



AC BioDiesel All in One Analyzer

Full Compliancy for EN 14214 and ASTM D6751 in a Single System

-  True All-in-One Solution
-  Superior Performance through Unique Dual Programmable Oven Design
-  Full Compliance with Latest Versions EN 14214 and ASTM D6751
-  Method Specific Quality Control Samples Guarantee Long Term Performance

ALL-IN-ONE BIODIESEL

ALL-IN-ONE BIODIESEL ANALYSIS USING GAS CHROMATOGRAPHY

In the last decade there has been a worldwide growth in the interest for alternative fuels. Biodiesel, Fatty Acid Methyl Esters known as FAMES, offers an alternative to fossil diesel fuel and contributes to the reduction of greenhouse gas emissions. Globally, public authorities promote the use of blends of biofuel and conventional fuel through directives and by setting ambitious goals. The AC Analytical Controls All-In-One Biodiesel analyzer determines the quality of fatty acid methyl esters (FAME) blending stock for diesel fuel, and yields fast results from a single dedicated system.

Fully compliant with the latest versions EN 14214 and ASTM D6751

The new AC All-In-One Biodiesel is the only instrument on the market that fully complies with biodiesel specifications EN 14214 and ASTM D6751. Methods include ASTM D6584 and 2011 updates of EN 14103, EN 14105, and EN 14110 as listed below. Furthermore it also complies with prEN 16300 for determination of Iodine Value and, on request also for determination of Poly Unsaturated Fatty Acids (PUFA) according to EN15779. The AC All-in-One Biodiesel reporting include the following calculations, and will report the result against the regulatory specification:

Method	Component	Range			
EN 14103:2011	Ester Content	≥ 96.5 % m/m			
	Linolenic acid methylester	≤ 12.0 % m/m			
EN 14105:2011	Free Glycerol	≤ 0.02 % m/m	ASTM D6584-2010	Free Glycerol	≤ 0.02 % m/m
	Total Glycerol	≤ 0.25 % m/m		Total	≤ 0.24 % m/m
	Monoglyceride	≤ 0.80 % m/m			
	Diglyceride	≤ 0.20 % m/m			
	Triglyceride	≤ 0.20 % m/m			
EN 14110	Methanol	≤ 0.20 % m/m			

AC All-in-One Biodiesel Calculations

UNIQUE DUAL OVEN DESIGN FOR TRUE ALL IN ONE!

The AC All in One Biodiesel Analyzer uses a single Agilent 8890 Series GC with electronic pneumatics control (EPC) an AC proprietary TPI inlet, a Split/Splitless inlet, two capillary columns, one programmable external capillary column oven and two Flame Ionization Detectors.

With the scope extension on EN 14103:2011, programming is now required for both FAME and Triglyceride methods. The AC proprietary secondary column oven allows temperature programming two column oven zones independantly. This dedicated physical location for each column means methods on either column can be run side by side without the need for the operator to remove columns and to protect the Wax-column from exceeding its maximum operating temperature.

The secondary programmable oven requires less operator intervention and contributes to:

- Excellent long-term analysis performance
- High Productivity: no down-time for column replacement or other maintenance
- Savings on operator time and spare parts
- Optimal system up time in the lab



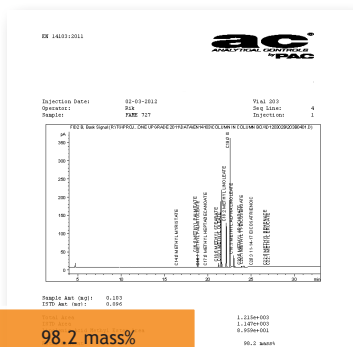
AC proprietary secondary programmable column oven

ENHANCED AND USER-FRIENDLY AC BIODIESEL SOFTWARE

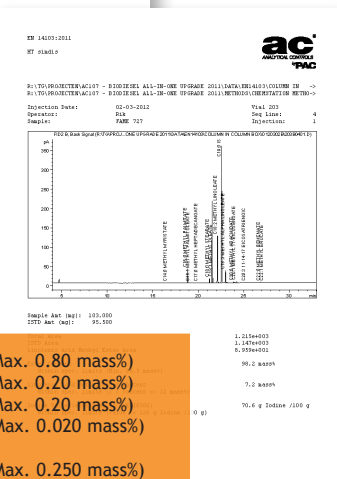
AC All in One biodiesel comes with dedicated methods and reporting templates.

This ensures compliancy and easy operation

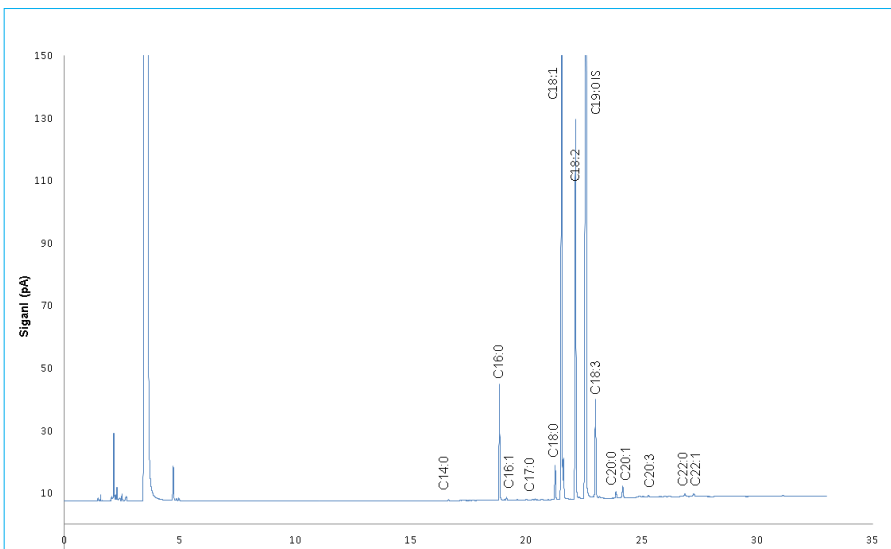
- All relevant information for each method is reported
- Specific calculations are included, no need for additional programming
- Data are checked against specification (pass/fail)
- Calibration data ensure traceability
- Automated Column performance checks for easy QC



