



Designation: D8564 – 24

Standard Test Method for Determination of Phenolic Antioxidants and Fuel System Icing Inhibitors in Aviation Turbine Fuels¹

This standard is issued under the fixed designation D8564; 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

1.1 This test method covers the determination, in the interim precision ranges, of hindered phenolic antioxidants from approximately 1 mg/L to 50 mg/L and fuel system icing inhibitors from approximately 450 mg/L to 4500 mg/L in aviation turbine fuels by solid phase extraction (SPE) with gas chromatography-mass spectrometry detection (SPE-GC/MS).

1.1.1 Higher concentrations can be determined, but the interim precision of the test method has not been determined.

1.2 This test method is applicable to aviation turbine fuels that meet several international aviation turbine fuel specifications including, but not limited to, petroleum based, such as specified in Specification [D1655](#), and synthetic aviation turbine fuels (SAF), such as specified in Specification [D7566](#), and a blend of such fuels.

1.3 The test method does not purport to identify all of the individual antioxidants and fuel system icing inhibitors. The interim precision estimates have been determined in accordance with Practice [D6300](#) for the following:

1.3.1 *Phenolic Antioxidants*—2,6-di-tert-butyltert-butylphenol; 2,4,6-tri-tert-butylphenol; 2,6-di-tert-butyl-4-methyl phenol; 4-sec-butyl-2,6-di-tert-butylphenol; 2-tert-butyl-4,6-dimethylphenol; 2-tert-butylphenol; 4-tert-butyl-2-methylphenol; and

1.3.2 *Fuel System Icing Inhibitors*—Diethylene glycol monomethyl ether (DiGME) and ethylene glycol monomethyl ether (EGM) (2-methoxyethanol).

1.3.3 Not all of the above antioxidants and/or fuel system icing inhibitors may be listed in all aviation turbine fuel specifications. User should consult the pertinent specification(s) for testing requirements.

1.4 [Appendix X1](#) presents information on the data such as accuracy recovery studies and application to several types of aviation turbine fuels.

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

1.6 *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.*

1.7 *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

[D1655](#) Specification for Aviation Turbine Fuels

[D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products

[D4171](#) Specification for Fuel System Icing Inhibitors

[D4175](#) Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

[D4177](#) Practice for Automatic Sampling of Petroleum and Petroleum Products

[D4307](#) Practice for Preparation of Liquid Blends for Use as Analytical Standards

[D5006](#) Test Method for Measurement of Fuel System Icing Inhibitors (Ether Type) in Aviation Fuels

[D6299](#) Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance

[D6300](#) Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products, Liquid Fuels, and Lubricants

[D7566](#) Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons

¹ 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 [D02.04.01](#) on Gas Chromatography Methods.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.