All-In-One
AC Biodiesel Analyzer

Background

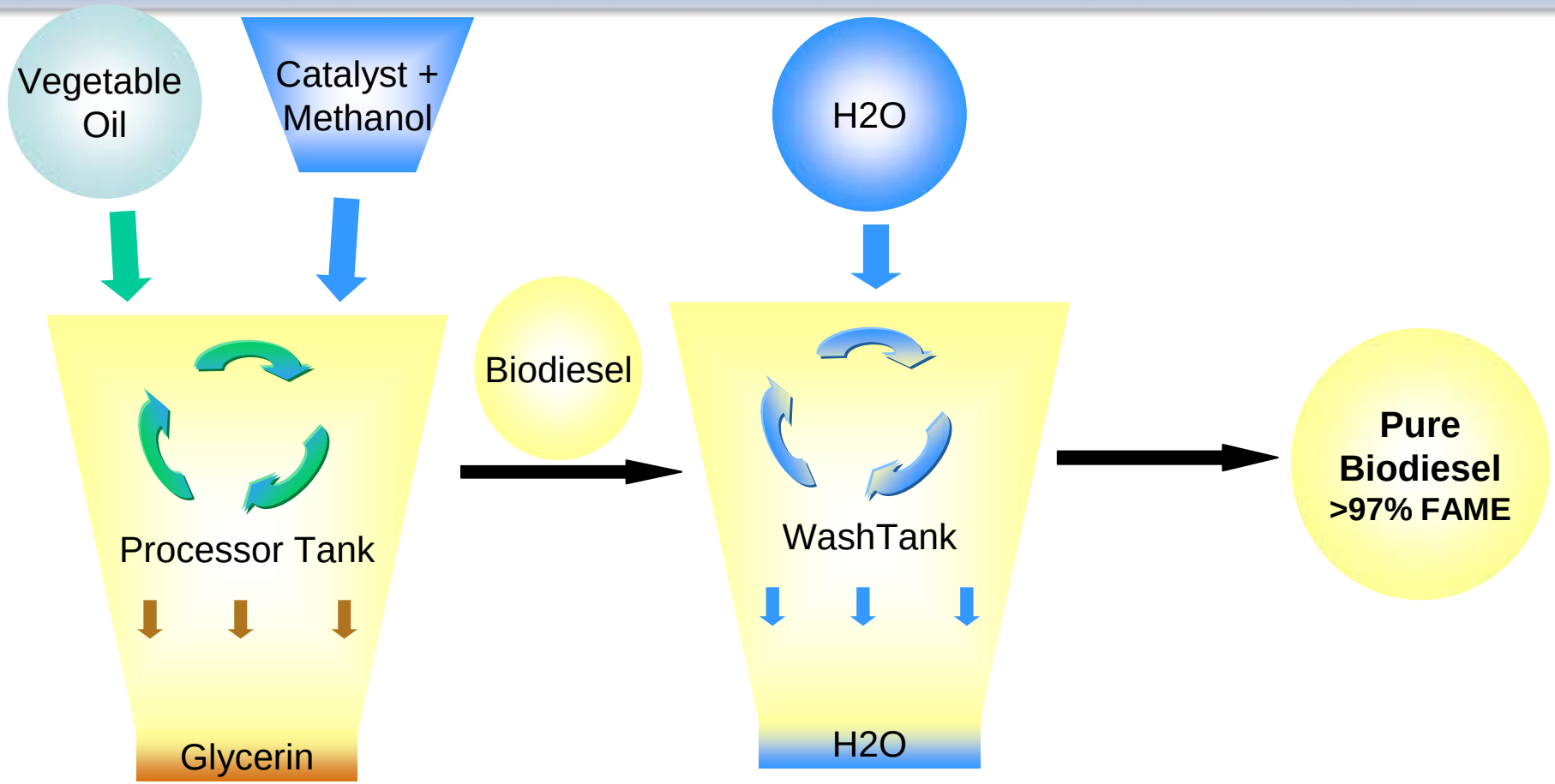
Biodiesel offers an alternative to fossil diesel fuel & contributes to the reduction of greenhouse gas emissions

