Results of Proficiency Test
Crude Oil
November 2018

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1998, the Institute for Interlaboratory Studies (iis) organizes a proficiency test (PT) for Crude Oil every year. During the annual proficiency testing program 2018/2019, it was decided to continue the round robin for the analysis of Crude Oil. In this interlaboratory study 155 laboratories in 51 different countries registered for participation. See appendix 4 for the number of participants per country.
In this report, the results of the 2018 Crude Oil proficiency test are presented and discussed. This report is also electronically available through 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 (PT). Sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. It was decided to send two different samples of Crude Oil: approx. 1 litre of Crude Oil, labelled #18215, in a one liter wide-necked bottle to enable use of a large size diameter high speed shear mixer for homogenisation and one 40ml vial, labelled #18216, for Mercury (Hg) only. The participants were requested to report rounded and unrounded test results. The unrounded test 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 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the 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 June 2018 (iis-protocol, version 3.5). This protocol is electronically available through the iis website 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 of Crude Oil for the preparation of subsamples #18215 and #18216 was obtained from a local refinery. Approximately 200 litre of Crude Oil was homogenised and transferred to 167 wide-neck transparent colorless glass bottles of 1 L and labelled #18215. The bottle was put into a red plastic bag to shield from light.
The homogeneity of the subsamples #18215 was checked by the determination of Density at 15°C in accordance of ASTM D5002 on 8 stratified randomly selected samples.

	Density at 15°C in kg/m^3
Sample #18215-1	873.99
Sample #18215-2	873.97
Sample #18215-3	874.03
Sample #18215-4	873.84
Sample #18215-5	874.11
Sample #18215-6	873.84
Sample #18215-7	873.86
Sample #18215-8	873.87

Table 1: homogeneity test results of subsamples #18215

From the above test results, the repeatability was calculated and compared with 0.3 times the corresponding reproducibility of the reference test 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)	0.28
reference test method	ASTM D5002:16
0.3*R (ref.test method)	1.08

Table 2: evaluation of the repeatability of subsamples #18215

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the reference test method. Therefore, homogeneity of the subsamples #18215 was assumed.

Because the Crude Oil used for samples #18215 did not contain a detectable concentration of Mercury, approx.10 liters of Crude Oil was taken from the original batch and spiked with 1.2 grams Conostan Hg std (100mg/kg) and with 0.17 ml of a 5.0 mg/ml $HgCl_2$ in Methanol solution especially for Mercury determination. After homogenisation, 168 amber glass vials of 40 ml were filled with the spiked Crude Oil and labelled #18216. The homogeneity of subsamples #18216 was checked by determination of Mercury in accordance with ASTM D7623 on 8 stratified randomly selected samples.

	Mercury in µg/kg
sample #18216-1	22
sample #18216-2	23
sample #18216-3	22
sample #18216-4	22
sample #18216-5	21
sample #18216-6	21
sample #18216-7	21
sample #18216-8	20

Table 3: homogeneity test results of subsamples #18216

From the above test results, the repeatability was calculated and compared with 0.3 times the corresponding reproducibility of the reference test method in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Mercury in µg/kg
r (observed)	2.6
reference method	Horwitz
0.3*R (reference method)	5.2

Table 4: evaluation of the repeatability of subsamples #18216

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the reference test method. Therefore, homogeneity of the subsamples #18216 was assumed.

To each of the participating laboratories a set of one bottle of 1 L in a red plastic bag (labelled #18215) and one 40 ml amber vial (labelled #18216) was sent on October 17, 2018. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Crude Oil packed in the clear glass bottles with a red plastic bag and in amber glass vials was checked. 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 #18215: total Acid Number, API Gravity, BS&W, Density at 15°C, Kinematic Viscosity at 40°C, Light ends (Methane, Ethane, Propane, iso-Butane, n-Butane, iso-Pentane, n-Pentane, cyclo-Pentane, total Hexanes and total C1-C6), Molecular Mass Average, Pour Point (Maximum), Salt as Chloride, Sediment by Extraction (ASTM D473) and Sediment by Membrane filtration (ASTM D4807), total Sulphur, Water content and Simulated Distillation.
On sample #18216 was requested to determine only total Mercury.

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 test results, but report as much significant figures as possible. It was also requested not to report ‘less than’ test results, which are above the detection limit, because such test results cannot be used for meaningful statistical evaluations.

To get comparable test results, a detailed report form and a letter of instructions are prepared. On the report form the reporting units are given as well as the appropiate reference test methods that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

During five weeks after sample dispatch, the test results of the individual laboratories were gathered via the data entry portal www.kpmd.co.uk/sgs-iis/. The reported test 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 had not reported 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 (no reanalyses). Additional or corrected test results are used for data analysis and the original test results are placed under ‘Remarks’ in the test 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 June 2018 (iis-protocol, version 3.5).
For the statistical evaluation, the *unrounded* (when available) figures were used instead of the rounded test results. Test 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. If a data set does not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

According to ISO 5725 the original test 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. In this PT, the criterion of ISO13528, paragraph 9.2.1, was met for all evaluated tests, therefore, the uncertainty of all assigned values may be negligible and need not be included in the PT report.

Finally, the reproducibilities were calculated from the standard deviations by multiplying these 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 test results are plotted. The corresponding laboratory numbers are on 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 reference test method. 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. The Kernel Density Graph 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. In case no literature reproducibility was available, other target values were used. In some cases, a reproducibility based on former iis proficiency tests could be used.

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 whether the reported test result is fit-for-use.

The z-scores were calculated according to:

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

The $z_{(target)}$ scores are listed in the result tables of 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 Brazil, Columbia, Equador, Nigeria, Peru and Vietnam arrived late or did never reach the laboratories in time due to customs clearance and/or transportation problems. Fifteen laboratories reported after the deadline and twelve did not reported any test results at all. In total 143 laboratories submitted 1234 numerical results. Observed were 60 statistically outlying test results, which is 4.9% of the reported results. In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

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, see also paragraph 3.1.

4.1 EVALUATION PER SAMPLE AND PER TEST

In this section, the reported test results are discussed per sample and per test. The test methods, which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the original data. The abbreviations, used in these tables, are listed in appendix 5.

Unfortunately, a suitable reference test method providing the precision data is not available for all determinations. For the tests that have no precision data the calculated reproducibility was compared against the reproducibility estimated from the Horwitz equation.

In the iis PT reports, ASTM test methods are referred to with a number (e.g. D473) and an added designation for the year that the test method was adopted or revised (e.g. D473:07e1). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D473:07e1(2017)). In the test results tables of appendix 1 only the test method number and year of adoption will be used.

Sample #18215

Acid Number: This determination was not problematic depending on the procedure used. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D664-A:17a (Inflection Point -125ml). However, the calculated reproducibility is not in agreement with the precision data of the procedures Inflection Point (60ml) and Buffer End Point (60 and 125 ml).

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

BS&W: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D4007:11e1(2016).

Density: This determination was not problematic. Ten statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D5002:16. Some participants used ASTM D4052. It must be noted that in the scope of test method ASTM D4052 it is mentioned that ASTM D5002 is intended for crude oils (see e.g. §1.3 of ASTM D4052:18).

Kin.Visc.at 40°C: This 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 D445:17a.

Light Ends: This determination was very problematic. In total fifteen statistical outliers were observed and two other test results were excluded over ten components. None of the ten calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of IP344:88(2010).

Molecular Mass: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D2503:92(2016). The limited number of test results may partly explain the variation.

Pour Point (max.): This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5853A:17a. It must be noted that in the scope of test method ASTM D97 it is mentioned that ASTM D5853 is intended for crude oils (see e.g. §1.3 of ASTM D97:17b).

Salt as Chloride: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after the 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. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D473:07e1(2017).

Sediment by Membrane filtration (ASTM D4807): The determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D4807:05(2015).

Sulphur: This determination was problematic. Nine 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 not problematic. Two statistical outliers were observed. One other test result was reported in a different unit and therefore excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ASTM D4377:00(2011).

Simulated Distillation: This determination was very problematic. Only 16 laboratories reported test results for this determination. In total over eight parameters four statistical outliers were observed and two other test results were excluded. However, only the calculated reproducibility of 10% recovered after rejection of the suspect data is in agreement with the requirements of ASTM D7169:18.

Sample #18216

Mercury as Hg: This determination may not be problematic at the mercury concentration of 21 µg/kg. Three statistical outliers were observed. Regretfully no target reproducibility is available. ASTM D7623 and UOP938 gives only a repeatability. Furthermore, UOP938, used by most 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 after rejection of the statistical outliers is in agreement with the reproducibility estimated using the Horwitz equation.
This sample was spiked with approximately 20 µg Hg per kg. The average recovery of Mercury (theoretical increment of 20.4 µg Hg/kg) is good: “less than 103%” (the actual blank Hg content is unknown).

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant reference test method and the reproducibility as found for the group of participating laboratories. The number of significant test results, the average results, the calculated reproducibility (2.8 * standard deviation) and the target reproducibility derived from literature reference test methods (in casu ASTM, EN standards) or estimated by using the Horwitz equation are presented in the next table.

Parameter		unit	n	average	2.8 * sd	R (lit)
Acid Number (total)		mg KOH/g	66	0.15	0.14	0.16
API Gravity			92	30.2	0.4	0.5
BS&W		%V/V	54	0.03	0.08	0.09
Density at 15°C		kg/m^3	126	874.4	1.4	3.6
Kinematic Viscosity at 40°C		mm^2/s	93	10.23	1.13	0.76
Methane		%M/M	19	<0.01	n.a.	n.a.
Ethane		%M/M	17	0.021	0.016	0.008
Propane		%M/M	18	0.28	0.14	0.06
i-Butane		%M/M	20	0.19	0.05	0.03
n-Butane		%M/M	21	0.88	0.23	0.12
i-Pentane		%M/M	19	0.74	0.11	0.07
n-Pentane		%M/M	20	1.25	0.22	0.13
cyclo-Pentane		%M/M	13	0.068	0.024	0.011
total Hexanes		%M/M	16	2.80	0.81	0.45
Total C1-C6 Light Ends		%M/M	16	6.18	0.95	0.49
Molecular Mass, average		g/mol	4	234.5	15.8	14
Pour Point, Max.		°C	56	-27.1	13.1	18.0
Salt as Chloride		mg/kg	82	8.2	11.7	13.4
Sediment Extraction (D473)		%V/V	60	0.008	0.011	0.035
Sediment Membrane filt. (D4807)		%M/M	34	0.016	0.019	0.015
Sulphur (total)		%M/M	99	2.66	0.21	0.14
Water		%V/V	109	0.031	0.030	0.035
Simulated Distillation	IBP	°C	15	<36	n.a.	n.a.
	5%recovered	°C	16	69.6	26.1	19.6
	10%recovered	°C	15	115	20	20
	30%recovered	°C	14	246	27	13
	50%recovered	°C	12	370	28	16
	70%recovered	°C	12	505	55	21
	90%recovered	°C	11	670	106	n.a.
	FBP	°C	11	>710	n.a.	n.a.
Mercury (total)		µg/kg	27	21.0	9.4	16.8

Table 5: reproducibilities of tests on sample #18215 and #18216 (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 reference test methods. The problematic tests have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF NOVEMBER 2018 WITH PREVIOUS PTS

	November 2018	*November 2017*	*November 2016*	*November 2015*	*November 2014*
Number of reporting labs	143	140	136	129	133
Number of results reported	1234	1234	1126	1077	985
Statistical outliers	60	60	60	26	44
Percentage outliers	4.9%	4.9%	5.3%	2.4%	4.5%

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 reference test methods. The conclusions are given the following table:

Determination	*November 2018*	*November 2017*	*November 2016*	*November 2015*	*November 2014*
Acid Number (total)	+	+	+	+	++
API Gravity	+	+	+	+/-	+
BS&W	+/-	+	+	-	++
Density at 15°C	++	++	++	++	++
Kinematic Viscosity at 40°C	-	-	-	-	+/-
Light Ends (C1-C6)	--	--	--	+/-	--
Molecular Mass, average	-	+/-	-	+	n.e.
Pour Point, Max	+	+	+	-	+
Salt as Chloride	+	+/-	+	+ *)	+ *)
Sediment Extraction (D473)	++	++	++	++	n.e.
Sediment Membrane filt. (D4807)	-	+/-	--	--	-
Sulphur (total)	-	-	-	--	+/-
Water	+	--	+/-	--	+/-
Simulated Distillation	--	--	--	--	n.e.
Mercury (total)	+	++	+	--	-

Table 7: comparison determinations against the reference test method

*) Salt as NaCL

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

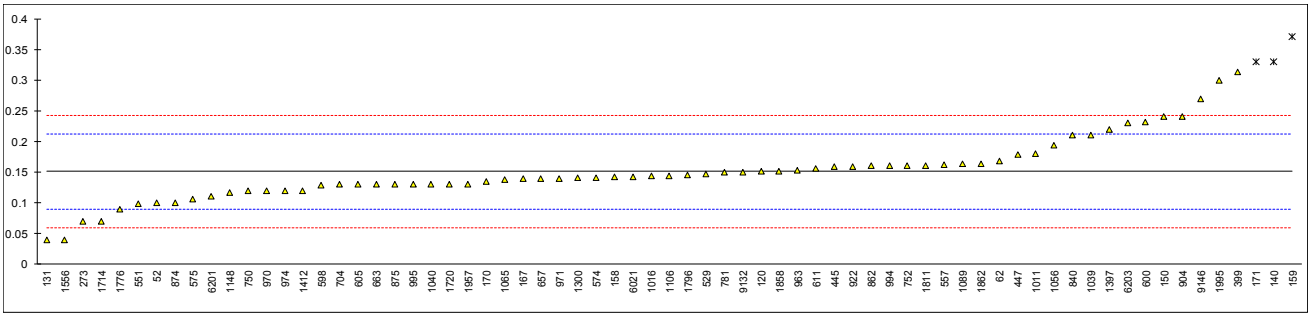
- ++: group performed much better than the reference test method
- + : group performed better than the reference test method
- +/-: group performance equals the reference test method
- - : group performed worse than the reference test method
- -- : group performed much worse than the reference test method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

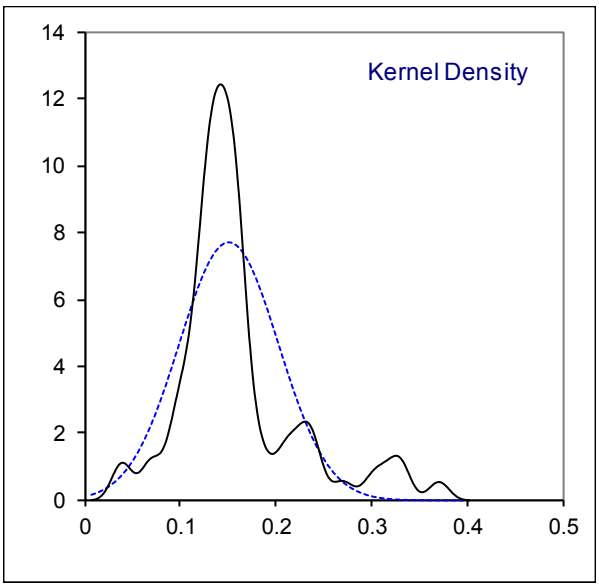
APPENDIX 1

Determination of Total Acid Number on sample #18215; results in mg KOH/g

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52	D664-A	0.10		-0.88	971	D664-A	0.14		-0.19
62	D664-A	0.168		0.29	974	D664-A	0.12		-0.54
90		-----		-----	988		-----		-----
92		-----		-----	991		-----		-----
120	D664-A	0.151		0.00	992		-----		-----
131		0.04		-1.92	994	D664-A	0.16		0.15
140	D664-A	0.33	R(0.05)	3.09	995	D664-A	0.13		-0.36
150	D664-A	0.24		1.53	997		-----		-----
154		-----		-----	1011	D664-A	0.18		0.50
158	D664-A	0.143		-0.14	1016	D664-A	0.144		-0.12
159	D664-A	0.37	R(0.05)	3.78	1039	D664-A	0.21		1.02
167	D664-A	0.139		-0.21	1040	D3242	0.130		-0.36
168		-----		-----	1056	D664-A	0.193		0.72
170	D664-A	0.1345		-0.29	1065	D664-A	0.138		-0.23
171	D664-A	0.329	R(0.05)	3.07	1089	D664-A	0.163		0.21
175		-----		-----	1106	D664	0.1446		-0.11
186		-----		-----	1109		-----		-----
203		-----		-----	1148	D4805	0.1162		-0.60
225		-----		-----	1236		-----		-----
238		-----		-----	1248		-----		-----
273	D974	0.07		-1.40	1259		-----		-----
311		-----		-----	1272		-----		-----
314		-----		-----	1300	D664-A	0.1407		-0.18
332		-----		-----	1379		-----		-----
333		-----		-----	1397	D664-A	0.22		1.19
334		-----		-----	1412	D664-A	0.12		-0.54
335		-----		-----	1543		-----		-----
336		-----		-----	1544		-----		-----
391		-----		-----	1556	D664-A	0.04		-1.92
398		-----		-----	1557		-----		-----
399	D664-A	0.313		2.79	1654		-----		-----
442		-----		-----	1656	D664-A	<0.1		-----
444		-----		-----	1695		-----		-----
445	D664-A	0.159		0.14	1714	In house	0.07		-1.40
446		-----		-----	1720	D664-A	0.13		-0.36
447	D664-A	0.178		0.46	1724		-----		-----
485		-----		-----	1728		-----		-----
511		-----		-----	1749		-----		-----
525		-----		-----	1776	D664-A	0.09		-1.05
529	D664-A	0.14703		-0.07	1796	D664-A	0.1455		-0.10
541		-----		-----	1810		-----		-----
551	D664	0.0980		-0.92	1811	D664-A	0.161		0.17
557	D664-A	0.1612894		0.18	1815		-----		-----
574	D664-A	0.141		-0.17	1842		-----		-----
575	D664-A	0.106		-0.78	1849		-----		-----
593		-----		-----	1858	D664-A	0.1518		0.01
595		-----		-----	1862	D664-A	0.163		0.21
598	D664-A	0.128		-0.40	1930		-----		-----
599		-----		-----	1957	D664-A	0.13		-0.36
600	D664-A	0.2314		1.39	1960		-----		-----
603		-----		-----	1984		-----		-----
605	D664-A	0.13		-0.36	1995	D664-A	0.3		2.57
608		-----		-----	6016		-----		-----
609		-----		-----	6021	D664-A	0.143		-0.14
610		-----		-----	6163		-----		-----
611	D664-A	0.1554		0.07	6188		-----		-----
612		-----		-----	6201	D664-A	0.11		-0.71
657	D664-A	0.14		-0.19	6203	D664-A	0.23		1.36
663	D664-A	0.130		-0.36	9051		-----		-----
704	D664-A	0.130		-0.36	9052		-----		-----
732		-----		-----	9057		-----		-----
739		-----		-----	9060		-----		-----
749		-----		-----	9063		-----		-----
750	D664-A	0.12		-0.54	9099		-----		-----
751		-----		-----	9100		-----		-----
752	D664-A	0.1608		0.17	9101		-----		-----
753		-----		-----	9132	D664-A	0.15		-0.02
781	D664-A	0.15		-0.02	9133		-----		-----
785		-----		-----	9134		-----		-----
840	D664-A	0.21		1.02	9135		-----		-----
862	D664-A	0.16		0.15	9136		-----		-----
874	D664-A	0.10		-0.88	9139		-----		-----
875	D664-A	0.13		-0.36	9142		-----		-----
904	D664-A	0.24		1.53	9143		-----		-----
922	D664-A	0.159		0.14	9146	D664Mod.	0.27		2.05
962		-----		-----	9151		-----		-----
963	D664-A	0.153		0.03	9152		-----		-----
970	D664-A	0.12		-0.54					

		Only IP – 125mL
normality	suspect	suspect
n	66	20
outliers	3	2
mean (n)	0.1511	0.1528
st.dev. (n)	0.05129	0.03487
R(calc.)	0.1436	0.0976
st.dev.(D664-A:17a IP – 125mL)	0.05796	0.05805
R(D664-A:17a IP – 125mL)	0.1623	0.1625
Compare		
R(D664-A:17a IP – 60mL)	0.0854	--
R(D664-A:17a BEP – 60mL)	0.0957	--
R(D664-A:17a BEP – 125mL)	0.0665	--



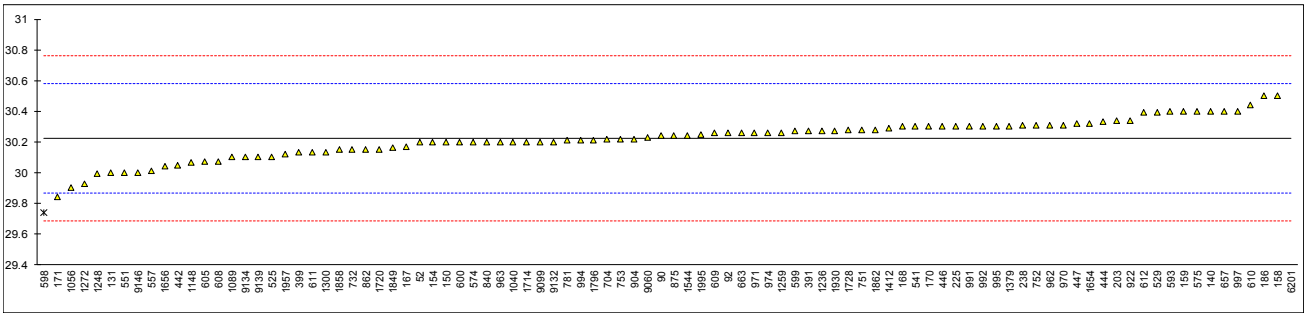


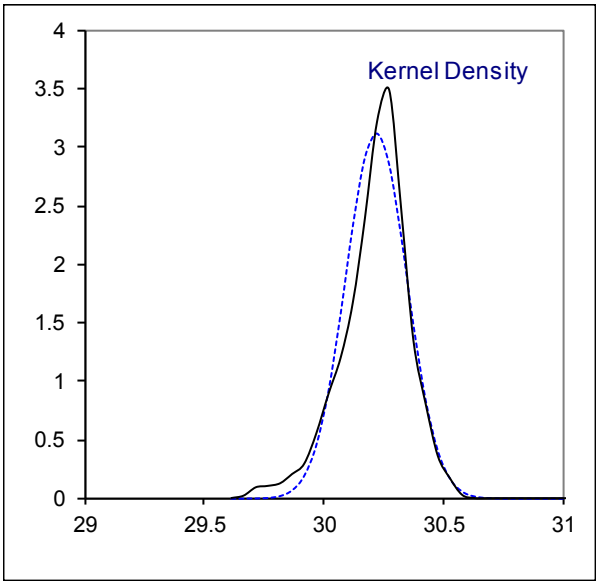
Determination of API Gravity on sample #18215;

