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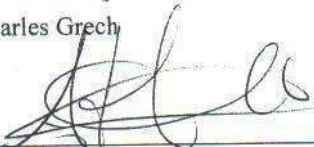
## Annex D1c:


Atmospheric Emissions from the Scrubber- Methanol, Acetone,  
and Sec-Butanol

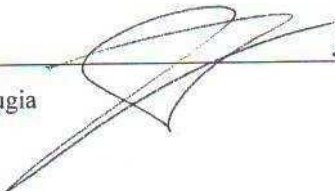
# ATMOSPHERIC EMISSIONS FROM THE SCRUBBER

METHANOL/ACETONE/Sec-BUTANOL

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## 1.1 Introduction

The method used for the analysis of the atmospheric emissions are the one stated by the NIOSH guidelines (National Institute for Occupational Safety and Health), issued on the 15<sup>th</sup> August 1994 for Acetone, 15<sup>th</sup> March 2003 for sec-butanol and 15<sup>th</sup> January 1998 for methanol

These three solvents (methanol, acetone and sec-butanol) were analyzed for since at that moment in time these were the three solvents being used in the production site for the manufacturing of two active ingredients, terbinafine hydrochloride and fexofenadine hydrochloride.

The sampling was taken from scrubber Tower AB203 and a diagram of the latter can be seen in Appendix A. The flow of exhaust from the chimney is 2000m<sup>3</sup>/hr

The sampling was carried out using Drager Sampling Tube 67 28831 (Activated Charcoal Tube Type G). The sampling was performed on Monday 24<sup>th</sup> September 2007. The sampling tube contains two layers: one sampling layer and one following layer. During sampling, the substances to be measured are adsorbed by the sampling layer. The following layer verifies whether the adsorption capacity of the sampling layer is adequate.

## 2.1 Sampling

**Sampler:** Drager Sampling Tube ( Activated Charcoal Tube Type G)

**Flow Rate:** 0.2L/min

**Volume:** 5 litres

**Samples:** 2 samples are taken for each scrubber under investigation.

Both tips of the sample tube are broken immediately prior to sampling. The sample tube is inserted tightly into the pump; with arrow on sample tube pointing towards the pump showing the direction of the flow. 5 litres of air are sucked through the sample tube maintaining a flow of the pump of 0.2litres/min, thus enabling the activated carbon to adsorb well any solvents present in the air being analysed. Following the sampling the tubes are immediately sealed using polyethylene caps.

### 3.1 Measurement

The analysis of the samples are carried out using a GC instrument using the following method:

GC Instrument:	Varian 3900
Injector Temperature:	250°C
Detector temperature:	250°C
Column Flow:	2.0ml/min
Column Program:	40°C for 10 minutes
Makeup Flow (Helium):	25ml/min
Hydrogen Flow:	30ml/min
Air Flow:	300ml/min
Solvent Used:	CS <sub>2</sub>



### **3.1.1 Calibration Curve:**

The calibration curve is performed by preparing standards of the solvents under investigation (Acetone, methanol and sec-butanol) of the following concentrations; 0.13mg/ml, 0.52mg/ml, 2.6mg/ml, 5.2mg/ml, 13mg/ml and 26mg/ml.

The above solutions are performed using the following dilutions:

#### *Solution 1*

650mg of each solvent in 25ml flask and brought to volume with CS<sub>2</sub> (Sol 1). (26mg/ml)

#### *Solution 2*

5ml of Sol 1 in 10ml flask and brought to volume with CS<sub>2</sub> (Sol 2). (13mg/ml)

#### *Solution 3*

2ml of Sol 1 in 10ml flask and brought to volume with CS<sub>2</sub> (Sol 3). (5.2mg/ml)

#### *Solution 4*

1ml of Sol 1 in 10ml flask and brought to volume with CS<sub>2</sub> (Sol 4). (2.6mg/ml)

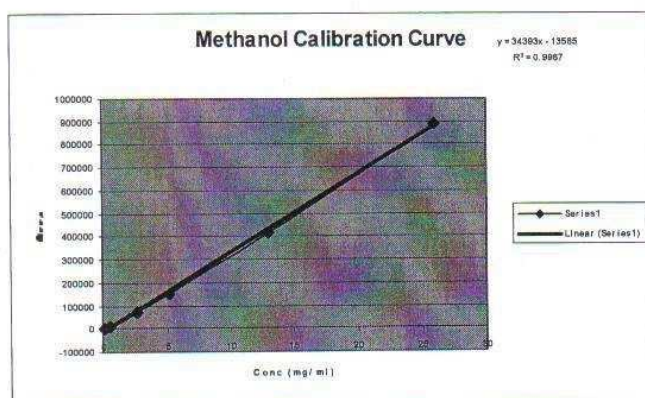
#### *Solution 5*

0.2ml of Sol 1 in 10ml flask and brought to volume with CS<sub>2</sub> (Sol 5). (0.52mg/ml)

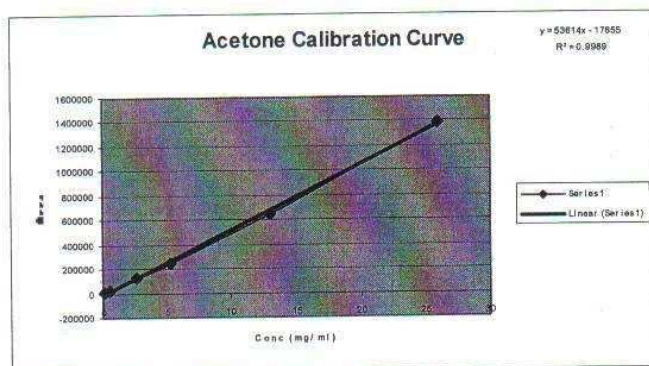
#### *Solution 6*

0.05ml of Sol 1 in 10ml flask and brought to volume with CS<sub>2</sub> (Sol 6). (0.13mg/ml)

Methanol							
Conc mg/ml	Standard 1	Standard 2	Standard 3	Sum	Average	STD	RSD
0.13	2688	2558	2519	7765	2588	88	3.4
0.52	14777	13600	12764	41141	13714	1011	7.4
2.6	80910	70638	69771	221319	73773	6196	8.4
5.2	149679	151595	149311	450585	150195	1226	0.8
13	422812	418864	417108	1258784	419595	2921	0.7
26	1019807	818044	833846	2671697	890566	112205	12.6

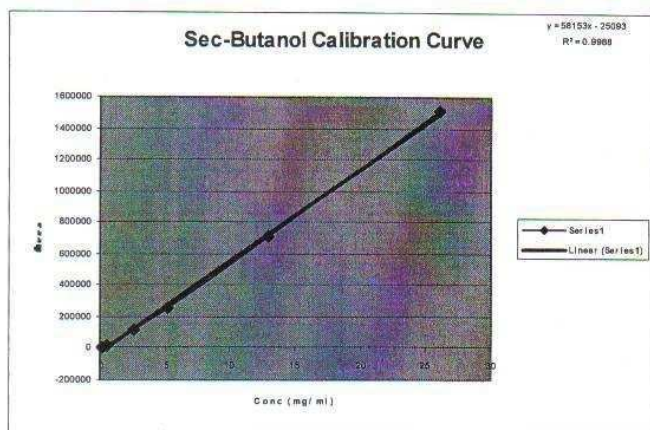


Acetone							
Conc mg/ml	Standard 1	Standard 2	Standard 3	Sum	Average	STD	RSD
0.13	4628	4725	4659	14012	4671	50	1.1
0.52	24560	22786	22065	69411	23137	1284	5.5
2.6	133232	115925	115345	364502	121501	10164	8.4
5.2	239625	244247	241677	725549	241850	2316	1.0
13	659012	653158	652090	1964260	654753	3727	0.6
26	1581550	1286206	1308661	4176417	1392139	164419	11.8





Sec-Butanol							
Conc mg/ml	Standard 1	Standard 2	Standard 3	Sum	Average	STD	RSD
0.13	3154	3163	3176	9493	3164	11	0.3
0.52	20256	19845	19248	59349	19783	507	2.6
2.6	127533	116071	115366	358970	119657	6830	5.7
5.2	253494	258866	256448	768808	256269	2690	1.0
13	708204	704740	705867	2118811	706270	1767	0.3
26	1676314	1407852	1426756	4510922	1503641	149838	10.0



### 3.1.2 Recovery of the Solvents on the Activated Carbon

Known quantities of every solvent were spiked onto the front part of the sampling tube. The tubes were sealed by the polyethylene caps and left to stand for one night. The back part of the sampling tube was discarded, while the front part was placed in a vial and sealed. 3ml of CS<sub>2</sub> were added to the carbon and left to stand for 30 minutes with occasional stirring. The solution was then placed in a GC vial and injected.

Methanol	Standard 1	Standard 2	Standard 3	Sum	Average	STD	RSD
0.52mg/ml	12339	11671	11215	35225	11742	565.32	4.8
13mg/ml	414056	400677	398784	1213517	404506	8324.81	2.1
Acetone	Standard 1	Standard 2	Standard 3	Sum	Average	STD	RSD
0.52mg/ml	21108	19598	18751	59457	19819	1193.94	6.0
13mg/ml	645909	627973	624027	1897909	632636	11662.57	1.8
Sec-Butanol	Standard 1	Standard 2	Standard 3	Sum	Average	STD	RSD
0.52mg/ml	20279	18127	17540	55946	18649	1442.09	7.7
13mg/ml	695722	682175	675098	2052995	684332	10479.78	1.5

The recovery of the solvents were calculated using the area of their respective standard concentration.

	mg of solvent spiked	mg of solvent recovered	Desorption efficiency
<b>Methanol</b>	1.56	1.34	85.6
	39	37.60	96.4
<b>Acetone</b>	1.56	1.34	85.7
	39	37.68	96.6
<b>Sec-Butanol</b>	1.56	1.47	94.3
	39	37.79	96.9

### 3.1.3 Analysis of sampling tubes from the scrubbers

	Methanol	mg of methanol/5ltr	Acetone	mg of acetone/5ltr	Sec-Butanol	mg of sec-butanol/5ltr
Sample 1 Back	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Sample 1 Front	1432	0.25	2964	0.29	1916	0.25
Sample 2 Back	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Sample 2 Front	1745	0.31	3045	0.30	2152	0.28

		Sample 1	Sample 2
Methanol		0.25mg/5lt	0.31mg/5ltr
Acetone		0.29mg/5lt	0.30mg/5lt
Sec-Butanol		0.25mg/5lt	0.28mg/5lt
Methanol	1ppm= 1.31mg/m <sup>3</sup> @NTP		
Acetone	1ppm= 2.37mg/m <sup>3</sup> @NTP		
Sec-Butanol	1ppm= 3.03mg/m <sup>3</sup> @NTP		

	Sample 1 (mg/m <sup>3</sup> )	ppm	Sample 2 (mg/m <sup>3</sup> )	ppm
Methanol	50	38	62	47
Acetone	58	24	60	25
Sec-Butanol	50	17	56	18

