Results of Proficiency Test
Biogasoline E10
May 2010

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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CONTENTS

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 international interlaboratory study, 33 laboratories in 18 different countries have participated. See appendix 4 for a list of participants in alphabetical country order. 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 #1044) and/or 1*1 litre (± 800 mL filled, labelled #1045 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% confidentially 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 190 litre of the bulk material 19 litre of Ethanol was added to increase the Ethanol content up to 10%. After homogenisation, the material was transferred into 128 brown glass bottles of 1 litre (labelled #1044) and into another 72 brown glass bottles of 1 litre filled for approx. 800 mL for Dry Vapour Pressure Equivalent only (labelled #1045).
The homogeneity of the subsamples #1044 was checked by determination of Density @15^{o}C in accordance with ASTM D4052:09 and Ethanol content in accordance with EN13132:00 on 8 stratified randomly selected samples.
The homogeneity of the subsamples #1045 was checked by determination of Dry Vapour Pressure Equivalent in accordance with ASTM D5191:07 on 6 stratified randomly selected samples.

	Density @ 15°C in kg/L	Ethanol in %V/V
Sample #1044-1	0.74140	9.60
Sample #1044-2	0.74133	9.71
Sample #1044-3	0.74136	9.77
Sample #1044-4	0.74133	9.68
Sample #1044-5	0.74134	9.75
Sample #1044-6	0.74132	9.76
Sample #1044-7	0.74139	9.67
Sample #1044-8	0.74133	9.75

table 1: homogeneity test of subsamples #1044

	DVPE in psi
Sample #1045-1	12.73
Sample #1045-2	12.72
Sample #1045-3	12.72
Sample #1045-4	12.69
Sample #1045-5	12.72
Sample #1045-6	12.73
Sample #1045-7	12.75
Sample #1045-8	12.76

table 2: homogeneity test of subsamples #1045

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 ^{o}C in kg/L	*Ethanol in %V/V*	*DVPE in psi*
r (sample #1044)	0.00008	0.16	--
r (sample #1045)	--	--	0.06
reference test	ISO12185:96	EN14517:04	ASTM D5191:07
r (reference test)	0.00015	0.18	0.12

table 3: repeatabilities of the subsamples #1044 and #1045

The calculated repeatabilities were less than 0.3 times the reproducibility of the corresponding reference method. Therefore, homogeneity of the subsamples #1044 and #1045 was assumed.

To the participants, depending on their registration, 2*1 litre of sample #1044 and/or 1*1 litre (± 800 mL filled) of sample #1045 were sent on April 28, 2010.

2.5 ANALYSIS

The participants were requested to determine on sample #1044: Aromatics (FIA & GC), Benzene, Copper Strip Corrosion 3hrs/50°C, Density @ 15°C, Distillation, Ethanol, Existent Gum, Mercaptans as S, Olefins (FIA & GC), Oxidation Stability, Oxygen, Sulphur, RON and MON (before and after correction). On sample #1045 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:

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

The $z_{(target)}$ 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:

	$\lvert z \rvert < 1$	good
$1 <$	$\lvert z \rvert < 2$	satisfactory
$2 <$	$\lvert z \rvert < 3$	questionable
$3 <$	$\lvert z \rvert$	unsatisfactory

4 EVALUATION

In this proficiency test, no problems were encountered during the dispatch of the samples to the participants.
Seven laboratories reported the results after the final reporting date and three participants did not report any results. Most laboratories reported results, but not all laboratories were able to perform all analyses requested. Finally, 30 laboratories did send in 664 numerical results. Observed were 47 outlying results, which is 7.1%. 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 and 10% evaporated. In these cases, the statistical evaluation should be used with care.

Aromatics by FIA: This determination is problematic. The reported results seem to be bimodally divided (see on page 13, Kernel Density). No statistical outliers were observed. However, when all reported results were evaluated, the calculated reproducibility is not in agreement with the requirements of ASTM D1319:08. The bimodal distribution and large spread may be caused by not or wrong correcting of the results for the (high) oxygenate content.

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. Only one statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D1298:05.

Benzene: This determination may be problematic for several laboratories. Only one statistical outlier was observed. The calculated reproducibility, after rejection of the statistical outlier, is almost 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 problematic for two laboratories. Two statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is in full agreement with the requirements of ISO12185:96.

Distillation: This determination is problematic for three laboratories. In total thirteen statistical outliers were observed. However, all the calculated reproducibilities after rejection of the statistical outliers are in good agreement with the requirements of ISO3405:00.

Doctor test: No problems have been observed, all reporting participants agreed on a test result of “negative”.

Ethanol: This determination is problematic for several laboratories. Three statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is in full agreement with the requirements of EN14517:04.

Existent Gum This determination may be problematic at this low level of 0.44 mg/100mL. 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 one participant reported a numerical result and three 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. All reporting participants, except one, agreed on a result below 0.0003 %M/M.

Olefins by FIA: This determination is problematic. The reported results seem to be bimodal divided (see on page 28, Kernel Density). No statistical outliers were observed. However, when all reported results were evaluated, the calculated reproducibility is not in agreement with the requirements of ASTM D1319:08. The bimodal distribution and 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. No statistical outliers were observed and 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 for one laboratory. Only one statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of EN14517:05.

Sulphur: This determination is problematic for several laboratories. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers, is in full agreement with the requirements of ISO20846:04.

RON: This determination is not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with ISO5164:02.

MON: This determination is 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 D5191:07 and the U.S. EPA guidelines (40 CFR Part 80, App. E, Method 3), showed in total eight (three for TVP, three for DVPE-ASTM and Three for DVPE-EPA) statistical outliers. After rejection of the statistical outliers, all three calculated reproducibilities are in good agreement with the requirement of ASTM D5191:07 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	mean	2.8 * sd	R (lit)
Aromatics (FIA)	%V/V	15	30.88	4.41	3.70
Aromatics (GC)	%V/V	20	28.97	0.93	1.44
API gravity		11	59.282	0.195	0.300
Benzene	%V/V	24	0.708	0.048	0.040
Copper Strip 3 hrs @ 50°C	-----	25	1	n.a.	n.a.
Density @ 15°C	kg/m^3	28	741.43	0.51	0.50
Initial Boiling Point	ºC	30	30.17	4.86	7.20
10% evaporated	ºC	27	42.95	2.27	4.90
50%evaporated	ºC	27	69.26	3.64	5.35
90% evaporated	ºC	26	152.30	1.75	5.43
Final Boiling Point	ºC	27	187.19	6.36	8.90
Evaporated @70ºC	%V/V	27	50.79	3.18	n.a.
Evaporated @100ºC	%V/V	28	59.61	2.61	n.a.
Evaporated @150ºC	%V/V	27	88.63	1.47	n.a.
Ethanol	%V/V	22	9.53	0.60	0.59
Existent Gum (washed)	mg/100mL	16	0.43	0.65	0.58
Mercaptans as S	%M/M	8	0.00019	0.00018	0.00032
Olefins (FIA)	%V/V	15	10.479	4.264	3.357
Olefins (GC)	%V/V	20	11.635	0.734	1.880
Oxygen	% M/M	23	3.552	0.338	0.441
Sulphur	mg/kg	22	6.57	1.91	1.86
RONm	-----	10	97.699	0.450	0.700
RON after correction	-----	9	97.510	0.466	0.700
MONm	-----	13	86.078	1.368	0.900
MON after correction	-----	11	85.874	1.477	0.900

table 6: performance evaluation sample #1044

Parameter	unit	n	average	2.8 * sd	R (lit)
TVP acc.to ASTM D5191	psi	21	13.775	0.237	0.375
DVPE acc.to ASTM D5191	psi	21	12.745	0.229	0.364
DVPE acc.to EPA	psi	17	12.823	0.256	0.365

table 7: performance evaluation sample #1045

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 2010 WITH PREVIOUS PT

	May 2010 *)	April 2009	May 2008	May 2007
Number of reporting labs	30	50	34	30
Number of results reported	664	1125	603	513
Statistical outliers	47	41	33	22
Percentage outliers	7.1%	4.0%	5.5%	4.3%

table 8: comparison with previous proficiency tests

*) This years PT is E10, previous PT were 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 2010	April 2009	May 2008	May 2007
Aromatics by FIA	--	--	+/-	--
Aromatics by GC	++	++	n.e.	n.e.
API gravity	++	n.e.	n.e.	n.e.
Benzene	--	+	+/-	--
Density @ 15°C	+/-	--	+/-	+/-
Distillation	++	+	+	++
Ethanol	+/-	+	+/-	+/-
Existent Gum (washed)	--	++	++	++
Mercaptans as S	++	++	+/-	++
Olefins by FIA	--	n.e.	--	--
Olefins by GC	++	++	n.e.	n.e.
Oxidation Stability	n.a.	n.a.	n.a.	--
Oxygen	++	+	+/-	+/-
Sulphur	+/-	++	--	--
RON	++	+/-	-	+
MON	--	++	-	++
TVP acc.to ASTM D5191	++	n.e.	n.e.	n.e.
DVPE acc.to ASTM D5191	++	--	-	++
DVPE acc.to EPA	++	--	-	++

table 9: comparison determinations against the 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:

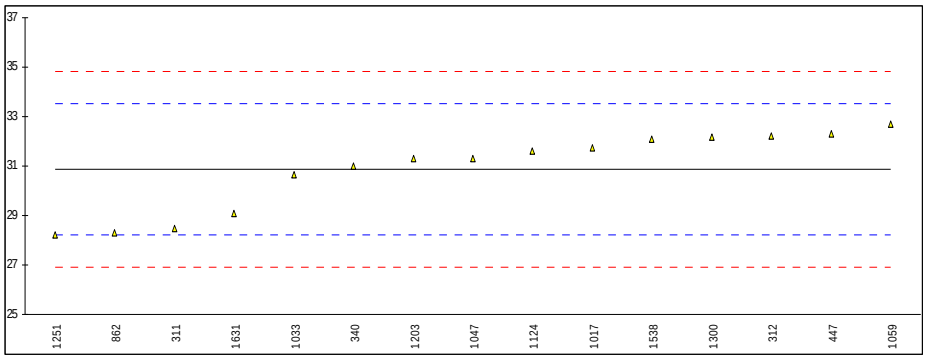
- ++: group performed much better than the standard
- + : group performed better than the standard
- +/-: group performance equals the standard
- - : group performed worse than the standard
- -- : group performed much worse than the standard
- n.e.: not evaluated
- n.d.: not determined

