

Results of Proficiency Test
Naphtha
March 2012

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1994, the Institute for Interlaboratory Studies organizes a proficiency test for the analysis of Naphtha every year. The interlaboratory study on Naphtha of March 2012 was extended with PT's for the determination for Mercury, Arsenic/Lead and Vapour Pressure. In the main PT, 82 laboratories in 35 different countries have participated; in the PT for Mercury, 39 laboratories in 19 different countries have participated; in the PT for Arsenic and Lead, 22 laboratories in 13 different countries have participated and in the PT for Vapour Pressure, 39 laboratories in 20 different countries have participated. See appendix 4 for the number of participants per country. In this report, the results of the proficiency test are presented and discussed.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkensisse, the Netherlands, was the organizer of this proficiency test. Sample analyses for fit-for-use and homogeneity testing were subcontracted. In this proficiency test, the participants received, depending on the registration, from one upto seven different samples of Naphtha, see table below.

Samples	Amount in mL	Purpose
#12041	1000	For regular analysis
#12042	100	For GC analysis
#12043, #12044	500	For Mercury
#12045, #12046	500	For Arsenic and Lead
#12047	± 800	For DVPE

table 1: Seven different Naphtha samples used in iis12N01

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 Spijkensisse, the Netherlands, is accredited in agreement with ISO/IEC 17043:2010 and ILAC-G13:2007, (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This ensures strict adherence to protocols for sample preparation and statistical evaluation and 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. The participants were asked to report the analytical results using the indicated units on the report form.

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

One drum with approx. 200 litres Naphtha was obtained from a local refinery. Seven different samples were prepared. After homogenisation 108 brown glass bottles of 0.5 litre were filled (labelled #12041) and 59 brown glass bottles of 1 litre filled with approx. 800 mL Naphtha (labelled #12047). The remaining Naphtha was used as shown in the table below. After homogenisation, the typical batches were filled in brown glass bottles of 100 mL and labelled.

	Naphtha intake	Spike intake	Theoretical conc. µg/kg
Sample #12042			
Methanol	7.55 kg	66.2 mg	8.8 mg/kg
Methyl tert-butyl ether (MTBE)		178.8 mg	23.7 mg/kg
Sample #12043			
HgCl ₂ (123.3 mg Hg/L)	22.2 kg	9.0 mg	50.0 µg/kg
Conostan (100 mg Hg/kg)		9.5 mg	42.9 µg/kg
Gascondensate (>0.66 mg/kg)		0 mg	0 µg/kg
Sample #12044			
HgCl ₂ (123.3 mg Hg/L)	22.1 kg	27 mg	151 µg/kg
Conostan (100 mg Hg/kg)		0 mg	0 µg/kg
Gascondensate (± 0.66 mg/kg)		3300 g	± 99 µg/kg
Sample #12045			
Conostan (1000 mg Pb/kg)	15.0 kg	1.01 g	67.1 µg/kg
Conostan (100 mg As/kg)		5.74 g	38.3 µg/kg
Sample #12046			
Conostan (1000 mg Pb/kg)	15.0 kg	3.01 g	200.5 µg/kg
Conostan (100 mg As/kg)		17.25 g	115.0 µg/kg

table 2: Addition scheme for samples #12042, #12043, #12044, #12045 and #12046

The homogeneity of subsamples #12041 was checked by determination of Density at 15°C in accordance with ASTM D4052:11 on 8 stratified randomly selected samples.

	Density @ 15°C in kg/L		Density @ 15°C in kg/L
sample #12041-1	0.73360	sample #12041-5	0.73360
sample #12041-2	0.73361	sample #12041-6	0.73361
sample #12041-3	0.73360	sample #12041-7	0.73364
sample #12041-4	0.73360	sample #12041-8	0.73362

table 3: homogeneity test results of subsamples #12041

The homogeneity of subsamples #12042 was checked by determination MTBE in accordance with an in-house method on 8 stratified randomly selected samples.

	MTBE in mg/kg		MTBE in mg/kg
sample #12042-1	25	sample #12042-5	24
sample #12042-2	25	sample #12042-6	25
sample #12042-3	25	sample #12042-7	24
sample #12042-4	25	sample #12042-8	24

table 4: homogeneity test results of subsamples #12042

The homogeneity of the subsamples #12043 and #12044 was checked by determination of Mercury in accordance with test method UOP938 on 4 stratified randomly selected samples from each batch.

	Mercury in µg/kg		Mercury in µg/kg
sample #12043-1	127	sample #12044-1	161
sample #12043-2	124	sample #12044-2	159
sample #12043-3	123	sample #12044-3	149
sample #12043-4	120	sample #12044-4	136

table 5: homogeneity test results of subsamples #12043 and #12044

The homogeneity of the subsamples #12045 and #12046 was checked by determination of Lead in accordance with an in-house test method on 4 stratified randomly selected samples from each batch.

	Lead in µg/kg	Arsenic in µg/kg
sample #12045-1	57	20
sample #12045-2	57	22
sample #12045-3	57	22
sample #12045-4	51	20
sample #12046-1	148	70
sample #12046-2	155	77
sample #12046-3	147	72
sample #12046-4	144	70

table 6: homogeneity test results of subsamples #12045 and #12046

The homogeneity of subsamples #12047 was checked by determination of DVPE in accordance with ASTM D5191:10b on 4 stratified randomly selected samples.

	DVPE in kPa
sample #12047-1	34.5
sample #12047-2	34.3
sample #12047-3	34.4
sample #12047-4	34.5

table 7: homogeneity test results of subsamples #12047

From the results in tables 3 - 7, the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities of the target methods or with 0.3 times the reproducibility calculated using the Horwitz equation in agreement with the procedure of ISO 13528, Annex B2 in the next table;

	Density in kg/L	MTBE in mg/kg	Mercury in µg/kg	Lead in µg/kg	Arsenic in µg/kg	DVPE in kPa
r (#12041)	0.00004	--	--	--	--	--
r (#12042)	--	1.4	--	--	--	--
r (#12043)	--	--	8	--	--	--
r (#12044)	--	--	32	--	--	--
r (#12045)	--	--	--	8.4	3.2	--
r (#12046)	--	--	--	13.0	9.3	--
r (#12047)	--	--	--	--	--	0.27
0.3*R (ref.)	0.00015	2.0	23 - 32	11.5 – 26.6	5.0 – 14.4	0.60
reference	D4052:11	Horwitz	Horwitz	Horwitz	Horwitz	D5191:10b

table 8: repeatabilities of subsamples #12041, #12042, #12043, #12044, #12045, #12046 and #12047

The repeatabilities of the results of the homogeneity tests for samples #12041, #12042, #12043, #12044, #12045, #12046 and #12047 are all in agreement with the requirements of standards or with the estimated repeatabilities calculated using the Horwitz equation. Therefore, homogeneity of all prepared subsamples was assumed.

To the participating laboratories, depending on its registration, 1 - 7 brown glass bottles (1*0.5 litre labelled #12041, 6*100 mL labelled #12042, #12043, #12044, #12045, #12046 and/or 1*800 mL labelled #12047) were sent on March 14, 2012.

2.5 STABILITY OF THE SAMPLES

The stability of the naphtha, packed in the brown glass bottles, was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were asked to determine on sample #12041 the following analyses: Colour Saybolt, Copper Corrosion 3hrs @ 50°C, Density @15°C, Distillation (IBP, 50% evaporated and FBP), Mercaptans and Sulphur. On sample #12042 the participants were requested to determine PONA / PIONA / PNA (n-Paraffines, i-Paraffines, Olefins,

Naphthenes, Aromatics, C₄ & lighter hydrocarbons and Compounds with Boiling Point > 200°C), Methanol, MTBE, Organic Chlorides and Total Oxygenates.

On samples #12043 and #12044 the participants were requested to determine Mercury. On samples #12045 and #12046 the participants were requested to determine Arsenic and Lead.

On sample #12047 the participants were requested to determine only TVP / DVPE.

To get comparable results a detailed report form, on which the units were prescribed as well as some of the required standards and a letter of instructions were prepared and made available for download on the iis website.

A SDS and a form to confirm receipt of the samples were added to the sample 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 the appendix 1 of this report. The laboratories are presented by their code numbers.

Directly after deadline, a reminder fax was sent to those laboratories that had not yet reported. 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 (raw data of the) reported results. Additional or corrected results have been used for data analysis and the 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 Organization, 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 conclusions of statistical evaluation should be used with due care.

In accordance with 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. For each assigned value, the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with

ISO13528. When the uncertainty passed the evaluation, no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

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 cross. Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. This method is 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. This results in an evaluation independent of the spread of this interlaboratory study.

The target standard deviation was calculated from the literature reproducibility by division with 2.8. The z-scores were calculated according to:

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

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

When a laboratory did use a test method with a reproducibility that is significantly different from the reproducibility of the reference test method used in this report, it is strongly advised to recalculate the z-score, while using the reproducibility of the actual test method used, this in order to evaluate the fit-for-useness of the reported test result.

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
$ z > 3$	unsatisfactory

4 EVALUATION

In this interlaboratory study, major problems with sample despatch were encountered during the execution. Laboratories in Argentina, Australia, Azerbaijan, Brazil, Côte D'Ivoire, Greece, India, Iran, Israel, Malaysia, Mexico, Nigeria, Qatar, Russia, Saudi Arabia, U.A.E. and Ukraine received the samples late or not at all due to several problems (i.e. courier, customs clearance).

Most laboratories reported results, but not all laboratories were able to perform all the requested analyses. Finally, in total 71 participants reported 1147 numerical results. Observed were in total 75 outlying results, which is 6.5%. In proficiency studies, outlier percentages of 3 % - 7.5 % are quite normal.

Not all original data sets proved to have a normal distribution. Not normal distributions were found:

On sample #12041 for Colour Saybolt, Density @15°C and Mercaptans; on sample #12042 for Olefins (%V/V and %M/M), Naphthenes (%V/V and %M/M), Aromatics (%V/V and %M/M) and C1-C4 (%M/M) and on sample #12047 for Total Vapour Pressure.

In these cases, the results of the statistical evaluations should be used with care.

4.1 EVALUATION PER TEST

In this section, the results are discussed per test. The methods, which are used by the various laboratories, are taken into account for explaining the observed differences when possible and applicable. These methods are also listed in the tables together with the original data in appendix 1. The abbreviations, used in these tables, are listed in appendix 3.

Evaluation for sample #12041:

Colour Saybolt: This determination was not problematic (both the manual and the automated mode). No statistical outliers were observed and both calculated reproducibilities are in full agreement with the respective requirements of ASTM D156:07a and ASTM D6045:09.

Copper Corrosion: No problems have been observed. All reporting participants agreed on a result of 1.

Density @ 15°C: This determination was not problematic. Only two statistical outliers were observed and the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D4052:11 and the previous version D4052:02e1.

Distillation: For the automated mode: This determination was problematic for a number of laboratories. In total three statistical outliers were observed. The calculated reproducibility of IBP is not in agreement with the requirements of ASTM D86:11a, but the calculated reproducibilities of 50% evaporated and FBP do meet the requirements, after rejection of the statistical outliers.

For the manual mode: This determination was problematic. In total only one statistical outlier was observed. However, the calculated reproducibilities of IBP and FBP after rejection of the statistical outlier are not in agreement with the requirements of ASTM D86:11a. But, the calculated reproducibility for 50% recovered is in good agreement with the respective requirements of ASTM D86:11a.

Mercaptans: This determination was problematic. Three statistical outliers were observed. The calculated reproducibility, after rejection of the statistical outliers, is not in agreement with the requirements of ASTM D3227:10.

Sulphur: This determination was problematic. Three statistical outliers were observed. The calculated reproducibility, after rejection of the statistical outliers, is not in agreement with ASTM D2622:10.

Evaluation for sample #12042:

Methanol: This determination was very problematic at this low concentration level of 12 mg/kg. The sample was spiked with Methanol, therefore the minimal Methanol concentration to be found was known (added amount = 8.8 mg/kg). Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not at all in agreement with the strict estimated reproducibility calculated using the Horwitz equation. The average recovery of Methanol (theoretical increment of 8.8 mg Methanol/kg) may be good: "less than 140%" (the actual blank Methanol content is unknown). The variety of test methods used may explain for the relatively large spread.

MTBE: This determination was problematic at the concentration level of 25 mg/kg. The samples were spiked with MTBE, therefore the minimal MTBE concentration to be found was known (added amount = 23.7 mg/kg). Only one statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the strict estimated reproducibility calculated using the Horwitz equation. The average recovery of MTBE (theoretical increment of 23.7 mg MTBE/kg) may be good: "less than 106%" (the actual blank MTBE content is unknown). The variety of test methods used may explain for the relatively large spread.

Total Oxygenates: This determination was problematic. No statistical outliers were observed.

The calculated reproducibility is not in agreement with the very strict estimated reproducibility, calculated using the Horwitz equation. The variety of test methods used may explain for the relatively large spread.

PONA/PIONA: This determination is only for Aromatics and C1-C4 lights not problematic. For the (n- and i-) Paraffines and Naphthenes, the calculated reproducibilities are not in agreement with the requirements of ASTM D5443:09e1. Regretfully, for Olefins no suitable test method with precision data exists. Most reproducibilities are in agreement with the reproducibilities in previous rounds:

	2012	2011	2010	2009	2008	ASTM
n-paraffines	5.7%	6.8%	5.1%	3.0%	5.7%	2.7%
i-paraffines	4.0%	5.4%	4.0%	2.9%	6.8%	2.8%
Olefins	259% *)	271% *)	220% *)	26%	190% *)	Unknown
naphthenes	5.9%	13%	10%	5.9%	9.1%	2.5%
aromatics	8.8%	5.7%	12%	13%	9.2%	15%
C4 lights	19%	27%	38%	49%	110% *)	19%

table 9: Comparison of relative reproducibilities (%M/M) with previous rounds

*) low concentrations

As in previous rounds, in this round robin again many participants did have problems with Naphthenes. Several laboratories reported to have used ASTM D5134, a test method that is in principle only applicable for Naphthas that do not contain any C9+. It is unknown how the amount of the fraction C9+ was treated by the laboratores (divided over the reported test results?). Some other laboratories reported to have used ASTM D6293, a test method that is in principle applicable for gasolines.

Also, it is remarkable to find that a number of laboratories did not report normalized test results. For one laboratory (1603) the sum of n-, i-paraffines, olefines, naphthenes and aromatics was >100%.

Evaluation for sample #12043 and #12044:

In this proficiency test, it was decided to spike the samples #12043 and #12044 on two different concentration levels of mercury.

Mercury:

This determination was not problematic. In total, three statistical outliers were observed and five laboratories mixed up the reported results of the two samples, probably caused by the text on the bottle labels.

Regretfully, besides the reference test method UOP938:10 (that does not provide reproducibility data, except for method B), no other reference method exists. When the calculated reproducibilities are compared with the estimated reproducibilities calculated using the Horwitz equation, the calculated reproducibilities are both in full agreement. The samples were spiked with Mercury, therefore the minimal Mercury concentration of sample #12043 to be found was known (added amount (#12043) = 92.9 µg/kg). The average

recovery of Mercury (theoretical increment of 92.9 mg Hg /kg) may be good: "less than 105%" for sample #12043.

Evaluation for sample #12045 and #12046:

In this proficiency test, it was decided to spike the samples #12045 and #12046 on two different concentration levels of arsenic and lead.

Arsenic: This determination was problematic. Arsenic was spiked in two different and measurable concentration levels (38 and 115 µg/kg). Regretfully, almost none of the reporting laboratories reported positive results. Therefore no conclusions were drawn.

Lead: This determination was problematic. Lead was spiked in two different and measurable concentration levels (67 and 201 µg/kg). Regretfully, almost none of the reporting laboratories reported positive results. Therefore no conclusions were drawn.

Evaluation for sample #12047:

TVP: This determination was problematic. Only one statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is not in agreement with the estimated requirements of ASTM D5191:10b.

DVPE: The conversion of the measured Total Vapour Pressure to the corresponding Dry Vapour Pressure Equivalent (DVPE) as described in the ASTM D5191:10b, showed one statistical outlier. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D5191:10b.

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 the laboratories that participated.

The reproducibilities derived from literature standards (in casu ASTM standards) and the calculated reproducibilities of the samples (see appendix 1) are compared in the next table.