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52	D5002	30.2		-0.13	971	D5002	30.26		0.21
62		-----		-----	974	Calc.	30.26		0.21
90	D5002	30.24		0.10	988		-----		-----
92	D5002	30.26		0.21	991	Calc.	30.3		0.43
120		-----		-----	992	Calc.	30.3		0.43
131	D5002	30.0		-1.25	994	Calc.	30.21		-0.07
140	D5002	30.4		0.99	995	D287	30.3		0.43
150	D287	30.2		-0.13	997	D287	30.4		0.99
154	D287	30.2		-0.13	1011		-----		-----
158	D287	30.5		1.55	1016		-----		-----
159	D287	30.4		0.99	1039		-----		-----
167	D4052	30.17		-0.29	1040	D287	30.2		-0.13
168	D287	30.3		0.43	1056	Calc.	29.9		-1.81
170	D5002	30.30		0.43	1065		-----		-----
171	D287	29.84		-2.14	1089	D287	30.1		-0.69
175		-----		-----	1106		-----		-----
186	D5002	30.5		1.55	1109		-----		-----
203	Calc.	30.34		0.66	1148	D287	30.069		-0.86
225	Calc.	30.3		0.43	1236	D287	30.27		0.27
238	D5002	30.31		0.49	1248	Calc.	29.993		-1.29
273		-----		-----	1259		30.26		0.21
311		-----		-----	1272	D1298	29.926		-1.66
314		-----		-----	1300	D4052	30.13		-0.52
332		-----		-----	1379	D4052	30.3		0.43
333		-----		-----	1397		-----		-----
334		-----		-----	1412	D5002	30.29		0.38
335		-----		-----	1543		-----		-----
336		-----		-----	1544	D5002	30.244		0.12
391	D5002	30.27		0.27	1556		-----		-----
398		-----		-----	1557		-----		-----
399	D4052	30.13		-0.52	1654	D4052	30.32		0.55
442	Calc.	30.0481		-0.98	1656	D5002	30.04	C	-1.02
444	D5002	30.33		0.60	1695		-----		-----
445		-----		-----	1714	Calc.	30.2		-0.13
446	D5002	30.3		0.43	1720	D5002	30.15	C	-0.41
447	D4052	30.32		0.55	1724		-----		-----
485		-----		-----	1728	D5002	30.275		0.29
511		-----		-----	1749		-----		-----
525	D7042	30.101		-0.68	1776		-----		-----
529	D287	30.39		0.94	1796	Calc.	30.21		-0.07
541	D4052	30.30		0.43	1810		-----		-----
551	D4052	30.00		-1.25	1811		-----		-----
557	D4052	30.01		-1.19	1815		-----		-----
574	D7042	30.2		-0.13	1842		-----		-----
575	D1298	30.4		0.99	1849	ISO3675	30.16		-0.35
593	D1298	30.4		0.99	1858	Calc.	30.148		-0.42
595		-----		-----	1862	D5002	30.28		0.32
598	D5002	29.74	R(0.05)	-2.70	1930	Calc.	30.27		0.27
599	Calc.	30.27		0.27	1957	D5002	30.12		-0.57
600	D5002	30.20		-0.13	1960		-----		-----
603		-----		-----	1984		-----		-----
605	D5002	30.07		-0.85	1995	Calc.	30.25		0.15
608	Calc.	30.07		-0.85	6016		-----		-----
609	D5002	30.26		0.21	6021		-----		-----
610	D4052	30.44		1.22	6163		-----		-----
611	D5002	30.13		-0.52	6188		-----		-----
612	D5002	30.39		0.94	6201	D5002	42.44	R(0.01)	68.42
657	D5002	30.4		0.99	6203		-----		-----
663	D4052	30.26		0.21	9051		-----		-----
704	D1298	30.22		-0.01	9052		-----		-----
732	D5002	30.15		-0.41	9057		-----		-----
739		-----		-----	9060	D287	30.23		0.04
749		-----		-----	9063		-----		-----
750		-----		-----	9099	D1298	30.20		-0.13
751	Calc.	30.28		0.32	9100		-----		-----
752	D287	30.31		0.49	9101		-----		-----
753	Calc.	30.22		-0.01	9132	D1250	30.2		-0.13
781	D5002	30.21		-0.07	9133		-----		-----
785		-----		-----	9134	D1250	30.1		-0.69
840	D5002	30.2		-0.13	9135		-----		-----
862	D287	30.15		-0.41	9136		-----		-----
874		-----		-----	9139	D1250	30.1		-0.69
875	D5002	30.24		0.10	9142		-----		-----
904	D5002	30.22		-0.01	9143		-----		-----
922	D4052	30.34		0.66	9146		30.0		-1.25
962	D5002	30.31		0.49	9151		-----		-----
963	D287	30.2		-0.13	9152		-----		-----
970	Calc.	30.31		0.49					

normality	OK
n	92
outliers	2
mean (n)	30.223
st.dev. (n)	0.1271
R(calc.)	0.356
st.dev.(D287:12b)	0.1786
R(D287:12b)	0.5

Lab 1656: first reported 33.43
Lab 1720: first reported 34.27



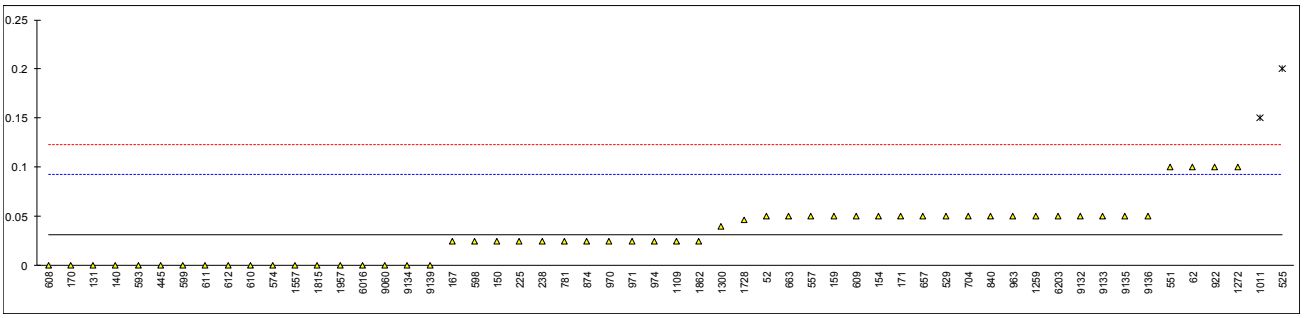


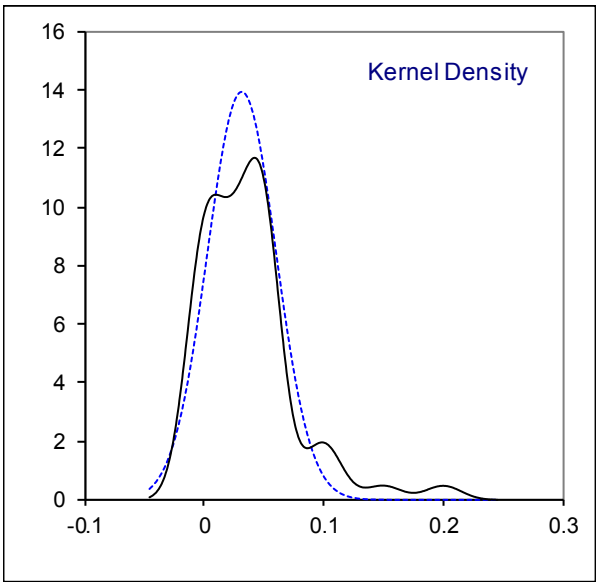
Determination of BS&W on sample #18215; results in %V/V

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52	D4007	0.05		0.61	971	D4007	0.025		-0.20
62	D4007	0.1		2.25	974	D4007	0.025		-0.20
90		-----		-----	988		-----		-----
92		-----		-----	991		-----		-----
120		-----		-----	992		-----		-----
131	D4007	0		-1.02	994		-----		-----
140	D4007	0.00		-1.02	995		-----		-----
150	D4007	0.025		-0.20	997		-----		-----
154	D4007	0.05		0.61	1011	D4007	0.15	R(0.01)	3.88
158	D4007	<0.025		-----	1016		-----		-----
159	D4007	0.05		0.61	1039		-----		-----
167	D4007	0.025		-0.20	1040		-----		-----
168	D4007	<0.025		-----	1056		-----		-----
170	D4007	0.00		-1.02	1065		-----		-----
171	D4007	0.05		0.61	1089		-----		-----
175		-----		-----	1106		-----		-----
186		-----		-----	1109	D4007	0.03	C	-0.20
203		-----		-----	1148		-----		-----
225	D4007	0.025		-0.20	1236		-----		-----
238	D4007	0.025		-0.20	1248		-----		-----
273		-----		-----	1259	ISO9030	0.05		0.61
311		-----		-----	1272	ISO9030	0.10		2.25
314		-----		-----	1300	D4007	0.04		0.29
332		-----		-----	1379		-----		-----
333		-----		-----	1397		-----		-----
334		-----		-----	1412		-----		-----
335		-----		-----	1543		-----		-----
336		-----		-----	1544		-----		-----
391		-----		-----	1556		-----		-----
398		-----		-----	1557	ISO9030	0		-1.02
399		-----		-----	1654		-----		-----
442		-----		-----	1656		-----		-----
444		-----		-----	1695		-----		-----
445	D4007	0.00		-1.02	1714		-----		-----
446		-----		-----	1720		-----		-----
447		-----		-----	1724		-----		-----
485		-----		-----	1728		0.046		0.48
511		-----		-----	1749		-----		-----
525	D4007	0.2	R(0.01)	5.52	1776		-----		-----
529	D4007	0.05		0.61	1796		-----		-----
541	D4007	<0.025		-----	1810		-----		-----
551	D4007	0.1		2.25	1811		-----		-----
557	D4007	0.05		0.61	1815	D4007	0.00		-1.02
574	D4007	0.00		-1.02	1842		-----		-----
575		-----		-----	1849		-----		-----
593	D4007	0.00		-1.02	1858		-----		-----
595		-----		-----	1862	D4007	0.025		-0.20
598	D4007	0.025		-0.20	1930		-----		-----
599	D4007	0.0		-1.02	1957	D4007	0.00		-1.02
600		-----		-----	1960		-----		-----
603		-----		-----	1984		-----		-----
605		-----		-----	1995		-----		-----
608	D4007	0.0		-1.02	6016	D4007	0.00		-1.02
609	D4007	0.05		0.61	6021		-----		-----
610	D4007	0.00		-1.02	6163		-----		-----
611	D4007	0.00		-1.02	6188		-----		-----
612	D4007	0.00		-1.02	6201		-----		-----
657	D4007	0.05		0.61	6203	ISO9030	0.05		0.61
663	D4007	0.05		0.61	9051		-----		-----
704	D4007	0.050		0.61	9052		-----		-----
732		-----		-----	9057		-----		-----
739		-----		-----	9060	D4007	0		-1.02
749		-----		-----	9063		-----		-----
750		-----		-----	9099		-----		-----
751		-----		-----	9100		-----		-----
752		-----		-----	9101		-----		-----
753		-----		-----	9132	D4007	0.05		0.61
781	D4007	0.025		-0.20	9133	D4007	0.05		0.61
785		-----		-----	9134	D4007	0.0		-1.02
840	D4007	0.05		0.61	9135	D4007	0.05		0.61
862		-----		-----	9136	D4007	0.05		0.61
874	D4007	0.025		-0.20	9139	D4007	0		-1.02
875		-----		-----	9142		-----		-----
904		-----		-----	9143		-----		-----
922	D4007	0.10		2.25	9146	D4007	<0.1		-----
962		-----		-----	9151		-----		-----
963	D4007	0.05		0.61	9152		-----		-----
970	D4007	0.025		-0.20					

normality	OK
n	54
outliers	2
mean (n)	0.0312
st.dev. (n)	0.02867
R(calc.)	0.0803
st.dev.(D4007:11e1)	0.03060
R(D4007:11e1)	0.0857

Lab 1109: first reported 0.20



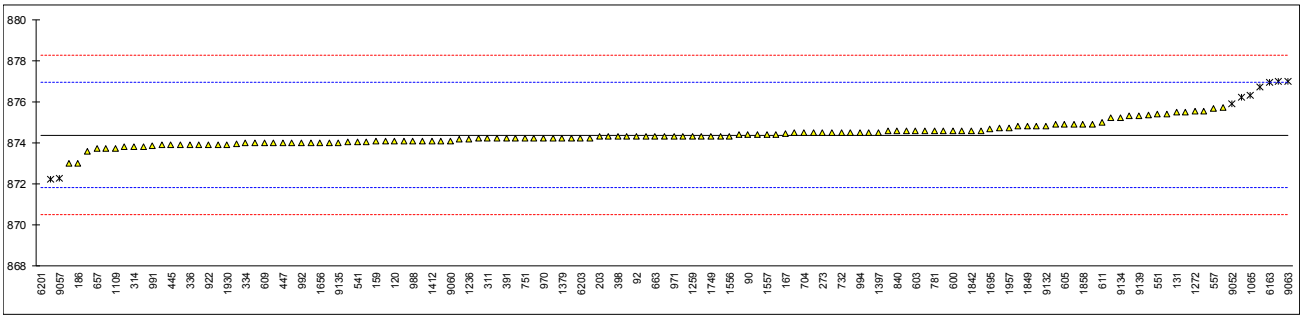


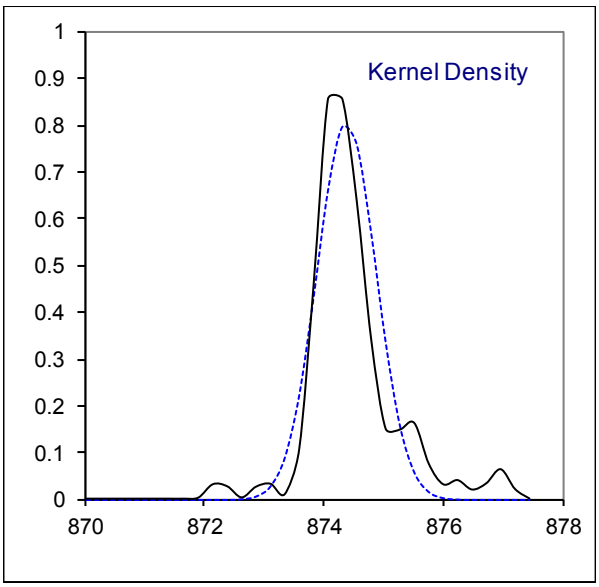
Determination of Density at 15°C on sample #18215; results in kg/m^3

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52	D5002	874.4		0.02	971	D5002	874.3		-0.06
62	D5002	874.3		-0.06	974	D5002	874.3		-0.06
90	D5002	874.4		0.02	988	D1298	874.1		-0.22
92	D5002	874.3		-0.06	991	D1298	873.85		-0.41
120	D5002	874.1		-0.22	992	D1298	874.0		-0.29
131	D5002	875.5		0.87	994	D5002	874.5		0.10
140	D5002	874.6		0.17	995	D5002	874.1		-0.22
150	D5002	874.2	C	-0.14	997	D5002	873.8		-0.45
154	D5002	874.6		0.17	1011	D5002	874.2		-0.14
158	D5002	873.8		-0.45	1016	D4052	873.9	C	-0.37
159	D5002	874.1	C	-0.22	1039	ISO12185	874.0		-0.29
167	D5002	874.46	C	0.06	1040	ISO12185	874.5		0.10
168		-----		-----	1056	D5002	876.2	R(0.01)	1.42
170	D5002	874.0		-0.29	1065	D4052	876.3	R(0.01)	1.49
171	D5002	877.0	R(0.01)	2.04	1089	D5002	875.5		0.87
175	D5002	874.2		-0.14	1106		-----		-----
186	D5002	873.0		-1.07	1109	D5002	873.74		-0.50
203	D5002	874.30		-0.06	1148	ISO12185	874.898		0.40
225	D5002	873.9		-0.37	1236	D5002	874.19	C	-0.15
238	D5002	873.97		-0.32	1248	D5002	875.55		0.91
273	D4052	874.5		0.10	1259	ISO12185	874.3		-0.06
311	D5002	874.2		-0.14	1272	ISO12185	875.52		0.89
314	D5002	873.8		-0.45	1300	D5002	874.59		0.17
332		-----		-----	1379	D5002	874.2		-0.14
333	D5002	873.9		-0.37	1397	D4052	874.5		0.10
334	D5002	874.0		-0.29	1412	D5002	874.1		-0.22
335		-----		-----	1543		-----		-----
336	D5002	873.9		-0.37	1544	D5002	874.05		-0.25
391	D5002	874.2		-0.14	1556	ISO12185	874.33		-0.04
398	D1298	874.3		-0.06	1557	ISO3675	874.4		0.02
399	D4052	874.7		0.25	1654	D4052	874.022		-0.28
442	IP365	874.3		-0.06	1656	D5002	874.0		-0.29
444	D5002	873.9		-0.37	1695	D5002	874.67		0.23
445	D5002	873.9		-0.37	1714	D5002	874.6		0.17
446	D5002	874.3		-0.06	1720	D5002	874.1	C	-0.22
447	D5002	874.0		-0.29	1724	D5002	874.3		-0.06
485	D5002	874.2		-0.14	1728	D5002	874.17		-0.16
511		-----		-----	1749	ISO3675	874.3		-0.06
525	D7042	875.4		0.79	1776	ISO12185	872.24	C,R(0.01)	-1.66
529	D5002	874.3		-0.06	1796	D5002	874.57		0.15
541	D5002	874.05		-0.25	1810	ISO12185	874.0		-0.29
551	D5002	875.4		0.79	1811	D5002	874.2		-0.14
557	D4052	875.67		1.00	1815	ISO3838	875.36		0.76
574	D7042	874.45		0.06	1842	D4052	874.6		0.17
575		-----		-----	1849	ISO3675	874.8		0.33
593		-----		-----	1858	D1298	874.9		0.41
595		-----		-----	1862	D5002	874.22		-0.12
598	D5002	876.7	R(0.01)	1.81	1930	ISO12185	873.91		-0.36
599	D1298	874.2	C	-0.14	1957	D5002	874.7		0.25
600	D5002	874.6		0.17	1960		-----		-----
603	D4052	874.6		0.17	1984	D5002	874.8		0.33
605	D5002	874.9		0.41	1995	D5002	874.3	C	-0.06
608	D5002	875.3		0.72	6016	D4052	875.7		1.03
609	D5002	874.0		-0.29	6021	D5002	874.4		0.02
610	D4052	873.0	C	-1.07	6163	ISO12185	876.933	R(0.01)	1.99
611	D5002	875		0.48	6188	D5002	875.2		0.64
612	D5002	873.6		-0.60	6201	D5002	816.46	R(0.01)	-45.02
657	D5002	873.7		-0.53	6203	D4052	874.2		-0.14
663	D5002	874.30		-0.06	9051		-----		-----
704	D5002	874.5		0.10	9052	Hydrometer	875.9	C,R(0.01)	1.18
732	ISO12185	874.5		0.10	9057	D4052	872.25	R(0.01)	-1.65
739	GOST R51069	874.9		0.41	9060	D5002	874.1	C	-0.22
749	GOST R51069	874.8		0.33	9063	ISO12185	877	R(0.01)	2.04
750	D5002	874.5		0.10	9099	D1298	874.6		0.17
751	D1298	874.2		-0.14	9100		-----		-----
752	D5002	874.0		-0.29	9101		-----		-----
753	ISO12185	874.5		0.10	9132	D5002	874.8		0.33
781	D5002	874.6		0.17	9133	D5002	874.9		0.41
785		-----		-----	9134	D5002	875.2		0.64
840	D5002	874.59		0.17	9135	D5002	874.0		-0.29
862	D5002	874.50		0.10	9136	D5002	873.7		-0.53
874	D5002	874.1		-0.22	9139	D5002	875.3		0.72
875	D5002	874.4		0.02	9142		-----		-----
904	D5002	874.1		-0.22	9143		-----		-----
922	D4052	873.9		-0.37	9146		-----		-----
962	D5002	874.0		-0.29	9151		-----		-----
963	D5002	874.5		0.10	9152		-----		-----
970	D5002	874.2		-0.14					

normality	OK
n	126
outliers	10
mean (n)	874.377
st.dev. (n)	0.4926
R(calc.)	1.379
st.dev.(D5002:16)	1.2866
R(D5002:16)	3.602

