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Standard Test Methods for Nonvolatile Content of Varnishes[1]

This standard is issued under the fixed designation D1644; 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.

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

1. Scope

1.1 These test methods determine the fraction of a varnish that is nonvolatile at the temperature of the test while volatile solvents are driven off. It is sometimes an approximate measure of the film-forming matter in a varnish.

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

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 and health practices and determine the applicability of regulatory limitations prior to use.* For a specific statement, see Section 3.

2. Significance and Use

2.1 These test methods are applicable to varnish and are useful to producers and users in determining nonvolatile content and are sometimes an appropriate measure of the film-forming matter in varnish.

3. Hazards

3.1 Since the flash points of some of the solvents used in coatings and related products are below the temperature of the test, care should be exercised that the lower explosive limits of the solvents are not exceeded. The amount of solvent in the oven atmosphere at any one time will depend on the number of tests (pans) in the oven, the percent nonvolatile of the samples, the size of the oven, the type of oven (mechanical or gravity convection) and the air changes per hour.

TEST METHOD A—3 h AT 105°C

4. Procedure

4.1 Place a portion of the thoroughly mixed sample in a stoppered bottle, or alternatively, in a weighing pipet or a 10-mL syringe without a needle, and from this weigh by difference 1.2 ± 0.1 g into a tared flat-bottomed metal or glass dish (Note 1), 80 to 100 mm in diameter and 5 to 10 mm in depth, such as friction-top can covers, ointment boxes, or petri dishes.

NOTE 1—The term "tared, flat-bottomed dish" implies that the empty dish has no measurable weight change when subjected to the same heat schedule as prescribed for the dish containing the specimen. If this is found to be not so, then more suitable vessels must be found, or corrections applied.

4.2 By gentle tilting, spread the specimen over the bottom of the dish and heat for 3 h in a ventilated oven maintained at 105 ± 2°C. If necessary, a piece of stout wire can be included in the tare of the dish and used at intervals to break up skins by stirring during the heating period. Cool in a desiccator and weigh the dish.

5. Calculation

5.1 Calculate the percent of nonvolatile matter *NV* as follows (Note 2):

$$NV = [(C - A)/S] \times 100 \quad (1)$$

where:

A = weight of dish, g,
S = weight of specimen used, g, and
C = weight of dish and contents after heating, g.

NOTE 2—Determinations of nonvolatile matter by this test method may give high results due either to incomplete elimination of volatile matter or to absorption of oxygen by oxidizing-type varnishes.

6. Report

6.1 Report the nonvolatile matter of the sample to the nearest 0.1 %.

TEST METHOD B—10 min at 150°C

7. Apparatus

7.1 *Sample Transfer Device,* a 2 or 5-mL Luer syringe.

7.2 *Solids Dish,* made from metal foil of such design as to ensure reasonably good contact of the bottom surface when placed on the hot plate. Condition the dish for at least 10 min at 150°C or higher; then store in a desiccator.

[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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