Designation: D1582 – 98 (Reapproved 2017)

Standard Test Method for Nonvolatile Content of Liquid Phenol, Resorcinol, and Melamine Adhesives[1]

This standard is issued under the fixed designation D1582; 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 nonvolatile content or total solids of liquid phenol, resorcinol, and melamine adhesives with or without hardener (Note 1) added and containing high-boiling and low-boiling volatile organic solvents or water, or both.

NOTE 1—Some low molecular weight materials in the adhesive may be lost if hardener is not used. When a hardener is used, it must be mixed in accordance with the manufacturer's instructions.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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.* For specific precautions, see 5.2.

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]

D907 Terminology of Adhesives

3. Terminology

3.1 *Definitions*—Many of the terms in this test method are defined in Terminology D907.

4. Summary of Test Method

4.1 *Without Hardener*—A weighed amount of adhesive and quartz sand are oven-dried, cooled in a desiccator, and weighed. The percent nonvolatile content is calculated based on the amount remaining.

4.2 *With Hardener*—A weighed amount of mixed adhesive is oven dried, cooled in a desiccator, and weighed. The percent nonvolatile content is calculated based on the amount remaining.

5. Apparatus

5.1 *Petri Dish,* 00 by 22 mm or its equivalent.

5.2 *Circulating-Air Oven,* capable of maintaining temperatures of 70 ± 1°C, 105 ± 1°C, and 150 ± 1°C. (**Warning** —A safety (explosion-proof) oven should be used when volatile materials are likely to burn or explode.)

5.3 *Desiccator,* with drying agent and tray.

5.4 *Analytical Balance,* accurate to 1 mg.

6. Sampling

6.1 Except in special cases, take a composite sample from three or more separate containers chosen at random. Also, take samples from containers which appear to be nonrepresentative and test such samples separately. Place the samples immediately in airtight containers, filled to prevent excessive air space above the adhesive, and take precautions to reduce evaporation or drying to a minimum. Mix the adhesive in the container thoroughly if there is a tendency for the materials to separate.

6.2 Test three specimens of each sample.

7. Procedure

7.1 *70°C Drying Temperature Without Hardener:*

7.1.1 Place approximately 20 g of the adhesive in a covered weighing bottle.

7.1.2 Place approximately 10 g of fine, oven-dried quartz sand in an open Petri dish, together with a small glass stirring rod, and weigh the dish, rod, and contents to the nearest 1 mg on the analytical balance. Weigh out to the nearest 1 mg approximately 2 g of the adhesive by difference from the weighing bottle, keeping the bottle covered as much as

[1] This test method is under the jurisdiction of ASTM Committee D14 on Adhesives and is the direct responsibility of Subcommittee D14.30 on Wood Adhesives.

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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.

possible. Mix the adhesive and quartz sand intimately by means of the stirring rod and distribute uniformly over the bottom of the dish in as thin a layer as possible. Condition the specimen at 23 ± 1°C for at least 16 h.

7.1.3 Place the dish with the rod and contents in the oven at 70 ± 1°C until a constant weight is reached.

7.1.4 Place the warm dish immediately in the desiccator and allow to cool to room temperature before weighing to the nearest 1 mg.

7.2 *70°C Drying Temperature With Hardener:*

7.2.1 Mix approximately 100 g of the adhesive in accordance with the manufacturer's directions, weighing components to the nearest 0.01 g.

7.2.2 Proceed as in 7.1.2, 7.1.3, and 7.1.4.

7.3 *105°C Drying Temperature Without Hardener*—Proceed as in 7.1 except to place the sample in the oven at 105 ± 1°C.

7.4 *105°C Drying Temperature With Hardener*—Proceed as in 7.2 except to place the sample in the oven at 105 ± 1°C.

7.5 *150°C Drying Temperature Without Hardener*—Proceed as in 7.1 except to place the sample in the oven at 150 ± 1°C.

7.6 *150°C Drying Temperature With Hardener*—Proceed as in 7.2 except to place the sample in the oven at 150 ± 1°C.

8. Calculation

8.1 Calculate the percent nonvolatile content or total solids as follows:

$$\text{Nonvolatile content, \%} = (\text{wt of residue/wt of specimen}) \times 100 \quad (1)$$

The weight of the residue is the difference in the weight of the dish, rod, and contents before and after heating.

8.2 Repeat the test if the results for the three specimens of a sample do not agree with ±0.5 percentage units of one another.

9. Report

9.1 Report the following information:

9.1.1 Complete identification of the adhesive tested, including type, lot number, and source,

9.1.2 Procedure used,

9.1.3 Catalyst or hardener, mixing proportions, and conditions used, where applicable,

9.1.4 Total drying time to reach constant weight,

9.1.5 Number of specimens tested, and

9.1.6 Individual nonvolatile content of the three specimens and the average nonvolatile content of the sample.

10. Precision and Bias

10.1 A precision and bias statement does not exist for this test method because resources necessary for round-robin testing have not been forthcoming.

11. Keywords

11.1 adhesives; melamine; nonvolatile content; phenol; resorcinol