

Results of Proficiency Test
Biogasoline E10
May 2011

Organised by: Institute for Interlaboratory Studies
Spijkensisse, the Netherlands

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1 INTRODUCTION

Since 2006, the Institute for Interlaboratory Studies organizes every year a proficiency test for the analysis of Biogasoline E5. In the annual proficiency testing program 2009/2010 it was decided to change this into a round robin for the analysis of Biogasoline E10.

In this interlaboratory study, 34 laboratories in 21 different countries have participated.

See appendix 3 for the number of participants per country. In this report, the results of the Biogasoline E10 proficiency test are presented and discussed.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organiser of this proficiency test. The sample analyses for fit-for-use and homogeneity testing were subcontracted. In this proficiency test, the participants received, depending on their registration, two or three samples of Biogasoline E10: 2*1 litre (labelled #11044) and/or 1*1 litre (\pm 800 mL filled, labelled #11045 for DVPE only).

Participants were requested to report rounded and unrounded results. The unrounded results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in accordance with ISO guide 43 and ILAC-G13:2007, (R007), since January 2000, by the Dutch Accreditation Council: RvA (Raad voor Accreditatie). This ensures 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organization, Statistics and Evaluation' of January 2010 (iis-protocol, version 3.2), which can be downloaded from www.iisnl.com.

2.3 CONFIDENTIALITY STATEMENT

All data present in this report must be regarded as confidential and for use by the participating companies only. Disclosure of the information in this report is only allowed by means of the entire report. Use of the contents of this report for third parties is only allowed by written permission of the Institute for Interlaboratory Studies. Disclosure of the identity of one or more of the participating companies will be done only after receipt of a written agreement of the companies involved.

2.4 SAMPLES

The necessary sample material of about 200 litres of Biogasoline E5 was purchased at a local pump station. To 150 litre of the bulk material 8 litre of Ethanol was added to increase the Ethanol content up to 10%. After homogenisation, the material was transferred into 84 brown glass bottles of 1 litre (labelled #11044) and into another 48 brown glass bottles of 1 litre filled for approx. 800 mL for Dry Vapour Pressure Equivalent only (labelled #11045).

The homogeneity of the subsamples #11044 was checked by determination of Density @15°C in accordance with ISO12185:96 on 7 stratified randomly samples.

The homogeneity of the subsamples #11045 was checked by determination of Dry Vapour Pressure Equivalent in accordance with ASTM D5191:10 on 8 stratified randomly selected samples.

	Density @ 15°C in kg/m ³
Sample #11044-1	733.42
Sample #11044-2	733.43
Sample #11044-3	733.42
Sample #11044-4	733.44
Sample #11044-5	733.48
Sample #11044-6	733.51
Sample #11044-7	733.50

table 1: homogeneity test results of subsamples #11044

	DVPE in psi
Sample #11045-1	12.22
Sample #11045-2	12.23
Sample #11045-3	12.23
Sample #11045-4	12.23
Sample #11045-5	12.23
Sample #11045-6	12.23
Sample #11045-7	12.20
Sample #11045-8	12.19

table 2: homogeneity test results of subsamples #11045

From the above test results, the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Density @ 15°C in kg/m ³	DVPE in psi
r (sample #1044)	0.11	--
r (sample #1045)	--	0.04
reference test	ISO12185:96	ASTM D5191:10
0.3*R (Reference)	0.15	0.11

table 3: repeatabilities of the subsamples #11044 and #11045

The calculated repeatabilities were less than 0.3 times the reproducibility of the corresponding reference method. Therefore, homogeneity of the subsamples #11044 and #11045 was assumed.

To the participants, depending on their registration, 2*1 litre of sample #11044 and/or 1*1 litre (\pm 800 mL filled) of sample #11045 were sent on April 27, 2011.

2.5 ANALYSIS

The participants were requested to determine on sample #11044: Aromatics (FIA & GC), Benzene, Copper Strip Corrosion 3hrs/50°C, Density @ 15°C, Distillation, Ethanol, Existent Gum, Mercaptans, Olefins (FIA & GC), Oxidation Stability, Oxygen, Sulphur, RON and MON (before and after correction). On sample #11045 the participants were requested to determine DVPE only (in accordance with ASTM D5191 and EPA requirements).

To get comparable results a detailed report form, on which the units were prescribed as well as some of the required standards, was sent together with each set of samples. Also, a letter of instructions and a SDS were added to the package.

3 RESULTS

During four weeks after sample despatch, the results of the individual laboratories were gathered. The original data are tabulated per determination in appendix 1 of this report. The laboratories are presented by their code numbers.

Directly after the deadline, a reminder fax was sent to the laboratories that had not reported results at that moment. Shortly after the deadline, the available results were screened for suspect data. A result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the results. Additional or corrected results are used for data analysis and original results are placed under 'Remarks' in the result tables in appendix 1.

3.1 STATISTICS

Statistical calculations were performed as described in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of January 2010 (iis-protocol, version 3.2).

For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded results. Results reported as '<... ' or '>...' were not used in the statistical evaluation.

First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test. After removal of outliers, this check was repeated.

Not all data sets proved to have a normal distribution, in which cases the statistical evaluation of the results should be used with due care.

In accordance to ISO 5725 (1986 and 1994) the original results per determination were submitted subsequently to Dixon and Grubbs outlier tests. Outliers are marked by D(0.01) for the Dixon test, by G(0.01) or DG(0.01) for the Grubbs test. Stragglers are marked by D(0.05) for the Dixon test, by G(0.05) or DG(0.05) for the Grubbs test. Both outliers and stragglers were not included in the calculations of averages and standard deviations. Finally, the reproducibilities were calculated from the standard deviations by multiplying them with a factor of 2.8.

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported analysis results are plotted. The corresponding laboratory numbers are under the X-axis.

The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected standard. Outliers and other data, which were excluded from the calculations, are represented as a "x". Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms (see appendix 3; nr.14 and 15).

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM reproducibilities, the z-scores were calculated using a target standard deviation. The target standard deviation was calculated from the literature reproducibility by division with 2.8. The z-scores were calculated in accordance with:

$$z_{(\text{target})} = (\text{result} - \text{average of PT}) / \text{target standard deviation}$$

The $z_{(\text{target})}$ scores are listed in the result tables in appendix 1.

Absolute values for $z < 2$ are very common and absolute values for $z > 3$ are very rare. Therefore the usual interpretation of z-scores is as follows:

$ z < 1$	good
$1 < z < 2$	satisfactory
$2 < z < 3$	questionable
$3 < z $	unsatisfactory

4 EVALUATION

In this proficiency test, no problems were encountered during the dispatch of the samples to the participants.

One laboratory reported the results after the final reporting date. All laboratories reported results, but not all laboratories were able to perform all analyses requested. Finally, 34 laboratories did send in 642 numerical results. Observed were 21 outlying results, which is 3.3%. In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

4.1 EVALUATION PER TEST

In this section, the results are discussed per test. Not all data sets proved to have a normal distribution. Not normal Gaussians distributions were found for the following determinations: Benzene, Density, Ethanol, Distillation (70% evaporated), Existent gum, Oxygen content and Total Vapour Pressure (TVP). In these cases, the statistical evaluation should be used with care.

Aromatics by FIA: This determination is very problematic. No statistical outliers were observed, but the calculated reproducibility is not at all in all agreement with the requirements of ASTM D1319:10. The large spread may be caused by not or wrongly correcting of the results for the (high) oxygenate content. It must be noted that ASTM D1319 is no longer part of EN238 and of ASTM D4814.

Aromatics by GC: This determination is not problematic. No statistical outliers were observed and the calculated reproducibility is in good agreement with the requirements of EN14517:04.

API gravity: This determination is not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of ASTM D1298:05.

Benzene: This determination is problematic for two laboratories. Two statistical outliers were observed. The calculated reproducibility, after rejection of the statistical outliers, is in agreement with the requirements of EN14517:04.

Copper strip: No problems have been observed, all reporting participants agreed on a test result of 1.

Density @15°C: This determination is somewhat problematic. Only one statistical outlier was observed. However, the calculated reproducibility, after rejection of the statistical outlier, is not in agreement with the requirements of ISO12185:96.

Distillation: This determination is problematic. In total eleven statistical outliers were observed, of which three statistical outliers were observed for the 90%

evaporated point. The calculated reproducibilities after rejection of the statistical outliers are in good agreement with the requirements of ISO3405:11 (Automated), except the Final Boiling Point (FBP).

- Doctor test: No problems have been observed, all reporting participants agreed on a test result of “negative”.
- Ethanol: This determination is not problematic. Only one statistical outlier was observed. The calculated reproducibility, after rejection of the statistical outlier, is in agreement with the requirements of EN14517:04.
- Existent Gum This determination may be problematic at this low level of 0.43 mg/100mL (near or below the limit of detection). All reporting participants agreed on a result below 1 mg/100mL. No statistical outliers were observed.
- Lead: The consensus value of the group is below the application range (2.5 - 25 mg/L) and almost all participants, except three, reported a “less then” result. Therefore, no significant conclusions were drawn.
- Manganese: Only three participants reported a numerical result and six participants reported a “less then” result. Therefore, no significant conclusions were drawn.
- Mercaptans: This determination may be not problematic at this low concentration level. The application range is 0.0003 – 0.01 %M/M. Five participants reported a less than result and nine participants reported a numerical value. One statistical outlier was observed. The calculated reproducibility, after rejection of the statistical outlier, is in agreement with the requirements ASTM D3227:10.
- Olefins by FIA: This determination is problematic. No statistical outliers were observed, but the calculated reproducibility is not in agreement with the requirements of ASTM D1319:10. The large spread may be caused by not or wrong correcting of the results for the (high) oxygenate content. Reported in an independent investigation, another cause for the observed spread may be the humidity of the silica used due to insufficient drying (see appendix 4; ref nr 15).
- Olefins by GC: This determination is not problematic. Two statistical outliers were observed, but the calculated reproducibility is in good agreement with the requirements of EN14517:04.
- Oxidation stab.: In this determination no problems have been observed. All reporting participants agreed on a result above 360 minutes.

- Oxygen: This determination is problematic. No statistical outliers were observed, but the calculated reproducibility is not in agreement with the requirements of EN14517:05.
- Sulphur: This determination is problematic. Only one statistical outlier was observed, but the calculated reproducibility is not in agreement with the requirements of ISO20846:04.
- RON: This determination is not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection is of the statistical outliers is (almost) in agreement with ISO5164:02.
- MON: This determination is very problematic. No statistical outliers were observed, but the calculated reproducibility is not at all in agreement with the requirements of ISO5163:02.
- TVP & DVPE: The conversion of the measured Total Vapour Pressure to the corresponding Dry Vapour Pressure Equivalent (DVPE) as described in the ASTM D5191:10 and the U.S. EPA guidelines (40 CFR Part 80, App. E, Method 3), showed no statistical outliers. The calculated reproducibilities are all not in agreement with the requirement of ASTM D5191:10 and the EPA guidelines. No errors were observed in the conversion calculations.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant standard and the reproducibility as found for the group of participating laboratories. The assigned values, calculated reproducibilities and reproducibilities, derived from literature standards (in casu ASTM, ISO, EN standards) are compared in the next table.