Parameters	unit	n	average	2.8 * sd	R (lit)
Colour Saybolt (manual)		42	29.7	1.7	2.0
Colour Saybolt (automated)		14	30.0	0.0	1.2
Copper Corrosion		53	1(a)	n.a.	n.a.
Density @ 15°C	kg/L	69	0.7337	0.0005	0.0025
Initial Boiling Point (auto)	°C	46	43.62	7.76	5.64
50% evaporated (auto)	°C	46	104.99	1.57	1.88
Final Boiling Point (auto)	°C	43	161.36	4.47	6.78
Initial Boiling Point (manual)	°C	13	44.76	8.40	5.60
50% evaporated (manual)	°C	14	104.84	2.04	4.07
Final Boiling Point (manual)	°C	13	162.85	9.01	7.20
Mercaptans	mg/kg	43	18.32	4.54	3.87
Sulphur	mg/kg	49	46.91	11.06	9.34

Table 10: comparison of the observed and target reproducibilities of the samples #12041

Parameters	unit	n	average	2.8 * sd	R (lit)
Methanol	mg/kg	21	12.36	6.05	3.79
MTBE	mg/kg	27	25.23	9.03	6.95
Total Oxygenates	%M/M	14	0.0042	0.0018	0.0015
n-Paraffins	%V/V	38	32.28	1.85	0.97
i-Paraffins	%V/V	37	35.53	1.41	1.01
Olefins	%V/V	30	0.14	0.37	n.a.
Naphthenes	%V/V	33	23.53	1.39	0.53
Aromatics	%V/V	38	8.64	0.76	0.82
C ₄ & lighter	%V/V	31	1.17	0.22	0.19
Compounds bp > 200 °C	%V/V	9	0.06	0.15	n.a.
n-Paraffins	%M/M	36	30.28	1.77	0.94
i-Paraffins	%M/M	37	33.75	1.81	0.99
Olefins	%M/M	30	0.16	0.46	n.a.
Naphthenes	%M/M	32	25.36	1.55	0.55
Aromatics	%M/M	36	10.52	0.98	0.91
C ₄ & lighter	%M/M	30	0.94	0.19	0.16
Compounds bp > 200 °C	%M/M	9	0.06	0.15	n.a.

Table 11: comparison of the observed and target reproducibilities of the sample #12042

Parameters	unit	n	average	2.8 * sd	R (lit)
Mercury as Hg #12043	µg/kg	23	97.91	62.62	62.23
Mercury as Hg #12044	µg/kg	25	245.3	146.9	135.8

Table 12: comparison of the observed and target reproducibilities of the samples #12043 and #12044

Parameters	unit	n	average	2.8 * sd	R (lit)
Arsenic as As #12045	µg/kg	9	<10	n.a.	n.a.
Arsenic as As #12046	µg/kg	8	18.3	n.a.	n.a.
Lead as Pb #12045	µg/kg	13	<10	n.a.	n.a.
Lead as Pb #12046	µg/kg	12	18.5	n.a.	n.a.

Table 13: comparison of the observed and target reproducibilities of the samples #12045 and #12046

Parameters	unit	n	average	2.8 * sd	R (lit)
TVP	psi	25	5.78	0.36	0.29
DVPE	psi	30	5.01	0.39	0.29

Table 14: comparison of the observed and target reproducibilities of the sample #12047

Without further statistical calculations, it can be concluded that for many tests there is not a reasonable compliance of the group of participating laboratories with the relevant standards. The problematic tests have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF APRIL 2012 WITH PREVIOUS PTS

	April 2012	April 2011	April 2010	April 2009
Number of reporting labs	71	72	75	88
Number of results reported	1147	1892	1294	1113
Statistical outliers	75	120	57	106
Percentage outliers	6.5%	6.3%	4.4%	9.5%

Table 15: comparison with previous proficiency tests

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	April 2012	April 2011	April 2010	April 2009
Colour Saybolt	++	--	++	++
Density @ 15°C	++	++	++	++
Distillation automated	+	+/-	+	++
Distillation manual	-	++	++	++
Mercaptans	--	+/-	--	--
Sulphur	--	--	--	--
Methanol	--	--	--	--
Methyl tert-butyl ether (MTBE)	--	--	++	--
Total Oxygenates	-	--	--	--
n-Paraffins	--	--	--	--
i-Paraffins	--	--	--	--
Naphthenes	--	--	--	--
Aromatics	+	++	++	+
C ₄ & lighter	+/-	--	--	--
Mercury	+	++	--	n.e.
Arsenic	n.e.	--	++	n.e.
Lead	n.e.	--	--	n.e.
Total Vapour Pressure	--	++	++	+/-
DVPE acc. to D5191	--	++	++	+/-

Table 16: comparison determinations against the standard requirements

* Results between brackets were below or near the application range of the method, therefore the results should be evaluated with care

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

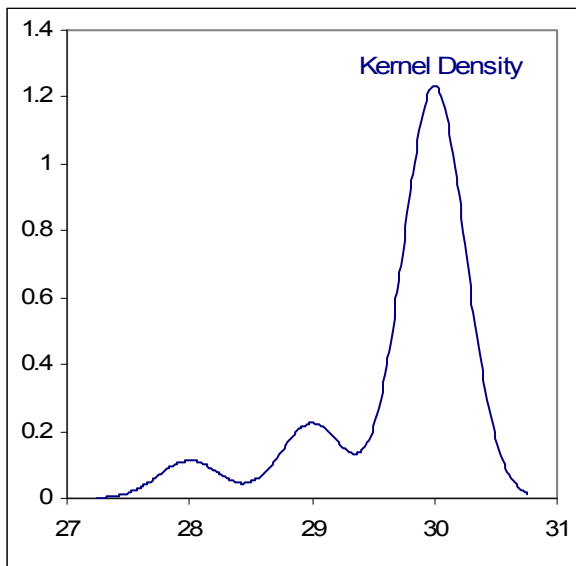
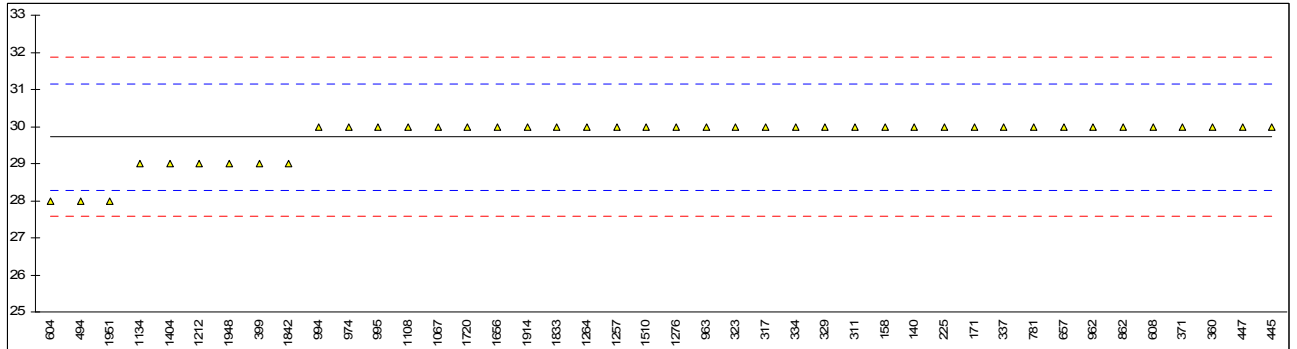
- ++: group performed much better than the standard
- + : group performed better than the standard
- +/-: group performance equals the standard
- : group performed worse than the standard
- : group performed much worse than the standard
- n.e.: not evaluated

APPENDIX 1**Determination of Colour Saybolt (Manual) on sample #12041**

lab	method	value	mark	z(targ)	remarks
140	D156	+30		0.40	
150		----		----	
158	D156	+30		0.40	
171	D156	+30		0.40	
225	D156	+30		0.40	
237		----		----	
238		----		----	
311	D156	+30		0.40	
317	D156	+30		0.40	
323	D156	+30		0.40	
329	D156	+30		0.40	
333		----		----	
334	D156	+30		0.40	
337	D156	+30		0.40	
360	D156	30		0.40	
371	D156	+30		0.40	
399	D156	+29		-1.00	
444		----		----	
445	D156	+30		0.40	
447	D156	+30		0.40	
494	D156	+28		-2.40	
495		----		----	
529		----		----	
541		----		----	
604	D156	+28		-2.40	
608	D156	+30		0.40	
657	D156	+30		0.40	
704		----		----	
759		----		----	
781	D156	+30		0.40	
784		----		----	
855		----		----	
862	D156	+30		0.40	
868		----		----	
873		----		----	
875		----		----	
912		----		----	
962	D156	+30		0.40	
963	D156	+30		0.40	
974	D156	+30		0.40	
982		----		----	
994	D156	+30		0.40	
995	D156	+30		0.40	
1011		----		----	
1016	D156	>+30		----	
1038		----		----	
1065		----		----	
1066		----		----	
1067	D156	+30		0.40	
1081	D156	>30		----	
1108	D156	30		0.40	
1134	D156	+29		-1.00	
1145		----		----	
1167	D156	>+30		----	
1200		----		----	
1212	D156	+29		-1.00	
1257	D156	+30		0.40	
1264	D156	+30		0.40	
1276	D156	+30		0.40	
1284		----		----	
1291		----		----	
1307		----		----	
1404	D156	29		-1.00	
1427	D156	>+30		----	
1429		----		----	
1477		----		----	
1510	D156	+30		0.40	
1603		----		----	
1616		----		----	
1653		----		----	
1656	D156	+30		0.40	
1720	D156	+30		0.40	
1737		----		----	
1833	D156	30		0.40	
1842	D156	+29		-1.00	

1914	D156	+30	0.40
1948	D156	29	-1.00
1951	D156	+28	-2.40
9054		----	----
9057		----	----
9058		----	----
9061		----	----

normality not OK
n 42
outliers 0
mean (n) 29.71
st.dev. (n) 0.596
R(calc.) 1.67
R(D156:07a) 2.00

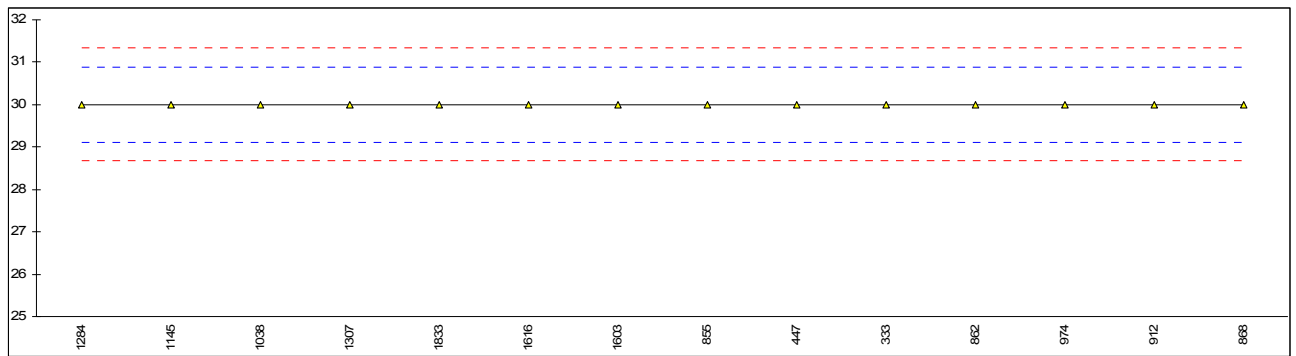


Determination of Colour Saybolt (Automated) on sample #12041

lab	method	value	mark	z(targ)	remarks
140		----		----	
150	D5950	>30		----	
158		----		----	
171		----		----	
225		----		----	
237		----		----	
238		----		----	
311		----		----	
317		----		----	
323		----		----	
329		----		----	
333	D5950	30+		0.00	
334		----		----	
337		----		----	
360		----		----	
371		----		----	
399		----		----	
444	D6045	>30+		----	
445		----		----	
447	D5950	30+		0.00	
494		----		----	
495		----		----	
529		----		----	
541		----		----	
604		----		----	
608		----		----	
657		----		----	
704		----		----	
759		----		----	
781		----		----	
784		----		----	
855	D6045	30+		0.00	
862	D6045	30+		0.00	
868	D6045	30+		0.00	
873		----		----	
875		----		----	
912	D6045	30+		0.00	
962		----		----	
963		----		----	
974	D6045	30+		0.00	
982		----		----	
994		----		----	
995		----		----	
1011		----		----	
1016		----		----	
1038	D6045	30+		0.00	
1065		----		----	
1066		----		----	
1067		----		----	
1081		----		----	
1108		----		----	
1134		----		----	
1145	D156	30+		0.00	
1167		----		----	
1200		----		----	
1212		----		----	
1257		----		----	
1264		----		----	
1276		----		----	
1284	D6045	30+		0.00	
1291		----		----	
1307	D6045	30		0.00	
1404		----		----	
1427		----		----	
1429	D6045	>30+		----	
1477		----		----	
1510		----		----	
1603	in house	30		0.00	
1616	D6045	30+		0.00	
1653		----		----	
1656		----		----	
1720		----		----	
1737		----		----	
1833	D5950	30		0.00	
1842		----		----	

1914	----	----
1948	----	----
1951	----	----
9054	----	----
9057	----	----
9058	----	----
9061	----	----

normality	unknown
n	14
outliers	0
mean (n)	30.0 (30+)
st.dev. (n)	0.00
R(calc.)	0.0
R(D6045:09)	1.2



Determination of Copper Corrosion, 3hrs at 50°C on sample #12041

lab	method	value	mark	z(targ)	remarks
140	D130	1a		----	
150	D130	1a		----	
158	D130	1a		----	
171	D130	1a		----	
225	D130	1a		----	
237		----		----	
238		----		----	
311	D130	1a		----	
317	D130	1a		----	
323	D130	1a		----	
329		----		----	
333		----		----	
334		----		----	
337		----		----	
360	D130	1a		----	
371	D130	1a		----	
399	D130	1a		----	
444		----		----	
445	D130	1a		----	
447	D130	1a		----	
494	D130	1		----	
495	D130	1a		----	
529		----		----	
541	D130	1a		----	
604		----		----	
608	D130	1a		----	
657	D130	1		----	
704		----		----	
759		----		----	
781	D130	1a		----	
784		----		----	
855	D130	1a		----	
862	D130	1a		----	
868	D130	1a		----	
873		----		----	
875		----		----	
912	D130	1a		----	
962	D130	1a		----	
963	D130	1a		----	
974	D130	1a		----	
982		----		----	
994	D130	1a		----	
995	D130	1a		----	
1011		----		----	
1016	D130	1a		----	
1038	D130	1a		----	
1065		----		----	
1066		----		----	
1067	D130	1a		----	
1081	D130	1a		----	
1108	D130	1a		----	
1134	D130	1a		----	
1145		----		----	
1167	ISO2160	1a		----	
1200		----		----	
1212	D130	1a		----	
1257	D130	1a		----	
1264	D130	1a		----	
1276	D130	1a		----	
1284		----		----	
1291		----		----	
1307	D130	1a		----	
1404	D130	1a		----	
1427	D130	1a		----	
1429	D130	1a		----	
1477		----		----	
1510	D130	1a		----	
1603	in house	1a		----	
1616	D130	1a		----	
1653		----		----	
1656	D130	1a		----	
1720		----		----	
1737		----		----	
1833	D130	1a		----	
1842	IP154	1a		----	

1914	D130	1a	----
1948	D130	1a	----
1951	D130	1a	----
9054	D1838	1a	----
9057		----	----
9058		----	----
9061		----	----
	normality	n.a.	
	n	53	
	outliers	0	
	mean (n)	1(1a)	
	st.dev. (n)	n.a.	
	R(calc.)	n.a.	
	R(D130:10)	n.a.	