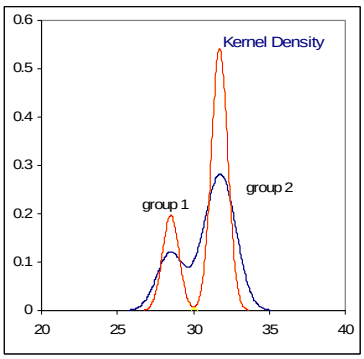
APPENDIX 1

Determination of Aromatics by FIA on sample #1044; results in %V/V

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	D1319	28.5	C	-1.80	First reported 27.5
312	D1319	32.2		1.00	
323		-----		-----	
335		-----		-----	
340	D1319	31.0		0.09	
447	D1319	32.3		1.08	
494		-----		-----	
495		-----		-----	
496		-----		-----	
862	D1319	28.3		-1.95	
1017	D1319	31.74		0.65	
1033	IP156	30.65		-0.17	
1047	D1319	31.3		0.32	
1059	D1319	32.7		1.38	
1080		-----		-----	
1081		-----		-----	
1121		-----		-----	
1124	D1319	31.59		0.54	
1126		-----		-----	
1201		-----		-----	
1203	D1319	31.3	C	0.32	First reported 34.6
1205		-----		-----	
1218		-----		-----	
1251	D1319	28.2		-2.03	
1300	D1319	32.1925		1.00	
1419		-----		-----	
1538	D1319	32.1		0.93	
1631	D1319	29.07		-1.37	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	

			Group 1	Group 2
	normality	OK	OK	OK
	n	15	4	11
	outliers	0	0	0
	mean (n)	30.88	28.52	31.73
	st.dev. (n)	1.575	0.389	0.627
	R(calc.)	4.41	1.09	1.75
	R(D1319:08)	3.70	3.70	3.70

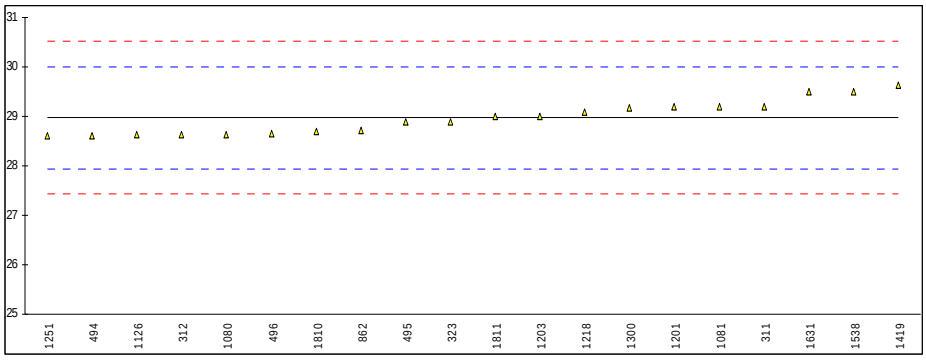


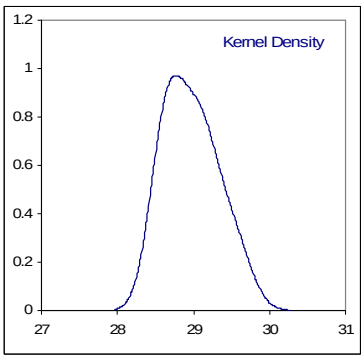


Determination of Aromatics by GC on sample #1044; results in %V/V

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	EN14517	29.2		0.44	
312	D6829	28.62		-0.68	
323	EN22854	28.9		-0.14	
335		-----		-----	
340		-----		-----	
447		-----		-----	
494	ISO22854	28.61		-0.70	
495	ISO22854	28.9		-0.14	
496	ISO22854	28.66		-0.60	
862	D6293	28.71		-0.51	
1017		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059		-----		-----	
1080	in house	28.63		-0.66	
1081	EN14517	29.20		0.44	
1121		-----		-----	
1124		-----		-----	
1126	D6839	28.62		-0.68	
1201	EN14517	29.2		0.44	
1203	EN14517	29.0		0.06	
1205		-----		-----	
1218	EN14517	29.08		0.21	
1251	EN14517	28.6		-0.72	
1300	EN14517	29.165	C	0.38	First reported 30.2482
1419	ISO22854	29.64		1.30	
1538	EN22854	29.5		1.03	
1631	EN14517	29.49		1.01	
1634		-----		-----	
1706		-----		-----	
1810	EN14517	28.7		-0.53	
1811	EN14517	29.0		0.06	

normality	OK
n	20
outliers	0
mean (n)	28.97
st.dev. (n)	0.331
R(calc.)	0.93
R(EN14517:04)	1.44

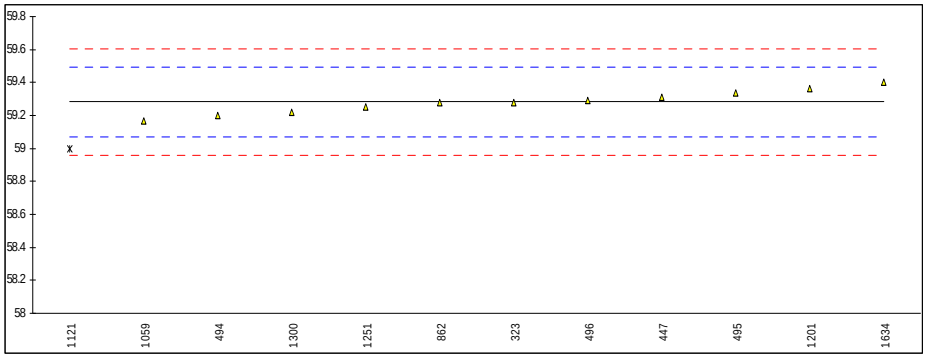


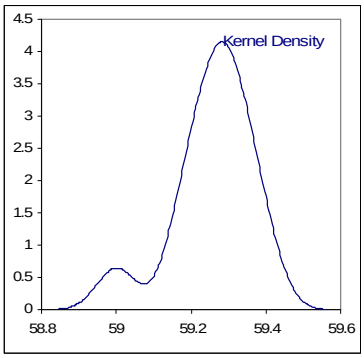


Determination of API gravity on sample #1044;

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312		-----		-----	
323	D1298	59.28		-0.02	
335		-----		-----	
340		-----		-----	
447	CALC.	59.31		0.26	
494	D1298	59.2		-0.76	
495	D1298	59.34		0.54	
496	D4052	59.29		0.08	
862	D1298	59.28		-0.02	
1017		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059	D4052	59.17		-1.04	
1080		-----		-----	
1081		-----		-----	
1121	D1250	59.0	G(0.05)	-2.63	
1124		-----		-----	
1126		-----		-----	
1201	D1298	59.36		0.73	
1203		-----		-----	
1205		-----		-----	
1218		-----		-----	
1251	D1298	59.25		-0.30	
1300	D1298	59.22		-0.58	
1419		-----		-----	
1538		-----		-----	
1631		-----		-----	
1634	D1298	59.4	C	1.10	First reported 742.1
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	

normality	OK
n	11
outliers	1
mean (n)	59.282
st.dev. (n)	0.0695
R(calc.)	0.195
R(D1298:05)	0.300

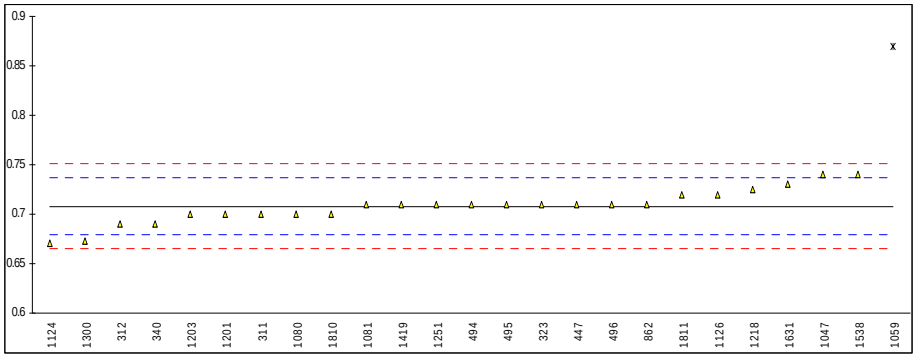


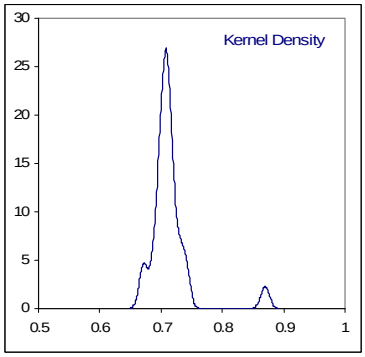


Determination of Benzene on sample #1044; results in %V/V

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	EN14517	0.70		-0.55	
312	RN12177	0.69		-1.25	
323	EN22854	0.71		0.15	
335		-----		-----	
340	D4053	0.69		-1.25	
447	EN231	0.71		0.15	
494	ISO22854	0.71		0.15	
495	ISO22854	0.71		0.15	
496	ISO22854	0.710		0.15	
862	D6293	0.71		0.15	
1017		-----		-----	
1033		-----		-----	
1047	EN238	0.74		2.25	
1059	EN12177	0.87	G(0.01)	11.35	
1080	in house	0.70		-0.55	
1081	EN14517	0.71		0.15	
1121		-----		-----	
1124	EN12177	0.671		-2.58	
1126	D6839	0.72		0.85	
1201	EN14517	0.70		-0.55	
1203	EN14517	0.70		-0.55	
1205		-----		-----	
1218	EN14517	0.725		1.20	
1251	EN14517	0.71		0.15	
1300	EN14517	0.6726		-2.47	
1419	ISO22854	0.71		0.15	
1538	EN22854	0.74		2.25	
1631	EN14517	0.73		1.55	
1634		-----		-----	
1706		-----		-----	
1810	EN14517	0.7		-0.55	
1811	EN14517	0.72		0.85	

normality	not OK
n	24
outliers	1
mean (n)	0.708
st.dev. (n)	0.0171
R(calc.)	0.048
R(EN14517:04)	0.040





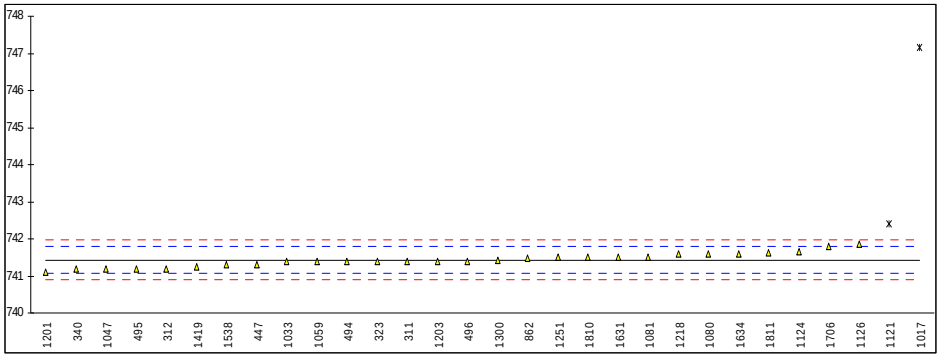
Determination of Copper strip 3hrs/50°C on sample #1044

