



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

This standard is issued under the fixed designation D5190; 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 of the total vapor pressure of air-containing, volatile, petroleum products. This test method is suitable for testing samples with boiling points above 0°C (32°F) that exert a vapor pressure between 7 and 172 kPa (1 and 25 psi) at 37.8°C (100°F) at a vapor-to-liquid ratio of 4:1. This test method is suitable for testing gasoline samples that contain oxygenates. No account is made of dissolved water in the sample.

1.1.1 Some gasoline-oxygenate blends may show a haze when cooled to 0 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 8).

1.2 This test method is suitable for the calculation of a dry vapor pressure equivalent (DVPE) by means of a correlation equation (see 13.1). The calculated DVPE very closely approximates the dry vapor pressure that would be obtained on the same material when tested in accordance with Test Method D4953.

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

1.4 *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 hazard statements, see 7.3 through 7.5 and 9.2.

2. Referenced Documents

2.1 ASTM Standards:²

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4175 Terminology Relating to Petroleum, Petroleum Products, and Lubricants

D4953 Test Method for Vapor Pressure of Gasoline and Gasoline-Oxygenate Blends (Dry Method)

D5191 Test Method for Vapor Pressure of Petroleum Products (Mini Method)

3. Terminology

3.1 Definitions:

3.1.1 *dry vapor pressure equivalent (DVPE), n* —value calculated by a defined correlation equation, that is expected to be comparable to the vapor pressure value obtained by Test Method D4953, Procedure A.

3.1.2 *gasoline-oxygenate blend, n* —spark-ignition engine fuel consisting primarily of gasoline with one or more oxygenates.

3.1.3 *oxygenate, n* —oxygen-containing ashless organic compound, such as an alcohol or ether, which may be used as a fuel or fuel supplement. **D4175**

3.1.4 *total vapor pressure, n* —the observed pressure measured in the experiment, that is, the sum of the partial pressure of the sample and the partial pressure of the dissolved air.

3.1.5 *vapor pressure, n* —pressure exerted by the vapor of a liquid when in equilibrium with the liquid. **D4175**

3.2 Abbreviations:

3.2.1 *DVPE, n* —dry vapor pressure equivalent.

3.2.2 *MTBE, n* —methyl *t*-butyl ether.

4. Summary of Test Method

4.1 The chilled sample cup of the automatic vapor pressure instrument is filled with chilled sample and is coupled to the instrument inlet fitting. The sample is then automatically forced from the sample chamber to the expansion chamber where it is held until thermal equilibrium at 37.8°C (100°F) is reached. In this process the sample is expanded to five times its volume (4:1 vapor-to-liquid ratio). The vapor pressure is measured by a pressure transducer.

4.2 The measured vapor pressure is automatically converted to a DVPE value by the instrument. A correction to this value is necessary to account for the observed bias between the test result and that obtained by Test Method D4953.

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.08 on Volatility.

Current edition approved Nov. 1, 2007. Published January 2008. Originally approved in 1991. Last previous edition approved in 2001 as D5190-01. DOI: 10.1520/D5190-07.

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.