



AMERICAN NATIONAL
STANDARD

ANSI/ASTM D 2567 - 68 (Reapproved 1978)

Standard Method for MOLECULAR DISTRIBUTION ANALYSIS FOR MONOALKYLBENZENES BY MASS SPECTROMETRY¹

This Standard is issued under the fixed designation D 2567; 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 method² is intended for application to detergent alkylate systems that have a typical aromatics content of 99 percent or more and that have a carbon number range of C_{12} to C_{42} . The method is applicable to other systems of monoalkylbenzenes if it is known that other molecular species that contribute to the C_nH_{2n-7} and C_nH_{2n-6} peaks are not present. The method has been cooperatively tested over a monoalkylbenzene carbon number range of C_{12} to C_{27} .

2. Summary of Method

2.1 Samples are analyzed by mass spectrometry using peak intensities of the C_nH_{2n-7} and C_nH_{2n-6} series between m/e (mass number) 161 and 162 and m/e 581 and 582. Calculations are made from calibration data given for each of the various individual m/e 's. Results are normalized to a total alkylbenzene content of 100 percent and are expressed in liquid volume percent.

3. Definitions and Symbols

3.1 "*K*" *Correction Factors*—The factor includes correction for heavy, isotopic abundances of carbon and hydrogen plus a calibration value based upon C_nH_{2n-7} peaks. Separate numerical values are given for each carbon number.

3.2 *Intensity Factor*—The intensity factor, I_r , is the reciprocal of relative total ionization sensitivities.

3.3 *Parent or Molecular Ion Peak, P*.

3.4 *Parent or Molecular Ion Peak Less One Mass Unit, P - 1*.

4. Apparatus

4.1 *Mass Spectrometer*—Any mass spectrometer capable of performance described both herein and in ASTM Recommended Practice E 137, for Evaluation of Mass Spectrometers for Use in Chemical Analysis.³

4.2 *Sample Inlet System*—Any inlet system operated at an elevated temperature (300 to 350 C) permitting the introduction of the sample without loss, contamination, or change in composition.

4.3 *Microburet or Constant-Volume Pipet*.

5. Procedure

5.1 Use a single magnetic field to permit a scan over the mass range of 161 to 582.

5.2 Use an ionization voltage of 70 eV and a measured ionizing current in the range from 10 to 50 μA .

5.3 *Background*—Samples should pump out so that peaks remaining are less than 0.1 percent of those on the previous spectrum.

5.4 Generally, mass spectrometers are in continuous operation and should require no additional preparation prior to loading samples. If the mass spectrometer has to be turned on, it will be necessary to check its operation according to the manufacturer's

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

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In 1968, this method was adopted as standard without revision.

² Boyer, E. W., Ford, H. T., and Hamming, M. C., "Rearrangement Technique for Analysis of Alkylbenzenes by Mass Spectrometry," *Analytical Chemistry*, ANCHA Vol 35, 1963, p. 1168.

³ *Annual Book of ASTM Standards*, Part 42.