AC Biodiesel Analyzer

Complies with all ASTM and EN chromatographic test methods listed in the FAME specifications EN-14214 or ASTM D-6751

Analysis Method	Analysis	Inlet	Analysis Time
ASTM D-6584	Free & total glycerin	On-column	35 min
EN-14103	Ester and linoleic acid methyl ester content	Split/splitless	25 min
EN-14105	Free & total glycerol,,mono-, di- and tri-glyceride content	On-column	35 min
EN-14106	Free glycerol	Split/splitless	10 min
EN-14110	Methanol content	Split/splitless	10 min

Biodiesel


Vegetable Oil
Catalyst + Methanol
H2O
Processor Tank
Glycerin
Biodiesel
WashTank
H2O
Pure Biodiesel
>97% FAME

Hardware Configuration

The All In One AC Biodiesel Solution uses the Agilent Technologies 7890 Series gas chromatograph equipped

Optional Automatic liquid sampler or Headspace Sampler

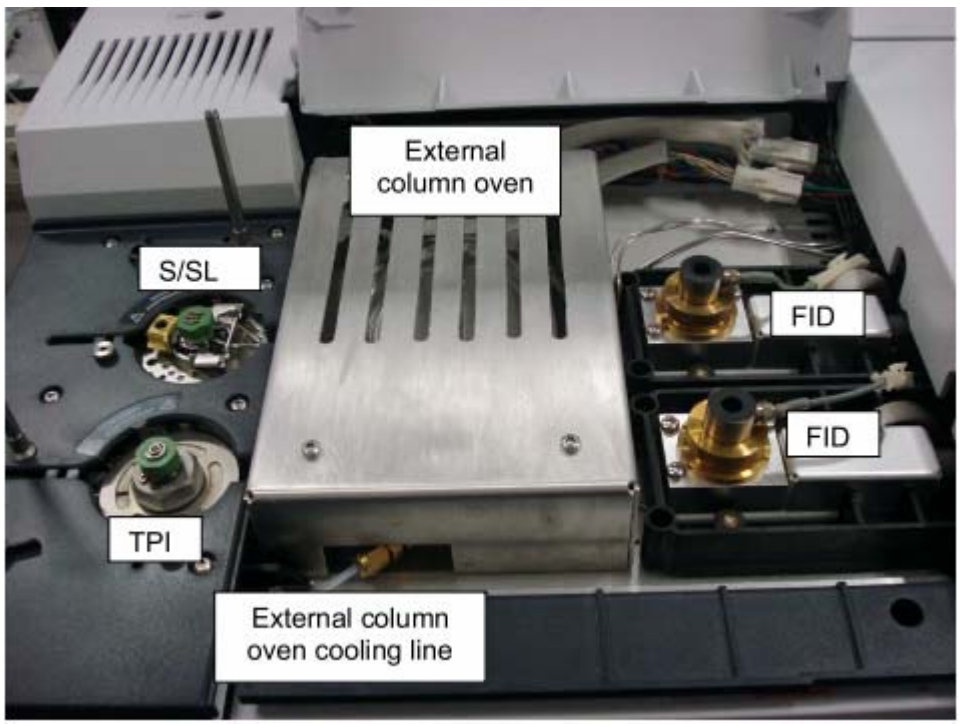
One split/splitless inlet, on-column inlet, 2 flame ionization detectors (FID)

Electronic Pneumatics Control (EPC), additional column oven module

Two capillary columns

Hardware Configuration

The All In One AC Biodiesel Solution uses the Agilent Technologies 7890 Series gas chromatograph equipped with:



Cost-effective design

The All In One AC Biodiesel Analyzer allows to **combine all** ASTM & EN chromatographic tests listed in Biodiesel Specifications EN 14214 & ASTM D 6751 in a **single** Agilent 7890 GC.

Compliance testing

Analyzers are **tested individually** to proof compliance with specified methods.

