



Designation: **D3367—09 D3367 – 13**

Standard Test Method for Plasticizer Sorption of Poly(Vinyl Chloride) Resins Under Applied Centrifugal Force¹

This standard is issued under the fixed designation D3367; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This test method covers the determination of the plasticizer sorption of poly(vinyl chloride) (PVC) homopolymers using a controlled centrifugal force.

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

1.4 This test method 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 test method.

NOTE 1—This test method is equivalent to ISO ~~4608-1984~~4608.

2. Referenced Documents

2.1 *ASTM Standards:*²

[D883 Terminology Relating to Plastics](#)

[D1600 Terminology for Abbreviated Terms Relating to Plastics](#)

2.2 *ISO Standards:*

[ISO ~~4608-1984~~4608 Homopolymers and Copolymers of Vinyl Chloride for General Use—Determination of Plasticizer Absorption at Room Temperature](#)³

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology [D883](#) and Terminology [D1600](#), unless otherwise indicated.

4. Summary of Test Method

4.1 A sample of PVC is saturated with plasticizer in a screening tube with an amount of plasticizer equal to approximately twice the weight of the PVC. The PVC and plasticizer are subjected to centrifugation for a specified time. A small amount of cotton is weighed into the screening tube before weighing of the PVC to prevent PVC particles from escaping through the orifice of the tube during weighing and centrifugation. Plasticizer that is not absorbed by the PVC particles is removed by the centrifugation through the orifice of the screening tube.

5. Significance and Use

5.1 This test method provides a quantitative measure of the relative plasticizer absorption of general-purpose poly(vinyl chloride) resins under standard temperature conditions. Plasticizer sorption thus defined is one of the criteria useful for the description of the powder blend characteristics of poly(vinyl chloride) resins.

¹ This test method is under the jurisdiction of ASTM Committee [D20](#) on Plastics and is the direct responsibility of Subcommittee [D20.15](#) on Thermoplastic Materials (Section D20.15.08).

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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 Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, [http://www.ansi.org](#).

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

6. Apparatus and Materials

6.1 *Centrifuge*, whose rotor turns in a horizontal plane and has an acceleration under the test conditions of 24 500 to 29 500 $m \cdot s^{-2}$ measured at the level of the bottom of the tube, with, if necessary, a cooling system to prevent the temperature of the mixture from exceeding 30°C at the end of the centrifuging for 60 min.

NOTE 2—It is permissible to use higher acceleration to reduce the centrifuging time, for example, 34 000 $m \cdot s^{-2}$ and 30 min, provided that it has been verified that the results obtained are equivalent.

6.2 *Centrifuge Tubes*, to fit the centrifuge used, of glass or plastic, with a conical bottom pierced by a hole of 0.8-mm diameter (see Fig. 1).

NOTE 3—It has been found using Fisherbrand Disposable Filter Column (Fisher HealthCare) #11-387-50, works well in this application. It is recommended removing the filter paper before placing the cotton in the column.

6.3 *Plastic Sheaths* (metal, polyamide, polyethylene, and so forth), with a piece of PVC pipe at the bottom to support the centrifuge tube (see Fig. 1).

6.4 *Cotton Wool*, pharmaceutical grade, having a DOP absorption measured under the test conditions (6.4.1) of approximately 10 %.

NOTE 4—Alternative materials to cotton wool may be used if it can be shown that they produce equivalent results; for example, glass wool, and PTFE-coated polyester felt.

6.4.1 *Measurement of DOP Absorbed by Cotton Wool*—In accordance with Section 8, carry out a test with a piece of cotton wool having a mass of 100 ± 2 mg, but without resin. Determine the mass of DOP absorbed by the cotton wool in grams (mass m_0).

6.5 *Di(2-ethyl hexyl)phthalate (DOP)*.

7. Conditioning

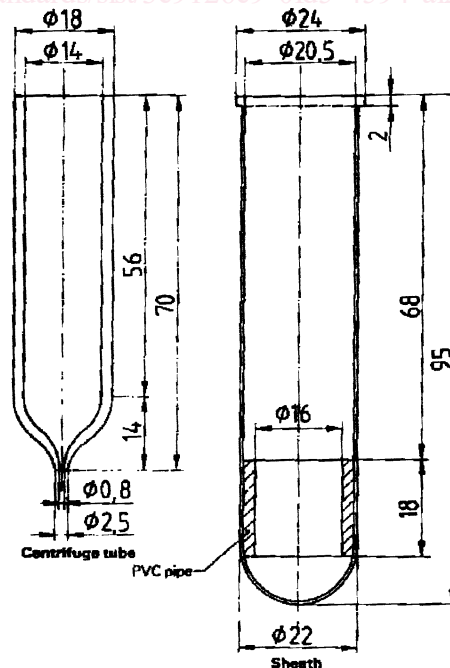
7.1 The PVC and plasticizer shall be at $23 \pm 1^\circ C$ $73.4 \pm 1.8^\circ F$ and $50 \pm 5\%$ $50 \pm 10\%$ relative humidity for at least 1 h before testing.

7.2 Perform the centrifugation with centrifuge and test samples at $23 \pm 1^\circ C$.

8. Procedure

8.1 Weigh 100 ± 2 mg of cotton wool and place it in the centrifuge tube, and pack it down slightly. Weigh the tube and cotton wool to the nearest ± 0.1 mg, m_1 being the mass in grams of the prepared tube.

8.2 Weigh 100 ± 2 mg of the resin being tested and place it into the tube, m_2 being the mass in grams of the prepared tube plus resin, to the nearest ± 0.1 mg.



NOTE 1—Dimensions in millimetres.

FIG. 1 Example of Centrifuge Tube and Sheath