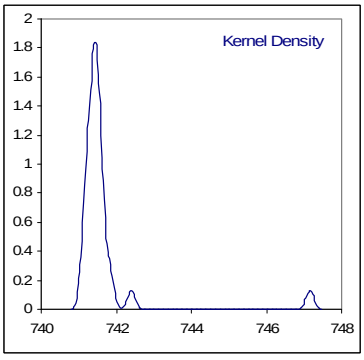
lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	ISO2160/D130	1a		-----	
312	D130	1a		-----	
323	D130	1a		-----	
335		-----		-----	
340	ISO2160/D130	1a		-----	
447	ISO2160/D130	1a		-----	
494	ISO2160	1		-----	
495	ISO2160/D130	1a		-----	
496	ISO2160	1a		-----	
862	D130	1a		-----	
1017	ISO2160/D130	1a		-----	
1033	IP154	1a		-----	
1047	ISO2160	1a		-----	
1059	ISO2160	1a		-----	
1080	D130	1a		-----	
1081	D130	1a		-----	
1121	IP154	1a		-----	
1124		-----		-----	
1126		-----		-----	
1201	D130	1a		-----	
1203	ISO2160/D130	1		-----	
1205		-----		-----	
1218		-----		-----	
1251	D130	1a		-----	
1300	ISO2160	1a		-----	
1419	ISO2160	1a		-----	
1538	ISO2160	1a		-----	
1631	D130	1		-----	
1634	D130	1a		-----	
1706		-----		-----	
1810		-----		-----	
1811	ISO2160/D130	1		-----	
	normality	n.a.			
	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 #1044; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	D4052	741.4		-0.18	
312	ISO12185	741.2		-1.30	
323	ISO12185	741.4		-0.18	
335		-----		-----	
340	ISO12185	741.18		-1.42	
447	ISO12185	741.3		-0.74	
494	ISO12185	741.4		-0.18	
495	ISO12185	741.2		-1.30	
496	ISO12185	741.40		-0.18	
862	D4052	741.48		0.26	
1017	ISO12185	747.16	G(0.01)	32.07	
1033	IP365	741.4		-0.18	
1047	ISO12185	741.2		-1.30	
1059	ISO12185	741.4		-0.18	
1080	ISO12185	741.6		0.94	
1081	ISO12185	741.5		0.38	
1121	IP365	742.4	G(0.01)	5.42	
1124	ISO12185	741.64		1.16	
1126	D4052	741.86		2.39	
1201	ISO12185	741.1		-1.86	
1203	ISO12185	741.4		-0.18	
1205		-----		-----	
1218	D4052	741.6		0.94	
1251	ISO12185	741.5		0.38	
1300	ISO12185	741.41		-0.13	
1419	ISO12185	741.25		-1.02	
1538	ISO12185	741.29		-0.80	
1631	ISO12185	741.5		0.38	
1634	D4052	741.6		0.94	
1706	ISO12185	741.8		2.06	
1810	ISO12185	741.5		0.38	
1811	ISO12185	741.61		0.99	

normality	OK
n	28
outliers	2
mean (n)	741.43
st.dev. (n)	0.184
R(calc.)	0.51
R(ISO12185:96)	0.50

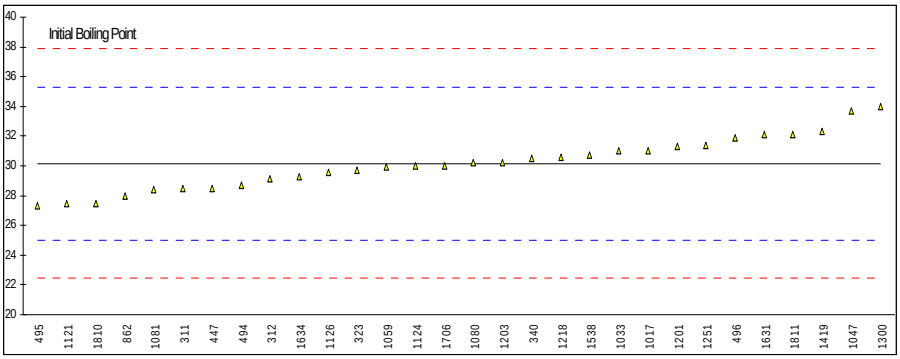


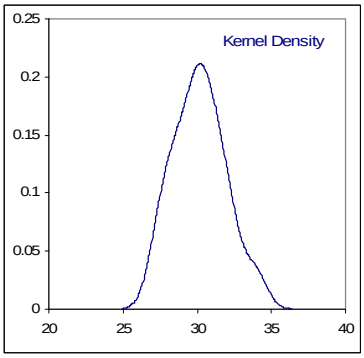


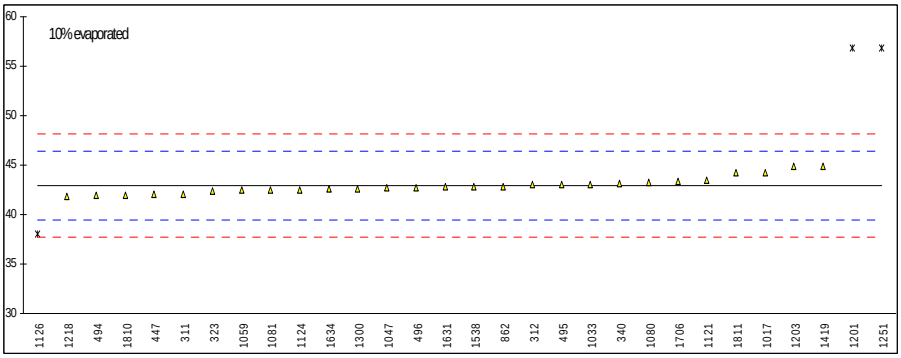
Determination of Distillation ASTM D86 on sample #1044; results in °C

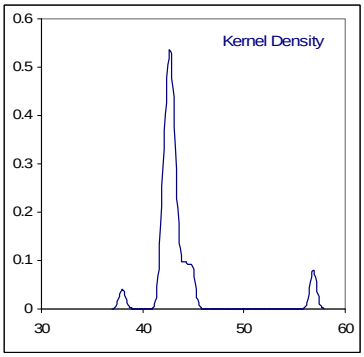
lab	method	IBP	mark	10%eva	mark	50%eva	mark	90%eva	mark	FBP	mark
237		-----		-----		-----		-----		-----	
311	ISO3405-A	28.5		42.1		68.5		152.2		186.7	
312	ISO3405-A	29.1		43.0		70.3		152.7		188.2	
323	ISO3405-A	29.7		42.4		69.4		151.4		188.3	
335		-----		-----		-----		-----		-----	
340	ISO3405-A	30.5		43.2		70.3		153.1		184.0	
447	ISO3405-A	28.5		42.1		69.0		152.8		187.6	
494	ISO3405-A	28.7		42.0		69.0		151.9		185.6	
495	ISO3405-A	27.3		43.0		70.1		152.5		187.2	
496	ISO3405-A	31.9		42.7		68.0		151.9		188.4	
862	D86-A	28.0		42.8		68.0		151.4		188.4	
1017	ISO3405-A	31.0		44.2		72.3		153.7		190.8	
1033	IP123-A	31.0		43.0	Fr 44.2	69.9	Fr 72.3	153.4	Fr 156.3	186.4	
1047	ISO3405-A	33.7		42.7		69.3		152.9		186.9	
1059	ISO3405-A	29.9		42.5		69.8		152.3		188.7	
1080	ISO3405-A	30.2		43.3		67.2		152.0		182.0	
1081	D86-A	28.4		42.5		69.1		151.4		188.0	
1121	IP123-M	27.5		43.5		67.4		152.3		182.2	
1124	ISO3405-A	30.0		42.5		68.0		152.5		189.5	
1126	In house-A	29.6		38.0	G(0.01)	84.8	G(0.01)	155.0	G(0.05)	193.8	G(0.05)
1201	D86-A	31.3		56.8	G(0.01)	113.0	G(0.01)	163.0	G(0.01)	202.5	G(0.01)
1203	ISO3405-A	30.2		44.9		69.8		153.5		186.6	
1205		-----		-----		-----		-----		-----	
1218	ISO3405-A	30.6		41.9		68.7		152.3		188.0	
1251	D86-A	31.4		56.9	G(0.01)	112.9	G(0.01)	162.6	G(0.01)	203.0	G(0.05)
1300	ISO3405-A	34.0		42.6		71.1		151.8		188.4	
1419	ISO3405-A	32.3		44.9		72.4		155.3	G(0.05)	189.7	
1538	ISO3405-A	30.7		42.8		68.2		152.6		184.8	Fr 179.4
1631	ISO3405-A	32.1		42.8		69.1		152.7		190.6	
1634	D86-A	29.3		42.6		68.4		152.4		187.1	
1706	ISO3405-A	30.0		43.4		68.5		152.7		189.8	
1810	ISO3405-A	27.5		42.0		68.2		151.8		185.1	
1811	ISO3405-A	32.1		44.2		70.0		152.0	Fr 156.3	185.0	
	normality	OK		not OK		OK		OK		OK	
	n	30		27		27		26		27	
	outliers	0		3		3		4		3	
	mean (n)	30.17		42.95		69.26		152.39		187.19	
	st.dev. (n)	1.737		0.812		1.301		0.624		2.272	
	R(calc.)	4.86		2.27		3.64		1.75		6.36	
	R(ISO3405:00)	7.20		4.90		5.35		5.43		8.90	

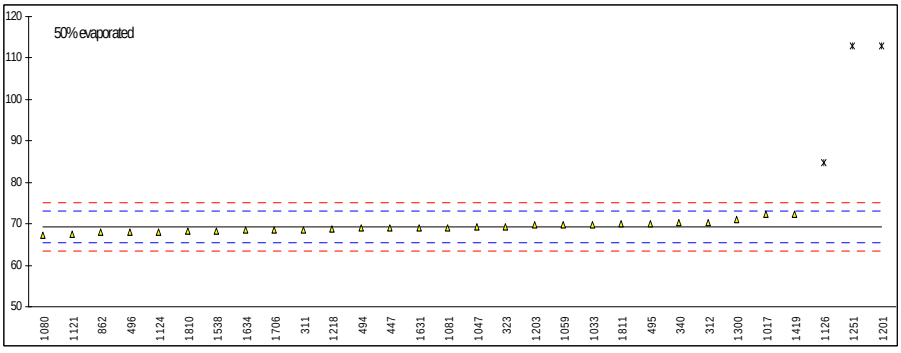
Determination of Distillation ASTM D86 on sample #1044; results in %V/V --continued—