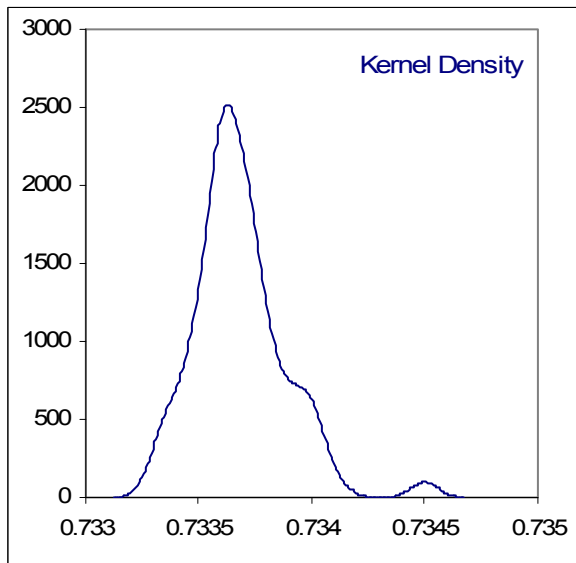
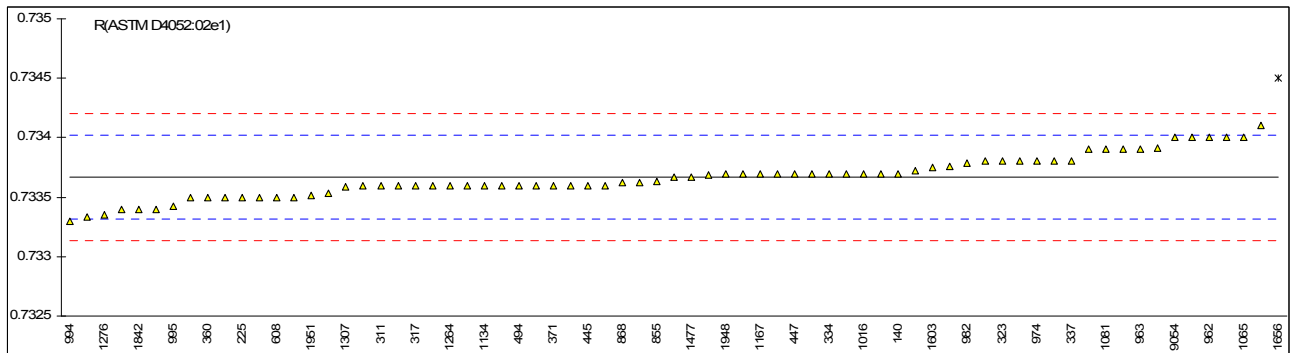
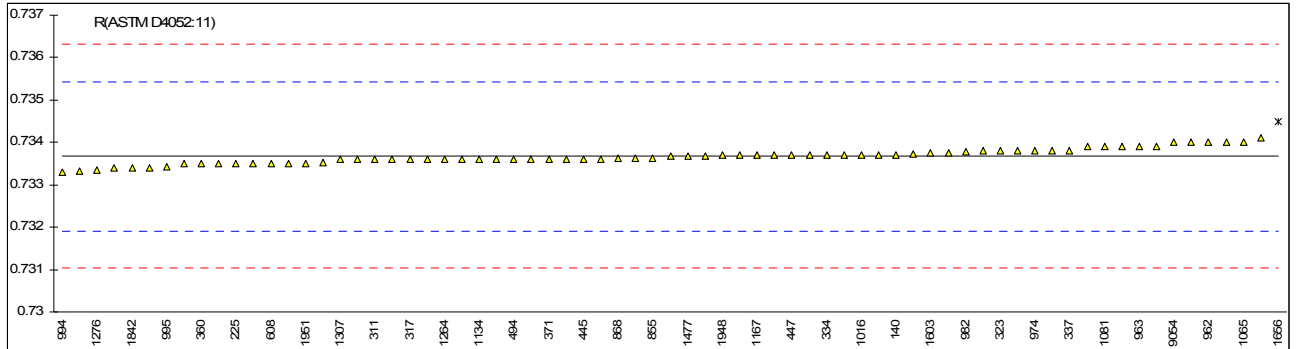
Determination of Density @ 15°C on sample #12041; results in kg/L

lab	method	value	mark	z(targ)	remarks
140	D4052	0.7337		0.04	
150	D4052	0.7338		0.15	
158	D4052	0.7335		-0.19	
171	D4052	0.733335		-0.38	
225	D4052	0.7335		-0.19	
237		----		----	
238		----		----	
311	D4052	0.7336		-0.08	
317	D4052	0.7336		-0.08	
323	D4052	0.7338		0.15	
329	D4052	0.7337		0.04	
333	D4052	0.7335		-0.19	
334	D4052	0.7337		0.04	
337	D4052	0.7338		0.15	
360	D4052	0.7335		-0.19	
371	D4052	0.7336		-0.08	
399	D4052	0.7336		-0.08	
444	D4052	0.73376		0.10	
445	D4052	0.7336		-0.08	
447	D4052	0.7337		0.04	
494	D4052	0.7336	C	-0.08	First reported 733.6
495	D4052	0.7336	C	-0.08	First reported 733.6
529	D4052	0.7336		-0.08	
541	D4052	0.7340		0.38	
604	D5052	0.73369		0.03	
608	D4052	0.7335		-0.19	
657	D4052	0.7337		0.04	
704		----		----	
759		----		----	
781	D4052	0.7337		0.04	
784		----		----	
855	D4052	0.73363		-0.04	
862	D4052	0.73362		-0.05	
868	D4052	0.73362		-0.05	
873		----		----	
875		----		----	
912	D4052	0.7336		-0.08	
962	D4052	0.7340		0.38	
963	D4052	0.7339		0.26	
974	D4052	0.7338		0.15	
982	D4052	0.73379		0.14	
994	D4052	0.7333		-0.42	
995	D4052	0.73342		-0.28	
1011	D4052	0.7339		0.26	
1016	D4052	0.7337		0.04	
1038	D4052	0.7340		0.38	
1065	D4052	0.7340		0.38	
1066		----		----	
1067	D4052	0.73353		-0.16	
1081	ISO12185	0.7339	C	0.26	First reported 733.9
1108	D4052	0.73367		0.00	
1134	IP365	0.7336		-0.08	
1145	D4052	0.7338		0.15	
1167	ISO12185	0.7337	C	0.04	First reported 733.7
1200		----		----	
1212	D4052	0.73370		0.04	
1257	D4052	0.7335		-0.19	
1264	D4052	0.7336		-0.08	
1276	D4052	0.73335		-0.36	
1284	D4052	0.73391		0.27	
1291		----		----	
1307	D4052	0.73359		-0.09	
1404	D4052	0.7335		-0.19	
1427	D4052	0.7336		-0.08	
1429	D4052	0.7336		-0.08	
1477	D4052	0.73367		0.00	
1510	D4052	0.7336		-0.08	
1603	in house	0.73375		0.09	
1616	D4052	0.7337		0.04	
1653		----		----	
1656	D4052	0.7345	G(0.01)	0.95	
1720	D4052	0.7341		0.49	
1737	D4052	0.7339		0.26	
1833	D4052	0.7336		-0.08	
1842	IP365	0.7334		-0.30	

1914	D4052	0.7334		-0.30	
1948	D4052	0.7337	C	0.04	First reported 733.7
1951	D4052	0.73351		-0.18	
9054	D4052	0.7340	C	0.38	First reported 734.0
9057	D4052	0.7338		0.15	
9058	D4052	0.7334		-0.30	
9061	D5002	0.73372		0.06	

normality not OK
n 69
outliers 2
mean (n) 0.73367
st.dev. (n) 0.000175
R(calc.) 0.00049
R(D4052:11) 0.00246

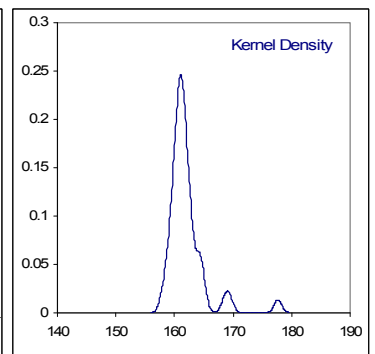
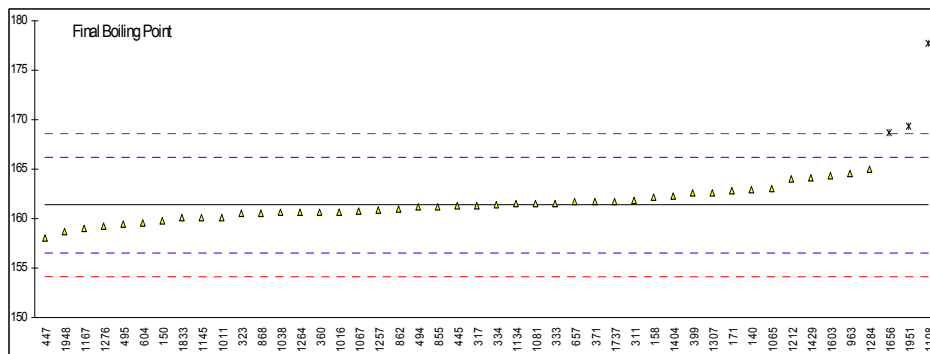
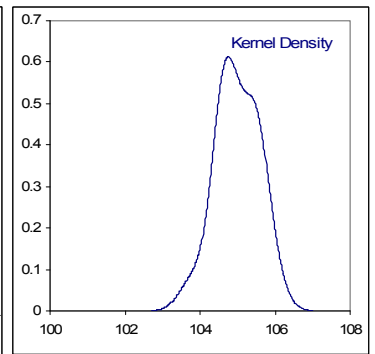
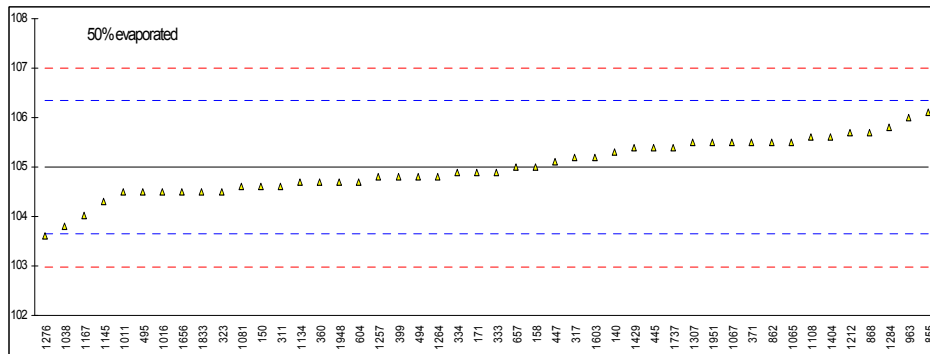
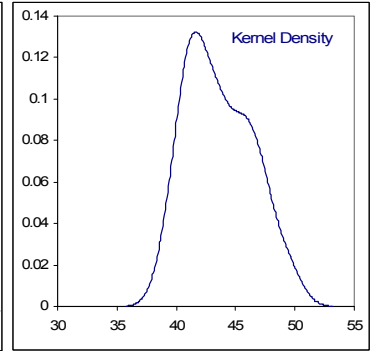
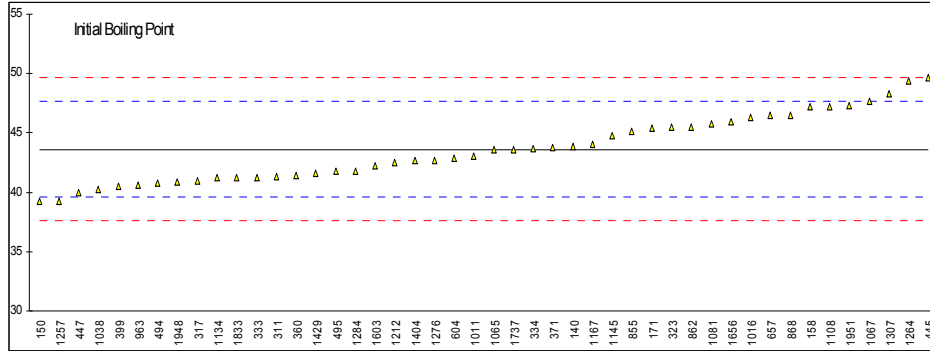
Compare R(D4052:02e1) = 0.00050



Determination of Distillation (automated mode) on sample #12041; results in °C

lab	method	IBP	mark	z(targ)	50%eva.	mark	z(targ)	FBP	mark	z(targ)	Remarks
140	D86-A	43.9		0.14	105.3		0.46	162.9	C	0.63	Fr 166.8
150	D86-A	39.2		-2.20	104.6		-0.59	159.8		-0.65	
158	D86-A	47.2		1.78	105.0		0.01	162.2		0.35	
171	D86-A	45.4		0.88	104.9		-0.14	162.8		0.59	
225		----		----	----		----	----		----	
237		----		----	----		----	----		----	
238		----		----	----		----	----		----	
311	D86-A	41.3		-1.15	104.6		-0.59	161.9		0.22	
317	D86-A	41.0		-1.30	105.2		0.31	161.3		-0.03	
323	D86-A	45.5		0.93	104.5		-0.74	160.5		-0.36	
329		----		----	----		----	----		----	
333	D86-A	41.2		-1.20	104.9		-0.14	161.5		0.06	
334	D86-A	43.7		0.04	104.9		-0.14	161.4		0.02	
337		----		----	----		----	----		----	
360	D86-A	41.4		-1.10	104.7		-0.44	160.6		-0.32	
371	D86-A	43.8		0.09	105.5		0.75	161.7		0.14	
399	D86-A	40.5		-1.55	104.8		-0.29	162.6		0.51	
444		----		----	----		----	----		----	
445	D86-A	49.7		3.02	105.4		0.60	161.3		-0.03	
447	D86-A	40.0		-1.80	105.1		0.16	158.0		-1.39	
494	D86-A	40.8		-1.40	104.8		-0.29	161.2		-0.07	
495	D86-A	41.8		-0.90	104.5		-0.74	159.5		-0.77	
529		----		----	----		----	----		----	
541		----		----	----		----	----		----	
604	D86-A	42.9		-0.36	104.7		-0.44	159.6		-0.73	
608		----		----	----		----	----		----	
657	D86-A	46.5		1.43	105.0		0.01	161.7		0.14	
704		----		----	----		----	----		----	
759		----		----	----		----	----		----	
781		----		----	----		----	----		----	
784		----		----	----		----	----		----	
855	D86-A	45.1		0.73	106.1		1.65	161.2		-0.07	
862	D86-A	45.5		0.93	105.5		0.75	161.0		-0.15	
868	D86-A	46.5		1.43	105.7		1.05	160.5		-0.36	
873		----		----	----		----	----		----	
875		----		----	----		----	----		----	
912		----		----	----		----	----		----	
962		----		----	----		----	----		----	
963	D86-A	40.6		-1.50	106.0		1.50	164.6		1.34	
974		----		----	----		----	----		----	
982		----		----	----		----	----		----	
994		----		----	----		----	----		----	
995		----		----	----		----	----		----	
1011	D86-A	43.0		-0.31	104.5		-0.74	160.1		-0.52	
1016	D86-A	46.3		1.33	104.5		-0.74	160.6		-0.32	
1038	D86-A	40.2		-1.70	103.8		-1.78	160.6		-0.32	
1065	D86-A	43.6		-0.01	105.5		0.75	163.0		0.68	
1066		----		----	----		----	----		----	
1067	D86-A	47.7		2.02	105.5		0.75	160.8		-0.23	
1081	D86-A	45.8		1.08	104.6		-0.59	161.5		0.06	
1108	D86-A	47.2		1.78	105.6		0.90	177.7	G(0.01)	6.75	
1134	D86-A	41.2		-1.20	104.7		-0.44	161.5		0.06	
1145	D86-A	44.8		0.58	104.3		-1.03	160.1		-0.52	
1167	ISO3405-A	44.07		0.22	104.03		-1.44	159.0		-0.98	
1200		----		----	----		----	----		----	
1212	D86-A	42.5		-0.56	105.7		1.05	164.0		1.09	
1257	D86-A	39.2		-2.20	104.8		-0.29	160.9		-0.19	
1264	D86-A	49.4		2.87	104.8		-0.29	160.6		-0.32	
1276	D86-A	42.7		-0.46	103.6		-2.08	159.2		-0.89	
1284	D86-A	41.8		-0.90	105.8		1.20	165.0		1.50	
1291		----		----	----		----	----		----	
1307	D86-A	48.3		2.32	105.5		0.75	162.6		0.51	
1404	D86-A	42.7		-0.46	105.6		0.90	162.3		0.39	
1427		----		----	----		----	----		----	
1429	D86-A	41.6		-1.00	105.4		0.60	164.1		1.13	
1477		----		----	----		----	----		----	
1510		----		----	----		----	----		----	
1603	in house-A	42.2		-0.71	105.2		0.31	164.4		1.25	
1616		----		----	----		----	----		----	
1653		----		----	----		----	----		----	
1656	D86-A	45.9		1.13	104.5		-0.74	168.7	G(0.01)	3.03	
1720		----		----	----		----	----		----	
1737	D86-A	43.6		-0.01	105.4		0.60	161.7		0.14	
1833	D86-A	41.2		-1.20	104.5		-0.74	160.1		-0.52	
1842		----		----	----		----	----		----	