Parameter	unit	n	average	2.8 * sd	R (lit)
Aromatics (FIA)	%V/V	16	26.08	6.37	3.70
Aromatics (GC)	%V/V	20	23.37	0.81	1.19
API gravity		13	61.31	0.16	0.30
Benzene	%V/V	26	0.84	0.03	0.04
Copper Strip 3 hrs @ 50°C	-----	25	1	n.a.	n.a.
Density @ 15°C	kg/m ³	32	733.6	0.6	0.5
Initial Boiling Point	°C	30	30.06	4.89	4.83
10% evaporated	°C	30	44.37	2.51	3.20
50% evaporated	°C	29	67.25	1.60	1.88
90% evaporated	°C	28	136.66	2.19	3.73
Final Boiling Point	°C	31	172.54	7.89	6.78
%Vol @70°C	%V/V	28	53.27	2.96	2.70
%Vol @100°C	%V/V	28	64.81	2.19	2.20
%Vol @150°C	%V/V	26	95.47	1.19	1.30
Ethanol	%V/V	29	9.70	1.16	1.65
Existent Gum (washed)	mg/100mL	12	0.43	0.65	0.56
Mercaptans as S	%M/M	8	0.0002	0.0001	0.0003
Olefins (FIA)	%V/V	16	11.49	4.60	3.55
Olefins (GC)	%V/V	18	11.45	1.11	1.86
Oxygen content	% M/M	24	4.24	0.64	0.46
Sulphur	mg/kg	28	6.52	2.41	1.86
RON	-----	18	97.30	0.75	0.70
MON	-----	19	85.86	1.43	0.90

table 4: performance evaluation sample #11044

Parameter	unit	n	average	2.8 * sd	R (lit)
TVP acc.to ASTM D5191	psi	25	13.21	0.41	0.37
DVPE acc.to ASTM D5191	psi	27	12.20	0.39	0.36
DVPE acc.to EPA	psi	22	12.31	0.39	0.36

table 5: performance evaluation sample #11045

Without further statistical calculations, it can be concluded that for several tests there is a good compliance of the group of participants with the relevant standards. The problematic tests have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF MAY 2011 WITH PREVIOUS PT

Determination	May 2011	May 2010	April 2009	May 2008
Number of reporting labs	34	30	50	34
Number of results reported	642	664	1125	603
Statistical outliers	21	47	41	33
Percentage outliers	3.3%	7.1%	4.0%	5.5%

table 6: comparison with previous proficiency tests

*) This years PT is on E10, previous PT were on E5

In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

The performance of the determinations of the proficiency tests was compared against the requirements of the respective standards. The conclusions are given the following table:

Determination	May 2011	May 2010	April 2009	May 2008
Aromatics by FIA	--	--	--	+/-
Aromatics by GC	++	++	++	n.e.
API gravity	++	++	n.e.	n.e.
Benzene	+	--	+	+/-
Density @ 15°C	-	+/-	--	+/-
Distillation	+	++	+	+
Ethanol	++	+/-	+	+/-
Existent Gum (washed)	n.a	--	++	++
Mercaptans as S	++	++	++	+/-
Olefins by FIA	--	--	n.e.	--
Olefins by GC	++	++	++	n.e.
Oxidation Stability	n.a	n.a.	n.a.	n.a.
Oxygen	--	++	+	+/-
Sulphur	-	+/-	++	--
RON	+/-	++	+/-	-
MON	--	--	++	-
TVP acc.to ASTM D5191	--	++	n.e.	n.e.
DVPE acc.to ASTM D5191	-	++	--	-
DVPE acc.to EPA	-	++	--	-

table 7: comparison of the quality of the various determinations against therespective standard requirements

The performance of the determinations against the requirements of the respective standards is listed in the above table. The following performance categories were used:

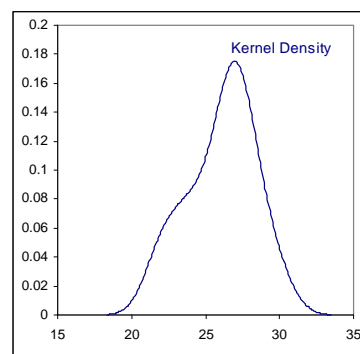
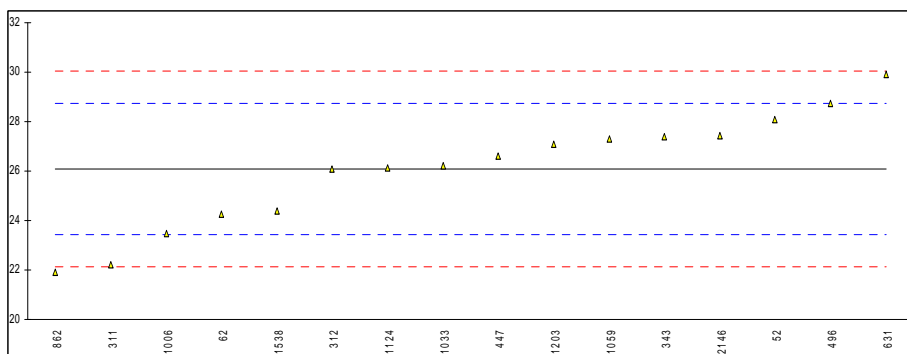
- ++: group performed much better than the standard
- + : group performed better than the standard
- +/-: group performance equals the standard
- : group performed worse than the standard
- : group performed much worse than the standard
- n.e.: not evaluated

APPENDIX 1

Determination of Aromatics by FIA on sample #11044; results in %V/V

lab	method	value	mark	z(targ)	remarks
52	D1319	28.1		1.53	
62	D1319	24.24		-1.39	
311	D1319corrected	22.2	C	-2.93	First reported 14.2
312	D1319	26.1		0.02	
323		----		----	
334		----		----	
338		----		----	
343	D1319	27.4		1.00	
447	D1319	26.6		0.40	
494		----		----	
495		----		----	
496	D1319	28.75		2.02	
631	D1319	29.9		2.89	
862	D1319	21.9		-3.16	
1006	D6293	23.48		-1.96	
1033	IP156	26.2		0.09	
1059	D1319	27.3		0.93	
1080		----		----	
1124	D1319	26.11		0.03	
1126		----		----	
1131		----		----	
1161		----		----	
1203	D1319	27.1		0.77	
1205		----		----	
1218		----		----	
1346		----		----	
1538	D1319	24.4		-1.27	
1634		----		----	
1706		----		----	
1710		----		----	
1727		----		----	
1810		----		----	
1811		----		----	
2146	D1319	27.445	C	1.04	First reported 9.591

normality OK
n 16
outliers 0
mean (n) 26.08
st.dev. (n) 2.276
R(calc.) 6.37
R(D1319:10) 3.70

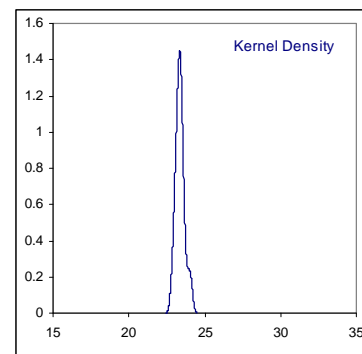
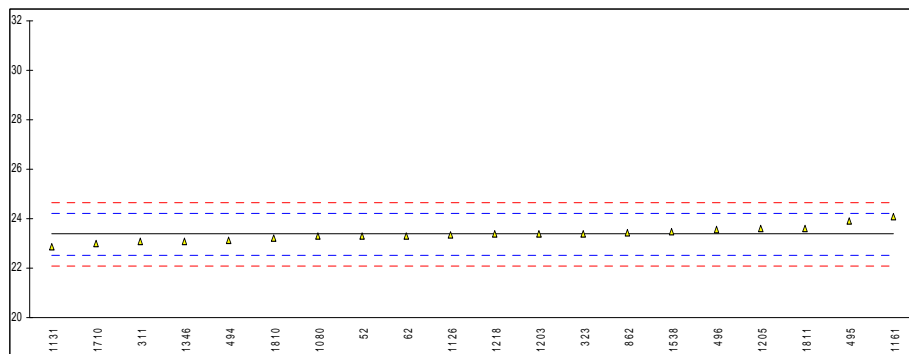


Determination of Aromatics by GC on sample #11044; results in %V/V

lab	method	value	mark	z(targ)	remarks
52	in house	23.3		-0.17	
62	in house	23.3	C	-0.17	first reported 25.0
311	EN14517	23.10		-0.64	
312		----		----	
323	EN22854	23.4		0.07	
334		----		----	
338		----		----	
343		----		----	
447		----		----	
494	EN22854	23.13		-0.57	
495	EN22854	23.9		1.24	
496	ISO22854	23.56		0.44	
631		----		----	
862	D6293	23.43		0.14	
1006		----		----	
1033		----		----	
1059		----		----	
1080	Reformulyzer	23.29		-0.19	
1124		----		----	
1126	Reformulyzer	23.34		-0.08	
1131	ISO22854	22.87		-1.18	
1161	ISO22854	24.08		1.67	
1203	EN14517	23.4		0.07	
1205	ISO22854	23.6		0.54	
1218	ISO22854	23.37		0.00	
1346	ISO22854	23.1		-0.64	
1538	ISO22854	23.46		0.21	
1634		----		----	
1706		----		----	
1710	EN14517	23.0		-0.88	
1727		----		----	
1810	EN14517	23.2		-0.40	
1811	EN14517	23.61		0.56	
2146		----		----	

normality OK
n 20
outliers 0
mean (n) 23.372
st.dev. (n) 0.2885
R(calc.) 0.808
R(EN14517:04) 1.190

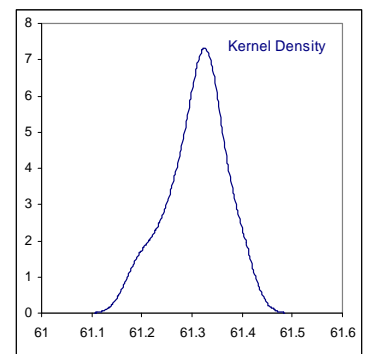
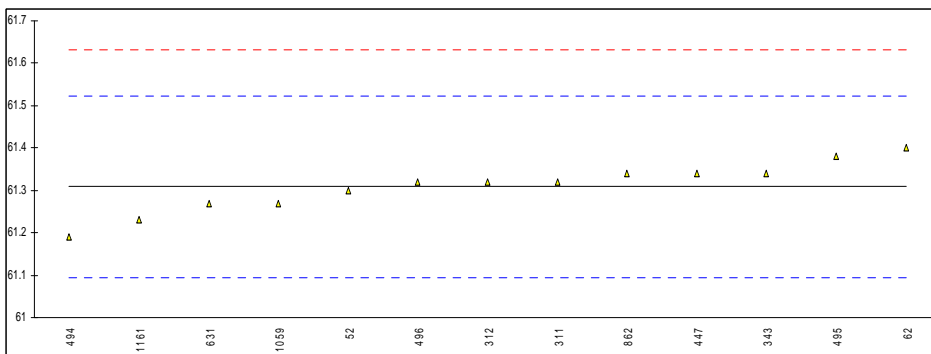
Compare R(ISO22854:08) = 1.190



Determination of API gravity on sample #11044;

