Results of Proficiency Test
Crude Oil
November 2016

CONTENTS

Appendices

1   INTRODUCTION

Since 1998, the Institute for Interlaboratory Studies organizes a proficiency test for Crude Oil every year. During the annual proficiency testing program 2016/2017, it was decided to continue the round robin for the analysis of Crude Oil. In this interlaboratory study 154 laboratories from 53 different countries registered for participation. See appendix 2 for the number of participants per country.

In this report, the results of the 2016 Crude Oil proficiency test are presented and discussed. This report is also available as PDF from the iis website www.iisnl.com.

2   SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, The Netherlands, was the organiser of this proficiency test. It was decided to send one sample of approx. 1 litre of Crude Oil in a one liter wide-necked bottle to enable use of a large size diameter high speed shear mixer for homogenisation. Analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. 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 agreement with ISO/IEC 17043:2010, since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie, R007). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 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 organisation was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3). This protocol can be downloaded from the iis website http://www.iisnl.com, from the FAQ page.

2.3   CONFIDENTIALITY STATEMENT

All data presented 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 bulk material was obtained from a local refinery. The approx. 200 litre of Crude Oil was homogenised in a metal drum. After homogenisation, the material was transferred to 200 wide-neck transparent colourless glass bottles of 1 L and labelled #16230.

The homogeneity of the subsamples was checked by the determination of Density in accordance ASTM D5002 on 8 stratified randomly selected samples.

	Density at 15 °C in kg/m^3
Sample #16230-1	873.90
Sample #16230-2	873.66
Sample #16230-3	873.43
Sample #16230-4	873.63
Sample #16230-5	873.53
Sample #16230-6	873.84
Sample #16230-7	873.50
Sample #16230-8	873.89

Table 1: Homogeneity test results of subsamples #16230

The repeatability (r) was calculated from the test results of table 1 and compared with 0.3 times the reproducibility (R) of the reference method in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Density at 15 °C in kg/m^3
r (observed)	0.52
reference testmethod	ASTM D5002:13
0.3*R (ref.test method)	1.08

Table 2: Repeatability on subsamples #16230

The calculated repeatability is less than 0.3 times the reproducibility of the reference method. Therefore, homogeneity of the subsamples #16230 was assumed.

Because the Crude Oil used for samples #16230 did not contain a detectable concentration mercury, 7 liters of Crude oil was taken from the original batch and spiked with 3.38 grams Conostan Hg std (100mg/kg) especially for Mercury determination. After homogenisation, 180 amber glass vials of 40 ml were filled with the spiked Crude Oil and labelled #16231. The homogeneity of subsamples #16231 was checked by determination of Mercury in accordance with UOP938 on 4 stratified randomly selected samples, see next table.

	Mercury in µg/kg
sample #16231-1	50.4
sample #16231-2	49.8
sample #16231-3	50.1
sample #16231-4	49.8

Table 3: homogeneity test results of subsamples #16231

The repeatability (r) was calculated from the test results of table 3 and compared with 0.3 times the target reproducibility (R) in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Mercury in µg/kg
r (observed)	0.8
reference	Horwitz
0.3*R (reference)	10.6

Table 4: Repeatability on subsamples #16231

The calculated repeatability is less than 0.3 times the target reproducibility Therefore, homogeneity of the subsamples #16231 was assumed.

Because brown coloured wide-neck glass bottles of 1 L were not available, the (clear glass) bottles of 1 L were packed in red plastics bags. In the letter of instructions, all participants were asked to shield the samples from light before analysis.

To each of the participating laboratories one bottle of 1 L (labelled #16230) and one 40 ml vial (labelled #16231) were sent on October 19, 2016.

2.5 STABILITY OF THE SAMPLES

The stability of Crude Oil packed in the clear glass bottles with red plastic bag was checked in the past. The material has been found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were requested to determine on sample #16230: Acid Number, API Gravity, BS&W, Density at 15°C, Kinematic Viscosity at 40°C, Light ends (C1-C6 and total C1-C6), Molecular Mass Average, Pour Point (Maximum), Salt as NaCl, Sediment by Extraction (ASTM D473) and Sediment by Membrane filtration (ASTM D4807), Sulphur total, Water content and simulated Distillation by high temp GC and total Mercury on sample #16231.

It was explicitly requested to treat the samples as if they were routine samples and to report the test results using the indicated units on the report form and not to round the results more, but report as much significant figures as possible. It was also requested not to report 'less than' results, which are above the detection limit, because such results cannot be used for meaningful statistical calculations.

To get comparable results a detailed report form, on which the units were prescribed as well as the reference test methods and a letter of instructions were prepared and made available on the data entry portal www.kpmd.co.uk/sgs-iis-cts/. The laboratories were also requested to confirm the sample receipt on the same data entry portal together with some details of the test methods used. A letter of instructions and a SDS were added to the sample package.

3 RESULTS

During five weeks after sample dispatch the results of the laboratories were collected via the data entry portal www.kpmd.co.uk/sgs-iis/. The original reported results are tabulated per determination in appendix 1 of this report. The laboratories are presented by their code numbers.

Directly after the deadline, a reminder was sent to those laboratories that did not report test results at that moment.

Shortly after the deadline, the available test results were screened for suspect data. A test 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 reported test results. Additional or corrected test results are used for the data analysis and the original results are placed under 'Remarks' in the result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

The protocol followed in the organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies, Protocol for the Organisation, Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3).

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, a variant of the Kolmogorov-Smirnov test, and by the calculation of skewness and kurtosis. Evaluation of the three normality indicators in combination with the visual evaluation of the graphic Kernel density plot, lead to judgement of the normality being either 'unknown', 'OK', 'suspect' or 'not OK'. 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.

According to ISO 5725 the original results per determination were submitted to Dixon's and/or Grubbs' and/or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's 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 is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also a normal Gauss curve was projected over the Kernel Density Graph for reference.

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 variation in this interlaboratory study. The target standard deviation was calculated from the literature reproducibility by division with 2.8.

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-use.

The z-scores were calculated in accordance with:

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

The $z_{(target)}$ scores are listed in appendix 1. Absolute values for z<2 are very common and absolute values for z>3 are very rare. The usual interpretation of z-scores is as follows:

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

4   EVALUATION

In this proficiency test sample dispatch problems were encountered during the execution. The samples to participants in Afghanistan, Algeria, Brazil, Colombia, Ecuador, Kazakhstan, Peru, Russian Federation, Saudi Arabia and Turkmenistan arrived late or after the deadline or did never reach the laboratories at all due to customs clearance and/or transportation problems. In total 136 laboratories submitted 1126 numerical results. Observed were 60 statistically outlying results, which is 5.3% of the reported results. In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

4.1   EVALUATION PER TEST

In the iis PT reports, ASTM methods are referred to with a number (e.g. D4007) and an added designation for the year that the method was adopted or revised (e.g. D4007:11e1). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D4007:11e1(2013)). In the results tables of appendix 1 only the method number and year of adoption or revision e.g. D4007:11e1 are used.

Not all original data sets proved to have a normal Gaussian distribution. These are referred to as "not OK" or "suspect". The statistical evaluation of these data sets should be used with due care.

Acid Number: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers, is in agreement with the requirements of ASTM D664-A:11a.

API Gravity: This determination was not problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D287:12b.

BS&W: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility reproducibility after rejection of the statistical outlier, is in agreement with the requirements of ASTM D4007:11e1(2013).

Density: This determination was not problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D5002:16. Several participants used ASTM D4052. It must be noted that in the scope of this method is mentioned that ASTM D5002 is intended for crude oils (see e.g. §1.3 of ASTM D4052:15).

Kin.Visc.at 40°C: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D445:15a.

Light Ends: This determination was problematic. In total ten statistical outliers were observed over nine components and one calculation error in total C1-C6. None of the nine calculated reproducibilities, after rejection of the statistical outliers, was in agreement with the requirements of IP344:88(2010). It is to be noted that D5134 and D6730 may not be suitable for testing crude oil.

Molecular Mass: This determination may be problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D2503:92(2012). The low number of reported test results (n=5) may (partly) explain the observed large variation.

Pour Point: This determination was not problematic. Seven (!) test results were excluded from the calculations as the reported test methods are in principle not suitable for Crude Oils (see for example the scope of the test method of

ASTM D97). After exclusion of these test results, only one statistical outlier was observed. The calculated reproducibility after rejection of the suspect test results is in agreement with the requirements of ASTM D5853A:11.

Salt as NaCl: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier, is in agreement with the requirements of ASTM D3230:13.

Sediment by Extraction (ASTM D473): This determination was not problematic. Six statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers, is in full agreement with the requirements of ASTM D473:07.

Sediment by Membrane filtration (ASTM D4807): The determination was problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers, is not in agreement with the requirements of ASTM D4807:05(2012).

Sulphur: This determination was problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D4294:16e1.

Water: This determination was only problematic for a number of laboratories. Seven statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers, is in full agreement with the requirements of ASTM D4377:00(2011). This is in contradiction to the observations in previous years. One of the possible reasons may be the change in reporting unit from %V/V in previous years to %M/M in 2016. Another reason may be the lack of free water. In previous year free water was added to the Crude Oil, whereas in 2016 no free water was present in the samples.

Simulated Distillation: This determination was very problematic. Only 16 labs reported test results for this determination. In total eleven statistical outliers were observed over eight parameters. However, none of the calculated reproducibilities after rejection of the statistical outliers, was in agreement with the requirements of ASTM D7169:11.

Mercury: This determination may not be problematic at the mercury concentration of
(#16231)   50 µg/kg. No statistical outliers were observed. Regretfully no target reproducibility is available. ASTM D7623 gives only a repeatability and UOP938, used by the majority of the laboratories, is not intended to be used on crude oil. Also, the repeatability of UOP938 is only available for concentrations in µg/**L** and conversion to µg/**kg** will lead to extra uncertainty. Therefore, it was decided to use the Horwitz equation for evaluation of the test results in this report. The calculated reproducibility is in agreement with the estimated requirements using the Horwitz equation.

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 target reproducibilities derived from literature standards and the calculated reproducibilities are compared in the next table.

Parameter		unit	n	average	2.8 *sd_R	R (lit)
Acid Number (total)		mg KOH/g	65	0.15	0.14	0.16
API Gravity			86	30.4	0.4	0.5
BS&W		%V/V	48	0.04	0.08	0.11
Density at 15°C		kg/m^3	123	873.8	2.0	3.6
Kinematic Viscosity at 40°C		mm^2/s	78	10.00	1.10	0.74
Light Ends						
methane		%M/M	10	<0.01	n.a.	n.a.
ethane		%M/M	15	0.017	0.013	0.007
propane		%M/M	16	0.27	0.09	0.06
i-butane		%M/M	16	0.18	0.05	0.03
n-butane		%M/M	16	0.83	0.19	0.11
i-pentane		%M/M	16	0.71	0.12	0.06
n-pentane		%M/M	16	1.21	0.20	0.12
cyclopentane		%M/M	16	0.07	0.03	0.01
total hexanes		%M/M	13	2.85	0.51	0.45
Total C1-C6 Light Ends		%M/M	13	6.1	0.9	0.5
Mercury (total)		µg/kg	16	46	28	33
Molecular Mass		g/mol	5	237	17	14
Pour Point, Max.		°C	23	-33	15	18
Salt as NaCl		mg/kg	82	7.8	10.3	12.9
Sediment Extraction (D473)		%V/V	58	0.008	0.015	0.035
Sediment Membrane filt. (D4807)		%M/M	38	0.017	0.025	0.015
Total Sulphur		%M/M	101	2.65	0.18	0.14
Water		%M/M	95	0.03	0.03	0.03
Simulated Distillation	IBP	°C	9	8	70	2
	5%recovered	°C	12	71	26	20
	10%recovered	°C	13	113	26	20
	30%recovered	°C	12	248	29	13
	50%recovered	°C	13	368	32	16
	70%recovered	°C	13	500	44	21
	90%recovered	°C	13	673	98	n.a.
	FBP	°C	10	>720	n.a.	n.a.

Table 5: Reproducibilities of the tests methods for sample #16230 and #16231 (Hg only)

Without further statistical calculations it can be concluded that for several tests there is a good 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 NOVEMBER 2016 WITH PREVIOUS PTS

	November 2016	November 2015	November 2014	October 2013	November 2012
Number of reporting labs	136	129	133	125	121
Number of results reported	1126	1077	985	827	860
Statistical outliers	60	26	44	36	42
Percentage outliers	5.3%	2.4	4.5	4.4	4.9

Table 6: 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	November 2016	November 2015	November 2014	October 2013	November 2012
Acid Number (total)	+	+	++	+	++
API Gravity	+	+/-	+	+	++
BS&W	+	-	++	-	++
Density at 15°C	++	++	++	++	++
Kinematic Viscosity at 40ºC	-	-	+/-	--	--
Light Ends (C1-C6)	--	+/-	--	--	--
Mercury (total)	(+)	(--)	(-)	(--)	(--)
Molecular Mass	-	+	n.e.	n.e.	n.e.
Pour Point, Max	+	-	+	--	+/-
Salt as NaCl	+	+	+	+	+
Sediment Extraction (D473)	++	++	n.e.	n.e.	++
Sediment Membrane fil. (D4807)	--	--	-	-	--
Total Sulphur	-	--	+/-	--	+/-
Water	+/-	--	+/-	--	--
Simulated Distillation	--	--	n.e.	n.e.	n.e.

Table 7: Comparison determinations against the standard
(between brackets is a comparison against Horwitz)

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 Acid Number (total) on sample #16230; results in mg KOH/g

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D664-A	0.13		-0.30	988		-----		-----
62	D664-A	0.10		-0.82	991		-----		-----
90		-----		-----	992		-----		-----
92		-----		-----	994	D664-A	0.165		0.31
120	D664-A	0.13		-0.30	995	D664-A	0.1479		0.01
131	D664-A	0.040		-1.85	997		-----		-----
133		-----		-----	998		-----		-----
140	D664-A	0.08		-1.16	1011	D664-A	0.14		-0.12
150	D664-A	0.10		-0.82	1016	D664-A	0.142		-0.09
151		-----		-----	1039	D664-A	0.27		2.13
154		-----		-----	1040	ISO6619	0.262		1.99
158		-----		-----	1056	D664-A	0.184		0.64
159	D664-A	0.178		0.53	1065	D664-A	0.136		-0.19
167	D664-A	0.056		-1.58	1066	D664-A	0.155		0.14
168		-----		-----	1081	D664-A	0.145		-0.04
171	D664-A	0.116		-0.54	1106	D664-A	0.1524		0.09
175		-----		-----	1109	D664-A	0.14		-0.12
186		-----		-----	1148	D8045	0.1496		0.04
203		-----		-----	1161	D664-A	0.1596		0.22
213		-----		-----	1201	D664-A	0.17		0.40
238	D664-A	0.066		-1.40	1236		-----		-----
273		-----		-----	1248		-----		-----
311	D664-A	0.16		0.22	1259	D664-A	0.140		-0.12
314		-----		-----	1264		-----		-----
332		-----		-----	1357	D664	1.48	R(0.01)	23.07
333	D664-A	0.15		0.05	1379		-----		-----
334		-----		-----	1397		-----		-----
335		-----		-----	1539	D664-A	0.19		0.74
340	D664-A	0.157		0.17	1544		-----		-----
391	D664-A	0.166		0.33	1556	D664-A	0.10		-0.82
399		-----		-----	1583		-----		-----
402	D664-A	0.165		0.31	1585	D664-A	0.154		0.12
441		-----		-----	1613		-----		-----
442		-----		-----	1654		-----		-----
444	D664-A	0.103		-0.76	1656	D664-A	<0.1		-----
445	D664-A	0.140		-0.12	1714		0.1076		-0.68
446		-----		-----	1720	D664-A	0.14		-0.12
447	D664-A	0.17		0.40	1728		-----		-----
485		-----		-----	1741	ISO6619	0.154		0.12
494	D664-A	0.111		-0.63	1776	D664-A	0.05		-1.68
511		-----		-----	1796	D664-A	0.1608		0.24
529	D664-A	0.24065		1.62	1800		-----		-----
541		-----		-----	1810		-----		-----
551		-----		-----	1811	D664-A	0.1766		0.51
557		-----		-----	1815		-----		-----
574	D664-A	0.206		1.02	1842		-----		-----
575	D664-A	0.110		-0.64	1849		-----		-----
593		-----		-----	1858	D664-A	0.16		0.22
602		-----		-----	1884		-----		-----
605	D664-A	0.08		-1.16	1892		-----		-----
606		-----		-----	1902		-----		-----
608	D664-A	0.101		-0.80	1930		-----		-----
609		-----		-----	1957	D664-A	0.144		-0.05
613		-----		-----	1967		-----		-----
621	D664-A	0.14		-0.12	1995		-----		-----
657	D664-A	0.15		0.05	6006		-----		-----
663	D664-A	0.13		-0.30	6016		-----		-----
704	D664-A	0.174		0.47	6028	D664-A	0.20		0.92
732		-----		-----	6073	D664-A	0.51	CR(0.01)	6.28
739		-----		-----	9051		-----		-----
742		-----		-----	9052		-----		-----
749		-----		-----	9057		-----		-----
750	D664-A	0.087		-1.04	9060		-----		-----
751		-----		-----	9063		-----		-----
752	D664-A	0.15		0.05	9101		-----		-----
753	D664-A	0.20		0.92	9132	D664-A	0.09		-0.99
781	D664-A	0.15		0.05	9133		-----		-----
785		-----		-----	9134		-----		-----
840		-----		-----	9135		-----		-----
862	D664-A	0.21		1.09	9136		-----		-----
874	D664-A	0.15		0.05	9139		-----		-----
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	D664-A	0.634	R(0.01)	8.43
971	D664-A	0.18		z 0.57	9146	D664-A	0.30		2.65
974		-----		-----	9151		-----		-----
982		-----		-----	9152		-----		-----

normality	suspect
n	65
outliers	3
mean (n)	0.1471
st.dev. (n)	0.04878
R(calc.)	0.1366
R(D664-A:11ae1)	0.1617

Lab 6073 first reported: 0.67
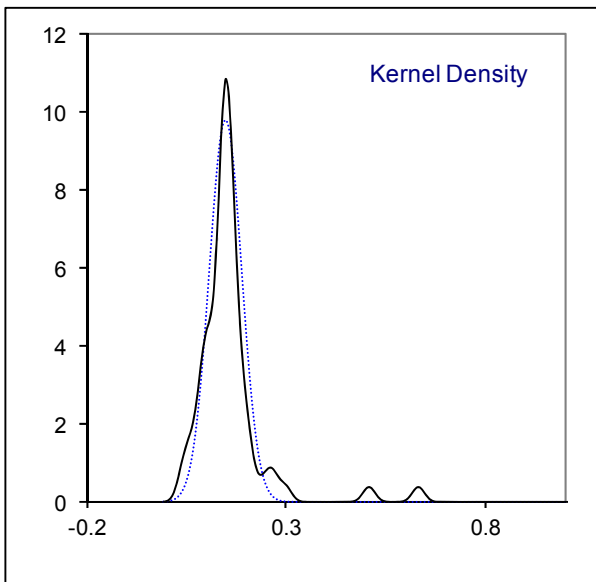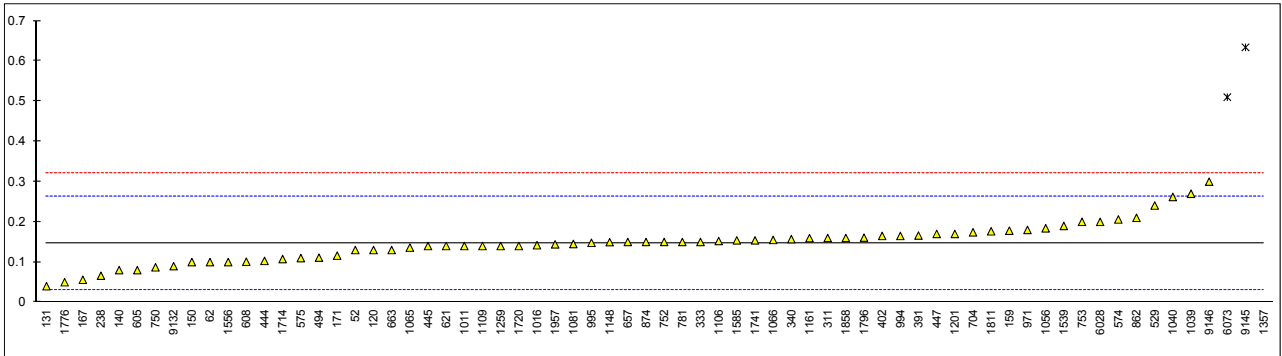
Determination of API Gravity on sample #16230;

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988	Calc.	30.5		0.82
62	D5002	30.3		-0.30	991	Calc.	30.6		1.38
90	D5002	30.39		0.20	992	Calc.	30.36		0.03
92	D5002	30.46		0.59	994	Calc.	30.34		-0.08
120	D5002	30.4		0.26	995	D287	30.30		-0.30
131	D5002	30.34		-0.08	997	D287	30.30		-0.30
133		-----		-----	998		-----		-----
140	D5002	30.5		0.82	1011		-----		-----
150	D287	30.4		0.26	1016		-----		-----
151		-----		-----	1039		-----		-----
154	D287	30.4		0.26	1040		-----		-----
158		-----		-----	1056	Calc.	30.5		0.82
159	D5002	30.3		-0.30	1065		-----		-----
167	D5002	30.345		-0.05	1066	D4052	30.42		0.37
168	D287	30.5		0.82	1081		-----		-----
171	D287	30.3		-0.30	1106		-----		-----
175	D5002	30.41		0.31	1109	Calc.	30.44		0.48
186	D5002	30.5		0.82	1148	Calc.	30.254		-0.56
203	Calc.	30.51		0.87	1161	D287	30.39		0.20
213		-----		-----	1201	Calc.	30.47		0.65
238	Calc.	30.33		-0.14	1236	D287	30.35		-0.02
273	D5002	30.6		1.38	1248	Calc.	30.039		-1.77
311		-----		-----	1259	Calc.	30.23		-0.70
314		-----		-----	1264		-----		-----
332		-----		-----	1357	D1298	30.34		-0.08
333		-----		-----	1379	D287	30.24		-0.64
334		-----		-----	1397		-----		-----
335		-----		-----	1539		-----		-----
340		-----		-----	1544		-----		-----
391	D5002	30.40		0.26	1556		-----		-----
399	D287	30.3		-0.30	1583	Calc.	30.348		-0.04
402		-----		-----	1585	D5002	30.44		0.48
441	Calc.	30.39		0.20	1613		-----		-----
442	D5002	30.3438		-0.06	1654	D4052	30.45		0.54
444	D5002	30.90	R(0.01)	3.06	1656	D5002	30.34		-0.08
445		-----		-----	1714	D5002	30.14		-1.20
446	D5002	30.46		0.59	1720		-----		-----
447	Calc.	30.4		0.26	1728	D5002	30.436		0.46
485		-----		-----	1741		-----		-----
494		-----		-----	1776		-----		-----
511		-----		-----	1796	Calc.	30.403		0.27
529	D287	30.45		0.54	1800		-----		-----
541	D5002	30.4		0.26	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815		-----		-----
574	D4052	30.3		-0.30	1842		-----		-----
575	D1298	30.3	C	-0.30	1849	D1298	30.30		-0.30
593	D1298	30.5		0.82	1858	Calc.	30.44		0.48
602		-----		-----	1884		-----		-----
605	D5002	30.11		-1.37	1892	D5002	30.33		-0.14
606	D5002	30.38		0.14	1902	D287	30.4		0.26
608	D5002	30.16		-1.09	1930	Calc.	30.37		0.09
609	D5002	30.00		-1.98	1957	D5002	29.35	R(0.01)	-5.62
613		-----		-----	1967		-----		-----
621	D5002	29.82	R(0.01)	-2.99	1995		-----		-----
657	D5002	30.37		0.09	6006		-----		-----
663	D5002	30.45		0.54	6016	D5002	30.323		-0.18
704	D1250	30.314		-0.23	6028	D1298	30.29		-0.36
732	D5002	30.02		-1.87	6073	D5002	30.3		-0.30
739		-----		-----	9051		-----		-----
742		-----		-----	9052		-----		-----
749		-----		-----	9057		-----		-----
750	D1298	30.4		0.26	9060	D5002	30.31		-0.25
751	Calc.	30.31		-0.25	9063		-----		-----
752	Calc.	30.39		0.20	9101		-----		-----
753	D5002	30.31		-0.25	9132	Calc.	30.1		-1.42
781	D5002	30.28		-0.42	9133	Calc.	30.1		-1.42
785		-----		-----	9134	Calc.	30.6		1.38
840	D5002	30.36		0.03	9135	Calc.	29.7	R(0.01)	-3.66
862	D287	30.28		-0.42	9136	Calc.	30.7		1.94
874	Calc.	30.44		0.48	9139	Calc.	30		-1.98
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	D4052	29.67	R(0.01)	-3.83
971	D5002	30.40		0.26	9146	In house	30.3		-0.30
974	Calc.	30.42		0.37	9151		-----		-----
982	Calc.	30.35		-0.02	9152		-----		-----

normality	suspect
n	86
outliers	5
mean (n)	30.354
st.dev. (n)	0.1294
R(calc.)	0.362
R(D287:12b)	0.500

