



Standard Test Method for Determination of Trace Thiophene in Refined Benzene by Gas Chromatography¹

This standard is issued under the fixed designation D4735; 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 of thiophene in refined benzene in the range from 0.80 to 1.80 mg/kg for the Flame Photometric Detector (FPD), and from 0.14 to 2.61 mg/kg for the Pulsed Flame Photometric Detector (PFPD). For the PFPD, the minimum level of quantitation (LOQ) is 0.14 mg/kg and the minimum level of detection (LOD) is 0.04 mg/kg, as described in ASTM Research Report RR:D16-1038.² The range of the test method may be extended by modifying the sample injection volume, split ratios, calibration range, or sample dilution with thiophene-free solvent.

1.2 This test method has been found applicable to benzene characteristic of the type described in Specifications [D2359](#) and [D4734](#) and may be applicable to other types or grades of benzene only after the user has demonstrated that the procedure can completely resolve thiophene from the other organic contaminants contained in the sample.

1.3 The following applies to all specified limits in this test method: for purposes of determining conformance to applicable specification using this test method, an observed value or a calculated value shall be rounded off “to the nearest unit” in the last right-hand digit used in expressing the specification limit in accordance with the rounding-off method of Practice [E29](#).

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

1.5 *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.* For specific hazard statements, see Section [7](#).

¹ This test method is under the jurisdiction of ASTM Committee [D16](#) on Aromatic Hydrocarbons and Related Chemicals and is the direct responsibility of Subcommittee [D16.04](#) on Instrumental Analysis.

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² Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D16-1038. Contact ASTM Customer Service at service@astm.org.

2. Referenced Documents

2.1 ASTM Standards:³

- [D1193](#) Specification for Reagent Water
- [D2359](#) Specification for Refined Benzene-535
- [D3437](#) Practice for Sampling and Handling Liquid Cyclic Products
- [D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products
- [D4177](#) Practice for Automatic Sampling of Petroleum and Petroleum Products
- [D4307](#) Practice for Preparation of Liquid Blends for Use as Analytical Standards
- [D4734](#) Specification for Refined Benzene-545
- [D6809](#) Guide for Quality Control and Quality Assurance Procedures for Aromatic Hydrocarbons and Related Materials
- [E29](#) Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- [E177](#) Practice for Use of the Terms Precision and Bias in ASTM Test Methods
- [E260](#) Practice for Packed Column Gas Chromatography
- [E355](#) Practice for Gas Chromatography Terms and Relationships
- [E691](#) Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method
- [E840](#) Practice for Using Flame Photometric Detectors in Gas Chromatography
- [E1510](#) Practice for Installing Fused Silica Open Tubular Capillary Columns in Gas Chromatographs

2.2 Other Document:

- [OSHA Regulations, 29 CFR paragraphs 1910.1000 and 1910.1200](#)⁴

3. Summary of Test Method

3.1 The thiophene concentration in refined benzene is determined at the milligram thiophene per kilogram sample level

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.

⁴ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

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