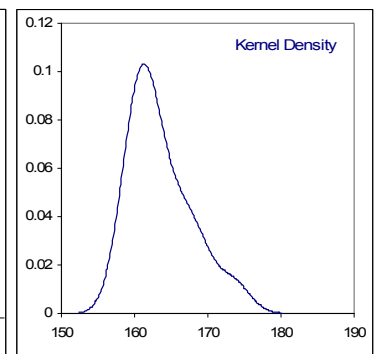
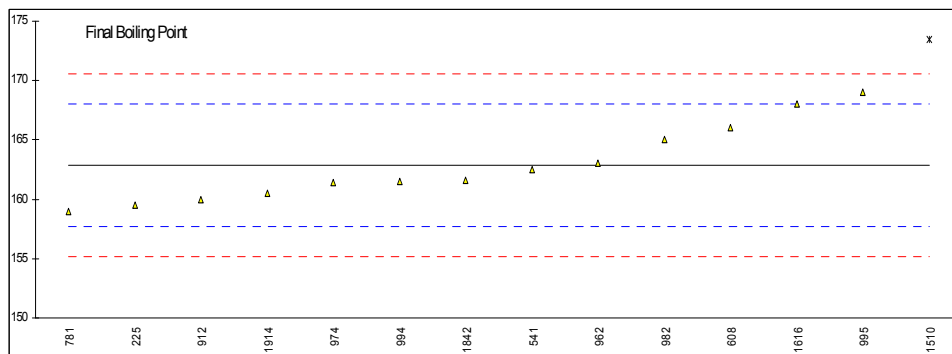
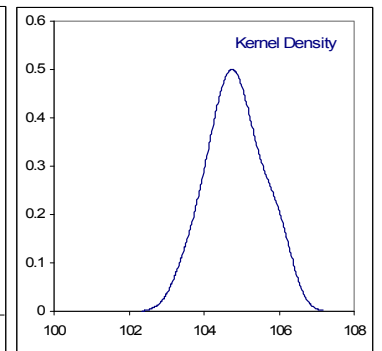
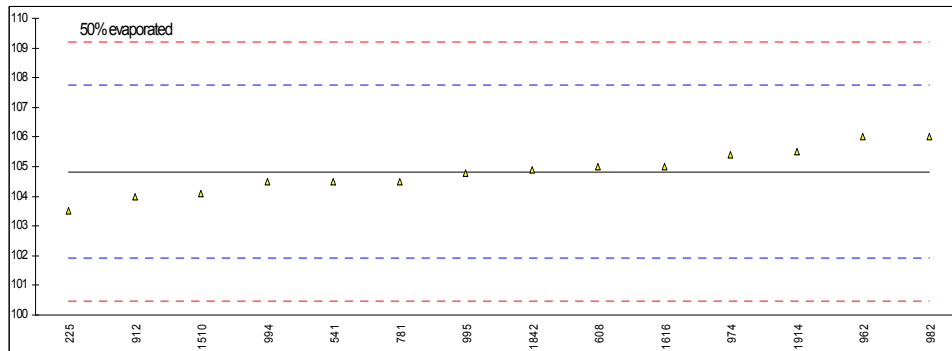
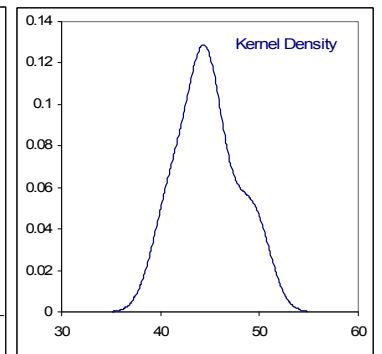
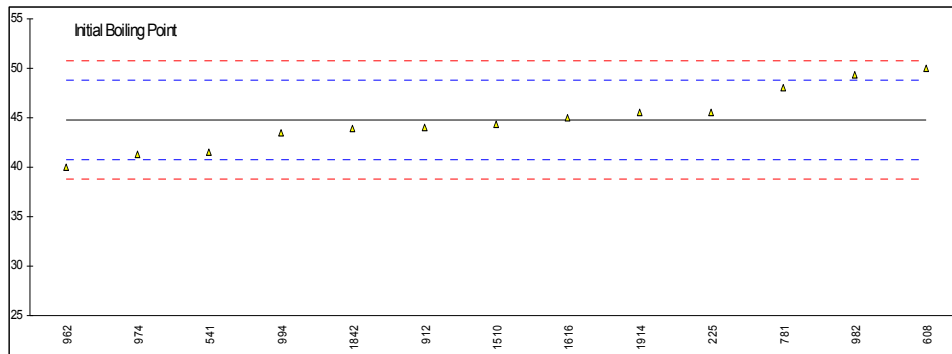
1914		----	----	----	----		----
1948	D86-A	40.9	-1.35	104.7	-0.44	158.7	C
1951	D86-A	47.3	1.82	105.5	0.75	169.4	G(0.01)
9054		----	----	----	----	----	
9057		----	----	----	----	----	
9058		----	----	----	----	----	
9061		----	----	----	----	----	
	normality	OK		OK		OK	
	n	46		46		43	
	outliers	0		0		3	
	mean (n)	43.62		104.99		161.36	
	st.dev. (n)	2.770		0.559		1.595	
	R(calc.)	7.76		1.57		4.47	
	R(D86:11a)	5.64		1.88		6.78	



Determination of Distillation (manual mode) on sample #12041; results in °C

lab	method	IBP	mark	z(targ)	50%eva.	Mark	z(targ)	FBP	mark	z(targ)	remarks
140		----		----	----		----	----		----	
150		----		----	----		----	----		----	
158		----		----	----		----	----		----	
171		----		----	----		----	----		----	
225	D86-M	45.5		0.37	103.5		-0.92	159.5		-1.30	
237		----		----	----		----	----		----	
238		----		----	----		----	----		----	
311		----		----	----		----	----		----	
317		----		----	----		----	----		----	
323		----		----	----		----	----		----	
329		----		----	----		----	----		----	
333		----		----	----		----	----		----	
334		----		----	----		----	----		----	
337		----		----	----		----	----		----	
360		----		----	----		----	----		----	
371		----		----	----		----	----		----	
399		----		----	----		----	----		----	
444		----		----	----		----	----		----	
445		----		----	----		----	----		----	
447		----		----	----		----	----		----	
494		----		----	----		----	----		----	
495		----		----	----		----	----		----	
529		----		----	----		----	----		----	
541	D86-M	41.5		-1.63	104.5		-0.23	162.5		-0.13	
604		----		----	----		----	----		----	
608	D86-M	50.0		2.62	105.0		0.11	166.0		1.23	
657		----		----	----		----	----		----	
704		----		----	----		----	----		----	
759		----		----	----		----	----		----	
781	D86-M	48.0		1.62	104.5		-0.23	159.0		-1.50	
784		----		----	----		----	----		----	
855		----		----	----		----	----		----	
862		----		----	----		----	----		----	
868		----		----	----		----	----		----	
873		----		----	----		----	----		----	
875		----		----	----		----	----		----	
912	D86-M	44.0		-0.38	104.0		-0.58	160.0		-1.11	
962	D86-M	40.0		-2.38	106.0		0.80	163.0		0.06	
963		----		----	----		----	----		----	
974	D86-M	41.3		-1.73	105.4		0.39	161.4		-0.56	
982	D86-M	49.3		2.27	106		0.80	165		0.84	
994	D86-M	43.5		-0.63	104.5		-0.23	161.5		-0.52	
995		----		----	104.8		-0.02	169		2.39	
1011		----		----	----		----	----		----	
1016		----		----	----		----	----		----	
1038		----		----	----		----	----		----	
1065		----		----	----		----	----		----	
1066		----		----	----		----	----		----	
1067		----		----	----		----	----		----	
1081		----		----	----		----	----		----	
1108		----		----	----		----	----		----	
1134		----		----	----		----	----		----	
1145		----		----	----		----	----		----	
1167		----		----	----		----	----		----	
1200		----		----	----		----	----		----	
1212		----		----	----		----	----		----	
1257		----		----	----		----	----		----	
1264		----		----	----		----	----		----	
1276		----		----	----		----	----		----	
1284		----		----	----		----	----		----	
1291		----		----	----		----	----		----	
1307		----		----	----		----	----		----	
1404		----		----	----		----	----		----	
1427		----		----	----		----	----		----	
1429		----		----	----		----	----		----	
1477		----		----	----		----	----		----	
1510	D86-M	44.4		-0.18	104.1		-0.51	173.5	G(0.05)	4.14	
1603		----		----	----		----	----		----	
1616	D86-M	45.0		0.12	105.0		0.11	168.0		2.00	
1653		----		----	----		----	----		----	
1656		----		----	----		----	----		----	
1720		----		----	----		----	----		----	
1737		----		----	----		----	----		----	
1833		----		----	----		----	----		----	

1842	D86-M	43.9	-0.43	104.9	0.04	161.6	-0.48
1914	D86-M	45.5	0.37	105.5	0.46	160.5	-0.91
1948		----	----	----	----	----	----
1951		----	----	----	----	----	----
9054		----	----	----	----	----	----
9057		----	----	----	----	----	----
9058		----	----	----	----	----	----
9061		----	----	----	----	----	----
	normality	OK		OK		OK	
	n	13		14		13	
	outliers	0		0		1	
	mean (n)	44.76		104.84		162.85	
	st.dev. (n)	3.000		0.728		3.217	
	R(calc.)	8.40		2.04		9.01	
	R(D86:11a)	5.60		4.07		7.20	

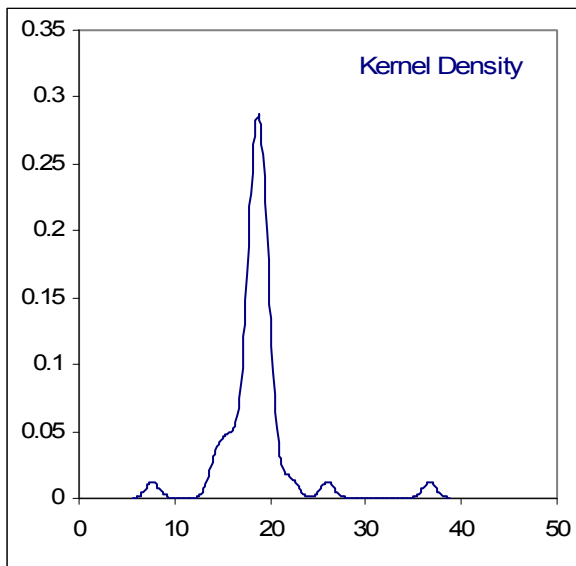
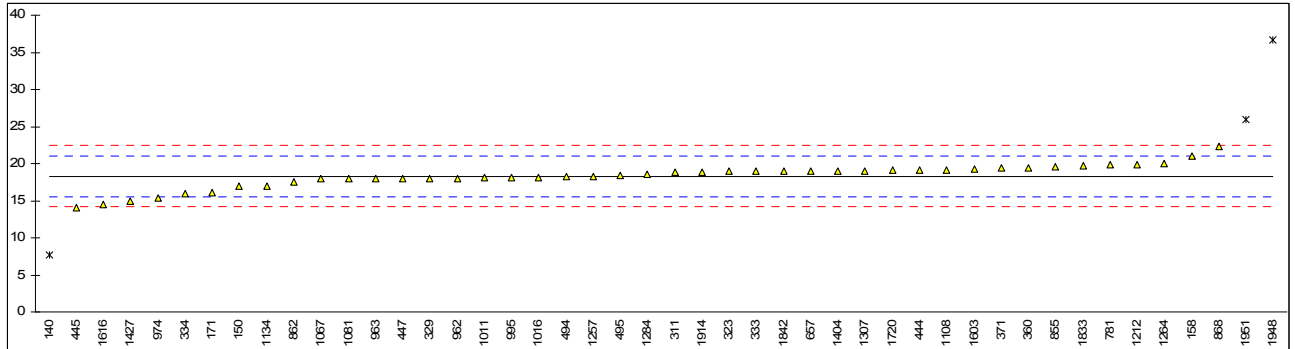


Determination of Mercaptans on sample #12041; results in mg/kg

lab	method	value	mark	z(targ)	remarks
140	D3227	7.7	C,G(0.01)	-7.68	First reported 4.1
150	D3227	17		-0.95	
158	D3227	21		1.94	
171	D3227	16.1		-1.60	
225		----		----	
237		----		----	
238		----		----	
311	UOP163	18.8		0.35	
317		----		----	
323	D3227	19		0.49	
329	D3227	18		-0.23	
333	D3227	19		0.49	
334	D3227	16		-1.68	
337		----		----	
360	D3227	19.4		0.78	
371	D3227	19.4		0.78	
399		----		----	
444	UOP163	19.15		0.60	
445	IP342	14		-3.12	
447	D3227	18		-0.23	
494	D3227	18.3		-0.01	
495	D3227	18.4		0.06	
529		----		----	
541		----		----	
604		----		----	
608		----		----	
657	D3227	19		0.49	
704		----		----	
759		----		----	
781	UOP163	19.8		1.07	
784		----		----	
855	D3227	19.5		0.86	
862	D3227	17.6		-0.52	
868	D3227	22.3		2.88	
873		----		----	
875		----		----	
912		----		----	
962	D3227	18.02		-0.22	
963	D3227	18		-0.23	
974	D3227	15.38		-2.13	
982		----		----	
994		----		----	
995	D3227	18.12		-0.14	
1011	D3227	18.1		-0.16	
1016	D3227	18.16		-0.11	
1038		----		----	
1065		----		----	
1066		----		----	
1067	UOP163	17.9		-0.30	
1081	D3227	18		-0.23	
1108	D3227	19.2		0.64	
1134	IP342	17.0		-0.95	
1145		----		----	
1167		----		----	
1200		----		----	
1212	D3227	19.8		1.07	
1257	D3227	18.3		-0.01	
1264	D3227	20		1.22	
1276		----		----	
1284	D3227	18.5		0.13	
1291		----		----	
1307	D3227	19.01		0.50	
1404	D3227	19		0.49	
1427	D3227	15		-2.40	
1429		----		----	
1477		----		----	
1510		----		----	
1603	in house	19.31		0.72	
1616	D3227	14.46		-2.79	
1653		----		----	
1656		----		----	
1720	D3227	19.1		0.57	
1737		----		----	
1833	D3227	19.7		1.00	
1842	IP342	19		0.49	

1914	D3227	18.83		0.37	
1948	D3227	36.7	C,G(0.01)	13.30	First reported 38.76
1951	D3227	26	G(0.01)	5.56	
9054		----		----	
9057		----		----	
9058		----		----	
9061		----		----	

normality not OK
 n 43
 outliers 3
 mean (n) 18.317
 st.dev. (n) 1.6224
 R(calc.) 4.543
 R(D3227:10) 3.869