Lab 150: first reported 0.8742 kg/m^3
Lab 159: reported 0.8741 kg/m^3
Lab 167: first reported 0.87446 kg/m^3
Lab 599: reported 0.8742 kg/m^3
Lab 610: first reported 0.8730 kg/m^3
Lab 1016: reported 0.8739 kg/m^3
Lab 1236: first reported 0.87419 kg/m^3
Lab 1720: first reported 852.2
Lab 1776: first reported 672.24
Lab 1995: first reported 0.8743 kg/m^3
Lab 9052: reported 0.8759 kg/m^3
Lab 9060: first reported 0.8741 kg/m^3



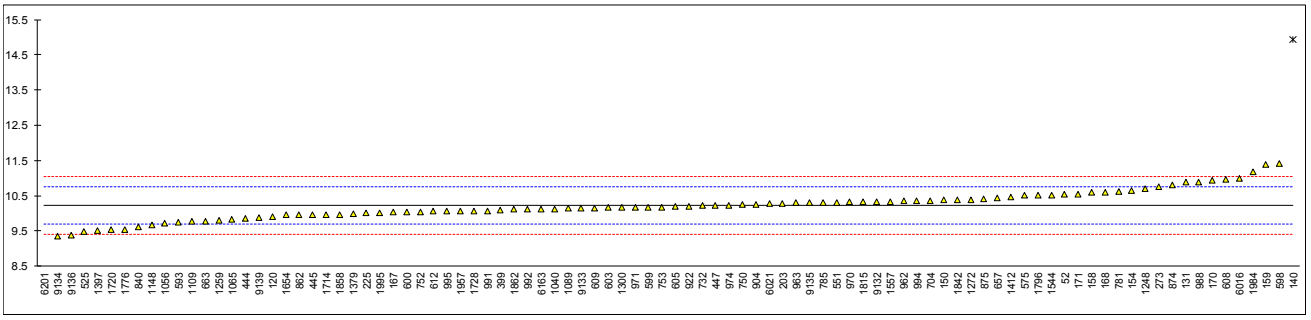


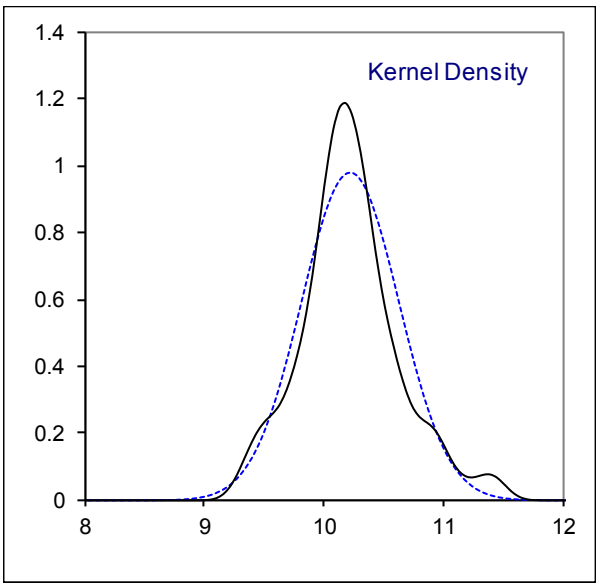
Determination of Kinematic Viscosity at 40°C on sample #18215; results in mm²/s

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52	D445	10.54		1.16	971	D445	10.17		-0.20
62		-----		-----	974	D445	10.22		-0.02
90		-----		-----	988	D445	10.883		2.43
92		-----		-----	991	D445	10.077		-0.55
120	D445	9.917		-1.14	992	D445	10.125		-0.37
131	D445	10.88		2.42	994	D445	10.35		0.46
140	D445	14.93	R(0.01)	17.41	995	D445	10.07		-0.58
150	D445	10.38		0.57	997		-----		-----
154	D445	10.65		1.57	1011		-----		-----
158	D445	10.5983		1.38	1016		-----		-----
159	D445	11.38		4.27	1039		-----		-----
167	D445	10.0305		-0.72	1040	D445	10.13		-0.35
168	D445	10.603		1.40	1056	D7042	9.73		-1.83
170	D445	10.935		2.63	1065	D445	9.825		-1.48
171	D445	10.55		1.20	1089	D445	10.140		-0.32
175		-----		-----	1106		-----		-----
186		-----		-----	1109	D445	9.7698		-1.69
203	D445	10.283		0.21	1148	EN16896	9.6691		-2.06
225	D445	10.00		-0.83	1236		-----		-----
238		-----		-----	1248	IP71Mod.	10.70		1.76
273	D445	10.74		1.90	1259	D7042	9.792		-1.60
311		-----		-----	1272	ISO3104	10.391		0.61
314		-----		-----	1300	D7042	10.1645		-0.23
332		-----		-----	1379	D445	9.984		-0.89
333		-----		-----	1397	D7042	9.505		-2.67
334		-----		-----	1412	D445	10.46		0.87
335		-----		-----	1543		-----		-----
336		-----		-----	1544	D445	10.528		1.12
391		-----		-----	1556		-----		-----
398		-----		-----	1557	ISO3104	10.34		0.42
399	D445	10.10	C	-0.46	1654	D445	9.9476		-1.03
442		-----		-----	1656		-----		-----
444	D445	9.847		-1.40	1695		-----		-----
445	D445	9.958		-0.99	1714	D445	9.9606		-0.98
446		-----		-----	1720	D445	9.524		-2.60
447	D445	10.22		-0.02	1724		-----		-----
485		-----		-----	1728	D445	10.075		-0.56
511		-----		-----	1749		-----		-----
525	D7042	9.475		-2.78	1776	ISO3104	9.5427		-2.53
529		-----		-----	1796	D445	10.521		1.09
541		-----		-----	1810		-----		-----
551	D445	10.31		0.31	1811		-----		-----
557		-----		-----	1815	ISO3104	10.321		0.35
574	D7042	10.340		0.42	1842	D445	10.39		0.61
575	D445	10.51		1.05	1849		-----		-----
593	D445	9.75		-1.76	1858	D445	9.9618		-0.98
595		-----		-----	1862	D445	10.109		-0.43
598	D7042	11.427		4.45	1930		-----		-----
599	D7042	10.172		-0.20	1957	D445	10.073		-0.56
600	D445	10.04		-0.69	1960		-----		-----
603	D445	10.16		-0.24	1984	ISO3104	11.18		3.53
605	D445	10.19		-0.13	1995	D7279 corr to D445	10.025	C	-0.74
608	D445	10.96		2.72	6016	D445	11.00		2.87
609	D445	10.15		-0.28	6021	D445	10.2662		0.15
610		-----		-----	6163	ISO3104	10.125		-0.37
611		-----		-----	6188		-----		-----
612	D7042	10.06		-0.61	6201	D445	2.764	R(0.01)	-27.61
657	D445	10.43		0.76	6203		-----		-----
663	D445	9.7820		-1.64	9051		-----		-----
704	D445	10.363		0.51	9052		-----		-----
732	D445	10.22		-0.02	9057		-----		-----
739		-----		-----	9060		-----		-----
749		-----		-----	9063		-----		-----
750	D445	10.24		0.05	9099		-----		-----
751		-----		-----	9100		-----		-----
752	D445	10.0476		-0.66	9101		-----		-----
753	D445	10.183		-0.16	9132	D445	10.33		0.39
781	D445	10.62		1.46	9133	D445	10.14		-0.32
785	D445	10.31		0.31	9134	D445	9.3616		-3.20
840	D7042	9.6098		-2.28	9135	D445	10.3		0.28
862	D445	9.9484		-1.03	9136	D445	9.3705		-3.16
874	D445	10.80		2.13	9139	D445	9.8829		-1.27
875	D445	10.41		0.68	9142		-----		-----
904	D445	10.25		0.09	9143		-----		-----
922	D7042	10.19		-0.13	9146		-----		-----
962	D445	10.35		0.46	9151		-----		-----
963	D445	10.30		0.28	9152		-----		-----
970	D445	10.32		0.35					

normality	OK
n	93
outliers	2
mean (n)	10.2254
st.dev. (n)	0.40459
R(calc.)	1.1329
st.dev.(D445:17a)	0.27024
R(D445:17a)	0.7567

Lab 399: first reported 13.855
Lab 1995: first reported 11.509





Determination of individual light ends on sample #18215; results in %M/M

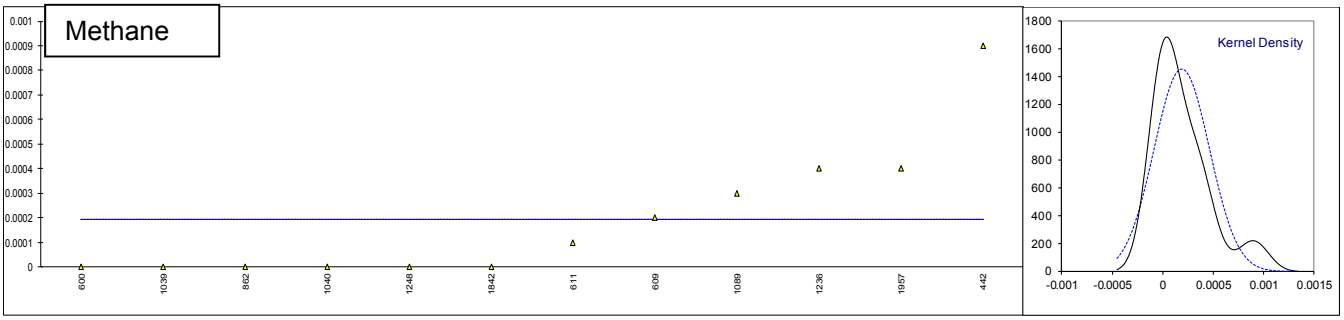
lab	method	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
52		-----	-----	-----	-----	-----	-----	-----	-----	-----
62		-----	-----	-----	-----	-----	-----	-----	-----	-----
90		-----	-----	-----	-----	-----	-----	-----	-----	-----
92		-----	-----	-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----	-----	-----
131		-----	-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----	-----
150	IP344	<0.01	0.02	0.30	0.19	0.90	0.72	1.31	0.08	3.17
154		-----	-----	-----	-----	-----	-----	-----	-----	-----
158		-----	-----	-----	-----	-----	-----	-----	-----	-----
159		-----	-----	-----	-----	-----	-----	-----	-----	-----
167	D7900	<0.01	0.0244	0.3143	0.2117	0.9416	0.7786	1.2913	0.0676 C	3.0139
168		-----	-----	-----	-----	-----	-----	-----	-----	-----
170		-----	-----	-----	-----	-----	-----	-----	-----	-----
171	D7900	<0.01	0.012	0.238	0.182	0.827	0.746	1.250	0.072	3.108
175		-----	-----	-----	-----	-----	-----	-----	-----	-----
186		-----	-----	-----	-----	-----	-----	-----	-----	-----
203		-----	-----	-----	-----	-----	-----	-----	-----	-----
225		-----	-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----	-----
311	D7900/INH-430	<0.005	0.019	0.271	0.173	0.871	0.692	1.198	**0.040**	2.25
314		-----	-----	-----	-----	-----	-----	-----	-----	-----
332		-----	-----	-----	-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	-----	-----	-----
334		-----	-----	-----	-----	-----	-----	-----	-----	-----
335		-----	-----	-----	-----	-----	-----	-----	-----	-----
336		-----	-----	-----	-----	-----	-----	-----	-----	-----
391		-----	-----	-----	-----	-----	-----	-----	-----	-----
398		-----	-----	-----	-----	-----	-----	-----	-----	-----
399		-----	-----	-----	-----	-----	-----	-----	-----	-----
442	IP344	0.0009	0.0321	0.3665	0.2125	1.0506	0.7795	1.4385	0.0687	2.4774
444		-----	-----	-----	-----	-----	-----	-----	-----	-----
445	INH	<0.01	<0.01	0.17	0.15	0.74	0.69	1.19	0.06	2.91
446		-----	-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----	-----
485		-----	-----	-----	-----	-----	-----	-----	-----	-----
511		-----	-----	-----	-----	-----	-----	-----	-----	-----
525		-----	-----	-----	-----	-----	-----	-----	-----	-----
529		-----	-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----	-----
551		-----	-----	-----	-----	-----	-----	-----	-----	-----
557		-----	-----	-----	-----	-----	-----	-----	-----	-----
574		-----	-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----	-----
593		-----	-----	-----	-----	-----	-----	-----	-----	-----
595		-----	-----	-----	-----	-----	-----	-----	-----	-----
598		-----	-----	-----	-----	-----	-----	-----	-----	-----
599		-----	-----	-----	-----	-----	-----	-----	-----	-----
600	In house	0.000	**0.002**	***0.154***	0.176	0.939	**0.959**	**1.674**	-----	***3.721***
603		-----	-----	-----	-----	-----	-----	-----	-----	-----
605		-----	-----	-----	-----	-----	-----	-----	-----	-----
608		-----	-----	-----	-----	-----	-----	-----	-----	-----
609	IP344	0.0002	0.0179	0.2662	0.1831	0.8237	**0.5624**	1.2211	-----	-----
610		-----	-----	-----	-----	-----	-----	-----	-----	-----
611	GPA2186	0.0001	0.0162	0.2432	0.17205	0.77935	0.68005	1.1502	**0.1178**	2.4147
612		-----	-----	-----	-----	-----	-----	-----	-----	-----
657		-----	-----	-----	-----	-----	-----	-----	-----	-----
663		-----	-----	-----	-----	-----	-----	-----	-----	-----
704		-----	-----	-----	-----	-----	-----	-----	-----	-----
732		-----	-----	-----	-----	-----	-----	-----	-----	-----
739		-----	-----	-----	-----	-----	-----	-----	-----	-----
749		-----	-----	-----	-----	-----	-----	-----	-----	-----
750		-----	-----	-----	-----	-----	-----	-----	-----	-----
751		-----	-----	-----	-----	-----	-----	-----	-----	-----
752		-----	-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----	-----
781		-----	-----	-----	-----	-----	-----	-----	-----	-----
785		-----	-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----	-----
862	IP344	0.000	0.0166	0.2731	0.1849	0.8676	0.7271	1.2200	0.0625	**1.2431**
874		-----	-----	-----	-----	-----	-----	-----	-----	-----
875		-----	-----	-----	-----	-----	-----	-----	-----	-----
904		-----	-----	-----	-----	-----	-----	-----	-----	-----
922		-----	-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----	-----	-----	-----
970		-----	-----	-----	-----	-----	-----	-----	-----	-----

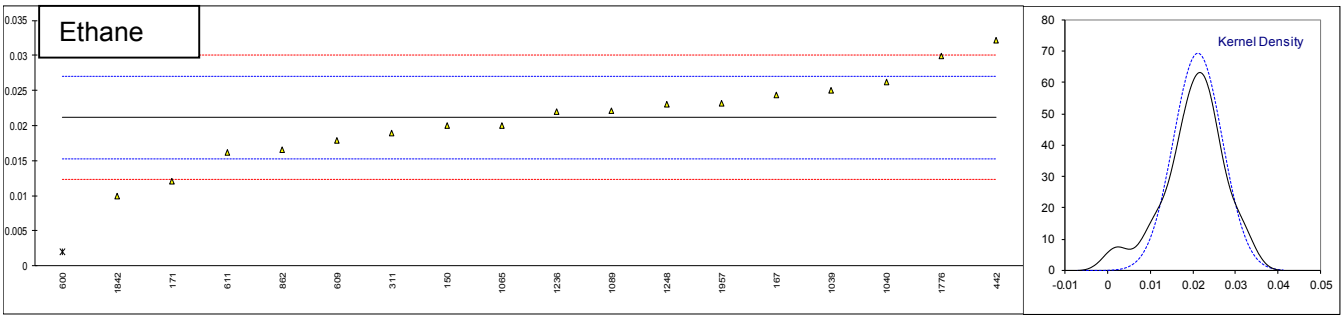
lab	method	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
971		-----	-----	-----	-----	-----	-----	-----	-----	-----
974		-----	-----	-----	-----	-----	-----	-----	-----	-----
988		-----	-----	-----	-----	-----	-----	-----	-----	-----
991		-----	-----	-----	-----	-----	-----	-----	-----	-----
992		-----	-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----	-----
995		-----	-----	-----	-----	-----	-----	-----	-----	-----
997		-----	-----	-----	-----	-----	-----	-----	-----	-----
1011		-----	-----	-----	-----	-----	-----	-----	-----	-----
1016		-----	-----	-----	-----	-----	-----	-----	-----	-----
1039	D6729	0	0.025	0.329	0.208	0.933	0.765	1.251	**0.148**	**1.505**
1040	In house	0	0.0262	0.3422	0.2205	0.9859	0.8178	1.3706	0.0579	3.1855
1056		-----	-----	-----	-----	-----	-----	-----	-----	-----
1065	In house	<0.001	0.02	**0.03**	0.2020	0.881	0.73	1.19	0.07	2.8
1089	D5134	0.0003	0.0221	0.2999	0.1989	0.8778	0.7477	1.2322	0.0746 C	2.4666 C
1106		-----	-----	-----	-----	-----	-----	-----	-----	-----
1109		-----	-----	-----	-----	-----	-----	-----	-----	-----
1148		-----	-----	-----	-----	-----	-----	-----	-----	-----
1236	D5134	0.0004	0.0220	0.2948	0.1956	0.8484	0.7345	1.2006	0.0740	2.9067
1248	In house	0	0.023	0.294	0.197	0.859	0.745	1.219	0.077	2.800
1259		-----	-----	-----	-----	-----	-----	-----	-----	-----
1272		-----	-----	-----	-----	-----	-----	-----	-----	-----
1300		-----	-----	-----	-----	-----	-----	-----	-----	-----
1379		-----	-----	-----	-----	-----	-----	-----	-----	-----
1397		-----	-----	-----	-----	-----	-----	-----	-----	-----
1412		-----	-----	-----	-----	-----	-----	-----	-----	-----
1543		-----	-----	-----	-----	-----	-----	-----	-----	-----
1544		-----	-----	-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----	-----	-----
1557		-----	-----	-----	-----	-----	-----	-----	-----	-----
1654		-----	-----	-----	-----	-----	-----	-----	-----	-----
1656		-----	-----	-----	-----	-----	-----	-----	-----	-----
1695		-----	-----	-----	-----	-----	-----	-----	-----	-----
1714		-----	-----	0.206	0.158	0.699	0.657	1.089	0.070	2.799
1720		-----	-----	-----	-----	-----	-----	-----	-----	-----
1724		-----	-----	-----	-----	-----	-----	-----	-----	-----
1728		-----	-----	-----	-----	-----	-----	-----	-----	-----
1749		-----	-----	-----	-----	-----	-----	-----	-----	-----
1776		-----	0.0299	0.3414	0.2106	0.9592	0.7822	1.3499	-----	-----
1796		-----	-----	-----	-----	-----	-----	-----	-----	-----
1810		-----	-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----	-----
1815		-----	-----	-----	-----	-----	-----	-----	-----	-----
1842	IP601	0.00	0.01	0.28	0.20	0.92	0.77	1.29	0.05	2.51
1849		-----	-----	-----	-----	-----	-----	-----	-----	-----
1858		-----	-----	-----	-----	-----	-----	-----	-----	-----
1862		-----	-----	-----	-----	-----	-----	-----	-----	-----
1930		-----	-----	-----	-----	-----	-----	-----	-----	-----
1957	IP344	0.0004	0.0232	0.2985	0.1999	0.8663	0.7189	1.2320	**0.1119**	3.0387
1960		-----	-----	-----	-----	-----	-----	-----	-----	-----
1984		-----	-----	-----	-----	-----	-----	-----	-----	-----
1995		-----	-----	-----	-----	-----	-----	-----	-----	-----
6016		-----	-----	-----	-----	-----	-----	-----	-----	-----
6021		-----	-----	-----	-----	-----	-----	-----	-----	-----
6163		-----	-----	-----	-----	-----	-----	-----	-----	-----
6188		-----	-----	-----	-----	-----	-----	-----	-----	-----
6201	D7900	<0.01	<0.01	<0.01	**0.26**	0.85	0.73	1.22	**0.16**	2.89
6203		-----	-----	-----	-----	-----	-----	-----	-----	-----
9051		-----	-----	-----	-----	-----	-----	-----	-----	-----
9052		-----	-----	-----	-----	-----	-----	-----	-----	-----
9057		-----	-----	-----	-----	-----	-----	-----	-----	-----
9060		-----	-----	-----	-----	-----	-----	-----	-----	-----
9063		-----	-----	-----	-----	-----	-----	-----	-----	-----
9099		-----	-----	-----	-----	-----	-----	-----	-----	-----
9100		-----	-----	-----	-----	-----	-----	-----	-----	-----
9101		-----	-----	-----	-----	-----	-----	-----	-----	-----
9132		-----	-----	-----	-----	-----	-----	-----	-----	-----
9133		-----	-----	-----	-----	-----	-----	-----	-----	-----
9134		-----	-----	-----	-----	-----	-----	-----	-----	-----
9135		-----	-----	-----	-----	-----	-----	-----	-----	-----
9136		-----	-----	-----	-----	-----	-----	-----	-----	-----
9139		-----	-----	-----	-----	-----	-----	-----	-----	-----
9142		-----	-----	-----	-----	-----	-----	-----	-----	-----
9143		-----	-----	-----	-----	-----	-----	-----	-----	-----
9146		-----	-----	-----	-----	-----	-----	-----	-----	-----
9151		-----	-----	-----	-----	-----	-----	-----	-----	-----
9152		-----	-----	-----	-----	-----	-----	-----	-----	-----

