



Designation: **D3030–17** **D3030 – 23**

Standard Test Method for Volatile Matter (Including Water) of Vinyl Chloride Resins¹

This standard is issued under the fixed designation D3030; 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 covers the quantitative determination of the volatile matter (including water) present in vinyl chloride resins.

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

NOTE 1—This test method is identical ISO 1269.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- [D618 Practice for Conditioning Plastics for Testing](#)
- [D883 Terminology Relating to Plastics](#)
- [D1600 Terminology for Abbreviated Terms Relating to Plastics](#)
- [E145 Specification for Gravity-Convection and Forced-Ventilation Ovens](#)
- [E456 Terminology Relating to Quality and Statistics](#)
- [E2935 Practice for Evaluating Equivalence of Two Testing Processes](#)

2.2 ISO Standard:

- [ISO 1269 Homopolymer and Copolymer Resins of Vinyl Chloride—Determination of Volatile Matter Including Water³](#)

3. Terminology

3.1 ~~Definitions: Definitions—Definitions are in accordance with Definitions For definitions of terms pertaining to plastics used in this test method, refer to Terminology D883 and . For abbreviations used in this test method, refer to Terminology D1600, unless otherwise indicated.~~

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

3.2 For definitions of terms that appear in this test method relating to quality and statistics, refer to Terminology [E456](#).

4. Summary of Test Method

4.1 This test method consists of heating at 110°C a known quantity of powdered resin to constant mass. The calculated mass loss defines quantitatively the volatile matter present in the sample.

5. Significance and Use

5.1 The quantity of volatile components in a vinyl chloride resin can be established by this test method. This test method does not identify the components.

6. Apparatus

6.1 *Oven*—A forced-ventilation oven conforming to the requirements for Type IIA in Specification [E145](#). The oven should be capable of maintaining a temperature of $110 \pm 1^\circ\text{C}$ when the damper is half open and the vent is wide open.

6.1.1 The oven shall be equipped with a calibrated ASTM thermometer and the proper stem correction shall be applied to the temperature measurement.

6.1.2 The oven temperature shall be controlled by an accurate, reliable thermoregulator, maintaining the set point within $\pm 1.0^\circ\text{C}$ or better.

6.1.3 The inside of the oven shall be free of contamination or surface deposits. Stainless steel oven liners should be used to reduce corrosion due to continued exposure to decomposition gases.

6.2 *Sample Container*—A weighing vessel of low shape design in glass, aluminum, or stainless steel of sufficient size to hold a 10-g resin sample.

NOTE 2—An aluminum weighing dish, 57 mm in diameter and 18 mm in depth, is suitable.

6.3 *Balance*—A weighing balance with a precision to within 0.001 g.

7. Preparation of Apparatus

7.1 Maintain the oven at the temperature of the test for at least 1 h prior to insertion of the specimens.

7.2 Prior to test operation, verify the uniformity of temperature within the oven according to Specification [E145](#). The airflow in the oven should be greater than 0.3 m³/min (10 ft³/min).

NOTE 3—The temperature uniformity can also be verified by placing 5 or more portions of the same resin sample in the oven, distributed over the test area, following Section 8. Calculate the percent of volatile loss (Section 9). If the differences in the volatile loss of the samples exceed the test reproducibility, the temperature in the oven is not uniform and must be corrected before proceeding with the test.

8. Procedure

8.1 Dry the weighing vessel in the oven at $110 \pm 1^\circ\text{C}$ for 30 min and cool to room temperature in a desiccator. Tare the weighing vessel to the nearest 0.001 g.

8.2 Spread approximately 10 g of sample resin evenly over the bottom of the weighing vessel and weigh to the nearest 0.001 g. Record the sample mass.

8.3 Place the resin-filled weighing dish in the oven controlled at $110 \pm 1^\circ\text{C}$ and close the oven.

8.4 After 1 h, remove the weighing dish, cool to room temperature in a desiccator, and weigh to the nearest 0.001 g. Return the

weighing dish to the oven and heat for an additional 15 min, cool to room temperature in the desiccator, and re-weigh. Constant mass is reached when the successive weighing differs by 0.001 g or less; if the mass variation is greater than 0.001, continue the 15 min heating-weighing cycle until constant mass is obtained.

NOTE 4—Prompt weighing after removal of the dish from desiccator will improve accuracy.

8.5 Test a minimum of two samples, and average the results.

9. Calculation

9.1 For each determination calculate the mass percent of volatile matter present as follows:

$$[(M - M')/M] \times 100$$

where:

M and M' = respectively, the mass before and after heating of the resin determined at room temperature (a temperature in the range from 20 to 30°C (68 to 85°F), as defined in Methods D618).

10. Report

10.1 Report the following information:

10.1.1 The arithmetic average of the determinations to the nearest 0.01 mass %.

11. Precision and Bias

11.1 The following should be used for judging the acceptability of results (95 % confidence limits):

11.2 ~~Reproducibility Limit, R —Reproducibility—The value below which the absolute difference between two test results obtained under reproducibility conditions is Precision under reproducibility conditions. (E456 likely to be expected to occur with a probability of approximately 0.95 (95 %).)~~

11.3 ~~Repeatability Limit, r —Repeatability—The value below which the absolute difference between two individual test results obtained under repeatability conditions is Precision under repeatability conditions. (E456 likely to be expected to occur with a probability of approximately 0.95 (95 %).)~~

11.4 Equivalence testing on numerical data from two sources shall be conducted in accordance with Practice E2935 or any known method for judging the equivalence of two means.

NOTE 5—Example: a t-test.

11.5 ~~Bias—No justifiable statement of bias can be made for this test method, since the true value of the property cannot be established by an accepted referee method.~~

NOTE 6—Other techniques of volatile determinations may be substituted at the option of the purchaser and seller, such as the use of a semi-automatic moisture tester or a procedure employing an infrared lamp as a heating source. With such methods, the temperature of the heated sample must be maintained at $110 \pm 1^\circ\text{C}$.

12. Keywords

12.1 moisture content; test method; vinyl chloride resins; volatile matter