



Standard Test Method for Estimating Processing Losses of Plastics and Organosols Due to Volatility¹

This standard is issued under the fixed designation D 6150; 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 test method describes a procedure for the determination of the relative volatility of polyvinyl chloride plastisols and organosols at elevated temperatures.

1.2 The values stated in SI units are to be regarded as the standard. The values given in brackets are for information only.

1.3 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes, excluding those in tables and figures, shall not be considered as requirements of this 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 equivalent to this test method.

2. Referenced Documents

2.1 ASTM Standards:

D 618 Practice for Conditioning Plastics for Testing²

D 883 Terminology Relating to Plastics²

D 1600 Terminology for Abbreviated Terms Relating to Plastics²

E 145 Specification for Gravity-Convection and Forced-Ventilation Ovens³

3. Terminology

3.1 *Definitions*—The terms used in this test method are in accordance with Terminology D 883 and abbreviations are in accordance with Terminology D 1600, unless otherwise indicated.

4. Summary of Test Method

4.1 Plastics or organosols are weighed in aluminum dishes and heated in a circulating air oven at 177°C [350°F] for 10

min. The specimens are removed from the oven, cooled, and reweighed. The weight loss is determined and reported as either percent weight loss or weight loss per unit area of exposed surface.

5. Significance and Use

5.1 The volatile components of a plastisol or organosol influences the weight loss during processing. In addition, this information may be useful to the producer and user and to environmental interests for estimating the volatiles emitted by the plastisol or organosol during processing.

5.2 Results obtained by this test method are not strictly equivalent to those experienced during product processing wherein conditions of temperature, air flow, coating mass, and configuration may be quite different.

5.3 This test method may not be applicable to all types of plastisol and organosol applications. Any change in the specified testing time or temperature to accommodate unique applications shall be included in the report (see 7.3).

6. Apparatus

6.1 *Oven*, forced-ventilation laboratory oven, Type II, Grade A, with 100 to 200 air exchanges/h as specified in Specification E 145.

6.1.1 A rotating turntable drive at a rate of 1 to 6 rpm may be used.

6.1.2 A tray to fit the turntable may be used to minimize the temperature drop in the oven.

6.2 *Aluminum Foil Dishes*, 57 mm in diameter by 18 mm high with a smooth (planar) bottom surface.

7. Procedure

7.1 Mix the sample by hand or mechanical stirrer until homogeneous.

7.2 Tare three aluminum dishes to the nearest 0.1 mg.

7.3 A more accurate measurement of weight loss may be obtained if the thickness of the sample in the aluminum dish approaches the thickness of the material during processing. The weight of the specimens added to the dish, therefore, can vary according to the application. The specimen should be added in such a manner as to entirely cover the bottom of the dish. The weight added to each dish should be as uniform as

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.

Current edition approved July 10, 2003. Published September 2003. Originally approved in 1997. Last previous edition approved in 1997 as D 6150 - 97.

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

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

possible and only vary by ± 0.1 g of the selected weight. If the thickness cannot be accurately determined, add 6.0 ± 0.1 g to each dish.

7.4 Reweigh the dishes to the nearest 0.1 mg.

7.5 Place only three dishes from a single specimen in the oven on a shelf or turntable, or both, perpendicular to the airflow.

7.5.1 If a rotating turntable is used, place the dishes on the turntable equally spaced from the center.

NOTE 2—Due to the short heating time, the specimens should be placed into the oven as quickly as possible to minimize the temperature drop in the oven.

7.6 Heat the aluminum foil dishes containing the specimens in the forced draft oven (6.1) for 10 min at 177°C [350°F].

7.7 Remove the dishes from the oven, place immediately in a desiccator, cool for 15 min to ambient temperature, and weigh to 0.1 mg.

8. Calculation

8.1 Calculate the percent volatile matter, V , in the plastisol or organosol as follows:

$$V = [(W_2 - W_1) - (W_3 - W_1)] / (W_2 - W_1) \times 100 \quad (1)$$

where:

W_1 = weight of aluminum foil dish,

W_2 = weight of dish plus specimen, and

W_3 = weight of dish plus specimen after heating.

8.2 Calculate the weight loss relative to unit area of exposed surface as follows:

$$\begin{aligned} \text{weight loss, g/mm}^2 &= [(W_2 - W_1) - (W_3 - W_1)] / (\pi d^2 / 4) \\ &= 1.273 [(W_3 - W_1) - (W_2 - W_1)] / d^2 \quad (2) \end{aligned}$$

where:

W_1 = weight of aluminum foil dish,

W_2 = weight of dish plus specimen,

W_3 = weight of dish plus specimen after heating, and

d = external diameter of specimen after heating in mm.

9. Report

9.1 Report the following information:

9.1.1 Sample identification.

9.1.2 Average of percent volatile loss of the sample run in triplicate or the average of the volatile weight loss of the sample relative to unit area, or both, g/mm^2 .

9.1.3 Any deviations from the test and the reasons for these deviations.

10. Precision and Bias

10.1 The precision and bias of this test method currently is being determined.

11. Keywords

11.1 organosol; plastisol; poly(vinyl chloride) (PVC); volatiles

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).