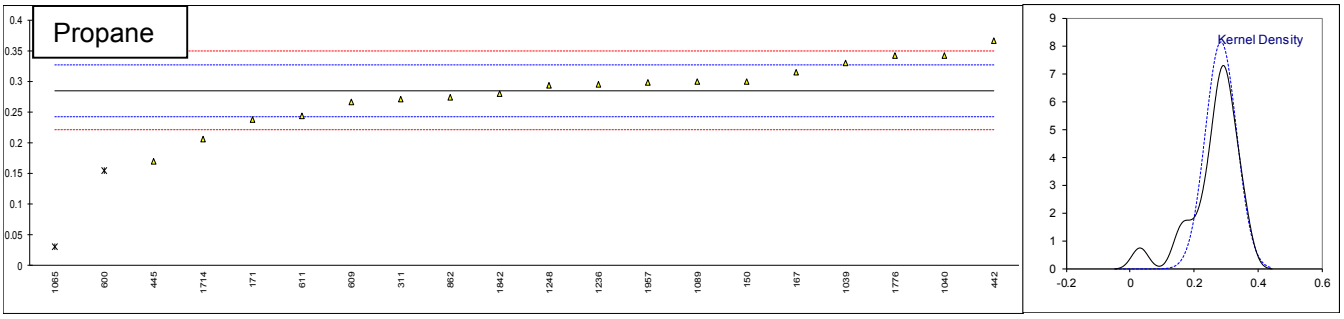
	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
normality	n.a.	OK	OK	OK	OK	OK	suspect	OK	OK
n	19	17	18	20	21	19	20	13	16
outliers	0	1	1 (+1excl)	1	0	2	1	5	2 (+1excl)
mean (n)	<0.01	0.0212	0.2849	0.1913	0.8771	0.7374	1.2457	0.0680	2.7963
st.dev. (n)	n.a.	0.00574	0.04901	0.01877	0.08054	0.04009	0.07916	0.00841	0.29037
R(calc.)	n.a.	0.0161	0.1372	0.0526	0.2255	0.1123	0.2216	0.0236	0.8130
st.dev.(IP344:88)	n.a.	0.00295	0.02127	0.01011	0.04135	0.02370	0.04582	0.00381	0.16071
R(IP344:88)	n.a.	0.0083	0.05954	0.0283	0.1158	0.0664	0.1283	0.0107	0.4500

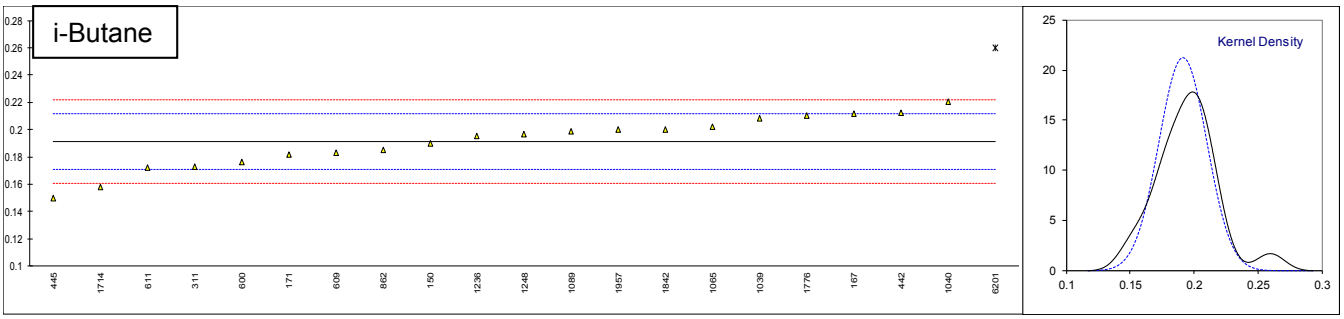
Bold and undelined test results are marked as statistical outliers
Bold and italic test results are excluded for statistical evaluations

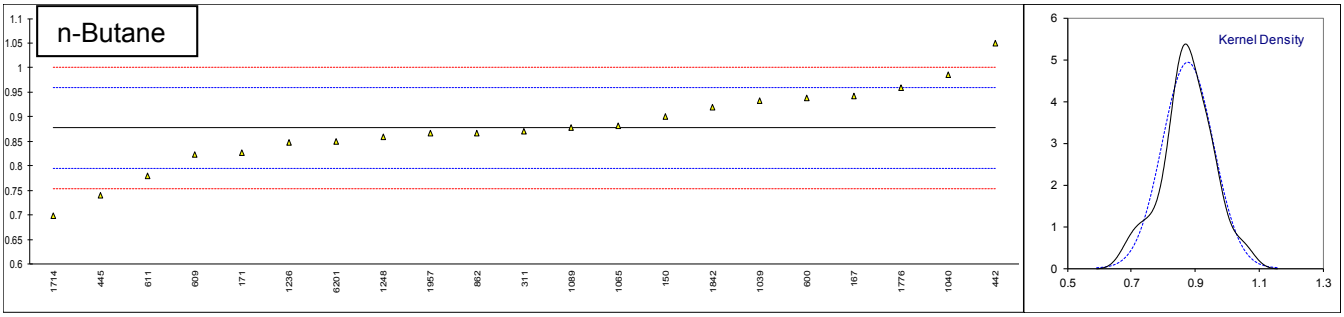
Lab 167: first reported 0.1639
Lab 1089: first reported 0.0160, 2.5412

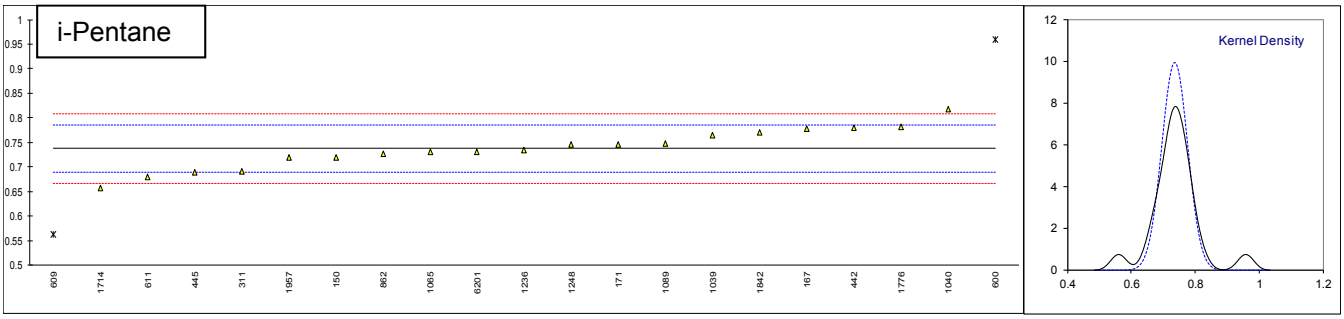


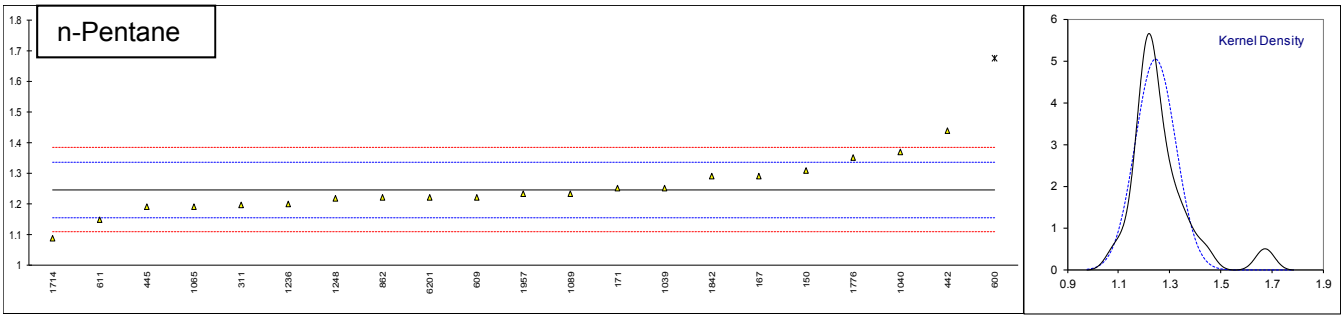


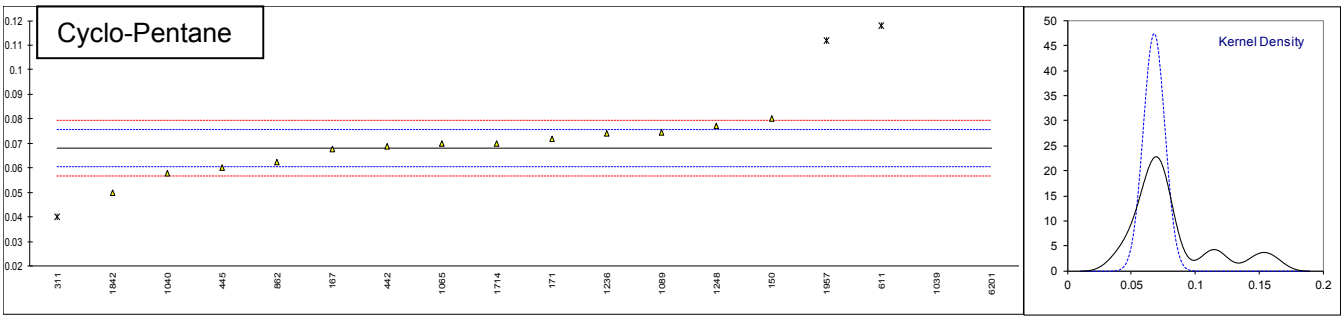


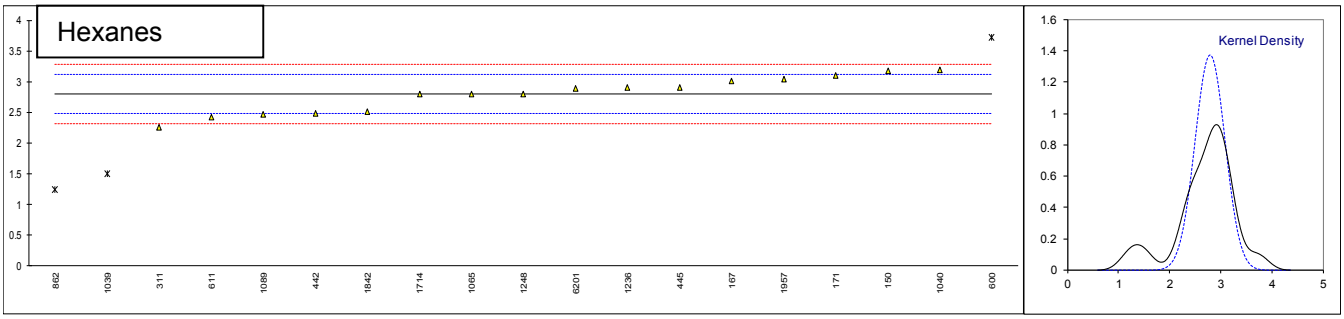



n-Butane
Kernel Density


i-Pentane
Kernel Density


n-Pentane
Kernel Density


Cyclo-Pentane
Kernel Density

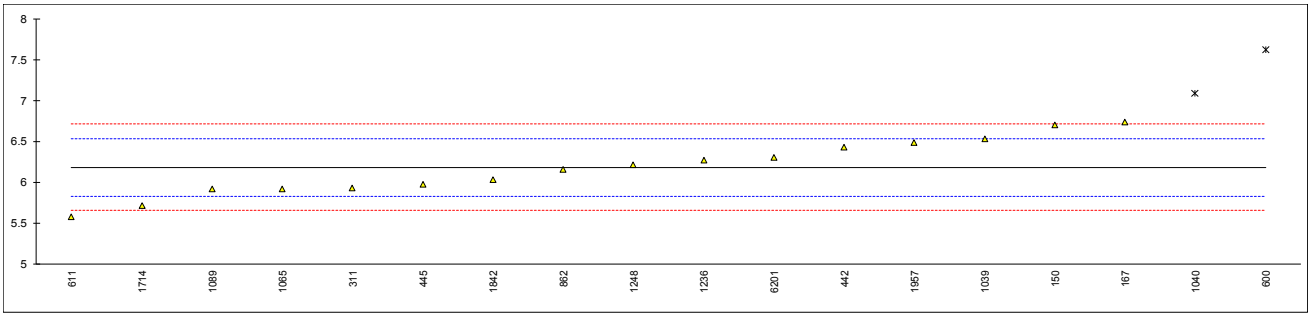

Hexanes
Kernel Density

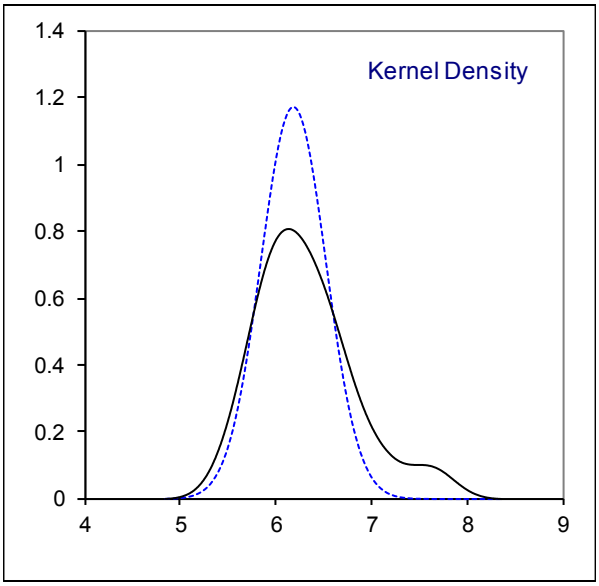
Determination of Total light ends C1 – C6 on sample #18215; results in %M/M

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	971		-----		-----
62		-----		-----	974		-----		-----
90		-----		-----	988		-----		-----
92		-----		-----	991		-----		-----
120		-----		-----	992		-----		-----
131		-----		-----	994		-----		-----
140		-----		-----	995		-----		-----
150	IP344	6.70		2.95	997		-----		-----
154		-----		-----	1011		-----		-----
158		-----		-----	1016		-----		-----
159		-----		-----	1039	D6729	6.537		2.02
167	D7900	6.7397		3.18	1040	In house	7.0868	DG(0.05)	5.16
168		-----		-----	1056		-----		-----
170		-----		-----	1065	In house	5.923		-1.48
171		-----		-----	1089	D5134	5.9201	C	-1.50
175		-----		-----	1106		-----		-----
186		-----		-----	1109		-----		-----
203		-----		-----	1148		-----		-----
225		-----		-----	1236	D5134	6.2730		0.52
238		-----		-----	1248	In house	6.214		0.18
273		-----		-----	1259		-----		-----
311	D7900/INH-430	5.93		-1.44	1272		-----		-----
314		-----		-----	1300		-----		-----
332		-----		-----	1379		-----		-----
333		-----		-----	1397		-----		-----
334		-----		-----	1412		-----		-----
335		-----		-----	1543		-----		-----
336		-----		-----	1544		-----		-----
391		-----		-----	1556		-----		-----
398		-----		-----	1557		-----		-----
399		-----		-----	1654		-----		-----
442	IP344	6.4295		1.41	1656		-----		-----
444		-----		-----	1695		-----		-----
445	INH	5.98		-1.15	1714	In house	5.712		-2.68
446		-----		-----	1720		-----		-----
447		-----		-----	1724		-----		-----
485		-----		-----	1728		-----		-----
511		-----		-----	1749		-----		-----
525		-----		-----	1776		-----		-----
529		-----		-----	1796		-----		-----
541		-----		-----	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815		-----		-----
574		-----		-----	1842	IP601	6.03		-0.87
575		-----		-----	1849		-----		-----
593		-----		-----	1858		-----		-----
595		-----		-----	1862		-----		-----
598		-----		-----	1930		-----		-----
599		-----		-----	1957	IP344	6.4898		1.75
600	In house	7.624	DG(0.05)	8.22	1960		-----		-----
603		-----		-----	1984		-----		-----
605		-----		-----	1995		-----		-----
608		-----		-----	6016		-----		-----
609		-----		-----	6021		-----		-----
610		-----		-----	6163		-----		-----
611	GPA2186	5.5794		-3.44	6188		-----		-----
612		-----		-----	6201	D7900	6.3		0.67
657		-----		-----	6203		-----		-----
663		-----		-----	9051		-----		-----
704		-----		-----	9052		-----		-----
732		-----		-----	9057		-----		-----
739		-----		-----	9060		-----		-----
749		-----		-----	9063		-----		-----
750		-----		-----	9099		-----		-----
751		-----		-----	9100		-----		-----
752		-----		-----	9101		-----		-----
753		-----		-----	9132		-----		-----
781		-----		-----	9133		-----		-----
785		-----		-----	9134		-----		-----
840		-----		-----	9135		-----		-----
862	IP344	6.162		-0.12	9136		-----		-----
874		-----		-----	9139		-----		-----
875		-----		-----	9142		-----		-----
904		-----		-----	9143		-----		-----
922		-----		-----	9146		-----		-----
962		-----		-----	9151		-----		-----
963		-----		-----	9152		-----		-----
970		-----		-----					

normality	OK
n	16
outliers	2
mean (n)	6.1825
st.dev. (n)	0.33982
R(calc.)	0.9515
st.dev.(IP344:88)	0.17537
R(IP344:88)	0.4910

Lab 1089: first reported 5.9361

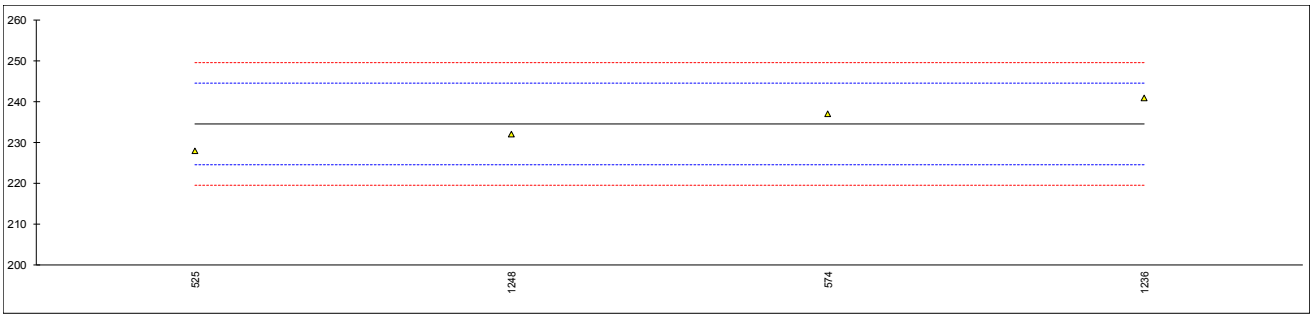




Determination of Molecular Mass, average on sample #18215; results in g/mol

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	971		-----		-----
62		-----		-----	974		-----		-----
90		-----		-----	988		-----		-----
92		-----		-----	991		-----		-----
120		-----		-----	992		-----		-----
131		-----		-----	994		-----		-----
140		-----		-----	995		-----		-----
150		-----		-----	997		-----		-----
154		-----		-----	1011		-----		-----
158		-----		-----	1016		-----		-----
159		-----		-----	1039		-----		-----
167		-----		-----	1040		-----		-----
168		-----		-----	1056		-----		-----
170		-----		-----	1065		-----		-----
171		-----		-----	1089		-----		-----
175		-----		-----	1106		-----		-----
186		-----		-----	1109		-----		-----
203		-----		-----	1148		-----		-----
225		-----		-----	1236	In house	240.94		1.30
238		-----		-----	1248	In house	232.0		-0.49
273		-----		-----	1259		-----		-----
311		-----		-----	1272		-----		-----
314		-----		-----	1300		-----		-----
332		-----		-----	1379		-----		-----
333		-----		-----	1397		-----		-----
334		-----		-----	1412		-----		-----
335		-----		-----	1543		-----		-----
336		-----		-----	1544		-----		-----
391		-----		-----	1556		-----		-----
398		-----		-----	1557		-----		-----
399		-----		-----	1654		-----		-----
442		-----		-----	1656		-----		-----
444		-----		-----	1695		-----		-----
445		-----		-----	1714		-----		-----
446		-----		-----	1720		-----		-----
447		-----		-----	1724		-----		-----
485		-----		-----	1728		-----		-----
511		-----		-----	1749		-----		-----
525	D2503	228		-1.29	1776		-----		-----
529		-----		-----	1796		-----		-----
541		-----		-----	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815		-----		-----
574	D2503	236.91		0.49	1842		-----		-----
575		-----		-----	1849		-----		-----
593		-----		-----	1858		-----		-----
595		-----		-----	1862		-----		-----
598		-----		-----	1930		-----		-----
599		-----		-----	1957		-----		-----
600		-----		-----	1960		-----		-----
603		-----		-----	1984		-----		-----
605		-----		-----	1995		-----		-----
608		-----		-----	6016		-----		-----
609		-----		-----	6021		-----		-----
610		-----		-----	6163		-----		-----
611		-----		-----	6188		-----		-----
612		-----		-----	6201		-----		-----
657		-----		-----	6203		-----		-----
663		-----		-----	9051		-----		-----
704		-----		-----	9052		-----		-----
732		-----		-----	9057		-----		-----
739		-----		-----	9060		-----		-----
749		-----		-----	9063		-----		-----
750		-----		-----	9099		-----		-----
751		-----		-----	9100		-----		-----
752		-----		-----	9101		-----		-----
753		-----		-----	9132		-----		-----
781		-----		-----	9133		-----		-----
785		-----		-----	9134		-----		-----
840		-----		-----	9135		-----		-----
862		-----		-----	9136		-----		-----
874		-----		-----	9139		-----		-----
875		-----		-----	9142		-----		-----
904		-----		-----	9143		-----		-----
922		-----		-----	9146		-----		-----
962		-----		-----	9151		-----		-----
963		-----		-----	9152		-----		-----
970		-----		-----					

