Designation: D3837 – 95 (Reapproved 2012)

Standard Practice for Preparing a Solution of Alkali–Soluble Resins[1]

This standard is issued under the fixed designation D3837; 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 a procedure for preparing solutions of alkali-soluble resins in aqueous ammonia and determining the characteristics of such solutions.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1544 Test Method for Color of Transparent Liquids (Gardner Color Scale)

D2834 Test Method for Nonvolatile Matter (Total Solids) in Water-Emulsion Floor Polishes, Solvent-Based Floor Polishes, and Polymer-Emulsion Floor Polishes

E70 Test Method for pH of Aqueous Solutions With the Glass Electrode

3. Summary of Practice

3.1 Alkali-soluble resins are dissolved in water by chemically reacting available carboxylic acid sites on the resin molecule with a base to form water-soluble carboxylate salts. In this practice, the base used is ammonium hydroxide.

4. Significance and Use

4.1 This practice is suitable for all types of akalali-soluble resins. The resin manufacturer shall specify the percent ammonium hydroxide to be used (based on the equivalent weight of resin) and the maximum temperature to be used to achieve solution.

5. Reagents and Materials

5.1 *Reaction Vessel*—A three-neck, round-bottom 1000-mL flask of heat-resistant glass.

5.2 *Thermometer,* laboratory grade, partial immersion thermometer. Range: from 0 to 230°F, 2° divisions; or from – 20 to 110°C, 1° divisions.

5.3 *Reflux Condenser.*

5.4 *Stirrer*—A motor-driven, variable-speed agitator. The shaft and blade shall be of nonreactive material.

5.5 *Heat Source*—Electric heating mantle or gas burner.

5.6 *Ammonium Hydroxide,* reagent grade, 28 to 30 % NH_3 (26° Baumé). This solution shall be refrigerated while in storage.

5.7 *Distilled Water,* or water of equal purity.

6. Preparation of Sample

6.1 Resin received in ground or flaked form shall be used as received. Select a sample representative of the material under test.

6.2 Resin received in lump form shall be crushed or ground and passed through a 10-mesh screen before testing. Select a sample representative of the material under test.

7. Procedure

7.1 Insert the reflux condenser into one of the sidearms of the flask and support the assembly suitably. Insert the agitator through the center neck and charge the flask with the calculated amount of ammonium hydroxide and water. Using moderate agitation, slowly add the resin to the contents of the flask. Adjust the agitator speed as necessary to keep the resin suspended and moving, but not so fast as to entrain air into the solution. Heat the solution to the specified temperature within 10 min, and maintain this temperature until the solution is complete, or for a maximum of 30 min. If the solution is cloudy or hazy at this point, add additional ammonium hydroxide to clear solution. Total heating time shall not exceed 40 min. Cool the solution and transfer to a clear, clean glass bottle.

NOTE 1—Any deviation from this procedure shall be specified by the resin manufacturer, for example, pre-wetting of resin prior to NH_4OH additive.

[1] This practice is under the jurisdiction of ASTM Committee D21 on Polishes and is the direct responsibility of Subcommittee D21.02 on Raw Materials.

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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.

8. Calculation

8.1 Solution weight desired (400 to 700 g suggested) times percent solids desired equals weight of resin.

8.2 Weight of resin times percent ammonium hydroxide specified equals weight of ammonium hydroxide.

8.3 Solution weight minus resin weight minus ammonium hydroxide weight equals weight of water.

8.4 *Example*—400 g of a 15 % solids solution is desired. The specified amount of ammonium hydroxide is 25 % of the weight of the resin. The calculations are as follows:

$$400\ \text{g} \times 0.15 = 60\ \text{g resin} \quad (1)$$

$$60\ \text{g} \times 0.25 = 15\ \text{g ammonium hydroxide} \quad (2)$$

$$400\ \text{g} - 60\ \text{g} - 15\ \text{g} = 325\ \text{g water} \quad (3)$$

9. Report

9.1 Report the following information:

9.1.1 Percent solids of the solution (Test Method D2834—4 h),

9.1.2 Total amount of NH_4OH used to prepare the solution,

9.1.3 Maximum temperature used,

9.1.4 Any undissolved material, haziness, or cloudiness,

9.1.5 Total elapsed time from start of heating until complete solution is achieved or heat is removed, and

9.1.6 Final pH of the solution, (Test Method E70).

NOTE 2—This solution may be used to test color in accordance with Test Method D1544 or viscosity by any suitable method, or both.

10. Keywords

10.1 alkali-soluble; leveling; polish; preparing resin solution; resin