



Designation: D7395 – 07

## Standard Test Method for Cone/Plate Viscosity at a 500 s<sup>-1</sup> Shear Rate<sup>1</sup>

This standard is issued under the fixed designation D7395; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers the determination of the viscosity of paints and related products using a cone/plate viscometer at a shear rate of 500 s<sup>-1</sup>.

1.2 Viscosity values obtained by this method may be used as an alternative to results from No. 4 Ford cup measurements. The values from this method do not replicate Ford cup results, but can be used for quality control, producer-user specifications and viscosity reduction in the same manner that Ford cups are used.

1.3 If viscosity at a higher shear rate is needed, Test Method D4287, which describes viscosity measurement at 10 000 to 12 000 s<sup>-1</sup> may be used.

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

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.*

### 2. Referenced Documents

- 2.1 *ASTM Standards:*<sup>2</sup>
- D3925 Practice for Sampling Liquid Paints and Related Pigmented Coatings
  - D4287 Test Method for High-Shear Viscosity Using a Cone/Plate Viscometer

### 3. Summary of Test Method

3.1 The material to be tested is placed between the cone and plate of a cone/plate viscometer set at 25°C, a solvent trap is lowered, and the specimen is subjected to a shear rate of 500 s<sup>-1</sup> while the viscosity is measured.

<sup>1</sup> 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 D01.24 on Physical Properties of Liquid Paints & Paint Materials.

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<sup>2</sup> 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.

### 4. Significance and Use

4.1 This test has been used to measure viscosities of automotive topcoats in place of No. 4 Ford cup measurements and has provided an equivalent ability to evaluate whether the paint meets specifications and is sprayable.

4.2 The method could be considered as an alternative to No. 4 Ford cup and other efflux cup measurements for other products as well.

4.3 The type of viscometer described in this method gives better temperature control than Ford and other efflux cups and is expected to give better precision.

4.4 This test method is suitable for all paints and related materials whether they are Newtonian in behavior or not.

### 5. Apparatus

5.1 *Cone/Plate Type Viscometer* with cone/speed combination producing a shear rate of 500 s<sup>-1</sup> and fitted with a solvent trap that covers the cone. For automotive topcoats, the viscometer must provide a viscosity measurement range that includes 20 to 200 cP (= mPa.s) at the above-mentioned shear rate. A Brookfield CAP1000+ or CAP2000+ with a #10 cone at 100 rpm shaft speed has worked well.

### 6. Reagents and Materials

6.1 *Water or Solvent*—If the viscometer allows manual zeroing, this should be done in accordance with the manufacturer's directions. Zeroing procedures that require liquids may be satisfied with water or a low-viscosity solvent such as xylene or mineral spirits.

6.2 *Mineral Oils*—One to three standard mineral oils with known viscosities (certified by an approved laboratory) lying between 10 and 90 % full scale to be used for calibrating the instrument. If a single oil is used, its viscosity should be similar to that of the materials being tested.

NOTE 1—Silicone oils should be avoided because of their tendency to contaminate instruments, containers and other equipment.

### 7. Sampling

7.1 Take a representative sample of the product to be tested in accordance with Practice D3925. If the sample has a tendency to settle or separate on standing, then it must be stirred or shaken until homogeneous before a test specimen is taken from it. However, it is appropriate to directly test a