



Standard Test Method for Assessing Middle Distillate Fuel Storage Stability by Oxygen Overpressure¹

This standard is issued under the fixed designation D5304; 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.

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

1. Scope*

1.1 This test method covers a procedure for assessing the potential storage stability of middle distillate fuels such as Grade No. 1D and Grade No. 2D diesel fuels, in accordance with Specification [D975](#).

1.2 This test method is applicable to either freshly refined fuels or fuels already in storage.

1.3 This test method is suitable for fuels containing stabilizer additives as well as fuels containing no such additives. However, fuels additized with dispersant additives, including dispersant-containing stability additives, may be ranked inaccurately using this test method compared to fuels that are not additized with dispersant additives.

1.4 [Appendix X1](#) provides information on other suggested test times and temperatures for which this test method may be used.

1.5 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

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 and health practices and determine the applicability of regulatory limitations prior to use.* For specific warning statements, see [4.1](#), [6.2](#), [6.3](#), and [7.4](#).

2. Referenced Documents

2.1 ASTM Standards:²

[D525](#) Test Method for Oxidation Stability of Gasoline (Induction Period Method)

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 [D02.14](#) on Stability and Cleanliness of Liquid Fuels.

Current edition approved April 1, 2015. Published May 2015. Originally approved in 1992. Last previous edition approved in 2011 as D5304 – 11. DOI: 10.1520/D5304-15.

² 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.

[D975](#) Specification for Diesel Fuel Oils

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

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

[D4306](#) Practice for Aviation Fuel Sample Containers for Tests Affected by Trace Contamination

[E1](#) Specification for ASTM Liquid-in-Glass Thermometers

3. Terminology

3.1 Definitions:

3.1.1 *membrane filter, n*—a porous article of closely controlled pore size through which a liquid is passed to separate matter in suspension.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *oxygen overpressure, n*—partial pressures of oxygen higher than that of air at atmospheric pressure.

3.2.2 *potential storage stability, n*—the tendency of a fuel to form insolubles under the conditions of this test method.

3.2.3 *reactor, n*—any vessel capable of sustaining pressures and temperatures above ambient, sometimes designated pressure vessel.

3.2.4 *weighing assembly, n*—a set of two filters and two aluminum weighing dishes used to determine total insolubles for each sample or blank.

4. Summary of Test Method

4.1 A 100 mL aliquot of filtered fuel is placed in a borosilicate glass container. The container is placed in a pressure vessel which has been preheated to 90 °C. The pressure vessel is pressurized with oxygen to 800 kPa (absolute) (100 psig) for the duration of the test. The pressure vessel is placed in a forced air oven at 90 °C for 16 h. (**Warning**—Observe all normal precautions while using oxygen under pressure and at high temperatures in the presence of combustible liquids. Appropriate shielding should be used for any containers under pressure. Pressurize and depressurize the containers *slowly* using appropriate personnel shielding. Never attempt to open the pressure vessel while it is pressurized. All fuel and solvent handling should be done in an appropriate

*A Summary of Changes section appears at the end of this standard