1 mPa·s.

3.2.1.1 *Discussion*—An apparent viscosity value may vary with the spindle and rotational speed elected for measuring non-Newtonian materials.

3.2.2 *thermoplastic pavement marking (material), n* —a highly filled 100 % total solids highway marking system that when heated to a molten state can be extruded or sprayed onto a road surface. Retroreflective optics are applied (dropped on) to the surface of the molten marking immediately after application to provide, when cooled, a solid durable delineator or thermoplastic pavement marking usually melted to ~218°C (425°F)

3.2.3 *viscosity, n* —the ratio of shear stress to shear rate.

3.2.3.1 *Discussion*—The viscosity of a liquid is a measure of the resistance to flow of the liquid. The SI unit of dynamic viscosity is the pascal second. For a Newtonian liquid, the viscosity is constant at all shear rates. For a non-Newtonian liquid, viscosity will vary depending on shear rate.

4. Summary of Test Method

4.1 This viscosity method is used to determine the apparent viscosity of thermoplastic pavement marking products at elevated temperatures. Apparent viscosity is determined under temperature equilibrium conditions using a rotating spindle type viscometer. The torque on a spindle rotating in a temperature-controlled sample holder containing a small amount of sample is used to measure the relative resistance to