Lab 575 first reported: 30.9

Kernel Density
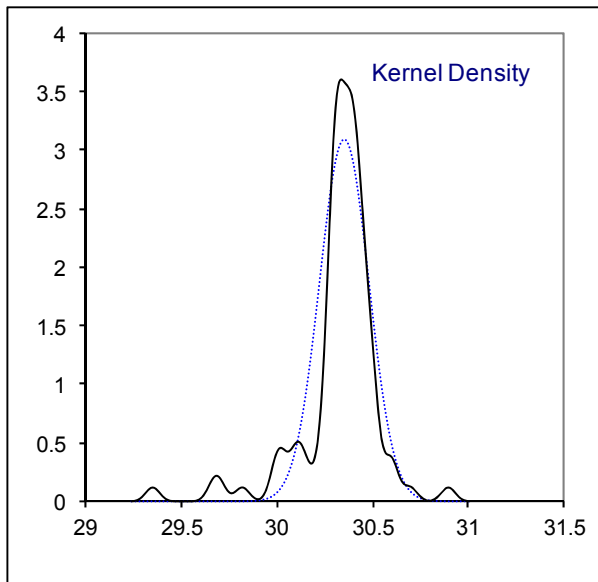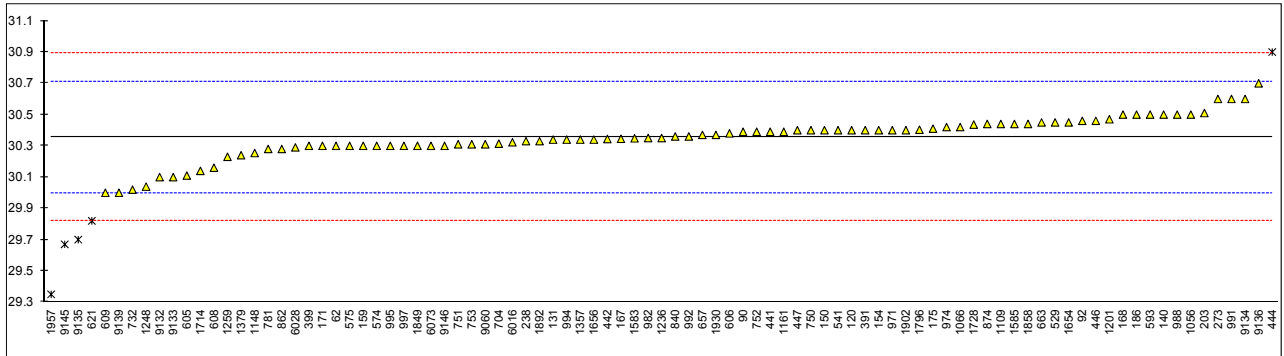
Determination of BS&W on sample #16230; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4007	0.05		0.19	988		-----		-----
62	D4007	0.20	C,R(0.01)	3.97	991		-----		-----
90		-----		-----	992		-----		-----
92		-----		-----	994	D4007	0.025		-0.44
120	D4007	0.02	C	-0.57	995		-----		-----
131	D4007	0.05		0.19	997		-----		-----
133		-----		-----	998		-----		-----
140	D4007	0		-1.07	1011	D4007	0.10		1.45
150	D4007	0.05		0.19	1016		-----		-----
151		-----		-----	1039		-----		-----
154	D4007	0.0		-1.07	1040		-----		-----
158		-----		-----	1056		-----		-----
159	D4007	<0.050		-----	1065	D4007	<0.1		-----
167	D4007	0.05		0.19	1066		-----		-----
168		-----		-----	1081		-----		-----
171	D4007	0.05		0.19	1106	D4007	0.00		-1.07
175		-----		-----	1109	D4007	0.05		0.19
186		-----		-----	1148		-----		-----
203		-----		-----	1161		-----		-----
213		-----		-----	1201	D4007	0.05		0.19
238		-----		-----	1236		-----		-----
273		-----		-----	1248		-----		-----
311		-----		-----	1259	ISO9030	0.05		0.19
314		-----		-----	1264		-----		-----
332		-----		-----	1357	D4007	0.10		1.45
333	D4007	0.025		-0.44	1379		-----		-----
334		-----		-----	1397		-----		-----
335		-----		-----	1539		-----		-----
340		-----		-----	1544		-----		-----
391		-----		-----	1556	ISO3734	0.05		0.19
399		-----		-----	1583		-----		-----
402	D4007	0.025		-0.44	1585		-----		-----
441		-----		-----	1613		-----		-----
442		-----		-----	1654		-----		-----
444		-----		-----	1656		-----		-----
445	D4007	0.00		-1.07	1714		-----		-----
446		-----		-----	1720		-----		-----
447		-----		-----	1728		0.045		0.06
485		-----		-----	1741	ISO9030	0.05		0.19
494		-----		-----	1776		-----		-----
511	D4007	0.05		0.19	1796		-----		-----
529	D4007	0.05		0.19	1800		-----		-----
541		-----		-----	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815	D4007	<0.050		-----
574	D4007	0.050		0.19	1842		-----		-----
575		-----		-----	1849		-----		-----
593	D4007	0		-1.07	1858		-----		-----
602	D4007	0.05		0.19	1884		-----		-----
605	D4007	0.05		0.19	1892	D4007	0.0		-1.07
606		-----		-----	1902		-----		-----
608	D4007	0.0		-1.07	1930		-----		-----
609	D4007	0.05		0.19	1957	D4007	0.025		-0.44
613		-----		-----	1967		-----		-----
621		-----		-----	1995		-----		-----
657	D4007	0.05		0.19	6006		-----		-----
663	D4007	0.025		-0.44	6016	D4007	0.00		-1.07
704	D4007	0.025		-0.44	6028	D4007	0.10		1.45
732		-----		-----	6073	Calc.	<0.1		-----
739		-----		-----	9051		-----		-----
742		-----		-----	9052		-----		-----
749		-----		-----	9057		-----		-----
750		-----		-----	9060	D4007	0.10		1.45
751		-----		-----	9063		-----		-----
752		-----		-----	9101		-----		-----
753		-----		-----	9132	D4007	0.05		0.19
781	D4007	0.025		-0.44	9133	D4007	0.05		0.19
785		-----		-----	9134	D4007	0.05		0.19
840	D4007	0.05		0.19	9135	D4007	0.05		0.19
862		-----		-----	9136	D4007	0.05		0.19
874	D4007	0		-1.07	9139	D4007	0.05		0.19
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	D4007	0.1		1.45
971		-----		-----	9146	D4007	<0.1		-----
974	D4007	0.10		1.45	9151		-----		-----
982		-----		-----	9152		-----		-----

normality	OK
n	48
outliers	1
mean (n)	0.043
st.dev. (n)	0.0292
R(calc.)	0.082
R(D4007:11)	0.111

Lab 62 first reported: 0.25
Lab 120 first reported: 0.2
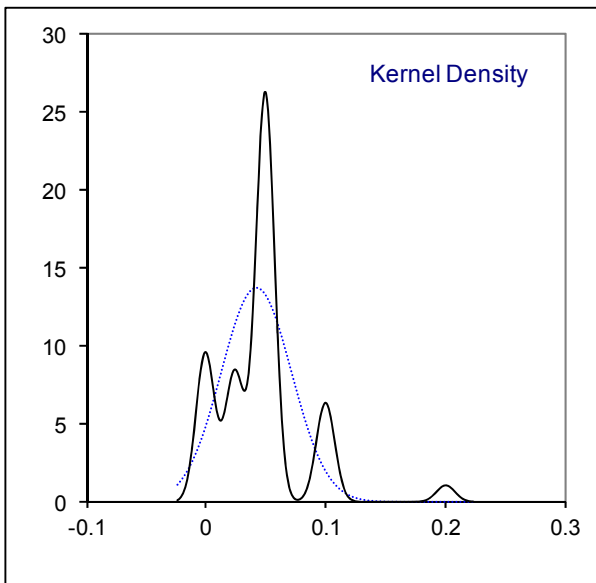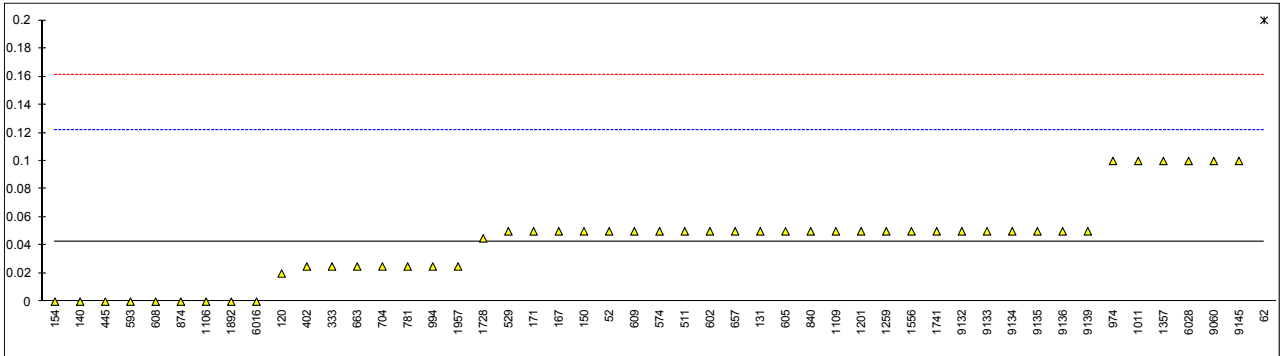
Determination of Density at 15°C on sample #16230; results in kg/m^3

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5002	873.5		-0.21	988	D1298	873.2		-0.45
62	D5002	874.0		0.17	991	D1298	872.3		-1.15
90	D5002	873.6		-0.14	992	D1298	873.7		-0.06
92	D5002	873.0		-0.60	994	D5002	873.9		0.10
120	D5002	873.5		-0.21	995	D5002	874.18		0.31
131	D5002	873.85		0.06	997	D5002	874.19		0.32
133		-----		-----	998		-----		-----
140	D5002	873.0		-0.60	1011	D5002	873.7		-0.06
150	D5002	874.5		0.56	1016	D4052	874.5		0.56
151		-----		-----	1039	ISO12185	873.3		-0.37
154	D5002	873.5		-0.21	1040	ISO12185	873.6		-0.14
158		-----		-----	1056	D5002	873.1		-0.53
159	D5002	874.2	C	0.33	1065	D4052	874.1	C	0.25
167	D5002	873.675		-0.08	1066	D5002	873.4	C	-0.29
168		-----		-----	1081	D5002	873.42		-0.28
171	D5002	873.0	C	-0.60	1106	D5002	874.4		0.49
175	D5002	873.4		-0.29	1109	D5002	873.0		-0.60
186	D5002	873.0		-0.60	1148	ISO12185	874.920		0.89
203	D1298	872.90		-0.68	1161	ISO3675	873.3		-0.37
213		-----		-----	1201	ISO12185	873.1		-0.53
238	D4052	873.9		0.10	1236	D5002	873.8		0.02
273	D5002	872.5		-0.99	1248	D5002	875.42		1.28
311	D5002	873.5		-0.21	1259	ISO3675	874.5		0.56
314	D5002	873.77		0.00	1264		-----		-----
332	D5002	873.4		-0.29	1357	D5002	873.5		-0.21
333	D5002	873.6		-0.14	1379	D5002	874.4		0.49
334	D4052	873		-0.60	1397		-----		-----
335	D5002	873.7		-0.06	1539	ISO12185	875.8		1.57
340	D5002	875.46		1.31	1544	D5002	873.75		-0.02
391	D5002	873.5		-0.21	1556	ISO12185	873.47		-0.24
399	D5002	874.3		0.41	1583	D5002	873.8		0.02
402	ISO12185	873.5		-0.21	1585	D5002	873.31		-0.36
441	D4052	873.6		-0.14	1613		-----		-----
442	IP365	873.4		-0.29	1654	D4052	873.27		-0.39
444	D5002	870.8	R(0.05)	-2.31	1656	D5002	873.4		-0.29
445	D4052	873.4		-0.29	1714	D5002	873.8		0.02
446	D5002	873.2		-0.45	1720	D4052	873.9		0.10
447	D5002	873.5		-0.21	1728	D5002	873.30		-0.37
485	D5002	873.35		-0.33	1741	ISO3675	874.3		0.41
494	ISO12185	873.4		-0.29	1776	ISO12185	873.33		-0.35
511		-----		-----	1796	D5002	873.51		-0.21
529	D5002	873.33	C	-0.35	1800	D5002	873.7		-0.06
541	D5002	873.5		-0.21	1810	D5002	873.5		-0.21
551		-----		-----	1811	D5002	873.4		-0.29
557		-----		-----	1815	ISO12185	874.16		0.30
574	D4052	874.2		0.33	1842	D4052	873.9		0.10
575	D1298	870.8	R(0.05)	-2.31	1849		-----		-----
593		-----		-----	1858	D1298	873.3		-0.37
602	D1298	873.0		-0.60	1884	D5002	874.94	C	0.91
605	D5002	874.76	C	0.77	1892	D5002	873.1	C	-0.53
606	D5002	873.3		-0.37	1902	D5002	873.8		0.02
608	D5002	874.8		0.80	1930	ISO12185	873.34		-0.34
609	D5002	875.4		1.26	1957	D5002	878.8	C,R(0.01)	3.91
613	D4052	873.2		-0.45	1967		-----		-----
621	D5002	875.9		1.65	1995		-----		-----
657	D5002	873.7		-0.06	6006	D5002	873.31		-0.36
663	D5002	873.26		-0.40	6016	D5002	873.62		-0.12
704	D5002	873.62		-0.12	6028	ISO3675	874.1		0.25
732	D5002	875.6		1.42	6073	D5002	873.95		0.14
739	GOST R51069	873.5		-0.21	9051		-----		-----
742	D5002	874.1		0.25	9052	In house	875.9		1.65
749	GOST R51069	873.3		-0.37	9057	D5002	874.45		0.52
750	D1298	873.7		-0.06	9060	D5002	874.0		0.17
751	D1298	874.0		0.17	9063		-----		-----
752	D5002	873.6		-0.14	9101		-----		-----
753	D5002	874.0		0.17	9132	D5002	874.9		0.87
781	D5002	874.2		0.33	9133	D5002	875.3		1.19
785	D5002	873.6		-0.14	9134	D5002	872.6		-0.91
840	D5002	873.06		-0.56	9135	D5002	877.3	R(0.01)	2.74
862	D5002	873.78		0.00	9136	D5002	871.9		-1.46
874	D5002	873.3		-0.37	9139	D5002	875.7		1.50
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	D5002	877.00	R(0.05)	2.51
971	D5002	873.5		-0.21	9146		-----		-----
974	D5002	873.4		-0.29	9151		-----		-----
982	D1298	873.8		0.02	9152	D5002	874.6	C	0.64

normality	suspect
n	123
outliers	5
mean (n)	873.78
st.dev. (n)	0.729
R(calc.)	2.04
R(D5002:16)	3.60

Lab 159 first reported: 0.8742 kg/m^3
Lab 171 first reported: 0.8730 kg/m^3
Lab 529 first reported: 0.87333 kg/m^3
Lab 605 first reported: 0.87476 kg/m^3
Lab 1065 first reported: 0.87411 kg/m^3

Lab 1066 first reported: 0.8734 kg/m^3
Lab 1884 first reported: 868.27
Lab 1892 reported: 8731 kg/m^3 (probably a unit error?)
Lab 1957 reported: 0.8788 kg/m^3 (probably a unit error?)
Lab 9152 first reported: 0.8746 kg/m^3
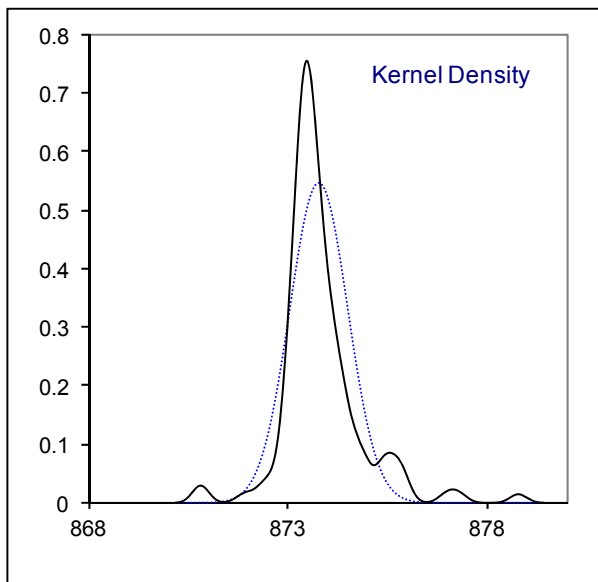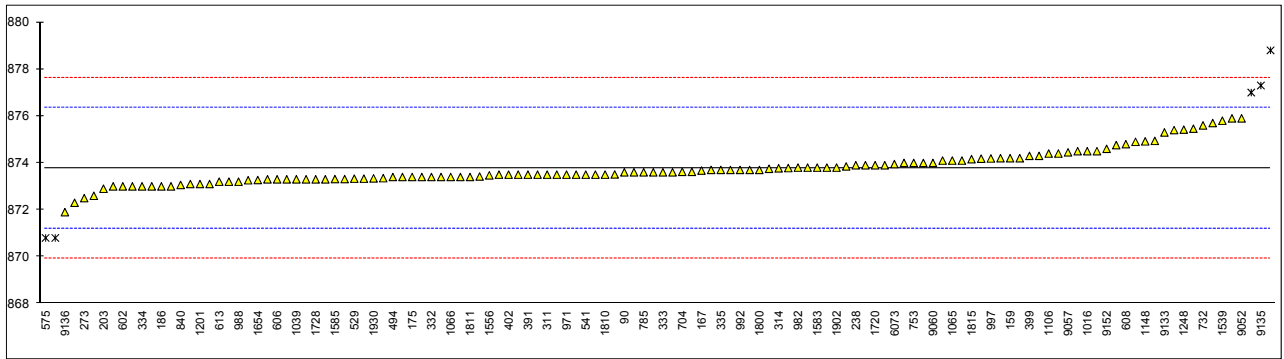
Determination of Kinematic Viscosity at 40 ºC on sample #16230; results in mm²/s

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988	D445	10.247		0.95
62		-----		-----	991		-----		-----
90		-----		-----	992	D445	10.465		1.78
92		-----		-----	994	D445	10.09		0.36
120	D445	10.23		0.89	995	D445	9.972		-0.09
131	D445	9.619		-1.42	997	D445	9.975		-0.08
133		-----		-----	998		-----		-----
140	D445	9.584		-1.56	1011		-----		-----
150	D445	9.709		-1.08	1016		-----		-----
151		-----		-----	1039		-----		-----
154		-----		-----	1040	D445	9.9715		-0.09
158		-----		-----	1056	D7042	9.45		-2.06
159	D445	10.82		3.12	1065	D445	9.988		-0.03
167		-----		-----	1066	D445	9.641		-1.34
168		-----		-----	1081		-----		-----
171	D445	10.53	C	2.02	1106		-----		-----
175		-----		-----	1109	D445	9.7682		-0.86
186		-----		-----	1148	ISO3104	10.39		1.49
203	D445	10.1855		0.72	1161	ISO3104	9.931		-0.24
213		-----		-----	1201	D445	10.42		1.61
238	D445	9.418		-2.19	1236		-----		-----
273	D445	10.52		1.99	1248	IP71Mod.	10.37		1.42
311		-----		-----	1259	ISO3104	10.02		0.09
314		-----		-----	1264		-----		-----
332		-----		-----	1357	D445	10.448		1.71
333		-----		-----	1379	D445	9.895		-0.38
334		-----		-----	1397		-----		-----
335		-----		-----	1539	ISO3104	10.62		2.37
340		-----		-----	1544	D445	10.235		0.91
391		-----		-----	1556	ISO3104	9.936		-0.22
399	D445	9.513		-1.83	1583	D445	9.657		-1.28
402		-----		-----	1585	D445	9.8799		-0.44
441		-----		-----	1613		-----		-----
442		-----		-----	1654	D445	9.6775		-1.20
444		-----		-----	1656		-----		-----
445	D445	9.727		-1.02	1714	D445	10.09		0.36
446		-----		-----	1720		-----		-----
447	D445	10.66		2.52	1728	D445	10.825		3.14
485		-----		-----	1741	ISO3104	9.762		-0.88
494	D445	10.24		0.93	1776	D7042	9.2562		-2.80
511	D445	10.265		1.02	1796	D445	9.6624		-1.26
529		-----		-----	1800		-----		-----
541		-----		-----	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815	ISO3104	9.9148		-0.30
574	D7042	9.4288		-2.14	1842	IP71	9.873		-0.46
575	D445	10.101		0.40	1849		-----		-----
593	D445	10.08		0.32	1858	D445	9.8197		-0.66
602		-----		-----	1884	D445	9.768		-0.86
605	D445	10.432		1.65	1892	D7042	9.4178		-2.19
606		-----		-----	1902		-----		-----
608	D445	10.65	C	2.48	1930		-----		-----
609	D445	10.536		2.05	1957		-----		-----
613		-----		-----	1967		-----		-----
621		-----		-----	1995		-----		-----
657	D445	9.999		0.01	6006		-----		-----
663	D445	9.5696		-1.61	6016	D445	10.25		0.96
704	D445	9.6730		-1.22	6028	ISO3104	9.392		-2.28
732	D445	9.925		-0.27	6073	D445	9.621		-1.42
739		-----		-----	9051		-----		-----
742		-----		-----	9052		-----		-----
749		-----		-----	9057		-----		-----
750	D445	10.21		0.81	9060		-----		-----
751		-----		-----	9063		-----		-----
752	D445	9.879		-0.44	9101		-----		-----
753	D445	9.745		-0.95	9132	D7042	9.7022		-1.11
781	D445	9.920		-0.28	9133	D7042	9.89		-0.40
785	D445	9.839		-0.59	9134	D7042	11.103		4.19
840	D445	9.9496		-0.17	9135	D7042	10.35		1.34
862	D445	9.7129		-1.07	9136	D7042	9.2		-3.01
874	D445	9.898		-0.37	9139	D7042	10.55		2.10
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	D7042	9.6370		-1.36
971	D445	9.951		-0.17	9146		-----		-----
974	D445	9.839		-0.59	9151		-----		-----
982	D445	10.135		0.53	9152		-----		-----

normality	OK
n	78
outliers	0
mean (n)	9.9952
st.dev. (n)	0.39225
R(calc.)	1.0983
R(D445:15a)	0.7396

