



Designation: D2538 – 18

Standard Practice for Fusion of Poly(Vinyl Chloride) (PVC) Compounds Using a Torque Rheometer¹

This standard is issued under the fixed designation D2538; 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 relative fusion characteristics of poly(vinyl chloride) compounds.

1.2 The test procedures appear in the following order:

	Section
Fusion Test	9
Thermal Stability Test	10
Color-Hold Stability Test	11
Shear Stability Test	12

1.3 The values stated in SI units are to be regarded as the standard.

1.4 *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.* Specific hazards statements are given in Section 8.

NOTE 1—There are no ISO standards covering the primary subject matter of this ASTM standard.

1.5 *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

E691 Practice for Conducting an Interlaboratory Study to

¹ This practice is under the jurisdiction of ASTM Committee D20 on Plastics and is 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.

Determine the Precision of a Test Method

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminologies **D883** and **D1600** unless otherwise indicated.

4. Summary of Practice

4.1 A sample of powder-mix compound is added to the heated roller mixer chamber and is transformed into a fused mass.

4.2 The resulting torque curve can be used to determine the relative fusion time and fusion characteristics.

5. Significance and Use

5.1 When PVC compounds are mixed under appropriate conditions of heat and shear, a fused mass is produced. This mass has certain melt characteristics which can be defined with a torque rheometer operated under fixed conditions of shear and temperature. The fusion characteristics of a PVC compound are manifest as fusion time, fusion torque, melt torque, melt viscosity, and heat and color stability.

5.2 A control lot is to be used as a standard against which other test results are to be compared. Test data are to be evaluated relative to the control lot.

6. Apparatus

6.1 *Microprocessor Torque Rheometer*,³ equipped with a high-shear mixer with roller-style blades, bowl-jacket thermocouple, stock thermocouple, and temperature recorder.

NOTE 2—A torque rheometer without microprocessor capability can be used to perform the fusion, thermal stability, and color hold tests.

6.1.1 For flexible and rigid compounds, use a Type 6 roller head with a rotor ratio of 3 Drive: 2 Driven.

NOTE 3—A Type 5 roller head can also be used, but the data generated cannot be compared with the Type 6 data.

6.2 *Quick-Loading Powder Chute* or equivalent.

³ Suitable equipment may be obtained from C. W. Brabender, 50 E. Wesley St., South Hackensack, NJ 07606, and Haake Buchler Instruments, 244 Saddle River Rd., Saddle Brook, NJ 07662.