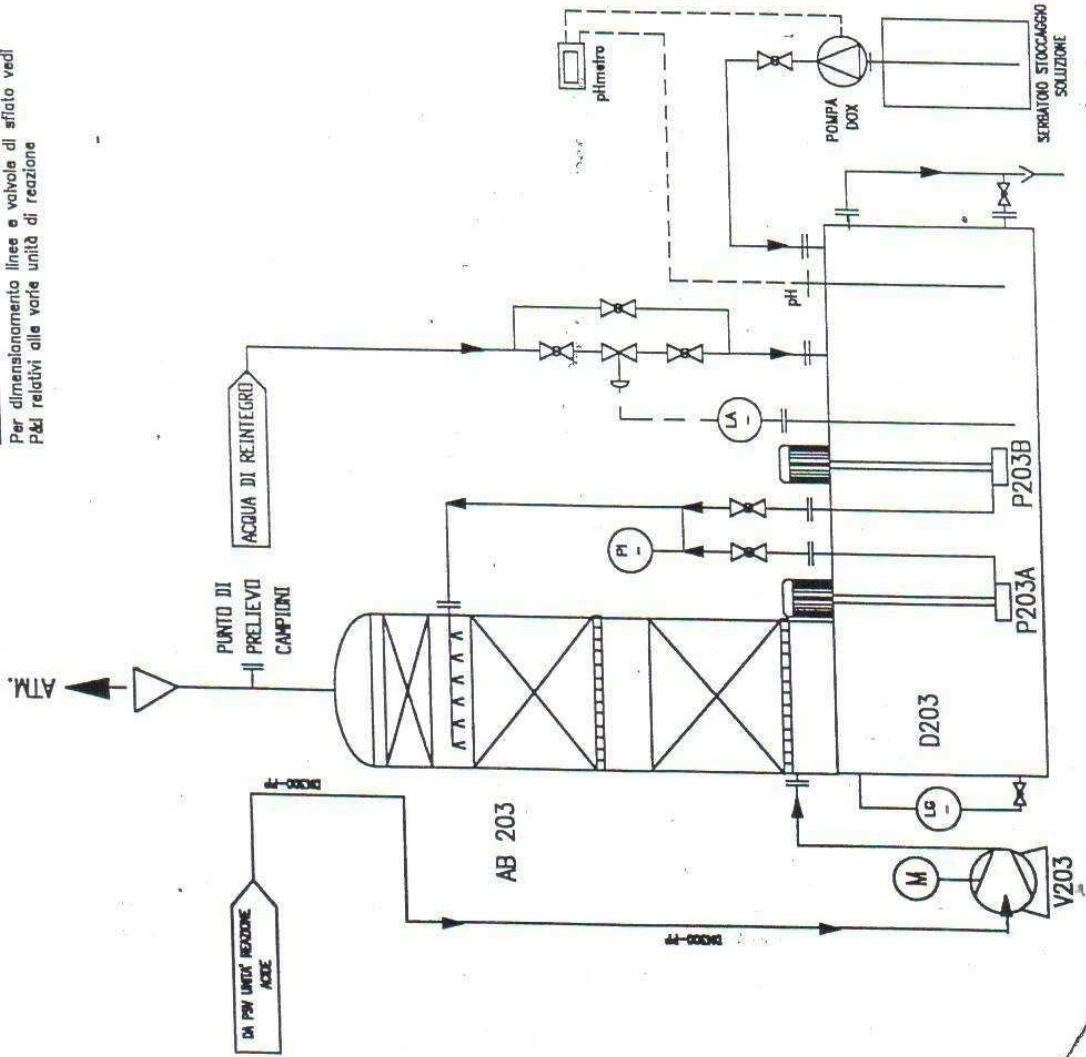
	MEAN PPM
Methanol	43
Acetone	25
Sec-Butanol	17

## **Appendix A – Diagram of the Scrubber**



Nota:

Per dimensionamento linee e valvole di sfiato vedi  
p.d. relativi alle varie unità di reazione



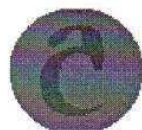
# ELENCO APPARECCHIATURE

SIGLA	PT NOMINALE	DESCRIZIONE UNITA' CONT.	CONV. (N)	SPESSE (m)	RETELLI	RETELLI (bar)	CHIESA
AB 203	/	/	DIAMETRO mm 100	ALTEZZA mm 7700	/	/	/
D203	/	/	/	/	/	/	/
S203	/	/	DIAMETRO mm 400	/	/	/	/
V203	/	/	PORTATA mm 400	PREVAL mm 400	/	/	/
P203A-B	/	/	PORTATA mm 400	PREVAL mm 400	/	/	/
DOX	/	/	PORTATA mm 400	PREVAL mm 400	/	/	/

REV.	DATA	DESCRIZIONE	DESIGN.	CONTR.	APPROV.
1	03-07-00	SITUAZIONE AL 03-07-00	RA	B.S.	/
0	07-06-00	PRIMA EMISSIONE	V.D.	/	/
AMINO CHEMICALS Ltd					
AG1, INDUSTRIAL ESTATE					
MARSA LOA 08, MALTA					
AB-203					
SCHEMA DI IMPIANTO					
IMPIANTO DI ASPIRAZIONE E ABBATTIMENTO EFFLUENTI GASSOSI					
DA VALVOLE SOVRAPPRESSIONE UNITA' REAZIONE ACIDE					
N: AMI-PD-AB203AU					



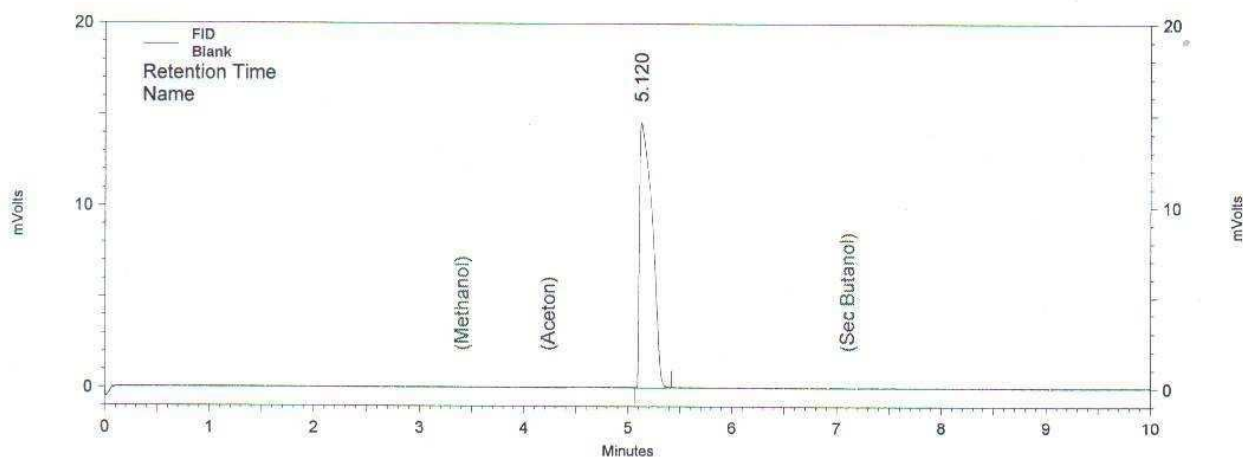
## **Appendix B – Chromatograms for Calibration Curve**



# Amino Chemicals

## Quality Control

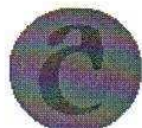
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28-09-2007 14-42-03  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 2  
Run time: 28/09/2007 14:43:48  
Operatore: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	5.120	123655	100.000	Methanol Aceton Sec Butanol	0.00
Totals		123655	100.000		

*[Signature]*  
01/10/07



# Amino Chemicals

## Quality Control

Sample ID: Standard 0.13 mg-ml Inj 1

File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Standard 0.13 mg-ml Inj 1 28-09-2007 14-53-49

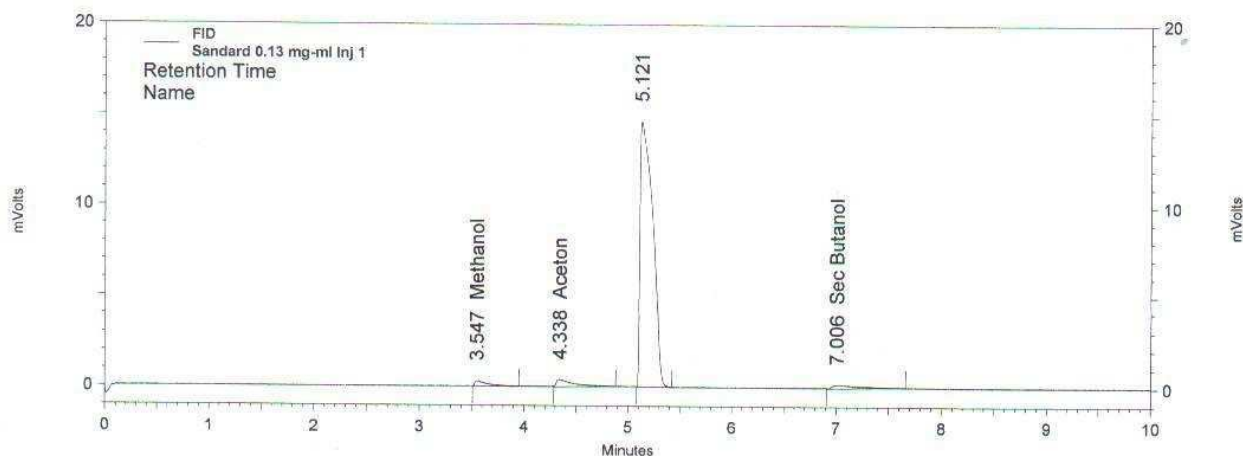
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Volume inj: 1 µl

Vial: 3

Run time: 28/09/2007 14:56:58

Operatore: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.547	2688	2.003	Methanol	0.00
2	4.338	4628	3.448	Aceton	3.11
3	5.121	123746	92.199		3.06
4	7.006	3154	2.350	Sec Butanol	5.44
Totals		134216	100.00		

*Roberto*



# Amino Chemicals

## Quality Control

Sample ID: Standard 0.13 mg-ml Inj 2

File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Standard 0.13 mg-ml Inj 2 28-09-2007 15-07-11

