



Standard Test Method for Determination of the Fatty Acid Methyl Ester (FAME) Content of a Blend of Biodiesel and Petroleum-Based Diesel Fuel Oil Using Mid-Infrared Spectroscopy¹

This standard is issued under the fixed designation D7806; 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 biodiesel (fatty acid methyl esters—FAME) in diesel fuel oils. It is applicable to concentrations from 1 to 30 volume %. This procedure is applicable only to FAME. This test method is not appropriate for the determination of the concentration of biodiesel that is in the form of fatty acid ethyl esters (FAEE).

1.2 The values stated in SI units 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

[D1298](#) Test Method for Density, Relative Density (Specific Gravity), 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

[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

[E131](#) Terminology Relating to Molecular Spectroscopy

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

[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 composed of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100 in Specification [D6751](#).

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

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

3.1.3 *diesel fuel oil, n*—a petroleum-based diesel fuel, as described in Specification [D975](#).

3.1.4 *FAME, n*—a biodiesel composed of long chain fatty acid methyl esters derived from vegetable or animal fats.

3.1.5 *Mid-Infrared Spectroscopy, n*—uses the mid-infrared region of the electromagnetic spectrum, as described in Terminology [E131](#).

4. Summary of Test Method

4.1 A sample of diesel fuel or biodiesel blend is introduced into a liquid sample cell having a specified path length. A beam of infrared light is imaged through the sample onto a detector, and the detector response is determined. Wavelengths of the absorption spectrum that correlate highly with biodiesel or interferences are selected for analysis. Mathematical analysis

¹ This test method is under the jurisdiction of ASTM Committee [D02](#) on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee [D02.04.0F](#) on Absorption Spectroscopic Methods.

Current edition approved Sept. 1, 2012. Published November 2012. DOI: 10.1520/D7806-12

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.