



Designation: D2425 – 17

Standard Test Method for Hydrocarbon Types in Middle Distillates by Mass Spectrometry¹

This standard is issued under the fixed designation D2425; 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 an analytical scheme using the mass spectrometer to determine the hydrocarbon types present in virgin middle distillates 204 °C to 343 °C (400 °F to 650 °F) boiling range, 5 % to 95 % by volume as determined by Test Method D86. Samples with average carbon number value of paraffins between C_{12} and C_{16} and containing paraffins from C_{10} and C_{18} can be analyzed. Eleven hydrocarbon types are determined. These include: paraffins, noncondensed cycloparaffins, condensed dicycloparaffins, condensed tricycloparaffins, alkylbenzenes, indans or tetralins, or both, C_nH_{2n-10} (indenes, etc.), naphthalenes, C_nH_{2n-14} (acenaphthenes, etc.), C_nH_{2n-16} (acenaphthylenes, etc.), and tricyclic aromatics.

NOTE 1—This test method was developed on Consolidated Electroynamics Corporation Type 103 Mass Spectrometers.

1.2 The values stated in SI units are to be regarded as the standard.

1.2.1 *Exception*—The inch-pound units given in parentheses are for information only.

1.3 *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.* For a specific warning statement, see 10.1.

1.4 *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.*

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. Referenced Documents

2.1 ASTM Standards:²

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

D2549 Test Method for Separation of Representative Aromatics and Nonaromatics Fractions of High-Boiling Oils by Elution Chromatography

3. Terminology

3.1 The summation of characteristic mass fragments are defined as follows:

$\sum 71$ (paraffins) = total peak height of $m/e^+ 71 + 85$.

$\sum 67$ (mono or noncondensed polycycloparaffins, or both) = total peak height of $m/e^+ 67 + 68 + 69 + 81 + 82 + 83 + 96 + 97$.

$\sum 123$ (condensed dicycloparaffins) = total peak height of $m/e^+ 123 + 124 + 137 + 138 + \dots$ etc. up to 249 + 250.

$\sum 149$ (condensed tricycloparaffins) = total peak height of $m/e^+ 149 + 150 + 163 + 164 + \dots$ etc. up to 247 + 248.

$\sum 91$ (alkyl benzenes) = total peak height of $m/e^+ 91 + 92 + 105 + 106 + \dots$ etc. up to 175 + 176.

$\sum 103$ (indans or tetralins, or both) = total peak height of $m/e^+ 103 + 104 + 117 + 118 + \dots$ etc. up to 187 + 188.

$\sum 115$ (indenes or C_nH_{2n-10} , or both) = total peak height of $m/e^+ 115 + 116 + 129 + 130 + \dots$ etc. up to 185 + 186.

128 (naphthalene) = total peak height of $m/e^+ 128$.

$\sum 141$ (naphthalenes) = total peak height of $m/e^+ 141 + 142 + 155 + 156 + \dots$ etc. up to 239 + 240.

$\sum 153$ (acenaphthenes or C_nH_{2n-14} , or both) = total peak height of $m/e^+ 153 + 154 + 167 + 168 + \dots$ etc. up to 251 + 252.

$\sum 151$ (acenaphthylenes or C_nH_{2n-16} , or both) = total peak height of $m/e^+ 151 + 152 + 165 + 166 + \dots$ etc. up to 249 + 250.

$\sum 177$ (tricyclic aromatics) = total peak height of $m/e^+ 177 + 178 + 191 + 192 + \dots$ etc. up to 247 + 248.

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