



Standard Test Methods for Nonvolatile Content of Resin Solutions¹

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

1. Scope

1.1 These test methods cover the determination of nonvolatile content of solutions of resins in volatile organic solvents.

1.2 Two test methods are included as follows:

1.2.1 *Test Method A*—For solutions of non-heat-reactive resins. These solutions contain resins that remain stable and release the solvent under conditions of the test. Examples are ester gums and alkyds.

1.2.2 *Test Method B*—For two types of solutions:

1.2.2.1 Solutions of heat-reactive resins. These solutions contain resins that undergo condensation or other reactions under the influence of heat. Examples include the formaldehyde reaction products of urea, melamine, and phenols.

1.2.2.2 Solutions that release solvent slowly. Examples include epoxy resin solutions.

1.3 Test Methods A and B differ primarily in the drying times and types of oven used.

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

1.5 *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 Methods

2.1 In both test methods, a weighed specimen of resin solution is spread under pressure between two weighed sheets of aluminum or tin foil. The coated foil sheets are separated and then dried. The weight of residue is determined and the nonvolatile content is calculated. The test method is unique in that it provides for drying of a very thin film of resin, thus

minimizing chances for volatiles to be trapped and held during the heating operation.

2.2 Either a gravity-convection or a forced-ventilation oven and a 30-min heating period at 105°C are used in Test Method A.

2.3 A forced-ventilation oven and a 2-h heating period at 105°C are used in Test Method B.

3. Significance and Use

3.1 The nonvolatile content of resin solutions is useful to coatings producers and users for the determination of the total solids available for film formation and for the estimation of the volatile organic content.

TEST METHOD A—NON-HEAT-REACTIVE RESIN SOLUTIONS

4. Apparatus

4.1 Ovens:

4.1.1 Gravity-convection type, maintained at $105 \pm 2^\circ\text{C}$, with vents open.

4.1.2 Forced-ventilation type, maintained at $105 \pm 2^\circ\text{C}$. For ovens with adjustable air flow rate, set the control damper at 50 %.

4.2 *Aluminum or Tin Foil*, from 38 to 50 μm (0.0015 to 0.0020 in.) in thickness. Either one piece 150 by 300 mm (6 by 12 in.), or two 150 by 150-mm (6 by 6-in.) pieces may be used. The foil must be perfectly smooth; if it becomes wrinkled during the initial handling, roll smooth as directed in 5.2.

4.3 *Plate Glass*—Two pieces about 5 mm ($3/16$ in.) thick; one piece 140 by 140 mm ($5\frac{1}{2}$ by $5\frac{1}{2}$ in.) and one piece 180 by 180 mm (7 by 7 in.).

4.4 *Device for Weighing Specimens*²—Apparatus that will prevent loss of volatile matter during the weighing operation such as any of the following, or equivalent:

4.4.1 *Syringe*, Luer, 2 or 5-mL capacity,

4.4.2 *Weighing Buret*, Smith, 10-mL capacity, or

4.4.3 *Bulb Pipet*, dropping, with 50-mL Erlenmeyer flask.

¹ These test methods are under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D01.21 on Chemical Analysis of Paints and Paint Materials.

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² The bulb pipet is available from most scientific supply houses.