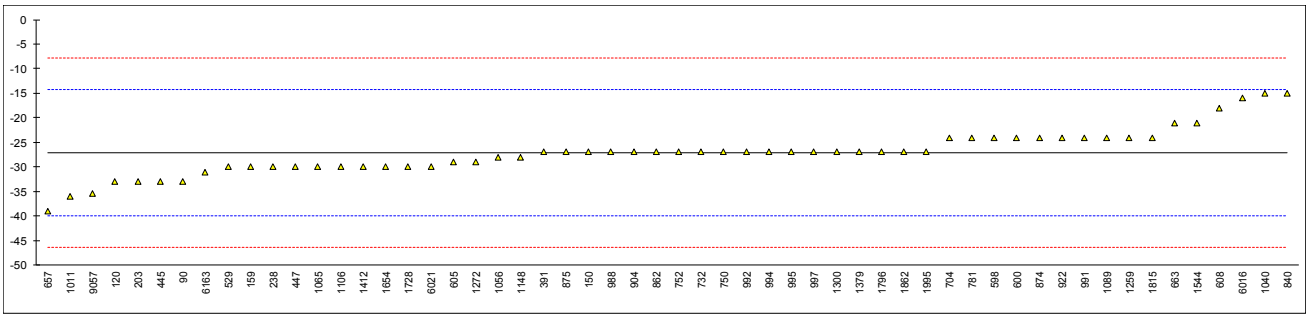
normality	unknown
n	4
outliers	0
mean (n)	234.46
st.dev. (n)	5.650
R(calc.)	15.82
st.dev.(D2503:92)	5
R(D2503:92)	14

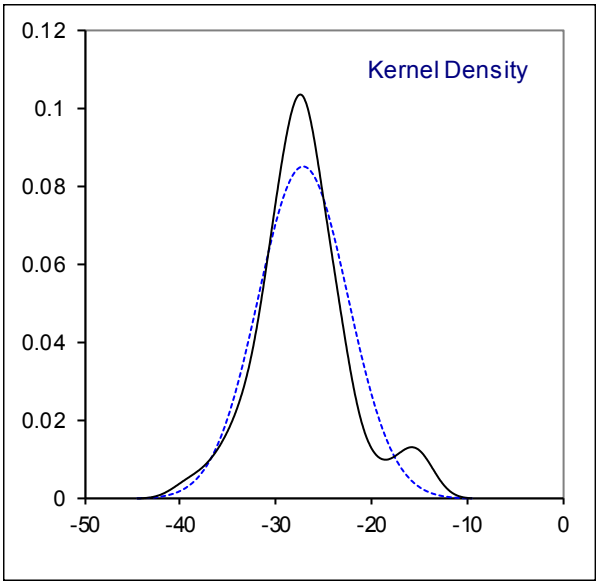


Determination of Pour Point (Maximum) on sample #18215; results in °C

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	971	D5853-A	<-36		-----
62		-----		-----	974	D5853-A	<-39		-----
90	D5853-A	-33		-0.91	988	D5853-A	-27		0.02
92		-----		-----	991	D5853-A	-24		0.49
120	D5853-A	-33		-0.91	992	D5853-A	-27		0.02
131		-----		-----	994	D5853-A	-27		0.02
140	D97	<-30		-----	995	D5853-A	-27		0.02
150	D97	-27		0.02	997	D5853-A	-27		0.02
154	D97	<-24		-----	1011	D5853-A	-36		-1.38
158		-----		-----	1016		-----		-----
159	D5853-A	-30		-0.45	1039	D5853-A	<-36		-----
167		-----		-----	1040	ISO3016	-15.1		1.87
168		-----		-----	1056	D5853-A	-28		-0.13
170	D5853-A	<-24		-----	1065	D5853-A	-30.0		-0.45
171		-----		-----	1089	D5853-A	-24		0.49
175		-----		-----	1106	D5853	-30.0		-0.45
186		-----		-----	1109		-----		-----
203	D5853-A	-33		-0.91	1148	ISO3016	-28		-0.13
225		-----		-----	1236		-----		-----
238	D5853	-30		-0.45	1248	IP441Mod.	<-36		-----
273		-----		-----	1259	D5853-A	-24		0.49
311		-----		-----	1272	ISO3016	-29		-0.29
314		-----		-----	1300	D5853-A	-27		0.02
332		-----		-----	1379	D5853-A	-27		0.02
333		-----		-----	1397		-----		-----
334		-----		-----	1412	D5853-A	-30		-0.45
335		-----		-----	1543		-----		-----
336		-----		-----	1544	D5853-A	-21.0		0.95
391	D5853-A	-27		0.02	1556		-----		-----
398		-----		-----	1557	ISO3016	<-40		-----
399		-----		-----	1654	D5853-A	-30.0		-0.45
442		-----		-----	1656	D5853-A	<-30		-----
444		-----		-----	1695		-----		-----
445	D5853-A	-33		-0.91	1714	D5853-A	<-36		-----
446		-----		-----	1720	D5853-A	<-30.0		-----
447	D5853-A	-30		-0.45	1724		-----		-----
485		-----		-----	1728	D5853-A	-30		-0.45
511		-----		-----	1749		-----		-----
525		-----		-----	1776		-----		-----
529	D5853-A	-30		-0.45	1796	D5853-A	-27		0.02
541		-----		-----	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815	D5853-A	-24.0		0.49
574	D5853	<-36		-----	1842	D5853-A	<-36		-----
575		-----		-----	1849		-----		-----
593		-----		-----	1858		-----		-----
595		-----		-----	1862	D5853-A	-27		0.02
598	In house	-24.0		0.49	1930		-----		-----
599		-----		-----	1957		-----		-----
600	D5853-A	-24.0		0.49	1960		-----		-----
603		-----		-----	1984	D5853-A	< -30		-----
605	D5853-A	-29		-0.29	1995		-27		0.02
608	D5853-A	-18		1.42	6016	D5853-A	-16		1.73
609		-----		-----	6021	D5853-A	-30		-0.45
610		-----		-----	6163	ISO3016	-31		-0.60
611		-----		-----	6188		-----		-----
612		-----		-----	6201	D5853-A	< -36		-----
657	D5853-A	-39		-1.85	6203		-----		-----
663	D5853-A	-21		0.95	9051		-----		-----
704	D5853-A	-24		0.49	9052		-----		-----
732	D5853-A	-27		0.02	9057		-35.4		-1.29
739		-----		-----	9060		-----		-----
749		-----		-----	9063		-----		-----
750	D5853-A	-27		0.02	9099		-----		-----
751		-----		-----	9100		-----		-----
752	D5853-A	-27		0.02	9101		-----		-----
753		-----		-----	9132		-----		-----
781	D5853-A	-24		0.49	9133		-----		-----
785		-----		-----	9134		-----		-----
840	D5853-A	-15		1.89	9135		-----		-----
862	D5853-A	-27		0.02	9136		-----		-----
874	D5853-A	-24		0.49	9139		-----		-----
875	D5853-A	-27		0.02	9142		-----		-----
904	D5853-A	-27		0.02	9143		-----		-----
922	D97	-24		0.49	9146		-----		-----
962		-----		-----	9151		-----		-----
963	D5853-A	<-36		-----	9152		-----		-----
970	D5853-A	<-36		-----					

normality	suspect
n	56
outliers	0
mean (n)	-27.13
st.dev. (n)	4.679
R(calc.)	13.10
st.dev.(D5853-A:17a)	6.429
R(D5853-A:17a)	18.0

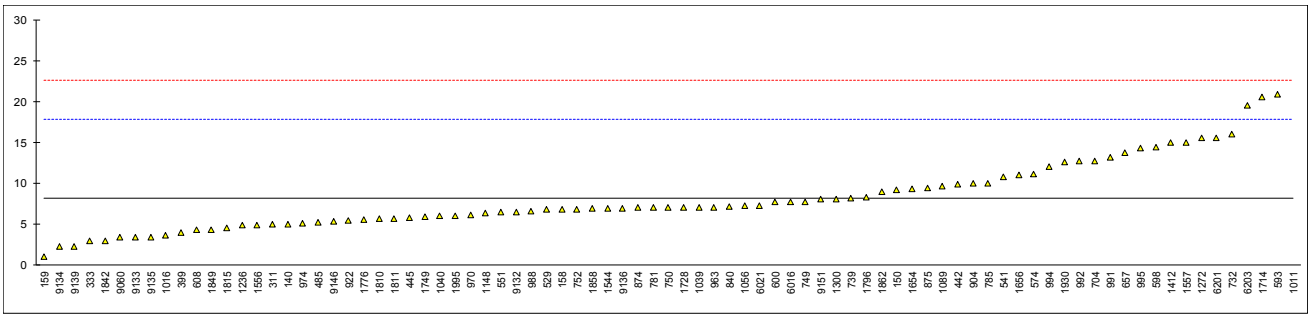


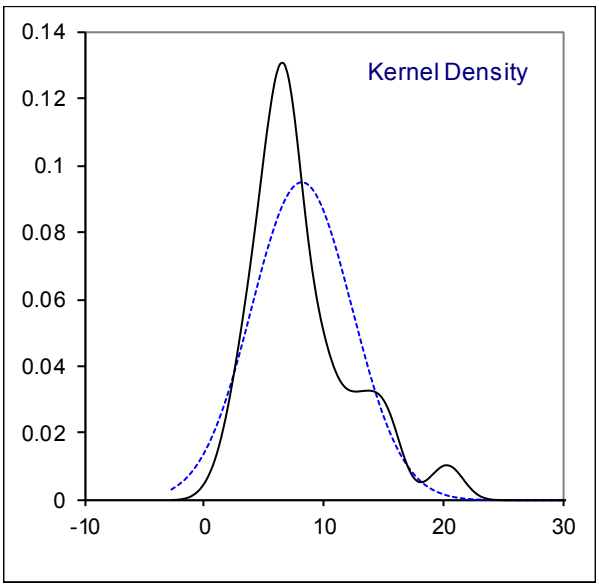


Determination of Salt as Chloride on sample #18215; results in mg/kg

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	971		-----		-----
62		-----		-----	974	D3230	5.1		-0.64
90		-----		-----	988	D3230	6.6		-0.33
92		-----		-----	991	D3230	13.2		1.05
120		-----		-----	992	D3230	12.7		0.94
131		-----		-----	994	D3230	12		0.80
140	D3230	5		-0.66	995	D3230	14.3		1.28
150	D3230	9.2		0.21	997		-----		-----
154		-----		-----	1011	D3230	86	R(0.01)	16.21
158	D3230	6.856		-0.28	1016	D3230	3.68		-0.94
159	D3230	1		-1.49	1039	In house	7.046		-0.24
167		-----		-----	1040	D3230	6.0		-0.45
168		-----		-----	1056	D3230	7.3		-0.18
170		-----		-----	1065		-----		-----
171		-----		-----	1089	D3230	9.7		0.32
175		-----		-----	1106		-----		-----
186		-----		-----	1109		-----		-----
203		-----		-----	1148	DIN51412-1	6.344		-0.38
225		-----		-----	1236	D3230	4.879		-0.69
238		-----		-----	1248		-----		-----
273		-----		-----	1259		-----		-----
311	D3230	5		-0.66	1272	D3230	15.510		1.53
314		-----		-----	1300	D3230	8.12		-0.01
332		-----		-----	1379		-----		-----
333	D3230	3		-1.08	1397		-----		-----
334		-----		-----	1412	D3230	15.0		1.42
335		-----		-----	1543		-----		-----
336		-----		-----	1544	D3230	6.9		-0.27
391		-----		-----	1556	D3230	4.9		-0.68
398		-----		-----	1557	D3230	15.01		1.42
399	D3230	4.0		-0.87	1654	D3230	9.31		0.24
442	IP265	9.905		0.36	1656	D3230	11		0.59
444		-----		-----	1695		-----		-----
445		5.8		-0.49	1714	D6470	20.49		2.56
446		-----		-----	1720		-----		-----
447		-----		-----	1724		-----		-----
485	D3230	5.26		-0.61	1728		7		-0.25
511		-----		-----	1749	D3230	5.95		-0.46
525		-----		-----	1776	D3230	5.61		-0.53
529	D3230	6.8		-0.29	1796	D3230	8.35		0.04
541	D3230	10.8		0.55	1810	D3230	5.7		-0.52
551	D3230	6.5		-0.35	1811	D3230	5.71		-0.51
557		-----		-----	1815	D3230	4.56		-0.75
574	D3230	11.1		0.61	1842	IP265	3		-1.08
575		-----		-----	1849	D3230	4.3		-0.81
593	D3230	20.83		2.64	1858	D3230	6.88		-0.27
595		-----		-----	1862	D3230	9		0.17
598	D3230	14.4		1.30	1930	DIN51576	12.56		0.91
599		-----		-----	1957		-----		-----
600	D3230	7.7		-0.10	1960		-----		-----
603		-----		-----	1984		-----		-----
605		-----		-----	1995	D3230	6		-0.45
608	D3230	4.3		-0.81	6016	D3230	7.768		-0.09
609		-----		-----	6021	D3230	7.3		-0.18
610		-----		-----	6163		-----		-----
611		-----		-----	6188		-----		-----
612		-----		-----	6201	D3230	15.6		1.55
657	D3230	13.7		1.15	6203	D3230	19.5		2.36
663		-----		-----	9051		-----		-----
704	D3230	12.73		0.95	9052		-----		-----
732	GOST21534	16		1.63	9057		-----		-----
739	GOST21534	8.18		0.00	9060	D3230	3.4		-0.99
749	GOST21534	7.78		-0.08	9063		-----		-----
750	GOST21534	7		-0.25	9099		-----		-----
751		-----		-----	9100		-----		-----
752	D3230	6.86		-0.27	9101		-----		-----
753		-----		-----	9132	D3230	6.5		-0.35
781	D3230	7		-0.25	9133	D3230	3.4		-0.99
785	D3230	10		0.38	9134	D3230	2.3		-1.22
840	D6470	7.2		-0.20	9135	D3230	3.4		-0.99
862		-----		-----	9136	D3230	6.9		-0.27
874	D3230	7		-0.25	9139	D3230	2.3		-1.22
875	D3230	9.4		0.25	9142		-----		-----
904	D3230	10		0.38	9143		-----		-----
922	D3230	5.5		-0.56	9146	In house	5.3		-0.60
962		-----		-----	9151		8.1		-0.02
963	D3230	7.1		-0.22	9152		-----		-----
970	D3230	6.1		-0.43					

normality	suspect
n	82
outliers	1
mean (n)	8.177
st.dev. (n)	4.1941
R(calc.)	11.743
st.dev.(D3230:13)	4.8013
R(D3230:13)	13.444

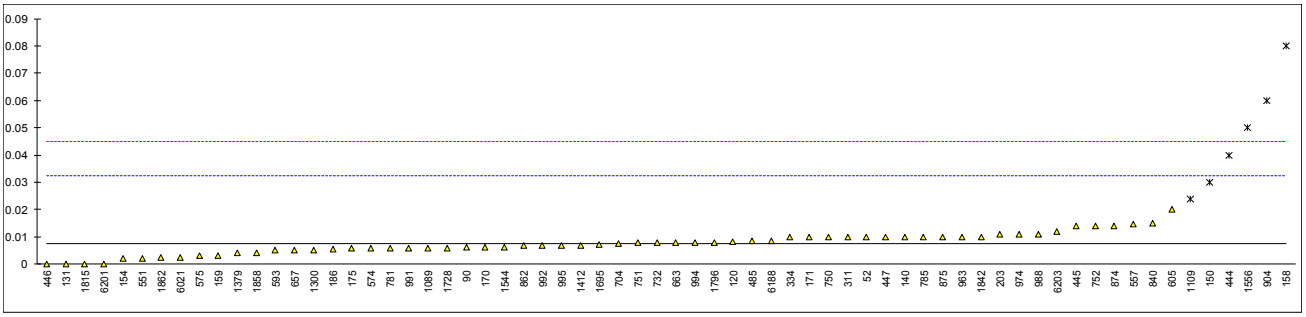


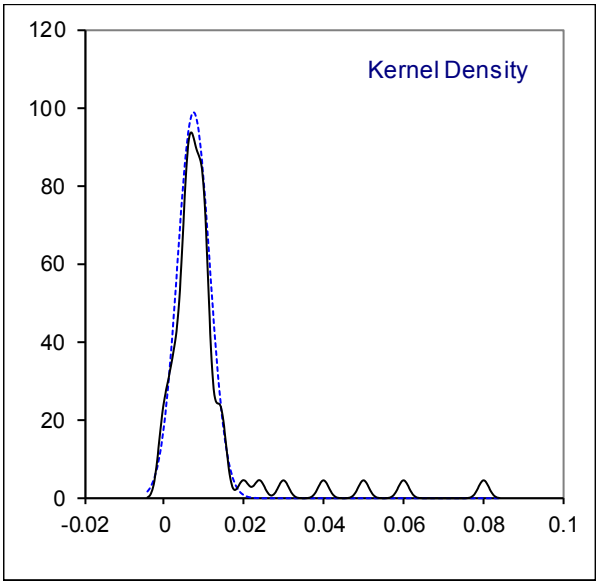


Determination of Sediment (Extraction method) ASTM D473 on sample #18215; results in %V/V

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52	D473	0.01		0.20	971		-----		-----
62		-----		-----	974	D473	0.011		0.28
90	D473	0.0061		-0.12	988	D473	0.011		0.28
92		-----		-----	991	D473	0.006		-0.12
120	D473	0.0083		0.06	992	D473	0.007		-0.04
131	D473	0		-0.61	994	D473	0.008		0.04
140	D473	0.01		0.20	995	D473	0.007		-0.04
150	D473	0.03	R(0.01)	1.80	997		-----		-----
154	D473	0.002		-0.44	1011		-----		-----
158	D473	0.08	R(0.01)	5.81	1016		-----		-----
159	D473	0.0032		-0.35	1039		-----		-----
167		-----		-----	1040		-----		-----
168		-----		-----	1056		-----		-----
170	D473	0.0061		-0.12	1065		-----		-----
171	D473	0.01		0.20	1089	D473	0.006		-0.12
175	D473	0.0057		-0.15	1106		-----		-----
186	D473	0.0056		-0.16	1109	D473	0.024	R(0.01)	1.32
203	D473	0.0109		0.27	1148		-----		-----
225		-----		-----	1236		-----		-----
238		-----		-----	1248		-----		-----
273		-----		-----	1259		-----		-----
311	D473	0.01		0.20	1272		-----		-----
314		-----		-----	1300	D473	0.005		-0.20
332		-----		-----	1379	D473	0.004		-0.28
333	D473	<0.01		-----	1397		-----		-----
334	D473	0.0098		0.18	1412	D473	0.007		-0.04
335		-----		-----	1543		-----		-----
336	D473	<0.01		-----	1544	D473	0.0063		-0.10
391		-----		-----	1556	ISO3735	0.05	R(0.01)	3.40
398		-----		-----	1557		-----		-----
399		-----		-----	1654		-----		-----
442		-----		-----	1656	D473	<0.01		-----
444	D473	0.04	R(0.01)	2.60	1695	D473	0.00736		-0.02
445	D473	0.014		0.52	1714		-----		-----
446	D473	0		-0.61	1720		-----		-----
447	D473	0.01		0.20	1724		-----		-----
485	D473	0.0087		0.09	1728	D473	0.006		-0.12
511		-----		-----	1749		-----		-----
525		-----		-----	1776		-----		-----
529		-----		-----	1796	D473	0.008		0.04
541	D473	<0.01		-----	1810		-----		-----
551	D473	0.002		-0.44	1811		-----		-----
557	D473	0.01466		0.57	1815	ISO3735	0		-0.61
574	D473	0.006		-0.12	1842	D473	0.01		0.20
575	D473	0.003		-0.36	1849		-----		-----
593	D473	0.005		-0.20	1858	D473	0.0041		-0.28
595		-----		-----	1862	D473	0.0023		-0.42
598		-----		-----	1930		-----		-----
599		-----		-----	1957		-----		-----
600		-----		-----	1960		-----		-----
603	D473	< 0.01		-----	1984		-----		-----
605	D473	0.02		1.00	1995		-----		-----
608		-----		-----	6016		-----		-----
609		-----		-----	6021	D473	0.0025		-0.40
610		-----		-----	6163		-----		-----
611		-----		-----	6188	D473	0.0087		0.09
612		-----		-----	6201	D473	0		-0.61
657	D473	0.005		-0.20	6203	D473	0.012		0.36
663	D473	0.008		0.04	9051		-----		-----
704	D473	0.0077		0.01	9052		-----		-----
732	D473	0.008		0.04	9057		-----		-----
739		-----		-----	9060		-----		-----
749		-----		-----	9063		-----		-----
750	D473	0.01		0.20	9099		-----		-----
751	D473	0.008		0.04	9100		-----		-----
752	D473	0.014		0.52	9101		-----		-----
753		-----		-----	9132		-----		-----
781	D473	0.006		-0.12	9133		-----		-----
785	D473	0.01		0.20	9134		-----		-----
840	D473	0.015		0.60	9135		-----		-----
862	D473	0.007		-0.04	9136		-----		-----
874	D473	0.014		0.52	9139		-----		-----
875	D473	0.01		0.20	9142		-----		-----
904	D473	0.06	R(0.01)	4.20	9143		-----		-----
922	D473	<0.01		-----	9146		-----		-----
962		-----		-----	9151		-----		-----
963	D473	0.01		0.20	9152		-----		-----
970		-----		-----					

normality	OK
n	60
outliers	6
mean (n)	0.00755
st.dev. (n)	0.004039
R(calc.)	0.01131
st.dev.(D473:07e1)	0.012473
R(D473:07e1)	0.03493