Lab 171 first reported: 18.139
Lab 608 first reported: 11.327
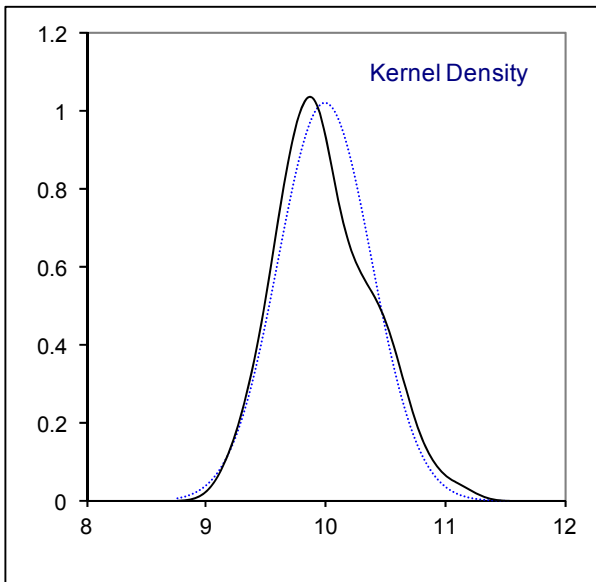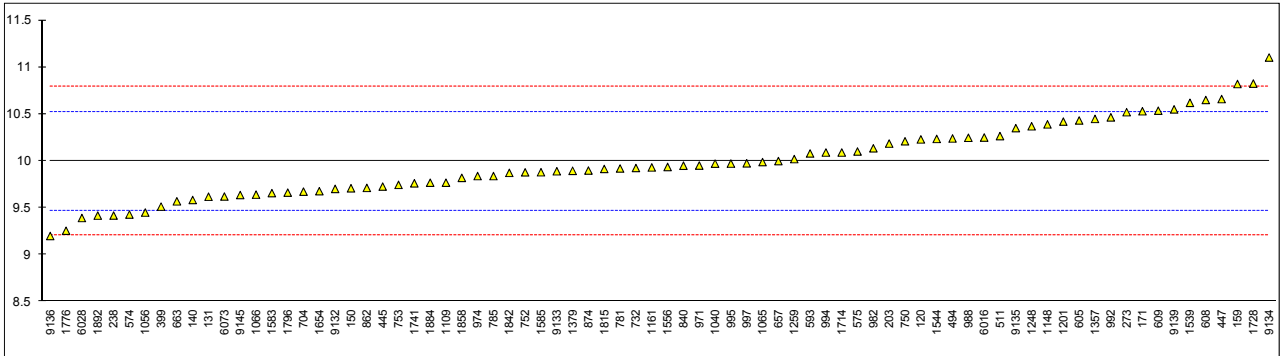
Determination of individual light ends: Methane, Ethane, Propane on sample #16230; results in %M/M

lab	method	Methane	mark	z(targ)	Ethane	mark	z(targ)	Propane	mark	z(targ)
52		-----		-----	-----		-----	-----		-----
62		-----		-----	-----		-----	-----		-----
90		-----		-----	-----		-----	-----		-----
92		-----		-----	-----		-----	-----		-----
120		-----		-----	-----		-----	-----		-----
131		-----		-----	-----		-----	-----		-----
133		-----		-----	-----		-----	-----		-----
140		-----		-----	-----		-----	-----		-----
150	IP344	<0.01		-----	0.02		1.12	0.26		-0.28
151		-----		-----	-----		-----	-----		-----
154		-----		-----	-----		-----	-----		-----
158		-----		-----	-----		-----	-----		-----
159		-----		-----	-----		-----	-----		-----
167		-----		-----	-----		-----	-----		-----
168		-----		-----	-----		-----	-----		-----
171	IP344	<0.01		-----	0.01		-3.03	0.21		-2.80
175		-----		-----	-----		-----	-----		-----
186		-----		-----	-----		-----	-----		-----
203		-----		-----	-----		-----	-----		-----
213		-----		-----	-----		-----	-----		-----
238		-----		-----	-----		-----	-----		-----
273		-----		-----	-----		-----	-----		-----
311	INH-267	<0.01		-----	0.01		-3.03	0.21	C	-2.80
314		-----		-----	-----		-----	-----		-----
332		-----		-----	-----		-----	-----		-----
333		-----		-----	-----		-----	-----		-----
334		-----		-----	-----		-----	-----		-----
335		-----		-----	-----		-----	-----		-----
340		-----		-----	-----		-----	-----		-----
391		-----		-----	-----		-----	-----		-----
399		-----		-----	-----		-----	-----		-----
402		-----		-----	-----		-----	-----		-----
441		-----		-----	-----		-----	-----		-----
442		0.0003		-----	0.0226		2.20	0.2999		1.74
444		-----		-----	-----		-----	-----		-----
445		-----		-----	-----		-----	-----		-----
446		-----		-----	-----		-----	-----		-----
447		-----		-----	-----		-----	-----		-----
485		-----		-----	-----		-----	-----		-----
494		-----		-----	-----		-----	-----		-----
511		-----		-----	-----		-----	-----		-----
529		-----		-----	-----		-----	-----		-----
541		-----		-----	-----		-----	-----		-----
551		-----		-----	-----		-----	-----		-----
557		-----		-----	-----		-----	-----		-----
574		-----		-----	-----		-----	-----		-----
575		-----		-----	-----		-----	-----		-----
593		-----		-----	-----		-----	-----		-----
602		-----		-----	-----		-----	-----		-----
605		-----		-----	-----		-----	-----		-----
606		-----		-----	-----		-----	-----		-----
608	IP344	0.00057		-----	0.0148		-1.04	0.2458		-0.99
609	IP344	0.0001	ex	-----	0.0143	ex	-1.24	0.2407	ex	-1.25
613		-----		-----	-----		-----	-----		-----
621		-----		-----	-----		-----	-----		-----
657		-----		-----	-----		-----	-----		-----
663		-----		-----	-----		-----	-----		-----
704		-----		-----	-----		-----	-----		-----
732		-----		-----	-----		-----	-----		-----
739		-----		-----	-----		-----	-----		-----
742		-----		-----	-----		-----	-----		-----
749		-----		-----	-----		-----	-----		-----
750		-----		-----	-----		-----	-----		-----
751		-----		-----	-----		-----	-----		-----
752		-----		-----	-----		-----	-----		-----
753		-----		-----	-----		-----	-----		-----
781		-----		-----	-----		-----	-----		-----
785		-----		-----	-----		-----	-----		-----
840		-----		-----	-----		-----	-----		-----
862	IP344	0.00		-----	0.014		-1.37	0.252		-0.68
874		-----		-----	-----		-----	-----		-----
875		-----		-----	-----		-----	-----		-----
962		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
971		-----		-----	-----		-----	-----		-----
974		-----		-----	-----		-----	-----		-----
982		-----		-----	-----		-----	-----		-----
988		-----		-----	-----		-----	-----		-----

lab	method	Methane	mark	z(targ)	Ethane	mark	z(targ)	Propane	mark	z(targ)
991		-----		-----	-----		-----	-----		-----
992		-----		-----	-----		-----	-----		-----
994		-----		-----	-----		-----	-----		-----
995		-----		-----	-----		-----	-----		-----
997		-----		-----	-----		-----	-----		-----
998		-----		-----	-----		-----	-----		-----
1011		-----		-----	-----		-----	-----		-----
1016		-----		-----	-----		-----	-----		-----
1039	EN15199-4	0		-----	0.021		1.54	0.306		2.05
1040	D7169	0	ex	-----	0.0328	ex	6.43	0.3662	ex	5.08
1056		-----		-----	-----		-----	-----		-----
1065		0.00026		-----	0.0246		3.03	0.3118		2.34
1066	IP344	<0.01		-----	<0.01		-----	0.27		0.23
1081		-----		-----	-----		-----	-----		-----
1106		-----		-----	-----		-----	-----		-----
1109		-----		-----	-----		-----	-----		-----
1148		-----		-----	-----		-----	-----		-----
1161		-----		-----	-----		-----	-----		-----
1201		-----		-----	-----		-----	-----		-----
1236		0.000		-----	0.018		0.29	0.255		-0.53
1248	In house	0.000		-----	0.017		-0.12	0.259		-0.33
1259		-----		-----	-----		-----	-----		-----
1264		-----		-----	-----		-----	-----		-----
1357		-----		-----	-----		-----	-----		-----
1379		-----		-----	-----		-----	-----		-----
1397		-----		-----	-----		-----	-----		-----
1539		-----		-----	-----		-----	-----		-----
1544		-----		-----	-----		-----	-----		-----
1556		-----		-----	-----		-----	-----		-----
1583		-----		-----	-----		-----	-----		-----
1585		-----		-----	-----		-----	-----		-----
1613		-----		-----	-----		-----	-----		-----
1654		-----		-----	-----		-----	-----		-----
1656		-----		-----	-----		-----	-----		-----
1714		-----		-----	0.01		-3.03	0.239		-1.34
1720		-----		-----	-----		-----	-----		-----
1728		-----		-----	-----		-----	-----		-----
1741		-----		-----	-----		-----	-----		-----
1776	IP344	-----		-----	0.0153		-0.83	0.2452		-1.02
1796		-----		-----	-----		-----	-----		-----
1800		-----		-----	-----		-----	-----		-----
1810		-----		-----	-----		-----	-----		-----
1811		-----		-----	-----		-----	-----		-----
1815		-----		-----	-----		-----	-----		-----
1842	IP601	0.00		-----	0.02		1.12	0.28		0.73
1849		-----		-----	-----		-----	-----		-----
1858		-----		-----	-----		-----	-----		-----
1884		-----		-----	-----		-----	-----		-----
1892		-----		-----	-----		-----	-----		-----
1902		-----		-----	-----		-----	-----		-----
1930		-----		-----	-----		-----	-----		-----
1957	IP344	0.0002		-----	0.0222		2.03	0.2939		1.43
1967		-----		-----	-----		-----	-----		-----
1995		-----		-----	-----		-----	-----		-----
6006		-----		-----	-----		-----	-----		-----
6016		-----		-----	-----		-----	-----		-----
6028		-----		-----	-----		-----	-----		-----
6073		-----		-----	-----		-----	-----		-----
9051		-----		-----	-----		-----	-----		-----
9052		-----		-----	-----		-----	-----		-----
9057		-----		-----	-----		-----	-----		-----
9060		-----		-----	-----		-----	-----		-----
9063		-----		-----	-----		-----	-----		-----
9101		-----		-----	-----		-----	-----		-----
9132		-----		-----	-----		-----	-----		-----
9133		-----		-----	-----		-----	-----		-----
9134		-----		-----	-----		-----	-----		-----
9135		-----		-----	-----		-----	-----		-----
9136		-----		-----	-----		-----	-----		-----
9139		-----		-----	-----		-----	-----		-----
9142		-----		-----	-----		-----	-----		-----
9143		-----		-----	-----		-----	-----		-----
9145	GPA2186	0		-----	0.02		1.12	0.31		2.25
9146		-----		-----	-----		-----	-----		-----
9151		-----		-----	-----		-----	-----		-----
9152		-----		-----	-----		-----	-----		-----

normality	not OK	OK	OK
n	10	15	16
outliers	0 (+2ex)	0(+2ex)	0(+2ex)
mean (n)	<0.01	0.0173	0.2655
st.dev. (n)	n.a.	0.00480	0.03267
R(calc.)	n.a.	0.0134	0.0915
R(IP344:88)	n.a.	0.0067	0.0555

Lab 311 first reported for Propane: 0.19
The test results of lab 609 and 1040 were excluded due to outliers in the other light ends determinations.
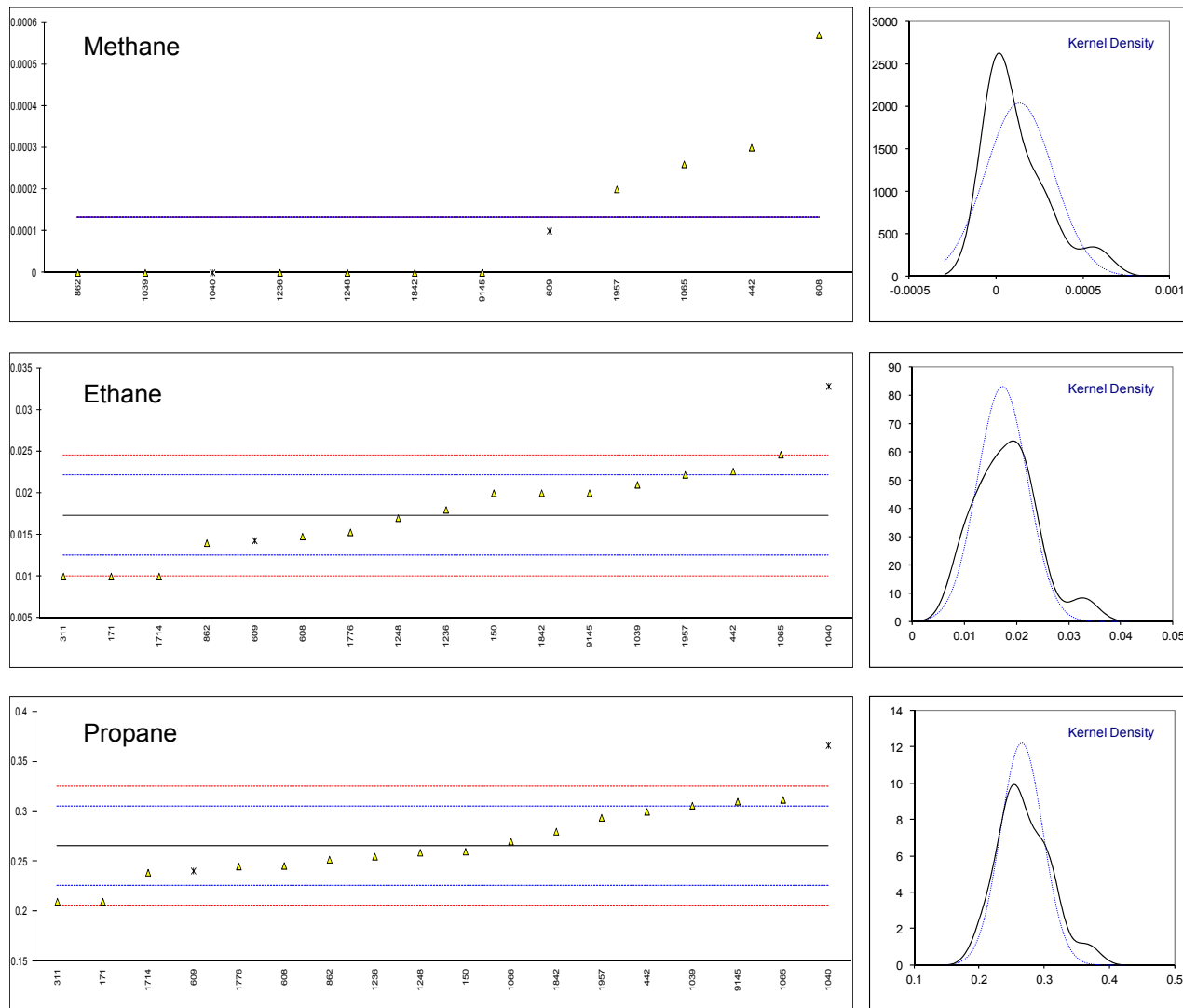
Determination of individual light ends: i-Butane, n-Butane, i-Pentane on sample #16230; results in %M/M

lab	method	i-Butane	mark	z(targ)	n-Butane	mark	z(targ)	i-Pentane	mark	z(targ)
52		-----		-----	-----		-----	-----		-----
62		-----		-----	-----		-----	-----		-----
90		-----		-----	-----		-----	-----		-----
92		-----		-----	-----		-----	-----		-----
120		-----		-----	-----		-----	-----		-----
131		-----		-----	-----		-----	-----		-----
133		-----		-----	-----		-----	-----		-----
140		-----		-----	-----		-----	-----		-----
150	IP344	0.18		-0.24	0.84		0.36	0.72		0.50
151		-----		-----	-----		-----	-----		-----
154		-----		-----	-----		-----	-----		-----
158		-----		-----	-----		-----	-----		-----
159		-----		-----	-----		-----	-----		-----
167		-----		-----	-----		-----	-----		-----
168		-----		-----	-----		-----	-----		-----
171	IP344	0.16		-2.32	0.72		-2.72	0.66		-2.13
175		-----		-----	-----		-----	-----		-----
186		-----		-----	-----		-----	-----		-----
203		-----		-----	-----		-----	-----		-----
213		-----		-----	-----		-----	-----		-----
238		-----		-----	-----		-----	-----		-----
273		-----		-----	-----		-----	-----		-----
311	INH-267	0.15	C	-3.36	0.72	C	-2.72	0.63	C	-3.44
314		-----		-----	-----		-----	-----		-----
332		-----		-----	-----		-----	-----		-----
333		-----		-----	-----		-----	-----		-----
334		-----		-----	-----		-----	-----		-----
335		-----		-----	-----		-----	-----		-----
340		-----		-----	-----		-----	-----		-----
391		-----		-----	-----		-----	-----		-----
399		-----		-----	-----		-----	-----		-----
402		-----		-----	-----		-----	-----		-----
441		-----		-----	-----		-----	-----		-----
442		0.1974		1.56	0.8544		0.73	0.7278		0.84
444		-----		-----	-----		-----	-----		-----
445		-----		-----	-----		-----	-----		-----
446		-----		-----	-----		-----	-----		-----
447		-----		-----	-----		-----	-----		-----
485		-----		-----	-----		-----	-----		-----
494		-----		-----	-----		-----	-----		-----
511		-----		-----	-----		-----	-----		-----
529		-----		-----	-----		-----	-----		-----
541		-----		-----	-----		-----	-----		-----
551		-----		-----	-----		-----	-----		-----
557		-----		-----	-----		-----	-----		-----
574		-----		-----	-----		-----	-----		-----
575		-----		-----	-----		-----	-----		-----
593		-----		-----	-----		-----	-----		-----
602		-----		-----	-----		-----	-----		-----
605		-----		-----	-----		-----	-----		-----
606		-----		-----	-----		-----	-----		-----
608	IP344	0.1719		-1.08	0.8043		-0.56	0.6708		-1.65
609	IP344	0.132	ex,C	-5.22	0.6477	ex	-4.58	0.490	C,G(0.05)	-9.57
613		-----		-----	-----		-----	-----		-----
621		-----		-----	-----		-----	-----		-----
657		-----		-----	-----		-----	-----		-----
663		-----		-----	-----		-----	-----		-----
704		-----		-----	-----		-----	-----		-----
732		-----		-----	-----		-----	-----		-----
739		-----		-----	-----		-----	-----		-----
742		-----		-----	-----		-----	-----		-----
749		-----		-----	-----		-----	-----		-----
750		-----		-----	-----		-----	-----		-----
751		-----		-----	-----		-----	-----		-----
752		-----		-----	-----		-----	-----		-----
753		-----		-----	-----		-----	-----		-----
781		-----		-----	-----		-----	-----		-----
785		-----		-----	-----		-----	-----		-----
840		-----		-----	-----		-----	-----		-----
862	IP344	0.177		-0.55	0.817		-0.23	0.710		0.06
874		-----		-----	-----		-----	-----		-----
875		-----		-----	-----		-----	-----		-----
962		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
971		-----		-----	-----		-----	-----		-----
974		-----		-----	-----		-----	-----		-----
982		-----		-----	-----		-----	-----		-----
988		-----		-----	-----		-----	-----		-----

lab	method	i-Butane	mark	z(targ)	n-Butane	mark	z(targ)	i-Pentane	mark	z(targ)
991		-----		-----	-----		-----	-----		-----
992		-----		-----	-----		-----	-----		-----
994		-----		-----	-----		-----	-----		-----
995		-----		-----	-----		-----	-----		-----
997		-----		-----	-----		-----	-----		-----
998		-----		-----	-----		-----	-----		-----
1011		-----		-----	-----		-----	-----		-----
1016		-----		-----	-----		-----	-----		-----
1039	EN15199-4	0.202		2.04	0.952		3.23	0.761		2.30
1040	D7169	0.2355	ex	5.52	1.0641	ex	6.11	0.8856	G(0.05)	7.76
1056		-----		-----	-----		-----	-----		-----
1065		0.2003		1.86	0.9046		2.02	0.7156		0.31
1066	IP344	0.18		-0.24	0.82		-0.16	0.71	C	0.06
1081		-----		-----	-----		-----	-----		-----
1106		-----		-----	-----		-----	-----		-----
1109		-----		-----	-----		-----	-----		-----
1148		-----		-----	-----		-----	-----		-----
1161		-----		-----	-----		-----	-----		-----
1201		-----		-----	-----		-----	-----		-----
1236		0.175		-0.76	0.767		-1.52	0.675		-1.47
1248	In house	0.181		-0.14	0.802		-0.62	0.705		-0.15
1259		-----		-----	-----		-----	-----		-----
1264		-----		-----	-----		-----	-----		-----
1357		-----		-----	-----		-----	-----		-----
1379		-----		-----	-----		-----	-----		-----
1397		-----		-----	-----		-----	-----		-----
1539		-----		-----	-----		-----	-----		-----
1544		-----		-----	-----		-----	-----		-----
1556		-----		-----	-----		-----	-----		-----
1583		-----		-----	-----		-----	-----		-----
1585		-----		-----	-----		-----	-----		-----
1613		-----		-----	-----		-----	-----		-----
1654		-----		-----	-----		-----	-----		-----
1656		-----		-----	-----		-----	-----		-----
1714		0.17		-1.28	0.785		-1.06	0.692		-0.72
1720		-----		-----	-----		-----	-----		-----
1728		-----		-----	-----		-----	-----		-----
1741		-----		-----	-----		-----	-----		-----
1776	IP344	0.1724		-1.03	0.7766		-1.27	0.6933		-0.67
1796		-----		-----	-----		-----	-----		-----
1800		-----		-----	-----		-----	-----		-----
1810		-----		-----	-----		-----	-----		-----
1811		-----		-----	-----		-----	-----		-----
1815		-----		-----	-----		-----	-----		-----
1842	IP601	0.20		1.83	0.90		1.90	0.76		2.25
1849		-----		-----	-----		-----	-----		-----
1858		-----		-----	-----		-----	-----		-----
1884		-----		-----	-----		-----	-----		-----
1892		-----		-----	-----		-----	-----		-----
1902		-----		-----	-----		-----	-----		-----
1930		-----		-----	-----		-----	-----		-----
1957	IP344	0.1904		0.84	0.8346		0.22	0.7061		-0.11
1967		-----		-----	-----		-----	-----		-----
1995		-----		-----	-----		-----	-----		-----
6006		-----		-----	-----		-----	-----		-----
6016		-----		-----	-----		-----	-----		-----
6028		-----		-----	-----		-----	-----		-----
6073		-----		-----	-----		-----	-----		-----
9051		-----		-----	-----		-----	-----		-----
9052		-----		-----	-----		-----	-----		-----
9057		-----		-----	-----		-----	-----		-----
9060		-----		-----	-----		-----	-----		-----
9063		-----		-----	-----		-----	-----		-----
9101		-----		-----	-----		-----	-----		-----
9132		-----		-----	-----		-----	-----		-----
9133		-----		-----	-----		-----	-----		-----
9134		-----		-----	-----		-----	-----		-----
9135		-----		-----	-----		-----	-----		-----
9136		-----		-----	-----		-----	-----		-----
9139		-----		-----	-----		-----	-----		-----
9142		-----		-----	-----		-----	-----		-----
9143		-----		-----	-----		-----	-----		-----
9145	GPA2186	0.21		2.87	0.92		2.41	0.80		4.01
9146		-----		-----	-----		-----	-----		-----
9151		-----		-----	-----		-----	-----		-----
9152		-----		-----	-----		-----	-----		-----

normality	OK	OK	OK
n	16	16	16
outliers	0(+2ex)	0(+2ex)	2
mean (n)	0.1823	0.8261	0.7085
st.dev. (n)	0.01649	0.06767	0.04157
R(calc.)	0.0462	0.1895	0.1164
R(IP344:88)	0.0270	0.1090	0.0639