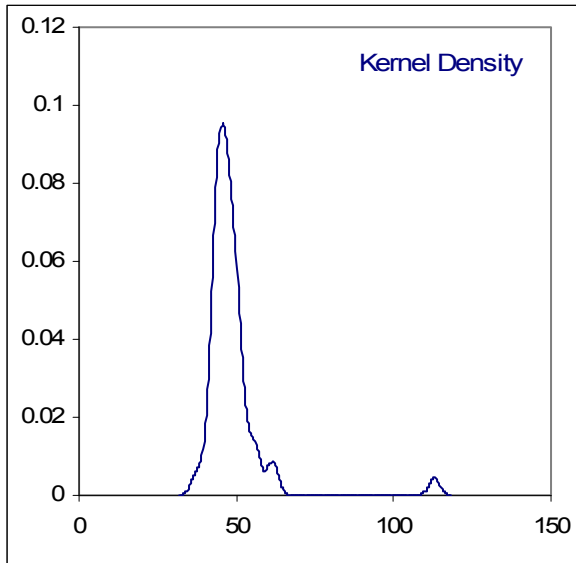
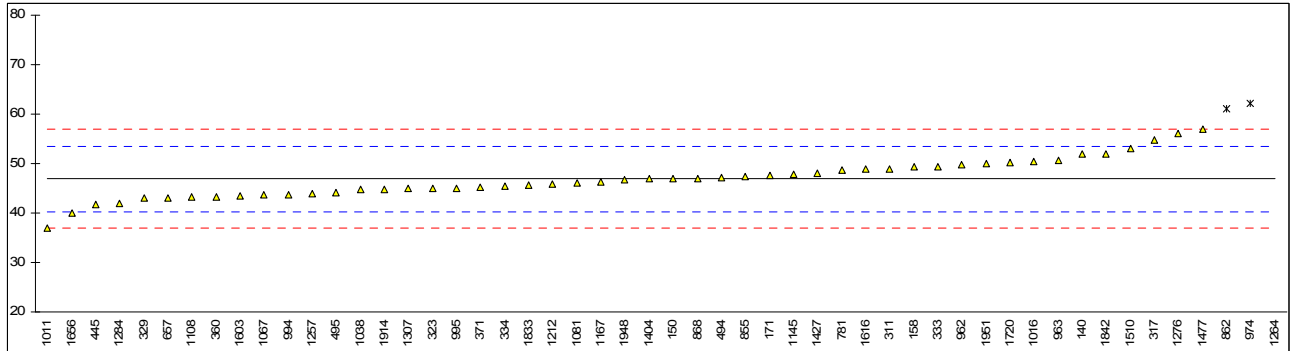


Determination of Sulphur on sample #12041; results in mg/kg

lab	method	value	mark	z(targ)	remarks
140	D2622	52		1.53	
150	D2622	47		0.03	
158	D2622	49.3		0.72	
171	D2622	47.7		0.24	
225		----		----	
237		----		----	
238		----		----	
311	D2622	49		0.63	
317	D2622	54.8		2.37	
323	D2622	45		-0.57	
329	D2622	43		-1.17	
333	D2622	49.4		0.75	
334	D5453	45.5		-0.42	
337		----		----	
360	D5453	43.2		-1.11	
371	D5453	45.3		-0.48	
399		----		----	
444		----		----	
445	D5453	41.68		-1.57	
447		----		----	
494	D5453	47.2		0.09	
495	D5453	44.2		-0.81	
529		----		----	
541		----		----	
604		----		----	
608		----		----	
657	D5453	43.1		-1.14	
704		----		----	
759		----		----	
781	D2622	48.8		0.57	
784		----		----	
855	D5453	47.5	C	0.18	First reported 60.3
862	D2622	61.0	DG(0.01)	4.22	
868	D3120	47.0		0.03	
873		----		----	
875		----		----	
912		----		----	
962	D2622	49.8		0.87	
963	D4294	50.7		1.14	
974	D4294	62.23	DG(0.01)	4.59	
982		----		----	
994	D5453	43.78		-0.94	
995	D5453	45.08		-0.55	
1011	ISO20846	37.04		-2.96	
1016	D2622	50.44		1.06	
1038	D2622	44.7		-0.66	
1065		----		----	
1066		----		----	
1067	D2622	43.6		-0.99	
1081	D4294	46		-0.27	
1108	D5453	43.2		-1.11	
1134		----		----	
1145	D5453	47.77	C	0.26	First reported 32.17
1167	ISO20846	46.37		-0.16	
1200		----		----	
1212	D2622	45.8		-0.33	
1257	D4294	44		-0.87	
1264	D4294	113	C,G(0.01)	19.82	First reported 64
1276	D5453	56.0		2.73	
1284	D5453	42.0		-1.47	
1291		----		----	
1307	D5453	44.99		-0.58	
1404	ISO20846	46.9	C	0.00	First reported 30
1427	D5453	48		0.33	
1429		----		----	
1477	D5453	57.0		3.02	
1510	D4294	53		1.83	
1603	in house	43.58		-1.00	
1616	D5453	49.0		0.63	
1653		----		----	
1656	D5443	40		-2.07	
1720	D5453	50.32		1.02	
1737		----		----	
1833	D5453	45.6		-0.39	
1842	D2622	52		1.53	

1914	D5453	44.75	-0.65
1948	D2622	46.67	-0.07
1951	D2622	49.9	0.90
9054		----	----
9057		----	----
9058		----	----
9061		----	----

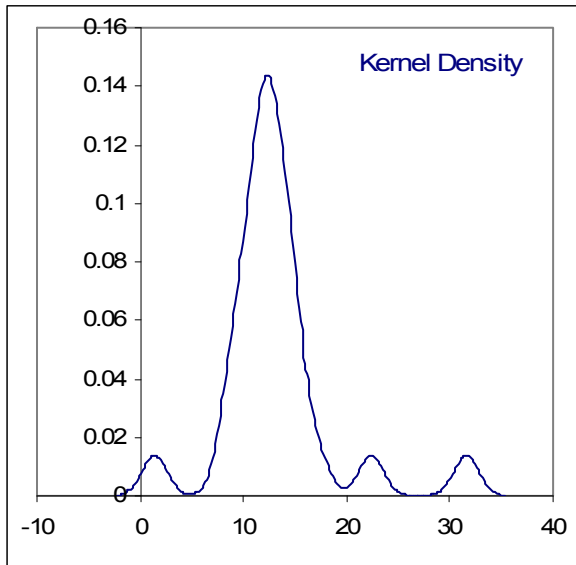
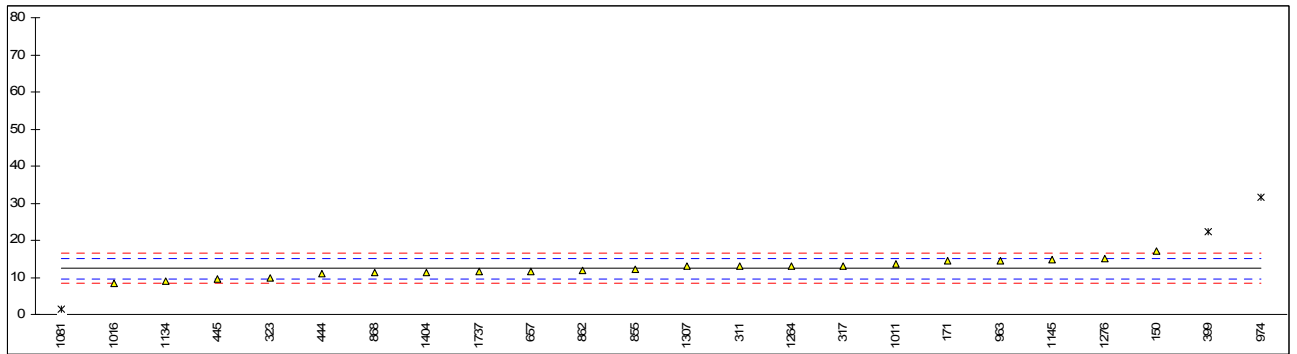
normality OK
 n 49
 outliers 3
 mean (n) 46.912
 st.dev. (n) 3.9505
 R(calc.) 11.061
 R(D2622:10) 9.338



Determination of Methanol on sample #12042; result in mg/kg

lab	method	value	mark	z(targ)	remarks
140		----		----	
150	D7423	17.1		3.50	
158		----		----	
171	D7423	14.46		1.55	
225		----		----	
237		----		----	
238		----		----	
311	INH-403	13		0.47	
317	INH-200	13		0.47	
323	INH-304	10		-1.74	
329		----		----	
333		----		----	
334		----		----	
337		----		----	
360		----		----	
371		----		----	
399	INH-002	22.4	G(0.01)	7.41	
444	in house	11.15		-0.89	
445	INH-060	9.57		-2.06	
447		----		----	
494		----		----	
495		----		----	
529		----		----	
541		----		----	
604		----		----	
608		----		----	
657	INH-130	11.70		-0.49	
704		----		----	
759		----		----	
781		----		----	
784		----		----	
855	INH-024	12.3		-0.05	
862	INH-024	12.0		-0.27	
868	INH-024	11.2		-0.86	
873		----		----	
875		----		----	
912		----		----	
962		----		----	
963	D7423	14.62		1.67	
974	D7423	31.615	G(0.01)	14.21	
982		----		----	
994		----		----	
995		----		----	
1011	INH-030	13.5		0.84	
1016	in house	8.37		-2.95	
1038		----		----	
1065		----		----	
1066		----		----	
1067		----		----	
1081	in house	1.4	G(0.05)	-8.09	
1108		----		----	
1134	in house	9.1		-2.41	
1145	D5808	14.74		1.76	
1167		----		----	
1200		----		----	
1212		----		----	
1257		----		----	
1264	in house	13		0.47	
1276	in house	15.1		2.02	
1284		----		----	
1291		----		----	
1307	in house	12.975		0.45	
1404	in house	11.21		-0.85	
1427		----		----	
1429		----		----	
1477		----		----	
1510		----		----	
1603	in house	<10		<-1.74	
1616		----		----	
1653		----		----	
1656		----		----	
1720		----		----	
1737	in house	11.5		-0.64	
1833		----		----	

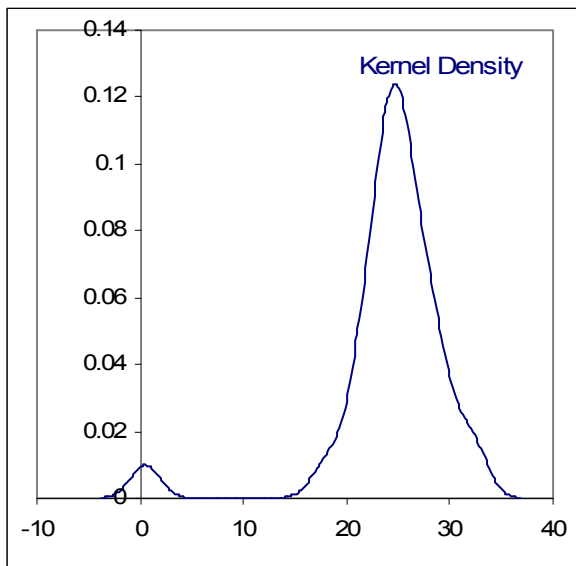
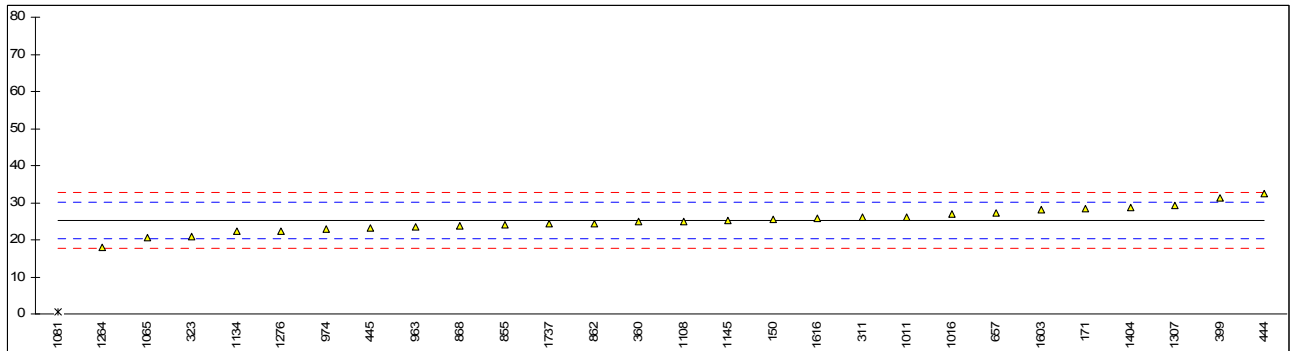
1842		----		----
1914	D4815	<2000		----
1948			W	----
1951		----		----
9054		----		----
9057		----		----
9058		----		----
9061		----		----
normality		OK		
n		21		
outliers		3	<u>Spike</u>	
mean (n)		12.362	8.8	Recovery <140%
st.dev. (n)		2.1611		
R(calc.)		6.051		
R(Horwitz)		3.793		



Determination of MTBE on sample #12042; result in mg/kg

lab	method	value	mark	z(targ)	remarks
140		----		----	
150	D7423	25.4		0.07	
158		----		----	
171	D7423	28.34		1.25	
225		----		----	
237		----		----	
238		----		----	
311	INH-403	26		0.31	
317	D6839	<100		----	
323	INH-304	21		-1.70	
329		----		----	
333		----		----	
334		----		----	
337		----		----	
360	D7423Mod.	25		-0.09	
371		----		----	
399	INH-002	31.3		2.44	
444	in house	32.54		2.94	
445	INH-060	23.18		-0.83	
447		----		----	
494		----		----	
495	D6839	<0.10		<-10.12	
529		----		----	
541		----		----	
604		----		----	
608		----		----	
657	INH-130	27.24		0.81	
704		----		----	
759		----		----	
781		----		----	
784		----		----	
855	INH-024	24.2		-0.42	
862	INH-024	24.3		-0.38	
868	INH-024	23.8		-0.58	
873		----		----	
875		----		----	
912		----		----	
962		----		----	
963	D7423	23.50		-0.70	
974	D7423	22.899		-0.94	
982		----		----	
994		----		----	
995		----		----	
1011	INH-030	26.0		0.31	
1016	in house	26.87		0.66	
1038		----		----	
1065	D6293	20.7		-1.82	
1066		----		----	
1067		----		----	
1081	in house	0.5	G(0.01)	-9.96	
1108	EN13132	25		-0.09	
1134	in house	22.2		-1.22	
1145	D5808	25.31		0.03	
1167		----		----	
1200		----		----	
1212		----		----	
1257		----		----	
1264	in house	18		-2.91	
1276	D6293	22.4		-1.14	
1284		----		----	
1291		----		----	
1307	in house	29.340		1.65	
1404	in house	28.75		1.42	
1427		----		----	
1429		----		----	
1477		----		----	
1510		----		----	
1603	in house	28		1.11	
1616	in house	25.70		0.19	
1653		----		----	
1656		----		----	
1720		----		----	
1737	in house	24.3		-0.38	
1833		----		----	
1842		----		----	

1914	D4815	<2000		----
1948		----	W	----
1951		----		----
9054		----		----
9057		----		----
9058		----		----
9061		----		----
normality		OK		
n		27		
outliers		1	<u>Spike:</u>	
mean (n)		25.232	23.7	Recovery <106%
st.dev. (n)		3.2257		
R(calc.)		9.032		
R(Horwitz)		6.954		

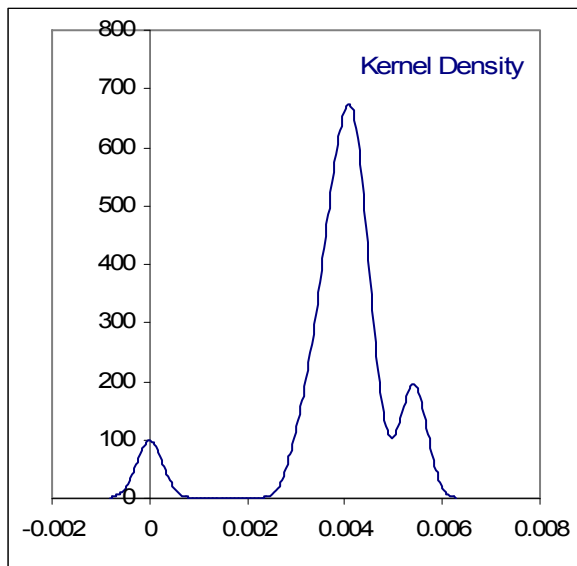
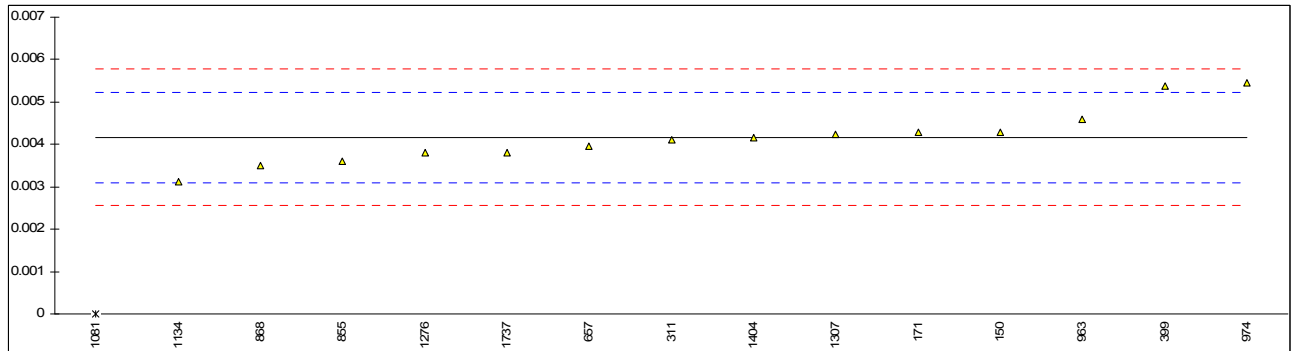