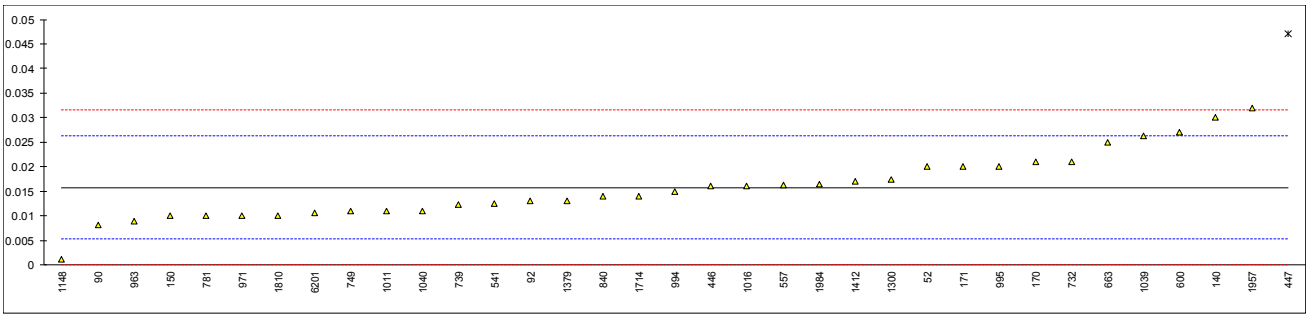


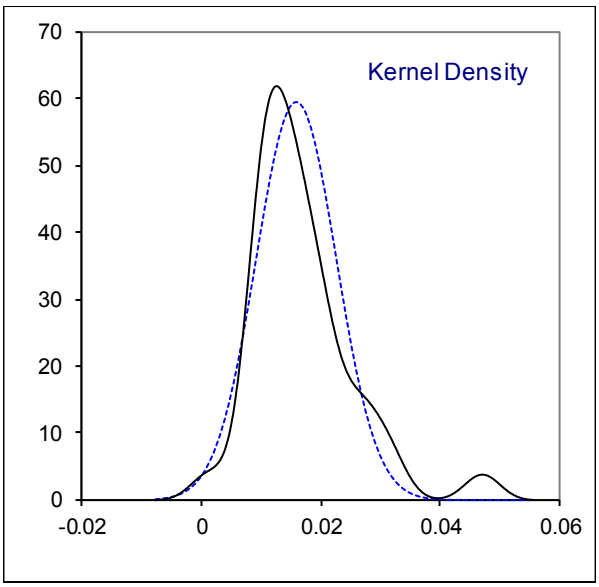
Determination of Sediment (Membrane filtration) ASTM D4807 on sample #18215; results in %M/M

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52	D4807	0.020		0.80	971	D4807	0.010		-1.10
62		-----		-----	974		-----		-----
90	D4807	0.0082		-1.44	988		-----		-----
92	D4807	0.013		-0.53	991		-----		-----
120		-----		-----	992		-----		-----
131		-----		-----	994	D4807	0.015		-0.15
140	D4807	0.030		2.69	995	D4807	0.020		0.80
150	D4807	0.010		-1.10	997		-----		-----
154		-----		-----	1011	D4807	0.011		-0.91
158		-----		-----	1016	D4807	0.016		0.04
159		-----		-----	1039	D4807	0.0263		1.99
167		-----		-----	1040	D4807	0.011		-0.91
168		-----		-----	1056		-----		-----
170	D4807	0.02099748		0.98	1065		-----		-----
171	D4807	0.020		0.80	1089		-----		-----
175		-----		-----	1106		-----		-----
186		-----		-----	1109		-----		-----
203		-----		-----	1148	D4807	0.0011		-2.78
225		-----		-----	1236		-----		-----
238		-----		-----	1248		-----		-----
273		-----		-----	1259		-----		-----
311		-----		-----	1272		-----		-----
314		-----		-----	1300	D4807	0.0175		0.32
332		-----		-----	1379	D4807	0.013		-0.53
333		-----		-----	1397		-----		-----
334		-----		-----	1412	D4807	0.017		0.23
335		-----		-----	1543		-----		-----
336		-----		-----	1544		-----		-----
391		-----		-----	1556		-----		-----
398		-----		-----	1557		-----		-----
399		-----		-----	1654		-----		-----
442		-----		-----	1656		-----		-----
444		-----		-----	1695		-----		-----
445		-----		-----	1714	D4807	0.014		-0.34
446	D4807	0.016		0.04	1720		-----		-----
447	D4807	0.047	R(0.01)	5.91	1724		-----		-----
485		-----		-----	1728		-----		-----
511		-----		-----	1749		-----		-----
525		-----		-----	1776		-----		-----
529		-----		-----	1796		-----		-----
541	D4807	0.0125		-0.62	1810	D4807	0.01		-1.10
551		-----		-----	1811		-----		-----
557	D4807	0.01625		0.09	1815		-----		-----
574		-----		-----	1842		-----		-----
575		-----		-----	1849		-----		-----
593		-----		-----	1858		-----		-----
595		-----		-----	1862		-----		-----
598		-----		-----	1930		-----		-----
599		-----		-----	1957	D4807	0.0319		3.05
600	D4807	0.027		2.12	1960		-----		-----
603		-----		-----	1984	D4807	0.0165		0.13
605		-----		-----	1995		-----		-----
608		-----		-----	6016		-----		-----
609		-----		-----	6021		-----		-----
610		-----		-----	6163		-----		-----
611		-----		-----	6188		-----		-----
612		-----		-----	6201	D4807	0.0106		-0.98
657		-----		-----	6203		-----		-----
663	D4807	0.0250	C	1.74	9051		-----		-----
704		-----		-----	9052		-----		-----
732	D4807	0.021		0.99	9057		-----		-----
739	GOST6370	0.0123		-0.66	9060		-----		-----
749	GOST6370	0.0110		-0.91	9063		-----		-----
750		-----		-----	9099		-----		-----
751		-----		-----	9100		-----		-----
752		-----		-----	9101		-----		-----
753		-----		-----	9132		-----		-----
781	D4807	0.010		-1.10	9133		-----		-----
785		-----		-----	9134		-----		-----
840	D4807	0.0140		-0.34	9135		-----		-----
862		-----		-----	9136		-----		-----
874		-----		-----	9139		-----		-----
875		-----		-----	9142		-----		-----
904		-----		-----	9143		-----		-----
922		-----		-----	9146		-----		-----
962		-----		-----	9151		-----		-----
963	D4807	0.009		-1.29	9152		-----		-----
970		-----		-----					

normality	OK
n	34
outliers	1
mean (n)	0.01580
st.dev. (n)	0.006720
R(calc.)	0.01881
st.dev.(D4807:05)	0.005279
R(D4807:05)	0.01478

Lab 663: first reported 0.0654



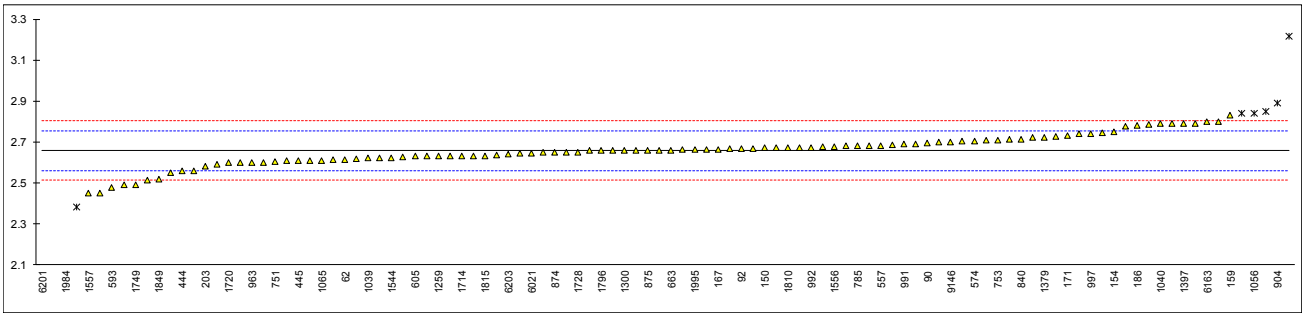


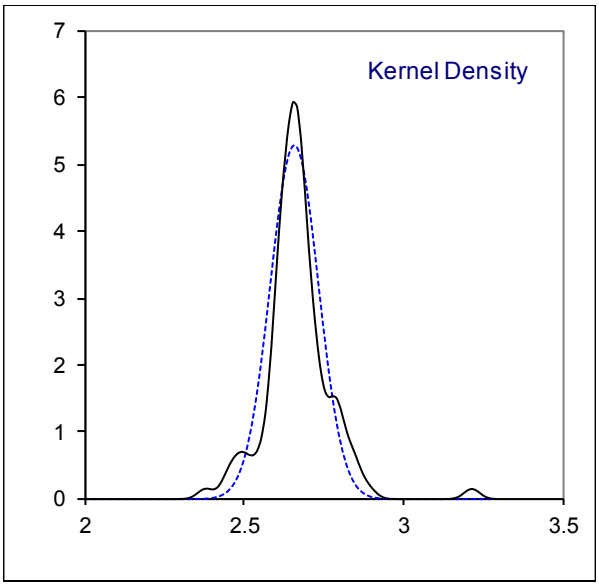
Determination of Total Sulphur on sample #18215; results in %M/M

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52	D4294	2.71		1.06	971	D4294	2.68		0.44
62	D4294	2.6149		-0.89	974	D4294	2.66		0.03
90	D4294	2.6965		0.78	988	D4294	2.684		0.53
92	D4294	2.667		0.18	991	D4294	2.6915		0.68
120	D4294	2.786		2.62	992	D4294	2.6743		0.33
131	D4294	2.79		2.70	994	D4294	2.668		0.20
140	D4294	2.38	R(0.05)	-5.71	995	D4294	2.657		-0.03
150	D4294	2.67		0.24	997	D4294	2.74		1.67
154	D4294	2.75		1.88	1011	D4294	2.702		0.89
158	D4294	2.63517		-0.48	1016	D2622	2.791		2.72
159	D4294	2.8322		3.57	1039	D2622	2.62		-0.79
167	D4294	2.665		0.14	1040	ISO8754	2.788		2.66
168	D4294	2.777		2.43	1056	D4294	2.84	R(0.05)	3.73
170	D4294	2.7215		1.30	1065	D4294	2.61		-0.99
171	D4294	2.73		1.47	1089	D4294	2.713		1.12
175	D4294	2.728		1.43	1106		-----		-----
186	D4294	2.78		2.50	1109		-----		-----
203	D4294	2.581		-1.59	1148	ISO14596	0.2235	C,R(0.01)	-49.96
225	D4294	2.74		1.67	1236		-----		-----
238	D4294	2.6120		-0.95	1248		-----		-----
273		-----		-----	1259	ISO8754	2.63		-0.58
311	ISO8754	2.63		-0.58	1272	ISO8754	2.6921		0.69
314		-----		-----	1300	D4294	2.65985		0.03
332		-----		-----	1379	D4294	2.724	C	1.35
333		-----		-----	1397	D2622	2.79		2.70
334	D2622	2.85	R(0.05)	3.93	1412	D4294	2.70		0.85
335		-----		-----	1543		-----		-----
336		-----		-----	1544	D4294	2.621		-0.77
391	ISO8754	2.56		-2.02	1556	ISO8754	2.678		0.40
398		-----		-----	1557	ISO8754	2.45	C	-4.28
399	D4294	2.676		0.36	1654	ISO8754	2.67		0.24
442	IP336	2.608		-1.03	1656	D4294	2.63		-0.58
444	D2622	2.559		-2.04	1695	D4294	2.659		0.01
445	D4294	2.609		-1.01	1714	D2622	2.63		-0.58
446		-----		-----	1720	D4294	2.599		-1.22
447	IP336	3.215	R(0.01)	11.42	1724	D4294	2.62		-0.79
485	D4294	2.801		2.93	1728	D4294	2.65		-0.17
511		-----		-----	1749	D4294	2.492		-3.41
525		-----		-----	1776	ISO8754	2.513		-2.98
529	D4294	2.616		-0.87	1796	D4294	2.657		-0.03
541		-----		-----	1810	D4294	2.67		0.24
551	D4294	2.84	R(0.05)	3.73	1811	D4294	2.630		-0.58
557	D4294	2.6811		0.47	1815	D7039	2.631		-0.56
574	D4294	2.7046		0.95	1842	D2622	2.49		-3.46
575		-----		-----	1849	ISO8754	2.52	C	-2.84
593	D4294	2.4786		-3.69	1858	D4294	2.664		0.12
595		-----		-----	1862	D4294	2.6447		-0.28
598		-----		-----	1930		-----		-----
599		-----		-----	1957		-----		-----
600	D4294	2.59	C	-1.40	1960		-----		-----
603		-----		-----	1984	INH-07059	0.9175	R(0.01)	-35.72
605	D4294	2.63		-0.58	1995	D4294	2.663		0.09
608	D4294	2.6287		-0.61	6016	D4294	2.746	C	1.80
609	D4294	2.55		-2.22	6021	D4294	2.6449		-0.28
610		-----		-----	6163	ISO8754	2.797		2.84
611		-----		-----	6188		-----		-----
612		-----		-----	6201	D4294	0.190	R(0.01)	-50.65
657	D4294	2.65		-0.17	6203	D2622	2.64		-0.38
663	D4294	2.6605		0.04	9051		-----		-----
704	D4294	2.667		0.18	9052		-----		-----
732	D4294	2.601		-1.18	9057		-----		-----
739	D4294	2.662		0.07	9060		-----		-----
749	D4294	2.674		0.32	9063		-----		-----
750	D4294	2.66		0.03	9099		-----		-----
751	D4294	2.606		-1.07	9100		-----		-----
752	D4294	2.4521		-4.23	9101		-----		-----
753	D4294	2.71		1.06	9132		-----		-----
781	D4294	2.68		0.44	9133		-----		-----
785	D4294	2.68		0.44	9134		-----		-----
840	D4294	2.715		1.16	9135		-----		-----
862		-----		-----	9136		-----		-----
874	D4294	2.65		-0.17	9139		-----		-----
875	D4294	2.66		0.03	9142		-----		-----
904	D4294	2.89	R(0.05)	4.75	9143		-----		-----
922	D4294	2.61		-0.99	9146	In house	2.7		0.85
962	D4294	2.60		-1.20	9151		-----		-----
963	D4294	2.60		-1.20	9152		-----		-----
970	D4294	2.65		-0.17					

normality	OK
n	99
outliers	9
mean (n)	2.6584
st.dev. (n)	0.07557
R(calc.)	0.2116
st.dev.(D4294:16e1)	0.04874
R(D4294:16e1)	0.1365

Lab 600: first reported 3.12
Lab 1148: first reported 2.0342
Lab 1379: first reported 2.86
Lab 1557: first reported 2.42
Lab 1849: first reported 2.25
Lab 6016: first reported 0.274



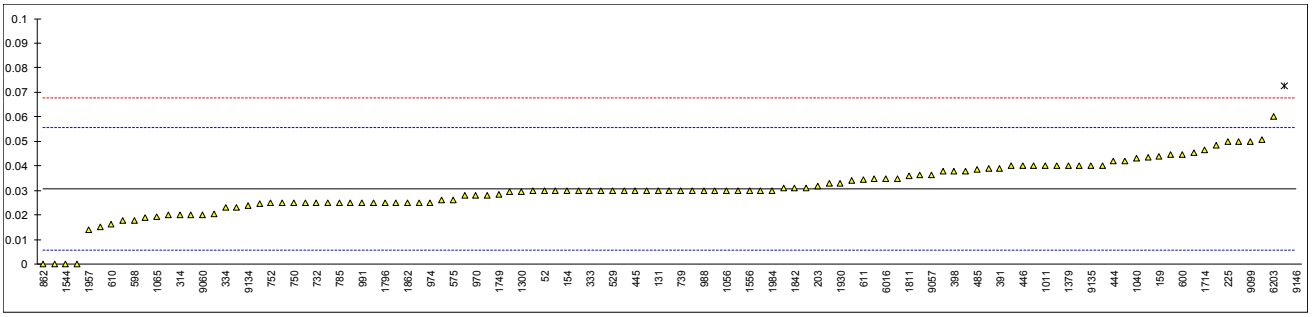


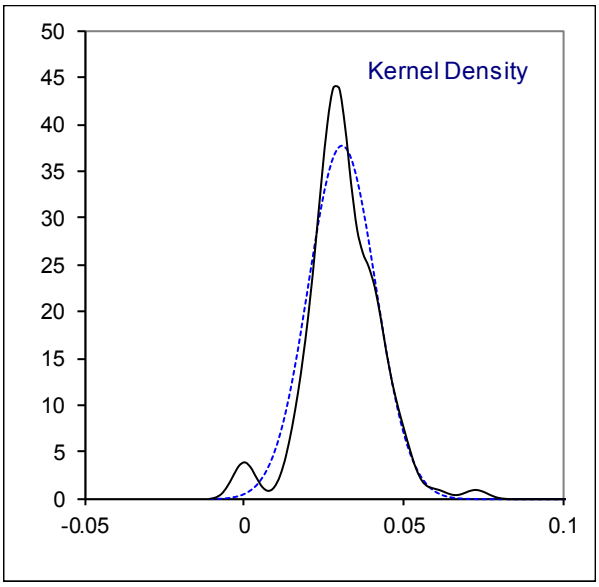
Determination of Water on sample #18215; results in %V/V

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52	D4928	0.03		-0.05	971	D4928	0.03		-0.05
62	D4377	0.0245		-0.50	974	D4928	0.0251		-0.45
90	D4928	0.034		0.27	988	D4006	0.030		-0.05
92	D4377	0.026		-0.38	991	D4006	0.025		-0.46
120		-----		-----	992	D4006	0.025		-0.46
131	D4928	0.03		-0.05	994	D4006	<0.05		-----
140	D4928	0.02		-0.86	995	D4377	0.04		0.75
150	D4928	0.018		-1.02	997	D4928	0.0365		0.47
154	D4928	0.03		-0.05	1011	D4928	0.04		0.75
158	D4377	0.03		-0.05	1016	D4377	0.03		-0.05
159	D4377	0.044		1.08	1039	D4928	0.042		0.91
167		-----		-----	1040	DIN51777	0.043		0.99
168		-----		-----	1056	D4928	0.03		-0.05
170		-----		-----	1065	D4377	0.0194		-0.91
171	D4377	0.03		-0.05	1089	D4928	0.04		0.75
175		-----		-----	1106		-----		-----
186	D4006	0.025		-0.46	1109	D4377	0.03		-0.05
203	D4928	0.0317		0.08	1148	DIN51777	0.031		0.03
225	D4006	0.050		1.56	1236	D4928	0.0455		1.20
238		-----		-----	1248	D4928Mod.	0.028		-0.21
273		-----		-----	1259	D4006	< 0.05		-----
311	D4928	0.03		-0.05	1272		-----		-----
314	D4928	0.02		-0.86	1300	D4928	0.0295		-0.09
332		-----		-----	1379	D4928	0.04		0.75
333	D4377	0.03		-0.05	1397		-----		-----
334	D4377	0.023		-0.62	1412	D4928	0.04		0.75
335		-----		-----	1543		-----		-----
336	D4377	0.03		-0.05	1544	D4006	0		-2.47
391	D4377	0.039		0.67	1556	D6304	0.03		-0.05
398	D4928	0.038		0.59	1557		-----		-----
399		-----		-----	1654		-----		-----
442	IP386	0.0726	R(0.05)	3.38	1656		-----		-----
444	D4377	0.042		0.91	1695	D4006	0.02		-0.86
445	D6304	0.030		-0.05	1714	D4006	0.0465	C	1.28
446	D4928	0.04		0.75	1720		-----		-----
447	IP386	0.015		-1.26	1724	D4377	0.05072		1.62
485	D4377	0.0385		0.63	1728		-----		-----
511		-----		-----	1749	ISO12937	0.0283		-0.19
525	D4928	0.03		-0.05	1776	D6304	0.0485		1.44
529	D4377	0.03		-0.05	1796	D4006	0.025		-0.46
541	D4928	0.033		0.19	1810	D4377	0.03		-0.05
551	D4377	0.04		0.75	1811	D4377	0.036		0.43
557		-----		-----	1815	D4377	0.0206		-0.81
574	D4377	0.0389		0.66	1842	IP386	0.031		0.03
575	D4377	0.026		-0.38	1849	D4928	0.0279		-0.22
593	D4006	0.000		-2.47	1858	D4006	0.025		-0.46
595		-----		-----	1862	D4377	0.025		-0.46
598	D4928	0.018		-1.02	1930	DIN51777	0.033		0.19
599		-----		-----	1957	D4377	0.014		-1.34
600	D4377	0.0446		1.12	1960		-----		-----
603	D4006	< 0.05		-----	1984	D4377	0.030		-0.05
605		-----		-----	1995	D4928	0.019		-0.94
608	D4006	<0.15		-----	6016	D4377	0.035		0.35
609	D4377	0.038		0.59	6021	D4006	0.025		-0.46
610	D6304	0.016447		-1.15	6163		-----		-----
611	D4377	0.0343		0.29	6188	D4006	0.000		-2.47
612		-----		-----	6201	D4377	0.035		0.35
657	D4377	0.05		1.56	6203	ISO9029	0.06	C	2.36
663	D4377	0.0328	U,ex	0.17	9051		-----		-----
704	D4377	0.0437		1.05	9052	D4298	0.0231		-0.61
732	GOST33700	0.025		-0.46	9057		0.0365		0.47
739	GOST2477	0.03	C	-0.05	9060	D4377	0.02		-0.86
749	GSOT2477	0.03	C	-0.05	9063	IP386	0.031		0.03
750	D4006	0.025		-0.46	9099	D4006	0.05		1.56
751		-----		-----	9100		-----		-----
752	D4006	0.025		-0.46	9101		-----		-----
753		-----		-----	9132		-----		-----
781	D4006	0.025		-0.46	9133	D4928	0.0445		1.12
785	D4006	0.025		-0.46	9134	D4928	0.024		-0.54
840	D4928	0.038		0.59	9135	D4928	0.04		0.75
862	D4006	0.000		-2.47	9136	D4928	0.04		0.75
874	D4006	0.025		-0.46	9139		-----		-----
875	D4006	0.025		-0.46	9142		-----		-----
904	D4928	0.03		-0.05	9143		-----		-----
922		-----		-----	9146	In house	0.45	R(0.01)	33.80
962		-----		-----	9151		0.0294		-0.10
963	D4377	0.035		0.35	9152		-----		-----
970	D4928	0.0280		-0.21					

normality	suspect
n	109
outliers	2 (+1 excl)
mean (n)	0.03066
st.dev. (n)	0.010558
R(calc.)	0.02956
st.dev.(D4377:00)	0.012407
R(D4377:00)	0.03474