Lab 311 first reported for i-Butane: 0.13, for n-Butane: 0.59 and for i-Pentane: 0.51
Lab 609 first reported for i-Butane: 0.2993 and for i-Pentane: 0.5039
Lab 1066 first reported for i-Pentane: 1.2
The test results of lab 609 and 1040 were excluded due to outliers in the other light ends determinations.
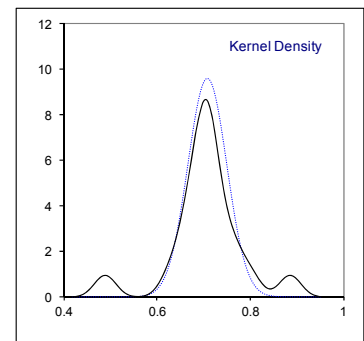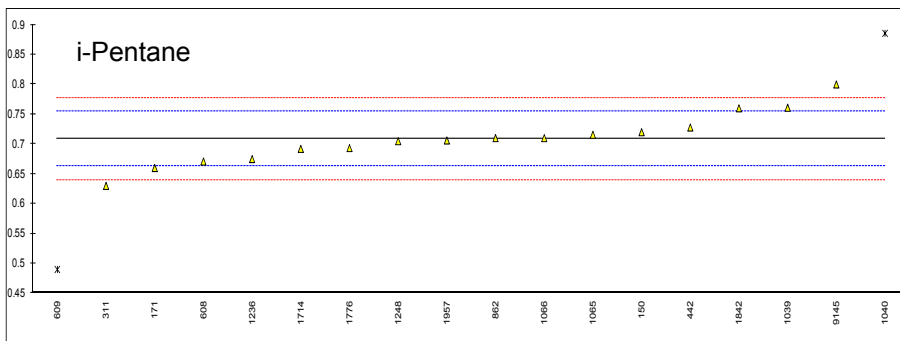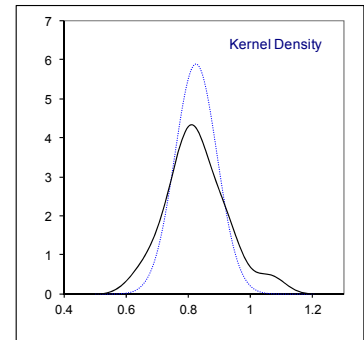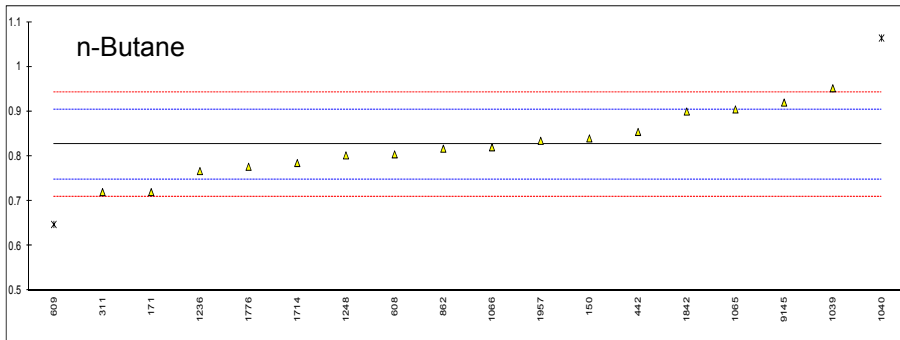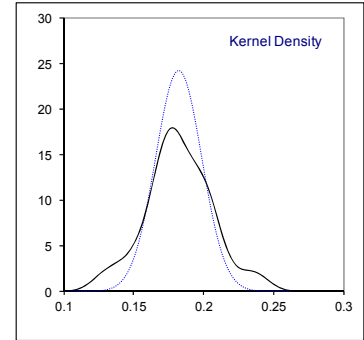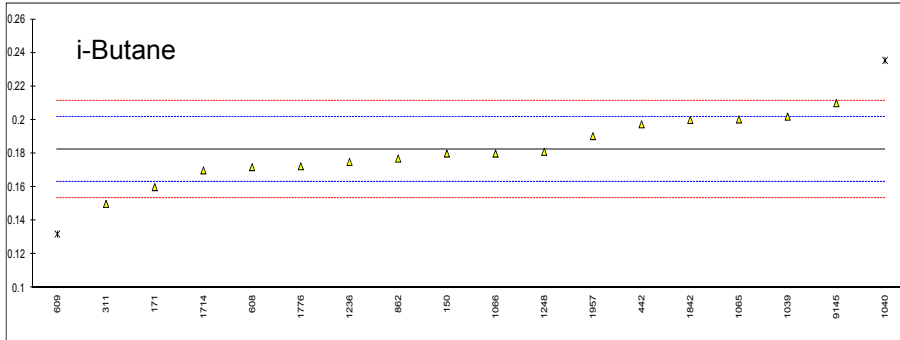
Determination of individual light ends: n-Pent., cyclo-Pent., tot. Hex. on sample #16230; results in %M/M

lab	method	n-Pentane	mark	z(targ)	cyclo-Pentane	mark	z(targ)	tot. Hexanes	mark	z(targ)
52		-----		-----	-----		-----	-----		-----
62		-----		-----	-----		-----	-----		-----
90		-----		-----	-----		-----	-----		-----
92		-----		-----	-----		-----	-----		-----
120		-----		-----	-----		-----	-----		-----
131		-----		-----	-----		-----	-----		-----
133		-----		-----	-----		-----	-----		-----
140		-----		-----	-----		-----	-----		-----
150	IP344	1.25		0.98	0.08		2.35	3.07		1.36
151		-----		-----	-----		-----	-----		-----
154		-----		-----	-----		-----	-----		-----
158		-----		-----	-----		-----	-----		-----
159		-----		-----	-----		-----	-----		-----
167		-----		-----	-----		-----	-----		-----
168		-----		-----	-----		-----	-----		-----
171	IP344	1.12		-1.95	0.06		-2.70	2.83		-0.13
175		-----		-----	-----		-----	-----		-----
186		-----		-----	-----		-----	-----		-----
203		-----		-----	-----		-----	-----		-----
213		-----		-----	-----		-----	-----		-----
238		-----		-----	-----		-----	-----		-----
273		-----		-----	-----		-----	-----		-----
311	INH-267	1.09	C	-2.62	0.05	C	-5.22	2.78	C	-0.44
314		-----		-----	-----		-----	-----		-----
332		-----		-----	-----		-----	-----		-----
333		-----		-----	-----		-----	-----		-----
334		-----		-----	-----		-----	-----		-----
335		-----		-----	-----		-----	-----		-----
340		-----		-----	-----		-----	-----		-----
391		-----		-----	-----		-----	-----		-----
399		-----		-----	-----		-----	-----		-----
402		-----		-----	-----		-----	-----		-----
441		-----		-----	-----		-----	-----		-----
442		1.2295		0.52	0.0724		0.43	3.0602		1.30
444		-----		-----	-----		-----	-----		-----
445		-----		-----	-----		-----	-----		-----
446		-----		-----	-----		-----	-----		-----
447		-----		-----	-----		-----	-----		-----
485		-----		-----	-----		-----	-----		-----
494		-----		-----	-----		-----	-----		-----
511		-----		-----	-----		-----	-----		-----
529		-----		-----	-----		-----	-----		-----
541		-----		-----	-----		-----	-----		-----
551		-----		-----	-----		-----	-----		-----
557		-----		-----	-----		-----	-----		-----
574		-----		-----	-----		-----	-----		-----
575		-----		-----	-----		-----	-----		-----
593		-----		-----	-----		-----	-----		-----
602		-----		-----	-----		-----	-----		-----
605		-----		-----	-----		-----	-----		-----
606		-----		-----	-----		-----	-----		-----
608	IP344	1.1834		-0.52	-----		-----	-----		-----
609	IP344	0.790	C,G(0.05)	-9.38	-----		-----	-----		-----
613		-----		-----	-----		-----	-----		-----
621		-----		-----	-----		-----	-----		-----
657		-----		-----	-----		-----	-----		-----
663		-----		-----	-----		-----	-----		-----
704		-----		-----	-----		-----	-----		-----
732		-----		-----	-----		-----	-----		-----
739		-----		-----	-----		-----	-----		-----
742		-----		-----	-----		-----	-----		-----
749		-----		-----	-----		-----	-----		-----
750		-----		-----	-----		-----	-----		-----
751		-----		-----	-----		-----	-----		-----
752		-----		-----	-----		-----	-----		-----
753		-----		-----	-----		-----	-----		-----
781		-----		-----	-----		-----	-----		-----
785		-----		-----	-----		-----	-----		-----
840		-----		-----	-----		-----	-----		-----
862	IP344	1.199		-0.17	0.065		-1.44	2.586		-1.65
874		-----		-----	-----		-----	-----		-----
875		-----		-----	-----		-----	-----		-----
962		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
971		-----		-----	-----		-----	-----		-----
974		-----		-----	-----		-----	-----		-----
982		-----		-----	-----		-----	-----		-----
988		-----		-----	-----		-----	-----		-----

lab	method	n-Pentane	mark	z(targ)	cyclo-Pentane	mark	z(targ)	tot. Hexanes	mark	z(targ)
991		-----		-----	-----		-----	-----		-----
992		-----		-----	-----		-----	-----		-----
994		-----		-----	-----		-----	-----		-----
995		-----		-----	-----		-----	-----		-----
997		-----		-----	-----		-----	-----		-----
998		-----		-----	-----		-----	-----		-----
1011		-----		-----	-----		-----	-----		-----
1016		-----		-----	-----		-----	-----		-----
1039	EN15199-4	1.266		1.34	0.141	C,G(0.01)	17.73	2.994	C	0.89
1040	D7169	1.5114	G(0.05)	6.87	0.0575	ex	-3.33	1.6709	DG(0.01)	-7.34
1056		-----		-----	-----		-----	-----		-----
1065		1.3316		2.82	0.0901		4.89	2.04	G(0.05)	-5.05
1066	IP344	1.2	C	-0.15	0.07		-0.18	2.44		-2.56
1081		-----		-----	-----		-----	-----		-----
1106		-----		-----	-----		-----	-----		-----
1109		-----		-----	-----		-----	-----		-----
1148		-----		-----	-----		-----	-----		-----
1161		-----		-----	-----		-----	-----		-----
1201		-----		-----	-----		-----	-----		-----
1236		1.130		-1.72	0.070		-0.18	2.842		-0.06
1248	In house	1.174		-0.73	0.074		0.83	2.742		-0.68
1259		-----		-----	-----		-----	-----		-----
1264		-----		-----	-----		-----	-----		-----
1357		-----		-----	-----		-----	-----		-----
1379		-----		-----	-----		-----	-----		-----
1397		-----		-----	-----		-----	-----		-----
1539		-----		-----	-----		-----	-----		-----
1544		-----		-----	-----		-----	-----		-----
1556		-----		-----	-----		-----	-----		-----
1583		-----		-----	-----		-----	-----		-----
1585		-----		-----	-----		-----	-----		-----
1613		-----		-----	-----		-----	-----		-----
1654		-----		-----	-----		-----	-----		-----
1656		-----		-----	-----		-----	-----		-----
1714		1.17		-0.82	0.063		-1.94	2.92		0.43
1720		-----		-----	-----		-----	-----		-----
1728		-----		-----	-----		-----	-----		-----
1741		-----		-----	-----		-----	-----		-----
1776	IP344	1.1775		-0.65	0.5737	G(0.01)	126.88	1.3807	DG(0.01)	-9.15
1796		-----		-----	-----		-----	-----		-----
1800		-----		-----	-----		-----	-----		-----
1810		-----		-----	-----		-----	-----		-----
1811		-----		-----	-----		-----	-----		-----
1815		-----		-----	-----		-----	-----		-----
1842	IP601	1.26		1.21	0.06		-2.70	2.99		0.86
1849		-----		-----	-----		-----	-----		-----
1858		-----		-----	-----		-----	-----		-----
1884		-----		-----	-----		-----	-----		-----
1892		-----		-----	-----		-----	-----		-----
1902		-----		-----	-----		-----	-----		-----
1930		-----		-----	-----		-----	-----		-----
1957	IP344	1.1820		-0.55	0.0746		0.98	2.9232		0.45
1967		-----		-----	-----		-----	-----		-----
1995		-----		-----	-----		-----	-----		-----
6006		-----		-----	-----		-----	-----		-----
6016		-----		-----	-----		-----	-----		-----
6028		-----		-----	-----		-----	-----		-----
6073		-----		-----	-----		-----	-----		-----
9051		-----		-----	-----		-----	-----		-----
9052		-----		-----	-----		-----	-----		-----
9057		-----		-----	-----		-----	-----		-----
9060		-----		-----	-----		-----	-----		-----
9063		-----		-----	-----		-----	-----		-----
9101		-----		-----	-----		-----	-----		-----
9132		-----		-----	-----		-----	-----		-----
9133		-----		-----	-----		-----	-----		-----
9134		-----		-----	-----		-----	-----		-----
9135		-----		-----	-----		-----	-----		-----
9136		-----		-----	-----		-----	-----		-----
9139		-----		-----	-----		-----	-----		-----
9142		-----		-----	-----		-----	-----		-----
9143		-----		-----	-----		-----	-----		-----
9145	GPA2186	1.34		3.01	0.09		4.87	2.89		0.24
9146		-----		-----	-----		-----	-----		-----
9151		-----		-----	-----		-----	-----		-----
9152		-----		-----	-----		-----	-----		-----

normality	OK	OK	OK
n	16	13	13
outliers	2	2 (+1ex)	3
mean (n)	1.2064	0.0707	2.8513
st.dev. (n)	0.07008	0.01160	0.18248
R(calc.)	0.1962	0.0325	0.5109
R(IP344:88)	0.1243	0.0111	0.4500

Lab 311 first reported for n-Pentane: 0.88, for cyclo-Pentane: 0.04 and for total Hexanes:1.08
Lab 609 first reported for n-Pentane: 1.5108
Lab 1066 first reported for n-Pentane: 0.71
Lab 1039 first reported for cyclo-Pentane: 0 and for total Hexanes: 2.932
The test results of 1040 were excluded due to outliers in the other light ends determinations.
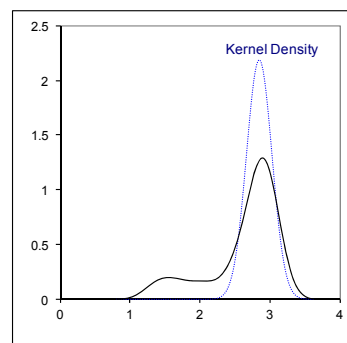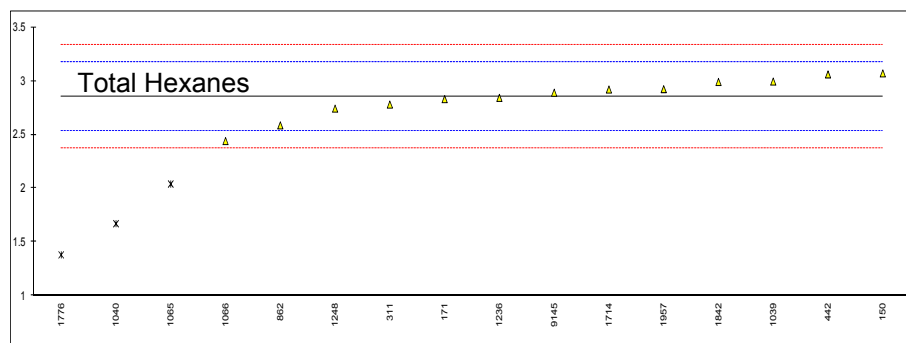
- empty page -

Determination of Total light ends on sample #16230; results in %M/M

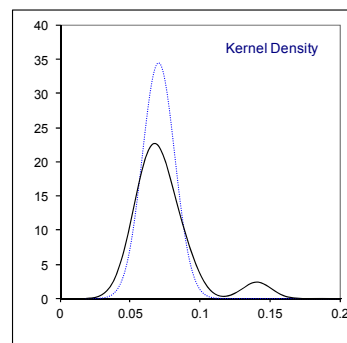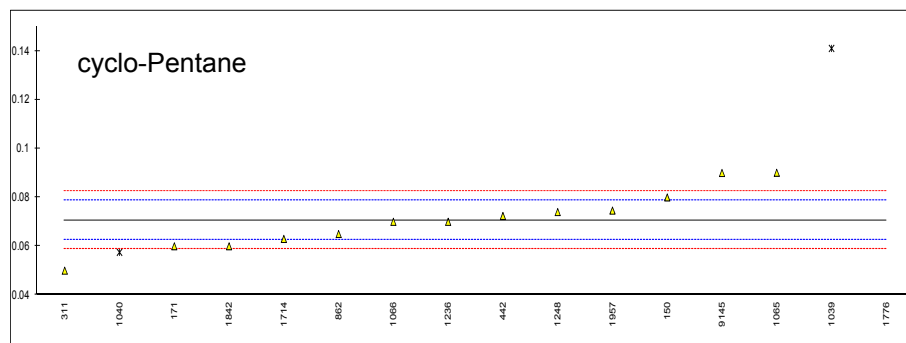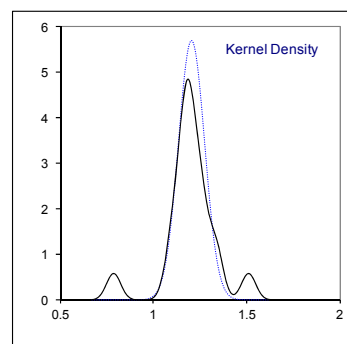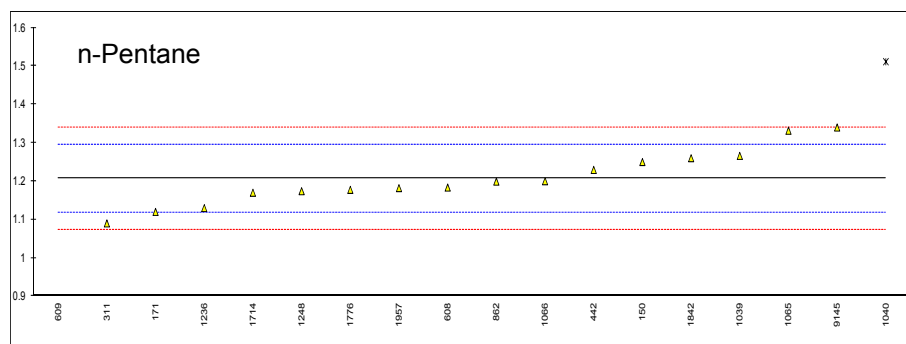| lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988		-----		-----
62		-----		-----	991		-----		-----
90		-----		-----	992		-----		-----
92		-----		-----	994		-----		-----
120		-----		-----	995		-----		-----
131		-----		-----	997		-----		-----
133		-----		-----	998		-----		-----
140		-----		-----	1011		-----		-----
150	IP344	6.42		1.73	1016		-----		-----
151		-----		-----	1039	EN15199-4	6.64	C	3.01
154		-----		-----	1040	D7169	7.862	E, G(0.01)	10.01
158		-----		-----	1056		-----		-----
159		-----		-----	1065		5.6189		-2.87
167		-----		-----	1066	IP344	6.19		0.41
168		-----		-----	1081		-----		-----
171		-----		-----	1106		-----		-----
175		-----		-----	1109		-----		-----
186		-----		-----	1148		-----		-----
203		-----		-----	1161		-----		-----
213		-----		-----	1201		-----		-----
238		-----		-----	1236		5.932		-1.07
273		-----		-----	1248	In house	5.953		-0.95
311	INH-267	5.66	C	-2.63	1259		-----		-----
314		-----		-----	1264		-----		-----
332		-----		-----	1357		-----		-----
333		-----		-----	1379		-----		-----
334		-----		-----	1397		-----		-----
335		-----		-----	1539		-----		-----
340		-----		-----	1544		-----		-----
391		-----		-----	1556		-----		-----
399		-----		-----	1583		-----		-----
402		-----		-----	1585		-----		-----
441		-----		-----	1613		-----		-----
442		6.4673		2.00	1654		-----		-----
444		-----		-----	1656		-----		-----
445		-----		-----	1714		6.07		-0.28
446		-----		-----	1720		-----		-----
447		-----		-----	1728		-----		-----
485		-----		-----	1741		-----		-----
494		-----		-----	1776		-----		-----
511		-----		-----	1796		-----		-----
529		-----		-----	1800		-----		-----
541		-----		-----	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815		-----		-----
574		-----		-----	1842	IP601	5.83		-1.66
575		-----		-----	1849		-----		-----
593		-----		-----	1858		-----		-----
602		-----		-----	1884		-----		-----
605		-----		-----	1892		-----		-----
606		-----		-----	1902		-----		-----
608		-----		-----	1930		-----		-----
609		-----		-----	1957	IP344	6.2303		0.64
613		-----		-----	1967		-----		-----
621		-----		-----	1995		-----		-----
657		-----		-----	6006		-----		-----
663		-----		-----	6016		-----		-----
704		-----		-----	6028		-----		-----
732		-----		-----	6073		-----		-----
739		-----		-----	9051		-----		-----
742		-----		-----	9052		-----		-----
749		-----		-----	9057		-----		-----
750		-----		-----	9060		-----		-----
751		-----		-----	9063		-----		-----
752		-----		-----	9101		-----		-----
753		-----		-----	9132		-----		-----
781		-----		-----	9133		-----		-----
785		-----		-----	9134		-----		-----
840		-----		-----	9135		-----		-----
862	IP344	6.040		-0.45	9136		-----		-----
874		-----		-----	9139		-----		-----
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	GPA2186	6.49		2.13
971		-----		-----	9146		-----		-----
974		-----		-----	9151		-----		-----
982		-----		-----	9152		-----		-----

normality	OK
n	13
outliers	1
mean (n)	6.1188
st.dev. (n)	0.32365
R(calc.)	0.9062
R(IP344:88)	0.4877