Determination of Total Oxygenates on sample #12042; result in %M/M

lab	method	value	mark	z(targ)	remarks
140		----		----	
150	D7423	0.00429		0.24	
158		----		----	
171	D7423	0.00428		0.22	
225		----		----	
237		----		----	
238		----		----	
311	INH-403	0.0041		-0.11	
317	D6839	<0.1		----	
323		----		----	
329		----		----	
333		----		----	
334		----		----	
337		----		----	
360		----		----	
371		----		----	
399	INH-002	0.00537		2.25	
444		----		----	
445		----		----	
447		----		----	
494		----		----	
495	D6839	<0.10		----	
529		----		----	
541		----		----	
604		----		----	
608		----		----	
657	INH-130	0.003951		-0.39	
704		----		----	
759		----		----	
781		----		----	
784		----		----	
855	INH-024	0.0036		-1.04	
862	INH-024	<0.01		----	
868	INH-024	0.0035		-1.23	
873		----		----	
875		----		----	
912		----		----	
962		----		----	
963	D7423	0.0046		0.82	
974	D7423	0.005451		2.40	
982		----		----	
994		----		----	
995		----		----	
1011		----		----	
1016		----		----	
1038		----		----	
1065		----		----	
1066		----		----	
1067		----		----	
1081	in house	0.00	ex	-7.75	Result excluded, zero not a real result
1108		----		----	
1134	in house	0.00313		-1.92	
1145		----		----	
1167		----		----	
1200		----		----	
1212		----		----	
1257		----		----	
1264		----		----	
1276	D6293	0.0038		-0.67	
1284		----		----	
1291		----		----	
1307	in house	0.004234		0.14	
1404	in house	0.004148		-0.02	
1427		----		----	
1429		----		----	
1477		----		----	
1510		----		----	
1603		----		----	
1616		----		----	
1653		----		----	
1656		----		----	
1720		----		----	
1737	in house	0.0038		-0.67	
1833		----		----	
1842		----		----	

1914	D4815	<0.2000	----
1948	D6293	<0.01	----
1951		----	----
9054		----	----
9057		----	----
9058		----	----
9061		----	----

normality OK
 n 14
 outliers 1
 mean (n) 0.00416
 st.dev. (n) 0.000649
 R(calc.) 0.00182
 R(Horwitz) 0.00150

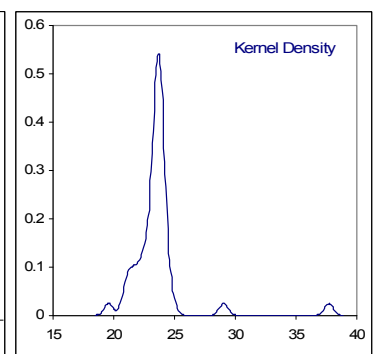
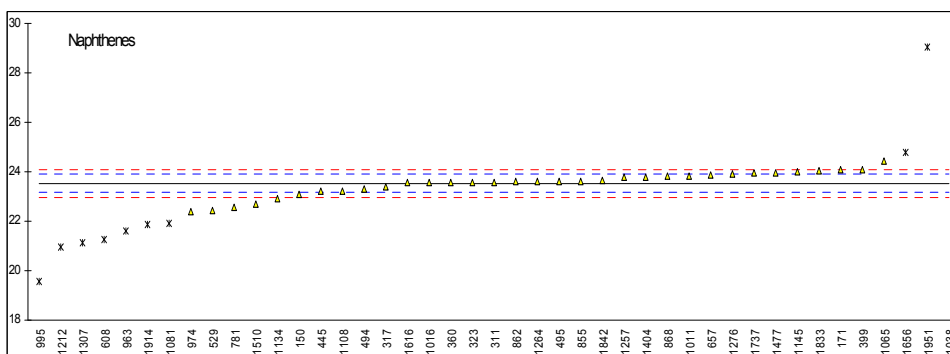
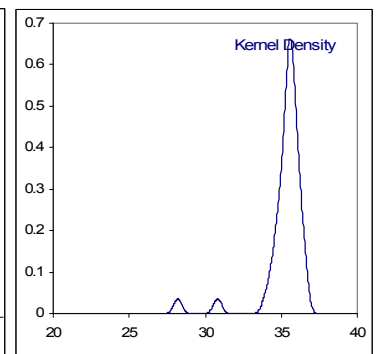
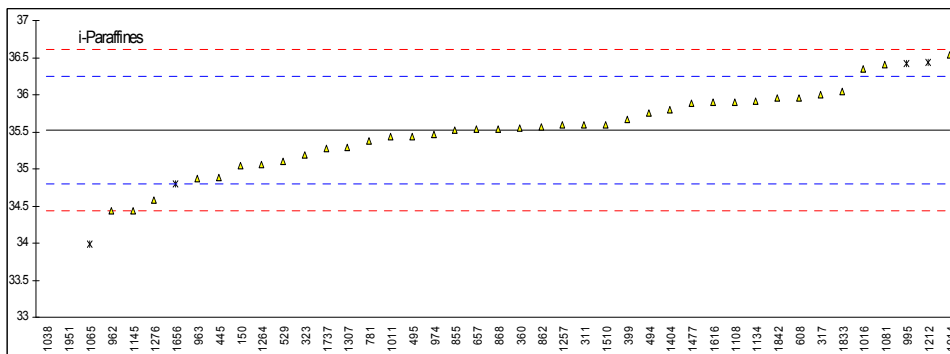
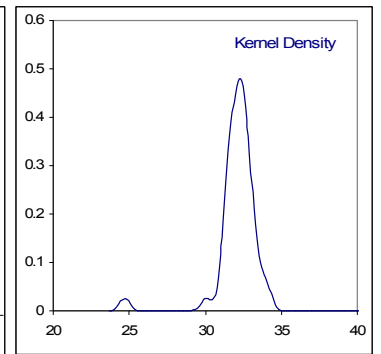
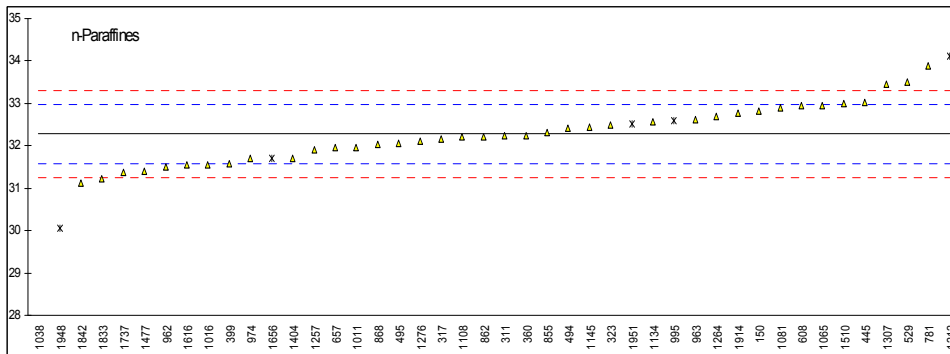


PONA/PIONA/PNA determination on sample #12042; results in %V/V

lab	method	n-paraf	mark	z(targ)	i-paraf	mark	z(targ)	Olefins	mark	z(targ)	Naphth.	Mark	z(targ)
140													
150	D5134	32.82		1.58	35.05		-1.32	0.02			23.09		-2.33
158													
171	D5443		*)			*)		<0.1			24.1		2.97
225													
237													
238													
311	D5443Mod.	32.24		-0.10	35.60		0.20	<0.2			23.57		0.19
317	D5443	32.15		-0.36	36.00		1.31	<0.1			23.39		-0.75
323	D5443	32.48		0.59	35.19		-0.93	0.13			23.57		0.19
329													
333													
334													
337													
360	D6730	32.241		-0.10	35.544		0.05	0.222			23.564		0.16
371													
399	D5443	31.57		-2.05	35.67		0.40	<0.01			24.10		2.97
444													
445	D5443	33.03		2.19	34.88		-1.79	0.19			23.20		-1.75
447													
494	D6839	32.42		0.42	35.75		0.62	0.02			23.29		-1.28
495	D6839	32.05		-0.65	35.44		-0.24	0.35			23.62		0.45
529	D6730	33.51		3.58	35.10		-1.18	0.26			22.43		-5.79
541								7.31	G(1)				
604													
608	D6730	32.93666		1.92	35.96129		1.20	0.48335			21.27443	G(5)	-11.86
657	D6839	31.96		-0.92	35.53		0.01	0.02			23.86		1.71
704													
759													
781	INH-52714	33.89		4.68	35.38		-0.40	0.11			22.56		-5.11
784													
855	D6293	32.32		0.13	35.52		-0.02	<0.1			23.62		0.45
862	D6293	32.20		-0.22	35.57		0.12	0.04			23.60		0.35
868	D6839	32.02		-0.74	35.54		0.04	<0.1			23.81		1.45
873													
875													
912													
962	D5443	31.51		-2.22	34.43		-3.03	0.30					
963	D6730	32.620		1.00	34.873		-1.80	0.260			21.626	G(5)	-10.01
974	D6839	31.70		-1.67	35.47		-0.15	0.36			22.38		-6.05
982													
994													
995	D6729	32.59	ex	0.91	36.42	ex	2.47	0.26	ex		19.58	G(5)	-20.75
1011	D5443	31.965		-0.90	35.435		-0.25	0.070			23.825		1.53
1016	ISO22854	31.56		-2.08	36.35		2.28	0.04			23.56		0.14
1038	D6839	24.7	G(1)	-21.96	28.2	G(1)	-20.24	0.5	ex		37.7	G(1)	74.33
1065	D5443	32.94		1.93	33.99	G(5)	-4.24	0.00			24.43		4.70
1066													
1067													
1081	in house	32.9		1.81	36.4		2.41	0.0			21.9	G(5)	-8.57
1108	D5443	32.2		-0.22	35.9		1.03	0.1			23.2		-1.75
1134	D5443	32.56		0.82	35.92		1.09	<0.05			22.91		-3.27
1145	D6839	32.45		0.51	34.44		-3.00	0.02			23.99		2.39
1167													
1200													
1212	D5134	34.11	ex	5.32	36.43	ex	2.50	0.08	ex		20.95	ex	-13.56
1257	D5443	31.9		-1.09	35.6		0.20				23.8		1.40
1264	D5443	32.68		1.17	35.06		-1.29	0.06			23.61		0.40
1276	D5543	32.103		-0.50	34.585		-2.60	0.344			23.898		1.91
1284													
1291													
1307	in house	33.442		3.38	35.2865		-0.66	0.7695	G(1)		21.138	G(5)	-12.57
1404	D5443	31.70		-1.67	35.79		0.73	0.12			23.80		1.40
1427													
1429													
1477	D5443	31.39		-2.57	35.88		0.98	<0.1			23.95		2.18
1510	D5443	32.99		2.07	35.60		0.20	0.3			22.71		-4.32
1603													
1616	D6839	31.54		-2.13	35.90		1.03	0.08			23.55		0.08
1653													
1656	D5443	31.7	ex	-1.67	34.8	ex	-2.01		ex		24.8	ex	6.64
1720													
1737	in house	31.37		-2.63	35.27		-0.71	0.13			23.94		2.13
1833	D5443	31.23		-3.03	36.05		1.45	0.05			24.05		2.71
1842	EN14517	31.11		-3.38	35.96		1.20	0.0			23.64		0.56

1914	D5134Mod.	32.78		1.46	36.54		2.80	0.10	----	21.86	G(5)	-8.78
1948	D5443	30.06	G(5)	-6.42	----	W	----	0.11	----	----	W	----
1951	D5443	32.51	ex	0.68	30.82	G(1)	-13.00	4.32	G(1)	29.05	G(1)	28.94
9054		----			----					----		----
9057		----			----					----		----
9058		----			----					----		----
9061		----			----					----		----
	normality	OK			OK			not OK		not OK		
	n	38			37			30		33		
	outliers	2			3			3		8		
	mean (n)	32.276			35.526			0.143		23.534		
	st.dev. (n)	0.6620			0.5022			0.1321		0.4970		
	R(calc.)	1.854			1.406			0.370		1.392		
	R(D5443:09e1)	0.966			1.013			n.a.		0.534		

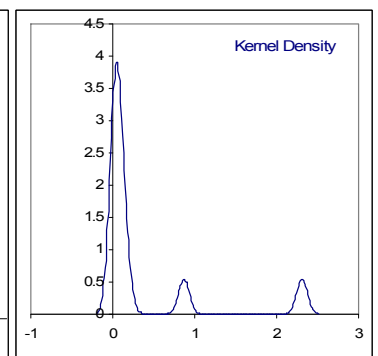
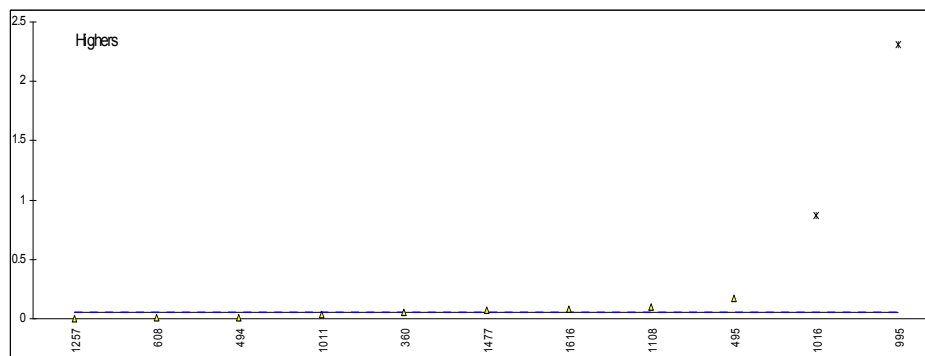
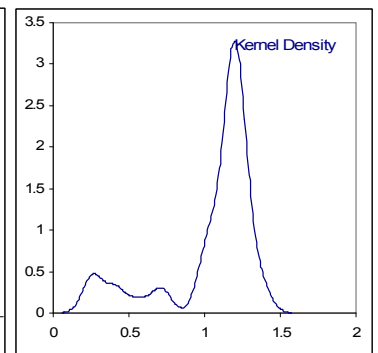
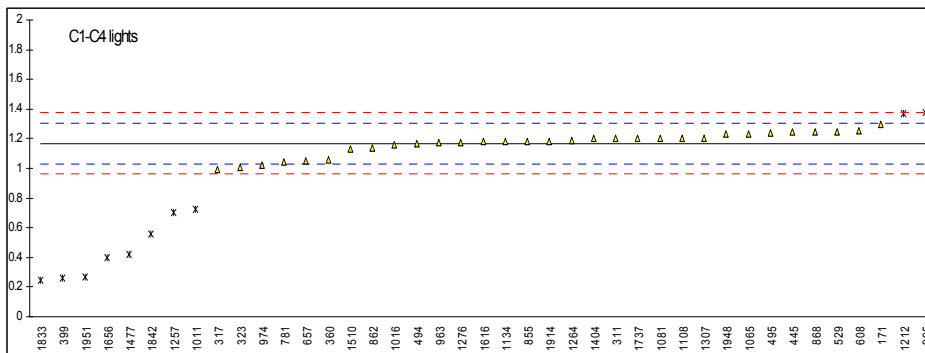
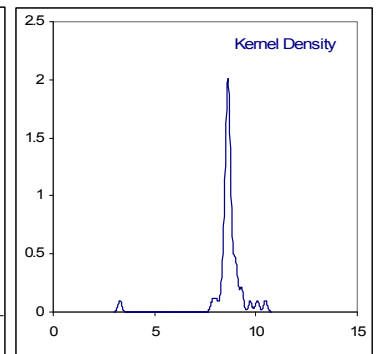
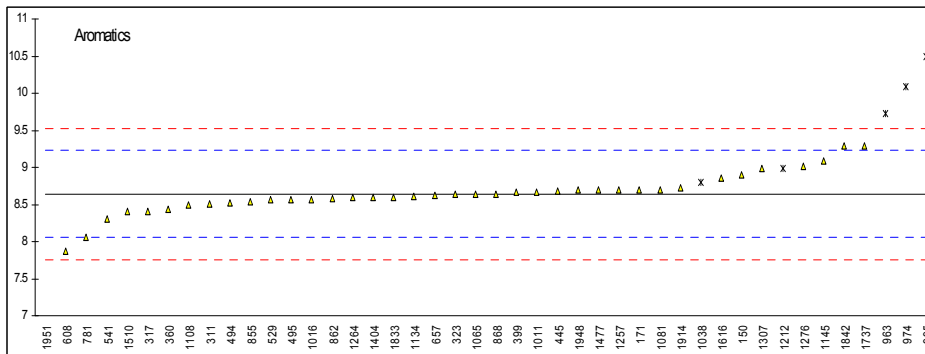
*) Lab 171 reported 67.2 (= sum n- + i-paraffines)