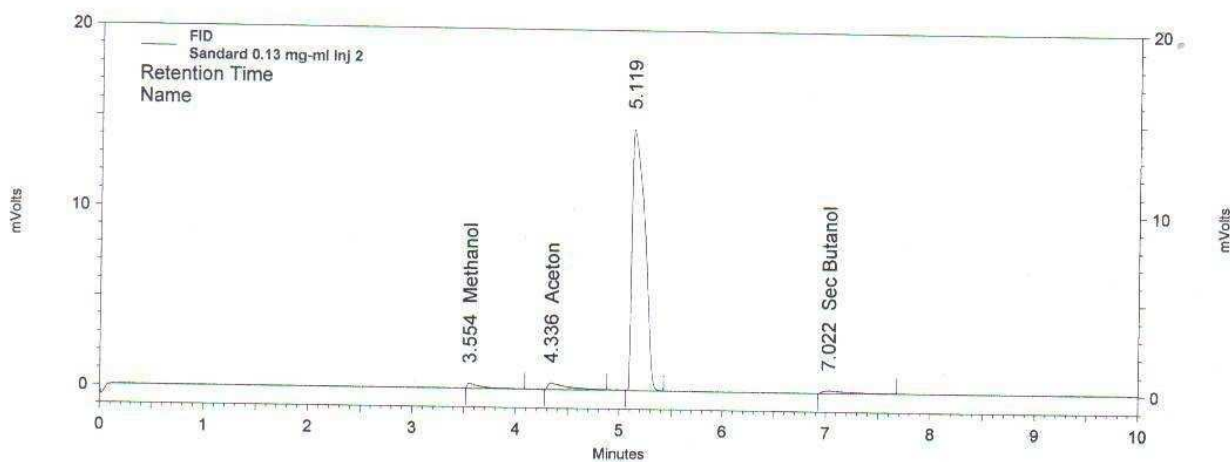
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Volume inj: 1 µl

Vial: 3

Run time: 28/09/2007 15:10:06

Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.554	2558	1.914	Methanol	0.00
2	4.336	4725	3.535	Aceton	2.92
3	5.119	123209	92.184		2.93
4	7.022	3163	2.367	Sec Butanol	5.34
Totals		133655	100.00		0

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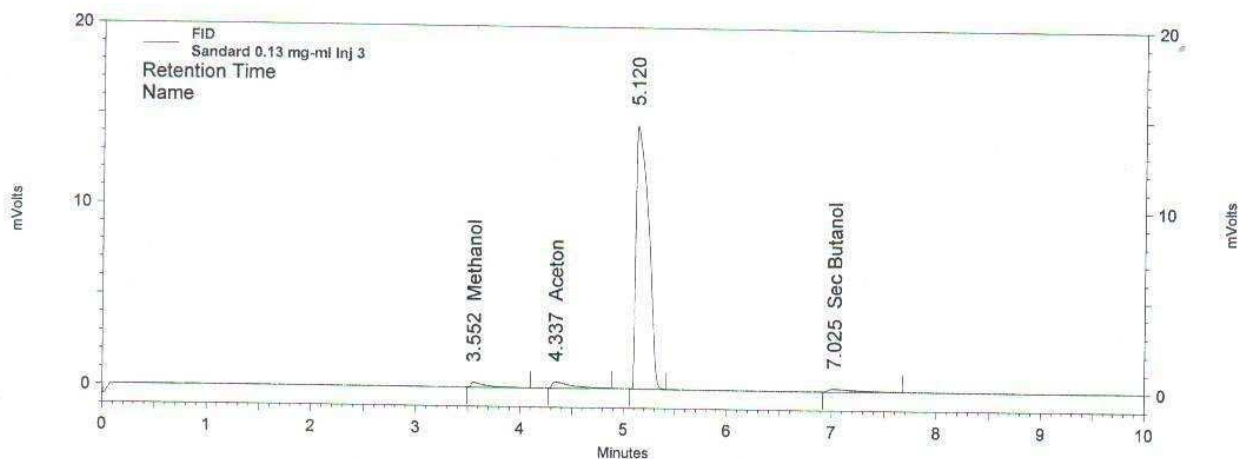




# Amino Chemicals

## Quality Control

Sample ID: Standard 0.13 mg-ml Inj 3  
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Volume inj: 1 µl  
Vial: 3  
Run time: 28/09/2007 15:23:11  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.552	2519	1.900	Methanol	0.00
2	4.337	4659	3.514	Aceton	2.95
3	5.120	122223	92.190		2.96
4	7.025	3176	2.396	Sec Butanol	5.26
Totals		132577	100.00		
			0		

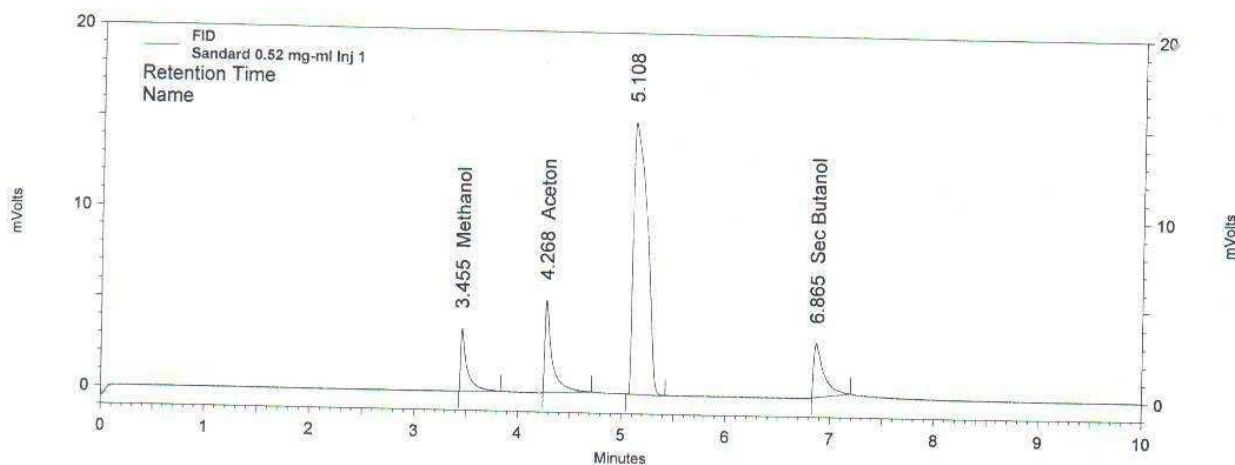
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# Amino Chemicals

## Quality Control

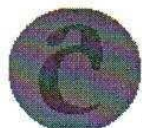
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Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 4  
Run time: 28/09/2007 15:36:18  
Operator: Roberto (VPDomain\Roberto)



### FID Results

PK #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.455	14777	7.553	Methanol	0.00
2	4.268	24560	12.553	Aceton	8.51
3	5.108	136052	69.540		5.01
4	6.865	20256	10.353	Sec Butanol	8.96
Totals		195645	100.00		

*Roberto*  
21/10/07



# Amino Chemicals

## Quality Control

Sample ID: Standard 0.52 mg-ml Inj 2

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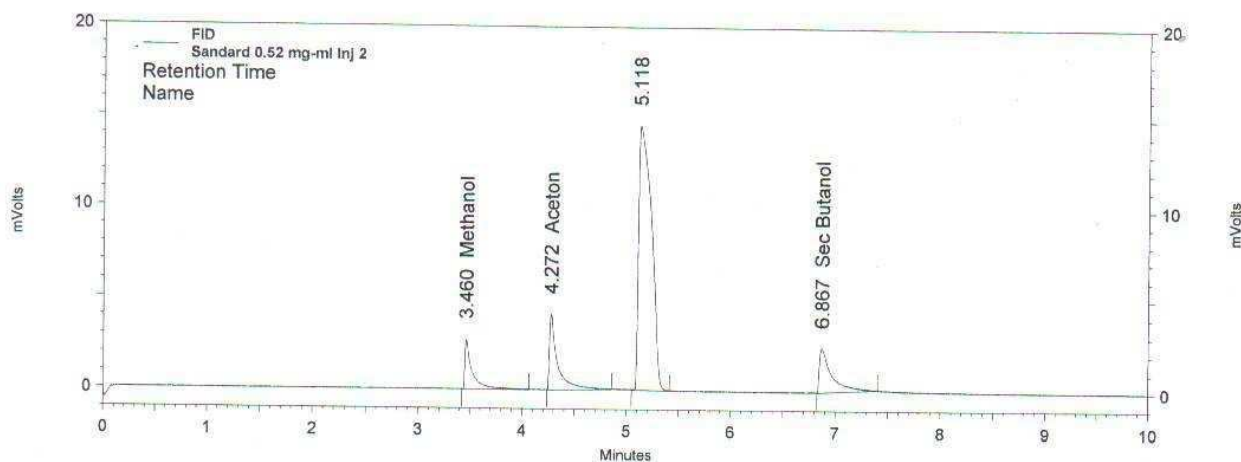
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Volume inj: 1 µl

Vial: 4

Run time: 28/09/2007 15:49:26

Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.460	13600	7.574	Methanol	0.00
2	4.272	22786	12.690	Aceton	7.67
3	5.118	123329	68.684		5.06
4	6.867	19845	11.052	Sec Butanol	8.74
Totals		179560	100.00		
			0		

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01/10/07



# Amino Chemicals

## Quality Control

Sample ID: Standard 0.52 mg-ml Inj 3

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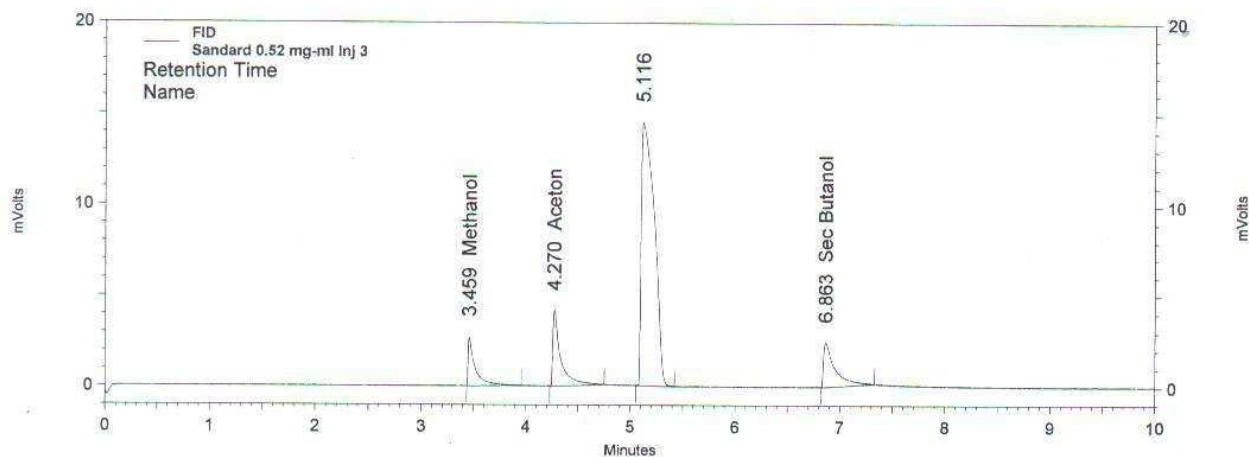
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Volume inj: 1 µl

Vial: 4

Run time: 28/09/2007 16:02:33

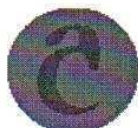
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.459	12764	7.197	Methanol	0.00
2	4.270	22065	12.441	Aceton	7.84
3	5.116	123276	69.509		5.11
4	6.863	19248	10.853	Sec Butanol	8.87
Totals		177353	100.00		
			0		

