



Designation: D2396 – 20

Standard Test Methods for Powder-Mix Time of Poly(Vinyl Chloride) (PVC) Resins Using a Torque Rheometer¹

This standard is issued under the fixed designation D2396; 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 These test methods cover the determination of the powder-mix time of a general-purpose poly(vinyl chloride) (PVC) resin.

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

NOTE 1—ISO 4574-2019 is covering the primary subject of this ASTM method.

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

D1600 Terminology for Abbreviated Terms Relating to Plastics

E456 Terminology Relating to Quality and Statistics

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

E2935 Practice for Conducting Equivalence Tests for Comparing Testing Processes

¹ These test methods are under the jurisdiction of ASTM Committee D20 on Plastics and are the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials.

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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.

3. Terminology

3.1 Definitions:

3.1.1 Terms used in this standard are defined in accordance with Terminology D883, and abbreviations are in accordance with Terminology D1600 unless otherwise specified. For terms relating to precision and bias and associated issues, the terms used in this standard are defined in accordance with Terminology E456.

4. Summary of Test Methods

4.1 A sample of resin is heated and mixed in a bowl to the test temperature. A measured amount of plasticizer is added to the resin through a dispersing funnel. When the plasticizer is added to the resin, the mix becomes wet and an increase in motor torque is needed to maintain the same rotor speed. As the mixing continues in the heated bowl, the plasticizer is absorbed into the resin and the resin granules become dry and free-flowing. When the mix reaches the dry and free-flowing state, its resistance to stirring decreases and the motor torque needed to maintain the same rotor speed decreases. By recording the changes in motor torque with time, it is possible to measure the time required for a resin to absorb a plasticizer.

4.2 These test methods describe the use of two different mixing heads that can be mounted on a torque rheometer to perform this test. Test results obtained with these mixing heads are compared in Section 14.

4.2.1 A sigma mixing head is used in Test Method A.

4.2.2 A planetary mixing head is used in Test Method B.

5. Significance and Use

5.1 The ability of PVC granules to accept a plasticizer and become a dry free-flowing powder is related to the internal pore structure of the resin, resin temperature, plasticizer temperature, and the plasticizer used. By choosing an applicable plasticizer and maintaining a uniform temperature for the resin and plasticizer, it is possible to classify resins by how rapidly they absorb plasticizer. Resin suitability for a specific intensive mixing operation can be ascertained using these test methods.