



Standard Practice for Dilute Solution Viscosity of Polymers¹

This standard is issued under the fixed designation D2857; 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 practice covers the determination of the dilute solution viscosity of polymers. There are several ASTM standards (Test Methods [D789](#), [D1243](#), [D1601](#), and [D4603](#), and Practice [D3591](#)) that describe dilute solution viscosity procedures for specific polymers, such as nylon, poly(vinyl chloride), polyethylene, and poly(ethylene terephthalate). This practice is written to augment these standards when problems arise with which the specific procedure is not concerned, or when no standard is available for the polymer under investigation.

1.2 This practice is applicable to all polymers that dissolve completely without chemical reaction or degradation to form solutions that are stable with time at a temperature between ambient and 150°C. Results are usually expressed as relative viscosity (viscosity ratio), inherent viscosity (logarithmic viscosity number), or intrinsic viscosity (limiting viscosity number) (see [3.1](#)).

1.3 For polyamides, relative viscosity values by this procedure are not equivalent to those determined by Test Methods [D789](#).

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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 and health practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—This standard and ISO 1628, “Plastics—Determination of Viscosity Number and Limiting Viscosity Number,” are technically equivalent.

¹ This practice is under the jurisdiction of ASTM Committee [D20](#) on Plastics and is the direct responsibility of Subcommittee [D20.70](#) on Analytical Methods.

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2. Referenced Documents

2.1 ASTM Standards:²

- [D445](#) Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
- [D446](#) Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers
- [D789](#) Test Methods for Determination of Solution Viscosities of Polyamide (PA)
- [D883](#) Terminology Relating to Plastics
- [D1243](#) Test Method for Dilute Solution Viscosity of Vinyl Chloride Polymers
- [D1600](#) Terminology for Abbreviated Terms Relating to Plastics
- [D1601](#) Test Method for Dilute Solution Viscosity of Ethylene Polymers
- [D3591](#) Test Method for Determining Logarithmic Viscosity Number of Poly(Vinyl Chloride) (PVC) in Formulated Compounds
- [D4603](#) Test Method for Determining Inherent Viscosity of Poly(Ethylene Terephthalate) (PET) by Glass Capillary Viscometer
- [D5226](#) Practice for Dissolving Polymer Materials
- [E1](#) Specification for ASTM Liquid-in-Glass Thermometers

2.2 ISO Standard:

- [1628/1](#) Guidelines for the Standardization of Methods for the Determination of Viscosity Number and Limiting Viscosity Number of Polymers in Dilute Solution³

2.3 National Institute of Standards and Technology Document:

- [Circular No. C602](#) Testing of Glass Volumetric Apparatus⁴

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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, <http://www.nist.gov>.