



Standard Test Method for Determination of Vapor Pressure (VP_x) of Petroleum Products, Hydrocarbons, and Hydrocarbon-Oxygenate Mixtures (Triple Expansion Method)¹

This standard is issued under the fixed designation D6378; 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 use of automated vapor pressure instruments to determine the vapor pressure exerted in vacuum by volatile, liquid petroleum products, hydrocarbons, and hydrocarbon-oxygenate mixtures. 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 150 kPa (1.0 psi and 21 psi) at 37.8 °C (100 °F) at a vapor-to-liquid ratio of 4:1. The liquid sample volume size required for analysis is dependent upon the vapor-to-liquid ratio chosen (see [Note 1](#)) and the measuring chamber volume capacity of the instrument (see [6.1.1](#) and [Note 3](#)).

NOTE 1—The test method is suitable for the determination of the vapor pressure of volatile, liquid petroleum products at temperatures from 0 °C to 100 °C at vapor to liquid ratios of 4:1 to 1:1 ($X = 4$ to 1) and pressures up to 500 kPa (70 psi), but the precision statement (see [Section 16](#)) may not be applicable.

1.2 This test method also covers the use of automated vapor pressure instruments to determine the vapor pressure exerted in vacuum by aviation turbine fuels. This test method is suitable for testing aviation turbine fuel samples with boiling points above 0 °C (32 °F) that exert a vapor pressure between 0 kPa and 110 kPa (0 psi and 15.5 psi) at a vapor-to-liquid ratio of 4:1, in the temperature range from 25 °C to 100 °C (77 °F to 212 °F).

1.3 The vapor pressure (VP_x) determined by this test method at a vapor-liquid ratio of 4:1 ($X = 4$) of gasoline and gasoline-oxygenate blends at 37.8 °C can be correlated to the dry vapor pressure equivalent (DVPE) value determined by Test Method [D5191](#) (see [16.3](#)). This condition does not apply when the sample is aviation turbine fuel.

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

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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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 warning statements, see [7.2 – 7.8](#).

2. Referenced Documents

2.1 ASTM Standards:²

- [D323](#) Test Method for Vapor Pressure of Petroleum Products (Reid Method)
- [D2892](#) Test Method for Distillation of Crude Petroleum (15-Theoretical Plate Column)
- [D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products
- [D4177](#) Practice for Automatic Sampling of Petroleum and Petroleum Products
- [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)
- [D5842](#) Practice for Sampling and Handling of Fuels for Volatility Measurement
- [D5854](#) Practice for Mixing and Handling of Liquid Samples of Petroleum and Petroleum Products
- [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 and Lubricants
- [D6708](#) Practice for Statistical Assessment and Improvement of Expected Agreement Between Two Test Methods that Purport to Measure the Same Property of a Material

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

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.