



Designation: D3703 – 18 (Reapproved 2024)

# Standard Test Method for Hydroperoxide Number of Aviation Turbine Fuels, Gasoline and Diesel Fuels<sup>1</sup>

This standard is issued under the fixed designation D3703; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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

## 1. Scope

1.1 This test method covers the determination of the hydroperoxide content expressed as hydroperoxide number of aviation turbine, gasoline and diesel fuels.

1.2 The range of hydroperoxide number included in the precision statement is 0 mg/kg to 50 mg/kg active oxygen as hydroperoxide.

1.3 The interlaboratory study to establish the precision of this test method consisted of spark-ignition engine fuels (regular, premium and California Cleaner-Burning gasoline), aviation gasoline, jet fuel, ultra low sulfur diesel, and biodiesel. However, biodiesel was not included in the precision calculation because of the large differences in results within labs and between labs.

1.4 This test method detects hydroperoxides such as t-butyl hydroperoxide and cumene hydroperoxide. It does not detect sterically-hindered hydroperoxides such as dicumyl and di-t-butyl hydroperoxides.

1.5 Di-alkyl hydroperoxides added commercially to diesel fuels are not detected by this test method.

1.6 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.7 *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 warning statements, see 7.3, 7.6, 9.2, and Annex A1.

1.8 *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:*<sup>2</sup>

D1193 Specification for Reagent Water

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D6447 Test Method for Hydroperoxide Number of Aviation Turbine Fuels by Voltammetric Analysis

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. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *hydroperoxide, n*—organic peroxide having the generalized formula ROOH.

3.1.1.1 *Discussion*—This test method detects hydroperoxides such as t-butyl hydroperoxide [(CH<sub>3</sub>)<sub>3</sub>COOH] and cumene hydroperoxide [C<sub>6</sub>H<sub>5</sub>C(CH<sub>3</sub>)<sub>2</sub>OOH]. It does not detect sterically-hindered hydroperoxides such as dicumyl and di-t-butyl hydroperoxides.

3.1.2 *hydroperoxide number, n*—an indication of the quantity of oxidizing constituents present in certain liquid fuels as determined by this test method.

3.1.2.1 *Discussion*—The higher the quantity of oxidizing constituents in the fuels, the higher the hydroperoxide number.

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

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [www.astm.org/contact](http://www.astm.org/contact). 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., 5755 North Point Pkwy, Suite 265, Alpharetta, GA 30022, <http://www.crao.org>.

<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.