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An American National Standard

AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Practice for Testing Plasticizer Compatibility in Poly(Vinyl Chloride) (PVC) Compounds Under Humid Conditions[1]

This standard is issued under the fixed designation D 2383; 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 defines the conditions for the exposure and qualitative evaluation of poly(vinyl chloride) (PVC) compounds for plasticizer compatibility under humid conditions. Change in appearance is used for judging compatibility.

1.2 The text of this practice references notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of this practice.

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 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 practice.

2. Referenced Documents

2.1 *ASTM Standards:*

D 883 Terminology Relating to Plastics[2]

D 1249 Specification for Octyl Ortho-Phthalate Ester Plasticizers[2]

D 1600 Terminology for Abbreviated Terms Relating to Plastics[2]

D 1755 Specification for Poly(Vinyl Chloride) Resins[2]

E 145 Specification for Gravity-Convection and Forced-Ventilation Ovens[3]

3. Terminology

3.1 *General*—Definitions are in accordance with Terminology D 883 and abbreviations with Terminology D 1600, unless otherwise indicated.

4. Summary of Practice

4.1 Specimens are suspended over water in closed containers and aged at either 60°C (140°F) or 80°C (176°F). The specimens are removed from the containers at specified intervals and their appearance is rated in accordance with 9.1 and recorded.

5. Significance and Use

5.1 This practice provides an accelerated method for determining the stability of PVC compounds with respect to plasticizer compatibility under humid conditions.

5.2 The temperatures and humidity employed in this test can represent actual use conditions, but are intended primarily for rating materials.

6. Apparatus

6.1 *Screw-Cap Glass Jars or Capped Metal Containers*, large enough to avoid contact between specimens. The covers shall be provided on the inside with hooks of a corrosion-resistant metal such as stainless steel, nichrome or nickel.

6.2 *Forced-Ventilation Laboratory Oven*, Type II, Grade A, in accordance with Specification E 145.

7. Specimen Preparation (Note 2)

7.1 Cut test specimens with one side having a surface area of 25 cm^2 from a 0.75-mm (0.029-in.) thick smooth surface plastic sheet (±0.05 mm (0.002-in.)) Punch a small hole near the edge for hanging the specimen.

NOTE 2—For use as a control in testing the relative performance of plasticizers, the following clear formulation may be employed.

	Parts
General-Purpose PVC Resin: Type GP 40000 as defined in Specification D 1755.	100
Plasticizer: Di-2-ethylhexyl phthalate (Specification D 1249)	50
Stabilizer: Coprecipitated solid barium-cadmium laurate (barium: cadmium 2:1)	1

7.2 Process the test compound in the usual manner on a two-roll mill for 5 min at the appropriate temperature for the plasticizer used (170°C (338°F) for Di-2-ethylhexyl phthalate). Cut test specimens from the compound sheeting prepared by pressing the milled sheet in a suitable mold at 10.3 MPa (1500 psi) for 5 min at 5 to 10°C (9 to 18°F) higher than the milling temperature.

[1] This practice is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D 20.15 on Thermoplastic Materials (Section D20.15.11).

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

[3] *Annual Book of ASTM Standards*, Vol 14.02.

***A Summary of Changes section appears at the end of this standard.**

NOTE 3—The test compound suggested in Note 2 will not exude under either test temperature specified in 8.2.

8. Procedure

8.1 Suspend the specimens from hooks over distilled water in closed containers so that they do not touch the water layer, sides of the container, or each other.

8.2 Place the containers in the circulating-air oven (see 6.2) at either 60 ± 1°C (140 ± 2°F) or 80 ± 1°C (176 ± 2°F), depending upon which temperature is specified in the applicable material specification. Put covers on loosely until the containers come to temperature equilibrium, then tighten covers.

8.3 Remove the containers from the oven at specified intervals. Under normal inspection, the intervals for plasticized PVC are:

8.3.1 At 60°C, once a week for a total of 4 weeks.

8.3.2 At 80°C, 1, 3, 7, 10, and 14 days.

8.4 Examine the specimens for evidence of exudation and record their appearance.

8.5 Replace the specimens in the original containers and continue the test for the specified period of time.

9. Ratings

9.1 The following visual and tactile ratings are used for judging plasticizer compatibility:

9.1.1 *None* (*Dry*)—No evidence of exudation.

9.1.2 *Slight* (*Tacky*)—Slight exudation resulting in a sticky specimen surface.

9.1.3 *Moderate* (*Greasy*)—Thin film of exuded plasticizer covers specimen surface. Film may be greasy, oily, or waxy.

9.1.4 *Heavy* (*Wet*)—Droplets of exuded plasticizer accumulated on specimen surface. Specimen may be blistered.

10. Report

10.1 The report shall include the following:

10.1.1 Sample identification,

10.1.2 Temperature of test, and

10.1.3 Rating and appearance of the specimen at the end of each test interval.

11. Precision and Bias

11.1 No precision and bias data are available due to subjective nature of determining the test results.

12. Keywords

12.1 plasticizer; poly(vinyl chloride) (PVC)

SUMMARY OF CHANGES

Committee D-20 has identified the location of selected changes to this edition of this practice since the last issue that may impact the use of this practice.

D 2383 – 97:
(1) Section 1.2 added.