



Standard Test Method for Dilute Solution Viscosity of Vinyl Chloride Polymers¹

This standard is issued under the fixed designation D 1243; 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 dilute solution viscosity of vinyl chloride polymers in cyclohexanone. The viscosity is expressed in terms of inherent viscosity (logarithmic viscosity number). The test method is limited to those materials that give clear, uniform solutions at the test dilution.

NOTE 1—Other expressions for viscosity may be used as described in the Appendix, but any change from the test method as specified shall be stated in the report.

1.2 The values stated in SI units are to be regarded as the 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 and health practices and determine the applicability of regulatory limitations prior to use.*

NOTE 2—Although this test method and ISO 1628-2-1988 differ in approach or detail, data obtained by either are technically equivalent.

2. Referenced Documents

2.1 ASTM Standards:

- D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)²
- D 883 Terminology Relating to Plastics²
- D 1600 Terminology for Abbreviated Terms Relating to Plastics³
- D 1755 Specification for Poly(Vinyl Chloride) Resins³
- D 2857 Test Method for Dilute Solution Viscosity of Polymers⁴
- E 77 Method for Verification and Calibration of Liquid-in-Glass Thermometers⁵

2.2 ISO Standard:

¹ This test method is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials (Section D20.15.07).

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This edition contains changes in Sections 1 and 2 to include an ISO equivalency statement.

² *Annual Book of ASTM Standards*, Vols 05.01 and 10.03.

³ *Annual Book of ASTM Standards*, Vol 08.01.

⁴ *Annual Book of ASTM Standards*, Vol 08.02.

⁵ *Annual Book of ASTM Standards*, Vol 14.03.

ISO 1628-2-1988 Determination of Viscosity Number and Limiting Viscosity Number—Part 2: Poly(Vinyl Chloride) Resins⁶

2.3 *National Institute of Standards and Technology Circular*:⁷

C-434 Testing of Glass Volumetric Apparatus

3. Terminology

3.1 *Definitions*: Definitions are in accordance with Terminology D 883 and Terminology D 1600, unless otherwise indicated.

4. Summary of Test Method

4.1 A sample of resin is dissolved in cyclohexanone to make a solution of specified concentration. Inherent viscosity (logarithmic viscosity number) is calculated from the measured flow times of the solvent and of the polymer solution.

NOTE 3—For additional information, refer to Test Method D 445 and Test Method D 2857 for Dilute Solution Viscosity of Polymers.³

5. Significance and Use

5.1 Dilute solution viscosity values for vinyl chloride polymers are related to the average molecular size of that portion of the polymer that dissolves in the solvent.

6. Apparatus

6.1 *Transfer Pipets*.

6.2 *Volumetric Flasks*, 100-mL, glass-stoppered, in accordance with National Institute of Standards and Technology Circular C-434.

6.3 *Viscometer*, Ubbelohde Series U-1 or Cannon-Ubbelohde No. 75.

6.4 *Water Bath*, at $30 \pm 0.5^\circ\text{C}$, controlled to within $\pm 0.01^\circ\text{C}$.

6.5 *Timer*, as specified in Test Method D 445, graduated in divisions of 0.1 s or less.

6.6 *Filter Funnel*, fritted-glass.⁸

6.7 *Thermometer*, standard, in accordance with Method E 77.

⁶ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁷ Available from National Institute of Standards and Technology, U. S. Dept. of Commerce, Washington, DC 20234.

⁸ Filters may be obtained from Corning Glass, No. 36060 "Coarse" type.