



Designation: D 5986 – 96

An American National Standard

Standard Test Method for Determination of Oxygenates, Benzene, Toluene, C₈–C₁₂ Aromatics and Total Aromatics in Finished Gasoline by Gas Chromatography/Fourier Transform Infrared Spectroscopy¹

This standard is issued under the fixed designation D 5986; 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 quantitative determination of oxygenates: methyl-t-butylether (MTBE), di-isopropyl ether (DIPE), ethyl-t-butylether (ETBE), t-amylmethyl ether (TAME), methanol (MeOH), ethanol (EtOH), 2-propanol (2-PrOH), t-butanol (t-BuOH), 1-propanol (1-PrOH), 2-butanol (2-BuOH), i-butanol (i-BuOH), 1-butanol (1-BuOH); benzene, toluene and C₈–C₁₂ aromatics, and total aromatics in finished motor gasoline by gas chromatography/Fourier Transform infrared spectroscopy (GC/FTIR).

1.2 This test method covers the following concentration ranges: 0.1–20 volume % per component for ethers and alcohols; 0.1–2 volume% benzene; 1–15 volume % for toluene, 10–40 volume % total (C₆–C₁₂) aromatics.

1.3 The method has not been tested by ASTM for refinery individual hydrocarbon process streams, such as reformates, fluid catalytic cracking naphthas, etc., used in blending of gasolines.

1.4 SI units of measurement are preferred and used throughout this test method.

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:

D 1298 Practice for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method²

D 4052 Test Method for Density and Relative Density of Liquids by Digital Density Meter³

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Product³

D 4307 Practice for Preparation of Liquid Blends for Use as Analytical Standards³

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *aromatics*—refers to any organic compound containing a benzene or naphthalene ring.

3.1.2 *calibrated aromatic component*—in this test method, refers to the individual aromatic components which have a specific calibration.

3.1.3 *cool on-column injector*—in gas chromatography, a direct sample introduction system which is set at a temperature at or below the boiling point of solutes or solvent on injection and then heated at a rate equal to or greater than the column. Normally used to eliminate boiling point discrimination on injection or to reduce adsorption, or both, on glass liners within injectors. The sample is injected directly into the head of the capillary column tubing or retention gap.

3.1.4 *Gram-Schmidt chromatogram*—a nonselective summation of total intensity from a spectral scan per unit time which resembles in profile a flame ionization detector chromatogram.

3.1.5 *retention gap*—in gas chromatography, refers to a deactivated precolumn which acts as a zone of low retention power for reconcentrating bands in space. The polarity of the precolumn must be similar to that of the analytical column.

3.1.6 *selective wavelength chromatogram (SWC)*—in this test method, refers to a selective chromatogram obtained by summing the spectral intensity in a narrow spectral wavelength or frequency range as a function of elution time which is unique to the compound being quantitated.

3.1.7 *uncalibrated aromatic component*—in this test method, refers to individual aromatics for which a calibration is not available and whose concentrations are estimated from the response factor of a calibrated aromatic component.

3.1.8 *wall coated open tubular (WCOT)*—a type of capillary column prepared by coating or bonding the inside wall of the capillary with a thin film of stationary phase.

4. Summary of Test Method

4.1 A gas chromatograph equipped with a methylsilicone

¹ This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.04 on Hydrocarbon Analysis.

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ *Annual Book of ASTM Standards*, Vol 05.02.