Component	Specification coefficient	Result
Glycerol	> 0.99	0.9946
Monoolein	> 0.99	0.99359
Diolein	> 0.99	0.99548
Triolein	> 0.99	0.9963

Results are reported for each analyzer

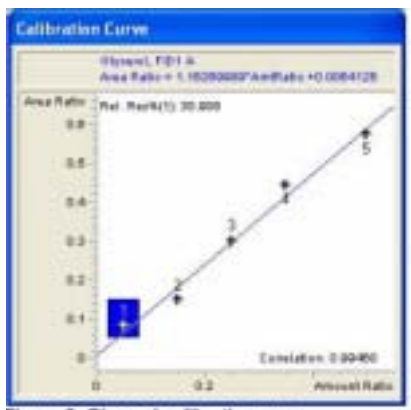


Figure-2: Glycerol calibration curve

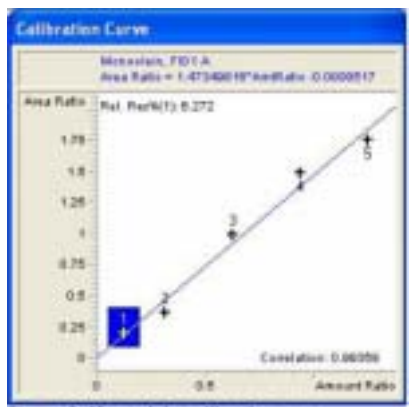


Figure-3: Monoolein calibration curve

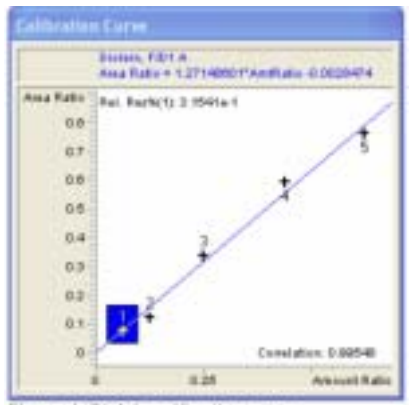


Figure-4: Diolein calibration curve

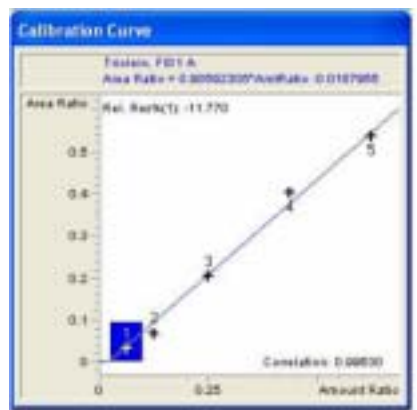
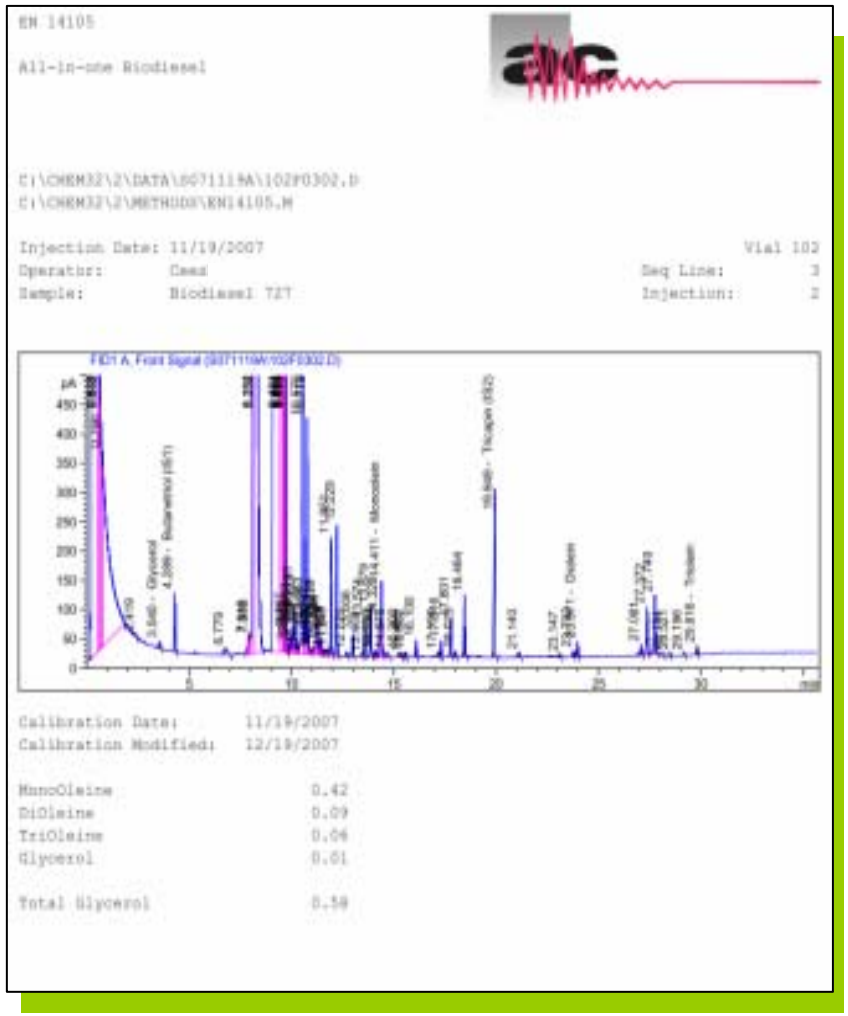


