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Standard Test Method for CARBON NUMBER DISTRIBUTION OF AROMATIC COMPOUNDS IN NAPHTHAS BY MASS SPECTROMETRY¹

This standard is issued under the fixed designation D 1658; 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.

1. Scope

1.1 This method covers the determination by mass spectrometry of the carbon number distribution of aromatic compounds in naphthas boiling up to 350°F (177°C). Erroneous results may be obtained if the method is applied to narrow boiling fractions or to samples having an isomer distribution different from that used in calibration.

2. Summary of Method

2.1 Samples are analyzed by mass spectrometry, using the parent masses of the aromatic compounds according to carbon number. Saturates and olefins have negligible contribution to these masses. Results are expressed in percent by liquid volume.

3. Significance and Use

3.1 A knowledge of the concentration of aromatic compounds by carbon number is useful in assessing the performance of motor gasoline and aromatics reformers and their associated fractionation and extraction units. Such data can also be used to advantage in the blending of motor fuels and in the manufacture of solvents.

4. Apparatus

4.1 *Mass Spectrometer*—Any mass spectrometer capable of passing the performance test described in Section 6.

4.2 *Sample Inlet System*—Any sample inlet system permitting the introduction of the test mixture (see 6.2) without loss, contamination, or change in composition.

4.3 *Microburet² or Constant-Volume Pipet.*

5. Reference Standards

5.1 Samples of the following hydrocarbons will be required: benzene, toluene, ethylbenzene, *p*-, *m*-, and *o*-xylene, isopropylbenzene, *n*-propylbenzene, 1-methyl-2-ethylbenzene, 1-methyl-3-ethylbenzene, 1-methyl-4-ethylbenzene, 1,2,3-trimethylbenzene, 1,2,4-trimethylbenzene, and 1,2,5-trimethylbenzene. (**Danger**—Benzene is a poison, carcinogen and is extremely flammable, see Annex A1.1. Other liquids are flammable, see Annex A1.2.)

NOTE—Only American Petroleum Institute pure hydrocarbons, National Bureau of Standards standard hydrocarbon samples, Phillips Petroleum Co. research grade hydrocarbons, or other hydrocarbons of equal purity should be used.

6. Performance Test

6.1 Calibration:

6.1.1 Calibrate the instrument in accordance with the manufacturer's instructions for the compounds listed under reference standards (Section 5) making duplicate runs and using the same manipulative technique as in 7.2. Rerun any compound whose coefficient on its parent mass differs by more than $\pm 0.5\%$ from the average value. The C₈ and C₉ compounds may either be run separately or combined in the proportions shown in Table 2 and run as mixtures.

¹ This method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants.

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² Satisfactory microburets are described by Taylor, R. C., and Young, W. S., "Application to Spectrometer Calibration and to Preparation of Known Mixtures," *Analytical Chemistry*, Vol 17, ANCHA, 1945, pp. 811-814, and Purdy, K. M., and Harris, R. J., *ibid.*, Vol 22, 1950, pp. 1337-1338.