



Designation: D 4209 – 82 (Reapproved 1996)

Standard Practice for Determining Volatile and Nonvolatile Content of Cellulosics, Emulsions, Resin Solutions, Shellac, and Varnishes¹

This standard is issued under the fixed designation D 4209; 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 practice is intended to serve as a guide to the selection of the proper ASTM test method for determining the volatile and nonvolatile content of cellulosics, emulsions, resin solutions, shellac, and varnishes.

NOTE 1—Standards for determining the composition of the volatile fraction are not covered by this practice.

1.2 The standards referenced in the practice are as follows:

Classification	Section	ASTM Standard
Cellulosics	5.1	D 871
		D 914
		D 1347
		D 2369
Emulsions	5.2	D 2369
Resin Solutions	5.3	D 1259
		D 1490
Shellac	5.4	D 29
		D 1650
		D 115
Varnishes	5.5	D 115
		D 1644

2. Referenced Documents

2.1 ASTM Standards:

- D 16 Terminology Relating to Paint, Varnish, Lacquer, and Related Products²
- D 29 Test Methods for Sampling and Testing Lac Resins³
- D 115 Test Methods for Testing Solvent Containing Varnishes Used for Electrical Insulation⁴
- D 360 Specification for Shellac Varnishes³
- D 871 Methods of Testing Cellulose Acetate³
- D 914 Test Methods For Ethylcellulose³
- D 1259 Test Methods for Nonvolatile Content of Resin Solutions²
- D 1347 Test Methods for Methylcellulose³
- D 1490 Test Method for Nonvolatile Content of Urea-Formaldehyde Resin Solutions⁵
- D 1644 Test Methods for Nonvolatile Content of Varnishes²

- D 1650 Test Methods for Sampling and Testing Shellac Varnish³
- D 2369 Test Method for Volatile Content of Coatings²
- D 4758 Test Method for Nonvolatile Content of Latexes³

3. Terminology (see Terminology D 16)

3.1 Definitions:

3.1.1 *cellulose esters*—derivatives of cellulose in which one or more of the hydroxyl hydrogens have been replaced by acyl groups.

3.1.2 *cellulose ethers*—derivatives of cellulose in which one or more of the hydroxyl hydrogens have been replaced by alkyl groups.

3.1.3 *cellulose nitrates (nitrocellulose)*—derivatives of cellulose in which one or more of the hydroxyl hydrogens have been replaced by nitrate groups.

3.1.4 *emulsion vehicle*—an emulsion of binder in water. The binder may be oil, oleoresinous varnish, resin, or other emulsifiable liquid.

3.1.5 *latex*—a stable aqueous dispersion of synthetic resin, produced by emulsion polymerization, as the principal constituent of the binder.

3.1.6 *shellac varnish*—a solution or “cut” of a specified type and grade of dry lac resin in a suitable alcohol.

3.1.7 *varnish*—a liquid composition that is converted by oxidation or thermal cross-linking to a transparent or translucent solid film after application as a thin layer.

4. Significance and Use

4.1 The nonvolatile content of raw materials may be used to determine the total nonvolatile content (solids) of paint and related coatings. Such information may be 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.

5. Procedure

5.1 Cellulosics:

5.1.1 Test Methods D 1644, Method A, should be used for determining the amount of alcohol present in nitrocellulose shipments. This method may also be used for other cellulose derivatives if mutually agreed upon by producer and user.

¹ This practice is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.21 on Chemical Analysis of Paint and Paint Materials.

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² *Annual Book of ASTM Standards*, Vol 06.01.

³ *Annual Book of ASTM Standards*, Vol 06.03.

⁴ *Annual Book of ASTM Standards*, Vol 10.01.

⁵ *Annual Book of ASTM Standards*, Vol 15.06.