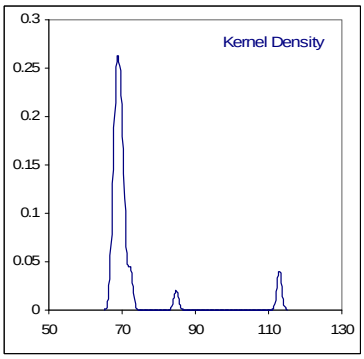


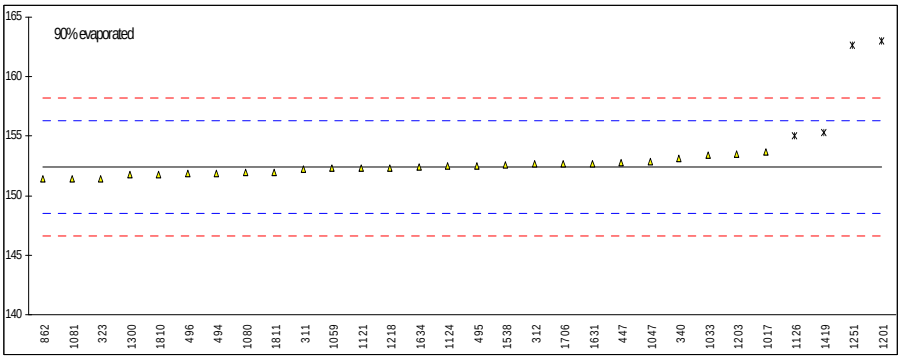


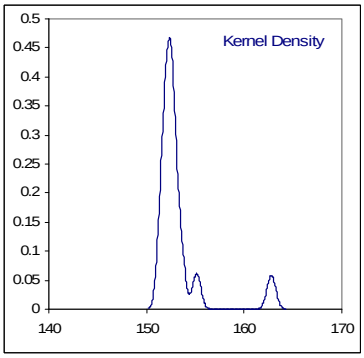


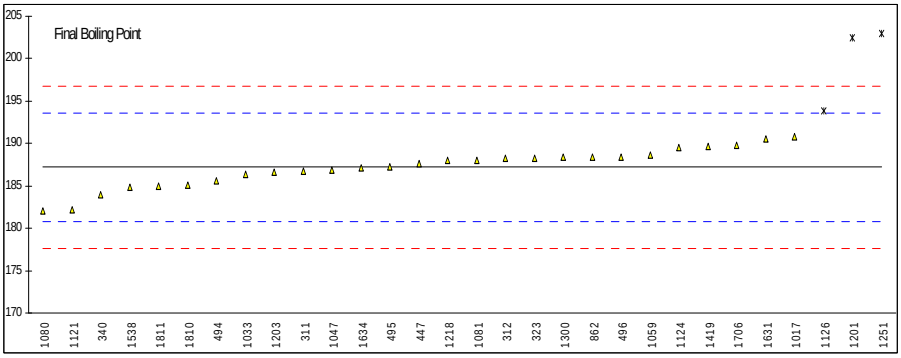


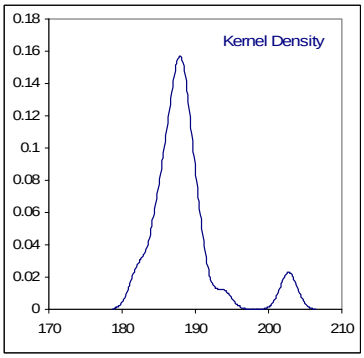






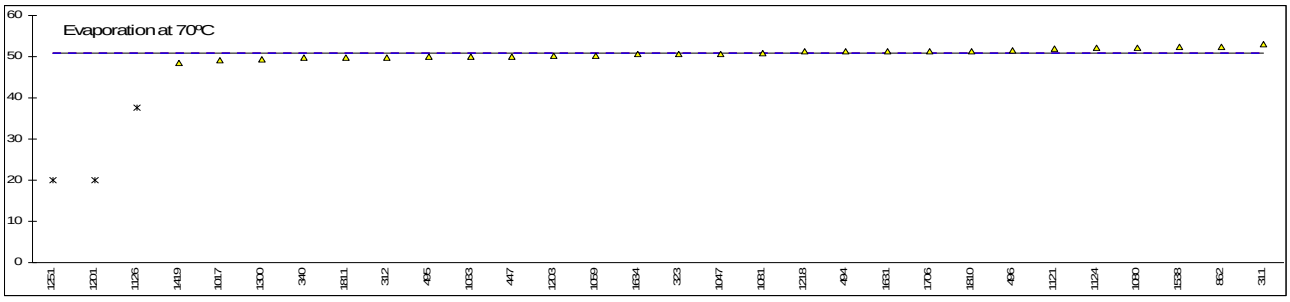


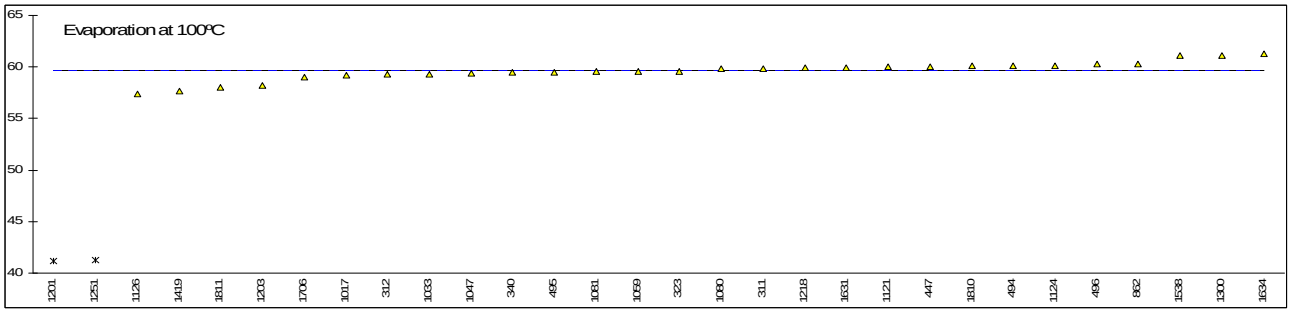




Determination of Distillation ASTM D86 on sample #1044; results in %V/V

lab	Method	evap 70°C	mark	evap 100°C	mark	evap 150°C	mark	residue	Mark
237		-----		-----		-----		-----	
311	ISO3405-A	53.0		59.8		88.7		1.3	
312	ISO3405-A	49.8		59.3		88.4		1.0	
323	ISO3405-A	50.6		59.6		89.6		1.0	
335		-----		-----		-----		-----	
340	ISO3405-A	49.7		59.5		88.1		1.2	
447	ISO3405-A	50.1		60.0		88.3		0.9	
494	ISO3405-A	51.2		60.1		88.9		1.0	
495	ISO3405-A	49.9		59.5		88.5		1.1	
496	ISO3405-A	51.5		60.3		88.9		0.8	
862	D86-A	52.5		60.3		89.4		1.0	
1017	ISO3405-A	49.1		59.2		88.5		1.3	
1033	IP123-A	50.0	Fr 48.5	59.3	Fr 57.8	-----		1.2	
1047	ISO3405-A	50.7		59.4		88.3		1.4	
1059	ISO3405-A	50.2		59.6		88.6		1.4	
1080	ISO3405-A	52.1		59.8		88.8		1.4	
1081	D86-A	50.9		59.6		89.0		-----	
1121	IP123-M	52		60		88		2	G(0.01)
1124	ISO3405-A	52.1		60.1		88.8		1.0	
1126	InHouse-A	37.7	G(0.01)	57.4		88.3		-----	
1201	D86-A	20.0	G(0.01)	41.2	G(0.01)	83.3	G(0.01)	1.0	
1203	ISO3405-A	50.2		58.2		87.9		1.0	
1205		-----		-----		-----		-----	
1218	ISO3405-A	51.2		59.9		88.7		-----	
1251	D86-A	20.0	G(0.01)	41.3	G(0.01)	83.2	G(0.01)	1.0	
1300	ISO3405-A	49.4		61.1		89.2		0.4	G(0.05)
1419	ISO3405-A	48.4		57.7		87.2		1.0	
1538	ISO3405-A	52.5		61.1		89.6		1.0	
1631	ISO3405-A	51.3		59.9		88.5		0.7	
1634	D86-A	50.6		61.3		88.6		1.0	
1706	ISO3405-A	51.3		59.0		88.3		1	
1810	ISO3405-A	51.3		60.1		89.0		1	
1811	ISO3405-A	49.8		58.0		88.9	Fr 87	1	
	normality	OK		OK		OK		not OK	
	n	27		28		27		25	
	outliers	3		2		2		2	
	mean (n)	50.79		59.61		88.63		1.07	
	st.dev. (n)	1.136		0.931		0.525		0.180	
	R(calc.)	3.18		2.61		1.47		0.50	
	R(ISO3405:00)	unknown		unknown		unknown		unknown	





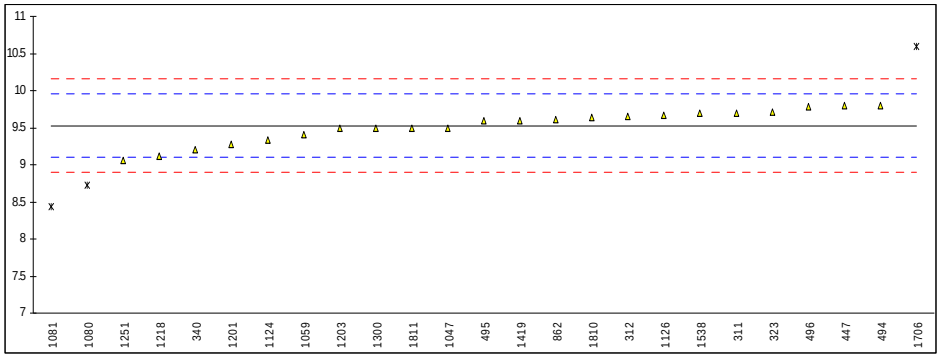
Determination of Doctor test on sample #1044

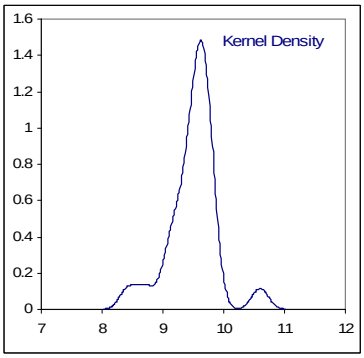
lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312	IP30	neg		-----	
323		-----		-----	
335		-----		-----	
340	D4952	neg		-----	
447	D4952	neg		-----	
494	D4952	neg		-----	
495	D4952	neg		-----	
496		-----		-----	
862	D4952	neg		-----	
1017		-----		-----	
1033		-----		-----	
1047	IP30	neg		-----	
1059	D4952	neg		-----	
1080		-----		-----	
1081		-----		-----	
1121	IP30	neg		-----	
1124		-----		-----	
1126		-----		-----	
1201	D4952	neg		-----	
1203	D4952	neg		-----	
1205		-----		-----	
1218		-----		-----	
1251	D4952	neg		-----	
1300	D4952	neg		-----	
1419	D4952	neg		-----	
1538		-----		-----	
1631		-----		-----	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811	D4952	neg		-----	
	normality	n.a.			
	n	0			
	outliers	0			
	mean (n)	Negative			
	st.dev. (n)	n.a.			
	R(calc.)	n.a.			
	R(D4952:09)	n.a.			

