



Designation: D7796 – 21

Standard Test Method for Analysis of Ethyl *tert*-Butyl Ether (ETBE) by Gas Chromatography¹

This standard is issued under the fixed designation D7796; 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 ethyl *tert*-butyl ether (ETBE) by gas chromatography. It also provides a procedure to measure impurities in ETBE such as C_4 to C_{12} olefins, methyl, isopropyl and *tert*-butyl alcohols, methyl *sec*-butyl and methyl *tert*-amyl ethers, acetone, and methyl ethyl ketone.

1.2 This test method is not applicable to the determination of ETBE in gasoline.

1.3 Water cannot be determined by this test method and shall be measured by a procedure such as Test Method [D6304](#) and the result used to normalize the chromatographic values.

1.4 Most of the impurities in ETBE are resolved by the test method, however, some co-elution is encountered.

1.5 This test method is inappropriate for impurities that boil at temperatures higher than 180 °C or for impurities that cause poor or no response in a flame ionization detector, such as water.

1.6 The values stated in SI units of measurement are preferred and used throughout the standard. Alternate units, in common usage, are also provided to improve clarity and aid the user 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.*

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. Referenced Documents

2.1 ASTM Standards:²

[D3700](#) Practice for Obtaining LPG Samples Using a Floating Piston Cylinder

[D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products

[D4175](#) Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants

[D4307](#) Practice for Preparation of Liquid Blends for Use as Analytical Standards

[D4626](#) Practice for Calculation of Gas Chromatographic Response Factors

[D6304](#) Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration

[D7618](#) Specification for Ethyl Tertiary-Butyl Ether (ETBE) for Blending with Aviation Spark-Ignition Engine Fuel

[E355](#) Practice for Gas Chromatography Terms and Relationships

[E594](#) Practice for Testing Flame Ionization Detectors Used in Gas or Supercritical Fluid Chromatography

3. Terminology

3.1 *Definitions*—This test method makes reference to many common and gas chromatographic procedures, terms, and relationships. Detailed definitions of these can be found in Practices [E355](#) and [E594](#), and Terminology [D4175](#).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 C_4 to C_{12} olefins, n —common olefin impurities in ETBE including unreacted feedstock and dimers or trimers of feed such as trimethylpentene or pentamethylheptene.

4. Summary of Test Method

4.1 A representative aliquot of the ETBE product sample is introduced into a gas chromatograph equipped with a methyl silicon bonded phase fused silica open tubular column. Helium carrier gas transports the vaporized aliquot through the column where the components are separated by the chromatographic

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org.

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