

PORTABLE BIODIESEL FAME ANALYZER



Portable Biodiesel FAME Analyzer - ToronFAME™ 500

Portable Biodiesel FAME Analyzer ToronFAME™ 500 gives fuel terminal operators, biodiesel producers, and quality control laboratories a fast, self-contained method for determining fatty acid methyl ester (FAME) content in diesel fuel blends. Housed in a rugged, transportable case, the analyzer pairs a compact optical bench with a Windows-based software console that runs from a laptop or tablet. The instrument delivers a FAME percentage result directly at the point of sampling, without requiring bench-top laboratory infrastructure.

The analyzer draws a small fuel sample directly into a flow-cell for measurement, avoiding the sample preparation steps that slow down conventional laboratory workflows. Battery operation extends the instrument's reach to remote terminals, tank farms, and field locations where mains power is unavailable. The ToronFAME™ 500 supports up to 500 measurements on a single charge, making it suitable for high-throughput sampling programs across a distribution network.

Fuel distributors, biodiesel blenders, engine test laboratories, and regulatory agencies use the analyzer to confirm that delivered fuel matches its labeled blend ratio, from low-level B5 and B7 blends through higher B20, B40, and B100 concentrations. Calibration is performed against certified biodiesel blend standards, giving operators a traceable basis for the FAME percentage the instrument reports.

APPLICATIONS

Portable Biodiesel FAME Analyzer - ToronFAME™ 500 Applications

The Portable Biodiesel FAME Analyzer ToronFAME™ 500 supports quality control and compliance checks anywhere diesel and biodiesel blend ratios need fast, on-site verification.

- Biodiesel Production Quality Control: verifies FAME concentration during blending so finished biodiesel batches match their labeled specification before shipment
- Fuel Terminal and Distribution Testing: confirms blend ratio (B5, B7, B20, B100) at terminals, loading racks, and tank farms before fuel changes ownership
- Regulatory and Compliance Monitoring: supports agencies checking that diesel sold as heating oil or transportation fuel stays within its permitted FAME limit
- Fleet and Engine Test Laboratories: confirms fuel blend ratio ahead of engine performance, filter plugging, or cold-weather operability testing
- Third-Party Fuel Testing Laboratories: provides a rapid screening step for producer and distributor samples ahead of full laboratory analysis
- Marine and Bulk Fuel Bunkering: field verification of biodiesel content in bunker fuel blends prior to delivery acceptance



Standards

Results from the Portable Biodiesel FAME Analyzer ToronFAME™ 500 correlate with the internationally recognized method for determining FAME content by infrared spectroscopy.

- ASTM D7371 - Standard Test Method for Determination of Biodiesel (Fatty Acid Methyl Esters) Content in Diesel Fuel Oil Using Mid Infrared Spectroscopy (FTIR-ATR-PLS Method)

FEATURES

Portable Biodiesel FAME Analyzer - ToronFAME™ 500 Key Features

The ToronFAME™ 500 combines laboratory-grade calibration with a rugged, field-ready build for testing outside the laboratory.

- Certified Blend Calibration: factory calibration against certified biodiesel blend standards gives operators a traceable basis for reported FAME percentages
- Portable, Battery-Powered Design: runs from an internal battery for use at terminals, tank farms, and remote sampling points without mains power
- 500 Measurements Per Charge: a 2,500 mAh internal battery supports up to 500 sample measurements before recharging, reducing downtime during high-volume sampling programs
- Windows-Based Software Console: an intuitive GUI runs from a laptop or optional tablet, guiding the operator through sample setup and result reporting
- Wide Operating Range: functions across 0°C to 70°C in non-condensing conditions, suiting outdoor and unconditioned storage environments
- Simple Syringe Sample Loading: a 2 to 3 mL sample loads directly into the flow-cell inlet with a syringe, avoiding solvent preparation or dilution steps

- Configurable Compliance Range: measurement range spans B0 to B100, with the analyzer set up for one target blend compliance level to keep calibration accuracy high

THEORY & METHOD

Theory and Method

Mid-infrared transmission spectroscopy measures how much infrared light a fuel sample absorbs as it passes through a fixed-pathlength cell. Fatty acid methyl esters carry an ester carbonyl group that absorbs infrared radiation strongly near 1745 cm^{-1} , a wavenumber where petroleum diesel shows comparatively little absorbance. Passing an infrared beam through the sample and comparing the transmitted intensity against a reference spectrum isolates this carbonyl absorption band from the surrounding hydrocarbon signal.

The analyzer converts the measured absorbance into a FAME percentage using a calibration model built from certified biodiesel blend standards spanning the B0 to B100 range. The relationship between absorbance and biodiesel concentration does not stay linear across that full range, so the calibration is set up for one target compliance level, such as B40, keeping the model accurate for the blend ratio the operator expects to test.

The operator draws a 2 to 3 mL fuel sample into the flow-cell inlet with a syringe, then loads the flow-cell into the analyzer for measurement, so no dilution or solvent preparation happens before analysis. This transmission-cell design keeps the optical path fixed and repeatable between samples, supporting a measurement cycle that completes in about a minute.

TECHNICAL SPECIFICATIONS

Portable Biodiesel FAME Analyzer - ToronFAME™ 500 Technical Specifications

Parameter	Specification
GUI / Software	Windows 10-based software console; runs from laptop or optional tablet
Operating Temperature and Humidity	0°C to 70°C, non-condensing
Power Requirement	230 VAC for mains charging; internal 2,500 mAh LiPo battery
Battery Runtime	Up to 500 sample measurements per charge
Compliance	Correlates with ASTM D7371
Cuvettes	1x cuvette (flow-cell)
Consumables	Dispensing syringes, 5 mL
Sample Volume	2 to 3 mL
Measurement Range	B0 to B100 (analyzer configured for one specific compliance level, e.g., B40)



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