Lab 311 first reported: 4.43
Lab 1039 first reported: 6.44
Test result of lab 1040 was excluded because of a calculation error, iis calculated: 5.824
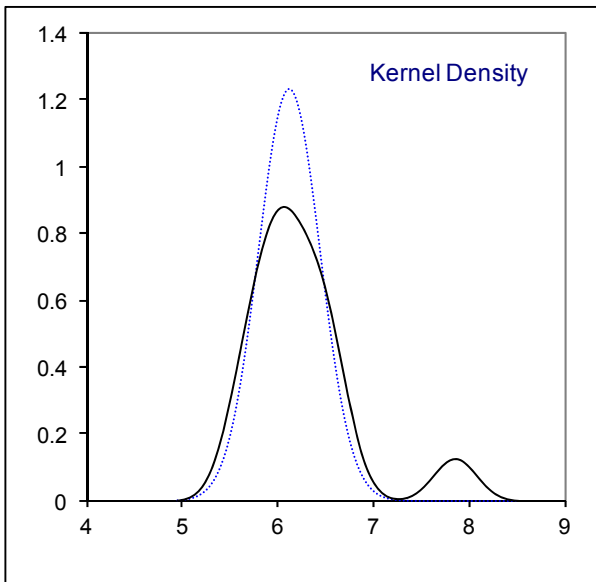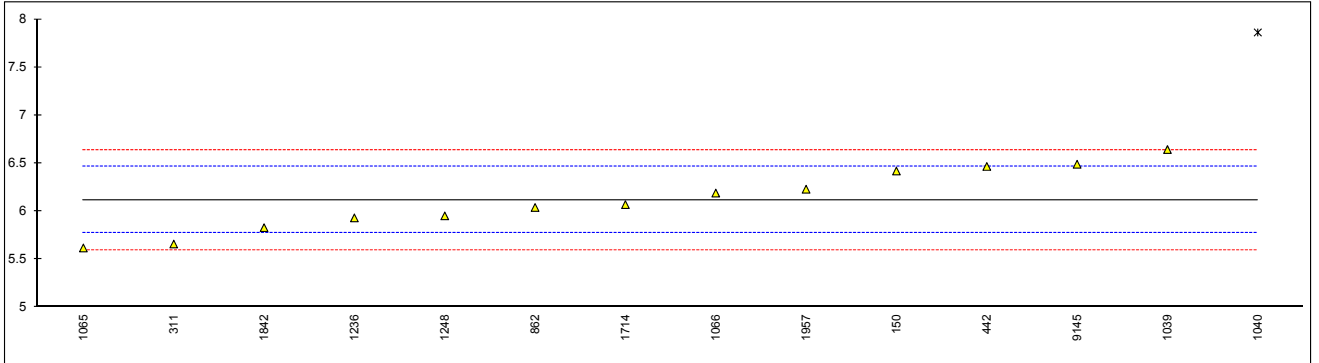
Determination of Molecular Mass, Average on sample #16230; results in g/mol

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988		-----		-----
62		-----		-----	991		-----		-----
90		-----		-----	992		-----		-----
92		-----		-----	994		-----		-----
120		-----		-----	995		-----		-----
131		-----		-----	997		-----		-----
133		-----		-----	998		-----		-----
140		-----		-----	1011		-----		-----
150		-----		-----	1016		-----		-----
151		-----		-----	1039		-----		-----
154		-----		-----	1040		-----		-----
158		-----		-----	1056		-----		-----
159		-----		-----	1065		-----		-----
167		-----		-----	1066		-----		-----
168		-----		-----	1081		-----		-----
171		-----		-----	1106		-----		-----
175		-----		-----	1109		-----		-----
186		-----		-----	1148		-----		-----
203		-----		-----	1161		-----		-----
213		-----		-----	1201		-----		-----
238		-----		-----	1236		241.57		0.92
273		-----		-----	1248	In house	230.6		-1.28
311		-----		-----	1259		-----		-----
314		-----		-----	1264		-----		-----
332		-----		-----	1357		-----		-----
333		-----		-----	1379		-----		-----
334		-----		-----	1397		-----		-----
335		-----		-----	1539		-----		-----
340		-----		-----	1544		-----		-----
391		-----		-----	1556		-----		-----
399		-----		-----	1583		-----		-----
402		-----		-----	1585		-----		-----
441		-----		-----	1613		-----		-----
442		-----		-----	1654		-----		-----
444		-----		-----	1656		-----		-----
445		-----		-----	1714		-----		-----
446		-----		-----	1720		-----		-----
447		-----		-----	1728		-----		-----
485		-----		-----	1741		-----		-----
494		-----		-----	1776		-----		-----
511		-----		-----	1796		-----		-----
529		-----		-----	1800		-----		-----
541		-----		-----	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815		-----		-----
574	D2503	240.78		0.76	1842		-----		-----
575		-----		-----	1849		-----		-----
593		-----		-----	1858		-----		-----
602		-----		-----	1884		-----		-----
605		-----		-----	1892		-----		-----
606		-----		-----	1902		-----		-----
608	In house	242		1.00	1930		-----		-----
609		230		-1.40	1957		-----		-----
613		-----		-----	1967		-----		-----
621		-----		-----	1995		-----		-----
657		-----		-----	6006		-----		-----
663		-----		-----	6016		-----		-----
704		-----		-----	6028		-----		-----
732		-----		-----	6073		-----		-----
739		-----		-----	9051		-----		-----
742		-----		-----	9052		-----		-----
749		-----		-----	9057		-----		-----
750		-----		-----	9060		-----		-----
751		-----		-----	9063		-----		-----
752		-----		-----	9101		-----		-----
753		-----		-----	9132		-----		-----
781		-----		-----	9133		-----		-----
785		-----		-----	9134		-----		-----
840		-----		-----	9135		-----		-----
862		-----		-----	9136		-----		-----
874		-----		-----	9139		-----		-----
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145		-----		-----
971		-----		-----	9146		-----		-----
974		-----		-----	9151		-----		-----
982		-----		-----	9152		-----		-----

|	
normality	unknown
n	5
outliers	0
mean (n)	236.99
st.dev. (n)	6.126
R(calc.)	17.15
R(D2503:92)	14.00
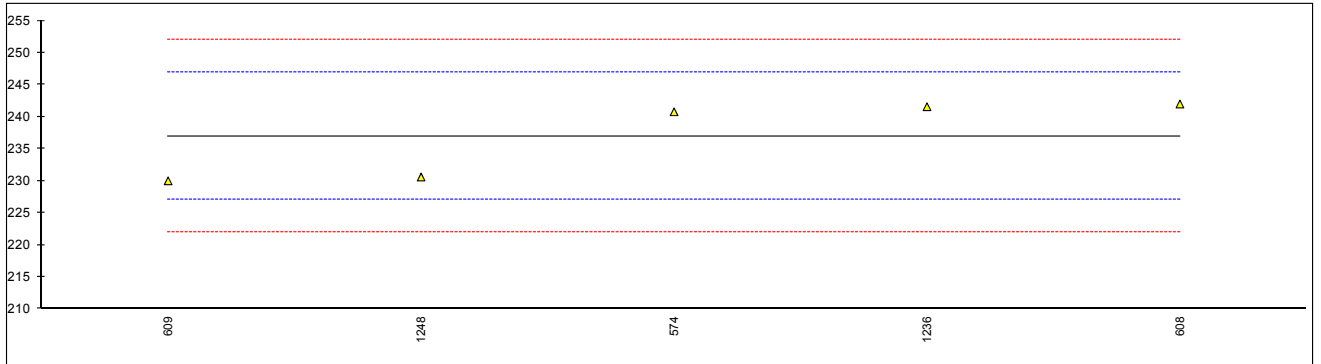
Determination of Pour Point (Maximum) on sample #16230; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988	D5853-A	<-36		-----
62		-----		-----	991	D5853-A	<-36		-----
90	D5853-A	-33		0.04	992	D5853-A	<-36		-----
92		-----		-----	994	D5853-A	<-36		-----
120	D5853-A	<-36		-----	995	D5853-A	<-36		-----
131	D5853-A	<-35		-----	997	D5853-A	<-36		-----
133		-----		-----	998		-----		-----
140		-----		-----	1011	D5853-A	< -21		-----
150	D97	-33	ex	0.04	1016		-----		-----
151		-----		-----	1039	ISO3016	-63	ex	-4.63
154		-----		-----	1040	ISO3016	-18	ex	2.37
158		-----		-----	1056	D5949	-28	ex	0.81
159	D5853-A	<-36		-----	1065	D5950	-18.0	ex	2.37
167		-----		-----	1066	D5853-A	<-60		-----
168		-----		-----	1081		-----		-----
171	D5853-A	-39		-0.90	1106		-----		-----
175		-----		-----	1109		-----		-----
186		-----		-----	1148	ISO3016	< 44		-----
203	D5853-A	-34		-0.12	1161	D6749	-34	ex	-0.12
213		-----		-----	1201	D5853-A	-36.0		-0.43
238	D5853-A	< - 24		-----	1236		-----		-----
273		-----		-----	1248	IP441Mod.	-30		0.50
311		-----		-----	1259	D5853-A	<-36		-----
314		-----		-----	1264		-----		-----
332		-----		-----	1357	D5853-A	-30.0		0.50
333		-----		-----	1379	D5853-A	-36		-0.43
334		-----		-----	1397		-----		-----
335		-----		-----	1539	D5853-A	-21		1.90
340		-----		-----	1544	D5853-A	<-36		-----
391	D5853-A	<-36		-----	1556		-----		-----
399		-----		-----	1583	D5853-A	-39		-0.90
402		-----		-----	1585	D5853-A	-33		0.04
441		-----		-----	1613		-----		-----
442		-----		-----	1654	D5853-A	>-36		-----
444	D5853-A	-39		-0.90	1656	IP15	<-36		-----
445	D5853-A	<-36		-----	1714	D5853-A	<-36		-----
446		-----		-----	1720	D5853-A	<-36		-----
447	D5853-A	<-36		-----	1728	D5853-A	-42		-1.36
485		-----		-----	1741	D5853-A	< -40		-----
494	D5853-A	-54	R(0.05)	-3.23	1776		-----		-----
511		-----		-----	1796	D5853-A	-39		-0.90
529	D5853-A	-33		0.04	1800		-----		-----
541		-----		-----	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815	D5853-A	<-45		-----
574	D5853-A	<-36		-----	1842		-----		-----
575	D5853-A	<-36		-----	1849		-----		-----
593		-----		-----	1858	D5853-A	-33		0.04
602		-----		-----	1884	D5853-A	-33		0.04
605	D5853-A	-36		-0.43	1892		-----		-----
606		-----		-----	1902	D5853-A	< -18		-----
608	D5853-A	<-36		-----	1930		-----		-----
609		-----		-----	1957		-----		-----
613		-----		-----	1967		-----		-----
621	D5853-A	-24.0		1.44	1995		-----		-----
657	D5853-A	<-36		-----	6006		-----		-----
663	D5853-A	< -36		-----	6016	D5853-A	<=-36		-----
704	D5853-A	-36		-0.43	6028	D5853-A	-27		0.97
732	D5853-A	less -36		-----	6073	D97	-39	ex	-0.90
739		-----		-----	9051		-----		-----
742		-----		-----	9052		-----		-----
749		-----		-----	9057	In house	-34.4		-0.18
750	D5853-A	less -36		-----	9060		-----		-----
751	D5853-A	≤-36		-----	9063		-----		-----
752	D5853-A	< -36		-----	9101		-----		-----
753	D5853-A	<=-36		-----	9132		-----		-----
781	D5853-A	<=-36		-----	9133		-----		-----
785		-----		-----	9134		-----		-----
840	D5853-A	<-42		-----	9135		-----		-----
862	D5853-A	<-36		-----	9136		-----		-----
874	D5853-A	<-36		-----	9139		-----		-----
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	D5853-A	-27		0.97
971	D5853-A	<-36		-----	9146		-----		-----
974	D5853-A	<-36		-----	9151		-----		-----
982		-30		0.50	9152		-----		-----

normality	OK
n	23
outliers	1 (+7ex)
mean (n)	-33.2
st.dev. (n)	5.16
R(calc.)	14.5
R(D5853A:11)	18.0

Test results of lab 150, 1039, 1040, 1056, 1065, 1161 and 6073 were excluded as the method used is not intended for crude oils (see §4)
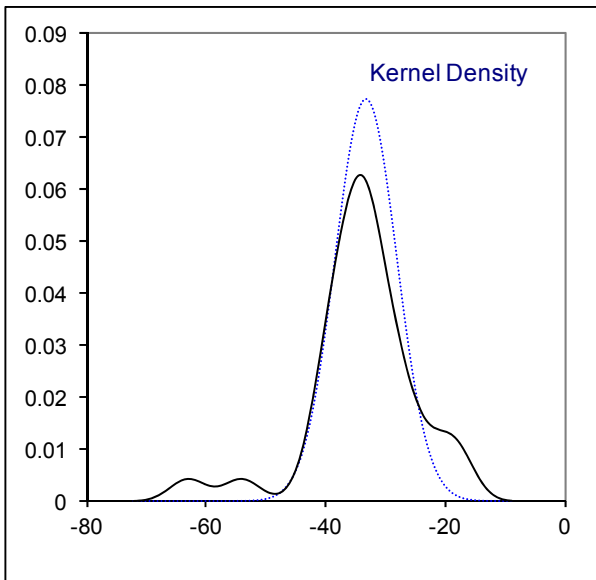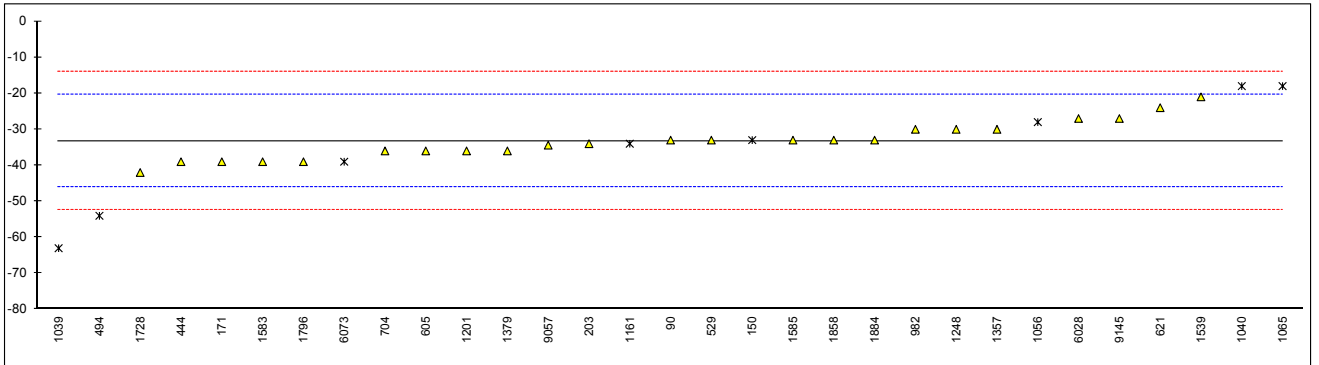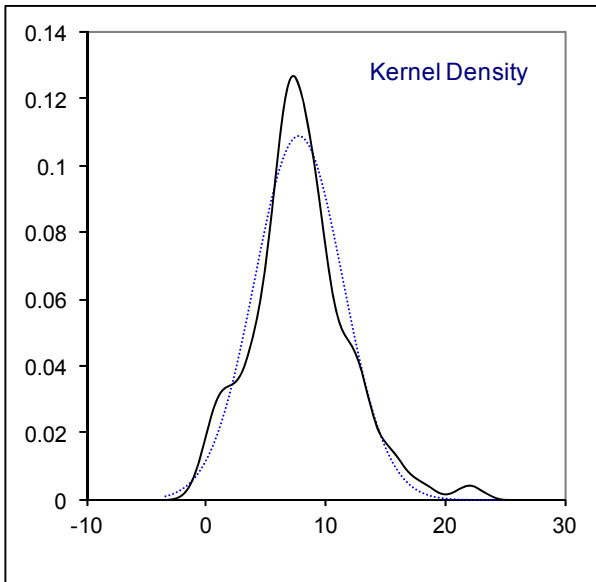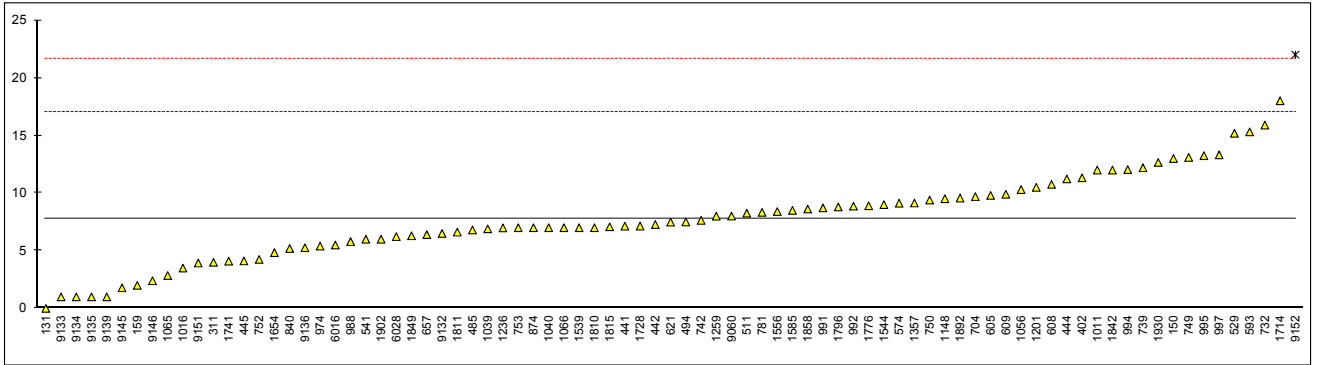
Determination of Salt as Chloride on sample #16230; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988	D3230	5.8		-0.43
62		-----		-----	991	D3230	8.72		0.20
90		-----		-----	992	D3230	8.87		0.24
92		-----		-----	994	D3230	12.04		0.92
120		-----		-----	995	D3230	13.25		1.18
131	D3230	0.00		-1.68	997	D3230	13.32		1.20
133		-----		-----	998		-----		-----
140		-----		-----	1011	D3230	12	C	0.91
150	D3230	13		1.13	1016	D3230	3.5		-0.92
151		-----		-----	1039	In house	6.9		-0.19
154		-----		-----	1040	D3230	7		-0.17
158		-----		-----	1056	D3230	10.31		0.55
159	D3230	2.0		-1.25	1065	D3230	2.85		-1.07
167		-----		-----	1066	D3230	7		-0.17
168		-----		-----	1081		-----		-----
171	D3230	<1		-----	1106		-----		-----
175		-----		-----	1109		-----		-----
186		-----		-----	1148	In house	9.516		0.38
203		-----		-----	1161		-----		-----
213		-----		-----	1201	D3230	10.5		0.59
238		-----		-----	1236	D3230	6.987		-0.17
273		-----		-----	1248		-----		-----
311	D3230	4		-0.82	1259	D3230	8		0.05
314		-----		-----	1264		-----		-----
332		-----		-----	1357	D3230	9.145		0.30
333		-----		-----	1379		-----		-----
334		-----		-----	1397		-----		-----
335		-----		-----	1539	D3230	7		-0.17
340		-----		-----	1544	D3230	9.0		0.26
391		-----		-----	1556	D3230	8.4		0.13
399		-----		-----	1583		-----		-----
402	D3230	11.33		0.77	1585	D3230	8.5		0.16
441	D3230	7.1361		-0.14	1613		-----		-----
442	IP265	7.282		-0.11	1654	D3230	4.84		-0.64
444	IP265	11.23		0.75	1656	D3230	<3		-----
445	IP265	4.12		-0.79	1714		18.01		2.21
446		-----		-----	1720		-----		-----
447		-----		-----	1728		7.14	C	-0.14
485	D3230	6.81		-0.21	1741	D3230	4.1		-0.80
494	D3230	7.5		-0.06	1776	D3230	8.90		0.24
511	D3230	8.26		0.10	1796	D3230	8.8		0.22
529	D3230	15.1912		1.60	1800		-----		-----
541	D3230	6		-0.38	1810	D3230	7.0		-0.17
551		-----		-----	1811	D3230	6.62		-0.25
557		-----		-----	1815	D3230	7.08		-0.15
574	D3230	9.13		0.29	1842	IP265	12		0.91
575		-----		-----	1849	D3230	6.3		-0.32
593	D3230	15.313	C	1.63	1858	D3230	8.62		0.18
602		-----		-----	1884		-----		-----
605	IP265	9.8		0.44	1892	D3230	9.57		0.39
606		-----		-----	1902	D3230	6		-0.38
608	D3230	10.76		0.65	1930	DIN51576	12.66		1.06
609	D3230	9.9		0.46	1957		-----		-----
613		-----		-----	1967		-----		-----
621	D3230	7.49		-0.06	1995		-----		-----
657	IP265	6.4		-0.30	6006		-----		-----
663		-----		-----	6016	D3230	5.5		-0.49
704	D3230	9.7		0.42	6028	D3230	6.23		-0.33
732	GOST 21534	15.9		1.76	6073		-----		-----
739	GOST 21534	12.2		0.96	9051		-----		-----
742	GOST 21534	7.64		-0.03	9052		-----		-----
749	GOST 21534	13.1		1.15	9057		-----		-----
750	D3230	9.4		0.35	9060	D3230	8.009		0.05
751		-----		-----	9063		-----		-----
752	D3230	4.25		-0.76	9101		-----		-----
753	D3230	7		-0.17	9132	D3230	6.5		-0.28
781	D3230	8.33		0.12	9133	D3230	1		-1.47
785		-----		-----	9134	D3230	1		-1.47
840	D6470	5.2		-0.56	9135	D3230	1		-1.47
862		-----		-----	9136	D3230	5.26		-0.54
874	D3230	7		-0.17	9139	D3230	1		-1.47
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	D3230	1.7892		-1.29
971		-----		-----	9146	In house	2.4		-1.16
974	D3230	5.4		-0.51	9151	In house	3.94		-0.83
982		-----		-----	9152	In house	22	R(0.05)	3.08

normality	OK
n	82
outliers	1
mean (n)	7.776
st.dev. (n)	3.6672
R(calc.)	10.268
R(D3230:13)	12.947

Lab 593 first reported: 26.13
Lab 1011 first reported: 0.0012
Lab 1728 first reported: 23