Determination of Ethanol on sample #1044; results in %V/V

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	EN14517	9.7		0.81	
312	EN13132	9.65		0.58	
323	EN22854	9.71		0.86	
335		-----		-----	
340	EN1601	9.21		-1.51	
447	D4815	9.79		1.24	
494	ISO22854	9.80		1.29	
495	ISO22854	9.59		0.29	
496	EN22854	9.786		1.22	
862	D4815	9.606		0.37	
1017		-----		-----	
1033		-----		-----	
1047	EN1601	9.5		-0.13	
1059	EN13132	9.4		-0.61	
1080	in house	8.72	G(0.05)	-3.83	
1081	EN14517	8.43	G(0.05)	-5.21	
1121		-----		-----	
1124	EN13132	9.33		-0.94	
1126	D6839	9.67		0.67	
1201	EN14517	9.28		-1.18	
1203	EN14517	9.49		-0.18	
1205		-----		-----	
1218	EN14517	9.12		-1.93	
1251	EN14517	9.06		-2.22	
1300	EN14517	9.4975		-0.15	
1419	ISO22854	9.59		0.29	
1538	EN13132	9.7		0.81	
1631		-----		-----	
1634		-----		-----	
1706	EN13132	10.6	D(0.01)	5.08	
1810	EN14517	9.64		0.53	
1811	EN14517	9.50		-0.13	

normality	OK
n	22
outliers	3
mean (n)	9.53
st.dev. (n)	0.215
R(calc.)	0.60
R(EN14517:04)	0.59

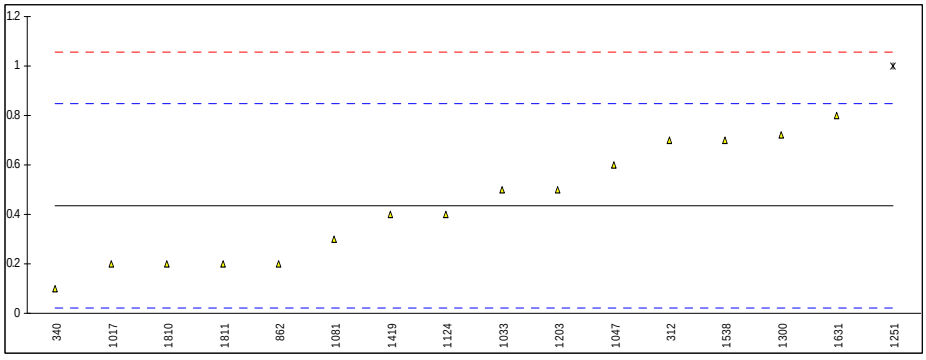


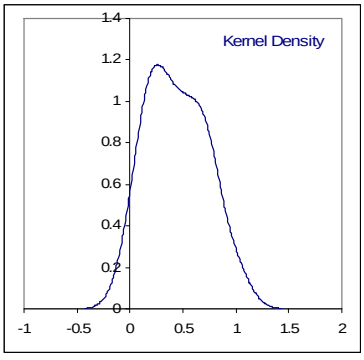


Determination of Existent Gum (washed) on sample #1044; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	ISO6246	<0.5		-----	
312	ISO6246	0.7		1.28	
323		-----		-----	
335		-----		-----	
340	ISO6246	0.1		-1.62	
447	ISO6246	<0.5		-----	
494	ISO6246	<1		-----	
495	ISO6246	<1		-----	
496	ISO6246	<1		-----	
862	D381	0.2		-1.13	
1017	ISO6246	0.2		-1.13	
1033	IP131	0.5		0.32	
1047	ISO6246	0.6		0.80	
1059	ISO6246	<1		-----	
1080		-----	W	-----	Results withdrawn, first reported 1.8
1081	D381	0.3		-0.65	
1121		-----		-----	
1124	ISO6246	0.4		-0.17	
1126		-----		-----	
1201	ISO6246	<0.5		-----	
1203	ISO6246	0.5		0.32	
1205		-----		-----	
1218		-----		-----	
1251	ISO6246	1.0	G(0.05)	2.73	
1300	ISO6246	0.72		1.38	
1419	ISO6246	0.4		-0.17	
1538	ISO6246	0.7		1.28	
1631	ISO6246	0.8		1.77	
1634		-----		-----	
1706		-----		-----	
1810	ISO6246	0.2		-1.13	
1811	ISO6246	0.2		-1.13	

normality	OK
n	15
outliers	1
mean (n)	0.43
st.dev. (n)	0.231
R(calc.)	0.65
R(ISO6246:97)	0.58





Determination of Lead as Pb on sample #1044; results in mg/L

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312	EN237	<2.5		-----	
323	EN237	<2.5		-----	
335		-----		-----	
340	EN237	<2		-----	
447		-----		-----	
494		-----		-----	
495	EN237	<2.5		-----	
496	inh-998	<0.1		-----	
862	EN237	<2.5		-----	
1017		-----		-----	
1033		-----		-----	
1047	EN237	<1.0		-----	
1059	EN13723	<1.0		-----	
1080		-----		-----	
1081	D5059-M	<1		-----	
1121		-----		-----	
1124	EN237	0		-----	
1126		-----		-----	
1201	EN237	<5		-----	
1203	EN237	<1		-----	
1205		-----		-----	
1218	in house	0.3		-----	
1251		-----		-----	
1300	EN237	0.6822		-----	
1419	EN237	<2.0		-----	
1538	EN237	<2.5		-----	
1631		-----		-----	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	

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.

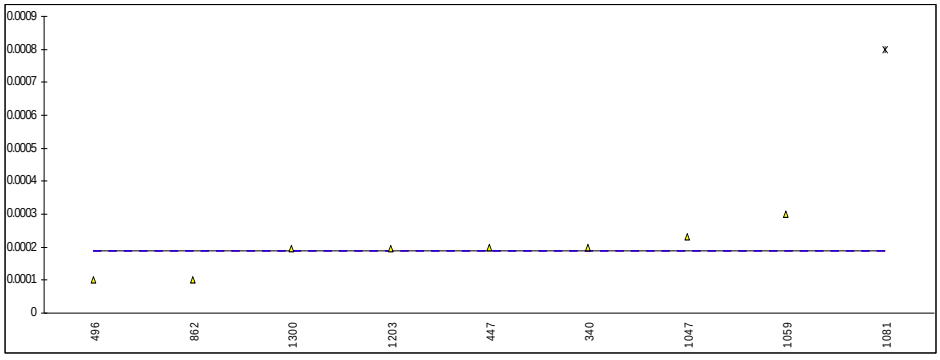
Determination of Manganese as Mn on sample #1044; results in mg/L

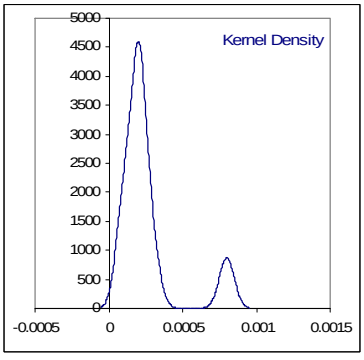
lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312	D3831	0.75		-----	
323	D3831	<0.3		-----	
335		-----		-----	
340		-----		-----	
447		-----		-----	
494		-----		-----	
495		-----		-----	
496		-----		-----	
862	D3831	<0.25		-----	
1017		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059		-----		-----	
1080		-----		-----	
1081		-----		-----	
1121		-----		-----	
1124		-----		-----	
1126		-----		-----	
1201	D3831	<1		-----	
1203		-----		-----	
1205		-----		-----	
1218		-----		-----	
1251		-----		-----	
1300		-----		-----	
1419		-----		-----	
1538		-----		-----	
1631		-----		-----	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	
	normality	n.a.			
	n	n.a.			
	outliers	n.a.			
	mean (n)	n.a.			
	st.dev. (n)	n.a.			
	R(calc.)	n.a.			
	R(D3831:06)	n.a.			Application range ASTM D3831 : 0.25 – 40 mg/L

Determination of Mercaptans as S on sample #1044; results in %M/M

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	D3227	<0.0003		-----	
312	D3227	<0.0003		-----	
323	D3227	<0.0003		-----	
335		-----		-----	
340	D3227	0.0002		0.09	
447	D3227	0.0002		0.09	
494	D3227	<0.0003		-----	
495	D3227	<0.0003		-----	
496	D3227	0.0001		-0.79	
862	D3227	0.0001		-0.79	
1017		-----		-----	
1033		-----		-----	
1047	D3227	0.00023		0.35	
1059	D3227	0.0003		0.97	
1080		-----		-----	
1081	D3227	0.0008	G(0.01)	5.37	
1121		-----		-----	
1124		-----		-----	
1126		-----		-----	
1201	D3227	<0.0003		-----	
1203	UOP163	0.000197		0.06	
1205		-----		-----	
1218		-----		-----	
1251	D3227	<0.0003		-----	
1300	D3227	0.0001948		0.04	
1419		-----		-----	
1538		-----		-----	
1631		-----		-----	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	

normality	OK
n	8
outliers	1
mean (n)	0.00019
st.dev. (n)	0.000066
R(calc.)	0.00018
R(D3227:04a)	0.00032

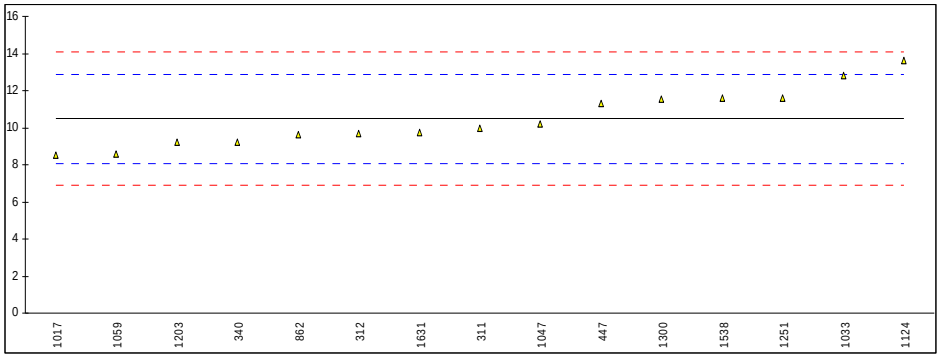


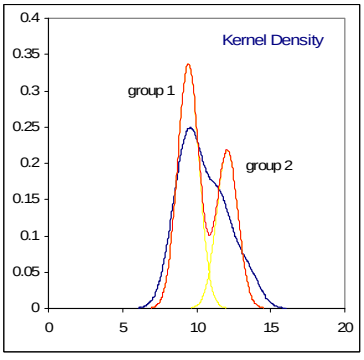


Determination of Olefins by FIA on sample #1044; results in %V/V

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	D1319	10.0		-0.40	
312	D1319	9.7		-0.65	
323		-----		-----	
335		-----		-----	
340	D1319	9.2		-1.07	
447	D1319	11.3		0.68	
494		-----		-----	
495		-----		-----	
496		-----		-----	
862	D1319	9.6		-0.73	
1017	D1319	8.50		-1.65	
1033	IP156	12.8		1.94	
1047	D1319	10.2		-0.23	
1059	D1319	8.6		-1.57	
1080		-----		-----	
1081		-----		-----	
1121		-----		-----	
1124	D1319	13.61		2.61	
1126		-----		-----	
1201		-----		-----	
1203	D1319	9.2		-1.07	
1205		-----		-----	
1218		-----		-----	
1251	D1319	11.6		0.94	
1300	D1319	11.5411		0.89	
1419		-----		-----	
1538	D1319	11.6		0.94	
1631	D1319	9.73		-0.62	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	

			Group 1	Group 2
	normality	OK	OK	not OK
	n	15	9	6
	outliers	0	0	0
	mean (n)	10.479	9.414	12.075
	st.dev. (n)	1.5230	0.5881	0.9186
	R(calc.)	4.264	1.647	2.572
	R(D1319:08)	3.357	3.148	3.655