Lab 663: reported in different unit (%M/M instead of %V/V)
Lab 739: first reported 0.08
Lab 749: first reported 0.08
Lab 1714: first reported 0.14
Lab 6203: first reported 0.10





Determination of Simulated Distillation on sample #18215; results in °C

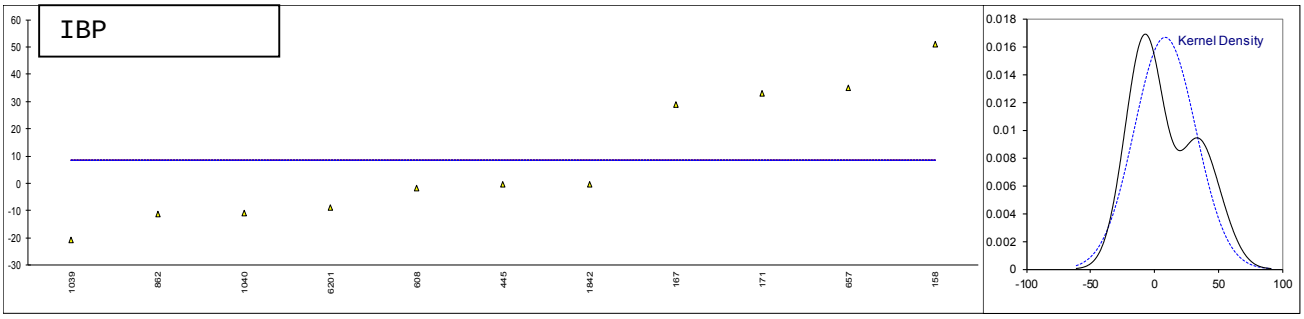
lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
52		-----	-----	-----	-----	-----	-----	-----	-----
62		-----	-----	-----	-----	-----	-----	-----	-----
90		-----	-----	-----	-----	-----	-----	-----	-----
92		-----	-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----	-----
131		-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----
150	D7169	<36.0	63.4	110.2	250.6	378.4	517.8	709.0	>720.0
154		-----	-----	-----	-----	-----	-----	-----	-----
158	D7169	51.12 f+?	86.48	128.99	251.35	364.44	487.09	646.15	743.30
159		-----	-----	-----	-----	-----	-----	-----	-----
167	D7169	28.9	70.1	114.4	235.1	355.8	486.2	654.1	>720.0
168		-----	-----	-----	-----	-----	-----	-----	-----
170		-----	-----	-----	-----	-----	-----	-----	-----
171	D7169	33.0	66.5	108.0	248.0	372.5	508.0	697.0	>720.0
175		-----	-----	-----	-----	-----	-----	-----	-----
186		-----	-----	-----	-----	-----	-----	-----	-----
203		-----	-----	-----	-----	-----	-----	-----	-----
225		-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----
311	D7169	<36.0	75.5	125.5	265.5	**400.5**	***552.5***	>720	>720
314		-----	-----	-----	-----	-----	-----	-----	-----
332		-----	-----	-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	-----	-----
334		-----	-----	-----	-----	-----	-----	-----	-----
335		-----	-----	-----	-----	-----	-----	-----	-----
336		-----	-----	-----	-----	-----	-----	-----	-----
391		-----	-----	-----	-----	-----	-----	-----	-----
398		-----	-----	-----	-----	-----	-----	-----	-----
399		-----	-----	-----	-----	-----	-----	-----	-----
442		-----	-----	-----	-----	-----	-----	-----	-----
444		-----	-----	-----	-----	-----	-----	-----	-----
445	D7169	-0.5	68.5	117.5	**391.5**	>720 f+?	>720 f+?	>720	>720
446		-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----
485		-----	-----	-----	-----	-----	-----	-----	-----
511		-----	-----	-----	-----	-----	-----	-----	-----
525		-----	-----	-----	-----	-----	-----	-----	-----
529		-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----
551		-----	-----	-----	-----	-----	-----	-----	-----
557		-----	-----	-----	-----	-----	-----	-----	-----
574		-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----
593		-----	-----	-----	-----	-----	-----	-----	-----
595		-----	-----	-----	-----	-----	-----	-----	-----
598		-----	-----	-----	-----	-----	-----	-----	-----
599		-----	-----	-----	-----	-----	-----	-----	-----
600		-----	-----	-----	-----	-----	-----	-----	-----
603		-----	-----	-----	-----	-----	-----	-----	-----
605		-----	-----	-----	-----	-----	-----	-----	-----
608	D7169	-1.6	74.1	118.6	247.6	356.0	470.7	624.4	714.5
609		-----	-----	-----	-----	-----	-----	-----	-----
610		-----	-----	-----	-----	-----	-----	-----	-----
611		-----	-----	-----	-----	-----	-----	-----	-----
612		-----	-----	-----	-----	-----	-----	-----	-----
657	D7169	35.1	87.0	124.0	251.5	370.5	501.5	668.0	>720
663		-----	-----	-----	-----	-----	-----	-----	-----
704		-----	-----	-----	-----	-----	-----	-----	-----
732		-----	-----	-----	-----	-----	-----	-----	-----
739		-----	-----	-----	-----	-----	-----	-----	-----
749		-----	-----	-----	-----	-----	-----	-----	-----
750		-----	-----	-----	-----	-----	-----	-----	-----
751		-----	-----	-----	-----	-----	-----	-----	-----
752		-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----
781	D7169	<36.0	77.6	112.6	229.9	**340.6**	***454.7***	605.4	712.1
785		-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----
862	D7169	-11.4	65.5	117.8	-----	-----	-----	-----	-----
874		-----	-----	-----	-----	-----	-----	-----	-----
875		-----	-----	-----	-----	-----	-----	-----	-----
904		-----	-----	-----	-----	-----	-----	-----	-----
922		-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----	-----	-----
970		-----	-----	-----	-----	-----	-----	-----	-----

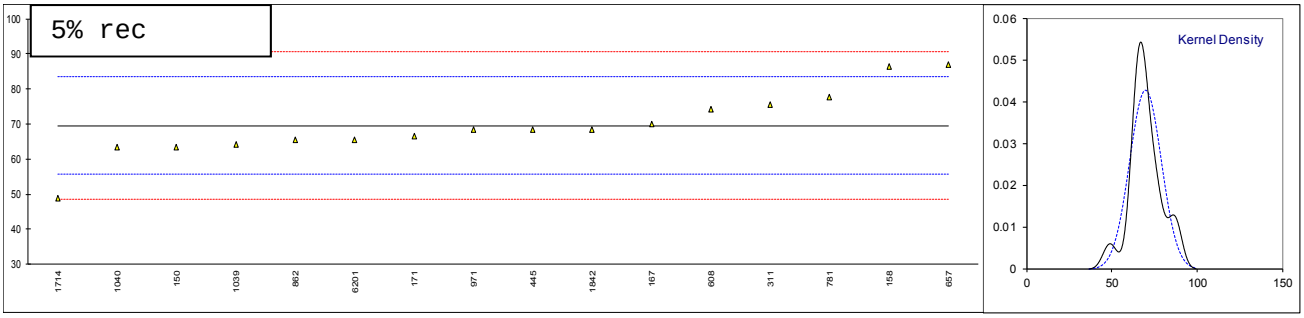
lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
971	D7169	<36	68.4	106.4	237.2	359.6	484.5	640.3	>720
974		-----	-----	-----	-----	-----	-----	-----	-----
988		-----	-----	-----	-----	-----	-----	-----	-----
991		-----	-----	-----	-----	-----	-----	-----	-----
992		-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----
995		-----	-----	-----	-----	-----	-----	-----	-----
997		-----	-----	-----	-----	-----	-----	-----	-----
1011		-----	-----	-----	-----	-----	-----	-----	-----
1016		-----	-----	-----	-----	-----	-----	-----	-----
1039	EN15199-3	-20.8	64.2	110.3	246.3	373.9	513.7	700.2	-----
1040	D7169	-10.8	63.3	104.2	253.3	388.7	541.9	-----	-----
1056		-----	-----	-----	-----	-----	-----	-----	-----
1065		-----	-----	-----	-----	-----	-----	-----	-----
1089		-----	-----	-----	-----	-----	-----	-----	-----
1106		-----	-----	-----	-----	-----	-----	-----	-----
1109		-----	-----	-----	-----	-----	-----	-----	-----
1148		-----	-----	-----	-----	-----	-----	-----	-----
1236		-----	-----	-----	-----	-----	-----	-----	-----
1248		-----	-----	-----	-----	-----	-----	-----	-----
1259		-----	-----	-----	-----	-----	-----	-----	-----
1272		-----	-----	-----	-----	-----	-----	-----	-----
1300		-----	-----	-----	-----	-----	-----	-----	-----
1379		-----	-----	-----	-----	-----	-----	-----	-----
1397		-----	-----	-----	-----	-----	-----	-----	-----
1412		-----	-----	-----	-----	-----	-----	-----	-----
1543		-----	-----	-----	-----	-----	-----	-----	-----
1544		-----	-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----	-----
1557		-----	-----	-----	-----	-----	-----	-----	-----
1654		-----	-----	-----	-----	-----	-----	-----	-----
1656		-----	-----	-----	-----	-----	-----	-----	-----
1695		-----	-----	-----	-----	-----	-----	-----	-----
1714	D7169	<36.1	48.7	**86.2**	233.1	370.3	516.4	-----	-----
1720		-----	-----	-----	-----	-----	-----	-----	-----
1724		-----	-----	-----	-----	-----	-----	-----	-----
1728		-----	-----	-----	-----	-----	-----	-----	-----
1749		-----	-----	-----	-----	-----	-----	-----	-----
1776		-----	-----	-----	-----	-----	-----	-----	-----
1796		-----	-----	-----	-----	-----	-----	-----	-----
1810		-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----
1815		-----	-----	-----	-----	-----	-----	-----	-----
1842	D7169	-0.5	68.5	110.5	251.0	381.0	519.0	710.0	735.0
1849		-----	-----	-----	-----	-----	-----	-----	-----
1858		-----	-----	-----	-----	-----	-----	-----	-----
1862		-----	-----	-----	-----	-----	-----	-----	-----
1930		-----	-----	-----	-----	-----	-----	-----	-----
1957		-----	-----	-----	-----	-----	-----	-----	-----
1960		-----	-----	-----	-----	-----	-----	-----	-----
1984		-----	-----	-----	-----	-----	-----	-----	-----
1995		-----	-----	-----	-----	-----	-----	-----	-----
6016		-----	-----	-----	-----	-----	-----	-----	-----
6021		-----	-----	-----	-----	-----	-----	-----	-----
6163		-----	-----	-----	-----	-----	-----	-----	-----
6188		-----	-----	-----	-----	-----	-----	-----	-----
6201	D7169	-9.0	65.5	110.5	249.5	374.0	511.0	710.0	-----
6203		-----	-----	-----	-----	-----	-----	-----	-----
9051		-----	-----	-----	-----	-----	-----	-----	-----
9052		-----	-----	-----	-----	-----	-----	-----	-----
9057		-----	-----	-----	-----	-----	-----	-----	-----
9060		-----	-----	-----	-----	-----	-----	-----	-----
9063		-----	-----	-----	-----	-----	-----	-----	-----
9099		-----	-----	-----	-----	-----	-----	-----	-----
9100		-----	-----	-----	-----	-----	-----	-----	-----
9101		-----	-----	-----	-----	-----	-----	-----	-----
9132		-----	-----	-----	-----	-----	-----	-----	-----
9133		-----	-----	-----	-----	-----	-----	-----	-----
9134		-----	-----	-----	-----	-----	-----	-----	-----
9135		-----	-----	-----	-----	-----	-----	-----	-----
9136		-----	-----	-----	-----	-----	-----	-----	-----
9139		-----	-----	-----	-----	-----	-----	-----	-----
9142		-----	-----	-----	-----	-----	-----	-----	-----
9143		-----	-----	-----	-----	-----	-----	-----	-----
9146		-----	-----	-----	-----	-----	-----	-----	-----
9151		-----	-----	-----	-----	-----	-----	-----	-----
9152		-----	-----	-----	-----	-----	-----	-----	-----

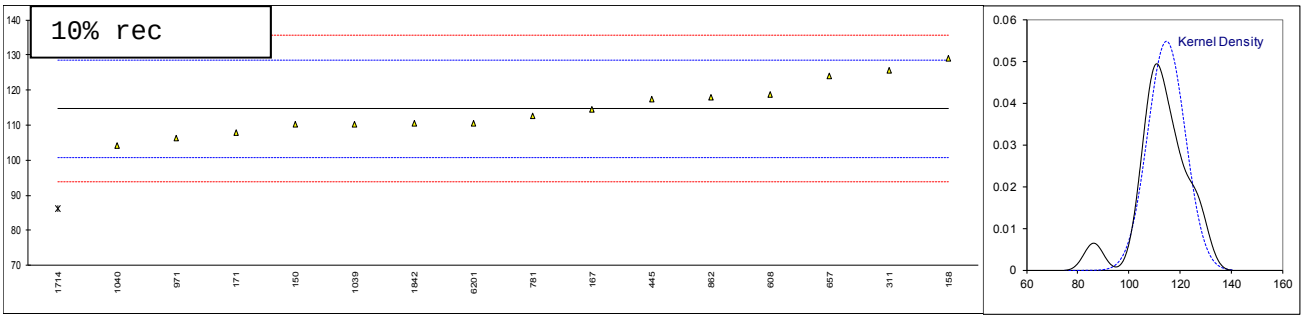
	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
normality	OK	suspect	OK	OK	OK	OK	OK	n.a.
n	15	16	15	14	12	12	11	11
outliers	0	0	1	1	2	0 (+2excl)	0	0
mean (n)	<36	69.58	114.63	246.43	370.43	504.82	669.50	>710
st.dev. (n)	n.a.	9.303	7.287	9.514	10.061	19.667	37.841	n.a.
R(calc.)	n.a.	26.05	20.40	26.64	28.17	55.07	105.96	n.a.
st.dev.(D7169:18)	n.a.	7	6.964	4.679	5.857	7.571	n.a.	n.a.
R(D7169:18)	n.a.	19.6	19.5	13.1	16.4	21.2	n.a.	n.a.

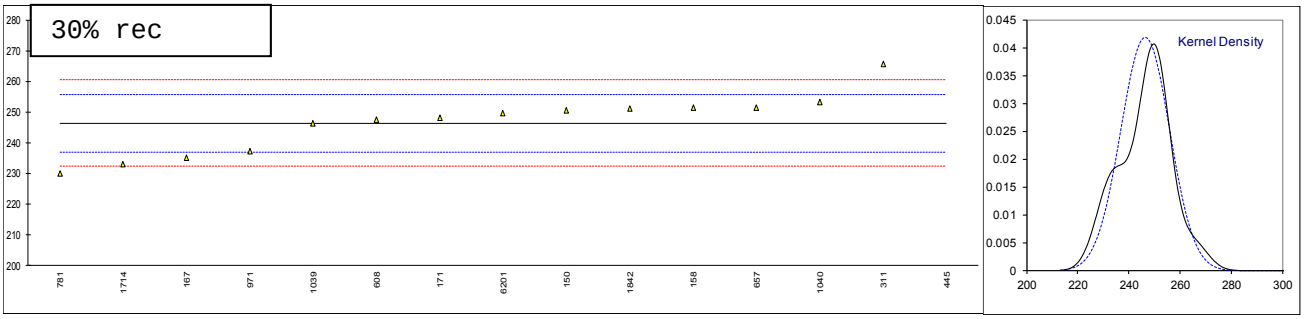
Bold and undelined test results are marked as statistical outliers
Bold and italic test results are excluded for statistical evaluations

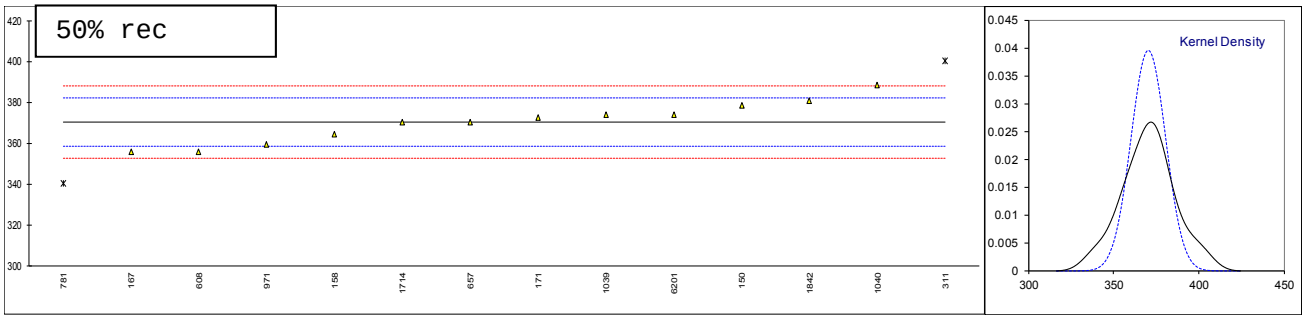
Lab 158: false positive?

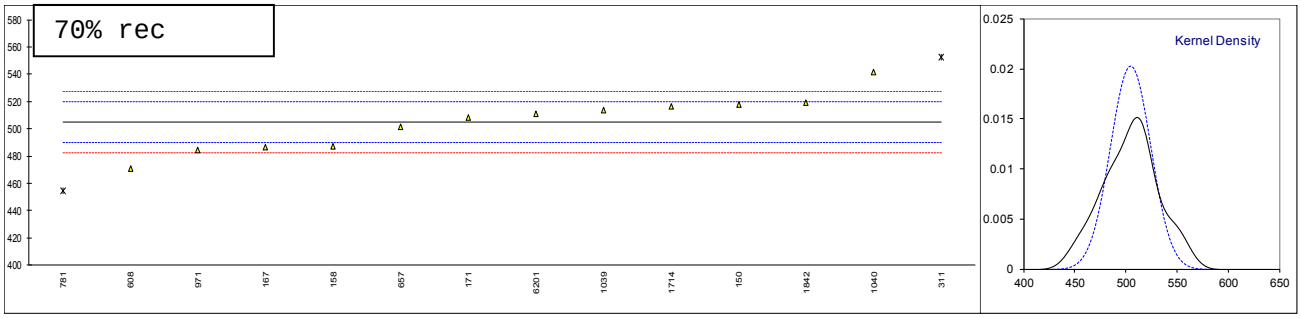


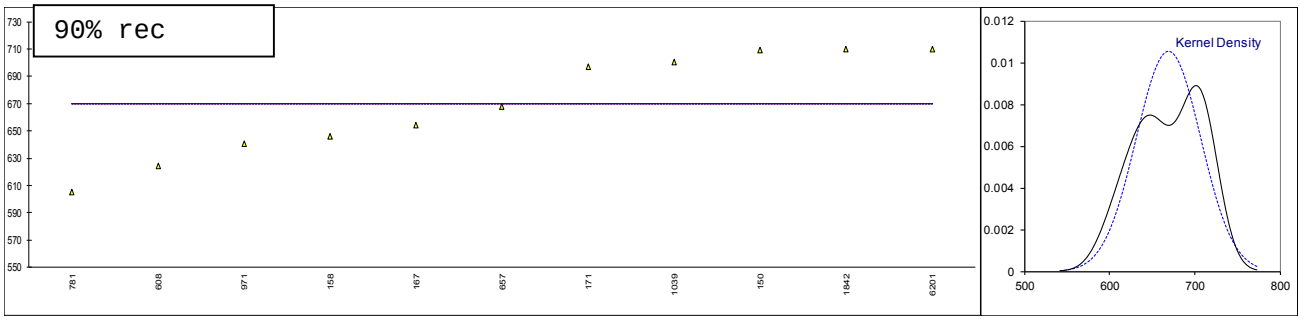


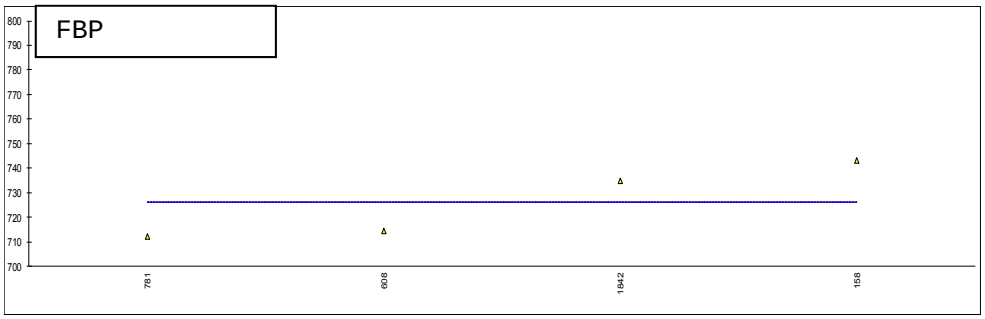





50% rec
Kernel Density


70% rec
Kernel Density


90% rec
Kernel Density

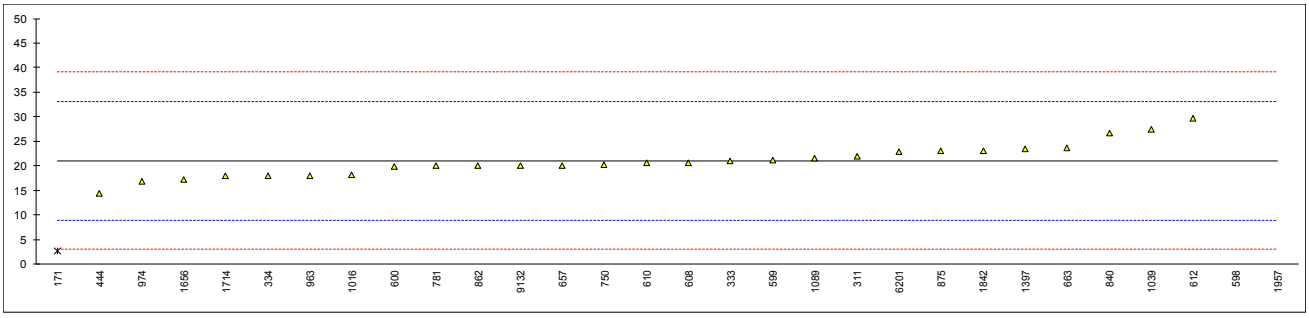

FBP

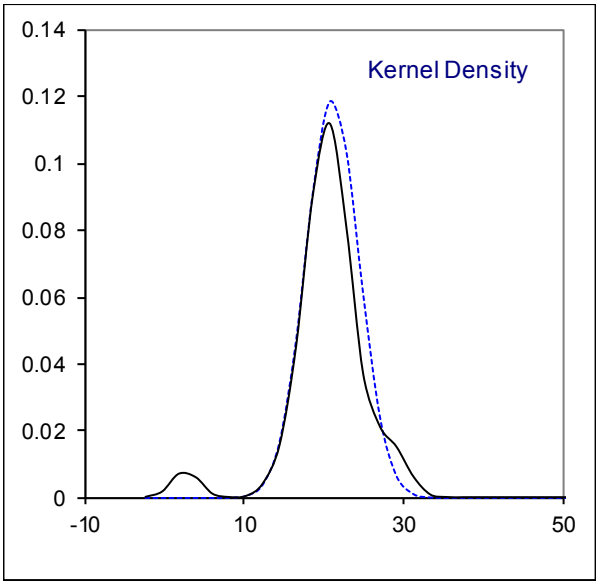
Determination of Total Mercury on sample #18216 results in µg/kg