PONA/PIONA/PNA determination on sample #12042; results in %V/V (continued)

lab	method	Aromat.	Mark	z(targ)	C4 lights	mark	z(targ)	highers	mark	z(targ)	remarks
140		----		----			----	----		----	
150	D5134	8.90		0.88			----	----		----	
158		----		----			----	----		----	
171	D5443	8.7		0.20	1.3		1.89	<0.1		----	
225		----		----			----	----		----	
237		----		----			----	----		----	
238		----		----			----	----		----	
311	D5443	8.51		-0.45	1.20		0.45	<0.2		----	
317	D5443	8.41		-0.79	0.99		-2.58	<0.05		----	
323	D5443	8.64		0.00	1.01		-2.29	<0.10		----	
329		----		----			----	----		----	
333		----		----			----	----		----	
334		----		----			----	----		----	
337		----		----			----	----		----	
360	D6730	8.429		-0.72	1.056		-1.63	0.056		----	
371		----		----			----	----		----	
399	D5443	8.67		0.10	0.26	DG(1)	-13.11	----		----	
444		----		----			----	----		----	
445	D5443	8.68		0.13	1.25		1.17	<0.1		----	
447		----		----			----	----		----	
494	D6839	8.52		-0.41	1.17		0.02	0.01		----	
495	D6839	8.57		-0.24	1.24		1.03	0.17		----	
529	D6730	8.56		-0.28	1.25		1.17	----		----	
541	D6730	8.30		-1.16	----		----	----		----	
604		----		----			----	----		----	
608	D6730	7.86735		-2.63	1.25005		1.17	0.00617		----	
657	D6839	8.62		-0.07	1.05		-1.71	----		----	
704		----		----			----	----		----	
759		----		----			----	----		----	
781	INH-52714	8.06		-1.98	1.04		-1.86	----		----	
784		----		----			----	----		----	
855	D6293	8.54		-0.34	1.18		0.16	<0.1		----	
862	D6293	8.58		-0.21	1.14		-0.41	----		----	
868	D6839	8.64		0.00	1.25		1.17	<0.1		----	
873		----		----			----	----		----	
875		----		----			----	----		----	
912		----		----			----	----		----	
962		----		----			----	----		----	
963	D6730	9.726	G(5)	3.69	1.174		0.08	<0.001		----	
974	D6839	10.09	G(1)	4.93	1.02		-2.14	<0.01		----	
982		----		----			----	----		----	
994		----		----			----	----		----	
995	D6729	10.49	G(1)	6.29	1.38	ex	3.05	2.31	G(1)	----	
1011	D5443	8.670		0.10	0.725	C,G(1)	-6.40	0.035		----	Fr 0.745
1016	ISO22854	8.57		-0.24	1.16		-0.12	0.87	G(1)	----	
1038	D6839	8.8	ex	0.54	----		----	----		----	
1065	D5443	8.64		0.00	1.23		0.88	----		----	
1066		----		----			----	----		----	
1067		----		----			----	----		----	
1081	in house	8.7		0.20	1.2		0.45	----		----	
1108	D5443	8.5		-0.48	1.2		0.45	0.1		----	
1134	D5443	8.61		-0.11	1.18		0.16	----		----	
1145	D6839	9.09		1.53	----		----	----		----	
1167		----		----			----	----		----	
1200		----		----			----	----		----	
1212	D5134	8.99	ex	1.19	1.37	ex	2.90	<0.1	C	----	Fr 51.31
1257	D5443	8.7		0.20	0.7	G(5)	-6.76	0.0		----	
1264	D5443	8.59		-0.17	1.19		0.31	----		----	
1276	D5443	9.011		1.26	1.175		0.09	----		----	
1284		----		----			----	----		----	
1291		----		----			----	----		----	
1307	in house	8.981		1.16	1.2035		0.50	----		----	
1404	D5443	8.59		-0.17	1.20	C	0.45	----		----	Fr 0.42
1427		----		----			----	----		----	
1429		----		----			----	----		----	
1477	D5443	8.69		0.17	0.42	DG(1)	-10.80	0.07		----	
1510	D5443	8.40		-0.82	1.13		-0.56	----		----	
1603		----		----			----	----		----	
1616	D6839	8.85		0.71	1.18		0.16	0.08		----	
1653		----		----			----	----		----	
1656		----	ex	----	0.4	ex	-11.09	----		----	
1720		----		----			----	----		----	
1737	in house	9.29		2.21	1.20		0.45	----		----	
1833	D5443	8.59		-0.17	0.25	DG(1)	-13.25	----		----	
1842	EN14517	9.29		2.21	0.56	G(1)	-8.78	----		----	

1914	D5134Mod.	8.72		0.27	1.18	0.16	----	----
1948	D5443	8.69		0.17	1.23	0.88	----	----
1951	D5443	3.30	G(1)	-18.17	0.27	G(5)	-12.96	----
9054		----		----				----
9057		----		----				----
9058		----		----				----
9061		----		----				----
	normality	not OK		not OK		OK		
	n	38		31		9		
	outliers	4		7		2		
	mean (n)	8.641		1.169		0.059		
	st.dev. (n)	0.2717		0.0792		0.0546		
	R(calc.)	0.761		0.222		0.153		
	R(D5443:09e1)	0.823		0.194		n.a.		



PONA/PIONA/PNA determination on sample #12042; results in %M/M

lab	method	n-paraf	mark	z(targ)	i-paraf	mark	z(targ)	Olefins	mark	z(targ)	Naphth.	mark	z(targ)
140													
150	D5134	30.80		1.57	33.31		-1.23	0.02			24.89		-2.38
158													
171	D5443		*)			*)		<0.1			26.1		3.74
225													
237													
238													
311	D5443Mod.	30.18		-0.29	33.92		0.50	<0.2			25.46		0.50
317	D5443	30.13		-0.44	34.30		1.57	<0.1			25.27		-0.46
323	D5443	30.47		0.58	33.48		-0.75	0.13			25.43		0.35
329													
333													
334													
337													
360	D6730	30.290		0.04	33.869		0.35	0.213			25.371		0.05
371													
399	D5443	29.61		-2.00	33.88		0.38	<0.01			25.98		3.13
444													
445	D5443	30.97		2.08	33.20		-1.55	0.20			25.05		-1.57
447													
494	D6839	30.42		0.43	34.09		0.98	0.02			25.08		-1.42
495	D6839	30.02		-0.77	33.70		-0.13	0.28			25.52		0.81
529	D6730	31.54		3.78	33.40		-0.98	0.27			24.21		-5.81
541								7.23	G(1)				
604													
608	D6730	32.85836	G(5)	7.73	34.10731		1.03	0.38507			22.11968	G(5)	-16.38
657	D6839	29.91		-1.10	33.83		0.24	0.02			25.76		2.02
704													
759													
781	INH-52714	32.01		5.19	33.87		0.35	0.11			24.12		-6.27
784													
855	D6293	30.32		0.13	33.76		0.04	<0.1			25.53		0.86
862	D6293	30.20		-0.23	33.89		0.41	0.04			25.42		0.30
868	D6839	30.01		-0.80	33.80		0.15	<0.1			25.70		1.72
873													
875													
912													
962	D5443	29.63		-1.94	32.31		-4.07	0.20					
963	D6730	30.583		0.92	33.181		-1.60	0.255			23.227	DG(5)	-10.78
974	D6839	29.74		-1.61	33.58		-0.47	0.36			24.12		-6.27
982													
994													
995	D6729	30.60		0.97	34.66		2.59	0.27			20.99	G(5)	-22.09
1011	D5443	29.960		-0.95	33.660		-0.24	0.070			25.720		1.82
1016	ISO22854	29.48		-2.38	34.71	C	2.74	0.04			25.43		0.35
1038													
1065	D5443	30.92		1.93	32.19		-4.41	0.00			26.35		5.00
1066													
1067													
1081	in house	30.9		1.87	34.7		2.71	0.0			23.6	G(5)	-8.90
1108	D5443	30.1		-0.53	34.3		1.57	0.1			25.2		-0.81
1134	D5443	30.51		0.70	34.24		1.40	<0.05			24.76		-3.03
1145	D6839	30.44		0.49	32.72		-2.91	0.02			25.77		2.07
1167													
1200													
1212	D5134	31.89	ex	4.83	34.48	ex	2.08	0.08	ex		22.46	ex	-14.66
1257	D5443	29.9		-1.13	33.9		0.44				25.7		1.72
1264	D5443	30.63		1.06	33.34		-1.15	0.06			25.51		0.76
1276	D5543	30.023		-0.76	32.206		-4.36	0.352			25.016		-1.74
1284													
1291													
1307	in house	31.443		3.49	33.595		-0.43	0.792			22.7825	DG(5)	-13.03
1404	D5443	29.72		-1.67	34.03		0.81	0.12			25.69		1.67
1427													
1429													
1477	D5443	29.48		-2.38	34.09		0.98	<0.1			25.76		2.02
1510													
1603	in house	31.42	ex	3.42	35.55	ex	5.12				24.31	ex	-5.31
1616	D6839	29.56		-2.15	34.13		1.09	0.08			25.38		0.10
1653													
1656	D5443	29.7	ex	-1.73	32.9	ex	-2.40				26.8	ex	7.28
1720	D6839	68.50	G(1)	114.42							24.52		-4.25
1737	in house	29.32		-2.86	33.50		-0.70	0.13			25.76		2.02
1833	D5443	29.33		-2.83	34.24		1.40	0.05			25.95		2.98
1842													

1914	D5134Mod.	30.81		1.60	34.89		3.25	0.10		----	23.56	G(5)	-9.10
1948		----	W	----	----	W	----	0.10		----	----	W	----
1951	D5443	30.42	ex	0.43	29.75	G(1)	-11.33	4.78	G(1)	----	31.07	G(1)	28.86
9054		----		----	----		----	----		----	----		----
9057		----		----	----		----	----		----	----		----
9058		----		----	----		----	----		----	----		----
9061		----		----	----		----	----		----	----		----
	normality	OK			OK			not OK			not OK		
	n	36			37			30			32		
	outliers	2			1			2			7		
	mean (n)	30.277			33.745			0.160			25.360		
	st.dev. (n)	0.6317			0.6456			0.1653			0.5533		
	R(calc.)	1.769			1.808			0.463			1.549		
	R(D5443:09e1)	0.935			0.988			n.a.			0.554		

*) Lab 171 reported 63.3 (= sum n- + i-paraffines)

<u>Corrections (C)</u>			
Lab 1016		First reported 36.35	

PONA/PIONA/PNA determination on sample #12042; results in %M/M (continued)

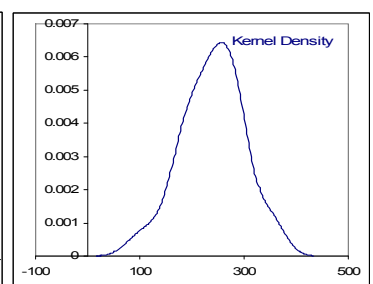
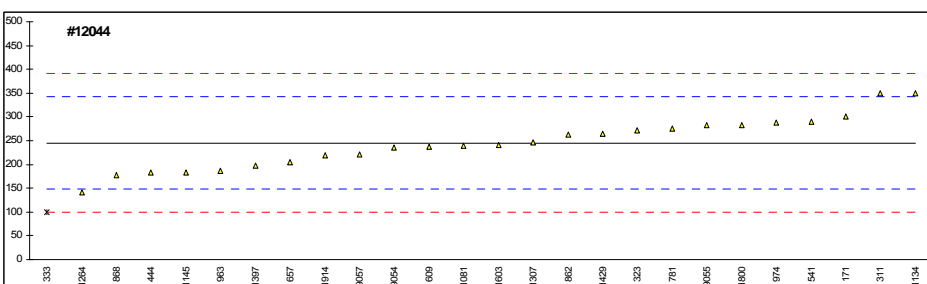
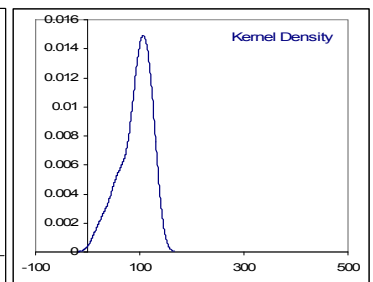
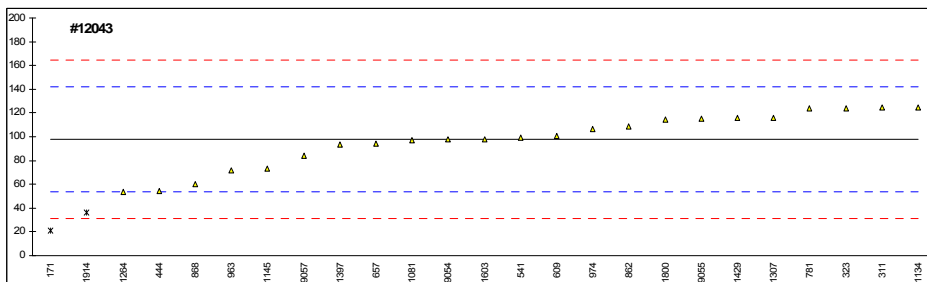
lab	method	Aromat.	Mark	z(targ)	C4 lights	mark	z(targ)	highers	mark	z(targ)	remarks
140		----		----			----			----	
150	D5134	10.85		1.03			----			----	
158		----		----			----			----	
171	D5443	10.6		0.26	1.0		1.02	<0.1		----	
225		----		----			----			----	
237		----		----			----			----	
238		----		----			----			----	
311	D5443	10.37		-0.45	0.96		0.33	<0.2		----	
317	D5443	10.24		-0.85	0.80		-2.45	<0.05		----	
323	D5443	10.51		-0.02	0.81		-2.27	<0.10		----	
329		----		----			----			----	
333		----		----			----			----	
334		----		----			----			----	
337		----		----			----			----	
360	D6730	10.257		-0.80	0.846		-1.65	0.047		----	
371		----		----			----			----	
399	D5443	10.53		0.05	0.21	DG(5)	-12.68			----	
444		----		----			----			----	
445	D5443	10.57		0.17	1.00		1.02	<0.1		----	
447		----		----			----			----	
494	D6839	10.39		-0.39	0.95		0.15	0.02		----	
495	D6839	10.43		-0.26	0.98		0.67	0.16		----	
529	D6730	10.45		-0.20	1.015		1.28			----	
541	D6730	10.21		-0.94						----	
604		----		----			----			----	
608	D6730	9.26422		-3.86	1.67868	G(5)	12.79	0.00371		----	
657	D6839	10.48		-0.11	0.84		-1.75			----	
704		----		----			----			----	
759		----		----			----			----	
781	INH-52714	9.89		-1.93	0.85		-1.58			----	
784		----		----			----			----	
855	D6293	10.39		-0.39	0.95		0.15	<0.1		----	
862	D6293	10.45		-0.20	0.93		-0.19			----	
868	D6839	10.50		-0.05	0.98		0.67	<0.1		----	
873		----		----			----			----	
875		----		----			----			----	
912		----		----			----			----	
962		----		----			----			----	
963	D6730	11.857	DG(5)	4.14	0.945		0.07	<0.001		----	
974	D6839	12.20	G(5)	5.20	0.81		-2.27	<0.01		----	
982		----		----			----			----	
994		----		----			----			----	
995	D6729	12.80	G(1)	7.05	1.10		2.75	2.48	G(1)	----	
1011	D5443	10.545		0.09	0.578	C,G(1)	-6.30	0.045		----	Fr 0.475
1016	ISO22854	10.42		-0.29	0.93		-0.19	0.93	G(1)	----	
1038		----		----			----			----	
1065	D5443	10.53		0.05	1.00		1.02			----	
1066		----		----			----			----	
1067		----		----			----			----	
1081	in house	10.7		0.57	0.9		-0.71			----	
1108	D5443	10.2		-0.97	1.0		1.02	0.1		----	
1134	D5443	10.49		-0.08	0.95		0.15			----	
1145	D6839	11.04		1.62						----	
1167		----		----			----			----	
1200		----		----			----			----	
1212	D5134	10.93	ex	1.28	1.10	ex	2.75	<0.1	C	----	Fr 53.69
1257	D5443	10.5		-0.05	0.5	G(1)	-7.65	0.0		----	
1264	D5443	10.96		1.37	0.95		0.15			----	
1276	D5543	11.142		1.93	0.947		0.10			----	
1284		----		----			----			----	
1291		----		----			----			----	
1307	in house	10.972		1.41	0.966		0.43			----	
1404	D5443	10.45		-0.20	0.97	C	0.50			----	Fr 0.33
1427		----		----			----			----	
1429		----		----			----			----	
1477	D5443	10.56	C	0.14	0.33	C,G(1)	-10.60	0.09		----	Fr 1.56
1510		----		----			----			----	
1603	in house	11.79	ex	3.93	0.94	ex	-0.02	0.01	ex	----	
1616	D6839	10.75		0.72	0.94		-0.02	0.10		----	
1653		----		----			----			----	
1656		----		----	0.3	ex	-11.12			----	
1720	D6839	6.98	G(1)	-10.90						----	
1737	in house	11.29		2.39	0.97		0.50			----	
1833	D5443	10.42		-0.29	0.20	DG(5)	-12.85			----	
1842		----		----			----			----	