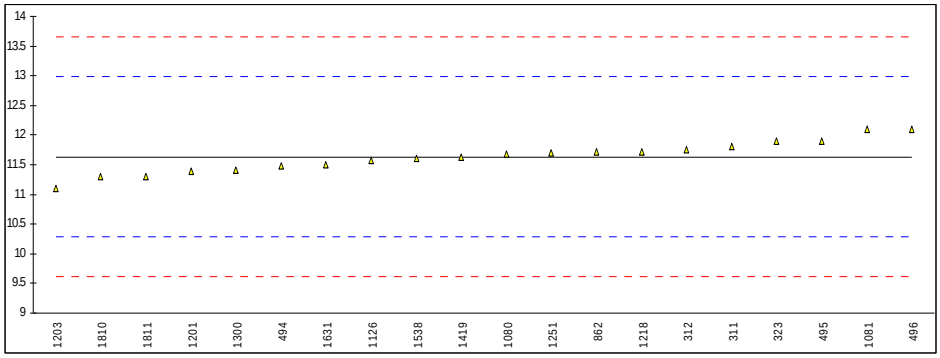


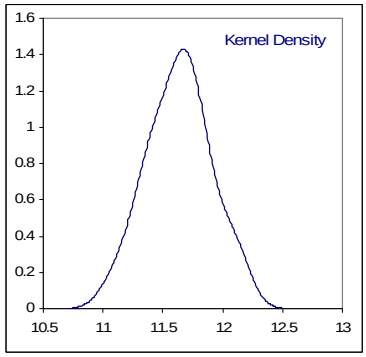


Determination of Olefins by GC on sample #1044; results in %V/V

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	EN14517	11.8		0.25	
312	D6839	11.76		0.19	
323	EN22854	11.9		0.40	
335		-----		-----	
340		-----		-----	
447		-----		-----	
494	ISO22854	11.48		-0.23	
495	ISO22854	11.9		0.40	
496	ISO22854	12.105		0.70	
862	D6293	11.72		0.13	
1017		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059		-----		-----	
1080	in house	11.69		0.08	
1081	EN14517	12.10		0.69	
1121		-----		-----	
1124		-----		-----	
1126	D6839	11.58		-0.08	
1201	EN14517	11.4		-0.35	
1203	EN14517	11.1	C	-0.80	First reported 10.8
1205		-----		-----	
1218	EN14517	11.72		0.13	
1251	EN14517	11.7		0.10	
1300	EN14517	11.4081	C	-0.34	First reported 10.0835
1419	ISO22854	11.63		-0.01	
1538	EN22854	11.6	C	-0.05	
1631	EN14517	11.50		-0.20	
1634		-----		-----	
1706		-----		-----	
1810	EN14517	11.3		-0.50	
1811	EN14517	11.3		-0.50	

normality	OK
n	20
outliers	0
mean (n)	11.635
st.dev. (n)	0.2622
R(calc.)	0.734
R(EN14517:04)	1.880





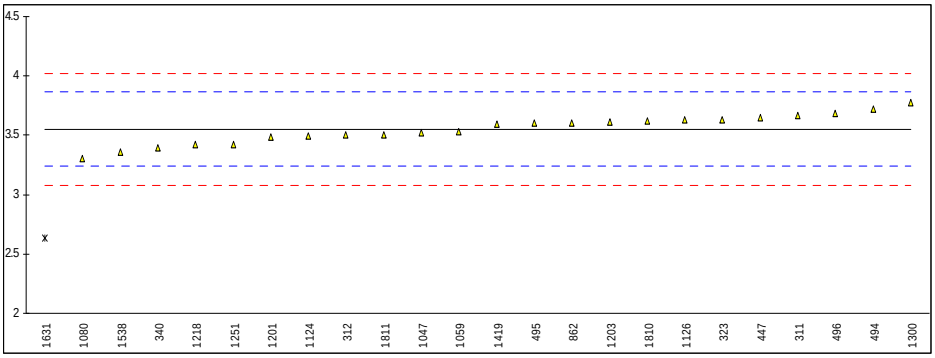
Determination of Oxidation Stability on sample #1044; results in minutes

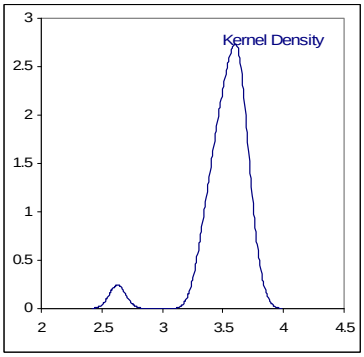
lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	ISO7536/D525	>360		-----	
312	D525	>900		-----	
323	D525	900		-----	
335		-----		-----	
340	ISO7536/D525	>960		-----	
447	ISO7536/D525	>900		-----	
494	D525	>900		-----	
495	ISO7536/D525	>900		-----	
496	D525	>1000		-----	
862	ISO7536/D525	>900		-----	
1017		-----		-----	
1033	IP40	>960		-----	
1047		-----		-----	
1059	ISO7536	>900		-----	
1080	D525	623		-----	
1081	D525	>360		-----	
1121		-----		-----	
1124	ISO7536	>900		-----	
1126		-----		-----	
1201	D525	>900		-----	
1203	ISO7536	540	C	-----	First reported 375
1205		-----		-----	
1218		-----		-----	
1251	D525	>900		-----	
1300	ISO7536	>900		-----	
1419	ISO7536	>900		-----	
1538	ISO7536	>560		-----	
1631	D525	>360		-----	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	
	normality	n.a.			
	n	3			
	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 #1044; results in %M/M

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	EN14517	3.67		0.75	
312	D6839	3.5		-0.33	
323	EN22854	3.63		0.49	
335		-----		-----	
340	EN14517	3.391		-1.02	
447	EN14517	3.65		0.62	
494	ISO22854	3.72		1.07	
495	ISO22854	3.60		0.30	
496	ISO22854	3.685		0.84	
862	D4815	3.600		0.30	
1017		-----		-----	
1033		-----		-----	
1047	EN1601	3.52		-0.21	
1059	EN13132	3.53	C	-0.14	First reported 5.59
1080	in house	3.30		-1.60	
1081		-----		-----	
1121		-----		-----	
1124	EN13132	3.493		-0.38	
1126	D6839	3.63		0.49	
1201	EN14517	3.49		-0.40	
1203	EN14517	3.61		0.37	
1205		-----		-----	
1218	EN14517	3.42		-0.84	
1251	EN14517	3.42		-0.84	
1300	EN14517	3.7733		1.40	
1419	ISO22854	3.59		0.24	
1538	EN13132	3.36		-1.22	
1631	EN14517	2.63	CG(0.01)	-5.86	First reported 2.87
1634		-----		-----	
1706		-----		-----	
1810	EN14517	3.62		0.43	
1811	EN14517	3.50		-0.33	

normality	OK
n	23
outliers	1
mean (n)	3.552
st.dev. (n)	0.1206
R(calc.)	0.338
R(EN14517:05)	0.441

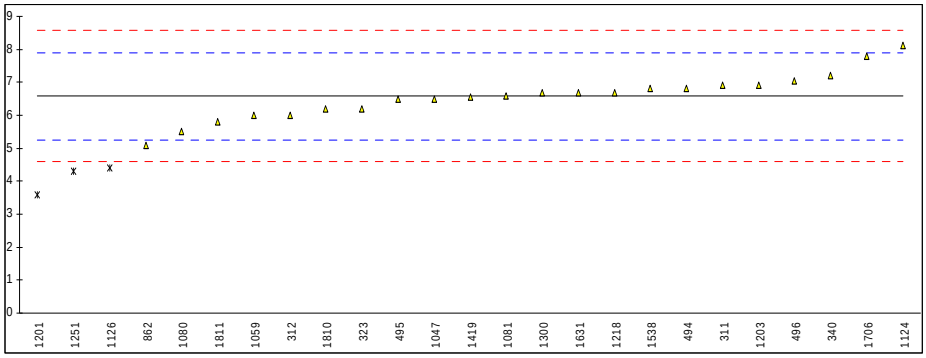


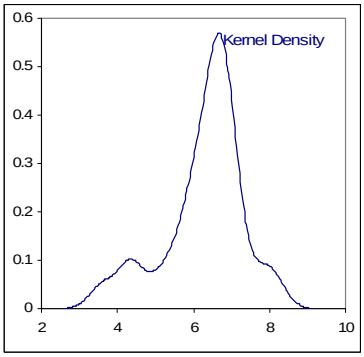


Determination of Sulphur on sample #1044; results in mg/kg

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311	D5453	6.9		0.49	
312	D5453	6.0		-0.87	
323	ISO20846	6.2		-0.56	
335		-----		-----	
340	ISO20846	7.2		0.94	
447		-----		-----	
494	ISO20846	6.8		0.34	
495	ISO20846	6.5		-0.11	
496	ISO20884	7.05		0.72	
862	D5453	5.1		-2.22	
1017		-----		-----	
1033		-----		-----	
1047	ISO20846	6.5		-0.11	
1059	ISO20846	6.0		-0.87	
1080	ISO20846	5.5		-1.62	
1081	ISO20846	6.6		0.04	
1121		-----		-----	
1124	ISO20844	8.13		2.35	
1126	ISO20846	4.4	G(0.05)	-3.28	
1201	ISO20846	3.6	G(0.05)	-4.49	
1203	ISO20846	6.91		0.51	
1205		-----		-----	
1218	ISO20884	6.7		0.19	
1251	ISO20846	4.3	G(0.05)	-3.43	
1300	ISO20846	6.686		0.17	
1419	ISO20846	6.55		-0.04	
1538	ISO20846	6.8		0.34	
1631	ISO20846	6.7		0.19	
1634		-----		-----	
1706	ISO20884	7.8		1.85	
1810	ISO20846	6.2		-0.56	
1811	ISO20846	5.8		-1.17	

normality	OK
n	22
outliers	3
mean (n)	6.57
st.dev. (n)	0.683
R(calc.)	1.91
R(ISO20846:04)	1.86