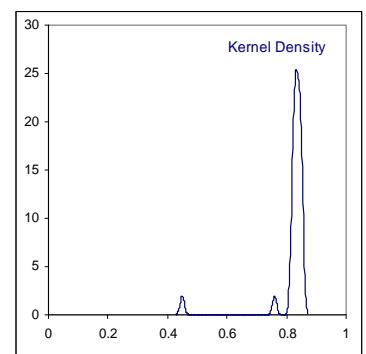
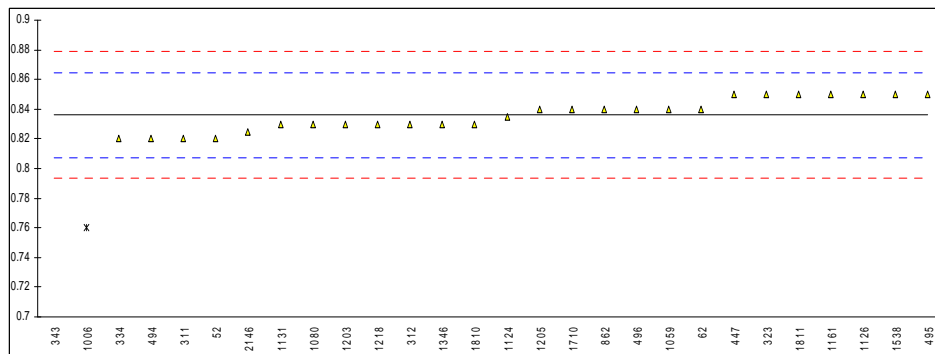
lab	method	value	mark	z(targ)	remarks
52	D4052	61.3		-0.09	
62	D1298	61.4		0.85	
311	D4052	61.32		0.10	
312	D1298	61.32		0.10	
323		----		----	
334		----		----	
338		----		----	
343	D4052	61.34		0.29	
447	D1298	61.34		0.29	
494	D1298	61.19		-1.11	
495	D1298	61.38		0.66	
496	D4052	61.32		0.10	
631	D1298	61.27		-0.37	
862	D1298	61.34		0.29	
1006		----		----	
1033		----		----	
1059	D4052	61.27		-0.37	
1080		----		----	
1124		----		----	
1126		----		----	
1131		----		----	
1161	D1298	61.23		-0.74	
1203		----		----	
1205		----		----	
1218		----		----	
1346		----		----	
1538		----		----	
1634		----		----	
1706		----		----	
1710		----		----	
1727		----		----	
1810		----		----	
1811		----		----	
2146		----		----	

normality OK
n 13
outliers 0
mean (n) 61.309
st.dev. (n) 0.0578
R(calc.) 0.162
R(D1298:05) 0.300



Determination of Benzene on sample #11044; results in %V/V

lab	method	value	mark	z(targ)	remarks
52	in house	0.82		-1.13	
62	in house	0.84	C	0.27	first reported 0.882
311	EN14517	0.82		-1.13	
312	EN12177	0.83	C	-0.43	first reported 0.77
323	EN22854	0.85		0.97	
334	EN238	0.82		-1.13	
338		----		----	
343	EN238	0.45	G(0.01)	-27.03	
447	IP429	0.85		0.97	
494	EN22854	0.82		-1.13	
495	EN22854	0.85		0.97	
496	ISO22854	0.840		0.27	
631		----		----	
862	D6293	0.84		0.27	
1006	D5580	0.76	G(0.01)	-5.33	
1033		----		----	
1059	EN12177	0.84		0.27	
1080	Reformulyzer	0.83		-0.43	
1124	EN12177	0.835		-0.08	
1126	Reformulyzer	0.85		0.97	
1131	ISO22854	0.83		-0.43	
1161	ISO22854	0.85		0.97	
1203	EN14517	0.83		-0.43	
1205	ISO22854	0.84		0.27	
1218	ISO22854	0.83		-0.43	
1346	ISO22854	0.83		-0.43	
1538	ISO22854	0.85		0.97	
1634		----		----	
1706		----		----	
1710	EN14517	0.84		0.27	
1727		----		----	
1810	EN14517	0.83		-0.43	
1811	EN14517	0.85		0.97	
2146	EN12177	0.825		-0.78	
	normality	not OK			
	n	26			
	outliers	2			
	mean (n)	0.836			
	st.dev. (n)	0.0107			
	R(calc.)	0.030			
	R(EN14517:04)	0.040			Compare R(ISO22854:08) = 0.040

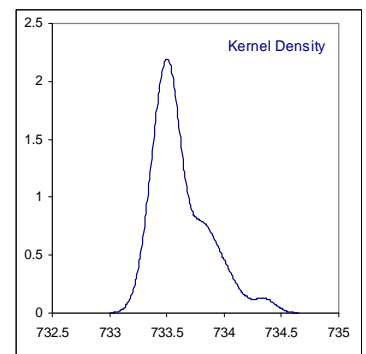
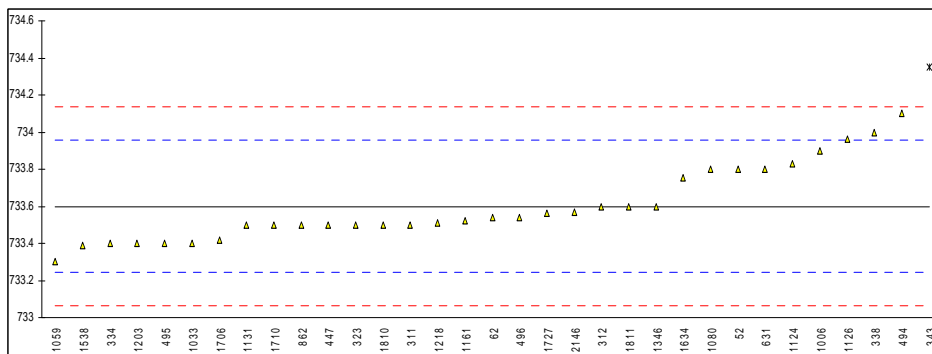


Determination of Copper strip 3hrs/50°C on sample #11044

lab	method	value	mark	z(targ)	remarks
52	D130	1A		----	
62	D130	1A		----	
311	D130	1A		----	
312	D130	1A		----	
323	D130	1A		----	
334	ISO2160	1		----	
338		----		----	
343	D130	1A		----	
447	D130	1A		----	
494	D130	1		----	
495	D130	1A		----	
496	ISO2160	1A		----	
631	D130	1A		----	
862	D130	1A		----	
1006	D130	1A		----	
1033	IP154	1A		----	
1059	ISO2160	1A		----	
1080	D130	1A		----	
1124	ISO2160	1A		----	
1126		----		----	
1131		----		----	
1161	ISO2160	1A		----	
1203	D130	1		----	
1205		----		----	
1218		----		----	
1346	D130	1A		----	
1538	ISO2160	1		----	
1634	D130	1A		----	
1706		----		----	
1710	D130	1A		----	
1727		----		----	
1810		----		----	
1811	D130	1		----	
2146		----		----	
	normality	unknown			
	n	25			
	outliers	0			
	mean (n)	1			
	st.dev. (n)	n.a			
	R(calc.)	n.a			
	R(D130:04e1)	n.a			

Determination of Density @ 15°C on sample #11044; results in kg/m³

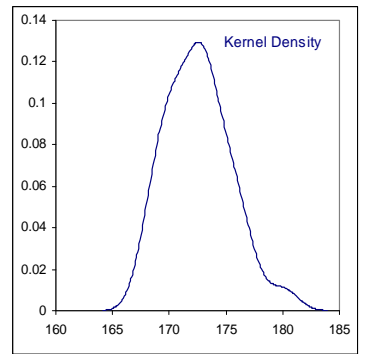
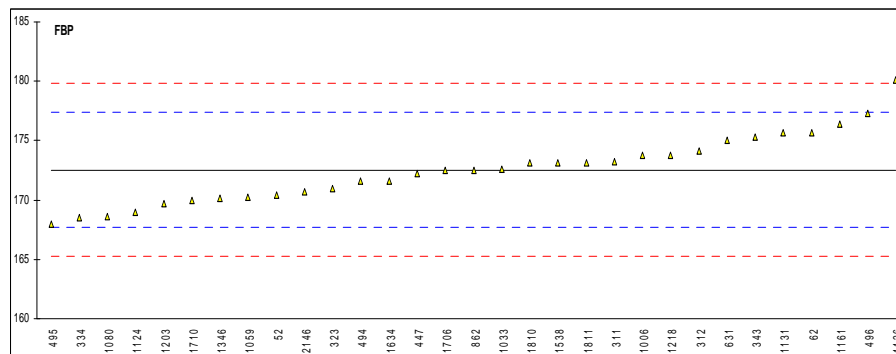
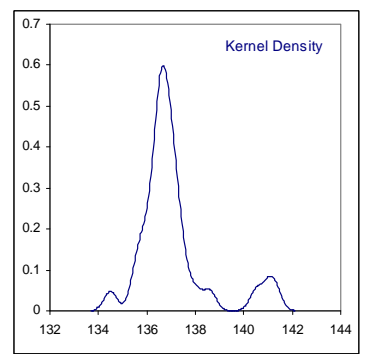
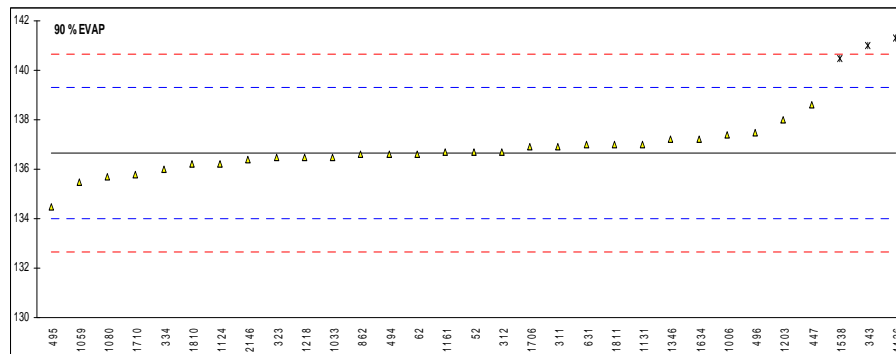
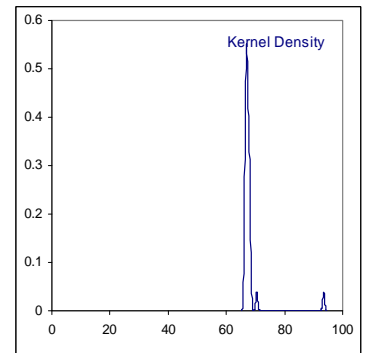
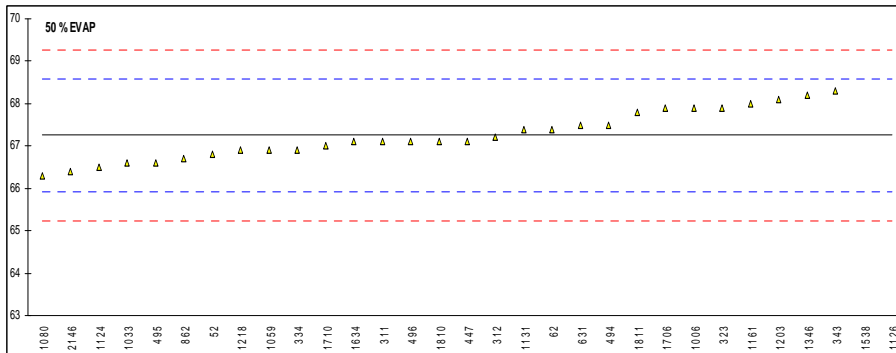
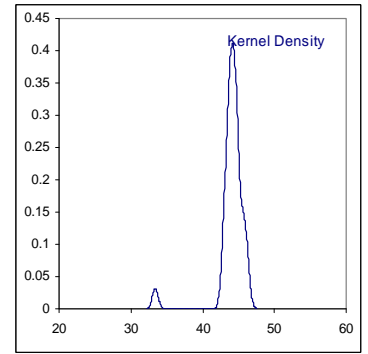
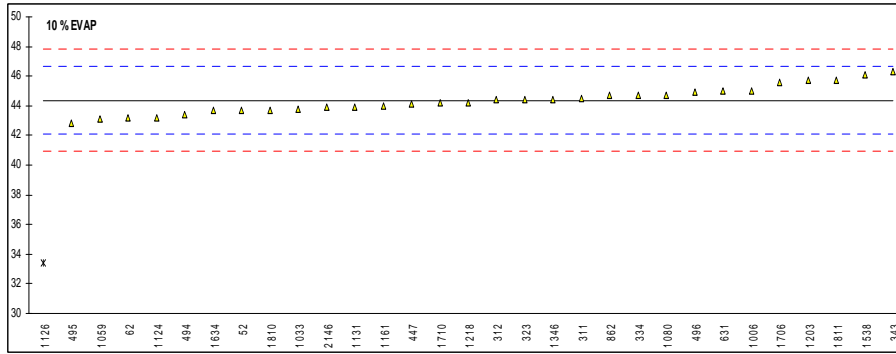
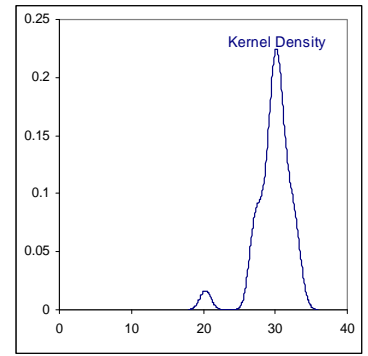
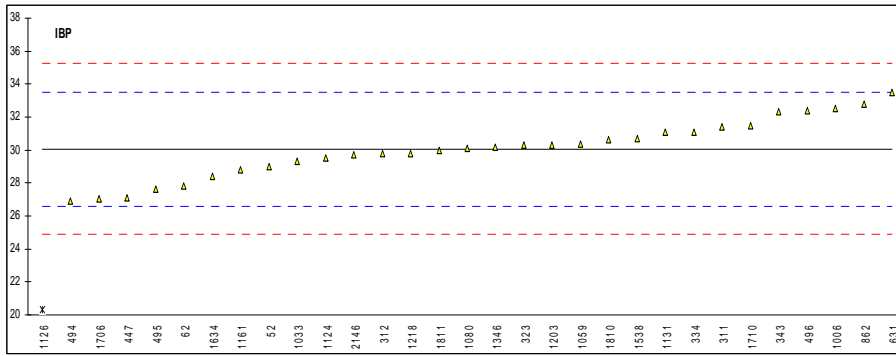
lab	method	value	mark	z(targ)	remarks
52	D4052	733.8		1.12	
62	D4052	733.54		-0.33	
311	ISO12185	733.5		-0.56	
312	ISO12185	733.6		0.00	
323	ISO12185	733.5		-0.56	
334	ISO12185	733.4		-1.12	
338	ISO12185	734.0		2.24	
343	D4052	734.35	G(0.05)	4.20	
447	IP365	733.5		-0.56	
494	ISO12185	734.1		2.80	
495	ISO12185	733.4		-1.12	
496	ISO12185	733.54		-0.33	
631	D4052	733.8		1.12	
862	D4052	733.50		-0.56	
1006	D4052	733.9		1.68	
1033	IP365	733.4		-1.12	
1059	ISO12185	733.3		-1.68	
1080	ISO12185	733.8		1.12	
1124	ISO12185	733.830		1.29	
1126	ISO12185	733.96		2.02	
1131	ISO12185	733.5		-0.56	
1161	ISO12185	733.52		-0.45	
1203	ISO12185	733.4		-1.12	
1205		-----		-----	
1218	ISO12185	733.51		-0.50	
1346	ISO12185	733.60		0.00	
1538	ISO12185	733.39		-1.17	
1634	ISO12185	733.752		0.85	
1706	ISO12185	733.42		-1.01	
1710	ISO12185	733.5		-0.56	
1727	ISO12185	733.56		-0.22	
1810	ISO12185	733.5	C	-0.56	First reported 734.4
1811	ISO12185	733.6	C	0.00	First reported 734.5
2146	ISO12185	733.57		-0.17	
normality		not OK			
n		32			
outliers		1			
mean (n)		733.60			
st.dev. (n)		0.200			
R(calc.)		0.56			
R(ISO12185:96)		0.50			