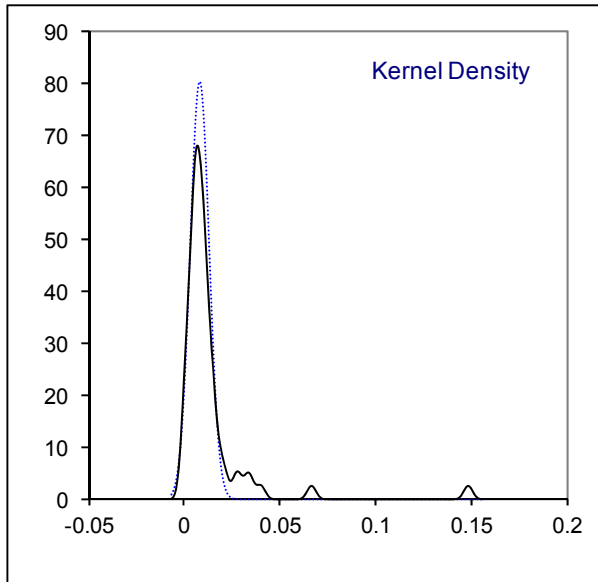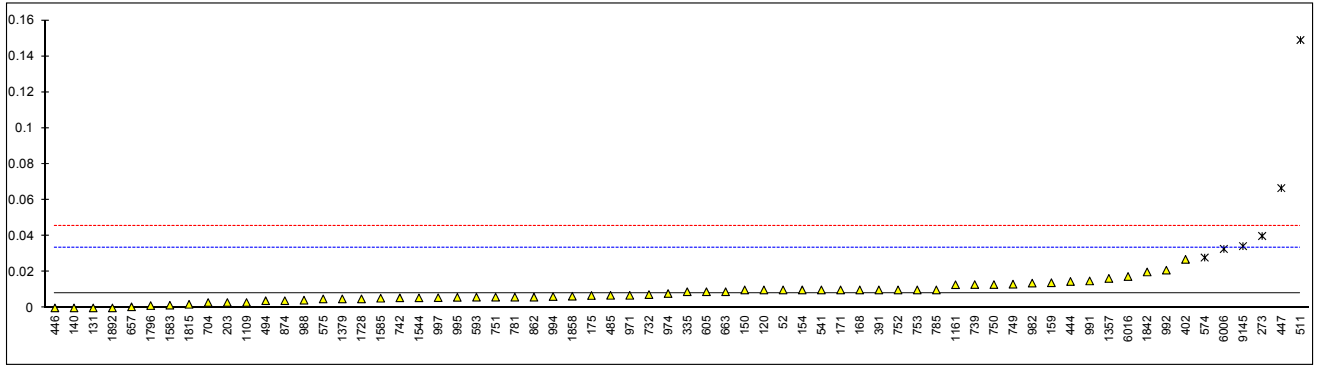Determination of Sediment (Extraction method) ASTM D473 on sample #16230; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D473	0.01		0.14	988	D473	0.0043		-0.31
62		-----		-----	991	D473	0.015		0.54
90		-----		-----	992	D473	0.021		1.02
92		-----		-----	994	D473	0.0063		-0.15
120	D473	0.01		0.14	995	D473	0.0059		-0.18
131	D473	0.00		-0.65	997	D473	0.0057		-0.20
133		-----		-----	998		-----		-----
140	D473	0.00		-0.65	1011		-----		-----
150	D473	0.01		0.14	1016		-----		-----
151		-----		-----	1039		-----		-----
154	D473	0.01		0.14	1040		-----		-----
158		-----		-----	1056		-----		-----
159	D473	0.014		0.46	1065		-----		-----
167		-----		-----	1066		-----		-----
168	D473	0.01		0.14	1081		-----		-----
171	D473	0.01		0.14	1106		-----		-----
175	D473	0.0069		-0.10	1109	D473	0.003		-0.41
186		-----		-----	1148		-----		-----
203	D473	0.003		-0.41	1161	ISO8754	0.0129		0.38
213		-----		-----	1201	D473	<0.01		-----
238		-----		-----	1236		-----		-----
273	D473	0.04	R(0.01)	2.54	1248		-----		-----
311	D473	<0.01		-----	1259		-----		-----
314		-----		-----	1264		-----		-----
332	D473	<0.01		-----	1357	D473	0.0164		0.66
333		-----		-----	1379	D473	0.005		-0.25
334		-----		-----	1397		-----		-----
335	D473	0.009		0.06	1539	D473	<0,01		-----
340	D473	<0.01		-----	1544	D473	0.0056		-0.21
391	D473	0.01		0.14	1556	ISO3735	<0,01		-----
399		-----		-----	1583	D473	0.0015		-0.53
402	D473	0.027		1.50	1585	D473	0.0054		-0.22
441		-----		-----	1613		-----		-----
442		-----		-----	1654		-----		-----
444	D473	0.0147		0.52	1656	D473	<0.01		-----
445	D473	<0.01		-----	1714		-----		-----
446	D473	0		-0.65	1720		-----		-----
447	D473	0.06665	C,R(0.01)	4.66	1728	D473	0.005		-0.25
485	D473	0.007		-0.10	1741		-----		-----
494	D473	0.0040		-0.33	1776		-----		-----
511	D473	0.14903	R(0.01)	11.24	1796	D473	0.0013		-0.55
529		-----		-----	1800		-----		-----
541	D473	0.01		0.14	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815	ISO3735	0.002		-0.49
574	D473	0.028	R(0.05)	1.58	1842	D473	0.02		0.94
575	D473	0.005		-0.25	1849		-----		-----
593	D473	0.006		-0.17	1858	D473	0.0065		-0.13
602		-----		-----	1884		-----		-----
605	D473	0.009		0.06	1892	D473	0.0		-0.65
606		-----		-----	1902		-----		-----
608		-----		-----	1930		-----		-----
609		-----		-----	1957		-----		-----
613		-----		-----	1967		-----		-----
621		-----		-----	1995		-----		-----
657	D473	0.0006		-0.61	6006	D473	0.0328	R(0.05)	1.96
663	D473	0.009		0.06	6016	D473	0.017488		0.74
704	D473	0.003		-0.41	6028		-----		-----
732	D473	0.0074		-0.06	6073		-----		-----
739	GOST 6370	0.0130		0.38	9051		-----		-----
742	GOST 6370	0.0056		-0.21	9052		-----		-----
749	GOST 6370	0.0132		0.40	9057		-----		-----
750	D473	0.013		0.38	9060		-----		-----
751	D473	0.006		-0.17	9063		-----		-----
752	D473	0.01		0.14	9101		-----		-----
753	D473	0.01		0.14	9132		-----		-----
781	D473	0.006		-0.17	9133		-----		-----
785	D473	0.01		0.14	9134		-----		-----
840	D473	<0.002		-----	9135		-----		-----
862	D473	0.006		-0.17	9136		-----		-----
874	D473	0.004		-0.33	9139		-----		-----
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	D473	0.03437	R(0.05)	2.09
971	D473	0.007		-0.10	9146		-----		-----
974	D473	0.008		-0.02	9151		-----		-----
982	D473	0.0138		0.45	9152		-----		-----

|	
normality	OK
n	58
outliers	6
mean (n)	0.00819
st.dev. (n)	0.005490
R(calc.)	0.01537
R(D473:07)	0.03500

Lab 447 first reported: 0.11

Test results of lab 391 and 402 were excluded as they were reported as %M/M (see §4).

Determination of Sediment (Membrane filtration) ASTM D4807 on sample #16230; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4807	0.016		-0.10	988		-----		-----
62	D4807	0.010		-1.21	991		-----		-----
90	D4807	0.0097		-1.27	992		-----		-----
92	D4807	0.013		-0.66	994	D4807	0.017		0.08
120	D4807	0.02		0.64	995	D4807	0.0126		-0.73
131	D4807	0.014		-0.47	997	D4807	0.0128		-0.70
133		-----		-----	998		-----		-----
140	D4807	0.035		3.41	1011	D4807	0.012		-0.84
150	D4807	0.008		-1.58	1016	D4807	0.033		3.04
151		-----		-----	1039	D4807	0.028		2.12
154		-----		-----	1040	D4807	0.0055		-2.05
158		-----		-----	1056		-----		-----
159	D4807	0.0257		1.69	1065		-----		-----
167		-----		-----	1066		-----		-----
168		-----		-----	1081		0.00137		-2.81
171	D4807	0.034		3.23	1106		-----		-----
175		-----		-----	1109		-----		-----
186		-----		-----	1148	In house	0.0018		-2.73
203	D4807	0.008		-1.58	1161		-----		-----
213		-----		-----	1201		-----		-----
238		-----		-----	1236		-----		-----
273		-----		-----	1248		-----		-----
311		-----		-----	1259		-----		-----
314		-----		-----	1264		-----		-----
332		-----		-----	1357	D4807	0.031		2.67
333		-----		-----	1379		-----		-----
334	D4807	0.018		0.27	1397		-----		-----
335		-----		-----	1539		-----		-----
340		-----		-----	1544		-----		-----
391	D4807	0.010		-1.21	1556		-----		-----
399		-----		-----	1583		-----		-----
402		-----		-----	1585		-----		-----
441	D4807	0.06665	R(0.01)	9.27	1613		-----		-----
442		-----		-----	1654		-----		-----
444	D4807	0.0532	R(0.01)	6.78	1656		-----		-----
445		-----		-----	1714	D4807	0.010		-1.21
446	D4807	0.013		-0.66	1720		-----		-----
447	D4807	0.032		2.86	1728		-----		-----
485		-----		-----	1741	D4807	0.0195		0.54
494		-----		-----	1776		-----		-----
511		-----		-----	1796		-----		-----
529		-----		-----	1800		-----		-----
541	D4807	0.0215		0.91	1810	D4807	0.014		-0.47
551		-----		-----	1811	D4807	0.016		-0.10
557		-----		-----	1815		-----		-----
574		-----		-----	1842		-----		-----
575		-----		-----	1849		-----		-----
593		-----		-----	1858		-----		-----
602		-----		-----	1884		-----		-----
605		-----		-----	1892		-----		-----
606		-----		-----	1902	D4807	0.020		0.64
608	D4807	0.0078		-1.62	1930		-----		-----
609		-----		-----	1957	D4807	0.0149		-0.31
613		-----		-----	1967		-----		-----
621		-----		-----	1995		-----		-----
657		-----		-----	6006		-----		-----
663	D4807	0.0237		1.32	6016		-----		-----
704		-----		-----	6028		-----		-----
732	D4807	0.027		1.93	6073		-----		-----
739		-----		-----	9051		-----		-----
742		-----		-----	9052		-----		-----
749		-----		-----	9057		-----		-----
750	GOST 6370	0.011		-1.03	9060		-----		-----
751		-----		-----	9063		-----		-----
752		-----		-----	9101		-----		-----
753		-----		-----	9132		-----		-----
781	D4807	0.012		-0.84	9133		-----		-----
785		-----		-----	9134		-----		-----
840	D4807	0.0105		-1.12	9135		-----		-----
862		-----		-----	9136		-----		-----
874		-----		-----	9139		-----		-----
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145		-----		-----
971		-----		-----	9146		-----		-----
974		-----		-----	9151		-----		-----
982		-----		-----	9152		-----		-----

|	
normality	OK
n	38
outliers	2
mean (n)	0.0166
st.dev. (n)	0.00892
R(calc.)	0.0250
R(D4807:05)	0.0151
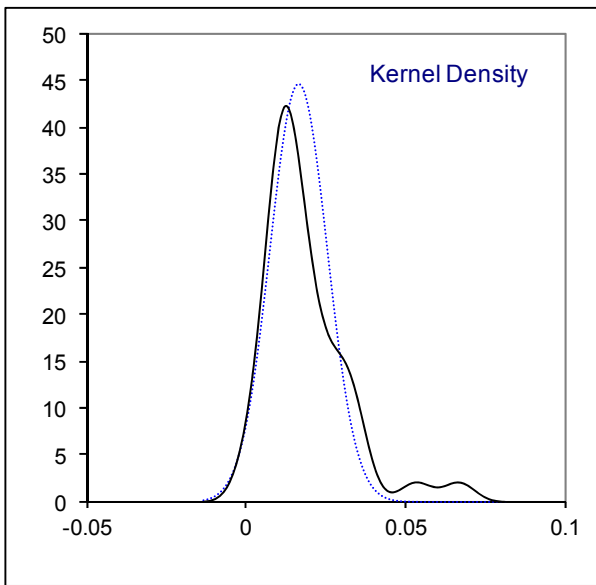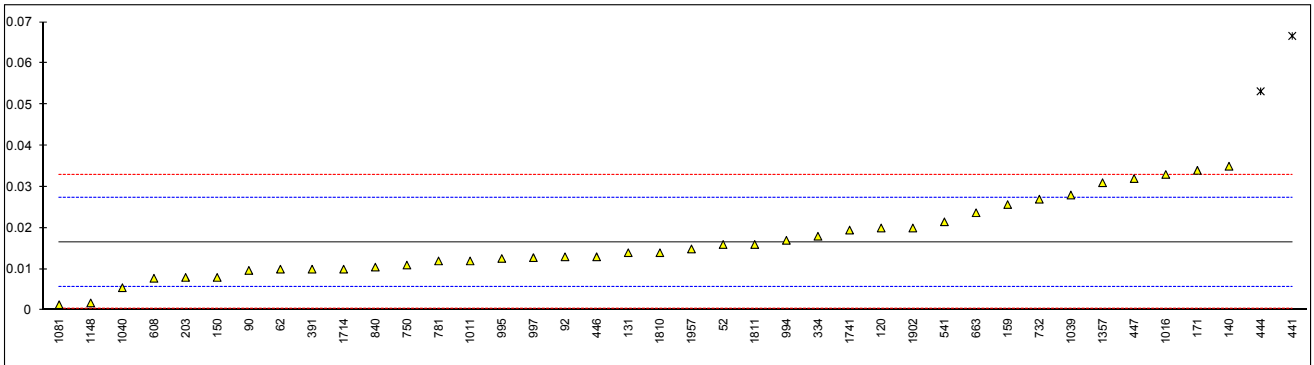
Determination of Sulphur, total on sample #16230; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4294	2.70		0.93	988	D4294	2.604		-1.04
62	D4294	2.61		-0.92	991	D4294	2.652		-0.06
90	D4294	2.714		1.21	992	D4294	2.676		0.43
92	D4294	2.803		3.04	994	D4294	2.629		-0.53
120	D4294	2.64		-0.31	995	D4294	2.667		0.25
131	D4294	2.6469		-0.16	997	D4294	2.662		0.15
133		-----		-----	998		-----		-----
140	D4294	2.66		0.11	1011	D4294	2.68		0.52
150	D4294	2.78		2.57	1016	D2622	2.606		-1.00
151		-----		-----	1039	D2622	2.56		-1.95
154	D4294	2.70		0.93	1040	ISO8754	2.605		-1.02
158		-----		-----	1056	D4294	2.79		2.77
159	D4294	2.69		0.72	1065	D4294	2.62		-0.72
167	D4294	2.71410		1.22	1066	D2622	2.60		-1.13
168	D4294	2.68		0.52	1081	D4294	2.786		2.69
171	D4294	2.65		-0.10	1106		-----		-----
175	D4294	2.709		1.11	1109	D4294	2.64		-0.31
186	D4294	2.81		3.19	1148	ISO8754	2.6885		0.69
203	D4294	2.590		-1.33	1161	ISO8754	2.52		-2.77
213		-----		-----	1201	D4294	2.600		-1.13
238	D4294	2.583		-1.48	1236		-----		-----
273	D4294	3.45	C,R(0.01)	16.33	1248		-----		-----
311	D4294	2.61		-0.92	1259	ISO8754	2.77		2.36
314		-----		-----	1264		-----		-----
332		-----		-----	1357	D4294	2.691		0.74
333	D4294	2.64		-0.31	1379	D4294	2.81		3.19
334	D4294	2.69		0.72	1397	D2622	2.76		2.16
335	D4294	2.619		-0.74	1539	D4294	2.63		-0.51
340	D4294	2.69		0.72	1544	D4294	2.685		0.62
391	D4294	2.61		-0.92	1556	ISO8754	2.631		-0.49
399	D4294	2.70		0.93	1583	D4294	2.648		-0.14
402	D2622	2.61		-0.92	1585	D4294	2.594		-1.25
441		-----		-----	1613		-----		-----
442		-----		-----	1654	ISO8754	2.67		0.31
444	D2622	2.606		-1.00	1656	D4294	2.85	C	4.01
445	IP336	2.676		0.43	1714	D2622	2.63		-0.51
446		-----		-----	1720	D4294	2.777	C	2.51
447	D4294	2.228	R(0.01)	-8.77	1728	D4294	2.60		-1.13
485	D4294	2.668		0.27	1741	ISO8754	2.642		-0.26
494	D4294	2.587		-1.39	1776	ISO8754	2.705		1.03
511		-----		-----	1796	D4294	2.639		-0.33
529		-----		-----	1800		3.03983	R(0.01)	7.91
541		-----		-----	1810	D4294	2.69		0.72
551		-----		-----	1811	D4294	2.63		-0.51
557		-----		-----	1815	D7039	2.650		-0.10
574	D4294	2.65507		0.00	1842	D2622	2.56		-1.95
575	D4294	2.69		0.72	1849		-----		-----
593	D4294	2.61		-0.92	1858	D4294	2.5875		-1.38
602		-----		-----	1884	D4294	4.648	C,R(0.01)	40.93
605	D4294	2.612		-0.88	1892	D4294	2.14	R(0.01)	-10.57
606		-----		-----	1902	D4294	2.63		-0.51
608	D4294	2.663		0.17	1930		-----		-----
609	D4294	2.598		-1.17	1957		-----		-----
613		-----		-----	1967		-----		-----
621	D4294	2.663		0.17	1995		-----		-----
657	D4294	2.64		-0.31	6006		-----		-----
663	D4294	2.646		-0.18	6016	D4294	2.7467		1.89
704	D4294	2.634		-0.43	6028	ISO8754	2.55		-2.15
732	D4294	2.660		0.11	6073	D7039	2.76		2.16
739		2.671		0.33	9051		-----		-----
742	GOST51947	2.50		-3.18	9052		-----		-----
749		2.666		0.23	9057		-----		-----
750	D4294	2.648		-0.14	9060		-----		-----
751	D4294	2.628		-0.55	9063		-----		-----
752	D4294	2.67		0.31	9101		-----		-----
753	D4294	2.65		-0.10	9132		-----		-----
781	D4294	2.63		-0.51	9133		-----		-----
785	D4294	2.581		-1.52	9134		-----		-----
840	D4294	2.643		-0.24	9135		-----		-----
862	D2622	2.592		-1.29	9136		-----		-----
874	D4294	2.550		-2.15	9139		-----		-----
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	D4294	2.635		-0.41
971	D4294	2.61		-0.92	9146	In house	2.7		0.93
974	D4294	2.59		-1.33	9151		-----		-----
982	D4294	2.60		-1.13	9152		-----		-----

normality	OK
n	101
outliers	5
mean (n)	2.6549
st.dev. (n)	0.06472
R(calc.)	0.1812
R(D4294:16e1)	0.1363

Lab 273 first reported: 3.05
Lab 1656 first reported: 2.9
Lab 1720 first reported:0.855
Lab 1884 first reported: 2.317
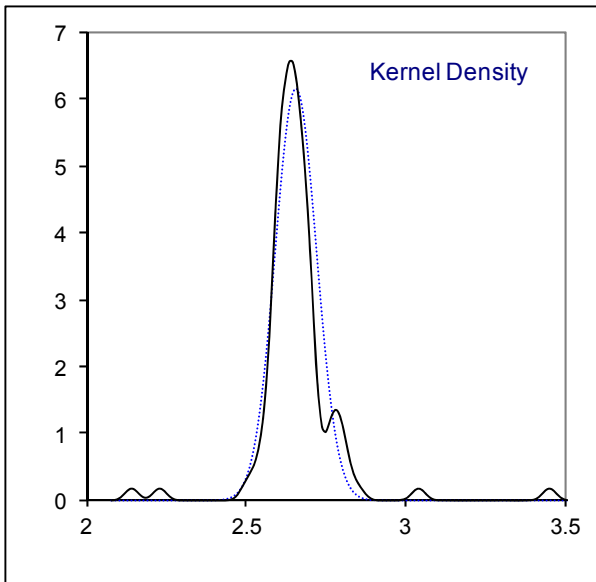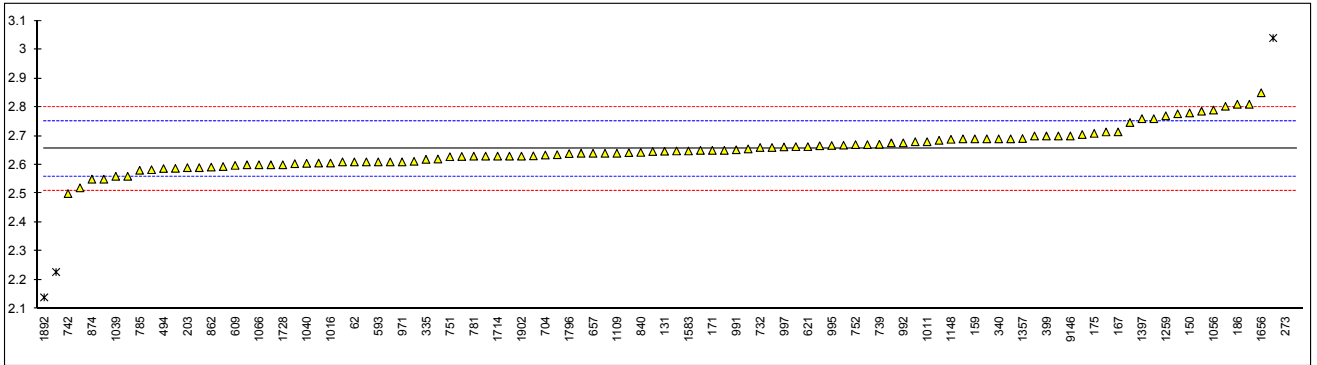
Determination of Water on sample #16230; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4928	0.02		-0.43	988	D4006	0.0025		-1.94
62	D4928	0.19	R(0.01)	14.24	991	D4006	0.10	R(0.01)	6.47
90	D4928	0.024		-0.08	992	D4006	0.15	R(0.01)	10.79
92	D4377	0.030		0.43	994	D4377	0.023		-0.17
120		-----		-----	995	D4377	0.0218		-0.27
131	D4928	0.02243		-0.22	997	D4377	0.0221		-0.25
133		-----		-----	998		-----		-----
140	D4928	0.02		-0.43	1011	D4928	0.03		0.43
150	D4928	0.02		-0.43	1016	D4377	0.037		1.04
151		-----		-----	1039	D4928	0.03		0.43
154	D4928	0.024		-0.08	1040	DIN51777	0.0245		-0.04
158		-----		-----	1056	D4928	0.032		0.61
159	D4377	0.045		1.73	1065	D4928	0.00365		-1.84
167		-----		-----	1066		-----		-----
168	D4928	0.017		-0.69	1081		0.019		-0.52
171	D4377	0.03		0.43	1106		-----		-----
175		-----		-----	1109	D4377	0.02		-0.43
186	D4928	0.01		-1.29	1148	DIN51777	0.028		0.26
203	D4928	0.0263		0.11	1161	ISO1428	<0,1		-----
213		-----		-----	1201	D4377	0.0575		2.81
238		-----		-----	1236	D4928	0.0323		0.63
273	D4928	0.0277		0.23	1248	D4377Mod.	0.027		0.17
311	D4928	0.03		0.43	1259	D4006	<0.05		-----
314	D4928	0.02		-0.43	1264		-----		-----
332	D4377	0.0388		1.19	1357	D4006	0.10	R(0.01)	6.47
333	D4377	0.03		0.43	1379	D4928	0.0205		-0.39
334	D4377	0.03		0.43	1397		-----		-----
335	D4377	0.0312		0.54	1539	D4377	0.036		0.95
340	D4377	0.029		0.35	1544		-----		-----
391	D4377	0.037		1.04	1556	D6304	<0,02		-----
399		-----		-----	1583	D4006	0.025		0.00
402		-----		-----	1585	D4006	0.0251		0.01
441	D4928	0.02224		-0.24	1613		-----		-----
442	IP386	0.0216		-0.29	1654		-----		-----
444	D4928	0.0240		-0.08	1656	D4377	0.10	R(0.01)	6.47
445	D4928	0.022		-0.26	1714	D4006	0.0298		0.42
446	D4928	0.03		0.43	1720		-----		-----
447	IP386	0.024		-0.08	1728		-----		-----
485	D4377	0.0288		0.33	1741	D4006	0		-2.16
494	D6304	0.0336		0.74	1776	D6304	0.01898	C	-0.52
511	D4006	0.0		-2.16	1796	D4006	0.025		0.00
529	D4377	0.02649		0.13	1800	D4928	0.053		2.42
541	D4928	0.028		0.26	1810	D4377	0.025		0.00
551		-----		-----	1811	D4377	0.024		-0.08
557		-----		-----	1815	D4377	0.0226		-0.21
574	D4377	0.03825		1.14	1842	IP386	0.028		0.26
575	D4377	0.030		0.43	1849	D6304	0.02		-0.43
593	D4006	0		-2.16	1858	D4006	0.0287		0.32
602		-----		-----	1884		-----		-----
605		-----		-----	1892	D4377	0.0318		0.59
606		-----		-----	1902		-----		-----
608		-----		-----	1930		0.023		-0.17
609	D4377	0.081	R(0.01)	4.83	1957	D4928	0.0197		-0.46
613		-----		-----	1967		-----		-----
621	D6304	0.0199	C	-0.44	1995		-----		-----
657	D4377	0.03		0.43	6006		-----		-----
663	D4377	0.025		0.00	6016	D4377	0.03		0.43
704	D4377	0.026		0.09	6028		-----		-----
732	D6304	0.0246		-0.03	6073		-----		-----
739	GOST 2477	< 0.03		-----	9051	INH-18	0.017		-0.69
742		-----		-----	9052	D4298	0.0231		-0.16
749	GOST 2477	< 0.03		-----	9057	In house	0.02465		-0.03
750	D6304	0.00972	C	-1.32	9060	D4928	0.02		-0.43
751	D4006	0		-2.16	9063		-----		-----
752	D4006	< 0.025		-----	9101		-----		-----
753	D4006	0.025		0.00	9132	D4928	0.0233		-0.15
781	D4006	0.025		0.00	9133	D4928	0.0216		-0.29
785	D4006	0.000		-2.16	9134		-----		-----
840	D4928	0.028		0.26	9135	D4928	0.0612		3.13
862		-----		-----	9136	D4928	0.025		0.00
874	D4006	0.025		0.00	9139		-----		-----
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145	D4928	0.0293		0.37
971	D4928	0.0275	z	0.22	9146	D4377	0.048		1.99
974	D4928	0.0237		-0.11	9151	In house	0.00287		-1.91
982		-----		-----	9152	In house	0.343	R(0.01)	27.44

