



Designation: D 1685 – 05

Standard Test Method for Traces of Thiophene in Benzene by Spectrophotometry¹

This standard is issued under the fixed designation D 1685; 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 benzene in which the thiophene concentration is between 0.1 and 250 mg/kg.

1.2 Contaminating materials that are darkened by sulfuric acid interfere and must be compensated for by a sample blank determination. Neither carbon disulfide in concentrations as high as 100 mg/kg nor water as high as the level of saturation will interfere.

1.3 Contaminating materials may occasionally cause the color development in this test method to be time dependent and may also contribute to spectral interferences at 589 nm. Consequently, test results indicating substantial thiophene, that cannot be verified by total sulfur analysis, should be considered suspect.

1.4 In determining the conformance of the test results using this method to applicable specifications, results shall be rounded off in accordance with the rounding-off method of Practice E 29.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.6 *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 7.6, 8.1, and 9.1.

2. Referenced Documents

2.1 ASTM Standards:²

D 1193 Specification for Reagent Water

D 3437 Practice for Sampling and Handling Liquid Cyclic Products

D 4790 Terminology of Aromatic Hydrocarbons and Related Chemicals

D 6809 Guide for Quality Control and Quality Assurance Procedures for Aromatic Hydrocarbons and Related Materials

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

E 832 Specification for Laboratory Filter Papers

2.2 Other Document:

OSHA Regulations, 29 CFR, paragraphs 1910.1000 and 1910.1200³

3. Terminology

3.1 Definitions:

3.1.1 For definition of terms used in this test method see Terminology D 4790.

4. Summary of Test Method

4.1 Thiophene is reacted with isatin, under prescribed conditions, to form a colored compound. The compound is extracted into sulfuric acid, and the intensity of the color is measured spectrophotometrically. Thiophene concentration is obtained by correlation with knowns.

5. Significance and Use

5.1 This test method is suitable for setting specifications on benzene and for use as an internal quality control tool where benzene is either produced or used in a manufacturing process. It may also be used in development or research work involving benzene.

6. Apparatus

NOTE 1—Labware made from materials other than glass and is impervious to the materials used in this standard is allowed.

6.1 *Separatory Funnels*, 50, 250, 500, and 1000-mL, with stoppers.

6.2 *Spectrophotometer*—Any spectrophotometer may be used that is capable of repeatability of 0.005 absorbance units in the range from 0.1 to 1.4 absorbance and repeatability of wavelength of 1 nm in the region from 400 to 700 nm.

6.3 *Absorption Cells*, 1-cm, matched, glass or silica.

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 D16.01 on Benzene, Toluene, Xylene, Cyclohexane, and Their Derivatives.

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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.

³ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop, SDE, Washington, DC 20401.

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