



Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method)¹

This standard is issued under the fixed designation D5191; 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 the use of automated vapor pressure instruments to determine the total vapor pressure exerted in vacuum by air-containing, volatile, liquid petroleum products, including automotive spark-ignition fuels with or without oxygenates (see **Note 1**). This test method is suitable for testing samples with boiling points above 0 °C (32 °F) that exert a vapor pressure between 7 kPa and 130 kPa (1.0 psi and 18.6 psi) at 37.8 °C (100 °F) at a vapor-to-liquid ratio of 4:1. Measurements are made on liquid sample sizes in the range from 1 mL to 10 mL. No account is made for dissolved water in the sample.

NOTE 1—An interlaboratory study was conducted in 2008 involving 11 different laboratories submitting 15 data sets and 15 different samples of ethanol-fuel blends containing 25 volume %, 50 volume %, and 75 volume % ethanol. The results indicated that the repeatability limits of these samples are within the published repeatability of this test method. On this basis, it can be concluded that D5191 is applicable to ethanol-fuel blends such as Ed75 and Ed85 (Specification **D5798**) and other ethanol-fuel blends with greater than 10 v% ethanol. See ASTM RR: D02–1694 filed with ASTM for supporting data.²

NOTE 2—Samples can also be tested at other vapor-to-liquid ratios, temperatures, and pressures, but the precision and bias statements need not apply.

NOTE 3—The interlaboratory studies conducted in 1988, 1991, and 2003 to determine the precision statements in Test Method D5191 did not include any crude oil in the sample sets. Test Method **D6377**, as well as IP 481, have been shown to be suitable for vapor pressure measurements of crude oils.

1.1.1 Some gasoline-oxygenate blends may show a haze when cooled to 0 °C to 1 °C. If a haze is observed in **8.5**, it shall be indicated in the reporting of results. The precision and bias statements for hazy samples have not been determined (see **Note 15**).

1.2 This test method is suitable for calculation of the dry vapor pressure equivalent (DVPE) of gasoline and gasoline-

oxygenate blends by means of a correlation equation (see **Eq 1** in **14.2**). The calculated DVPE very closely approximates the dry vapor pressure that would be obtained on the same material when tested by Test Method **D4953**.

1.3 The values stated in SI units are regarded as standard. The inch-pound units given in parentheses are provided for information only.

1.4 **WARNING**—Mercury has been designated by many regulatory agencies as a hazardous material that can cause central nervous system, kidney and liver damage. Mercury, or its vapor, may be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury containing products. See the applicable product Material Safety Data Sheet (MSDS) for details and EPA's website – <http://www.epa.gov/mercury/faq.htm> – for additional information. Users should be aware that selling mercury and/or mercury containing products into your state or country may be prohibited by law.

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.* For specific safety warning statements, see **7.2** through **7.8**.

2. Referenced Documents

2.1 ASTM Standards:³

- D2892** Test Method for Distillation of Crude Petroleum (15-Theoretical Plate Column)
- D4057** Practice for Manual Sampling of Petroleum and Petroleum Products
- D4953** Test Method for Vapor Pressure of Gasoline and Gasoline-Oxygenate Blends (Dry Method)
- D5798** Specification for Ethanol Fuel Blends for Flexible-Fuel Automotive Spark-Ignition Engines
- D6299** Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical

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 **D02.08** on Volatility.

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² Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D02-1694.

³ 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.