



Standard Test Method for Permanganate Time of Acetone and Methanol¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the detection in acetone and methanol of the presence of impurities that reduce potassium permanganate.

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.*

1.3 For specific hazard information and guidance, consult the supplier's Material Safety Data Sheet.

2. Referenced Documents

2.1 *ASTM Standards:*

D 329 Specification for Acetone²

D 1152 Specification for Methanol (Methyl Alcohol)²

D 1193 Specification for Reagent Water³

D 1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)²

E 180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Specialty Chemicals⁴

E 346 Test Methods for Analysis of Methanol⁴

3. Summary of Test Method

3.1 Substances reacting with potassium permanganate in neutral solutions reduce it to manganese dioxide which colors the solution yellow. In the permanganate test the time required for the color of the test solution to change to that of a standard solution is measured. The color of the test solution changes from pink-orange to yellow-orange.

4. Significance and Use

4.1 The permanganate time can be used to judge the presence of oxidizable materials that may be associated with

manufacture or contamination during distribution and to assess compliance with a specification.

4.2 Many chemical processes that use acetone or methanol, or both, involve catalyst, metals, or ligand complexes that are sensitive to oxidation. Since oxidizable contaminants may affect the efficiency of these processes, this test method provides a comparative test for manufacturing control and assessing compliance with a specification.

5. Apparatus

5.1 *Color Comparison Tubes*—Matched 50-mL, tall form Nessler tubes, provided with ground on, optically clear, glass caps.

5.2 *Constant-Temperature Bath*, capable of maintaining a temperature of $15.0 \pm 0.5^\circ\text{C}$ or of $25.0 \pm 0.5^\circ\text{C}$. It is important that the constant-temperature bath be protected from direct light. If a glass constant-temperature bath is employed, it should be wrapped or coated with an opaque material.

5.3 *Pipet*, capable of delivering 2.0 mL of solution.

5.4 *Interval Timer and Clock*, capable of measuring a time interval of 120 min or more. An alarm arrangement may be desirable.

6. Reagents

6.1 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.

6.2 Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Type IV of Specification D 1193.

6.3 *Potassium Permanganate Solution* (0.200 g/L)—Dissolve 0.200 g of potassium permanganate (KMnO_4) and

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.35 on Solvents, Plasticizers, and Chemical Intermediates.

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² *Annual Book of ASTM Standards*, Vol 06.04.

³ *Annual Book of ASTM Standards*, Vol 11.01.

⁴ *Annual Book of ASTM Standards*, Vol 15.05.

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.