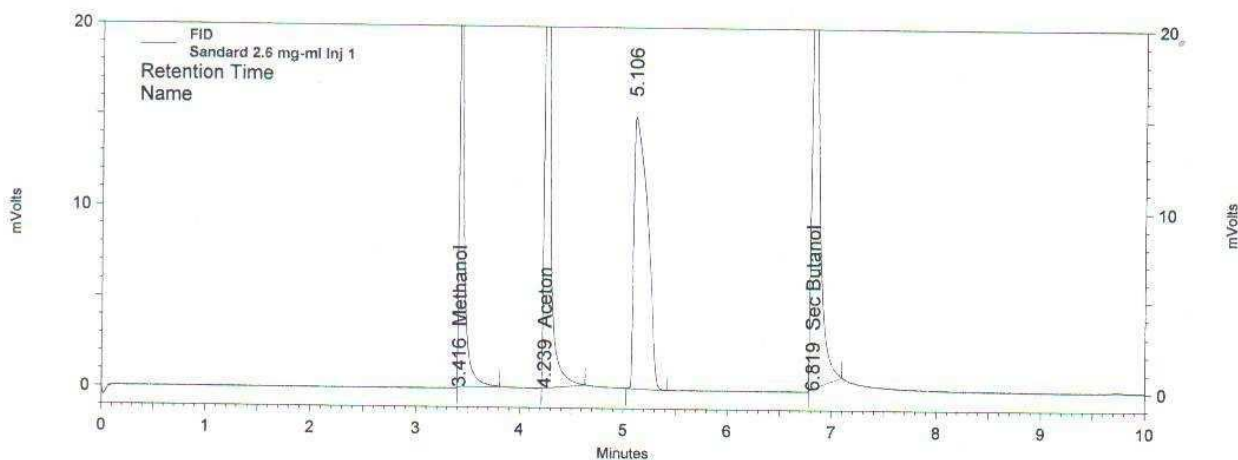
*Roberto*



# Amino Chemicals

## Quality Control

Sample ID: Standard 2.6 mg-ml Inj 1  
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Volume inj: 1 µl  
Vial: 5  
Run time: 28/09/2007 16:15:35  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.416	80910	16.951	Methanol	0.00
2	4.239	133232	27.912	Aceton	11.53
3	5.106	135649	28.419		5.57
4	6.819	127533	26.718	Sec Butanol	9.52
Totals		477324	100.00		

*Roberto*

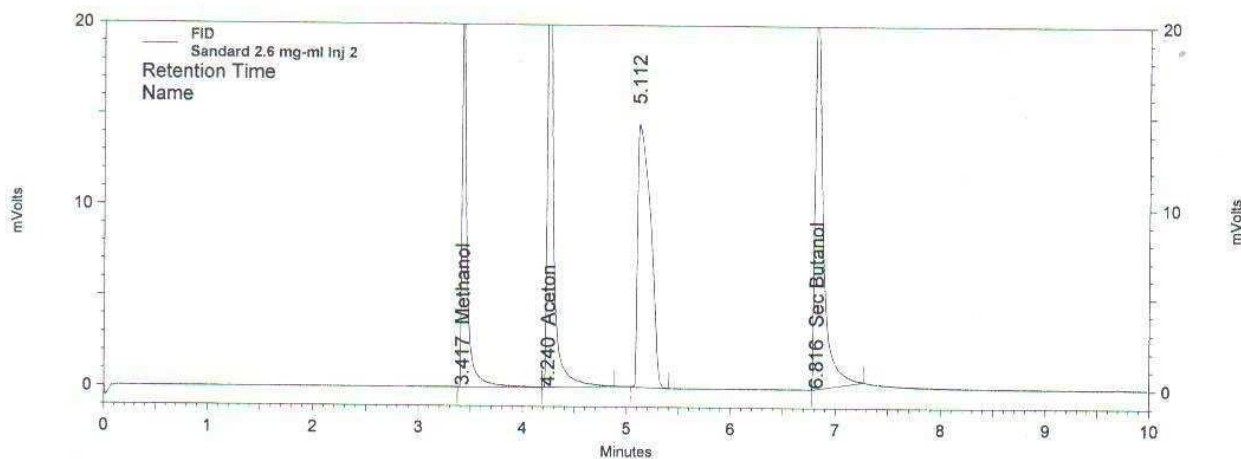




# Amino Chemicals

## Quality Control

Sample ID: Standard 2.6 mg-ml Inj 2  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Standard 2.6 mg-ml Inj 2 28-09-2007 16-25-42  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 5  
Run time: 28/09/2007 16:28:40  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.417	70638	16.564	Methanol	0.00
2	4.240	115925	27.183	Aceton	11.21
3	5.112	123822	29.035		5.81
4	6.816	116071	27.218	Sec Butanol	9.75
Totals		426456	100.00		

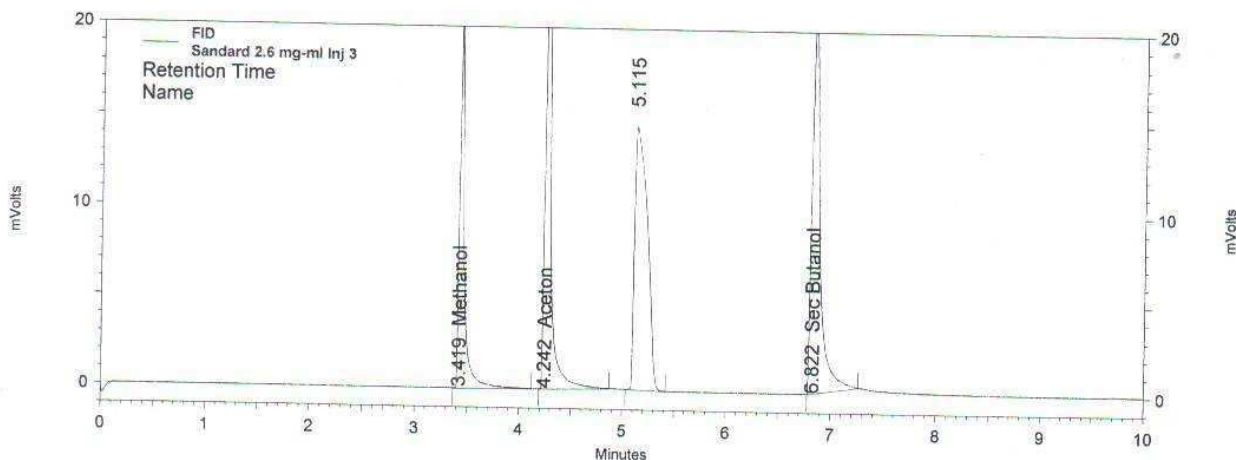
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01/10/07



# Amino Chemicals

## Quality Control

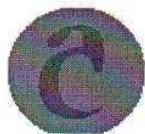
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Volume inj: 1 µl  
Vial: 5  
Run time: 28/09/2007 16:41:44  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.419	69771	16.457	Methanol	0.00
2	4.242	115345	27.207	Aceton	11.32
3	5.115	123478	29.125		5.84
4	6.822	115366	27.212	Sec Butanol	9.79
Totals		423960	100.00		0

*Roberto*  
01/10/07



# Amino Chemicals

## Quality Control

Sample ID: Standard 5.2 mg-ml Inj 1

File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Standard 5.2 mg-ml Inj 1 28-09-2007 16-51-51

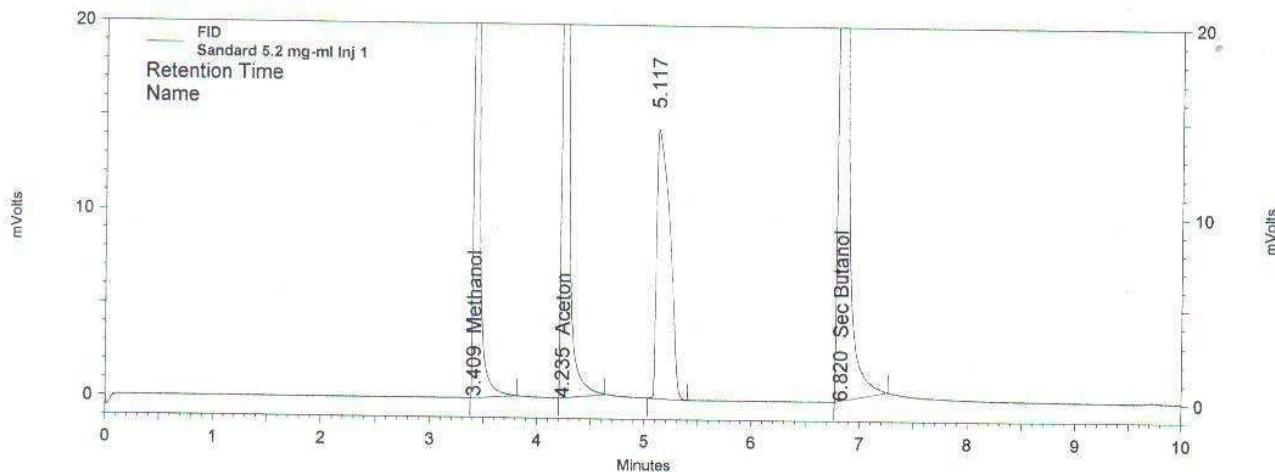
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met

Volume inj: 1 µl

Vial: 6

Run time: 28/09/2007 16:54:50

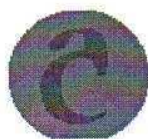
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.409	149679	19.576	Methanol	0.00
2	4.235	239625	31.339	Aceton	11.84
3	5.117	121821	15.932		5.97
4	6.820	253494	33.153	Sec Butanol	9.81
Totals		764619	100.00		
			0		

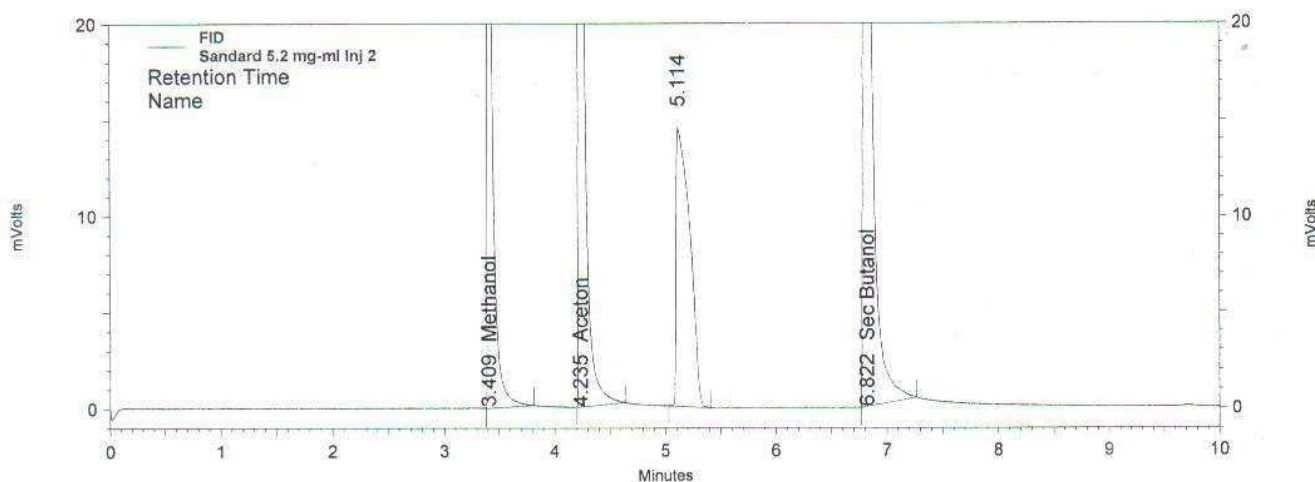
*Handwritten signature:* Roberto  
01/10/07