Determination of Distillation on sample #11044; results in °C

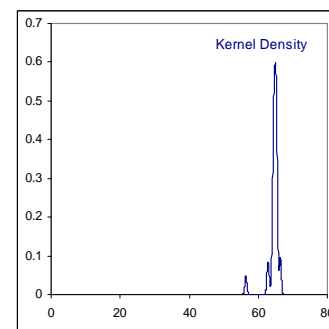
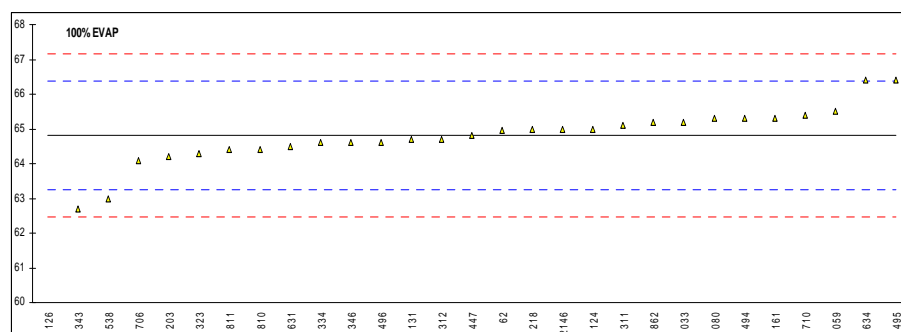
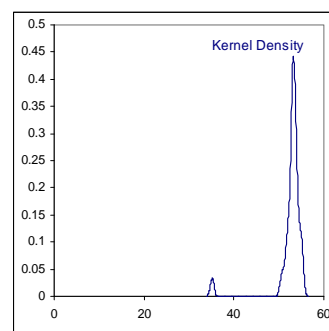
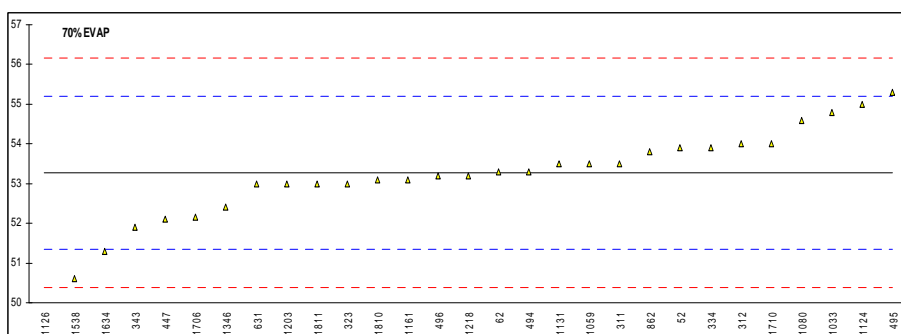
lab	method	IBP	mark	10%eva	mark	50%eva	mark	90%eva	mark	FBP	mark
52	D86-A	29.0		43.7		66.8		136.7		170.4	
62	D86-A	27.8		43.2		67.4		136.6		175.7	
311	ISO3405-A	31.4		44.5		67.1		136.9		173.2	
312	D86-A	29.8		44.4		67.2		136.7		174.1	
323	ISO3405-A	30.3		44.4		67.9		136.5		171.0	
334	D86-A	31.1		44.7		66.9		136.0		168.5	
338		----		----		----		----		----	
343	D86-A	32.3		46.3		68.3		141.0	DG(0.01)	175.3	
447	IP123-A	27.1		44.1		67.1		138.6		172.2	
494	ISO3405-A	26.9		43.4	Fr 45.2	67.5	Fr 69.0	136.6	Fr 141.6	171.6	
495	ISO3405-A	27.6		42.8		66.6		134.5		168.0	
496	ISO3405-A	32.4		44.9		67.1		137.5		177.3	
631	D86-M	33.5	Fr 36.0	45.0		67.5		137.0	Fr 134.0	175.0	
862	D86-A	32.8		44.7		66.7		136.6		172.5	
1006	D86-A	32.5		45.0		67.9		137.4		173.8	
1033	IP123-A	29.3		43.8		66.6		136.5		172.6	
1059	ISO3405-A	30.4		43.1		66.9		135.5		170.2	
1080	ISO3405-A	30.1		44.7		66.3		135.7		168.6	
1124	ISO3405-A	29.5		43.2		66.5		136.2		169.0	
1126	in house	20.3	G(0.01)	33.4	G(0.01)	93.5	G(0.01)	141.3	DG(0.01)	180.1	
1131	ISO3405-A	31.1		43.9		67.4		137.0		175.7	
1161	ISO3405-A	28.8		44.0		68.0		136.7		176.4	
1203	ISO3405-A	30.3		45.7		68.1		138.0		169.7	
1205		----		----		----		----		----	
1218	ISO3405-A	29.8		44.2		66.9		136.5		173.8	
1346	ISO3405-A	30.2		44.4		68.2		137.2		170.1	
1538	ISO3405-A	30.7		46.1		70.5	G(0.01)	140.5	G(0.01)	173.1	
1634	ISO3405-A	28.4		43.7		67.1		137.2		171.6	
1706	ISO3405-A	27.05		45.6		67.9		136.9		172.5	
1710	ISO3405-A	31.5		44.2		67.0		135.8		170.0	
1727		----		----		----		----		----	
1810	ISO3405-A	30.6		43.7		67.1		136.2		173.1	
1811	ISO3405-A	30.0		45.7		67.8		137.0		173.1	
2146	ISO3405-A	29.7		43.9		66.4		136.4		170.7	
	normality	OK		OK		OK		OK		OK	
	n	30		30		29		28		31	
	outliers	1		1		2		3		0	
	mean (n)	30.06		44.37		67.25		136.66		172.54	
	st.dev. (n)	1.746		0.897		0.570		0.783		2.820	
	R(calc.)	4.89		2.51		1.60		2.19		7.89	
	R(ISO3405A:11)	4.83		3.20		1.88		3.73		6.78	