1914	D5134Mod.	10.64		0.39	0.946		0.08	----	----
1948	D5443	10.55		0.11	1.00		1.02	----	----
1951	D5443	3.99	G(1)	-20.12	0.21	G(5)	-12.68	----	----
9054		----		----	----		----	----	----
9057		----		----	----		----	----	----
9058		----		----	----		----	----	----
9061		----		----	----		----	----	----
	normality	not OK			not OK		OK		
	n	36			30		9		
	outliers	5			7		2		
	mean (n)	10.515			0.941		0.063		
	st.dev. (n)	0.3501			0.0690		0.0534		
	R(calc.)	0.980			0.193		0.149		
	R(D5443:09e1)	0.908			0.161		n.a.		

Determination of Mercury content as Hg on sample #12043 and #12044; results in µg/kg

lab	method	#12043	mark	z(targ)	#12044	mark	z(targ)	remarks
150		----		----	----		----	
171	EPA6010B	21	G(0.05)	-3.46	300		1.13	
311	UOP938	125		1.22	350		2.16	
317		----		----	----		----	
323	INH-072	124		1.17	271		0.53	
333		----		----	99	G(0.05)	-3.02	
444	UOP938	54.64	C	-1.95	182.5	C	-1.29	Results were mixed up
541	INH-244	99		0.05	289		0.90	
609	UOP938	100.620	C	0.12	236.675	C	-0.18	Results were mixed up
657	UOP938	93.90		-0.18	204.70		-0.84	
781	INH-001	124	C	1.17	276		0.63	First reported 157
855		----		----	----		----	
862	UOP938	109.0	C	0.50	262.8	C	0.36	Original results probably mixed up
868	UOP938	59.9		-1.71	177.3		-1.40	
873		----		----	----		----	
875		----		----	----		----	
912		----		----	----		----	
963	D3323Mod.	72.1	C	-1.16	186.2	C	-1.22	Results were mixed up
974	UOP938	106.476		0.39	288.197		0.88	
1067		----		----	----		----	
1081	in house	97		-0.04	240		-0.11	
1134	in house	125		1.22	350		2.16	
1145	UOP938	73.3	C	-1.11	183	C	-1.28	Results were mixed up
1200		----		----	----		----	
1264	UOP938	53.8		-1.98	140.8		-2.15	
1307	UOP938	116.13		0.82	247.00		0.04	
1397	in house	93.28		-0.21	197.29		-0.99	
1404		----		----	----		----	
1429	INH-02	115.8		0.80	264.9		0.40	
1603	in house	98		0.00	241		-0.09	
1616		----		----	----		----	
1800	in house	114.20		0.73	283.06		0.78	
1842		----		----	----		----	
1914	in house	36	G(0.05)	-2.79	220		-0.52	
1951		----		----	----		----	
9054	UOP938	97.53		-0.02	236.30		-0.19	
9055		115		0.77	283		0.78	
9057	INH-1483	84.3		-0.61	221.5		-0.49	
9061		----		----	----		----	
	normality	OK			OK			
	n	23			25			
	outliers	2	spike		1	spike		
	mean (n)	97.912	92.87		245.289	249.2		
	st.dev. (n)	22.3625			52.4538			
	R(calc.)	62.615			146.871			
	R(Horwitz)	62.231			135.775			

Compare R(UOP938:10-B) = 9.19 / 23.03



Determinations of Arsenic content as As on sample #12045 and #12046; results in µg/kg

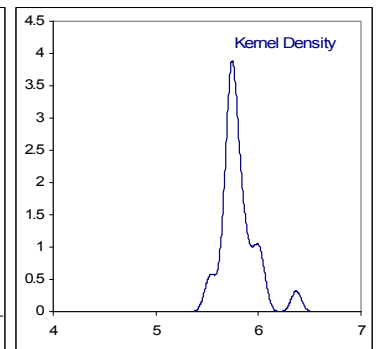
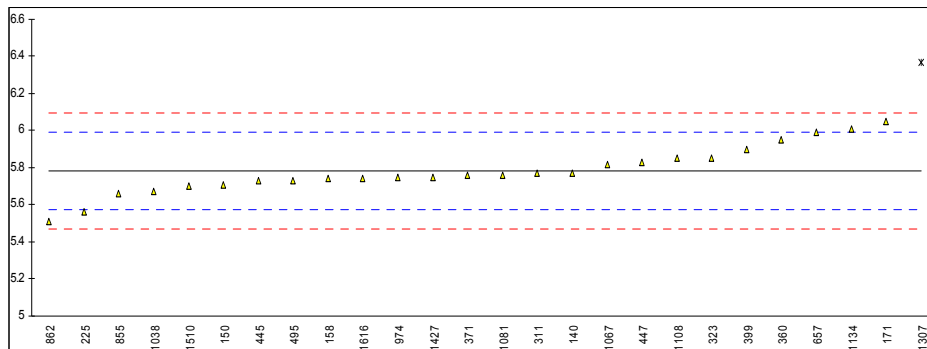
lab	method	#12045	mark	z(targ)	#12046	mark	z(targ)	remarks
150		----		----	----		----	
171		----		----	----		----	
311	INH-006	<10		----	20		----	
323	INH-018	<10		----	17		----	
444		----		----	----		----	
781		----		----	----		----	
855		----		----	----		----	
862	AAS	<10		----	<10		----	
868		----		----	----		----	
873		----		----	----		----	
875		----		----	----		----	
912		----		----	----		----	
963	UOP946	38.9		----	110		----	
1067		----		----	----		----	
1081	in house	<10		----	<10		----	
1134	in house	<1		----	----		----	
1145	INH-9312	0.50		----	0.61		----	
1404		----		----	----		----	
1603		----		----	----		----	
1616		----		----	----		----	
1842	in house	0.53		----	1.21		----	
1914	AAS	25		----	18		----	
	normality	n.a.			n.a.			
	n	9			8			
	outliers	0	<u>Spike:</u>		0	<u>Spike:</u>		
	mean (n)	<10	38.3		18.3	115.0		
	st.dev. (n)	n.a.			n.a.			
	R(calc.)	n.a.			n.a.			
	R(Horwitz)	n.a.			n.a.			

Determinations of Lead content as Pb on sample #12045 and #12046; results in µg/kg

lab	method	#12045	mark	z(targ)	#12046	mark	z(targ)	remarks
150		----		----	----		----	
171		<5		----	10		----	
311	INH-003	<10		----	36		----	
323	INH-002	<10		----	20		----	
444		----		----	----		----	
781	UOP952	4		----	8		----	
855	INH-242	<10		----	<10		----	
862	UOP952	<10		----	<10		----	
868	UOP952	<10		----	<10		----	
873		----		----	----		----	
875		----		----	----		----	
912		----		----	----		----	
963	IP224	52		----	148		----	
1067		----		----	----		----	
1081	in house	<10		----	<10		----	
1134		----		----	----		----	
1145	INH-9406	0.25		----	0.34		----	
1404	IP224	<10		----	----		----	
1603		----		----	----		----	
1616		----		----	----		----	
1842	in house	<0.5		----	2.22		----	
1914	IP224	2.8		----	1		----	
	normality	n.a.			n.a.			
	n	13			12			
	outliers	0	<u>Spike:</u>		0	<u>Spike:</u>		
	mean (n)	<10	67.1		18.5	200.5		
	st.dev. (n)	n.a.			n.a.			
	R(calc.)	n.a.			n.a.			
	R(Horwitz)	n.a.			n.a.			

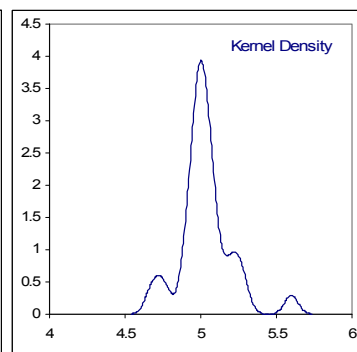
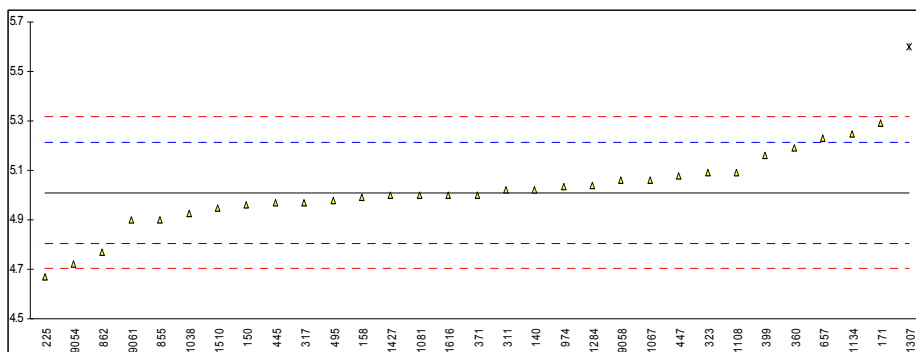
Determination of Total Vapour Pressure on sample #12047; results in psi

lab	method	value	mark	z(targ)	remarks
140	D5191	5.77		-0.12	
150	D5191	5.71		-0.69	
158	D5191	5.74		-0.40	
171	D5191	6.05		2.55	
225	D5191	5.56		-2.12	
311	D5191	5.77		-0.12	
317		----		----	
323	D5191	5.85		0.65	
329		----		----	
360	D5191	5.95		1.60	
371	D5191	5.76		-0.21	
399	D5191	5.90		1.12	
445	D5191	5.73		-0.50	
447	D5191	5.83		0.46	
495	D5191	5.73		-0.50	
657	D5191	5.99		1.98	
704		----		----	
759		----		----	
784		----		----	
855	D5191	5.66		-1.16	
862	D5191	5.51		-2.59	
868		----		----	
875		----		----	
974	D5191	5.748		-0.33	
1038	D5191	5.671		-1.06	
1065		----		----	
1067	D5191	5.816		0.32	
1081	D5191	5.76		-0.21	
1108	D5191	5.85		0.65	
1134	D5191	6.01		2.17	
1257		----		----	Reported Vapour pressure according ASTM D323 : 5.23 psi
1284		----		----	
1307	D5191	6.37	G(0.01)	5.60	
1427	D5191	5.75		-0.31	
1510	D5191	5.70		-0.78	
1616	D5191	5.74		-0.40	
9054		----		----	
9058		----		----	
9061		----		----	
	normality	not OK			
	n	25			
	outliers	1			
	mean (n)	5.782			
	st.dev. (n)	0.1286			
	R(calc.)	0.360			
	R(D5191:10b)	0.294			



Determination of DVPE acc. D5191 on sample #12047; results in psi

lab	method	value	mark	z(targ)	remarks
140	D5191	5.02		0.09	
150	D5191	4.96		-0.50	
158	D5191	4.99		-0.20	
171	D5191	5.29		2.73	
225	D5191	4.67		-3.33	
311	D5191	5.02		0.09	
317	D5191	4.97		-0.40	
323	D5191	5.09		0.78	
329		----		----	
360	D5191	5.19		1.76	
371	D5191	5.00		-0.10	
399	D5191	5.16		1.46	
445	D5191	4.97		-0.40	
447	D5191	5.08		0.68	
495	D5191	4.98		-0.30	
657	D5191	5.23		2.15	
704		----		----	
759		----		----	
784		----		----	
855	D5191	4.90		-1.08	
862	D5191	4.77		-2.36	
868		----		----	
875		----		----	
974	D5191	5.034		0.23	
1038	D5191	4.924		-0.85	
1065		----		----	
1067	D5191	5.062		0.50	
1081	D5191	5.00		-0.10	
1108	D5191	5.09		0.78	
1134	D5191	5.25		2.34	
1257		----		----	
1284	D5191	5.04		0.29	
1307	D5191	5.60	G(0.01)	5.77	
1427	D5191	5.00		-0.10	
1510	D5191	4.95		-0.59	
1616	D5191	5.00		-0.10	
9054	D5191	4.72		-2.85	
9058	D5191	5.06		0.48	
9061	D5191	4.9		-1.08	
normality		OK			
n		30			
outliers		1			
mean (n)		5.011			
st.dev. (n)		0.1394			
R(calc.)		0.390			
R(D5191:10b)		0.286			



APPENDIX 2

Number of participants per country

1 laboratory in ARGENTINA
1 laboratory in AUSTRALIA
1 laboratory in AZERBAIJAN
3 laboratories in BELGIUM
2 laboratories in BRAZIL
1 laboratory in BULGARIA
1 laboratory in CÔTE D'IVOIRE
5 laboratories in FRANCE
1 laboratory in GEORGIA
3 laboratories in GERMANY
1 laboratory in GREECE
1 laboratory in INDIA
1 laboratory in IRAN
1 laboratory in ISRAEL
1 laboratory in ITALY
2 laboratories in LATVIA
2 laboratories in MALAYSIA
1 laboratory in MEXICO
2 laboratories in NIGERIA
1 laboratory in NORWAY
3 laboratories in P.R. of CHINA
2 laboratories in PORTUGAL
3 laboratories in QATAR
5 laboratories in RUSSIA
3 laboratories in SAUDI ARABIA
1 laboratories in SINGAPORE
1 laboratory in SUDAN
1 laboratory in SWEDEN
1 laboratory in THAILAND
8 laboratories in THE NETHERLANDS
4 laboratories in TURKEY
3 laboratories in U.A.E.
4 laboratories in U.S.A.
1 laboratory in UKRAINE
10 laboratories in UNITED KINGDOM

APPENDIX 3

Abbreviations:

C	= corrected 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
fr	= first reported
ex	= excluded from calculations
w	= withdrawn on request participant
E	= error in calculations
S	= scope of the reported method is not applicable
U	= reported in a deviating unit
n.a.	= not applicable
n.e.	= not evaluated
SDS	= Safety Data Sheet
RSD	= Relative Standard Deviation

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