



Standard Test Method for Aromatic Types Analysis of Gas-Oil Aromatic Fractions by High Ionizing Voltage Mass Spectrometry¹

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1. Scope

1.1 This test method² covers the determination by high ionizing voltage, low resolution mass spectrometry of 18 aromatic hydrocarbon types and 3 aromatic thiophenotypes in straight run aromatic petroleum fractions boiling within the range from 205 °C to 540 °C (400 °F to 1000 °F) (corrected to atmospheric pressure). Samples must be nonolefinic, must contain not more than 1 % by mass of total sulfur, and must contain not more than 5 % nonaromatic hydrocarbons. Composition data are in volume percent.

NOTE 1—Although names are given to 15 of the compound types determined, the presence of other compound types of the same empirical formulae is not excluded. All other compound types in the sample, unidentified by name or empirical formula, are lumped into six groups in accordance with their respective homologous series.

1.2 The values stated in acceptable SI units are to be regarded as the standard. The values given in parentheses are provided for information purposes 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:³

- D2549 Test Method for Separation of Representative Aromatics and Nonaromatics Fractions of High-Boiling Oils by Elution Chromatography
- D2786 Test Method for Hydrocarbon Types Analysis of

Gas-Oil Saturates Fractions by High Ionizing Voltage Mass Spectrometry

E137 Practice for Evaluation of Mass Spectrometers for Quantitative Analysis from a Batch Inlet (Withdrawn 1992)⁴

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 Characteristic Mass Summations— Classes I–VII:

3.1.2 Class I:

$$\begin{aligned} \sum 78 &= 78 + 92 + 106 + 120 + \dots \text{to end, polyisotopic} \\ &+ 91 + 105 + 119 + \dots \text{to end, monoisotopic} \end{aligned} \quad (1)$$

3.1.3 Class II:

$$\begin{aligned} \sum 104 &= 104 + 118 + 132 + 146 + \dots \text{to end, polyisotopic} \\ &+ 117 + 131 + 145 + \dots \text{to end, monoisotopic} \end{aligned} \quad (2)$$

3.1.4 Class III:

$$\begin{aligned} \sum 129 &= 130 + 144 + 158 + 172 + \dots \text{to end, polyisotopic} \\ &+ 129 + 143 + 157 + 171 + \dots \text{to end, monoisotopic} \end{aligned} \quad (3)$$

3.1.5 Class IV:

$$\begin{aligned} \sum 128 &= 128 + 142 + 156 + 170 + \dots \text{to end, polyisotopic} \\ &+ 141 + 155 + 169 + \dots \text{to end, monoisotopic} \end{aligned} \quad (4)$$

3.1.6 Class V:

$$\begin{aligned} \sum 154 &= 154 + 168 + 182 + 196 + \dots \text{to end, polyisotopic} \\ &+ 167 + 181 + 195 + \dots \text{to end, monoisotopic} \end{aligned} \quad (5)$$

3.1.7 Class VI:

$$\begin{aligned} \sum 166 &= 166 + 180 + 194 + 208 + \dots \text{to end, polyisotopic} \\ &+ 179 + 193 + 207 + \dots \text{to end, monoisotopic} \end{aligned} \quad (6)$$

3.1.8 Class VII:

⁴ The last approved version of this historical standard is referenced on www.astm.org.

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 Robinson, C. J., and Cook, G. L., *Analytical Chemistry* (ANCHA), Vol 41, 1969, p. 1548.

³ 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.