Figure-5: Triolein calibration curve

AC Biodiesel Analysis

ASTM D 6584 - Determination of free and total glycerol and residual mono-, di- and triglyceride

- Reporting
- Complies with requirements as described in the Standard Method
- Calculations listed in the method are automatically reported



EN 14105

All-in-one Biodiesel

C:\CHEM32\2\DATA\B071119A\102F0302.D
C:\CHEM32\2\METHODS\EN14105.M

Injection Date: 11/19/2007 Vial 102
Operator: Cass Seq Line: 3
Sample: Biodiesel 727 Injection: 2

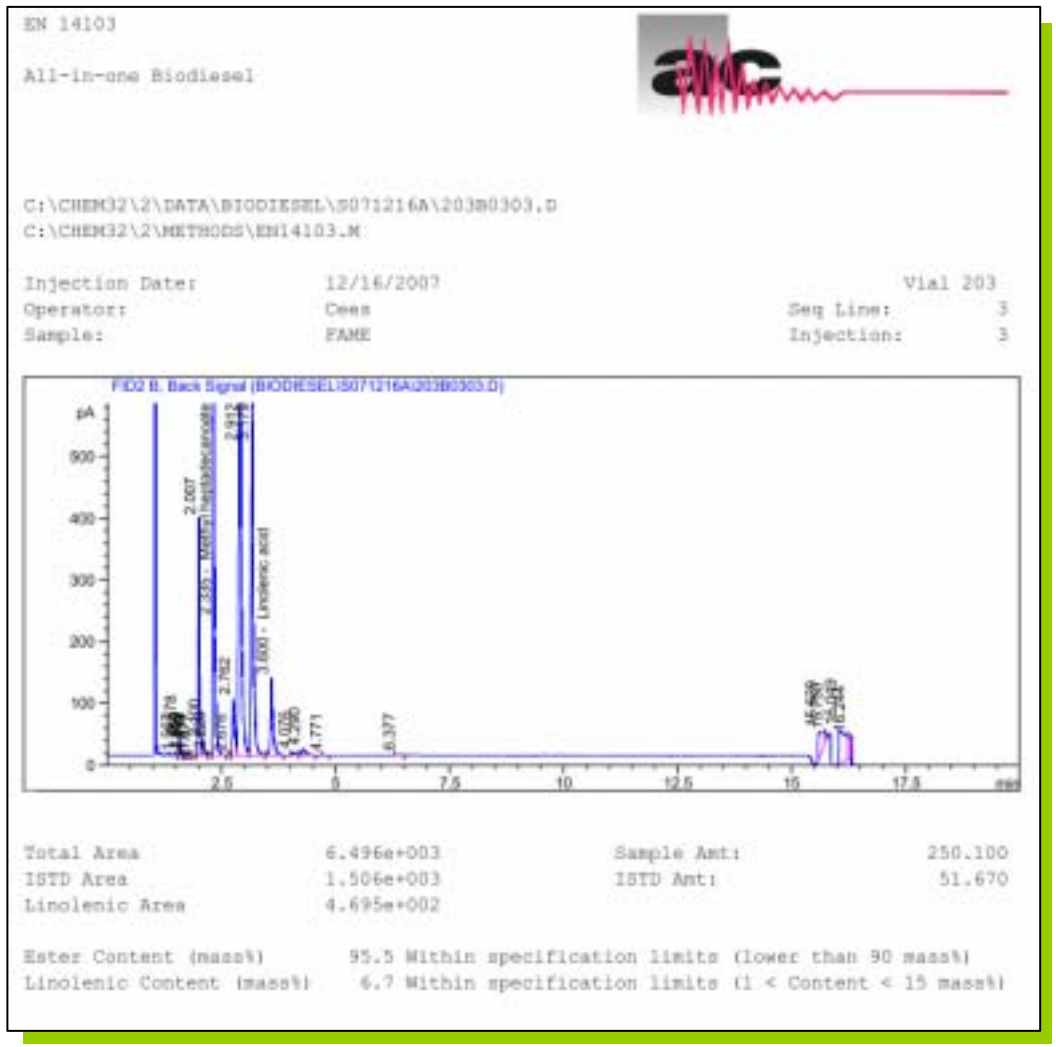
Calibration Date: 11/19/2007
Calibration Modified: 12/19/2007

