



Standard Test Method for Oxidation Stability of Middle Distillate Fuels—Rapid Small Scale Oxidation Test (RSSOT)¹

This standard is issued under the fixed designation D7545; 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 laboratory test method covers a quantitative determination of the stability of middle distillate fuels such as diesel fuels and heating oils, with up to 100% biodiesel, under accelerated oxidation conditions, by an automatic instrument.

NOTE 1—This test method is technically equivalent to test method EN 16091

1.2 This test method is designed for products complying with Specification [D975](#) on Diesel Fuel, Grades No. 1D and 2D; Specification [D396](#) on Burner Fuel, Grades No. 1 and No. 2; Specification [D6751](#) on Biodiesel, B100, and Specification [D7467](#) on Diesel Fuel Oil, B6 to B20.

1.3 This test method measures the induction period, under specified conditions, which can be used as an indication of the oxidation and storage stability of middle distillate fuels.

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

1.5 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

[D396](#) Specification for Fuel Oils

[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

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 Jan. 1, 2014. Published January 2014. Originally approved in 2009. Last previous edition approved in 2013 as D7545 – 13. DOI: 10.1520/D7545-14.

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.

[D6751](#) Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels

[D7467](#) Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20)

2.2 Other Standards:

[CEN/TR 16366:2012](#) Liquid Petroleum Products—Middle Distillates and Fatty Acid Methyl Ester (FAME) Fuels and Blends—Round Robin Report on Applicability of Rapid Small Scale Oxidation Test Method³

[EN 590](#) Automotive Fuels—Diesel—Requirements and Test Methods³

[EN 16091](#) Liquid Petroleum Products—Middle Distillates and Fatty Acid Methyl Ester (FAME) Fuels and Blends—Determination of Oxidation Stability by Rapid Small Scale Oxidation Method³

[ISO 4259](#) Petroleum Products—Determination and Application of Precision Data in Relation to Methods of Test⁴

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *break point, n*—pressure in the test apparatus which is 10 % below the maximum pressure of the actual test run.

3.1.2 *induction period, n*—time elapsed between starting the heating procedure of the sample vessel and the break point, measured in minutes.

4. Summary of Test Method

4.1 A 5 mL sample is introduced into a pressure vessel which is then charged with oxygen to 700 kPa at ambient temperature. The test is initiated by starting the heater and heating the pressure vessel to a temperature of 140°C.

4.2 The pressure is recorded continuously until the break-point is reached. Alternatively, the test may be terminated when a minimum specification requirement is reached.

5. Significance and Use

5.1 The induction period may be used as an indication of the oxidation and storage stability of middle distillate fuel.

³ Available from European Committee for Standardization (CEN), Avenue Marnix 17, B-1000, Brussels, Belgium, <http://www.cen.eu>.

⁴ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.

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