# Amino Chemicals

## Quality Control

Sample ID: Standard 5.2 mg-ml Inj 2  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Standard 5.2 mg-ml Inj 2 28-09-2007 17-04-56  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 6  
Run time: 28/09/2007 17:07:55  
Operator: Roberto (VPDomain\Roberto)



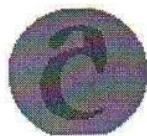
### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.409	151595	19.487	Methanol	0.00
2	4.235	244247	31.398	Aceton	11.77
3	5.114	123205	15.838		5.90
4	6.822	258866	33.277	Sec Butanol	9.87

Totals		777913	100.000		
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*Handwritten signature and date: 01/10/02*

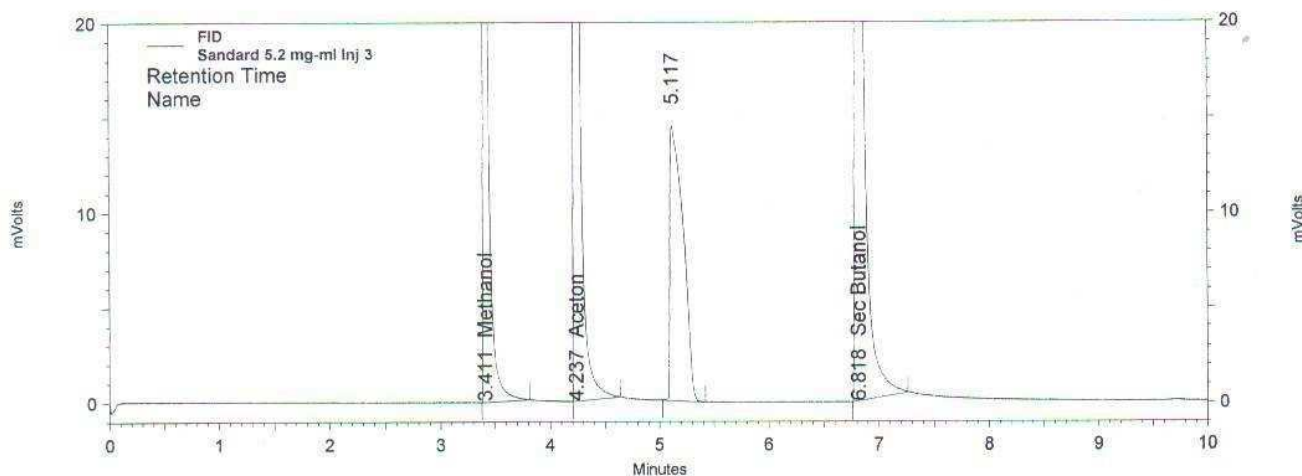




# Amino Chemicals

## Quality Control

Sample ID: Standard 5.2 mg-ml Inj 3  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Standard 5.2 mg-ml Inj 3 28-09-2007 17-18-17  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 6  
Run time: 28/09/2007 17:21:25  
Operator: Roberto (VPDomain\Roberto)



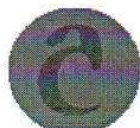
### FID Results

PK #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.411	149311	19.393	Methanol	0.00
2	4.237	241677	31.390	Aceton	11.70
3	5.117	122469	15.907		5.92
4	6.818	256448	33.309	Sec Butanol	9.77

Totals		769905	100.00 0		
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12/10/08

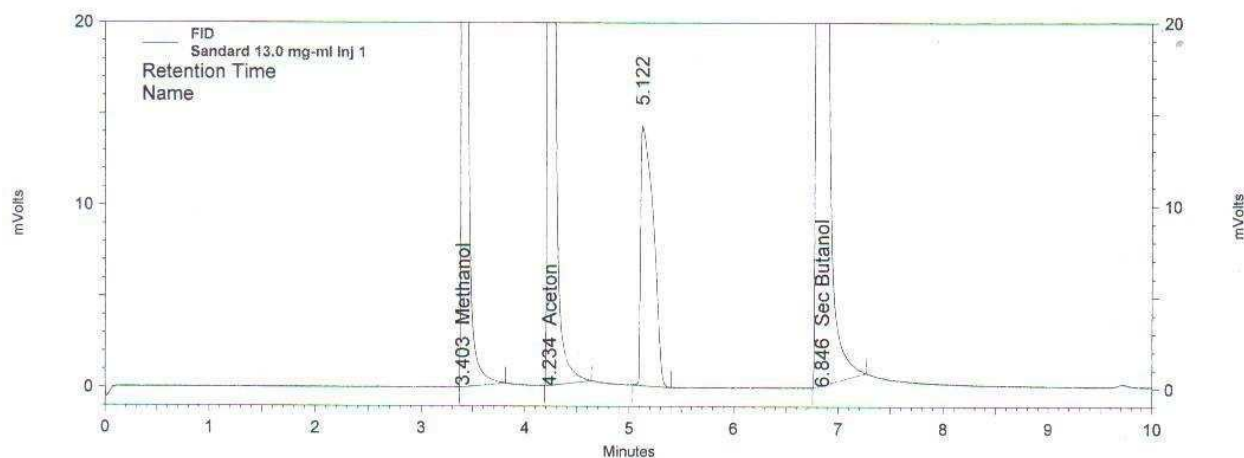




# Amino Chemicals

## Quality Control

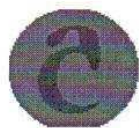
Sample ID: Sandard 13.0 mg-ml Inj 1  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Sandard 13.0 mg-ml Inj 1 28-09-2007 17-31-41  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 7  
Run time: 28/09/2007 17:35:00  
Operatore: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.403	422812	22.145	Methanol	0.00
2	4.234	659012	34.516	Aceton	11.65
3	5.122	119242	6.245		6.01
4	6.846	708204	37.093	Sec Butanol	9.70
Totals		1909270	100.00		

*Handwritten signature:* J. 9/10/07



# Amino Chemicals

## Quality Control

Sample ID: Sandard 13.0 mg-ml Inj 2

File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Sandard 13.0 mg-ml Inj 2 28-09-2007 17-45-07

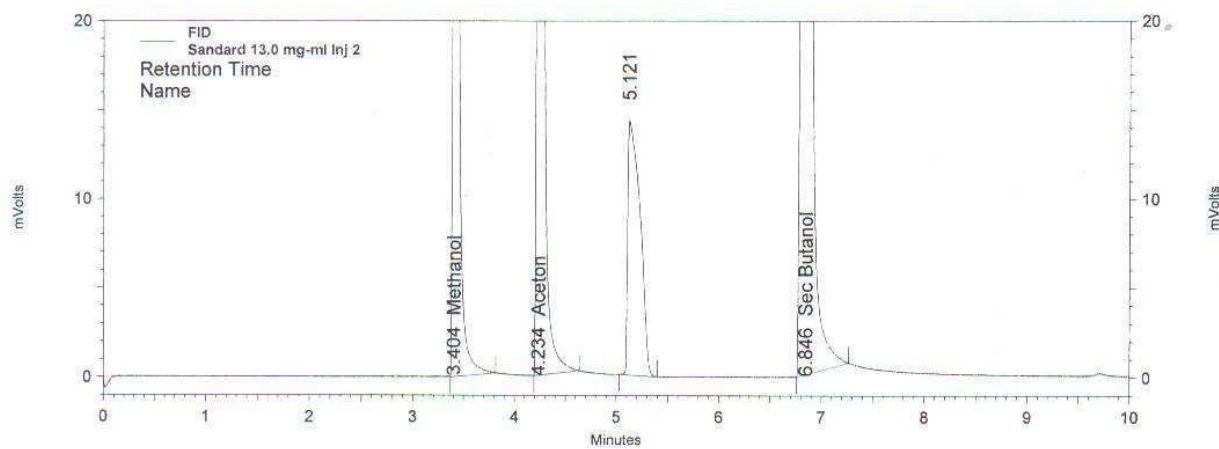
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met

Volume inj: 1 µl

Vial: 7

Run time: 28/09/2007 17:48:09

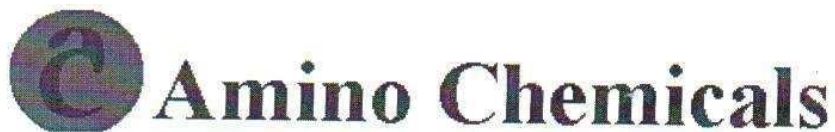
Operatore: Roberto (VPDomain\Roberto)



### FID Results

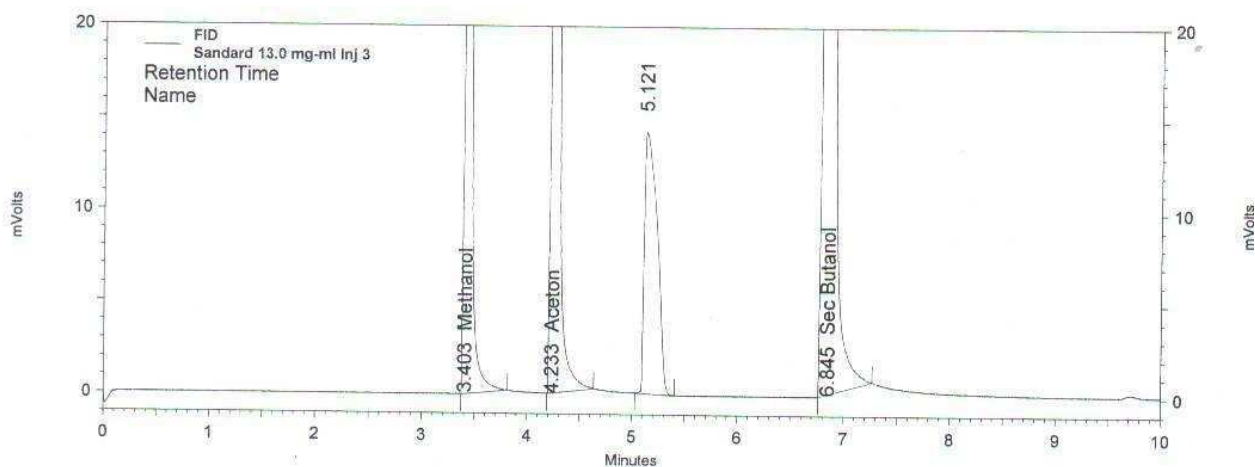
Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.404	418864	22.099	Methanol	0.00
2	4.234	653158	34.461	Aceton	11.59
3	5.121	118602	6.257		6.01
4	6.846	704740	37.182	Sec Butanol	9.74
Totals		1895364	100.00		
			0		