Determination of Distillation on sample #11044; results in °C



Determination of Distillation on sample #11044; results in °C

lab	Method	%vol@70°C	mark	%vol@100°C	mark	%vol@150°C	mark	residue	Mark
52	D86-A	53.9		----		----		0.8	
62	D86-A	53.3		64.95		95.6		0.7	
311	ISO3405-A	53.5		65.1		95.4		0.9	
312	D86-A	54.0		64.7		95.3		1.0	
323	ISO3405-A	53.0		64.3		95.1		1.1	
334	D86-A	53.9		64.6		95.6		0.9	
338		----		----		----		----	
343	D86-A	51.9		62.7		93.5	DG(0.01)	1.1	
447	IP123-A	52.1		64.8		94.6		1.5	
494	ISO3405-A	53.3		65.3		95.3		1.0	
495	ISO3405-A	55.3		66.4		96.3		0.6	
496	ISO3405-A	53.2		64.6		95.1		0.9	
631	D86-M	53.0		64.5	Fr 66.5	96.0		0.8	
862	D86-A	53.8		65.2		96.2		0.9	
1006		----		----		----		----	
1033	IP123-A	54.8		65.2		----		1.0	
1059	ISO3405-A	53.5		65.5		95.6		1.0	
1080	ISO3405-A	54.6		65.3		96.3		0.8	
1124	ISO3405-A	55.0		65.0		95.4		1.1	
1126	in house	35.2	G(0.01)	56.4	G(0.01)	93.5	DG(0.01)	----	
1131	ISO3405-A	53.5		64.7		95.2		1.0	
1161	ISO3405-A	53.1		65.3		95.9		0.85	
1203	ISO3405-A	53.0		64.2		95.3		0.9	
1205		----		----		----		----	
1218	ISO3405-A	53.2		65.0		95.8		----	
1346	ISO3405-A	52.4		64.6		95.2		1.0	
1538	ISO3405-A	50.6		63.0		95.7		1.1	
1634	ISO3405-A	51.3		66.4		95.3	Fr 93.32	1.0	
1706	ISO3405-A	52.15		64.1		94.9		1.0	
1710	ISO3405-A	54.0		65.4		95.6		0.9	
1727		----		----		----		----	
1810	ISO3405-A	53.1		64.4		95.0		1.0	
1811	ISO3405-A	53		64.4		95.3		0.9	
2146	ISO3405-A	----		65.0		95.3		1	
normality		not OK		OK		OK			
n		28		28		26			
outliers		1		1		2			
mean (n)		53.27		64.81		95.47			
st.dev. (n)		1.057		0.783		0.425			
R(calc.)		2.96		2.19		1.19			
R(ISO3405A:11)		2.70		2.20		1.30			

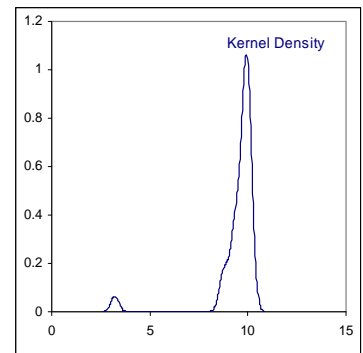
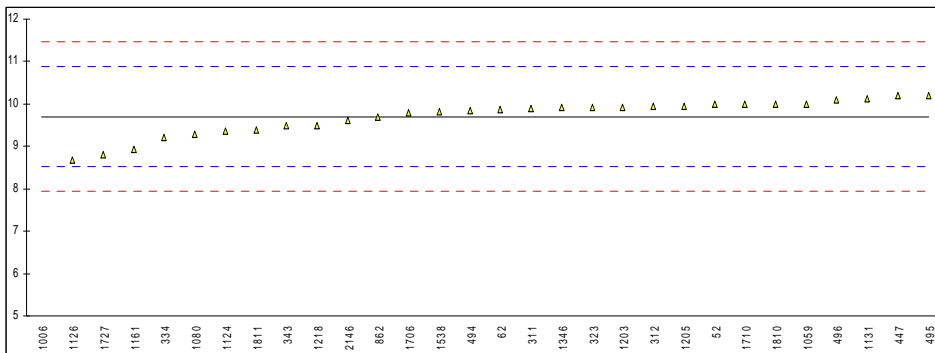


Determination of Doctor test on sample #11044

lab	method	value	mark	z(targ)	remarks
52	D4925	negative		----	
62				----	
311	D4925	negative		----	
312	IP30	negative		----	
323	D4925	negative		----	
334				----	
338				----	
343				----	
447	IP30	negative		----	
494	D4925	negative		----	
495	D4925	negative		----	
496				----	
631	D4925	negative		----	
862	D4925	negative		----	
1006				----	
1033				----	
1059	D4925	negative		----	
1080				----	
1124				----	
1126				----	
1131				----	
1161				----	
1203	D4925	negative		----	
1205				----	
1218				----	
1346				----	
1538				----	
1634				----	
1706				----	
1710	D4925	negative		----	
1727				----	
1810				----	
1811	D4925	negative		----	
2146				----	
	normality	n.a.			
	n	13			
	outliers	0			
	mean (n)	Negative			
	st.dev. (n)	n.a.			
	R(calc.)	n.a.			
	R(D4952:09)	n.a.			

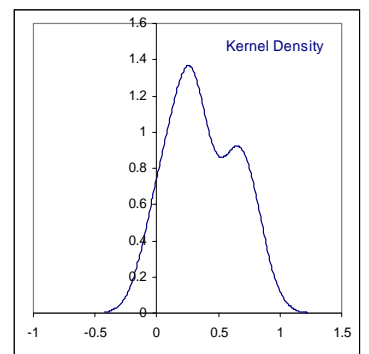
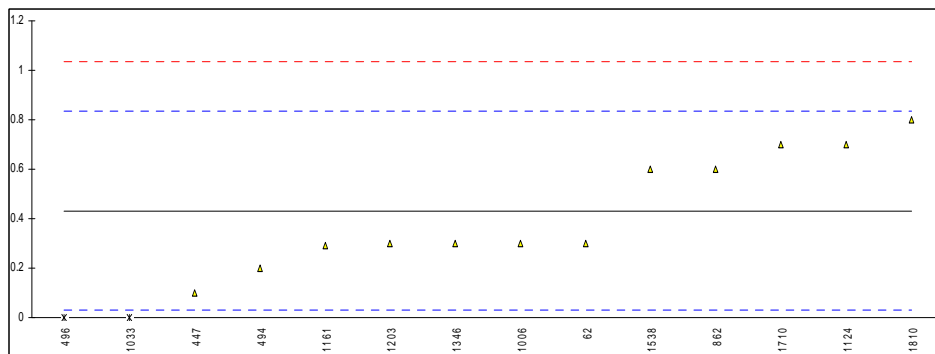
Determination of Ethanol on sample #11044; results in %V/V

lab	method	value	mark	z(target)	remarks
52	in house	10.0		0.50	
62	in house	9.88	C	0.30	First reported 6.337
311	EN14517	9.89		0.32	
312	EN13132	9.94		0.40	
323	EN22854	9.92		0.37	
334	EN1601	9.2		-0.85	
338		----		----	
343	EN13132	9.49		-0.36	
447	D4815	10.19		0.82	
494	EN22854	9.85		0.25	
495	EN22854	10.19		0.82	
496	ISO22854	10.100		0.67	
631		----		----	
862	D4815	9.69		-0.02	
1006	D4815	3.22	G(0.01)	-10.98	
1033		----		----	
1059	EN13132	10.0		0.50	
1080	Reformulyzer	9.28		-0.72	
1124	EN13132	9.36		-0.58	
1126	Reformulyzer	8.67		-1.75	
1131	ISO22854	10.12		0.71	
1161	EN13132	8.92		-1.33	
1203	EN14517	9.93		0.38	
1205	ISO22854	9.95		0.42	
1218	ISO22854	9.5		-0.34	
1346	EN13132	9.91		0.35	
1538	ISO13132	9.81		0.18	
1634		----		----	
1706	EN13132	9.8		0.16	
1710	EN1601	10.0		0.50	
1727	in house	8.80		-1.53	
1810	EN14517	10.0		0.50	
1811	EN14517	9.39		-0.53	
2146	EN13132	9.619		-0.14	
normality		not OK			
n		29			
outliers		1			
mean (n)		9.703			
st.dev. (n)		0.4124			
R(calc.)		1.155			
R(EN14517:04)		1.653			
				Compare R(EN13132) = 0.800	



Determination of Existent Gum (washed) on sample #11044; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
52	D381	<0.5		----	
62	D381	0.3		-0.66	
311	ISO6246	<0.5		----	
312	ISO6246	<0.5		----	
323	D381	<0.5		----	
334		----		----	
338		----		----	
343	D381	<0.5		----	
447	IP131	0.1		-1.65	
494	ISO6246	0.2		-1.16	
495	ISO6246	<1		----	
496	ISO6246	0.0	ex	-2.15	Zero is not a real value
631	D381	<0.5		----	
862	D381	0.6		0.83	
1006	D381	0.3		-0.66	
1033	IP131	0.0	ex	-2.15	Zero is not a real value
1059	ISO6246	<1		----	
1080	ISO6246	<1		----	
1124	ISO6246	0.7		1.33	
1126		----		----	
1131		----		----	
1161	ISO6246	0.29		-0.71	
1203	ISO6246	0.3		-0.66	
1205		----		----	
1218		----		----	
1346	ISO6246	0.3		-0.66	
1538	ISO6246	0.6		0.83	
1634		----		----	
1706		----		----	
1710	ISO6246	0.7		1.33	
1727		----		----	
1810	ISO6246	0.8		1.83	
1811		----		----	
2146		----		----	
normality		not OK			
n		12			
outliers		0			
mean (n)		0.43			
st.dev. (n)		0.231			
R(calc.)		0.65			
R(ISO6246:97)		0.56			



Determination of Lead as Pb on sample #11044; results in mg/L

lab	method	value	mark	z(targ)	remarks
52	D3237	0.5		----	
62	D3237	<0.1		----	
311		----		----	
312	EN237	<2.5		----	
323	EN237	<2.5		----	
334		----		----	
338		----		----	
343	D3237	<2.5		----	
447	IP428	<0.25		----	
494		----		----	
495	EN237	<2.5		----	
496	in house	<0.1		----	
631	D3237	<0.25		----	
862	EN237	<2.5		----	
1006		----		----	
1033		----		----	
1059	EN13727	<1.0		----	
1080		----		----	
1124	EN237	<2.5		----	
1126		----		----	
1131	EN237	<2.5		----	
1161	EN237	<5		----	
1203	EN237	2.6		----	
1205		----		----	
1218	in house	0.3		----	
1346		----		----	
1538	EN237	<2.5		----	
1634		----		----	
1706		----		----	
1710		----		----	
1727		----		----	
1810		----		----	
1811		----		----	
2146		----		----	
	normality	n.a			
	n	3			
	outliers	0			
	mean (n)	<2.5			
	st.dev. (n)	n.a			
	R(calc.)	n.a			
	R(EN237:96)	n.a			

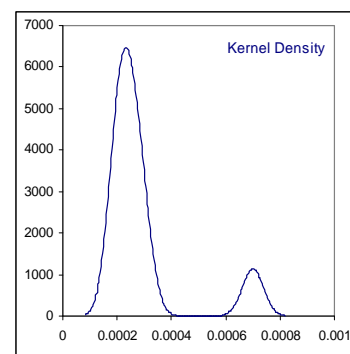
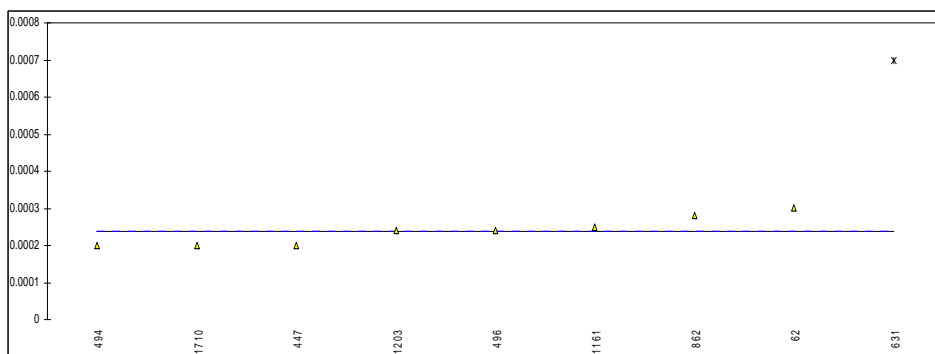
Determination of Manganese as Mn on sample #11044; results in mg/L

lab	method	value	mark	z(targ)	remarks
52	D3831	0.25		----	
62	D3831	<0.3		----	
311		----		----	
312	D3831	<0.25		----	
323	D3831	<0.3		----	
334		----		----	
338		----		----	
343		----		----	
447		----		----	
494	in house	0.017		----	
495		----		----	
496		----		----	
631	D3831	1.04		----	
862	D3831	<0.25		----	
1006		----		----	
1033		----		----	
1059		----		----	
1080		----		----	
1124		----		----	
1126		----		----	
1131	D3831	<0.25		----	
1161		----		----	
1203	in house	<1		----	
1205		----		----	
1218		----		----	
1346		----		----	
1538		----		----	
1634		----		----	
1706		----		----	
1710		----		----	
1727		----		----	
1810		----		----	
1811		----		----	
2146		----		----	
	normality	n.a			
	n	3			
	outliers	0			
	mean (n)	n.a			
	st.dev. (n)	n.a			
	R(calc.)	n.a			
	R(D3831:06)	n.a			

