



# Standard Guide for Testing Amino Resins<sup>1</sup>

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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<sup>2</sup>
- D 1013 Test Method for Determining Total Nitrogen in Resins and Plastics<sup>3</sup>
- D 1198 Test Method for Solvent Tolerance of Amine Resins<sup>3</sup>
- D 1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)<sup>4</sup>
- D 1259 Test Methods for Nonvolatile Content of Resin Solutions<sup>5</sup>
- D 1475 Test Method for Density of Paint, Varnish, Lacquer, and Related Products<sup>5</sup>
- D 1545 Test Method for Viscosity of Transparent Liquids by Bubble Time Method<sup>3</sup>
- D 1639 Test Method for Acid Value of Organic Coating Materials<sup>3</sup>
- D 3278 Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus<sup>5</sup>

## 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.

## 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

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 08.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 06.03.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 06.04.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 06.01.

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

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 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

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