



Designation: ~~D2119~~—~~19~~ D2119 – 24

Standard Test Method for Aldehydes in Styrene Monomer¹

This standard is issued under the fixed designation D2119; 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—Scope*

1.1 This test method covers the wet chemical determination of aldehydes in styrene monomer. Aldehydes are calculated and reported as benzaldehyde. ~~The range of concentration for this test method is 0.001 % to 0.030 %.~~

1.2 This test method is applicable to samples with aldehyde concentrations to 0.030 mass%. The limit of detection (LOD) is 0.0006 mass% and the limit of quantitation (LOQ) is 0.002 mass% based on the data in 13.1.

1.3 In determining conformance of the test results using this method to applicable specifications, results shall be rounded off in accordance with the rounding-off method of Practice E29.

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

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements, see Section 8.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

D1193 Specification for Reagent Water

D3437 Practice for Sampling and Handling Liquid Cyclic Products

D6809 Guide for Quality Control and Quality Assurance Procedures for Aromatic Hydrocarbons and Related Materials

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

2.2 Other Documents:

OSHA Regulations, 29 CFR paragraphs 1910.1000 and 1910.1200³

¹ This test method is under the jurisdiction of ASTM Committee D16 on Aromatic, Industrial, Specialty and Related Chemicals and is the direct responsibility of Subcommittee D16.07 on Styrene, Ethylbenzene and C9 and C10 Aromatic Hydrocarbons.

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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 Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://www.dodssp.daps.mil.

*A Summary of Changes section appears at the end of this standard

3. Summary of Test Method

3.1 An alcoholic solution of hydroxylamine hydrochloride is added to a specimen of styrene monomer. Active aldehydes present react in accordance with the following equation:



The hydrochloric acid, which is equivalent to the aldehyde present in the sample, is titrated with standard sodium hydroxide solution.

4. Significance and Use

4.1 This test method is suitable for determining the quantity of aldehydes, both for quality control and quality assurance of the product.

5. Interferences

5.1 Ketones, if present, interfere by partially reacting with the reagent.

6. Apparatus

6.1 *Erlenmeyer Flasks*, glass-stoppered, ~~250-mL~~, 250 mL.

6.2 *Pipets*, ~~25-mL~~, 25 mL.

6.3 *Volumetric Flasks*, ~~100-mL~~, 100 mL.

6.4 *Burets*, ~~10-mL~~, 10 mL. (Microburets are preferred.)

6.5 *Thermometers*, capable of differentiating $\pm 0.1^\circ\text{C}$ at ambient.

7. Reagents and Materials

7.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents 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.

7.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type ~~III~~ of I or II of Specification **D1193**.

7.3 *Hydrochloric Acid, Standard (0.05 N)*—Prepare a 0.05 N solution of hydrochloric acid (~~HCl~~) (HCl CAS 7647-01-0) by diluting 4.15 mL of concentrated HCl (density 1.19 g/mL) to 1 L with water.

7.4 *Hydroxylamine Hydrochloride Solution*—Dissolve 20 g of hydroxylamine hydrochloride (~~NH₂OH·HCl~~) (OH·HCl, CAS 5470-11-1) in 1 L of methanol and neutralize to the red-yellow end point of thymol blue indicator.

7.5 ~~Methanol~~, Methanol (CAS 67-56-1).

7.6 *Sodium Hydroxide, Standard Solution (0.05 N)*—Dissolve 2.00 g of low-carbonate sodium hydroxide (~~NaOH~~) (NaOH, CAS 1310-73-2) in water and dilute to 1 L. Standardize against primary standard benzoic acid.

⁴ *Reagent Chemicals, American Chemical Society Specifications*, *ACS Reagent Chemicals, Specifications and Procedures for Reagents and Standard-Grade Reference Materials*, 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. ~~Pharmaceutical~~ Pharmaceutical Convention, Inc. (USPC), Rockville, MD.