Designation: D2930 – 03

Standard Test Method for Maleic Acid in Maleic Anhydride by Potentiometric Titration[1]

This standard is issued under the fixed designation D2930; 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 determination of free maleic acid in refined maleic anhydride by potentiometric titration.

1.2 This test method is applicable for all concentrations of maleic acid; however, it is primarily used for concentrations below 0.5 %.

1.3 The following applies to all specified limits in this standard: For purposes of determining conformance with this standard, an observed value or a calculated value shall be rounded off "to the nearest unit" in the last right-hand digit used in expressing the specification limit, in accordance with the rounding-off method of Practice E29.

1.4 *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 specific hazard statements, see Section 7.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1193 Specification for Reagent Water

D3438 Practice for Sampling and Handling Naphthalene, Maleic Anhydride, and Phthalic Anhydride

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

2.2 *Other Documents:*

OSHA Regulations, 29CFR paragraphs 1910.1000 and 1910.1200.[3]

3. Summary of Test Method

3.1 This test method is based on a direct titration of maleic acid using a tertiary amine as the base. The titration is carried out in an anhydrous solvent system and followed potentiometrically by means of a pH meter. Tertiary amines do not react with anhydrides. Only one carboxylic acid group is titrated.

4. Significance and Use

4.1 The maleic acid content is usually an indication of exposure to moisture in air. Maleic anhydride reacts with moisture to form maleic acid.

5. Apparatus

5.1 *Titrimeter or pH meter*, equipped with glass and calomel electrodes. The pair of electrodes shall be mounted to extend well below the liquid level.

5.2 *Microburet*, 5 or 10-mL size, graduated 20 divisions/mL.

5.3 *Stirrer*, mechanical, that will furnish a rapid stirring action, but not such vigorous stirring that air bubbles will be drawn to the electrodes of the titrimeter or pH meter.

5.4 *Beaker*, 250-mL, tall-form.

5.5 *Automatic Titrator* can be used in place of the above apparatus.

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, where such specifications are available.[4] Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

6.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Type IV of Specification D1193.

6.3 *Acetone*, dried over Linde Type 5A molecular sieves.[5]

[1] This test method is under the jurisdiction of ASTM Committee D16 on Aromatic Hydrocarbons and Related Chemicals and is the direct responsibility of Subcommittee D16.02 on Oxygenated Aromatics.

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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.

[3] Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, http://www.access.gpo.gov.

[4] *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

[5] Manufactured by Union Carbide Corp., Linde Div., 270 Park Ave., New York, NY 10017.