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Standard Guide for Testing Amino Resins[1]

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1. Scope

1.1 This guide covers test methods suitable for testing heat-reactive nitrogen resins, particularly urea-formaldehyde and melamine-formaldehyde resins. The test methods used are listed in Table 1.

2. Referenced Documents

2.1 *ASTM Standards:*

D 883 Terminology Relating to Plastics[2]

D 1013 Test Method for Determining Total Nitrogen in Resins and Plastics[3]

D 1198 Test Method for Solvent Tolerance of Amine Resins[3]

D 1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)[4]

D 1259 Test Methods for Nonvolatile Content of Resin Solutions[5]

D 1475 Test Method for Density of Paint, Varnish, Lacquer, and Related Products[5]

D 1545 Test Method for Viscosity of Transparent Liquids by Bubble Time Method[3]

D 1639 Test Method for Acid Value of Organic Coating Materials[3]

D 3278 Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus[5]

3. Terminology

3.1 *Definition*—The following definition is taken from Terminology D 883:

3.1.1 amino resin—a resin made by polycondensation of a compound containing amino groups such as urea or melamine with an aldehyde, such as formaldehyde, or an aldehyde-yielding material.

TABLE 1 Methods for Testing Nitrogen Resins

Test Method	Section	ASTM Designation
Total nitrogen in resins and plastics	5	D 1013
Solvent tolerance of amino resins	6	D 1198
Color of clear liquids	7	D 1209
Nonvolatile content resin solutions	8	D 1259
Density	9	D 1475
Viscosity	10	D 1545
Acid value	11	D 1639
Flash point	12	D 3278

4. Significance and Use

4.1 This guide summarizes the currently available ASTM test methods useful for testing amino resins. These test methods may be used by producers and users to characterize a variety of properties of nitrogen resins related to their quality and safe use.

5. Total Nitrogen

5.1 Test Method D 1013 is a standard Kjeldahl procedure for nitrogen determination, directly applicable to amino resins and solutions thereof.

6. Solvent Tolerance

6.1 The amount of hydrocarbon that an amino resin tolerates is measured in accordance with Test Method D 1198. The end point of this titration, a defined degree of turbidity, is sensitive to both the alkylation and degree of polymerization of the amino resin.

7. Color

7.1 The color of solutions of amino resins can be measured using the platinum-cobalt scale according to the procedure in Test Method D 1209.

8. Nonvolatile Content

8.1 The nonvolatile content of amino resins is measured using Test Methods D 1259, Method B, which applies to heat reactive resin solutions and requires a longer drying time. A very thin film, created by pressing a resin specimen between sheets of aluminum foil, is dried for 2 h and weighed. There may be some reaction of amino resins during the drying

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[2] *Annual Book of ASTM Standards*, Vol 08.01.

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

[4] *Annual Book of ASTM Standards*, Vol 06.04.

[5] *Annual Book of ASTM Standards*, Vol 06.01.

procedure, but the repeatability (0.7 % absolute) and reproducibility (1.7 % absolute) are acceptable.

9. Density

9.1 Test Method D 1475 is a general-purpose test method for determination of density using a pycnometer or cup. It is fully applicable to amino resins.

10. Viscosity

10.1 Viscosity of amino resins is determined in bubble seconds, approximately equal to stokes, using standard viscosity tubes as described in Test Method D 1545.

11. Acid Value

11.1 Test Method D 1639, which describes titration of a resin specimen with standard potassium hydroxide, is suitable for determining the acid value of amino resins.

12. Flash Point

12.1 Test Methods D 3278 provide for either a flash/no flash or finite flash point determination using the Setaflash closed tester. It is applicable only when the material to be tested has a flash point between 0 and 110°C and a viscosity lower than 150 St at 25°C.

13. Keywords

13.1 amino resin; solvent tolerance; total nitrogen