

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



AC BIODIESEL ALL IN ONE ANALYZER



ac[®]
ANALYTICAL CONTROLS
by **PAC**

FULL BIODIESEL ANALYSIS 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 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
	Total Glycerol	≤ 0.25 % m/m
	Monoglyceride	≤ 0.80 % m/m
	Diglyceride	≤ 0.20 % m/m
	Triglyceride	≤ 0.20 % m/m
ASTM D6584-2010	Free Glycerol	≤ 0.02 % m/m
	Total Glycerol	≤ 0.24 % 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 7890A 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

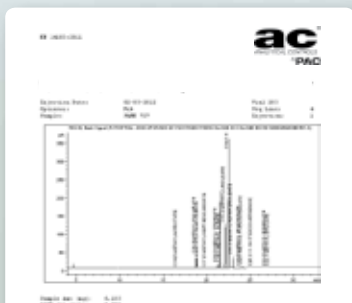


AC proprietary secondary programmable column oven

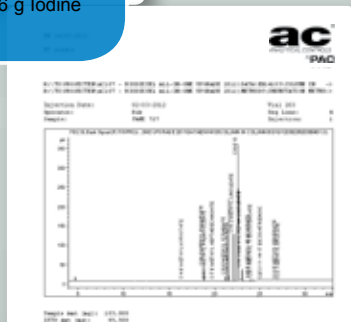
ENHANCED AND USER-FRIENDLY AC BIODIESEL SOFTWARE

AC All in One biodiesel comes with dedicated methods and reporting templates. This ensures compliancy and easy operation

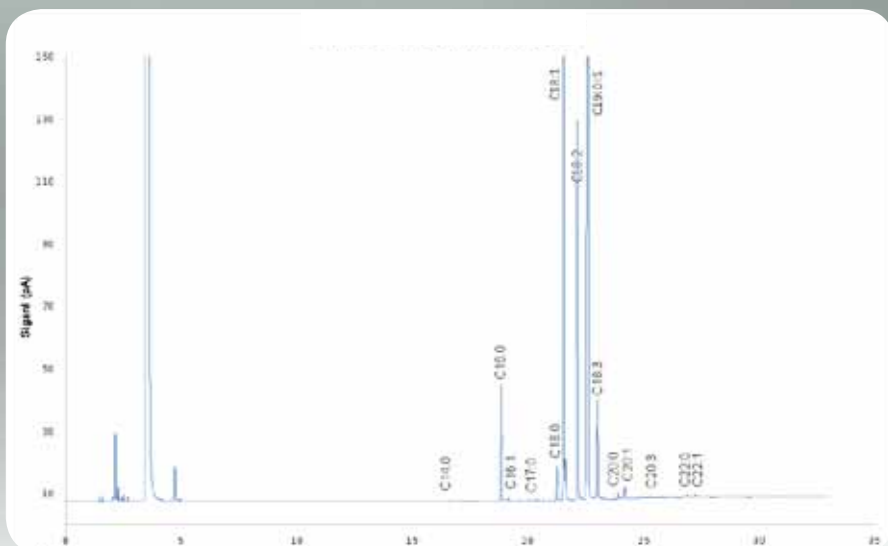
- All relevant information for each method is reported
- Specific calculations are included, no need for additional programming
- Data are checked against specification (pass/fail)
- Calibration data ensure traceability
- Automated Column performance checks for easy QC



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



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.





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SPECIFICATIONS

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 (m/m)	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 * (X + 1.000E-04)0.4888
		Total Glycerin	0.05 – 0.5 % R = 5.405E-02 * (X + 0.5164)
		Monoglycerides	0.1452 * X0.6995
		Diglycerides	0.1304 * (X+1.310E02)0.3784
		Triglycerides	0.3528 * (X+9.100E03)0.5780
Ordering information			
CCG4500A	AC Biodiesel All in One System 120V on 7890 GC		
CCG4500C	AC Biodiesel All in One System 230V on 7890 GC		
CCG4500.300	UPGRADE KIT, BIODIESEL ALL IN ONE (existing system to 2012) for 120 & 230V systems		
Utilities 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		

AC Analytical Controls® by PAC,

has been the recognized leader in chromatography analyzers for gas, naphtha and gasoline streams in crude oil refining since 1981. AC also provides technology for residuals analysis for the hydrocarbon processing industry. Applications cover the entire spectrum of petroleum, petrochemical and refinery, gas and natural gas analysis; ACs Turn-Key Application solutions include the AC Reformulyzer, Simdis, HiSpeed RGA and DHA instruments.

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