



Standard Test Method for Analysis of Isopropylbenzene (Cumene) by Gas Chromatography¹

This standard is issued under the fixed designation D 3760; 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 the purity of isopropylbenzene (cumene) by gas chromatography.

1.2 This test method has been found applicable to the measurement of impurities such as nonaromatic hydrocarbons, benzene, ethylbenzene, *t*-butylbenzene, *n*-propylbenzene, alpha-methylstyrene, sec-butylbenzene, and diisopropylbenzene, which are common to the manufacturing process of isopropylbenzene. Limit of detection for these impurities is 10 mg/kg (see 5.1).

1.3 The following applies to all specified limits in this standard: for purposes of determining conformance with this standard, 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 E 29.

1.4 *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.

2. Referenced Documents

2.1 ASTM Standards:

D 3437 Practice for Sampling and Handling Liquid Cyclic Products²

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications³

E 260 Practice for Packed Gas Chromatography⁴

E 355 Practice for Gas Chromatography Terms and Relationships⁴

2.2 Other Document:

OSHA Regulations, 29CFR, paragraphs 1910.1000 and 1910.1200⁵

3. Summary of Test Method

3.1 A known amount of internal standard is added to a sample of isopropylbenzene. The prepared sample is mixed and analyzed by a gas chromatograph equipped with a flame ionization detector (FID). The peak area of each impurity and the internal standard is measured and the amount of each impurity is calculated from the ratio of the peak area of the internal standard versus the peak area of the impurity. Purity by GC (the isopropylbenzene content) is calculated by subtracting the sum of the impurities found from 100.00. Results are reported in weight percent.

4. Significance and Use

4.1 This test method is suitable for setting specifications on the materials referenced in 1.2 and for use as an internal quality control tool where isopropylbenzene is produced or is used in a manufacturing process. It may also be used in development or research work involving isopropylbenzene.

4.2 This test method is useful in determining the purity of isopropylbenzene with normal impurities present including diisopropylbenzenes. If extremely high boiling or unusual impurities are present in the isopropylbenzene, this test method would not necessarily detect them and the purity calculation would be erroneous.

4.3 Cumene hydroperoxide, if present, will yield decomposition products that will elute in the chromatogram thereby giving incorrect results.

4.4 The nonaromatic hydrocarbons commonly present from the isopropylbenzene manufacturing process will interfere with the determination of benzene when Column A in Table 1 is used.

4.5 The internal standard must be sufficiently resolved from any impurity and the isopropylbenzene peak.

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 D16.07 on Styrene, Ethylbenzene, and C₉ and C₁₀ Aromatic Hydrocarbons.

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² Annual Book of ASTM Standards, Vol 06.04.

³ Annual Book of ASTM Standards, Vol 14.02.

⁴ Annual Book of ASTM Standards, Vol 03.06.

⁵ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.