MonoOleine	0.42
DiOleine	0.09
TriOleine	0.06
Glycerol	0.01
Total Glycerol	0.58

AC Biodiesel Analysis

EN 14103 - Determination of ester & linolenic acid methyl esters content

- Reporting
- Complies with requirements as described in the Standard Method
- States if FAME complies with specification



EN 14103

All-in-one Biodiesel

C:\CHEM32\2\DATA\BIODIESEL\S071216A\203B0303.D
C:\CHEM32\2\METHODS\EN14103.M

Injection Date:	12/16/2007		Vial 203
Operator:	Cees	Seq Line:	3
Sample:	FAME	Injection:	3

FID2 B, Back Signal (BIODIESEL\S071216A\203B0303.D)

pA
900
400
300
200
100
0
2.007
2.762
3.600 - Linolenic acid
4.771
6.377
2.5
5
7.5
10
12.5
15
17.5
min

Total Area	6.496e+003	Sample Amt:	250.100
ISTD Area	1.506e+003	ISTD Amt:	51.670
Linolenic Area	4.695e+002		

Ester Content (mass%) 95.5 Within specification limits (lower than 90 mass%)
Linolenic Content (mass%) 6.7 Within specification limits (1 < Content < 15 mass%)

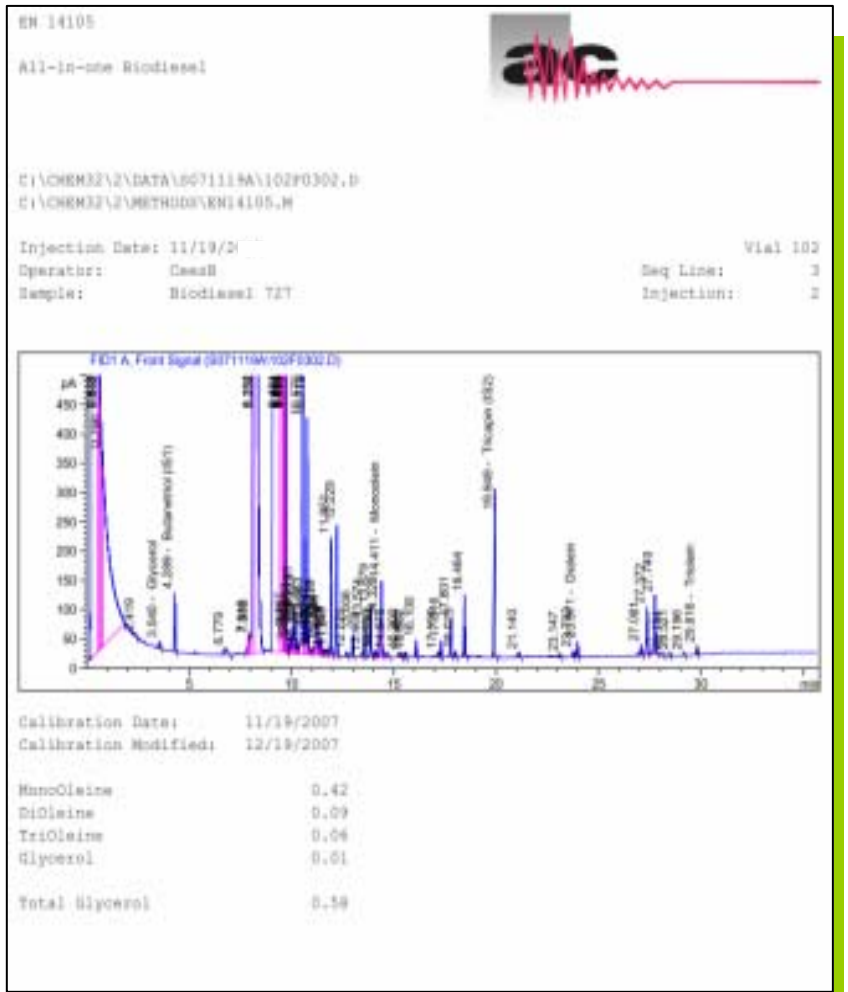
AC Biodiesel Analysis

EN 14105 - Determination of free and total glycerol and residual mono-, di- and triglyceride

Reporting

Complies with requirements as described in the Standard Method

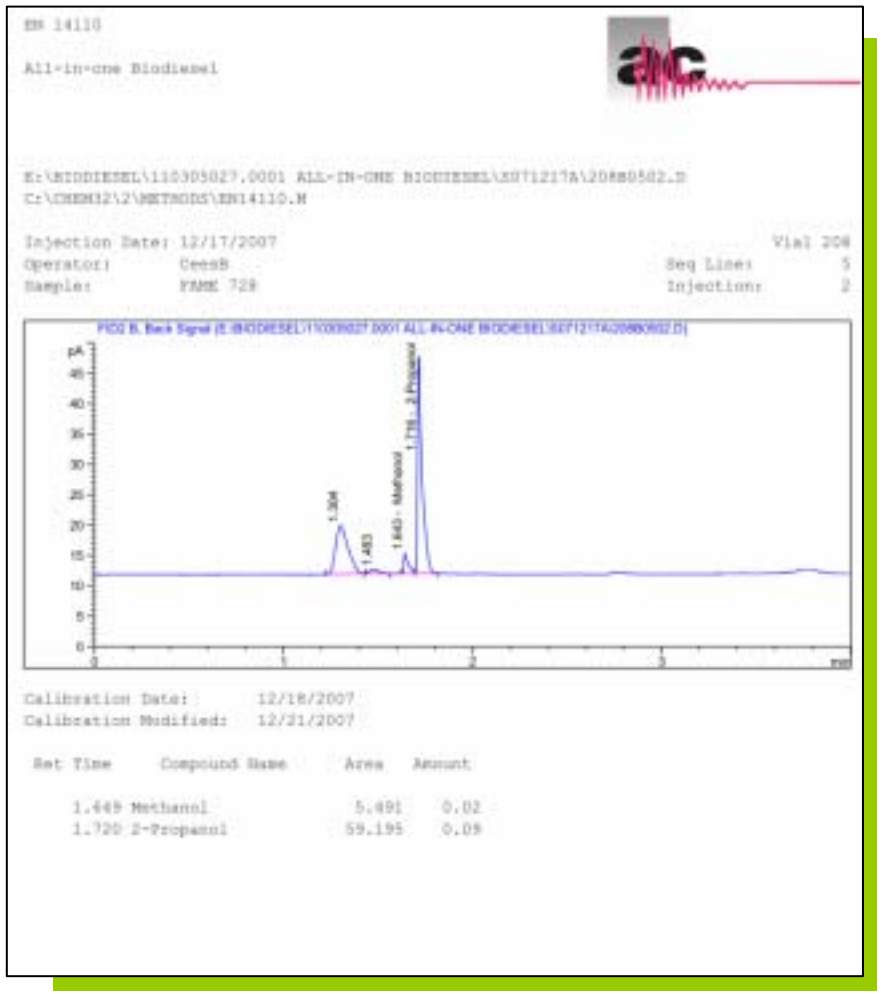
Calculations listed in the method are automatically reported