normality	not OK
n	95
outliers	7
mean (n)	0.0250
st.dev. (n)	0.01087
R(calc.)	0.0304
R(D4377:00)	0.0324

Lab 621 reported: 199 (probably a unit error?)
Lab 750 first reported: 97.2
Lab 1776 first reported: 189.8
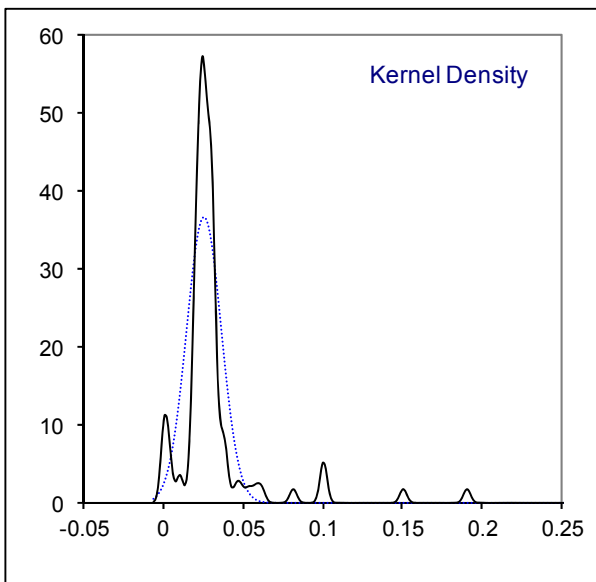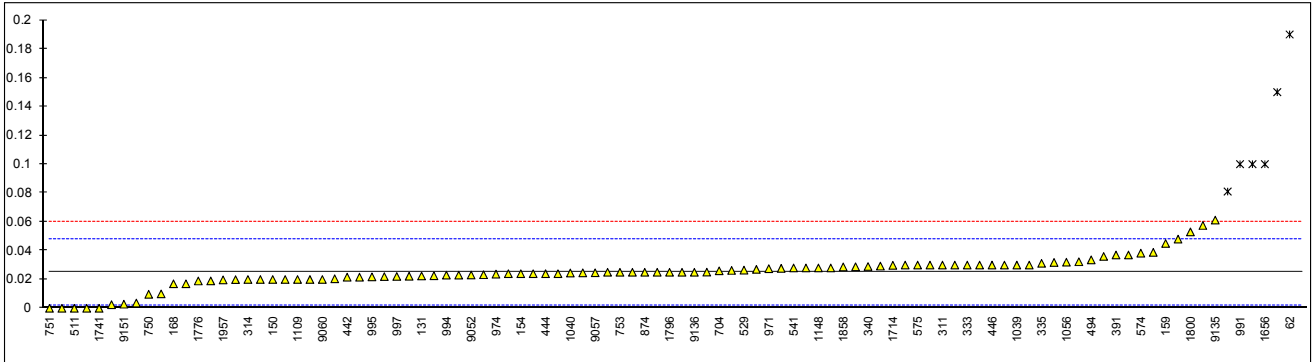
Determination of Simulated Distillation on sample #16230; results in °C

lab	method	IBP	mark	5%rec	mark	10%rec	mark	30%rec	mark
52		-----		-----		-----		-----	
62		-----		-----		-----		-----	
90		-----		-----		-----		-----	
92		-----		-----		-----		-----	
120		-----		-----		-----		-----	
131		-----		-----		-----		-----	
133		-----		-----		-----		-----	
140		-----		-----		-----		-----	
150	D7169	<36		68.0		115.0		253.0	
151		-----		-----		-----		-----	
154		-----		-----		-----		-----	
158		-----		-----		-----		-----	
159		-----		-----		-----		-----	
167		-----		-----		-----		-----	
168		-----		-----		-----		-----	
171	D7169	32.0		67.0		110.5		246.5	
175		-----		-----		-----		-----	
186		-----		-----		-----		-----	
203		-----		-----		-----		-----	
213		-----		-----		-----		-----	
238		-----		-----		-----		-----	
273		-----		-----		-----		-----	
311	D7169	<36.0		69.0	C	125.5	C	249.5	C
314		-----		-----		-----		-----	
332		-----		-----		-----		-----	
333		-----		-----		-----		-----	
334		-----		-----		-----		-----	
335		-----		-----		-----		-----	
340		-----		-----		-----		-----	
391		-----		-----		-----		-----	
399		-----		-----		-----		-----	
402		-----		-----		-----		-----	
441		-----		-----		-----		-----	
442		-----		-----		-----		-----	
444		-----		-----		-----		-----	
445	D7169	-0.5		68.7		115.1		244.6	
446		-----		-----		-----		-----	
447		-----		-----		-----		-----	
485		-----		-----		-----		-----	
494		-----		-----		-----		-----	
511		-----		-----		-----		-----	
529		-----		-----		-----		-----	
541		-----		-----		-----		-----	
551		-----		-----		-----		-----	
557		-----		-----		-----		-----	
574		-----		-----		-----		-----	
575		-----		-----		-----		-----	
593		-----		-----		-----		-----	
602		-----		-----		-----		-----	
605		-----		-----		-----		-----	
606		-----		-----		-----		-----	
608		-----		-----		-----		-----	
609		-----		-----		-----		-----	
613		-----		-----		-----		-----	
621		-----		-----		-----		-----	
657		-----		-----		-----		-----	
663		-----		-----		-----		-----	
704		-----		-----		-----		-----	
732		-----		-----		-----		-----	
739		-----		-----		-----		-----	
742		-----		-----		-----		-----	
749		-----		-----		-----		-----	
750		-----		-----		-----		-----	
751		-----		-----		-----		-----	
752		-----		-----		-----		-----	
753		-----		-----		-----		-----	
781		-----		-----		-----		-----	
785		-----		-----		-----		-----	
840		-----		-----		-----		-----	
862	D7169	-10.1		66.9		112.5		272.3	
874		-----		-----		-----		-----	
875		-----		-----		-----		-----	
962		-----		-----		-----		-----	
963		-----		-----		-----		-----	
971		IBP		5%rec		10%rec		30%rec	
974		-----		-----		-----		-----	
982		-----		-----		-----		-----	
988		-----		-----		-----		-----	

lab	method	IBP	mark	5%rec	mark	10%rec	mark	30%rec	mark
991		-----		-----		-----		-----	
992		-----		-----		-----		-----	
994		-----		-----		-----		-----	
995		-----		-----		-----		-----	
997		-----		-----		-----		-----	
998		-----		-----		-----		-----	
1011		-----		-----		-----		-----	
1016		-----		-----		-----		-----	
1039	EN15199-3	-16.1		64.1		109.4		256.5	
1040	D7169	-11.7		60.3		98.4		233.5	
1056		-----		-----		-----		-----	
1065		-----		-----		93.2		215.6	R(0.05)
1066	D7169	-0.5		68.5		117.5		253.0	
1081		-----		-----		-----		-----	
1106		-----		-----		-----		-----	
1109	D7169	44.2		80.8		116.4		238.2	
1148		-----		-----		-----		-----	
1161		-----		-----		-----		-----	
1201		-----		-----		-----		-----	
1236		-----		-----		-----		-----	
1248		-----		-----		-----		-----	
1259		-----		-----		-----		-----	
1264		-----		-----		-----		-----	
1357		-----		-----		-----		-----	
1379		-----		-----		-----		-----	
1397	D2887	18.00	ex	62.00	ex	101.00	ex	217.00	ex
1539		-----		-----		-----		-----	
1544		-----		-----		-----		-----	
1556		-----		-----		-----		-----	
1583		-----		-----		-----		-----	
1585		-----		-----		-----		-----	
1613		-----		-----		-----		-----	
1654		-----		-----		-----		-----	
1656		-----		-----		-----		-----	
1714		-----		-----		-----		-----	
1720		-----		-----		-----		-----	
1728		-----		-----		-----		-----	
1741		-----		-----		-----		-----	
1776		-----		-----		-----		-----	
1796		-----		-----		-----		-----	
1800		-----		-----		-----		-----	
1810		-----		-----		-----		-----	
1811		-----		-----		-----		-----	
1815		-----		-----		-----		-----	
1842	IP545	-12		64		111		240	
1849		-----		-----		-----		-----	
1858		-----		-----		-----		-----	
1884		-----		-----		-----		-----	
1892		-----		-----		-----		-----	
1902	D7169	< 36		90.0		125.0		251.5	
1930		-----		-----		-----		-----	
1957		-----		-----		-----		-----	
1967		-----		-----		-----		-----	
1995		-----		-----		-----		-----	
6006		-----		-----		-----		-----	
6016	D7500	44.0		85.4		121.4		240.3	
6028		-----		-----		-----		-----	
6073	D7169	55	ex	115	DG(0.01)	121	ex	190	G(0.05)
9051		-----		-----		-----		-----	
9052		-----		-----		-----		-----	
9057		-----		-----		-----		-----	
9060		-----		-----		-----		-----	
9063		-----		-----		-----		-----	
9101		-----		-----		-----		-----	
9132		-----		-----		-----		-----	
9133		-----		-----		-----		-----	
9134		-----		-----		-----		-----	
9135		-----		-----		-----		-----	
9136		-----		-----		-----		-----	
9139		-----		-----		-----		-----	
9142		-----		-----		-----		-----	
9143		-----		-----		-----		-----	
9145	D7169	35.0	ex	117.3	DG(0.01)	164.6	G(0.01)	314.9	G(0.05)
9146		-----		-----		-----		-----	
9151		-----		-----		-----		-----	
9152		-----		-----		-----		-----	

normality	OK	suspect	OK	suspect
n	9	12	13	12
outliers	0(+3ex)	2(+1ex)	1 (+2ex)	3 (+1ex)
mean (n)	7.70	71.06	113.15	248.24
st.dev. (n)	25.057	9.209	9.307	10.313
R(calc.)	70.16	25.78	26.06	28.88
R(D7169:11)	(2.49)	19.60	19.50	13.10

Lab 311 first reported for 5% rec. 106.0, for 10% rec. 133.0 and for 30% rec. 268.0
Test results of lab 1397, 6073 and 9145 were excluded as other results showed two or more outliers (see §4)
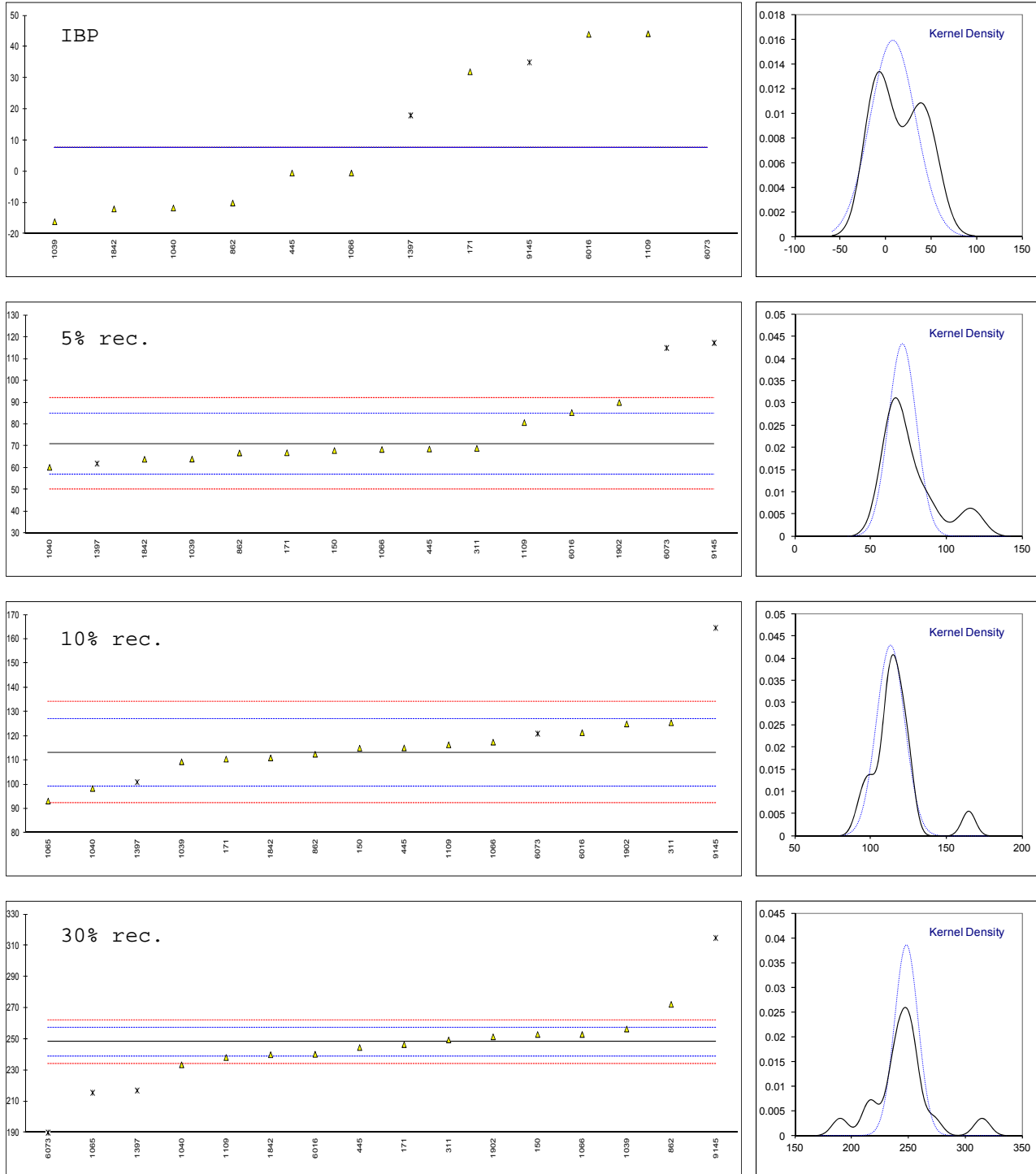
Determination of Simulated Distillation on sample #16230; results in °C, continued

lab	method	50%rec	mark	70%rec	mark	90%rec	mark	FBP	mark
52		-----		-----		-----		-----	
62		-----		-----		-----		-----	
90		-----		-----		-----		-----	
92		-----		-----		-----		-----	
120		-----		-----		-----		-----	
131		-----		-----		-----		-----	
133		-----		-----		-----		-----	
140		-----		-----		-----		-----	
150	D7169	379.5		519.0		709.5		>720.0	
151		-----		-----		-----		-----	
154		-----		-----		-----		-----	
158		-----		-----		-----		-----	
159		-----		-----		-----		-----	
167		-----		-----		-----		-----	
168		-----		-----		-----		-----	
171	D7169	372.0		510.5		700.5		711.0	
175		-----		-----		-----		-----	
186		-----		-----		-----		-----	
203		-----		-----		-----		-----	
213		-----		-----		-----		-----	
238		-----		-----		-----		-----	
273		-----		-----		-----		-----	
311	D7169	364.5	C	487.5	C	637	C	>720.0	
314		-----		-----		-----		-----	
332		-----		-----		-----		-----	
333		-----		-----		-----		-----	
334		-----		-----		-----		-----	
335		-----		-----		-----		-----	
340		-----		-----		-----		-----	
391		-----		-----		-----		-----	
399		-----		-----		-----		-----	
402		-----		-----		-----		-----	
441		-----		-----		-----		-----	
442		-----		-----		-----		-----	
444		-----		-----		-----		-----	
445	D7169	361.1		486.4		633.7		733.7	
446		-----		-----		-----		-----	
447		-----		-----		-----		-----	
485		-----		-----		-----		-----	
494		-----		-----		-----		-----	
511		-----		-----		-----		-----	
529		-----		-----		-----		-----	
541		-----		-----		-----		-----	
551		-----		-----		-----		-----	
557		-----		-----		-----		-----	
574		-----		-----		-----		-----	
575		-----		-----		-----		-----	
593		-----		-----		-----		-----	
602		-----		-----		-----		-----	
605		-----		-----		-----		-----	
606		-----		-----		-----		-----	
608		-----		-----		-----		-----	
609		-----		-----		-----		-----	
613		-----		-----		-----		-----	
621		-----		-----		-----		-----	
657		-----		-----		-----		-----	
663		-----		-----		-----		-----	
704		-----		-----		-----		-----	
732		-----		-----		-----		-----	
739		-----		-----		-----		-----	
742		-----		-----		-----		-----	
749		-----		-----		-----		-----	
750		-----		-----		-----		-----	
751		-----		-----		-----		-----	
752		-----		-----		-----		-----	
753		-----		-----		-----		-----	
781		-----		-----		-----		-----	
785		-----		-----		-----		-----	
840		-----		-----		-----		-----	
862	D7169	385.4		511.8		666.7		>720	
874		-----		-----		-----		-----	
875		-----		-----		-----		-----	
962		-----		-----		-----		-----	
963		-----		-----		-----		-----	
971		-----		-----		-----		-----	
974		-----		-----		-----		-----	
982		-----		-----		-----		-----	
988		-----		-----		-----		-----	

lab	method	50%rec	mark	70%rec	mark	90%rec	mark	FBP	mark
991		-----		-----		-----		-----	
992		-----		-----		-----		-----	
994		-----		-----		-----		-----	
995		-----		-----		-----		-----	
997		-----		-----		-----		-----	
998		-----		-----		-----		-----	
1011		-----		-----		-----		-----	
1016		-----		-----		-----		-----	
1039	EN15199-3	379.9		516.2		707.5		-----	
1040	D7169	366.8		511.9		724.5		-----	
1056		-----		-----		-----		-----	
1065		347.8		488.8		679.8		-----	
1066	D7169	377.5		517.0		695.0		>750	
1081		-----		-----		-----		-----	
1106		-----		-----		-----		-----	
1109	D7169	359.0		486.4		637.0		742.0	
1148		-----		-----		-----		-----	
1161		-----		-----		-----		-----	
1201		-----		-----		-----		-----	
1236		-----		-----		-----		-----	
1248		-----		-----		-----		-----	
1259		-----		-----		-----		-----	
1264		-----		-----		-----		-----	
1357		-----		-----		-----		-----	
1379		-----		-----		-----		-----	
1397	D2887	319.00	DG(0.05)	427.00	G(0.05)	557.00	ex	639.00	G(0.01)
1539		-----		-----		-----		-----	
1544		-----		-----		-----		-----	
1556		-----		-----		-----		-----	
1583		-----		-----		-----		-----	
1585		-----		-----		-----		-----	
1613		-----		-----		-----		-----	
1654		-----		-----		-----		-----	
1656		-----		-----		-----		-----	
1714		-----		-----		-----		-----	
1720		-----		-----		-----		-----	
1728		-----		-----		-----		-----	
1741		-----		-----		-----		-----	
1776	EN15199-3	-----		-----		-----		-----	
1796		-----		-----		-----		-----	
1800		-----		-----		-----		-----	
1810		-----		-----		-----		-----	
1811		-----		-----		-----		-----	
1815		-----		-----		-----		-----	
1842	IP545	368		498		664		737	
1849		-----		-----		-----		-----	
1858		-----		-----		-----		-----	
1884		-----		-----		-----		-----	
1892		-----		-----		-----		-----	
1902	D7169	371.0		503.0		678.0		> 720.0	
1930		-----		-----		-----		-----	
1957		-----		-----		-----		-----	
1967		-----		-----		-----		-----	
1995		-----		-----		-----		-----	
6006		-----		-----		-----		-----	
6016	D7500	350.9		468.9		610.7		734.1	
6028		-----		-----		-----		-----	
6073	D7169	325	DG(0.05)	468	ex	628	ex	742	
9051		-----		-----		-----		-----	
9052		-----		-----		-----		-----	
9057		-----		-----		-----		-----	
9060		-----		-----		-----		-----	
9063		-----		-----		-----		-----	
9101		-----		-----		-----		-----	
9132		-----		-----		-----		-----	
9133		-----		-----		-----		-----	
9134		-----		-----		-----		-----	
9135		-----		-----		-----		-----	
9136		-----		-----		-----		-----	
9139		-----		-----		-----		-----	
9142		-----		-----		-----		-----	
9143		-----		-----		-----		-----	
9145	D7169	459.7	G(0.01)	633.0	G(0.01)	-----		707.7	
9146		-----		-----		-----		-----	
9151		-----		-----		-----		-----	
9152		-----		-----		-----		-----	

normality	OK	OK	OK	n.a.
n	13	13	13	10
outliers	3	2 (+1ex)	0 (+2ex)	n.a.
mean (n)	367.95	500.42	672.61	>720
st.dev. (n)	11.309	15.634	34.908	n.a.
R(calc.)	31.66	43.78	97.74	n.a..
R(D7169:11)	16.40	21.20	n.a.	n.a.