*Roberto*



### Quality Control

Sample ID: Standard 13.0 mg-ml Inj 3  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Standard 13.0 mg-ml Inj 3 28-09-2007 17-58-11  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 7  
Run time: 28/09/2007 18:01:12  
Operator: Roberto (VPDomain\Roberto)

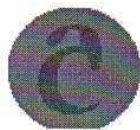


#### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.403	417108	22.025	Methanol	0.00
2	4.233	652090	34.432	Aceton	11.51
3	5.121	118761	6.271		6.02
4	6.845	705867	37.272	Sec Butanol	9.72
Totals		1893826	100.00 0		

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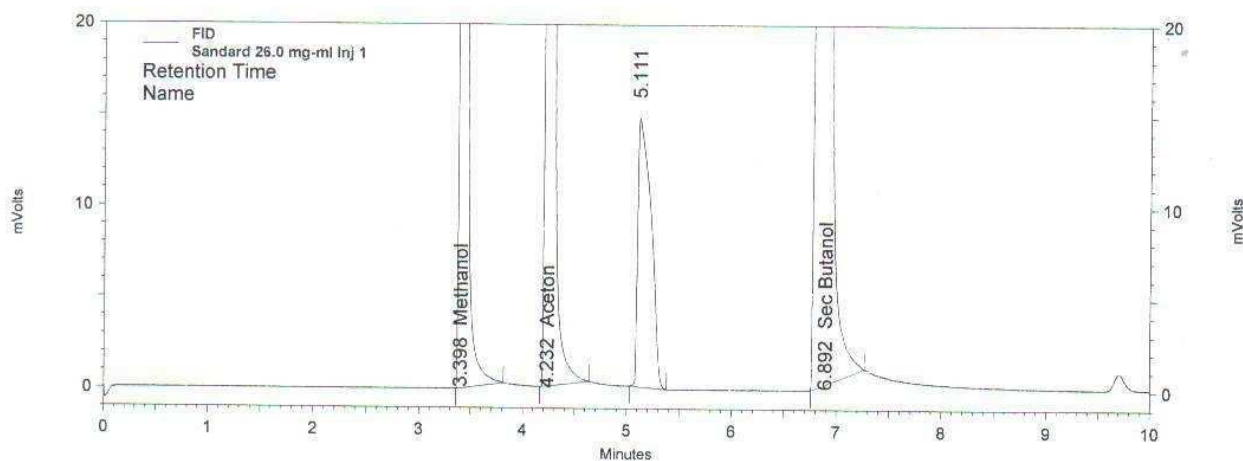




# Amino Chemicals

## Quality Control

Sample ID: Standard 26.0 mg-ml Inj 1  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Standard 26.0 mg-ml Inj 1 28-09-2007 18-11-12  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 8  
Run time: 28/09/2007 18:14:30  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.398	1019807	23.144	Methanol	0.00
2	4.232	1581550	35.893	Aceton	11.45
3	5.111	128650	2.920		5.74
4	6.892	1676314	38.043	Sec Butanol	8.93
Totals		4406321	100.00		

*Roberto*  
09/10/07





# Amino Chemicals

## Quality Control

Sample ID: Sandard 26.0 mg-ml Inj 2

File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Sandard 26.0 mg-ml Inj 2 28-09-2007 18-24-35

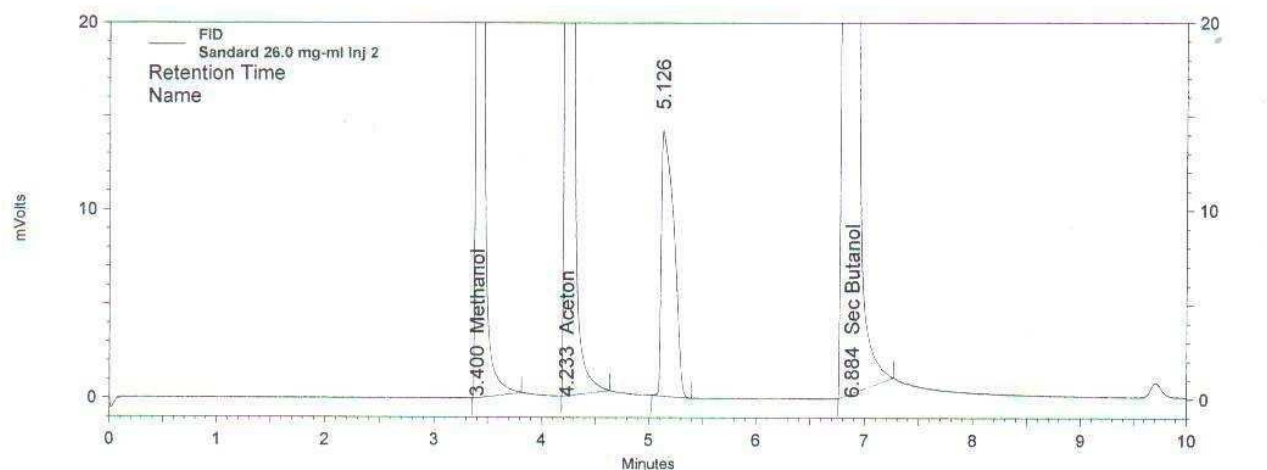
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met

Volume inj: 1 µl

Vial: 8

Run time: 28/09/2007 18:27:38

Operatore: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.400	818044	22.557	Methanol	0.00
2	4.233	1286206	35.466	Aceton	11.36
3	5.126	114439	3.156		6.10
4	6.884	1407852	38.821	Sec Butanol	9.37
Totals		3626541	100.000		

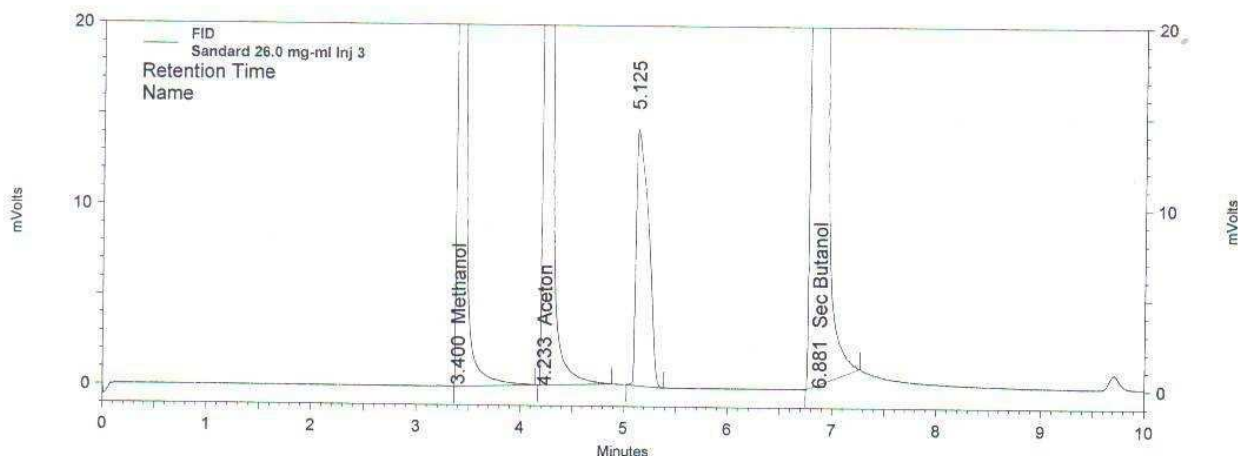
*Roberto*



# Amino Chemicals

## Quality Control

Sample ID: Standard 26.0 mg-ml Inj 3  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Calib Curve\Standard 26.0 mg-ml Inj 3 28-09-2007 18-37-42  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 8  
Run time: 28/09/2007 18:41:01  
Operator: Roberto (VPDomain\Roberto)

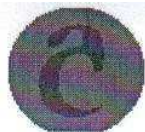


### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.400	833846	22.630	Methanol	0.00
2	4.233	1308661	35.517	Aceton	11.36
3	5.125	115382	3.131		6.10
4	6.881	1426756	38.722	Sec Butanol	9.31
Totals		3684645	100.00		

*Handwritten signature and date: 21/10/07*

## **Appendix C – Chromatograms for Recovery**



# Amino Chemicals

## Quality Control

Sample ID: Recovery 0.52mg-ml Inj 1

File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Recovery\Recovery 0.52mg-ml Inj 1 28-09-2007 18-51-01

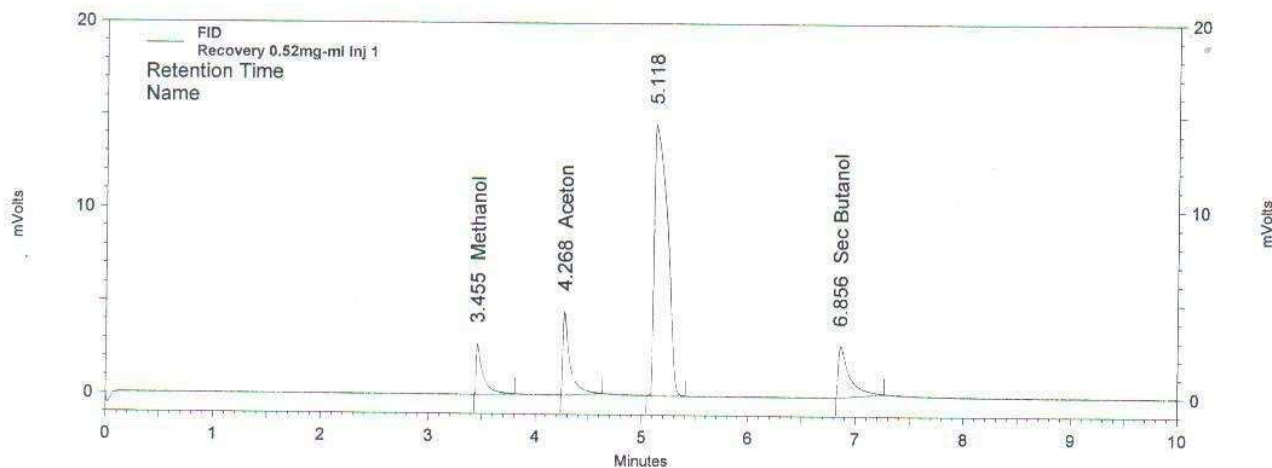
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met

Volume inj: 1 µl

Vial: 9

Run time: 28/09/2007 18:54:22

Operator: Roberto (VPDomain\Roberto)



### FID Results

PK #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.455	12339	6.987	Methanol	0.00
2	4.268	21108	11.953	Aceton	8.26
3	5.118	122861	69.575		5.28
4	6.856	20279	11.484	Sec Butanol	8.94
Totals		176587	100.00		
			0		

*Roberto*



# Amino Chemicals

## Quality Control

Sample ID: Recovery 0.52mg-ml Inj 2

File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Recovery\Recovery 0.52mg-ml Inj 2 28-09-2007 19-04-36

