



Designation: D4815 – 15b (Reapproved 2019)

Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, tertiary-Amyl Alcohol and C₁ to C₄ Alcohols in Gasoline by Gas Chromatography¹

This standard is issued under the fixed designation D4815; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method covers the determination of ethers and alcohols in gasolines by gas chromatography. Specific compounds determined are methyl *tert*-butylether (MTBE), ethyl *tert*-butylether (ETBE), *tert*-amylmethylether (TAME), diisopropylether (DIPE), methanol, ethanol, isopropanol, *n*-propanol, isobutanol, *tert*-butanol, *sec*-butanol, *n*-butanol, and *tert*-pentanol (*tert*-amylalcohol).

1.2 Individual ethers are determined from 0.20 % to 20.0 % by mass. Individual alcohols are determined from 0.20 % to 12.0 % by mass. Equations used to convert to mass % oxygen and to volume % of individual compounds are provided. At concentrations <0.20 % by mass, it is possible that hydrocarbons may interfere with several ethers and alcohols. The reporting limit of 0.20 % by mass was tested for gasolines containing a maximum of 10 % by volume olefins. It may be possible that for gasolines containing >10 % by volume olefins, the interference may be >0.20 % by mass. **Annex A1** gives a chromatogram showing the interference observed with a gasoline containing 10 % by volume olefins.

1.3 This test method includes a relative bias correlation for ethanol in spark-ignition engine fuels for the U.S. EPA regulations reporting based on Practice **D6708** accuracy assessment between Test Method D4815 and Test Method **D5599** as a possible Test Method D4815 alternative to Test Method **D5599**. The Practice **D6708** derived correlation equation is only applicable for ethanol in fuels in the concentration range from 2.28 % to 14.42 % by mass as measured by Test Method D4815. The applicable Test Method **D5599** range for ethanol is from 2.16 % to 14.39 % by mass as reported by Test Method **D5599**.

1.4 Alcohol-based fuels, such as M-85 and E-85, MTBE product, ethanol product, and denatured alcohol, are specifi-

cally excluded from this test method. The methanol content of M-85 fuel is considered beyond the operating range of the system.

1.5 Benzene, while detected, cannot be quantified using this test method and must be analyzed by alternate methodology (see Test Method **D3606**).

1.6 The values stated in SI units are to be regarded as standard. Alternate units, in common usage, are also provided to increase clarity and aid the users of this test method.

1.7 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

- D1298** Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- D1744** Test Method for Water in Liquid Petroleum Products by Karl Fischer Reagent³
- D3606** Test Method for Determination of Benzene and Toluene in Spark Ignition Fuels by Gas Chromatography
- D4052** Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter
- D4057** Practice for Manual Sampling of Petroleum and Petroleum Products

¹ This test method is under the jurisdiction of ASTM Committee **D02** on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee **D02.04.01** 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.