



Standard Test Method for Apparent Viscosity of Plastisols and Organosols at High Shear Rates by Extrusion Viscometer¹

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1. Scope

1.1 This test method covers the measurement of plastisol and organosol viscosity at high shear rates by means of an extrusion viscometer.

1.2 Apparent viscosity at low shear rates is covered in Test Method D 1824.

1.3 The values stated in SI units are to be regarded as the standard. The values in parentheses are given for information only.

1.4 *This standard does not purport to address the safety concerns 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 resembles ISO 4575-1985 in title only. The content is significantly different.

2. Referenced Documents

2.1 ASTM Standards:

D 1475 Test Method for Density of Paint, Varnish, Lacquer, and Related Products²

D 1755 Specification for Poly(Vinyl Chloride) Resins³

D 1824 Test Method for Apparent Viscosity of Plastisols and Organosols at Low Shear Rate³

E 1 Specification for ASTM Thermometers⁴

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method⁵

2.2 ISO Standard:

ISO 4575-1985: Poly Vinyl Chloride Pastes—Determination of Apparent Viscosity Using the Severs Rheometer⁶

3. Summary of Test Method

3.1 The sample is conditioned to the proper temperature, placed into an extrusion chamber, and extruded under standard conditions. The viscosity is calculated from the extrusion pressure and the rate of flow through the orifice.

4. Significance and Use

4.1 The suitability of a dispersion resin for any given application is dependent upon its viscosity characteristics.

4.2 The extrusion viscosity defines the flow behavior of a plastisol or organosol under high shear. This viscosity relates to the conditions encountered in mixing, pumping, knife coating, roller coating, and spraying processes.

5. Apparatus

5.1 *Extrusion Rheometer*.⁷

5.2 *Orifice*, 3.17 \pm 0.13 mm (0.125 \pm 0.005 in.) inside diameter and 50 \pm 1.0 mm (1.97 \pm 0.04 in.) long.

5.3 *Sample Containers, Tin Cans, or Glass Jars*, 1-pt (500-mL) capacity.

5.4 *Paper Cups*, 8-oz (250-mL) capacity.

5.5 *Nitrogen Cylinder*, equipped with pressure regulator and gage.

5.6 *Thermometer*—ASTM Solvents Distillation Thermometer having a range from -2 to $+52^\circ\text{C}$ (28 to 126°F) and conforming to the requirements for Thermometer 37C as prescribed in Specification E 1.

5.7 *Timer*.

6. Conditioning

6.1 Maintain the plastisol or organosol samples at $23 \pm 1^\circ\text{C}$ ($73 \pm 2^\circ\text{F}$) and $50 \pm 5\%$ relative humidity at all times after mixing and throughout the period of viscosity determinations.

7. Procedure

7.1 *Set Up Rheometer*—Attach the pressure regulator to the nitrogen tank. Connect the nitrogen supply to the rheometer by means of the copper tubing. Do not use oxygen or liquid pressure sources (Note 2). Set the three-way quick-acting valve to the IN position. Regulate the tank pressure to give 1.04 MPa

⁷ Burrell Severs, Model A-120, or equivalent, has been found satisfactory for this purpose. The Burrell Severs, Model A-120 is available from the Burrell Corp., 2223 Fifth Ave., Pittsburgh, PA 15219.

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 D20.15.08).

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This edition contains changes in Sections 1, 2, and 11 to include an ISO equivalency statement, to reference a low shear rate test method, and to include Keywords.

² *Annual Book of ASTM Standards*, Vol 06.01.

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

⁴ *Annual Book of ASTM Standards*, Vol 14.03.

⁵ *Annual Book of ASTM Standards*, Vol 14.02.

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