AC Biodiesel Analysis

EN 14110 - Determination of methanol content

Alternative direct injection method possible instead of headspace



AC Biodiesel Analysis

EN 14110 - Determination of methanol content

Each system is checked for calibration and resolution

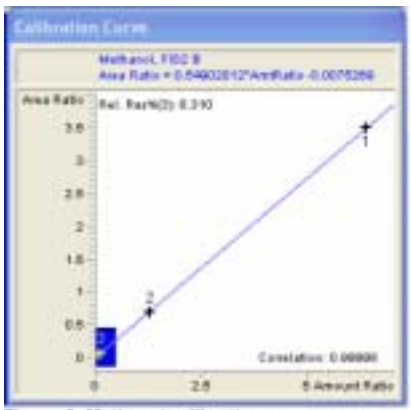


Figure-6: Methanol calibration curve

Correlation coefficient	Specification	Found
Methanol	> 0.95	> 0.99

Component	Specification	Result
Methanol – 2-Propanol	>1.5	2.73

Turn-Key Solution

System comes with calibration, internal standards and reagents materials

EN 14103

AC partnumber	AC description
Not supplied	Heptane (solvent)
00.80.551	Methyl heptadecanoate

EN 14105 & ASTM D 6584

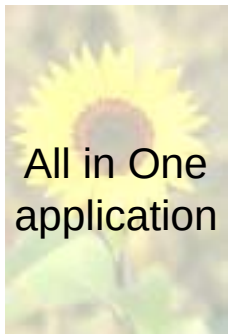
AC partnumber	AC description
00.03.002	EN14105 & D6584 individual standard solution and internal standard kit
00.03.005	N-Methyl-N-trimethylsilyltrifluoroacetamide (MSTFA)
Not supplied	Heptane (solvent)
Not supplied	Pyridine (solvent)

EN 14110

AC partnumber	AC description	Concentration
00.03.008	2-Propanol	ISTD
00.03.009	Methanol	various

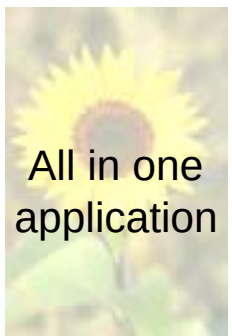
Features & Benefits

All In One application combines all current chromatographic ASTM & EN methods in one GC



Features & Benefits

Complies with EN 14214 and ASTM D 6751 biodiesel specifications



Features & Benefits

Software is compatible with various chromatographic data systems such as Atlas, ChemStation and EZchrom

Full application range

Various Data Systems

Biodiesel Specs

Features & Benefits

Completely tested according to the specified methods

All in One application

Various data systems

Biodiesel specs

Completely tested

Features & Benefits

Includes multiple sets of calibration components, internal standards and reagents

All in One application

Various data systems

Calibration components

Biodiesel specs

Completely tested

Features & Benefits

Global network of AC certified support engineers install system on-site and familiarizes users with operation

All in One application

Various data systems

Calibration components

Biodiesel specs

Completely tested

Global Support

Features & Benefits

One year warranty covers hardware and application

- All in one application
- Various data systems
- Calibration components
- Warranty
- Biodiesel specs
- Completely tested
- Global Support

Features & Benefits

Analyzers include free helpdesk assistance for any hardware or software related questions

All in one application	Various data systems	Calibration components	Warranty
Biodiesel specs	Completely tested	Global Support	Free Helpdesk

Features & Benefits

Optional on-line remote support by LAN connection is available

Conclusion

AC Analytical Controls offers an All In One Biodiesel solution covering all the current specification test methods.

- All in one application
- Various Data Systems
- Calibration Components
- Warranty
- Remote
- Biodiesel Specs
- Completely tested
- Global Support
- Free Helpdesk

More Information

www.analytical-controls.com

Questions