Designation: D 3133 – 01 (Reapproved 2005)

Standard Test Method for Quantitative Determination of Cellulose Nitrate in Alkyd Modified Lacquers by Infrared Spectrophotometry[1]

This standard is issued under the fixed designation D 3133; 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 quantitative determination of the content of cellulose nitrate (also known as nitrocellulose) in lacquers containing alkyd resins.

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 hazard statement, see 7.1.1.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 1644 Test Methods for Nonvolatile Content of Varnishes

D 2372 Practice for Separation of Vehicle from Solvent-Reducible Paints

E 168 Practices for General Techniques of Infrared Quantitative Analysis

E 275 Practice for Describing and Measuring Performance of Ultraviolet, Visible, and Near-Infrared Spectrophotometers

3. Summary of Test Method

3.1 The method of standard additions is employed. Increments of cellulose nitrate, in solution, are added to aliquots of the sample. Absorbance measurements are made of the band at 11.8 μm (848 cm^{-1}) for each addition. The original content is then calculated from absorbance versus concentration.

4. Significance and Use

4.1 Coating compositions based on a mixture of synthetic resins and cellulose nitrate dissolved in organic solvents are quantitatively analyzed for the cellulosic derivative without isolating it. The test method is applicable to lacquers for which the grade of nitrocellulose is known and available. Other cellulosics, alkyd resins, many vinyl resins, and solvents do not interfere. Components, such as acrylic resins and some vinyl polymers, that absorb infrared near 11.8 μm (848 cm^{-1}) interfere with the determination. High boiling ester solvents, in particular methyl cellosolve acetate, may also interfere with the determination if not removed in the evaporation procedure (see 8.3).

5. Apparatus

5.1 *Infrared Spectrophotometer*, automatic recording, double-beam. Most infrared spectrophotometers operate from 2.5 to 15 μm (4000 to 650 cm^{-1}), but in this test method only the range between 10 to 14 μm (1000 and 750 cm^{-1}) is used. See Practices E 168.

5.2 *Absorption Cells*, sealed, with sodium chloride (NaCl) windows, 0.1-mm path length, one pair approximately matched.

5.3 *Film Vacuum Evaporator*, rotary thin or equivalent apparatus, to obtain redissolvable lacquer solids without decomposition of the cellulose nitrate.

5.4 *Oven*, vacuum drying, thermostatically controlled to operate at 65 ± 2 C.

6. Reagents

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society,

[1] This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.55 on Factory Applied Coatings on Preformed Products.

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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.