



Designation: D 2031 – 97

Standard Test Method for Reducing Substances in Refined Pyridine¹

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1. Scope

1.1 This test method covers the qualitative determination of reducing substances in refined pyridine.

1.2 *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 6.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water²

D 3437 Practice for Sampling and Handling Liquid Cyclic Products³

2.2 *Other Document:*⁴

OSHA Regulations, 29 CFR, paragraphs 1910.1000 and 1910.1200.

3. Summary of Test Method

3.1 Specified volumes of pyridine and potassium permanganate are mixed, allowed to stand for 30 min at room temperature, and the color of the solution noted.

4. Significance and Use

4.1 This test method gives a qualitative means of detection of reducing substances in pyridine.

5. Reagents

5.1 *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.⁵ 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.

5.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Types I to IV of Specification D 1193.

5.3 *Potassium Permanganate Solution* (3.2 g/L)—Dissolve 3.2 g of potassium permanganate (KMnO₄) in water and dilute to 1 L in a volumetric flask. Standardization of the solution is not required. Store the permanganate solution in a brown bottle and prepare fresh every 30 days.

5.4 *Hydrochloric Acid*, concentrated (HCl, sp gr 1.19).

NOTE 1—Clean all equipment used to store and handle the permanganate solution with concentrated hydrochloric acid (HCl, sp gr 1.19) and rinse thoroughly with water. Continuous use of such equipment without cleaning results in a deposition of manganese dioxide (MnO₂) which catalyzes reduction of the permanganate.

6. Hazards

6.1 Consult current OSHA regulations, supplier's Material Safety Data Sheets, and local regulations for all materials used in this test method.

7. Sampling and Handling

7.1 Sample the material in accordance with practice D 3437.

8. Procedure

8.1 Pipet 5 mL of pyridine specimen and 0.5 mL of KMnO₄ solution into a 25 by 150-mm test tube. Mix thoroughly by shaking, stopper, and let stand for 30 min at room temperature.

8.2 Note the color of the specimen solution. If a brown color or precipitate interferes, the solution should be centrifuged or filtered through a sintered glass filter before observing the color of the solution.

9. Report

9.1 If the specimen solution retains any permanganate (purple-pink) color, report the specimen "passes."

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 D16.03 on Organic Nitrogen Compounds.

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² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Annual Book of ASTM Standards*, Vol 06.04.

⁴ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

⁵ *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.



9.2 If all of the permanganate color has been discharged from the specimen solution, report the specimen “fails.”

10. Precision and Bias

10.1 This test method for determining reducing substances in pyridine has no precision nor bias because the value of reducing substances in pyridine is defined only in terms of this test method.

11. Keywords

11.1 permanganate; pyridine; reducing substances

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