Determination of Mercaptans as S on sample #11044; results in %M/M

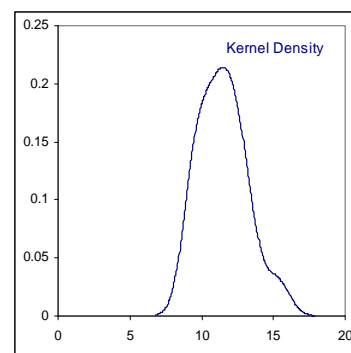
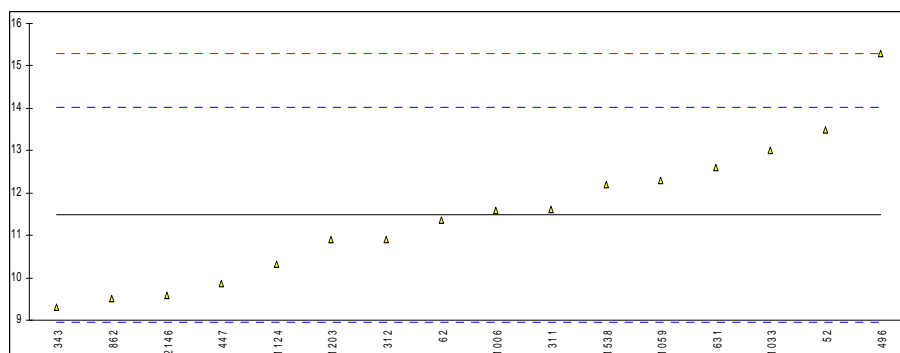
lab	method	value	mark	z(targ)	remarks
52	D3227	<0.0003		----	
62	D3227	0.0003		0.54	
311	D3227	<0.0003		----	
312		----		----	
323	D3227	<0.0003		----	
334		----		----	
338		----		----	
343		----		----	
447	D3227	0.0002		-0.34	
494	D3227	0.0002		-0.34	
495	D3227	<0.0003		----	
496	D3227	0.00024		0.01	
631	D3227	0.0007	G(0.01)	4.04	
862	D3227	0.00028		0.36	
1006		----		----	
1033		----		----	
1059	D3227	<0.0003		----	
1080		----		----	
1124		----		----	
1126		----		----	
1131		----		----	
1161	ISO3012	0.00025		0.10	
1203	UOP163	0.00024		0.01	
1205		----		----	
1218		----		----	
1346		----		----	
1538		----		----	
1634		----		----	
1706		----		----	
1710	D3227	0.0002		-0.34	
1727		----		----	
1810		----		----	
1811		----		----	
2146		----		----	

normality OK
n 8
outliers 1
mean (n) 0.00024
st.dev. (n) 0.000038
R(calc.) 0.00011
R(D3227:10) 0.00032



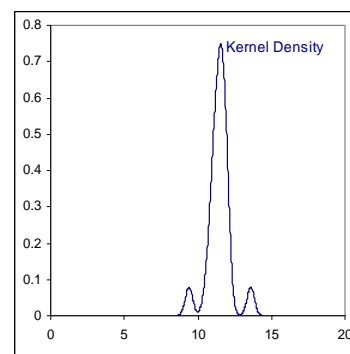
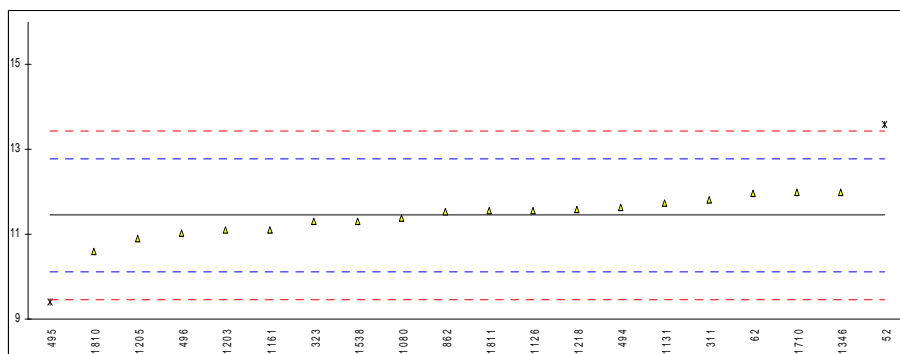
Determination of Olefins by FIA on sample #11044; results in %V/V

lab	method	value	mark	z(targ)	remarks
52	D1319	13.5		1.59	
62	D1319	11.35		-0.11	
311	D1319corrected	11.6	C	0.09	First reported 19.1
312	D1319	10.9		-0.46	
323		----		----	
334		----		----	
338		----		----	
343	D1319	9.3		-1.73	
447	D1319	9.85		-1.29	
494		----		----	
495		----		----	
496	D1319	15.30		3.01	
631	D1319	12.6		0.88	
862	D1319	9.5		-1.57	
1006	D6293	11.58		0.07	
1033	IP156	13.0		1.19	
1059	D1319	12.3		0.64	
1080		----		----	
1124	D1319	10.31		-0.93	
1126		----		----	
1131		----		----	
1161		----		----	
1203	D1319	10.9		-0.46	
1205		----		----	
1218		----		----	
1346		----		----	
1538	D1319	12.2		0.56	
1634		----		----	
1706		----		----	
1710		----		----	
1727		----		----	
1810		----		----	
1811		----		----	
2146	D1319	9.591	C	-1.50	First reported 27.445
normality		OK			
n		16			
outliers		0			
mean (n)		11.49			
st.dev. (n)		1.641			
R(calc.)		4.60			
R(D1319:10)		3.55			



Determination of Olefins by GC on sample #11044; results in %V/V

lab	method	value	mark	z(targ)	remarks
52	INH-143	13.6	G(0.05)	3.23	
62	in house	11.975		0.79	
311	EN14517	11.81		0.54	
312		----		----	
323	EN22854	11.3		-0.23	
334		----		----	
338		----		----	
343		----		----	
447		----		----	
494	EN22854	11.65		0.30	
495	EN22854	9.4	G(0.01)	-3.09	
496	ISO22854	11.03		-0.64	
631		----		----	
862	D6293	11.53		0.12	
1006		----		----	
1033		----		----	
1059		----		----	
1080	Reformulyzer	11.38		-0.11	
1124		----		----	
1126	Reformulyzer	11.57		0.18	
1131	ISO22854	11.75		0.45	
1161	ISO22854	11.10		-0.53	
1203	EN14517	11.1		-0.53	
1205	ISO22854	10.9	C	-0.83	First reported 23.6
1218	ISO22854	11.59		0.21	
1346	ISO22854	12.0		0.82	
1538	ISO22854	11.32		-0.20	
1634		----		----	
1706		----		----	
1710	EN14517	12.0		0.82	
1727		----		----	
1810	EN14517	10.6		-1.29	
1811	EN14517	11.56		0.16	
2146		----	W	----	First reported 3.68 EN13132
normality		OK			
n		18			
outliers		2			
mean (n)		11.45			
st.dev. (n)		0.397			
R(calc.)		1.11			
R(EN14517:04)		1.86	Compare R(ISO22854:08) = 1.86		

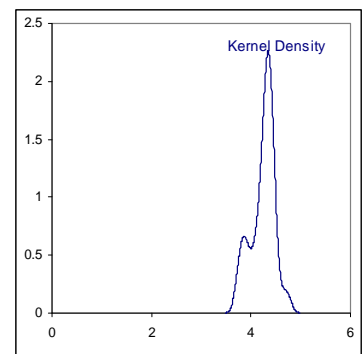
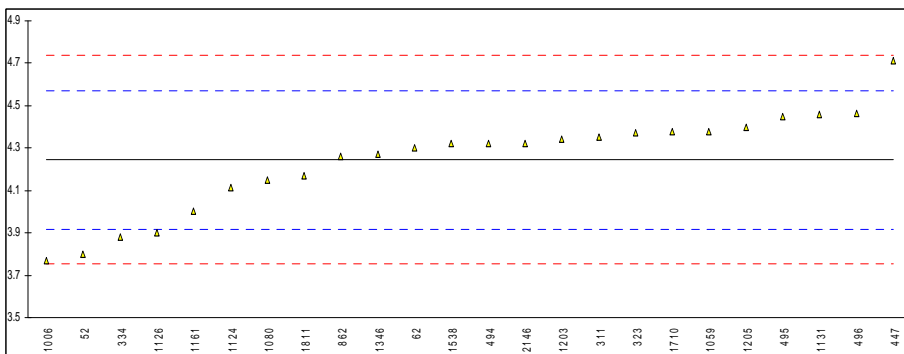


Determination of Oxidation Stability on sample #11044; results in minutes

lab	method	value	mark	z(targ)	remarks
52	D525	>600		----	
62	D525	975		----	
311	ISO7536	-----		----	acc. To 12.3: slowly oxidizing fuel, 14h,260 pressure drop
312	D525	>900		----	
323	D525	>900		----	
334		----		----	
338		----		----	
343	D525	>900		----	
447	D525	>360		----	
494	ISO7536	>900		----	
495	ISO7536	>900		----	
496	ISO7536	>900		----	
631	D525	315		----	
862	D525	>900		----	
1006	D525	932		----	
1033	IP40	>960		----	
1059	ISO7536	>360		----	
1080	ISO7536	>900		----	
1124	ISO7536	>900		----	
1126		----		----	
1131	ISO7536	>900		----	
1161	ISO7536	>900		----	
1203	ISO7536	660		----	
1205		----		----	
1218		----		----	
1346		----		----	
1538	ISO7536	>900		----	
1634		----		----	
1706		----		----	
1710	ISO7536	830		----	
1727		----		----	
1810		----		----	
1811		----		----	
2146		----		----	
	normality	n.a			
	n	5			
	outliers	0			
	mean (n)	n.a			
	st.dev. (n)	n.a			
	R(calc.)	n.a			
	R(ISO7536:96)	n.a			