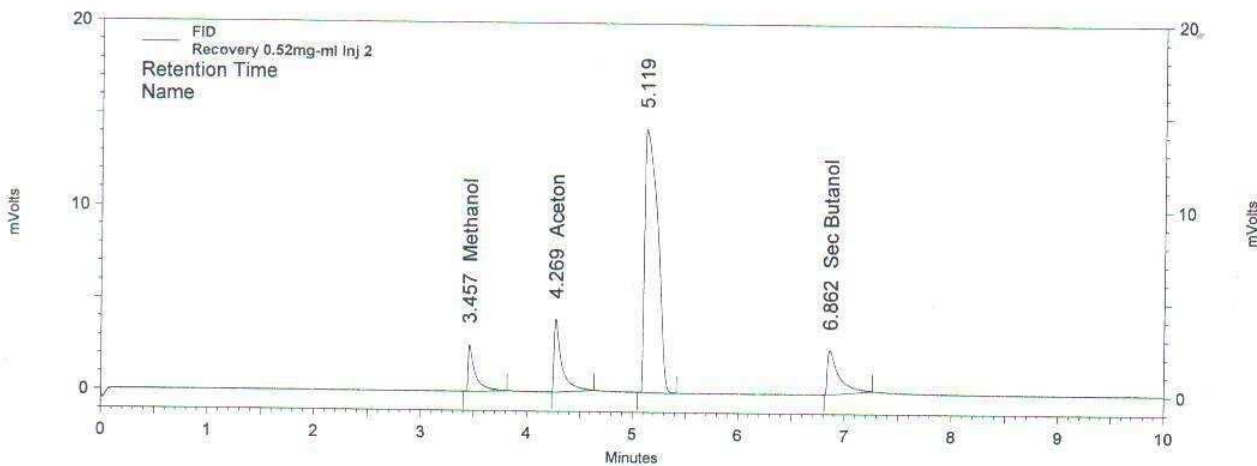
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met

Volume inj: 1 µl

Vial: 9

Run time: 28/09/2007 19:07:40

Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.457	11671	6.885	Methanol	0.00
2	4.269	19598	11.561	Aceton	7.96
3	5.119	120119	70.860		5.22
4	6.862	18127	10.693	Sec Butanol	8.99
Totals		169515	100.00		
			0		

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01/10/07

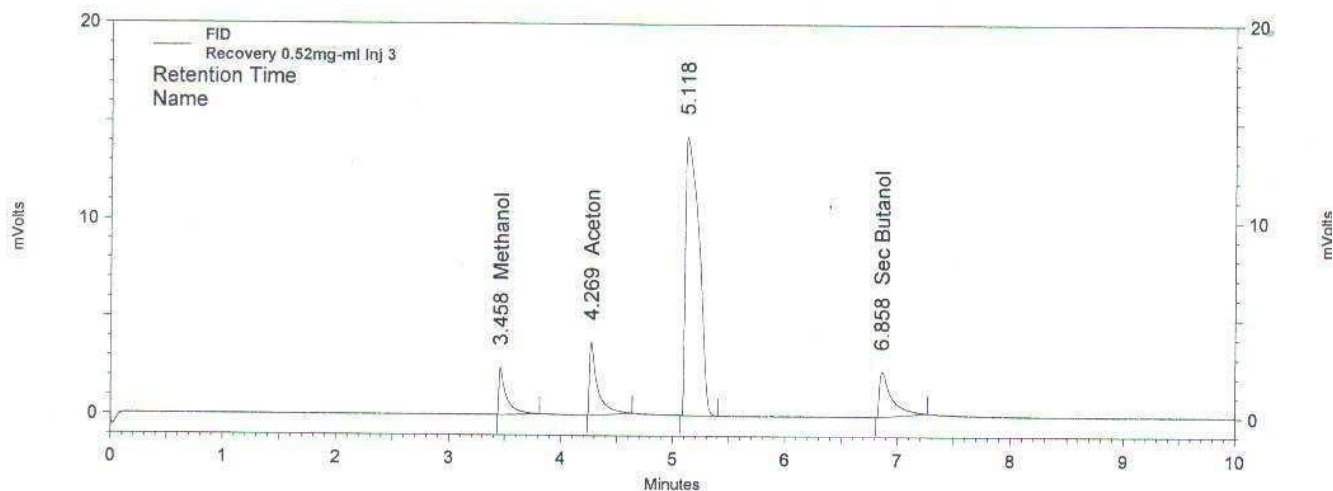




# Amino Chemicals

## Quality Control

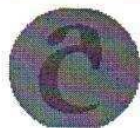
Sample ID: Recovery 0.52mg-ml Inj 3  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Recovery\Recovery 0.52mg-ml Inj 3 28-09-2007 19-17-41  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 9  
Run time: 28/09/2007 19:21:01  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.458	11215	6.763	Methanol	0.00
2	4.269	18751	11.308	Aceton	7.88
3	5.118	118315	71.351		5.24
4	6.858	17540	10.578	Sec Butanol	9.01
Totals		165821	100.000		

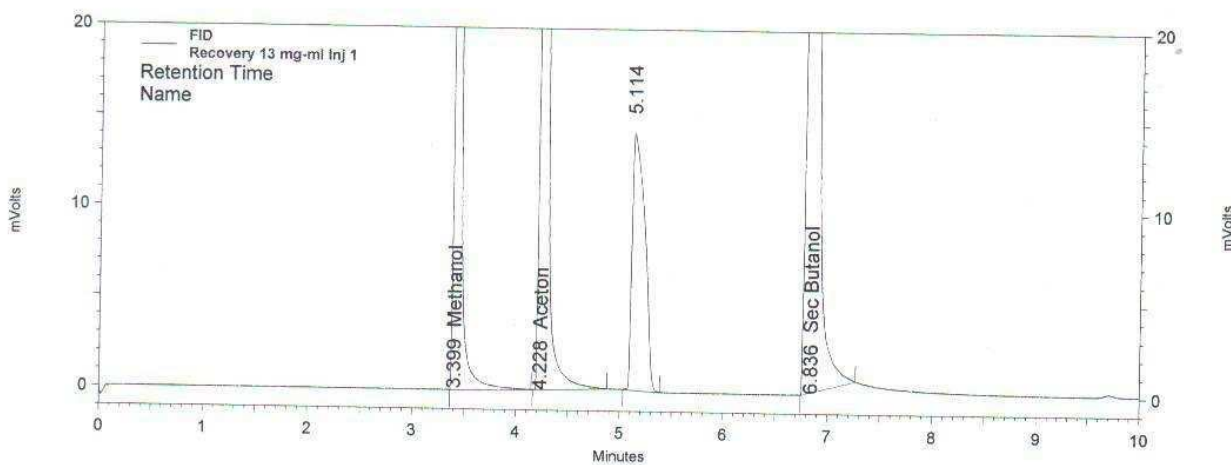
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11/10/07



# Amino Chemicals

## Quality Control

Sample ID: Recovery 13 mg-ml Inj 1  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Recovery\Recovery 13 mg-ml Inj 1 28-09-2007 19-31-16  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 10  
Run time: 28/09/2007 19:34:22  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.399	414056	22.103	Methanol	0.00
2	4.228	645909	34.480	Aceton	11.70
3	5.114	117617	6.279		6.01
4	6.836	695722	37.139	Sec Butanol	9.81
Totals		1873304	100.00		
			0		

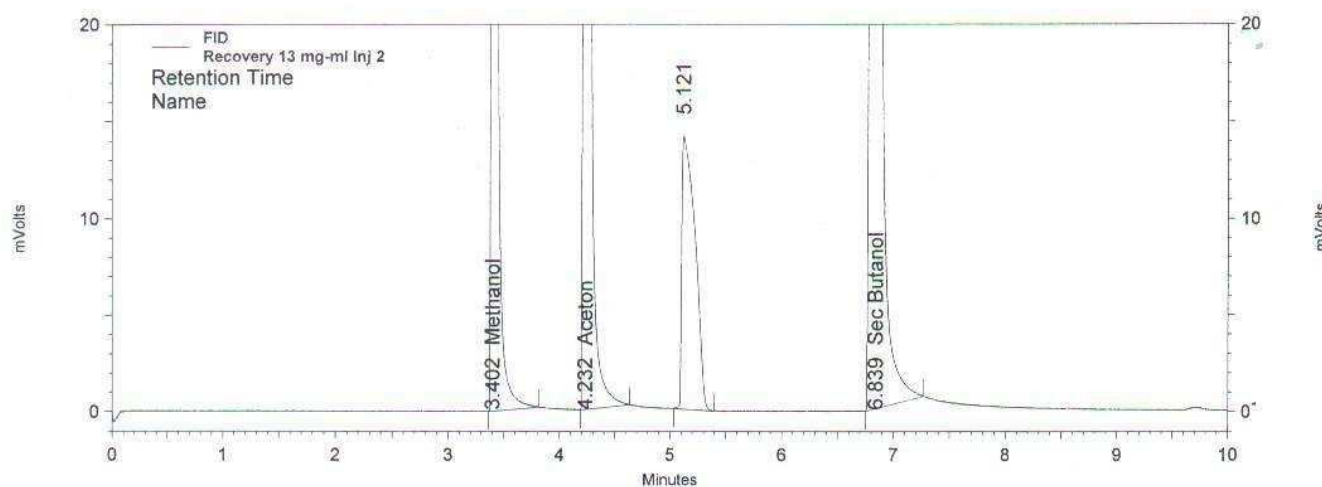
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09/10/07



# Amino Chemicals

## Quality Control

Sample ID: Recovery 13 mg-ml Inj 2  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Recovery\Recovery 13  
mg-ml Inj 2 28-09-2007 19-44-39  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1  $\mu$ l  
Vial: 10  
Run time: 28/09/2007 19:47:45  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.402	400677	21.928	Methanol	0.00
2	4.232	627973	34.368	Aceton	11.63
3	5.121	116401	6.370		6.04
4	6.839	682175	37.334	Sec Butanol	9.74

Totals		1827226	100.00 0		
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09/10/07



# Amino Chemicals

## Quality Control

Sample ID: Recovery 13 mg-ml Inj 3

File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Recovery\Recovery 13 mg-ml Inj 3 28-09-2007 19-58-01

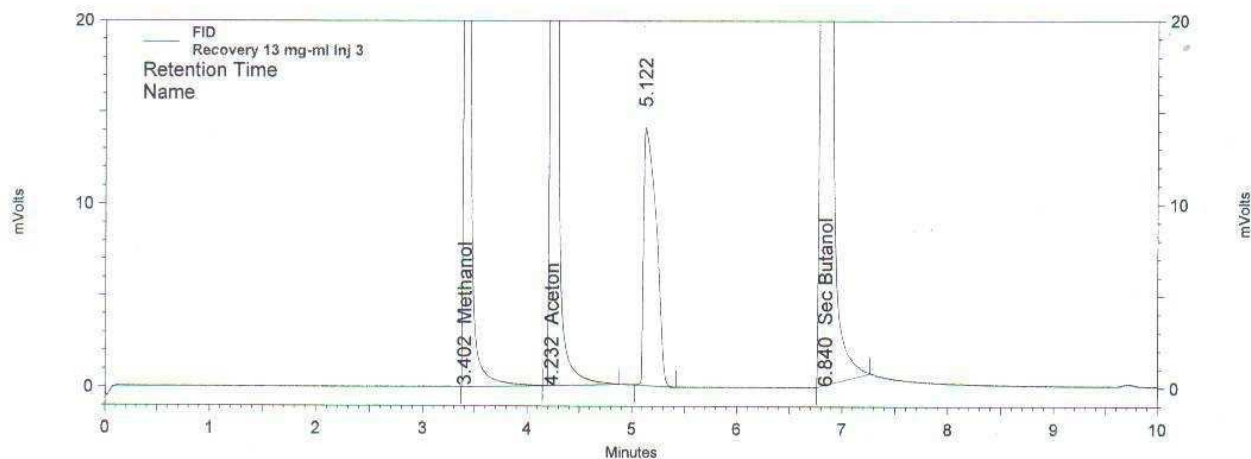
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met

