



Standard Test Method for Thermal Stability of Poly(Vinyl Chloride) (PVC) Resin¹

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1. Scope

1.1 This test method covers the determination of the thermal stability of poly(vinyl chloride) (PVC) resins.

1.2 As each type and quantity of stabilizer will have a different effect on thermal stability of various resins, this test method is not intended to predict the thermal stability of a given resin in a given compound. However, it may be useful in quality assurance or in-plant quality control testing.

1.3 This test method has not been validated for PVC compounds.

1.4 *This standard does not purport to address all of the safety problems, 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 1—There are no ISO standards covering the primary subject of this ASTM standard.

2. Referenced Documents

2.1 *ASTM Standards:*

D 883 Terminology Relating to Plastics²

D 1600 Terminology for Abbreviated Terms Relating to Plastics²

3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *thermal stability*—the time elapsed from the moment at which the resin is exposed to the test temperature until the first sign of evolution of hydrogen chloride (decomposition) by indicator paper color change.

4. Summary of Test Method

4.1 The sample of powder or granular is tested at the test temperature in still air, and the time, required for the hydrogen chloride that is split off to change the color of congo-red paper placed above the specimen, is measured.

5. Significance and Use

5.1 The splitting off of hydrogen chloride is one of the earliest indications of decomposition of PVC; it is the precursor of discoloration and other degradation phenomena.

6. Apparatus

6.1 *Congo Red Indicator Paper*, 6-mm wide by 50-mm long strips (supplied in stoppered plastic vials).

6.2 *Timing Device*, calibrated in minutes and seconds, having a minimum range of 60 min.

6.3 *Oil Bath*, fitted with stirrer and thermostatic control, capable of maintaining the temperature within $\pm 1^\circ\text{C}$ in the range of 120 to 210°C . The bath is fitted with clamps capable of holding test tubes immersed to a depth of 50 mm.

6.4 *Test Tubes*, 18 by 150-mm.

6.5 *Small Glass Tubes*, 2 to 3-mm in inside diameter and 100 ± 25 mm in length.

6.6 *Stopper*, to fit the test tubes. A hole is bored in the stopper to accommodate the 2 to 3-mm small glass tubes.

6.7 See Fig. 1 for assembly of the tube, sample, and indicator paper.

7. Procedure

7.1 *Conditioning*—Maintain the sample at room temperature for at least 2 h.

7.2 Heat the oil bath to the test temperature and maintain it to $\pm 1^\circ\text{C}$. The preferred temperature is 150°C , but 130°C may be used for resins having a short stability time and 180°C for resins having a long stability time.

7.3 Place enough of the sample of the resin in a test tube to fill the tube to a depth of 50 ± 2 mm. Gently shake or tap the material down, taking care not to form a compact mass.

7.4 Place the small glass tube in the hole in the stopper. The tube should extend from the top and bottom of the stopper. Roll one end of a strip of congo red indicator paper and insert it into the glass tube so that 30 ± 2 mm of the paper strip extends from the glass tube. Place the stopper in the test tube containing the sample. Position the glass tube in the stopper so that the end of the paper is 25 ± 2 mm above the top of the upper surface of the sample (see Fig. 1).

7.5 Immerse the tube thus prepared in the oil bath (stabilized at the desired temperature) to the level of the upper surface of the sample.

7.6 Measure the time in seconds from the moment the test

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 D20.15.18).

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² *Annual Book of ASTM Standards*, Vol 08.01.