Lab 311 first reported for 50% rec. 397.5, for 70% rec. 542.0 and for 90% rec. >720.0
Test results of lab 1397, 6073 and 9145 were excluded as other results showed two or more outliers (see §4)
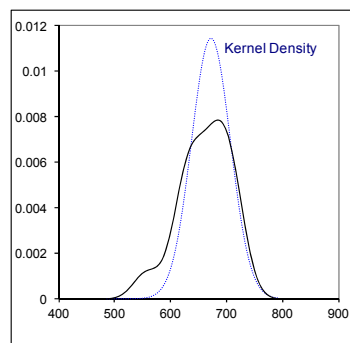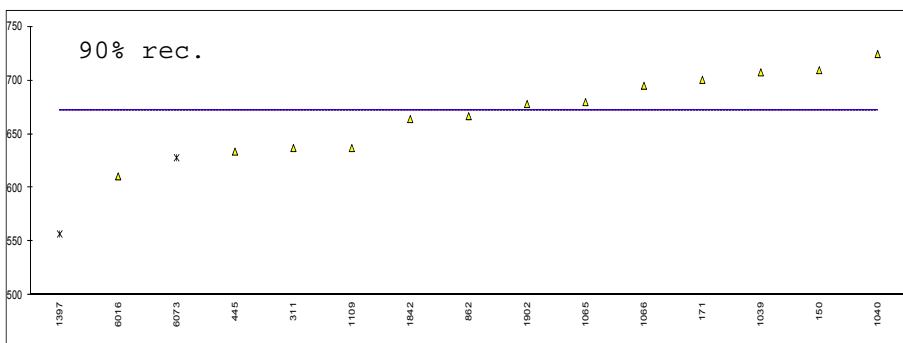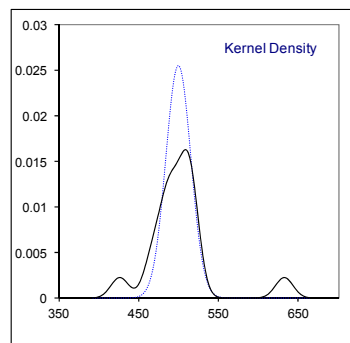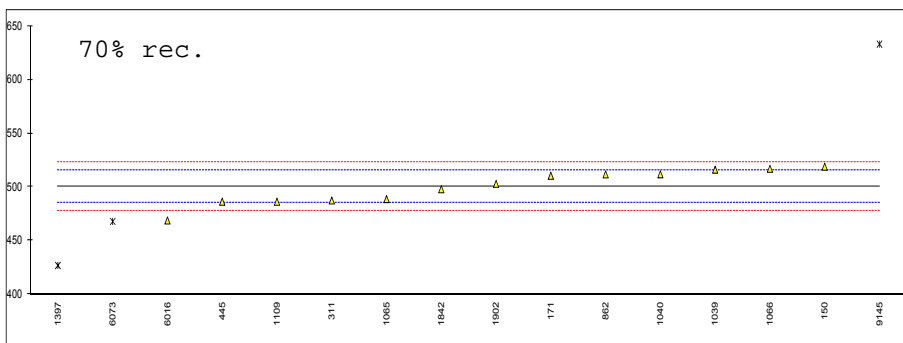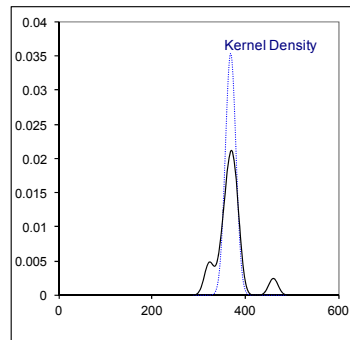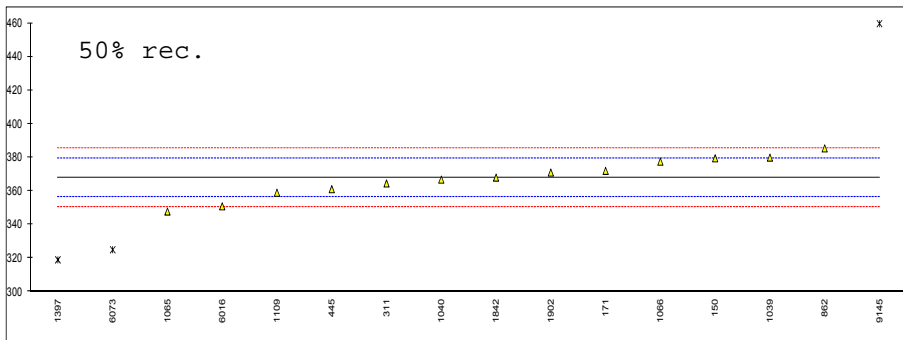
Determination of Mercury, total on sample #16231 results in µg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988		-----		-----
62		-----		-----	991		-----		-----
90		-----		-----	992		-----		-----
92		-----		-----	994		-----		-----
120		-----		-----	995		-----		-----
131		-----		-----	997		-----		-----
133		-----		-----	998		-----		-----
140		-----		-----	1011		-----		-----
150		-----		-----	1016	UOP938	33.8		-1.03
151		-----		-----	1039	UOP938	<1	false-?	<-3.84
154		-----		-----	1040		-----		-----
158		-----		-----	1056		-----		-----
159		-----		-----	1065		-----		-----
167		-----		-----	1066	In house	44		-0.16
168		-----		-----	1081		-----		-----
171		-----		-----	1106		-----		-----
175		-----		-----	1109		-----		-----
186		-----		-----	1148		-----		-----
203		-----		-----	1161		-----		-----
213		-----		-----	1201		-----		-----
238		-----		-----	1236		-----		-----
273		-----		-----	1248		-----		-----
311		-----		-----	1259		-----		-----
314		-----		-----	1264		-----		-----
332		-----		-----	1357	UOP938	39.1		-0.58
333	EPA7473	67		1.81	1379		-----		-----
334		-----		-----	1397		-----		-----
335		-----		-----	1539		-----		-----
340		-----		-----	1544		-----		-----
391		-----		-----	1556		-----		-----
399		-----		-----	1583		-----		-----
402		-----		-----	1585		-----		-----
441		-----		-----	1613		-----		-----
442		-----		-----	1654		-----		-----
444	UOP938	51.18		0.45	1656		-----		-----
445		-----		-----	1714	UOP938	37.62		-0.71
446		-----		-----	1720		-----		-----
447		-----		-----	1728		-----		-----
485		-----		-----	1741		-----		-----
494		-----		-----	1776		-----		-----
511		-----		-----	1796		-----		-----
529		-----		-----	1800	UOP938	56.3		0.89
541		-----		-----	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815		-----		-----
574		-----		-----	1842	UOP938	44		-0.16
575		-----		-----	1849		-----		-----
593		-----		-----	1858		-----		-----
602		-----		-----	1884		-----		-----
605		-----		-----	1892		-----		-----
606		-----		-----	1902		-----		-----
608		-----		-----	1930	In house	63.7		1.53
609		-----		-----	1957		-----		-----
613		-----		-----	1967		-----		-----
621		-----		-----	1995		-----		-----
657	UOP938	51.7		0.50	6006	UOP938	35.77		-0.87
663	UOP938	47.32		0.12	6016	D7622	43.87		-0.17
704		-----		-----	6028		-----		-----
732		-----		-----	6073		-----		-----
739		-----		-----	9051		-----		-----
742		-----		-----	9052		-----		-----
749		-----		-----	9057		-----		-----
750		-----		-----	9060		-----		-----
751		-----		-----	9063		-----		-----
752		-----		-----	9101		-----		-----
753		-----		-----	9132	D7623	45.0		-0.08
781		-----		-----	9133		-----		-----
785		-----		-----	9134		-----		-----
840		-----		-----	9135		-----		-----
862	UOP938	38.73		-0.61	9136		-----		-----
874		-----		-----	9139		-----		-----
875		-----		-----	9142		-----		-----
962		-----		-----	9143		-----		-----
963		-----		-----	9145		-----		-----
971		-----		-----	9146		-----		-----
974	UOP938	35		-0.93	9151		-----		-----
982		-----		-----	9152		-----		-----

normality	OK	
n	16	
outliers	0	
mean (n)	45.881	Spike: 44.38 (recovery < 103%)
st.dev. (n)	9.9329	
R(calc.)	27.812	
R(Horwitz)	32.685	Compare R(D7623:10) = 12.432 & R(UOP938:10) = 11.561

Kernel Density
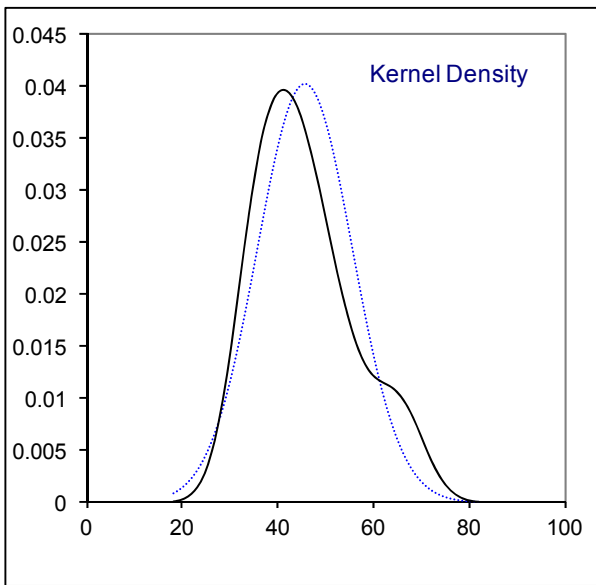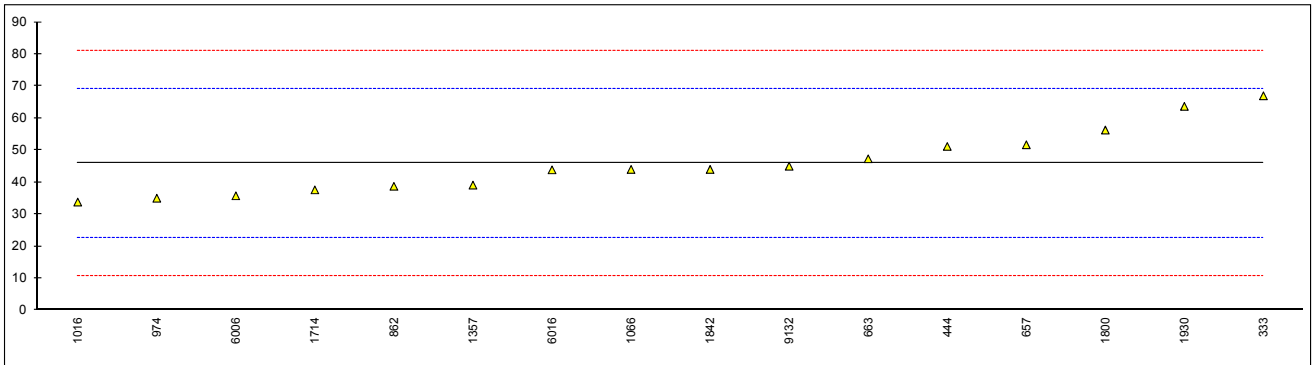
APPENDIX 2
z-scores of Simulated Distillation on sample #16230

lab	method	IBP	5%rec	10%rec	30%rec	50%rec	70%rec	90%rec	FBP
52		-----	-----	-----	-----	-----	-----	-----	-----
62		-----	-----	-----	-----	-----	-----	-----	-----
90		-----	-----	-----	-----	-----	-----	-----	-----
92		-----	-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----	-----
131		-----	-----	-----	-----	-----	-----	-----	-----
133		-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----
150	D7169	-----	-0.44	0.27	1.02	1.97	2.45	-----	-----
151		-----	-----	-----	-----	-----	-----	-----	-----
154		-----	-----	-----	-----	-----	-----	-----	-----
158		-----	-----	-----	-----	-----	-----	-----	-----
159		-----	-----	-----	-----	-----	-----	-----	-----
167		-----	-----	-----	-----	-----	-----	-----	-----
168		-----	-----	-----	-----	-----	-----	-----	-----
171	D7169	-----	-0.58	-0.38	-0.37	0.69	1.33	-----	-----
175		-----	-----	-----	-----	-----	-----	-----	-----
186		-----	-----	-----	-----	-----	-----	-----	-----
203		-----	-----	-----	-----	-----	-----	-----	-----
213		-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----
311	D7169	-----	-0.29	1.77	0.27	-0.59	-1.71	-----	-----
314		-----	-----	-----	-----	-----	-----	-----	-----
332		-----	-----	-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	-----	-----
334		-----	-----	-----	-----	-----	-----	-----	-----
335		-----	-----	-----	-----	-----	-----	-----	-----
340		-----	-----	-----	-----	-----	-----	-----	-----
391		-----	-----	-----	-----	-----	-----	-----	-----
399		-----	-----	-----	-----	-----	-----	-----	-----
402		-----	-----	-----	-----	-----	-----	-----	-----
441		-----	-----	-----	-----	-----	-----	-----	-----
442		-----	-----	-----	-----	-----	-----	-----	-----
444		-----	-----	-----	-----	-----	-----	-----	-----
445	D7169	-----	-0.34	0.28	-0.78	-1.17	-1.85	-----	-----
446		-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----
485		-----	-----	-----	-----	-----	-----	-----	-----
494		-----	-----	-----	-----	-----	-----	-----	-----
511		-----	-----	-----	-----	-----	-----	-----	-----
529		-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----
551		-----	-----	-----	-----	-----	-----	-----	-----
557		-----	-----	-----	-----	-----	-----	-----	-----
574		-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----
593		-----	-----	-----	-----	-----	-----	-----	-----
602		-----	-----	-----	-----	-----	-----	-----	-----
605		-----	-----	-----	-----	-----	-----	-----	-----
606		-----	-----	-----	-----	-----	-----	-----	-----
608		-----	-----	-----	-----	-----	-----	-----	-----
609		-----	-----	-----	-----	-----	-----	-----	-----
613		-----	-----	-----	-----	-----	-----	-----	-----
621		-----	-----	-----	-----	-----	-----	-----	-----
657		-----	-----	-----	-----	-----	-----	-----	-----
663		-----	-----	-----	-----	-----	-----	-----	-----
704		-----	-----	-----	-----	-----	-----	-----	-----
732		-----	-----	-----	-----	-----	-----	-----	-----
739		-----	-----	-----	-----	-----	-----	-----	-----
742		-----	-----	-----	-----	-----	-----	-----	-----
749		-----	-----	-----	-----	-----	-----	-----	-----
750		-----	-----	-----	-----	-----	-----	-----	-----
751		-----	-----	-----	-----	-----	-----	-----	-----
752		-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----
781		-----	-----	-----	-----	-----	-----	-----	-----
785		-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----
862	D7169	-----	-0.59	-0.09	5.14	2.98	1.50	-----	-----
874		-----	-----	-----	-----	-----	-----	-----	-----
875		-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----	-----	-----
971		-----	-----	-----	-----	-----	-----	-----	-----
974		-----	-----	-----	-----	-----	-----	-----	-----
982		-----	-----	-----	-----	-----	-----	-----	-----
988		-----	-----	-----	-----	-----	-----	-----	-----

lab	method	IBP	5%rec	10%rec	30%rec	50%rec	70%rec	90%rec	FBP
991		-----	-----	-----	-----	-----	-----	-----	-----
992		-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----
995		-----	-----	-----	-----	-----	-----	-----	-----
997		-----	-----	-----	-----	-----	-----	-----	-----
998		-----	-----	-----	-----	-----	-----	-----	-----
1011		-----	-----	-----	-----	-----	-----	-----	-----
1016		-----	-----	-----	-----	-----	-----	-----	-----
1039	EN15199-3	-----	-0.99	-0.54	1.77	2.04	2.08	-----	-----
1040	D7169	-----	-1.54	-2.12	-3.15	-0.20	1.52	-----	-----
1056		-----	-----	-----	-----	-----	-----	-----	-----
1065		-----	-----	-2.86	-6.98	-3.44	-1.53	-----	-----
1066	D7169	-----	-0.37	0.63	1.02	1.63	2.19	-----	-----
1081		-----	-----	-----	-----	-----	-----	-----	-----
1106		-----	-----	-----	-----	-----	-----	-----	-----
1109	D7169	-----	1.39	0.47	-2.15	-1.53	-1.85	-----	-----
1148		-----	-----	-----	-----	-----	-----	-----	-----
1161		-----	-----	-----	-----	-----	-----	-----	-----
1201		-----	-----	-----	-----	-----	-----	-----	-----
1236		-----	-----	-----	-----	-----	-----	-----	-----
1248		-----	-----	-----	-----	-----	-----	-----	-----
1259		-----	-----	-----	-----	-----	-----	-----	-----
1264		-----	-----	-----	-----	-----	-----	-----	-----
1357		-----	-----	-----	-----	-----	-----	-----	-----
1379		-----	-----	-----	-----	-----	-----	-----	-----
1397	D2887	-----	-1.29	-1.74	-6.68	-8.36	-9.70	-----	-----
1539		-----	-----	-----	-----	-----	-----	-----	-----
1544		-----	-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----	-----
1583		-----	-----	-----	-----	-----	-----	-----	-----
1585		-----	-----	-----	-----	-----	-----	-----	-----
1613		-----	-----	-----	-----	-----	-----	-----	-----
1654		-----	-----	-----	-----	-----	-----	-----	-----
1656		-----	-----	-----	-----	-----	-----	-----	-----
1714		-----	-----	-----	-----	-----	-----	-----	-----
1720		-----	-----	-----	-----	-----	-----	-----	-----
1728		-----	-----	-----	-----	-----	-----	-----	-----
1741		-----	-----	-----	-----	-----	-----	-----	-----
1776	EN15199-3	-----	-----	-----	-----	-----	-----	-----	-----
1796		-----	-----	-----	-----	-----	-----	-----	-----
1800		-----	-----	-----	-----	-----	-----	-----	-----
1810		-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----
1815		-----	-----	-----	-----	-----	-----	-----	-----
1842	IP545	-----	-1.01	-0.31	-1.76	0.01	-0.32	-----	-----
1849		-----	-----	-----	-----	-----	-----	-----	-----
1858		-----	-----	-----	-----	-----	-----	-----	-----
1884		-----	-----	-----	-----	-----	-----	-----	-----
1892		-----	-----	-----	-----	-----	-----	-----	-----
1902	D7169	-----	2.71	1.70	0.70	0.52	0.34	-----	-----
1930		-----	-----	-----	-----	-----	-----	-----	-----
1957		-----	-----	-----	-----	-----	-----	-----	-----
1967		-----	-----	-----	-----	-----	-----	-----	-----
1995		-----	-----	-----	-----	-----	-----	-----	-----
6006		-----	-----	-----	-----	-----	-----	-----	-----
6016	D7500	-----	2.05	1.19	-1.70	-2.91	-4.16	-----	-----
6028		-----	-----	-----	-----	-----	-----	-----	-----
6073	D7169	-----	6.28	1.13	-12.45	-7.33	-4.28	-----	-----
9051		-----	-----	-----	-----	-----	-----	-----	-----
9052		-----	-----	-----	-----	-----	-----	-----	-----
9057		-----	-----	-----	-----	-----	-----	-----	-----
9060		-----	-----	-----	-----	-----	-----	-----	-----
9063		-----	-----	-----	-----	-----	-----	-----	-----
9101		-----	-----	-----	-----	-----	-----	-----	-----
9132		-----	-----	-----	-----	-----	-----	-----	-----
9133		-----	-----	-----	-----	-----	-----	-----	-----
9134		-----	-----	-----	-----	-----	-----	-----	-----
9135		-----	-----	-----	-----	-----	-----	-----	-----
9136		-----	-----	-----	-----	-----	-----	-----	-----
9139		-----	-----	-----	-----	-----	-----	-----	-----
9142		-----	-----	-----	-----	-----	-----	-----	-----
9143		-----	-----	-----	-----	-----	-----	-----	-----
9145	D7169	-----	6.61	7.39	14.25	15.66	17.51	-----	-----
9146		-----	-----	-----	-----	-----	-----	-----	-----
9151		-----	-----	-----	-----	-----	-----	-----	-----
9152		-----	-----	-----	-----	-----	-----	-----	-----

APPENDIX 3

Number of participants per country

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 1 lab in  AFGHANISTAN
 1 lab in  ALGERIA
 1 lab in  ARGENTINA
 2 labs in AUSTRALIA
 1 lab in  AZERBAIJAN
 2 labs in BRAZIL
 1 lab in  BRUNEI
 1 lab in  BULGARIA
 7 labs in CANADA
 1 lab in  CHINA, People's Republic
 2 labs in COLOMBIA
 2 labs in CROATIA
 2 labs in CZECH REPUBLIC
 1 lab in  DAGESTAN, Republic of
 1 lab in  ECUADOR
 2 labs in EGYPT
 5 labs in FRANCE
 4 labs in GEORGIA
 4 labs in GERMANY
 1 lab in  INDONESIA
 1 lab in  IRAN, Islamic Republic of
 1 lab in  IRAQ
 1 lab in  ISRAEL
 2 labs in ITALY
 1 lab in  JORDAN
 2 labs in KAZAKHSTAN
 6 labs in MALAYSIA
 1 lab in  MEXICO
 9 labs in NETHERLANDS
 4 labs in NIGERIA
 3 labs in NORWAY
 7 labs in OMAN
 1 lab in  PERU
 3 labs in POLAND
 1 lab in  PORTUGAL
 2 labs in ROMANIA
16 labs in RUSSIAN FEDERATION
 2 labs in SAUDI ARABIA
 1 lab in  SERBIA
 2 labs in SINGAPORE
 1 lab in  SOUTH AFRICA
 1 lab in  ST. LUCIA - WEST INDIES
 1 lab in  SUDAN
 2 labs in SWEDEN
 1 lab in  THAILAND
 1 lab in  TUNISIA
 3 labs in TURKEY
 2 labs in TURKMENISTAN
 1 lab in  UKRAINE
 3 labs in UNITED ARAB EMIRATES
13 labs in UNITED KINGDOM
14 labs in UNITED STATES OF AMERICA
 1 lab in  VIETNAM
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APPENDIX 4

Abbreviations

C	= final test result after checking of first reported suspect test 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
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
E	= probably an error in calculations
U	= test result probably reported in a different unit
W	= test result withdrawn on request of participant
ex	= test result excluded from calculations
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
SDS	= Safety Data Sheet

Literature

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15   Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), pp. 165-172, (1983)