Ester Content: Within spec. limits (Min. 96.5 mass%)	98.2 mass%
Linolenic Acid Methyl Ester Content: Within spec. limits (1 < Content <= 12 mass%)	7.2 mass%
Iodine Value (according to prEN16300) Within spec. limits (Value <= 120 g Iodine /100 g)	70.6 g Iodine



Mono Glyceride	0.42	Within spec. limits (Max. 0.80 mass%)
DiGlyceride	0.10	Within spec. limits (Max. 0.20 mass%)
TriGlyceride	0.05	Within spec. limits (Max. 0.20 mass%)
Free Glycerol	0.008	Within spec. limits (Max. 0.020 mass%)
Total Glycerol	0.136	Within spec. limits (Max. 0.250 mass%)
Column performance	1.78	Within spec. limits (Max. 1.8 mass%)



Analysis of a rapeseed FAME sample according to EN 14103:2011



METHOD SPECIFIC QC SAMPLES FOR LONG TERM PERFORMANCE

AC offers a wide range of materials to calibrate your system; 'certified finished products' and other QC checks that will hold up in any QC-audit. Most often these materials have been part of extensive Round Robin tests in the industry, and have ensured successful installation of hundreds of AC lab-solutions.

- A Full range of calibration standards, QC checks and 'finished product' reference materials for every application or solution.
- Round Robin tested, certified & proven values
- Stringent Quality Control on manufacturing, storage and shipping
- MSDS included
- All samples come with chromatograms and a comprehensive booklet to guide you to a better QC system in your lab

QC SAMPLES FOR EACH BIODIESEL METHOD

For each biodiesel method, AC offers a calibration, reference and re-agents sample set. The AC reference materials are designed and produced in-house to be intrinsic part of your laboratory quality system. They are used for testing the equipment and application prior to delivery and for qualification on-site during installation. After that they offer you a full QC-program for the lifetime of the instrument, sensitivity, and stability.



SPECIFICATIONS

Ordering Information				
GCG4500A	AC Biodiesel All in One System 120V on 8890 GC			
GCG4500C	AC Biodiesel All in One System 230V on 8890 GC			
GCG4500.100	Kit, Spare Parts BioDiesel All-in-One, 8890 GC			
GCG4500.200	Kit, Consumable Parts BioDiesel All-in-One, 8890 GC			
Utility Requirements				
Power	120/230V			
Accessories included	Columns Dual Oven Hardware System Testing Documentation System Operation Manual AC Biodiesel Software Reference Materials for system startup and first QC for all methods			
Analysis Scope				
Method compliancy	EN 14103, EN14105, EN14110, ASTM 6584, prEN 16300 EN 15779 is optional on request			
Sample Type / Range	B5 / B7 / B20 / B100 FAME Feedstocks and Blends			
Analysis Performance				
Precision Range	Method		Range	Repeatability
	EN14103	Total ester content	> 90%	$r = 1,01 \%$
		Linolenic acid	1 - 15 %	$r = 0.0283 + 0.0175 X \%$
	EN14105	Free Glycerol	> 0.001 %	$r = 0.1615 X + 0.0003$
		Monoglycerides	> 0.1 %	$r = 0.0787 X + 0.0059$
		Diglycerides	> 0.1 %	$r = 0.0989 X + 0.0042$
		Triglycerides	> 0.1 %	$r = 0.0469 X + 0.0128$
		Total Glycerol		$r = 0.1092 X - 0.0034$
	EN14110	Methanol	0.01 % - 0.5 %	$r = 0.056 X + 0.001$
	ASTM D6584	Free Glycerin	0.005 - 0.05 %	$R = 2.339E-02 *$
		Total Glycerin	0.05 - 0.5 %	$(X + 1.000E-04)0.4888$
		Monoglycerides		$R = 5.405E-02 * (X + 0.5164)$
		Diglycerides		$0.1452 * X0.6995$
		Triglycerides		$0.1304 * (X+1.310E02)0.3784$

ABOUT PAC

PAC develops advanced instrumentation for lab and process applications based on strong **Analytical Expertise** that ensures **Optimal Performance** for our clients. Our analyzers help our clients meet complex industry challenges by providing a low cost of ownership, safe operation, high performance with fast, accurate, and actionable results, high uptime through reliable instrumentation, and compliance with standard methods.

Our solutions are from industry-leading brands: AC Analytical Controls, Advanced Sensors, Alcor, Antek, Herzog, ISL, Cambridge Viscosity, PSPI, and PetroSpec. We are committed to delivering superior and local customer service worldwide with 16 office locations and a network of over 50 distributors. PAC operates as a unit of Roper Technologies, Inc., a diversified technology company and a constituent of S&P 500, Fortune 1000, and Russell 1000 indices.

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