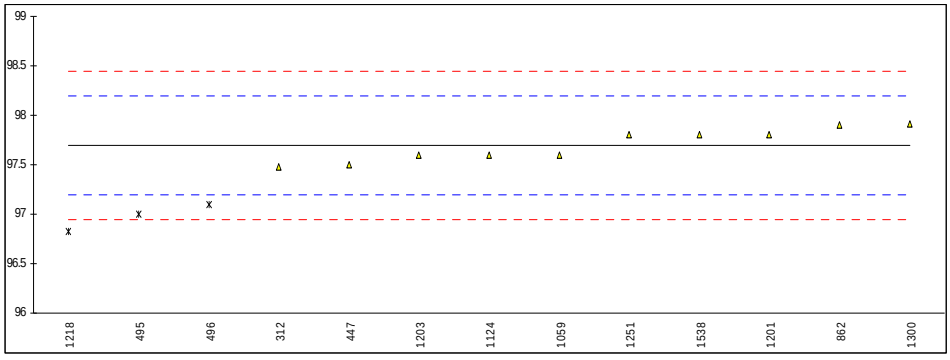


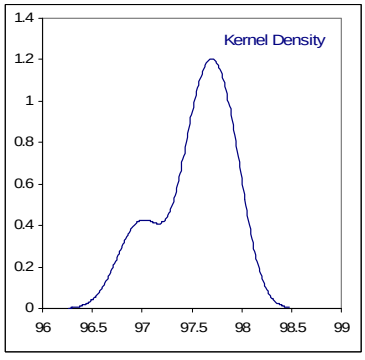


Determination of RONm (before correction) on sample #1044

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312	ISO5164	97.48		-0.88	
323		-----		-----	
335		-----		-----	
340		-----		-----	
447	ISO5164/D2699	97.5		-0.80	
494		-----		-----	
495	ISO5164/D2699	97.0	DG(0.05)	-2.80	
496	ISO5164	97.1	DG(0.05)	-2.40	
862	D2699	97.9	E	0.80	Reported first RONm < RON
1017		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059	ISO5164	97.6		-0.40	
1080		-----		-----	
1081		-----		-----	
1121		-----		-----	
1124	ISO5164	97.6		-0.40	
1126		-----		-----	
1201	D2699	97.8		0.40	
1203	ISO5164/D2699	97.6		-0.40	
1205		-----		-----	
1218	in house	96.83	G(0.05)	-3.48	
1251	D2699	97.8		0.40	
1300	D5164	97.91		0.84	
1419		-----		-----	
1538	ISO5164	97.8		0.40	
1631		-----		-----	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	

normality	OK
n	10
outliers	3
mean (n)	97.699
st.dev. (n)	0.1607
R(calc.)	0.450
R(ISO5164:02)	0.700

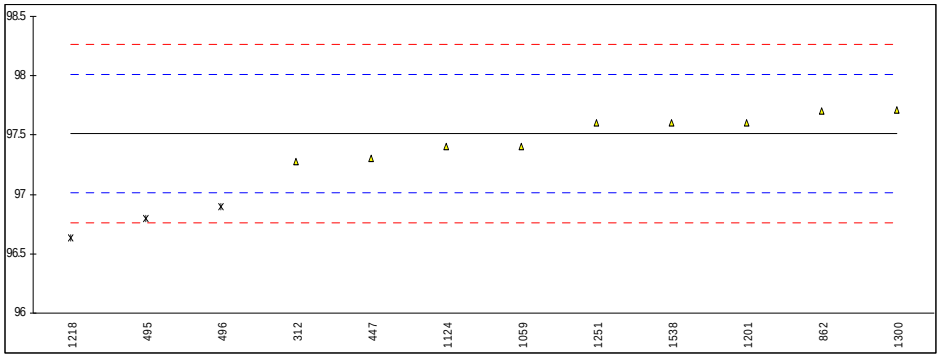


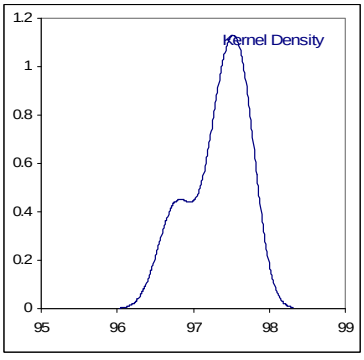


Determination of RON (after correction) on sample #1044

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312	ISO5164	97.28		-0.92	
323		-----		-----	
335		-----		-----	
340		-----		-----	
447	ISO5164/D2699	97.3		-0.84	
494		-----		-----	
495	ISO5164/D2699	96.8	DG(0.05)	-2.84	
496	ISO5164	96.9	DG(0.05)	-2.44	
862	D2699	97.7	E	0.76	Reported first RON > RONm
1017		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059	ISO5164	97.4		-0.44	
1080		-----		-----	
1081		-----		-----	
1121		-----		-----	
1124	ISO5164	97.4		-0.44	
1126		-----		-----	
1201	D2699	97.6		0.36	
1203		-----		-----	
1205		-----		-----	
1218	in house	96.63	G(0.05)	-3.52	
1251	D2699	97.6		0.36	
1300	D5164	97.71		0.80	
1419		-----		-----	
1538	ISO5164	97.6		0.36	
1631		-----		-----	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	

normality	OK
n	9
outliers	3
mean (n)	97.510
st.dev. (n)	0.1664
R(calc.)	0.466
R(ISO5164:02)	0.700

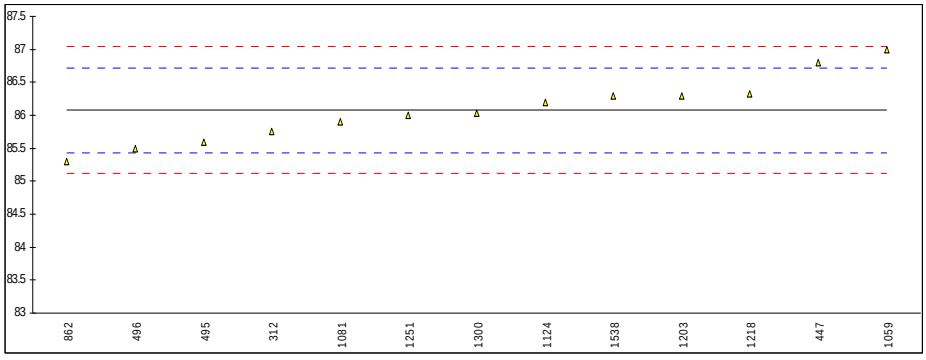


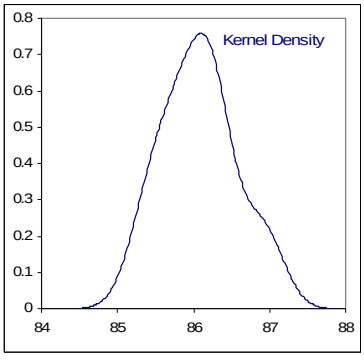


Determination of MONm (before correction) on sample #1044

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312	ISO5163	85.75		-1.02	
323		-----		-----	
335		-----		-----	
340		-----		-----	
447	ISO5163	86.8		2.25	
494		-----		-----	
495	ISO5163	85.6		-1.49	
496	ISO5163	85.5		-1.80	
862	D2700	85.3	E	-2.42	Reported first MONm < MON
1017		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059	ISO5163	87.0		2.87	
1080		-----		-----	
1081	D2700:03	85.9		-0.55	
1121		-----		-----	
1124	ISO5163	86.2		0.38	
1126		-----		-----	
1201		-----		-----	
1203	ISO5163	86.3		0.69	
1205		-----		-----	
1218	in house	86.33		0.78	
1251	D2700	86.0		-0.24	
1300	ISO5163	86.03		-0.15	
1419		-----		-----	
1538	ISO5163	86.3		0.69	
1631		-----		-----	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	

normality	OK
n	13
outliers	0
mean (n)	86.078
st.dev. (n)	0.4885
R(calc.)	1.368
R(ISO5163:02)	0.900

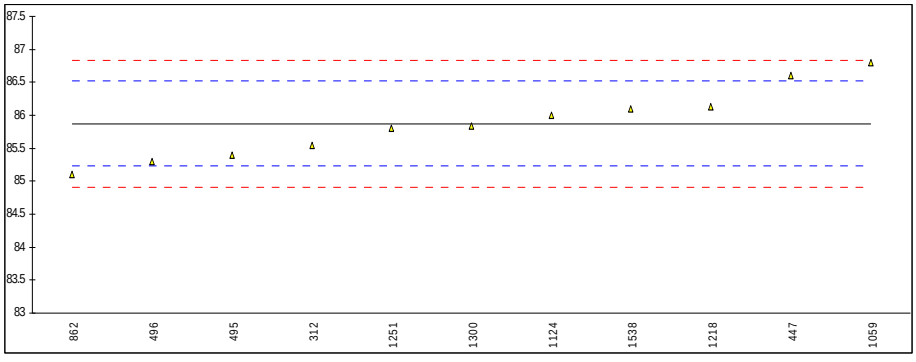


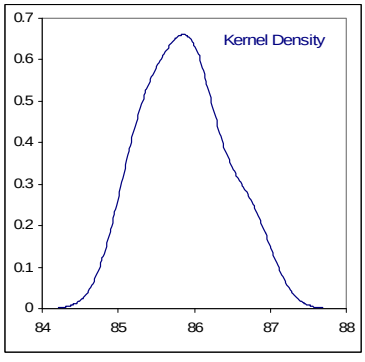


Determination of MON (after correction) on sample #1044

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312	ISO5163	85.55		-1.01	
323		-----		-----	
335		-----		-----	
340		-----		-----	
447	ISO5163	86.6		2.26	
494		-----		-----	
495	ISO5163	85.4		-1.47	
496	ISO5163	85.3		-1.78	
862	D2700	85.1	E	-2.41	Reported first MON > MONm
1017		-----		-----	
1033		-----		-----	
1047		-----		-----	
1059	ISO5163	86.8		2.88	
1080		-----		-----	
1081		-----		-----	
1121		-----		-----	
1124	ISO5163	86.0		0.39	
1126		-----		-----	
1201		-----		-----	
1203		-----		-----	
1205		-----		-----	
1218	in house	86.13		0.80	
1251	D2700	85.8		-0.23	
1300	ISO5163	85.83		-0.14	
1419		-----		-----	
1538	ISO5163	86.1		0.70	
1631		-----		-----	
1634		-----		-----	
1706		-----		-----	
1810		-----		-----	
1811		-----		-----	

normality	OK
n	11
outliers	0
mean (n)	85.874
st.dev. (n)	0.5275
R(calc.)	1.477
R(ISO5163:02)	0.900

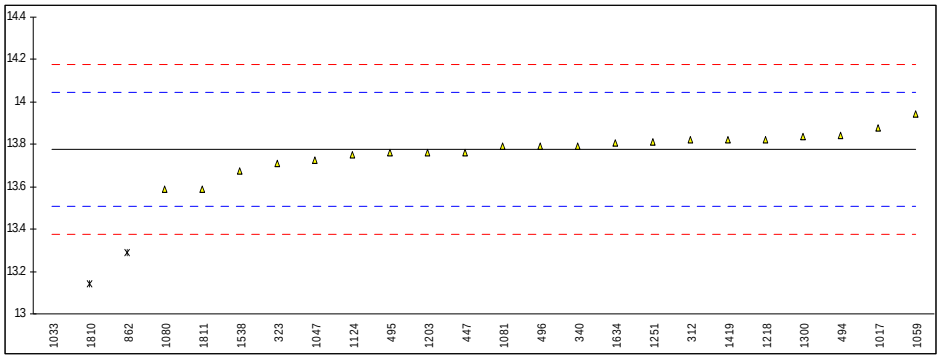


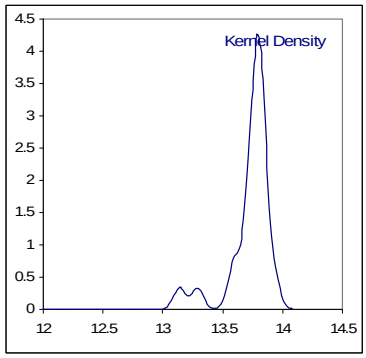


Determination of Total Vapour Pressure on sample #1045; results in psi

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312	D5191	13.82		0.34	
323	D5191	13.71		-0.48	
340	D5191	13.79		0.11	
447	D5191	13.76		-0.11	
494	D5191	13.84		0.49	
495	D5191	13.76		-0.11	
496	D5191	13.79		0.11	
862	D5191	13.290	G(0.01)	-3.62	
1017	EN13016	13.88		0.79	
1033	IP394	9.427	G(0.01)	-32.47	
1047	D5191	13.726		-0.36	
1059	D5191	13.942		1.25	
1080	D5191	13.59		-1.38	
1081	D5191	13.79		0.11	
1124	EN13016	13.75		-0.19	
1201		-----		-----	
1203	EN13016	13.760		-0.11	
1218	EN13016	13.8221		0.35	
1251	D5191	13.81		0.26	
1300	D5191	13.8366		0.46	
1419	EN13016	13.822		0.35	
1538	EN13016	13.6735		-0.76	
1634	EN13016	13.809		0.26	
1810	D5191	13.14	G(0.01)	-4.74	
1811	D5191	13.59	C	-1.38	First reported 13.28

normality	OK
n	21
outliers	3
mean (n)	13.775
st.dev. (n)	0.0846
R(calc.)	0.237
R(D5191:07)	0.375