Volume inj: 1 µl

Vial: 10

Run time: 28/09/2007 20:01:08

Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.402	398784	21.985	Methanol	0.00
2	4.232	624027	34.402	Aceton	11.52
3	5.122	116006	6.395		6.09
4	6.840	675098	37.218	Sec Butanol	9.77

Totals		1813915	100.00 0		
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*Roberto*  
28/09/07

## **Appendix D – Chromatograms of Samples**



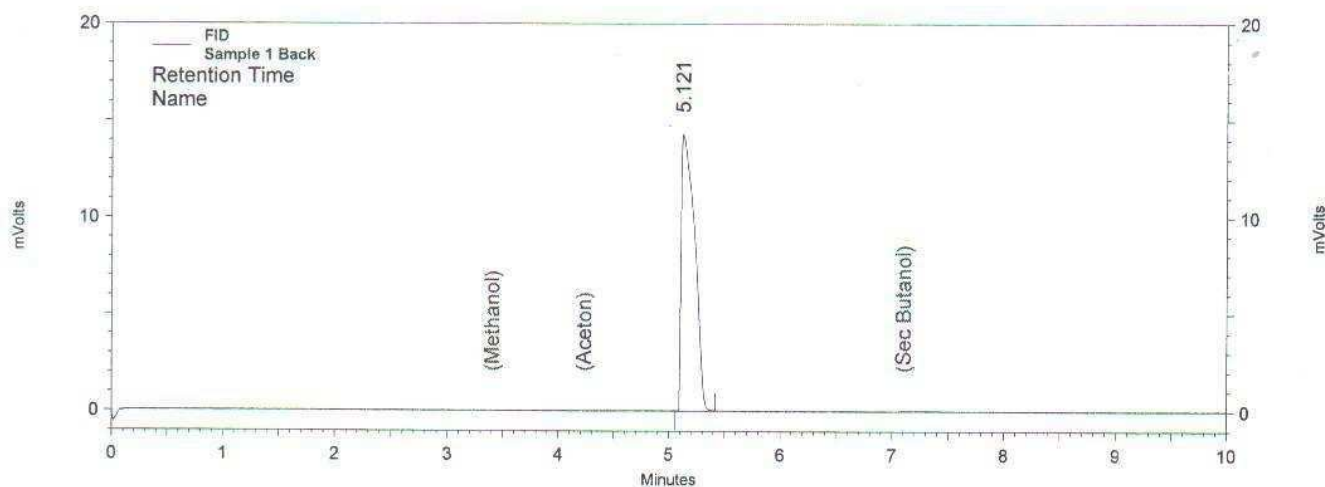




# Amino Chemicals

## Quality Control

Sample ID: Sample 1 Back  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Samples\Sample 1 Back  
28-09-2007 20-11-24  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 11  
Run time: 28/09/2007 20:14:32  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	5.121	119203	100.000	Methanol Aceton Sec Butanol	0.00

Totals		119203	100.000		
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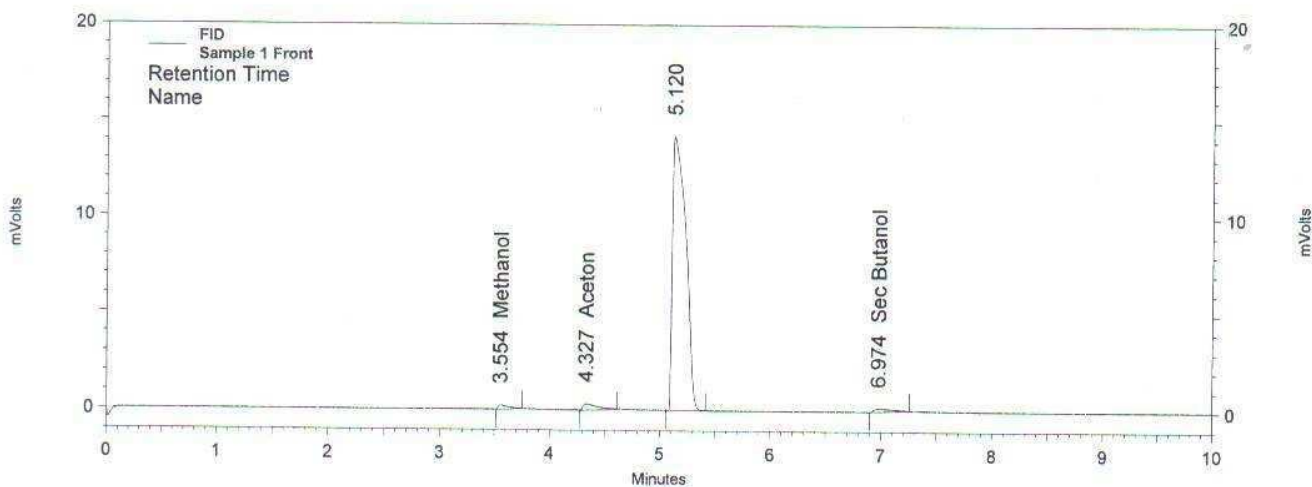
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01/10/07



# Amino Chemicals

## Quality Control

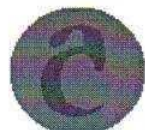
Sample ID: Sample 1 Front  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Samples\Sample 1 Front  
28-09-2007 20-24-42  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 12  
Run time: 28/09/2007 20:27:51  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.554	1432	1.145	Methanol	0.00
2	4.327	2964	2.371	Aceton	3.74
3	5.120	118724	94.952		3.53
4	6.974	1916	1.532	Sec Butanol	6.86
Totals		125036	100.000		

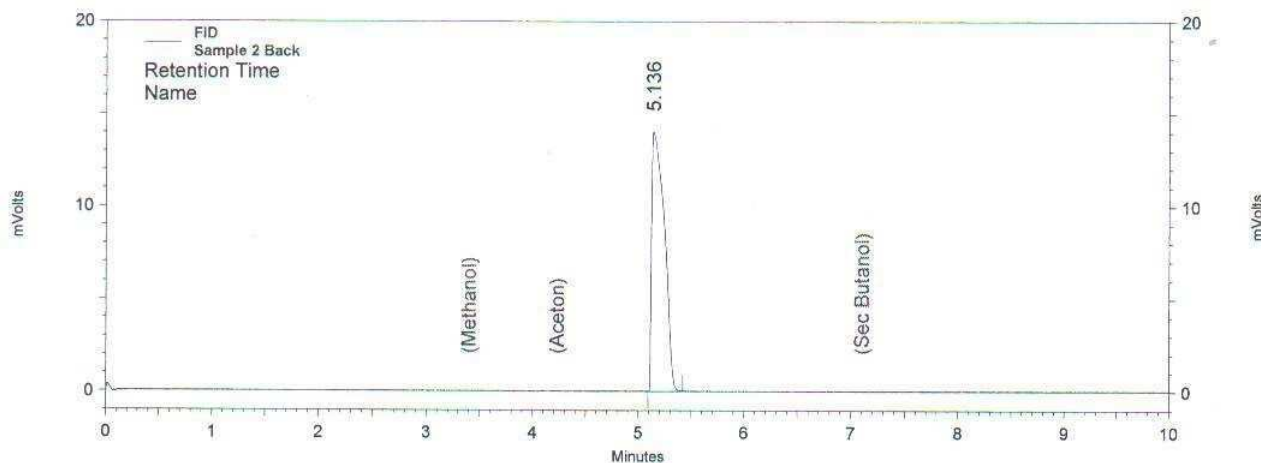
*Roberto*  
21/10/07



# Amino Chemicals

## Quality Control

Sample ID: Sample 2 Back  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Samples\Sample 2 Back  
28-09-2007 23-45-47  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Vial: 2  
Run time: 28/09/2007 23:47:35  
Operator: Roberto (VPDomain\Roberto)



### FID Results

Pk #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	5.136	116670	100.000	Methanol Aceton Sec Butanol	0.00
Totals		116670	100.000		

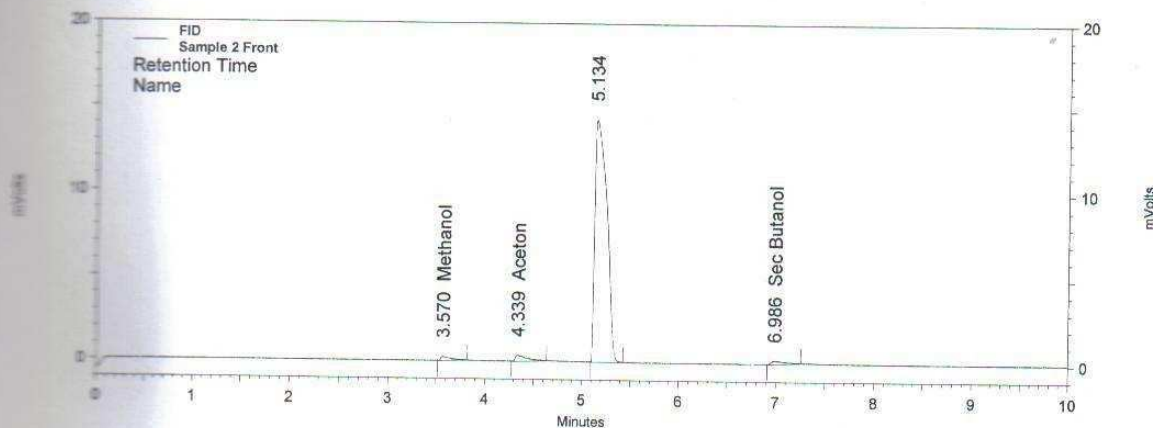
*Handwritten signature/initials*  
a/b/o/r



# Amino Chemicals

## Quality Control

Sample ID: Sample 2 Front  
File: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Chromatograms\Samples\Sample 2 Front  
28-09-2007 23-57-47  
Method: \\Vp7server\VP7Data\Projects\Default\2007\GC\Solvent in Atmos\Methods\Solvent In atm GC4.met  
Volume inj: 1 µl  
Wait: 3  
Run time: 29/09/2007 00:00:42  
Operator: Roberto (VPDomain\Roberto)



FID Results					
PK #	Retention Time	Area	Area Percent	Name	Resolution (USP)
1	3.570	1745	1.352	Methanol	0.00
2	4.339	3045	2.360	Aceton	3.77
3	5.134	122109	94.621		3.61
4	6.986	2152	1.668	Sec Butanol	7.08
Totals		129051	100.000		

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01/10/07