



Standard Practice for Testing Plasticizer Compatibility in Poly(Vinyl Chloride) (PVC) Compounds Under Humid Conditions¹

This standard is issued under the fixed designation D2383; 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 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 is no known ISO equivalent to this practice.

2. Referenced Documents

2.1 *ASTM Standards:*²

D883 Terminology Relating to Plastics

D1600 Terminology for Abbreviated Terms Relating to Plastics

D1755 Specification for Poly(Vinyl Chloride) Resins

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

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 (Section D20.15.07).

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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 *General*—Definitions are in accordance with Terminology D883 and abbreviations with Terminology D1600, unless otherwise indicated.

4. Summary of Practice

4.1 Specimens are suspended over water in closed containers and aged at either 60°C or 80°C. The specimens are removed from the containers at specified intervals and their appearance is rated in accordance with 10.1 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 and between the specimens and 1 cm of deionized water. 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 E145.

7. Materials

7.1 *Distilled Water*—Freshly prepared distilled or deionized water.

8. Specimen Preparation (Note 2)

8.1 Cut test specimens with one side having a surface area of 25 cm² from a 0.5-mm (0.02-in.) thick smooth surface plastic sheet (± 0.05 mm (0.002-in.)) Punch a small hole near the edge for hanging the specimen.

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

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

	Parts
<i>General-Purpose PVC Resin:</i> Type GP 40000 as defined in Specification D1755.	100
<i>Plasticizer:</i> Di-2-ethylhexyl phthalate	50
<i>Stabilizer:</i> Weatherable BaZn	1

NOTE 3—The test compound suggested in Note 2 will not exude under either test temperature specified in 9.2.

9. Procedure

9.1 Suspend the specimens from hooks over 1-1.3 cm of distilled water in closed containers so that they do not touch the water layer, sides of the container, or each other.

9.2 Place the containers in the circulating-air oven (see 6.2) at either $60 \pm 1^\circ\text{C}$ or $80 \pm 1^\circ\text{C}$, 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.

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

- 9.3.1 At 60°C , once a week for a total of 4 weeks.
- 9.3.2 At 80°C , 1, 3, 7, 10, and 14 days.

9.4 After allowing to dry, examine the specimens for evidence of exudation and record their appearance.

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

10. Ratings

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

- 10.1.1 *None (Dry)*—No evidence of exudation.
- 10.1.2 *Slight (Tacky)*—Slight exudation resulting in a sticky specimen surface.
- 10.1.3 *Moderate (Greasy)*—Thin film of exuded plasticizer covers specimen surface. The film will appear to be greasy, oily, or waxy.
- 10.1.4 *Heavy (Wet)*—Droplets of exuded plasticizer accumulated on specimen surface.

NOTE 4—The specimen may be blistered.

11. Report

- 11.1 The report shall include the following:
 - 11.1.1 Sample identification,
 - 11.1.2 Temperature of test, and
 - 11.1.3 Rating and appearance of the specimen at the end of each test interval.

12. Precision and Bias

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

13. Keywords

- 13.1 compatibility; plasticizer; poly(vinyl chloride) (PVC)

SUMMARY OF CHANGES

Committee D20 has identified the location of selected changes to this standard since the last issue (D2383 - 09) that may impact the use of this standard. (March 1, 2014)

(1) Removed permissive language from 10.1.3.

(2) Moved second sentence of 10.1.4 to Note 4.

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