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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Method for Volatile Content in Phenolic Resins[1]

This standard is issued under the fixed designation D 4639; 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 determination of matter in a solid phenolic resin that is volatile at 300°F (150°C).

1.2 *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.*

2. Summary of Test Method

2.1 A specified weight of resin is added to a tared aluminum dish and weighed. The resin is then heated for 2 h in an oven at 300°F (150°C) and reweighed.

3. Significance and Use

3.1 Volatile material causes problems when phenolic resins and varnishes are heated at temperatures above 300°F (150°C). Heating a specified weight of resin for 2 h at this temperature indicates the amount of volatile material emitted when molding or curing phenolic resins.

4. Apparatus

4.1 *Analytical Balance*, capable of weighing to 0.1 mg.

4.2 *Thermometer*, glass, having a range from 1 to 200°C and accurate to 1°C.

4.3 *Circulating Oven*, maintained at 300 ± 3.5°F (150 ± 2°C).

4.4 *Aluminum Drying Dishes*, 2½-in. (63 mm) diameter, ¾-in. (20 mm) depth or equivalent.

4.5 *Desiccator*.

5. Procedure

5.1 Mark two aluminum dishes for identification of each resin being tested and weigh them on the analytical balance to 0.1 mg. Record as w_1.

5.2 Weigh a 5-g specimen of resin to 0.1 mg into each aluminum dish. Record total weight as w_2.

5.3 Place the dishes in the oven for 2 h at 300°F (150°C).

5.4 Remove from oven and immediately place in desiccator until they cool to room temperature. Reweigh immediately upon removal from the desiccator and record as w_3.

6. Calculation

6.1 Calculate the volatile content, *V*, as follows:

$$V, \% = 100 - \left[\frac{w_3 - w_1}{w_2 - w_1} \times 100\right]$$

where:

w_1 = weight of aluminum dish, g,
w_2 = weight of aluminum dish and specimen used, g, and
w_3 = weight of aluminum dish and specimen after 2 h in oven, g.

7. Report

7.1 Report the following information:

7.1.1 Resin identification, time, and temperature.

7.1.2 Percent of volatile matter, or volatile content (average of duplicate determinations).

8. Precision and Bias

8.1 The precision and bias for this method have not been determined.

9. Keywords

9.1 phenolic resins; volatile content

[1] This test method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.33 on Polymers and Resins.

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