Designation: D3606 – 10

Standard Test Method for Determination of Benzene and Toluene in Finished Motor and Aviation Gasoline by Gas Chromatography[1]

This standard is issued under the fixed designation D3606; 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 benzene and toluene in finished motor and aviation gasolines by gas chromatography.

1.2 Benzene can be determined between the levels of 0.1 and 5 volume % and toluene can be determined between the levels of 2 and 20 volume %.

1.3 The precision for this test method was determined using conventional gasoline as well as gasolines containing oxygenates (ethers such as methyl *tert*-butyl ether, ethyl *tert*-butyl ether and *tert*-amyl methyl ether).

1.4 Methanol may cause interference. Appendix X1 provides an option for modifying the test method for analyzing samples containing ethanol.

1.5 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

E694 Specification for Laboratory Glass Volumetric Apparatus

E969 Specification for Glass Volumetric (Transfer) Pipets

E1044 Specification for Glass Serological Pipets (General Purpose and Kahn)

E1293 Specification for Glass Measuring Pipets

3. Summary of Test Method

3.1 An internal standard, methyl ethyl ketone (MEK), is added to the sample which is then introduced into a gas chromatograph equipped with two columns connected in series. The sample passes first through a column packed with a nonpolar phase such as dimethylpolysiloxane (8.1.1) which separates the components according to boiling point. After octane has eluted, the flow through the nonpolar column is reversed, flushing out the components heavier than octane. The octane and lighter components then pass through a column packed with a highly polar phase such as 1, 2, 3-tris(2-cyanoethoxy) propane (8.1.2) which separates the aromatic and nonaromatic compounds. The eluted components are detected by a thermal conductivity detector. The detector response is recorded, the peak areas are measured, and the concentration of each component is calculated with reference to the internal standard.

4. Significance and Use

4.1 Benzene is classed as a toxic material. A knowledge of the concentration of this compound can be an aid in evaluating the possible health hazard to persons handling and using the gasoline. This test method is not intended to evaluate such hazards.

5. Apparatus

5.1 *Chromatograph*—Any chromatographic instrument that has a backflush system and thermal conductivity detector, and that can be operated at the conditions given in Table 1, can be employed. Two backflush systems are shown. Fig. 1 is a pressure system and Fig. 2 is a switching valve system. Either one can be used.

5.2 *Columns*:

5.2.1 *Column A*—One 0.8 m (2.5 ft) by 3.2 mm (⅛ in.) outside diameter stainless steel column packed with 10 mass % dimethylpolysiloxane (for example, OV-101) on Chromosorb W, 60 to 80 mesh.

[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.04.0L on Gas Chromatography Methods.

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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.

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

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