



Standard Test Method for Hydrocarbon Types in Low Olefinic Gasoline by Mass Spectrometry¹

This standard is issued under the fixed designation D2789; 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 by mass spectrometry of the total paraffins, monocycloparaffins, dicycloparaffins, alkylbenzenes, indans or tetralins or both, and naphthalenes in gasoline having an olefin content of less than 3 % by volume and a 95 % distillation point of less than 210 °C (411 °F) as determined in accordance with Test Method D86. Olefins are determined by Test Method D1319, or by Test Method D875.

1.2 It has not been determined whether this test method is applicable to gasoline containing oxygenated compounds (for example, alcohols and ethers).

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

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.*

2. Referenced Documents

2.1 ASTM Standards:²

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

D875 Method for Calculating of Olefins and Aromatics in Petroleum Distillates from Bromine Number and Acid Absorption (Withdrawn 1984)³

D1319 Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption

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 D02.04.0M on Mass Spectroscopy.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

D2001 Test Method for Depentanization of Gasoline and Naphthas

D2002 Practice for Isolation of Representative Saturates Fraction from Low-Olefinic Petroleum Naphthas (Withdrawn 1998)³

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 The summations of characteristic mass fragments are defined as follows (equations are identical to those in 11.1):

$$\sum 43 \text{ (paraffins)} = \text{total peak height of } m/e^+ 43 + 57 + 71 + 85 + 99. \quad (1)$$

$$\sum 41 \text{ (monocycloparaffins)} = \text{total peak height of } m/e^+ 41 + 55 + 69 + 83 + 97. \quad (2)$$

$$\sum 67 \text{ (dicycloparaffins)} = \text{total peak height of } m/e^+ 67 + 68 + 81 + 82 + 95 + 96. \quad (3)$$

$$\sum 77 \text{ (alkylbenzenes)} = \text{total peak height of } m/e^+ 77 + 78 + 79 + 91 + 92 + 105 + 106 + 119 + 120 + 133 + 134 + 147 + 148 + 161 + 162. \quad (4)$$

$$\sum 103 \text{ (indans and tetralins)} = \text{total peak height of } m/e^+ 103 + 104 + 117 + 118 + 131 + 132 + 145 + 146 + 159 + 160. \quad (5)$$

$$\sum 128 \text{ (naphthalenes)} = \text{total peak height of } m/e^+ 128 + 141 + 142 + 155 + 156. \quad (6)$$

$$T = \text{total ion intensity} = \sum 41 + \sum 43 + \sum 67 + \sum 77 + \sum 103 + \sum 128. \quad (7)$$

3.1.2 *carbon number*—by definition, is the average number of carbon atoms in the sample.

3.1.3 *mass number*—with a plus sign as superscript, is defined as the peak height associated with the same mass number.

4. Summary of Test Method

4.1 Samples are analyzed by mass spectrometry, based on the summation of characteristic mass fragments, to determine the concentration of the hydrocarbon types. The average number of carbon atoms of the sample is estimated from