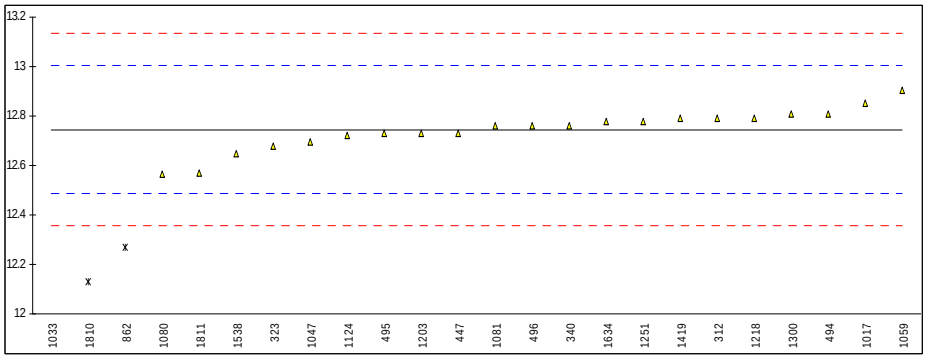


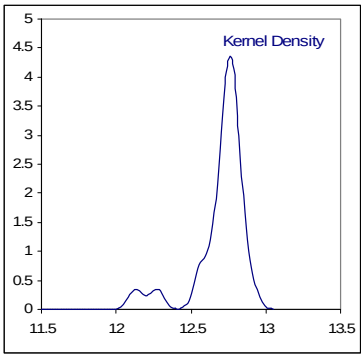


Determination of DVPE (ASTM D5191 calculation) on sample #1045; results in psi

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312	D5191	12.79		0.34	
323	D5191	12.68		-0.50	
340	D5191	12.76		0.11	
447	D5191	12.73		-0.12	
494	D5191	12.81		0.50	
495	D5191	12.73		-0.12	
496	D5191	12.76		0.11	
862	D5191	12.270	G(0.01)	-3.65	
1017	EN13016	12.85		0.80	
1033	IP394	8.549	G(0.01)	-32.24	
1047	D5191	12.696		-0.38	
1059	D5191	12.906		1.24	
1080	D5191	12.566		-1.38	
1081	D5191	12.76		0.11	
1124	EN13016	12.72		-0.19	
1201		-----		-----	
1203	EN13016	12.730		-0.12	
1218	EN13016	12.7901		0.34	
1251	D5191	12.78		0.27	
1300	D5191	12.8069		0.47	
1419	EN13016	12.790		0.34	
1538	EN13016	12.6469		-0.76	
1634	EN13016	12.778		0.25	
1810	D5191	12.13	G(0.01)	-4.73	
1811	D5191	12.57	C	-1.35	First reported 12.27

normality	OK
n	21
outliers	3
mean (n)	12.745
st.dev. (n)	0.0819
R(calc.)	0.229
R(D5191:07)	0.364

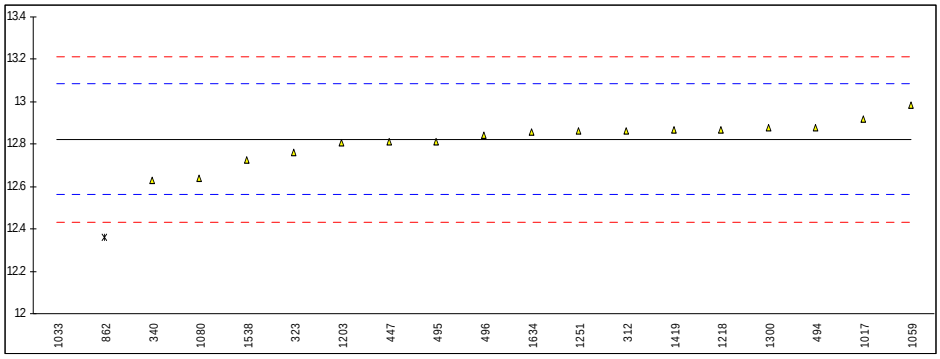


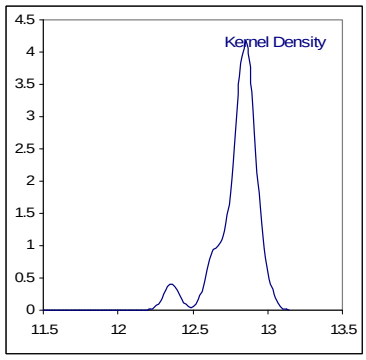


Determination of DVPE (EPA calculation) on sample #1045; results in psi

lab	method	value	mark	z(targ)	remarks
237		-----		-----	
311		-----		-----	
312	D5191	12.86		0.28	
323	D5191	12.76		-0.48	
340	D5191	12.63		-1.48	
447	D5191	12.81		-0.10	
494	D5191	12.88		0.44	
495	D5191	12.81		-0.10	
496	D5191	12.84		0.13	
862	D5191	12.358	G(0.01)	-3.57	
1017	EN13016	12.92		0.74	
1033	IP394	8.665	G(0.01)	-31.87	
1047		-----		-----	
1059	D5191	12.982		1.22	
1080	D5191	12.64		-1.40	
1081		-----		-----	
1124		-----		-----	
1201		-----		-----	
1203	EPA	12.808		-0.12	
1218	EN13016	12.8673		0.34	
1251	D5191	12.86		0.28	
1300	D5191	12.8794		0.43	
1419	EN13016	12.867		0.34	
1538	EN13016	12.7249		-0.75	
1634	EN13016	12.855		0.24	
1810		-----		-----	
1811		-----		-----	

normality	OK
n	17
outliers	2
mean (n)	12.823
st.dev. (n)	0.0915
R(calc.)	0.256
R(D5191:07)	0.365





APPENDIX 2:

Z-scores of Distillation ASTM D86

lab	method	IBP	10%eva	50%eva	90%eva	FBP
237		-----	-----	-----	-----	-----
311	ISO3405-A	-0.65	-0.48	-0.40	-0.10	-0.15
312	ISO3405-A	-0.41	0.03	0.54	0.16	0.32
323	ISO3405-A	-0.18	-0.31	0.07	-0.51	0.35
335		-----	-----	-----	-----	-----
340	ISO3405-A	0.13	0.14	0.54	0.36	-1.00
447	ISO3405-A	-0.65	-0.48	-0.14	0.21	0.13
494	ISO3405-A	-0.57	-0.54	-0.14	-0.25	-0.50
495	ISO3405-A	-1.11	0.03	0.44	0.06	0.00
496	ISO3405-A	0.67	-0.14	-0.66	-0.25	0.38
862	D86-A	-0.84	-0.08	-0.66	-0.51	0.38
1017	ISO3405-A	0.32	0.72	1.59	0.67	1.14
1033	IP123-A	0.32	0.03	0.34	0.52	-0.25
1047	ISO3405-A	1.37	-0.14	0.02	0.26	-0.09
1059	ISO3405-A	-0.10	-0.26	0.28	-0.05	0.48
1080	ISO3405-A	0.01	0.20	-1.08	-0.20	-1.63
1081	D86-A	-0.69	-0.26	-0.08	-0.51	0.26
1121	IP123-M	-1.04	0.32	-0.97	-0.05	-1.57
1124	ISO3405-A	-0.06	-0.26	-0.66	0.06	0.73
1126	InHouse-A	-0.22	-2.83	8.13	1.34	2.08
1201	D86-A	0.44	7.92	22.89	5.47	4.82
1203	ISO3405-A	0.01	1.12	0.28	0.57	-0.18
1205		-----	-----	-----	-----	-----
1218	ISO3405-A	0.17	-0.60	-0.29	-0.05	0.26
1251	D86-A	0.48	7.97	22.84	5.26	4.98
1300	ISO3405-A	1.49	-0.20	0.96	-0.31	0.38
1419	ISO3405-A	0.83	1.12	1.64	1.50	0.79
1538	ISO3405-A	0.21	-0.08	-0.55	0.11	-0.75
1631	ISO3405-A	0.75	-0.08	-0.08	0.16	1.07
1634	D86-A	-0.34	-0.20	-0.45	0.00	-0.03
1706	ISO3405-A	-0.06	0.26	-0.40	0.16	0.82
1810	ISO3405-A	-1.04	-0.54	-0.55	-0.31	-0.66
1811	ISO3405-A	0.75	0.72	0.39	-0.20	-0.69

APPENDIX 3

Number of participants per country

1 laboratory in	AUSTRIA
3 laboratories in	BELGIUM
2 laboratories in	CZECH REPUBLIC
1 laboratory in	ESTONIA
2 laboratories in	FRANCE
3 laboratories in	GERMANY
2 laboratories in	HUNGARY
1 laboratory in	IRELAND
1 laboratory in	LATVIA
1 laboratory in	NIGERIA
1 laboratory in	P.R. of CHINA
2 laboratories in	POLAND
1 laboratory in	PORTUGAL
1 laboratory in	SLOVAK REPUBLIC
1 laboratory in	SLOVENIA
6 laboratories in	THE NETHERLANDS
1 laboratory in	TURKEY
3 laboratories 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

Literature:

1	iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, January 2010
2	ASTM E178-02
3	ASTM E1301-03
4	ISO 5725-86
5	ISO 5725, parts 1-6, 1994
6	ISO13528-05
7	M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
8	W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
9	IP 367/84
10	DIN 38402 T41/42
11	P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
12	J.N. Miller, Analyst, 118, 455, (1993)
13	Analytical Methods Committee Technical Brief, No4 January 2001
14	The Royal Society of Chemistry 2002, Analyst 2002, 127 page1359-1364, P.J. Lowthian and M. Thompson. (see http://www.rsc.org/suppdata/an/b2/b205600n/)
15	H. Verplaetse and M. Lacourt, Accred Qual Assur (2006) 11:521-522