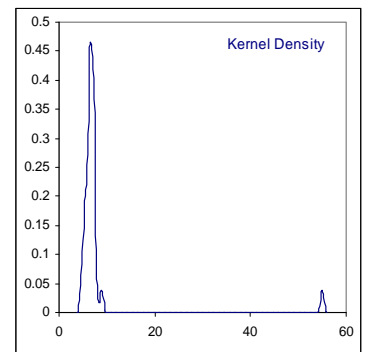
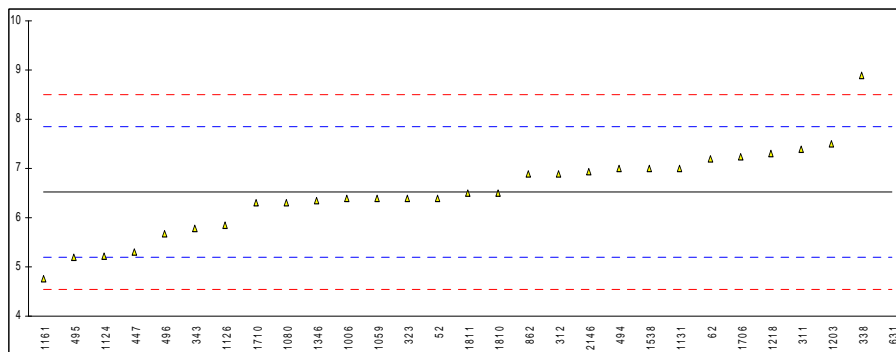
Determination of Oxygen content on sample #11044; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	INH-143	3.8		-2.72	
62	in house	4.3	C	0.34	First reported 3.025
311	EN14517	4.35		0.64	
312		----		----	
323	EN22854	4.37		0.76	
334	EN6101	3.88		-2.23	
338		----		----	
343	EN13132	>3.7		----	
447	D4815	4.71		2.84	
494	EN22854	4.32		0.46	
495	EN22854	4.45		1.25	
496	ISO22854	4.465		1.35	
631		----		----	
862	D4815	4.260		0.09	
1006	D4815	3.77		-2.90	
1033		----		----	
1059	EN13132	4.38		0.83	
1080	Reformulyzer	4.15		-0.58	
1124	EN13132	4.113		-0.81	
1126	Reformulyzer	3.90		-2.11	
1131	ISO22854	4.46		1.31	
1161	EN13132	4.0		-1.50	
1203	EN14517	4.34		0.58	
1205	ISO22854	4.4	C	0.95	First reported 0.84
1218		----		----	
1346	ISO22854	4.27		0.15	
1538	ISO13132	4.32		0.46	
1634		----		----	
1706		----		----	
1710	EN1601	4.38		0.83	
1727		----		----	
1810		----		----	
1811	EN14517	4.17		-0.46	
2146	EN13132	4.321		0.46	
normality		not OK			
n		24			
outliers		0			
mean (n)		4.244			
st.dev. (n)		0.2320			
R(calc.)		0.649			
R(EN14517:05)		0.458			Compare R(ISO22854:08) = 0.458



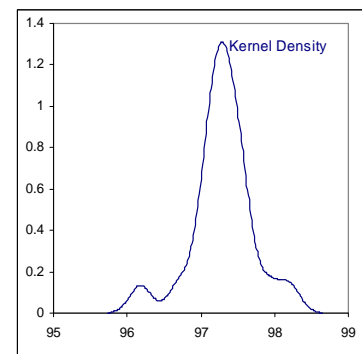
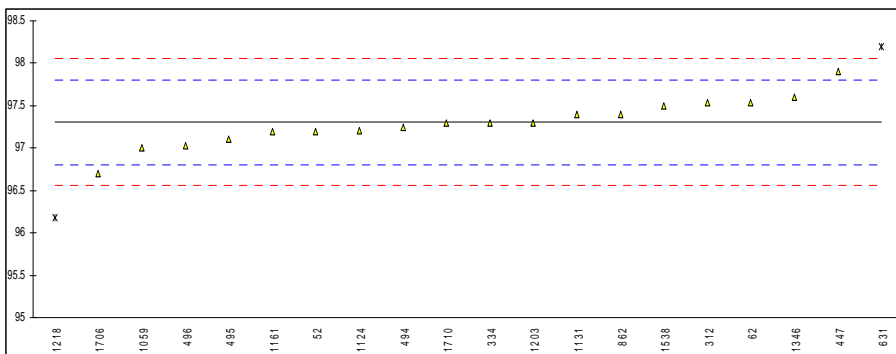
Determination of Sulphur on sample #11044; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52	D5453	6.4		-0.18	
62	D5453	7.2		1.03	
311	ISO20846	7.4		1.33	
312	D5453	6.9		0.57	
323	ISO20846	6.4		-0.18	
334		----		----	
338	ISO20846	8.9		3.60	
343	ISO20846	5.79		-1.11	
447	IP490	5.3		-1.85	
494	ISO20846	6.99		0.71	
495	ISO20846	5.2		-2.00	
496	ISO20846	5.67		-1.29	
631	D4294	55	C,G(0.01)	73.36	First reported 82
862	D5453	6.9		0.57	
1006	D5453	6.4		-0.18	
1033		----		----	
1059	ISO20846	6.4		-0.18	
1080	ISO20846	6.3		-0.33	
1124	ISO20884	5.21		-1.98	
1126	ISO20846	5.84		-1.03	
1131	ISO20846	7.0		0.72	
1161	ISO20846	4.77		-2.65	
1203	ISO20846	7.5		1.48	
1205		----		----	
1218	ISO20884	7.3		1.18	
1346	ISO20846	6.34		-0.27	
1538	ISO20846	7.0		0.72	
1634		----		----	
1706	ISO20884	7.25		1.10	
1710	ISO20846	6.3		-0.33	
1727		----		----	
1810	ISO20846	6.5		-0.03	
1811	ISO20846	6.5		-0.03	
2146	ISO20846	6.938		0.63	
normality		OK			
n		28			
outliers		1			
mean (n)		6.521			
st.dev. (n)		0.8620			
R(calc.)		2.414			
R(ISO20846:04)		1.850			



Determination of RON on sample #11044

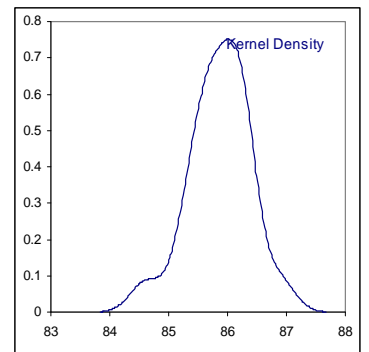
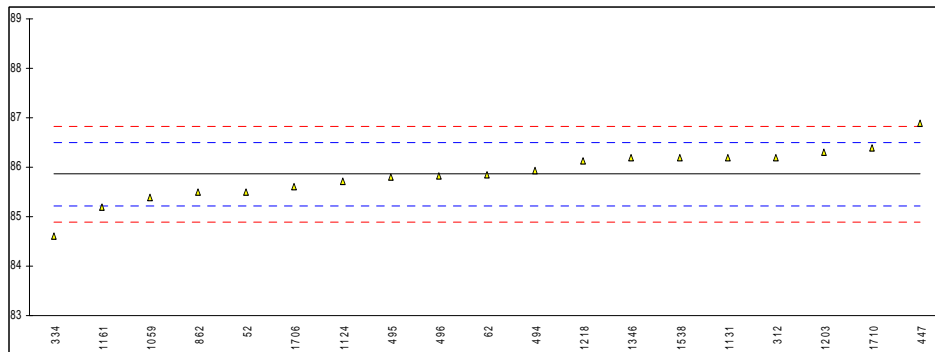
lab	method	value	mark	z(targ)	remarks
52	D2699	97.2		-0.42	
62	D2699	97.54		0.94	
311		-----		-----	
312	D2699	97.54		0.94	
323		-----		-----	
334	D2699	97.3		-0.02	
338		-----		-----	
343		-----		-----	
447	D2699	97.9		2.38	
494	ISO5164	97.25		-0.22	
495	ISO5164	97.1		-0.82	
496	D2699	97.03		-1.10	
631	D2699	98.2	D(0.05)	3.58	
862	D2699	97.4		0.38	
1006		-----		-----	
1033		-----		-----	
1059	ISO5164	97.0		-1.22	
1080		-----		-----	
1124	ISO5164	97.21		-0.38	
1126		-----		-----	
1131	ISO5164	97.4		0.38	
1161	ISO5164	97.2		-0.42	
1203	ISO5164	97.3		-0.02	
1205		-----		-----	
1218	in house	96.18	D(0.01)	-4.50	
1346	ISO5164	97.6		1.18	
1538	ISO5164	97.5		0.78	
1634		-----		-----	
1706	in house	96.7		-2.42	
1710	ISO5164	97.3		-0.02	
1727		-----		-----	
1810		-----		-----	
1811		-----		-----	
2146		-----		-----	
normality		OK			
n		18			
outliers		2			
mean (n)		97.304			
st.dev. (n)		0.2677			
R(calc.)		0.750			
R(ISO5164:02)		0.700			



Determination of MON on sample #11044

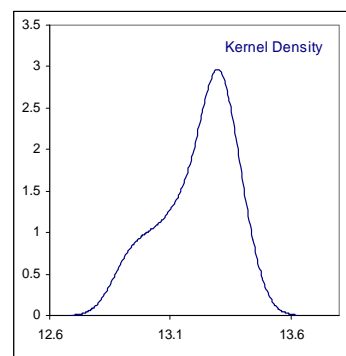
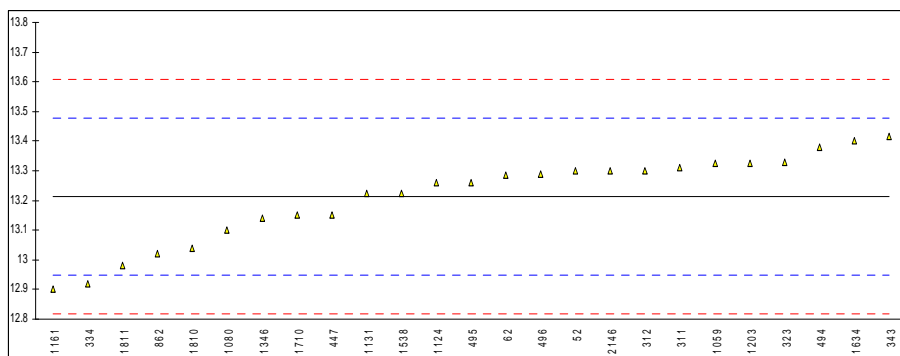
lab	method	value	mark	z(targ)	remarks
52	D2700	85.5		-1.14	
62	D2699	85.84		-0.08	
311		----		----	
312	D2700	86.20		1.04	
323		----		----	
334	D2700	84.6		-3.94	
338		----		----	
343		----		----	
447	D2700	86.9		3.22	
494	ISO5163	85.93		0.20	
495	ISO5163	85.8		-0.20	
496	D2699	85.82		-0.14	
631		----		----	
862	D2700	85.5		-1.14	
1006		----		----	
1033		----		----	
1059	ISO5163	85.4		-1.45	
1080		----		----	
1124	ISO5163	85.72		-0.45	
1126		----		----	
1131	ISO5163	86.2		1.04	
1161	ISO5163	85.2		-2.07	
1203	ISO5163	86.3		1.35	
1205		----		----	
1218	in house	86.13		0.82	
1346	ISO5163	86.2		1.04	
1538	ISO5163	86.2		1.04	
1634		----		----	
1706	in house	85.6		-0.83	
1710	ISO5163	86.4		1.66	
1727		----		----	
1810		----		----	
1811		----		----	
2146		----		----	

normality OK
n 19
outliers 0
mean (n) 85.865
st.dev. (n) 0.5106
R(calc.) 1.430
R(ISO5163:02) 0.900



