



## Standard Test Method for Peroxide Number of Aviation Turbine Fuels<sup>1</sup>

This standard is issued under the fixed designation D 3703; 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 approval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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

### 1. Scope

1.1 This test method covers the determination of the peroxide content of aviation turbine fuels.

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 consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific warning statements, see 6.3, 6.6, 8.2, and Annex A1.

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

D 1193 Specification for Reagent Water

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products

#### 2.2 Other Standards:

CRC Report No. 559 Determination of the Hydroperoxide Potential of Jet Fuels<sup>3</sup>

4500-C1 B. Iodometric Method I—Standard Methods for the Examination of Water and Wastewater<sup>4</sup>

### 3. Summary of Test Method

3.1 A quantity of sample dissolved in 1,1,2-trichloro-1,2,2-trifluoroethane is contacted with aqueous potassium iodide solution. The peroxides present are reduced by the potassium iodide. An equivalent amount of iodine is liberated, which is titrated with sodium thiosulfate solution. The results are calculated as milligrams per kilogram (ppm) of peroxide.

### 4. Significance and Use

4.1 The magnitude of the peroxide number is an indication of the quantity of oxidizing constituents present. Deterioration of turbine fuel results in the formation of peroxides and other oxygen-carrying compounds. The peroxide number measures those compounds that will oxidize potassium iodide.

4.2 The determination of the peroxide number of aviation turbine fuels is significant because of the adverse effect of peroxides upon certain elastomers in the fuel systems.

### 5. Apparatus

5.1 Iodine Number Flask, 250 mL, glass-stoppered.

### 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.<sup>5</sup> 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 Specification D 1193, Type II.

6.3 *Acetic Acid Solution*—Mix 4 mL of concentrated hydrochloric acid (HCl, sp gr 1.19) with 996 mL of glacial acetic acid (CH<sub>3</sub>COOH). (**Warning**—Poison Corrosive. Combustible can be fatal if swallowed. Causes severe burns. Harmful if inhaled. See A1.2).

6.4 1,1,2-Trichloro-1,2,2 Trifluoroethane. (**Warning**—See A1.1.)

6.5 *Potassium Dichromate Solution, Standard (0.1 N)*—ACS reagent grade. Dissolve 2.452 g of the dried potassium dichromate (K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>) in water and dilute to 500 mL in a

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.05 on Properties of Fuels, Petroleum Coke and Carbon Material.

Current edition approved Nov. 1, 2004. Published November 2004. Originally approved in 1978. Last previous edition approved in 1999 as D 3703 – 99.

<sup>2</sup> 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.

<sup>3</sup> Available from the Coordinating Research Council, Inc., 219 Perimeter Center Parkway, Atlanta, GA 30346.

<sup>4</sup> Published by the American Health Assoc., the American Water Works Assoc. and Water Environment Federation. Available from American Public Health Publication Sales, P. O. Box 753, Waldorf, MD 20604–0753.

<sup>5</sup> "Reagent Chemicals, American Chemical Society Specifications," American Chemical Society, Washington, D.C. 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.