



Standard Test Method for Trace Benzene in Hydrocarbon Solvents by Capillary Gas Chromatography¹

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1. Scope*

1.1 This test method covers the determination by capillary gas chromatography of trace benzene in hydrocarbon solvents at levels from 1.0 to 2400 vppm.

NOTE 1—Lower levels of benzene may be determined by this test method. However the gas chromatography (GC) will have to be modified from those specified in this test method. The precision of the method may not apply to these lower benzene levels.

1.2 For hazard information and guidance, see the supplier's Material Safety Data Sheet.

1.3 The values stated in SI units are to be regarded as the statement. The values in parenthesis are given for information only and are not necessarily the exact equivalent of the SI unit values.

1.4 For purposes of determining conformance of an observed or a calculated value using this test method to relevant specifications, test result(s) shall be rounded off "to the nearest unit" in the last right-hand digit used in expressing the specification limit, in accordance with Practice E29.

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.*

2. Referenced Documents

2.1 ASTM Standards:²

D4367 Test Method for Benzene in Hydrocarbon Solvents by Gas Chromatography
E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
E300 Practice for Sampling Industrial Chemicals

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.35 on Solvents, Plasticizers, and Chemical Intermediates

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² 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.

2.2 ASTM Adjuncts:

D2PP Determination of Precision and Bias Data³

3. Summary of Test Method

3.1 A given volume of the sample is introduced into a gas chromatograph equipped with two capillary columns connected in series by switching valve. The specimen passes first through a short capillary column with a bounded nonpolar phase where the components are separated by boiling point. After octane has eluted from the first column, the components heavier than octane are back-flushed to vent. The octane and lighter components then pass through a second capillary column with bounded polar phase where the aromatic and nonaromatic components are separated. The eluted components are detected by a flame ionization detector, and the peak areas are integrated electronically. The concentration of benzene is calculated by a data processor using a response factor determined by external standard technique.

4. Significance and Use

4.1 This test method is similar to Test Method D4367 with the exception that capillary columns are used and intended for trace level of benzene in hydrocarbon solvents. The need for trace benzene analysis in hydrocarbon solvents arose because of the increase of more stringent regulation of benzene level in these materials.

5. Apparatus

5.1 *Chromatograph*—Any gas chromatographic instrument that has a backflush system operated by a switching valve automatically, flame ionization detector, and can be operated at the conditions given in Table 1.

5.2 *Detector*—The flame ionization detector shall have sufficient sensitivity to detect 0.1 vppm of benzene at a peak height of 3 times the noise level.

5.3 *Columns*—one 2-m (6.5-ft), 0.53 mm inside diameter fused silica capillary with 5- μ m thick bounded methyl silicone

³ Available from ASTM International Headquarters. Order Adjunct No. ADJD6300.

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