Determination of Total Vapour Pressure on sample #11045; results in psi

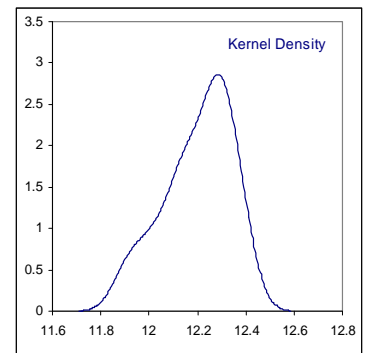
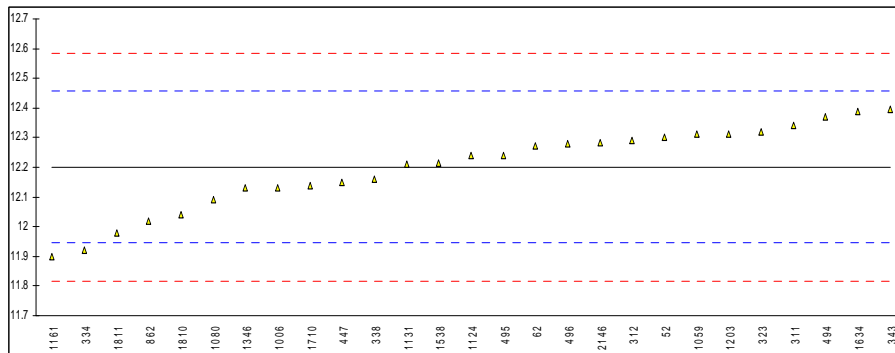
lab	method	value	mark	z(targ)	remarks
52	D5191	13.3		0.66	
62	D5191	13.285		0.54	
311	D5191	13.31		0.73	
312	D5191	13.30		0.66	
323	D5191	13.33		0.89	
334	D5191	12.92		-2.22	
338		-----		-----	
343	D5191	13.416		1.54	
447	D5191	13.15		-0.48	
494	D5191	13.38		1.27	
495	D5191	13.26		0.36	
496	D5191	13.29		0.58	
862	D5191	13.02		-1.46	
1006		-----	C	-----	First reported 12.13, see DVPE (EPA calculation)
1059	D5191	13.325		0.85	
1080	D5191	13.10		-0.86	
1124	EN13016	13.26		0.36	
1131	EN13016	13.223		0.07	
1161	D5191	12.9		-2.37	
1203	EN13016	13.326		0.86	
1218		-----		-----	
1346	D6378	13.14		-0.55	
1538	ISO13016	13.2240		0.08	
1634	EN13016	13.400		1.42	
1710	D5191	13.15		-0.48	
1810	D5191	13.04		-1.31	
1811	D5191	12.98		-1.77	
2146	D5191	13.300		0.66	
normality		not OK			
n		25			
outliers		0			
mean (n)		13.213			
st.dev. (n)		0.1475			
R(calc.)		0.413			
R(D5191:10)		0.369			



Determination of DVPE (ASTM D5191 calculation) on sample #11045; results in psi

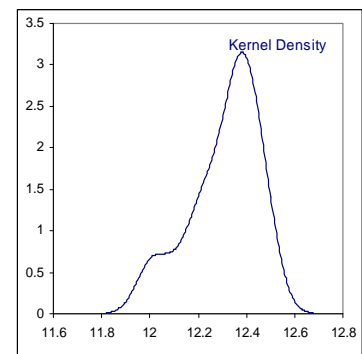
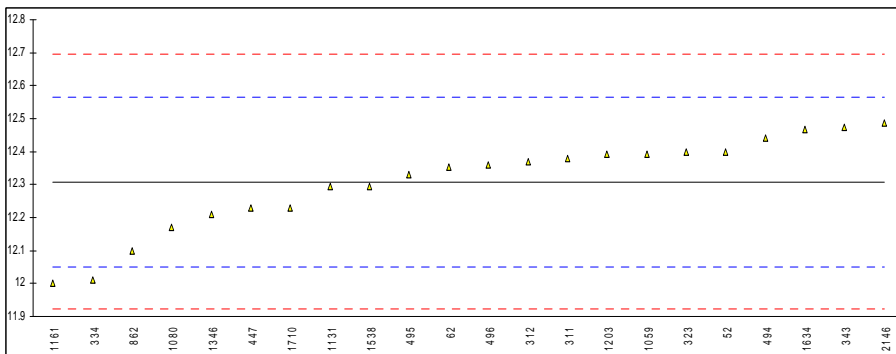
lab	method	value	mark	z(targ)	remarks
52	D5191	12.3		0.77	
62	D5191	12.272		0.55	
311	D5191	12.34		1.08	
312	D5191	12.29		0.69	
323	D5191	12.32		0.93	
334	D5191	11.92		-2.19	
338	D5191	12.16	C	-0.32	Probably reported in deviating unit 83.9 kPa
343	D5191	12.395		1.51	
447	D5191	12.15		-0.40	
494	D5191	12.37		1.32	
495	D5191	12.24		0.30	
496	D5191	12.28		0.62	
862	D5191	12.02		-1.41	
1006	D5191	12.13	C	-0.55	First reported under TVP
1059	D5191	12.311		0.86	
1080	D5191	12.09		-0.87	
1124	EN13016	12.24		0.30	
1131	EN13016	12.212		0.09	
1161	D5191	11.9		-2.35	
1203	EN13016	12.311		0.86	
1218		-----		-----	
1346	D5191	12.13		-0.55	
1538	ISO13016	12.2132		0.09	
1634	EN13016	12.390		1.47	
1710	D5191	12.14		-0.48	
1810	D5191	12.04		-1.26	
1811	D5191	11.98		-1.72	
2146	D5191	12.285		0.65	

normality OK
n 27
outliers 0
mean (n) 12.201
st.dev. (n) 0.1396
R(calc.) 0.391
R(D5191:10) 0.359



Determination of DVPE (EPA calculation) on sample #11045; results in psi

lab	method	value	mark	z(targ)	remarks
52	D5191	12.4		0.71	
62	D5191	12.353		0.35	
311	D5191	12.38		0.56	
312	D5191	12.37		0.48	
323	D5191	12.40		0.71	
334	D5191	12.01		-2.32	
338		-----		-----	
343	D5191	12.475		1.30	
447	D5191	12.23		-0.61	
494	D5191	12.44		1.02	
495	D5191	12.33		0.17	
496	D5191	12.36		0.40	
862	D5191	12.10		-1.62	
1006		-----		-----	
1059	D5191	12.392		0.65	
1080	D5191	12.17		-1.08	
1124		-----		-----	
1131	EN13016	12.294	C	-0.11	First reported 12.641
1161	D5191	12.0		-2.40	
1203	EN13016	12.392		0.65	
1218		-----		-----	
1346	D5191	12.21		-0.77	
1538	ISO13016	12.2951		-0.10	
1634	EN13016	12.467		1.23	
1710	D5191	12.23		-0.61	
1810		-----		-----	
1811		-----		-----	
2146	calc	12.487		1.39	
normality		OK			
n		22			
outliers		0			
mean (n)		12.308			
st.dev. (n)		0.1408			
R(calc.)		0.394			
R(D5191:10)		0.360			



APPENDIX 2:**Z-scores of Distillation**

lab	method	IBP	10%eva	50%eva	90%eva	FBP	%vol@70°C	%vol@100°C	%vol@150°C
52	D86-A	-0.62	-0.58	-0.67	0.03	-0.89	0.66	-----	-----
62	D86-A	-1.31	-1.02	0.23	-0.04	1.30	0.04	0.18	0.27
311	ISO3405-A	0.77	0.12	-0.22	0.18	0.27	0.24	0.37	-0.16
312	D86-A	-0.15	0.03	-0.07	0.03	0.64	0.76	-0.14	-0.37
323	ISO3405-A	0.14	0.03	0.97	-0.12	-0.64	-0.28	-0.65	-0.80
334	D86-A	0.60	0.29	-0.52	-0.49	-1.67	0.66	-0.27	0.27
338		-----	-----	-----	-----	-----	-----	-----	-----
343	D86-A	1.29	1.69	1.57	3.26	1.14	-1.42	-2.68	-4.25
447	IP123-A	-1.72	-0.23	-0.22	1.46	-0.14	-1.21	-0.01	-1.88
494	ISO3405-A	-1.83	-0.85	0.37	-0.04	-0.39	0.04	0.62	-0.37
495	ISO3405-A	-1.43	-1.37	-0.97	-1.62	-1.88	2.11	2.02	1.78
496	ISO3405-A	1.35	0.47	-0.22	0.63	1.96	-0.07	-0.27	-0.80
631	D86-M	1.99	0.55	0.37	0.26	1.01	-0.28	-0.39	1.13
862	D86-A	1.58	0.29	-0.82	-0.04	-0.02	0.55	0.50	1.57
1006	D86-A	1.41	0.55	0.97	0.56	0.52	-----	-----	-----
1033	IP123-A	-0.44	-0.50	-0.97	-0.12	0.02	1.59	0.50	-----
1059	ISO3405-A	0.19	-1.11	-0.52	-0.87	-0.97	0.24	0.88	0.27
1080	ISO3405-A	0.02	0.29	-1.41	-0.72	-1.63	1.38	0.62	1.78
1124	ISO3405-A	-0.33	-1.02	-1.11	-0.34	-1.46	1.80	0.24	-0.16
1126	in house	-5.66	-9.60	39.10	3.48	3.12	-18.74	-10.70	-4.25
1131	ISO3405-A	0.60	-0.41	0.23	0.26	1.30	0.24	-0.14	-0.59
1161	ISO3405-A	-0.73	-0.32	1.12	0.03	1.59	-0.17	0.62	0.92
1203	ISO3405-A	0.14	1.17	1.27	1.01	-1.18	-0.28	-0.78	-0.37
1205		-----	-----	-----	-----	-----	-----	-----	-----
1218	ISO3405-A	-0.15	-0.15	-0.52	-0.12	0.52	-0.07	0.24	0.70
1346	ISO3405-A	0.08	0.03	1.42	0.41	-1.01	-0.90	-0.27	-0.59
1538	ISO3405-A	0.37	1.52	4.84	2.88	0.23	-2.76	-2.30	0.49
1634	ISO3405-A	-0.96	-0.58	-0.22	0.41	-0.39	-2.04	2.02	-0.37
1706	ISO3405-A	-1.75	1.08	0.97	0.18	-0.02	-1.16	-0.90	-1.23
1710	ISO3405-A	0.83	-0.15	-0.37	-0.64	-1.05	0.76	0.75	0.27
1727		-----	-----	-----	-----	-----	-----	-----	-----
1810	ISO3405-A	0.31	-0.58	-0.22	-0.34	0.23	-0.17	-0.52	-1.02
1811	ISO3405-A	-0.04	1.17	0.82	0.26	0.23	-0.28	-0.52	-0.37
2146	ISO3405-A	-0.21	-0.41	-1.26	-0.19	-0.76	-----	0.24	-0.37

APPENDIX 3

Number of participants per country

1 lab in AUSTRIA
2 labs in BELGIUM
2 labs in CANADA
2 labs in CZECH REPUBLIC
1 lab in FINLAND
2 labs in FRANCE
3 labs in GERMANY
4 labs in HUNGARY
1 lab in IRELAND
1 lab in LATVIA
1 lab in LITHUANIA
1 lab in P.R. of CHINA
1 lab in PHILIPPINES
1 lab in POLAND
1 lab in PORTUGAL
1 lab in SLOVENIA
2 labs in SPAIN
1 lab in TAIWAN R.O.C.
3 labs in THE NETHERLANDS
1 lab in TURKEY
2 labs in UNITED KINGDOM

APPENDIX 4**Abbreviations:**

C	= final result after checking of first reported suspect result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
ex	= excluded from calculations
E	= error in calculations
n.a.	= not applicable
W	= withdrawn
fr.	= first reported
U	= reported in different unit
SDS	= Safety Data Sheet

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