



Designation: D2889 – 24

# Standard Test Method for Calculation of True Vapor Pressures of Petroleum Distillate Fuels<sup>1</sup>

This standard is issued under the fixed designation D2889; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This test method describes the calculation of true vapor pressures of petroleum distillate fuels for which distillation data may be obtained in accordance with Test Method **D86** without reaching a decomposition point prior to obtaining 90 % by volume distilled.

1.2 The test method may be used to calculate vapor pressures at temperatures between the 0 % equilibrium flash temperature and the critical temperature of the fuel. Provision is included for obtaining a calculated critical temperature for fuels for which it is not known.

1.3 Critical pressure-temperature data are usually not available for petroleum fuels. However, if both the critical pressure and critical temperature are known, the values shall be used as the coordinates in **Fig. 1** to establish a critical point to be used instead of the focal point established as described in **7.5.4**; and the calculations described in **7.5** through **7.5.4** are not required. If either a determined true boiling point or determined equilibrium flash vaporization temperature at 0 % distilled at atmospheric pressure is known, the determined value shall be used to establish the lower limit of the bubble-point line referred to in **7.4**.

1.4 The method is not reliable for distillate fuels having a boiling range of less than 100 °F (38 °C) between the Test Method **D86** 10 % by volume and 90 % by volume distilled temperatures.

1.5 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

<sup>1</sup> This test method is under jurisdiction of ASTM Committee **D02** on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee **D02.04.0K** on Correlative Methods.

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1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

**D86** Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure

**D287** Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer/Method)

**D4175** Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

2.2 *ASTM Adjuncts:*

Temperature Pressure Conversion Chart (16 by 20 in. drawings)<sup>3</sup>

## 3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this test method, refer to Terminology **D4175**.

## 4. Summary of Test Method

4.1 Equilibrium flash vaporization (EFV) temperatures are calculated from distillation data (Test Method **D86**) determined on the sample. The distillation data, calculated EFV data, and API gravity of the sample are used with a graphical correlation procedure to obtain two pairs of temperature-pressure coordinates through which the bubble-point line of the phase diagram for the sample may be drawn. The calculated true vapor pressure at a specified temperature is obtained by reading the pressure at the intersection of the bubble-point line and specified temperature.

NOTE 1—Details of the procedure and data substantiating its validity for

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [www.astm.org/contact](http://www.astm.org/contact). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from ASTM International Headquarters. Order Adjunct No. **ADJD2889**. Original adjunct produced in 1987.

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