



Standard Test Method for Determination of Biodiesel (Fatty Acid Methyl Esters) Content in Diesel Fuel Oil Using Mid Infrared Spectroscopy (FTIR-ATR-PLS Method)¹

This standard is issued under the fixed designation D7371; 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 content of fatty acid methyl esters (FAME) biodiesel in diesel fuel oils. It is applicable to concentrations from 1.00 to 20 volume % (see [Note 1](#)). This procedure is applicable only to FAME. Biodiesel in the form of fatty acid ethyl esters (FAEE) will cause a negative bias.

NOTE 1—Using the proper ATR sample accessory, the range maybe expanded from 1 to 100 volume %, however precision data is not available above 20 volume %.

1.2 The values stated in SI units of measurement are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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

[D975 Specification for Diesel Fuel Oils](#)

[D976 Test Method for Calculated Cetane Index of Distillate Fuels](#)

[D1298 Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method](#)

[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](#)

[D4177 Practice for Automatic Sampling of Petroleum and Petroleum Products](#)

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

[D4737 Test Method for Calculated Cetane Index by Four Variable Equation](#)

[D5854 Practice for Mixing and Handling of Liquid Samples of Petroleum and Petroleum Products](#)

[D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance](#)

[D6751 Specification for Biodiesel Fuel Blend Stock \(B100\) for Middle Distillate Fuels](#)

[D7467 Specification for Diesel Fuel Oil, Biodiesel Blend \(B6 to B20\)](#)

[E168 Practices for General Techniques of Infrared Quantitative Analysis](#) (Withdrawn 2015)³

[E1655 Practices for Infrared Multivariate Quantitative Analysis](#)

[E2056 Practice for Qualifying Spectrometers and Spectrophotometers for Use in Multivariate Analyses, Calibrated Using Surrogate Mixtures](#)

3. Terminology

3.1 Definitions:

3.1.1 *biodiesel, n*—a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100. **D6751**

3.1.2 *biodiesel blend, BXX, n*—a blend of biodiesel fuel with petroleum-based diesel fuel. **D7467**

3.1.2.1 *Discussion*—In the abbreviation BXX, the XX represents the volume percentage of biodiesel fuel in the blend. **D6751**

3.1.3 *diesel fuel, n*—petroleum-based middle distillate fuel.

3.1.4 *multivariate calibration, n*—process for creating a model that relates component concentrations or properties to the absorbances of a set of known reference samples at more than one wavelength or frequency. **E1655**

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 D02.04.0F on Absorption Spectroscopic 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.

³ The last approved version of this historical standard is referenced on www.astm.org.