lab	method	value	Mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	971		-----		-----
62		-----		-----	974	UOP938	16.90		-0.69
90		-----		-----	988		-----		-----
92		-----		-----	991		-----		-----
120		-----		-----	992		-----		-----
131		-----		-----	994		-----		-----
140		-----		-----	995		-----		-----
150		-----		-----	997		-----		-----
154		-----		-----	1011		-----		-----
158		-----		-----	1016	UOP938	18.217		-0.47
159		-----		-----	1039	UOP938	27.44		1.07
167		-----		-----	1040		-----		-----
168		-----		-----	1056		-----		-----
170		-----		-----	1065		-----		-----
171	UOP938	2.60	R(0.01)	-3.06	1089	In house	21.5		0.08
175		-----		-----	1106		-----		-----
186		-----		-----	1109		-----		-----
203		-----		-----	1148		-----		-----
225		-----		-----	1236		-----		-----
238		-----		-----	1248		-----		-----
273		-----		-----	1259		-----		-----
311	D7623	22		0.16	1272		-----		-----
314		-----		-----	1300		-----		-----
332		-----		-----	1379		-----		-----
333	EPA9403	21		0.00	1397	In house	23.4		0.40
334	In house	18.0		-0.50	1412		-----		-----
335		-----		-----	1543		-----		-----
336		-----		-----	1544		-----		-----
391		-----		-----	1556		-----		-----
398		-----		-----	1557		-----		-----
399		-----		-----	1654		-----		-----
442		-----		-----	1656	UOP938	17.3		-0.62
444	UOP938	14.36		-1.11	1695		-----		-----
445		-----		-----	1714	UOP938	17.9		-0.52
446		-----		-----	1720		-----		-----
447		-----		-----	1724		-----		-----
485		-----		-----	1728		-----		-----
511		-----		-----	1749		-----		-----
525		-----		-----	1776		-----		-----
529		-----		-----	1796		-----		-----
541		-----		-----	1810		-----		-----
551		-----		-----	1811		-----		-----
557		-----		-----	1815		-----		-----
574		-----		-----	1842	UOP938	23		0.33
575		-----		-----	1849		-----		-----
593		-----		-----	1858		-----		-----
595		-----		-----	1862		-----		-----
598	UOP938	110.77	R(0.01)	14.92	1930		-----		-----
599	UOP938	21.1		0.01	1957	UOP938	528.6	R(0.01)	84.38
600	D7622	19.861		-0.19	1960		-----		-----
603		-----		-----	1984		-----		-----
605		-----		-----	1995		-----		-----
608	D7622	20.67	C	-0.06	6016		-----		-----
609		-----		-----	6021		-----		-----
610	D7622	20.645		-0.06	6163		-----		-----
611		-----		-----	6188		-----		-----
612	UOP938	29.7		1.44	6201	UOP938	22.98		0.33
657	UOP938	20.04		-0.16	6203		-----		-----
663	UOP938	23.74		0.45	9051		-----		-----
704		-----		-----	9052		-----		-----
732		-----		-----	9057		-----		-----
739		-----		-----	9060		-----		-----
749		-----		-----	9063		-----		-----
750	UOP938	20.2		-0.14	9099		-----		-----
751		-----		-----	9100		-----		-----
752		-----		-----	9101		-----		-----
753		-----		-----	9132	D7623	20.03		-0.16
781	D7622	20		-0.17	9133		-----		-----
785		-----		-----	9134		-----		-----
840	EPA7471B	26.6		0.93	9135		-----		-----
862	UOP938	20.0		-0.17	9136		-----		-----
874		-----		-----	9139		-----		-----
875		23		0.33	9142		-----		-----
904		-----		-----	9143		-----		-----
922		-----		-----	9146		-----		-----
962		-----		-----	9151		-----		-----
963	UOP938	18.0		-0.50	9152		-----		-----
970		-----		-----					

normality	OK		
n	27		
outliers	3	Spike:	
mean (n)	21.022	20.37	% recovery: <103%
st.dev. (n)	3.3451		
R(calc.)	9.366		
st.dev.(Horwitz)	6.0152		
R(Horwitz)	16.843		
Compare			
R(D7623:10)	7.867		
R(UOP938:10)	5.513		

Lab 608: first reported 0.02067





APPENDIX 2
Analytical details Acid Number determination

lab	determination of end point	volume of titration solvent
52	---	---
62	Inflection Point	60 mL
90	---	---
92	---	---
120	---	---
131	Buffer End Point (pH 11)	---
140	Inflection Point	125 mL
150	Inflection Point	60 mL
154	---	---
158	Inflection Point	125 mL
159	Inflection Point	125 mL
167	Inflection Point	60 mL
168	---	---
170	Inflection Point	60 mL
171	Buffer End Point (pH 11)	125 mL
175	---	---
186	---	---
203	---	---
225	---	---
238	---	---
273	---	---
311	---	---
314	---	---
332	---	---
333	---	---
334	---	---
335	---	---
336	---	---
391	---	---
398	---	---
399	Inflection Point	60 mL
442	---	---
444	---	---
445	Inflection Point	60 mL
446	---	---
447	Inflection Point	125 mL
485	---	---
511	---	---
525	---	---
529	Inflection Point	60 mL
541	---	---
551	---	---
557	---	---
574	---	---
575	---	---
593	---	---
595	---	---
598	Inflection Point	125 mL
599	---	---
600	Inflection Point	125 mL
603	---	---
605	---	---
608	---	---
609	---	---
610	---	---
611	Buffer End Point (pH 11)	125 mL
612	---	---
657	Inflection Point	125 mL
663	Inflection Point	125 mL
704	Inflection Point	125 mL
732	---	---
739	---	---
749	---	---
750	---	---
751	---	---
752	---	---
753	---	---
781	Inflection Point	125 mL
785	---	---
840	---	---
862	---	---
874	Buffer End Point (pH 11)	125 mL
875	Inflection Point	60 mL
904	---	---
922	Inflection Point	125 mL
962	---	---
963	Inflection Point	60 mL
970	Inflection Point	125 mL

lab	determination of end point	volume of titration solvent
971	Inflection Point	125 mL
974	Inflection Point	125 mL
988	---	---
991	---	---
992	---	---
994	Inflection Point	125 mL
995	Inflection Point	125 mL
997	---	---
1011	---	---
1016	---	---
1039	Inflection Point	125 mL
1040	Inflection Point	60 mL
1056	Inflection Point	60 mL
1065	Inflection Point	125 mL
1089	Inflection Point	125 mL
1106	---	---
1109	---	---
1148	---	---
1236	---	---
1248	---	---
1259	---	---
1272	---	---
1300	Buffer End Point (pH 11)	125 mL
1379	---	---
1397	---	---
1412	Buffer End Point (pH 11)	125 mL
1543	---	---
1544	---	---
1556	---	---
1557	---	---
1654	---	---
1656	Inflection Point	125 mL
1695	---	---
1714	---	---
1720	---	---
1724	---	---
1728	---	---
1749	---	---
1776	Buffer End Point (pH 11)	125 mL
1796	Inflection Point	125 mL
1810	---	---
1811	---	---
1815	---	---
1842	---	---
1849	---	---
1858	Buffer End Point (pH 11)	125 mL
1862	---	---
1930	---	---
1957	---	---
1960	---	---
1984	---	---
1995	Buffer End Point (pH 11)	60 mL
6016	---	---
6021	---	---
6163	---	---
6188	---	---
6201	Inflection Point	125 mL
6203	Inflection Point	125 mL
9051	---	---
9052	---	---
9057	---	---
9060	---	---
9063	---	---
9099	---	---
9100	---	---
9101	---	---
9132	---	---
9133	---	---
9134	---	---
9135	---	---
9136	---	---
9139	---	---
9142	---	---
9143	---	---
9146	---	---
9151	---	---
9152	---	---

APPENDIX 3

z-scores of Light Ends on sample #18215

lab	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
52	-----	-----	-----	-----	-----	-----	-----	-----	-----
62	-----	-----	-----	-----	-----	-----	-----	-----	-----
90	-----	-----	-----	-----	-----	-----	-----	-----	-----
92	-----	-----	-----	-----	-----	-----	-----	-----	-----
120	-----	-----	-----	-----	-----	-----	-----	-----	-----
131	-----	-----	-----	-----	-----	-----	-----	-----	-----
140	-----	-----	-----	-----	-----	-----	-----	-----	-----
150	-----	-0.39	0.71	-0.13	0.55	-0.74	1.40	3.14	2.33
154	-----	-----	-----	-----	-----	-----	-----	-----	-----
158	-----	-----	-----	-----	-----	-----	-----	-----	-----
159	-----	-----	-----	-----	-----	-----	-----	-----	-----
167	-----	1.10	1.38	2.02	1.56	1.74	1.00	-0.11	1.35
168	-----	-----	-----	-----	-----	-----	-----	-----	-----
170	-----	-----	-----	-----	-----	-----	-----	-----	-----
171	-----	-3.11	-2.21	-0.92	-1.21	0.36	0.09	1.04	1.94
175	-----	-----	-----	-----	-----	-----	-----	-----	-----
186	-----	-----	-----	-----	-----	-----	-----	-----	-----
203	-----	-----	-----	-----	-----	-----	-----	-----	-----
225	-----	-----	-----	-----	-----	-----	-----	-----	-----
238	-----	-----	-----	-----	-----	-----	-----	-----	-----
273	-----	-----	-----	-----	-----	-----	-----	-----	-----
311	-----	-0.73	-0.65	-1.81	-0.15	-1.92	-1.04	-7.35	-3.40
314	-----	-----	-----	-----	-----	-----	-----	-----	-----
332	-----	-----	-----	-----	-----	-----	-----	-----	-----
333	-----	-----	-----	-----	-----	-----	-----	-----	-----
334	-----	-----	-----	-----	-----	-----	-----	-----	-----
335	-----	-----	-----	-----	-----	-----	-----	-----	-----
336	-----	-----	-----	-----	-----	-----	-----	-----	-----
391	-----	-----	-----	-----	-----	-----	-----	-----	-----
398	-----	-----	-----	-----	-----	-----	-----	-----	-----
399	-----	-----	-----	-----	-----	-----	-----	-----	-----
442	-----	3.72	3.84	2.10	4.20	1.77	4.21	0.18	-1.98
444	-----	-----	-----	-----	-----	-----	-----	-----	-----
445	-----	-----	-5.40	-4.08	-3.32	-2.00	-1.21	-2.10	0.71
446	-----	-----	-----	-----	-----	-----	-----	-----	-----
447	-----	-----	-----	-----	-----	-----	-----	-----	-----
485	-----	-----	-----	-----	-----	-----	-----	-----	-----
511	-----	-----	-----	-----	-----	-----	-----	-----	-----
525	-----	-----	-----	-----	-----	-----	-----	-----	-----
529	-----	-----	-----	-----	-----	-----	-----	-----	-----
541	-----	-----	-----	-----	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----	-----	-----	-----	-----
557	-----	-----	-----	-----	-----	-----	-----	-----	-----
574	-----	-----	-----	-----	-----	-----	-----	-----	-----
575	-----	-----	-----	-----	-----	-----	-----	-----	-----
593	-----	-----	-----	-----	-----	-----	-----	-----	-----
595	-----	-----	-----	-----	-----	-----	-----	-----	-----
598	-----	-----	-----	-----	-----	-----	-----	-----	-----
599	-----	-----	-----	-----	-----	-----	-----	-----	-----
600	-----	-6.50	-6.16	-1.51	1.50	9.35	9.35	-----	5.75
603	-----	-----	-----	-----	-----	-----	-----	-----	-----
605	-----	-----	-----	-----	-----	-----	-----	-----	-----
608	-----	-----	-----	-----	-----	-----	-----	-----	-----
609	-----	-1.10	-0.88	-0.81	-1.29	-7.38	-0.54	-----	-----
610	-----	-----	-----	-----	-----	-----	-----	-----	-----
611	-----	-1.68	-1.96	-1.90	-2.36	-2.42	-2.08	13.05	-2.37
612	-----	-----	-----	-----	-----	-----	-----	-----	-----
657	-----	-----	-----	-----	-----	-----	-----	-----	-----
663	-----	-----	-----	-----	-----	-----	-----	-----	-----
704	-----	-----	-----	-----	-----	-----	-----	-----	-----
732	-----	-----	-----	-----	-----	-----	-----	-----	-----
739	-----	-----	-----	-----	-----	-----	-----	-----	-----
749	-----	-----	-----	-----	-----	-----	-----	-----	-----
750	-----	-----	-----	-----	-----	-----	-----	-----	-----
751	-----	-----	-----	-----	-----	-----	-----	-----	-----
752	-----	-----	-----	-----	-----	-----	-----	-----	-----
753	-----	-----	-----	-----	-----	-----	-----	-----	-----
781	-----	-----	-----	-----	-----	-----	-----	-----	-----
785	-----	-----	-----	-----	-----	-----	-----	-----	-----
840	-----	-----	-----	-----	-----	-----	-----	-----	-----
862	-----	-1.55	-0.55	-0.63	-0.23	-0.44	-0.56	-1.45	-9.66
874	-----	-----	-----	-----	-----	-----	-----	-----	-----
875	-----	-----	-----	-----	-----	-----	-----	-----	-----
904	-----	-----	-----	-----	-----	-----	-----	-----	-----
922	-----	-----	-----	-----	-----	-----	-----	-----	-----
962	-----	-----	-----	-----	-----	-----	-----	-----	-----
963	-----	-----	-----	-----	-----	-----	-----	-----	-----
970	-----	-----	-----	-----	-----	-----	-----	-----	-----

lab	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
971	-----	-----	-----	-----	-----	-----	-----	-----	-----
974	-----	-----	-----	-----	-----	-----	-----	-----	-----
988	-----	-----	-----	-----	-----	-----	-----	-----	-----
991	-----	-----	-----	-----	-----	-----	-----	-----	-----
992	-----	-----	-----	-----	-----	-----	-----	-----	-----
994	-----	-----	-----	-----	-----	-----	-----	-----	-----
995	-----	-----	-----	-----	-----	-----	-----	-----	-----
997	-----	-----	-----	-----	-----	-----	-----	-----	-----
1011	-----	-----	-----	-----	-----	-----	-----	-----	-----
1016	-----	-----	-----	-----	-----	-----	-----	-----	-----
1039	-----	1.31	2.07	1.65	1.35	1.16	0.12	20.97	-8.03
1040	-----	1.71	2.69	2.89	2.63	3.39	2.73	-2.65	2.42
1056	-----	-----	-----	-----	-----	-----	-----	-----	-----
1065	-----	-0.39	-11.99	1.06	0.09	-0.31	-1.21	0.52	0.02
1089	-----	0.32	0.71	0.75	0.02	0.43	-0.29	1.72	-2.05
1106	-----	-----	-----	-----	-----	-----	-----	-----	-----
1109	-----	-----	-----	-----	-----	-----	-----	-----	-----
1148	-----	-----	-----	-----	-----	-----	-----	-----	-----
1236	-----	0.29	0.47	0.43	-0.69	-0.12	-0.98	1.57	0.69
1248	-----	0.63	0.43	0.56	-0.44	0.32	-0.58	2.35	0.02
1259	-----	-----	-----	-----	-----	-----	-----	-----	-----
1272	-----	-----	-----	-----	-----	-----	-----	-----	-----
1300	-----	-----	-----	-----	-----	-----	-----	-----	-----
1379	-----	-----	-----	-----	-----	-----	-----	-----	-----
1397	-----	-----	-----	-----	-----	-----	-----	-----	-----
1412	-----	-----	-----	-----	-----	-----	-----	-----	-----
1543	-----	-----	-----	-----	-----	-----	-----	-----	-----
1544	-----	-----	-----	-----	-----	-----	-----	-----	-----
1556	-----	-----	-----	-----	-----	-----	-----	-----	-----
1557	-----	-----	-----	-----	-----	-----	-----	-----	-----
1654	-----	-----	-----	-----	-----	-----	-----	-----	-----
1656	-----	-----	-----	-----	-----	-----	-----	-----	-----
1695	-----	-----	-----	-----	-----	-----	-----	-----	-----
1714	-----	-----	-3.71	-3.29	-4.31	-3.39	-3.42	0.52	0.02
1720	-----	-----	-----	-----	-----	-----	-----	-----	-----
1724	-----	-----	-----	-----	-----	-----	-----	-----	-----
1728	-----	-----	-----	-----	-----	-----	-----	-----	-----
1749	-----	-----	-----	-----	-----	-----	-----	-----	-----
1776	-----	2.97	2.66	1.91	1.99	1.89	2.27	-----	-----
1796	-----	-----	-----	-----	-----	-----	-----	-----	-----
1810	-----	-----	-----	-----	-----	-----	-----	-----	-----
1811	-----	-----	-----	-----	-----	-----	-----	-----	-----
1815	-----	-----	-----	-----	-----	-----	-----	-----	-----
1842	-----	-3.79	-0.23	0.86	1.04	1.37	0.97	-4.73	-1.78
1849	-----	-----	-----	-----	-----	-----	-----	-----	-----
1858	-----	-----	-----	-----	-----	-----	-----	-----	-----
1862	-----	-----	-----	-----	-----	-----	-----	-----	-----
1930	-----	-----	-----	-----	-----	-----	-----	-----	-----
1957	-----	0.69	0.64	0.85	-0.26	-0.78	-0.30	11.50	1.51
1960	-----	-----	-----	-----	-----	-----	-----	-----	-----
1984	-----	-----	-----	-----	-----	-----	-----	-----	-----
1995	-----	-----	-----	-----	-----	-----	-----	-----	-----
6016	-----	-----	-----	-----	-----	-----	-----	-----	-----
6021	-----	-----	-----	-----	-----	-----	-----	-----	-----
6163	-----	-----	-----	-----	-----	-----	-----	-----	-----
6188	-----	-----	-----	-----	-----	-----	-----	-----	-----
6201	-----	-----	-----	6.80	-0.66	-0.31	-0.56	24.11	0.58
6203	-----	-----	-----	-----	-----	-----	-----	-----	-----
9051	-----	-----	-----	-----	-----	-----	-----	-----	-----
9052	-----	-----	-----	-----	-----	-----	-----	-----	-----
9057	-----	-----	-----	-----	-----	-----	-----	-----	-----
9060	-----	-----	-----	-----	-----	-----	-----	-----	-----
9063	-----	-----	-----	-----	-----	-----	-----	-----	-----
9099	-----	-----	-----	-----	-----	-----	-----	-----	-----
9100	-----	-----	-----	-----	-----	-----	-----	-----	-----
9101	-----	-----	-----	-----	-----	-----	-----	-----	-----
9132	-----	-----	-----	-----	-----	-----	-----	-----	-----
9133	-----	-----	-----	-----	-----	-----	-----	-----	-----
9134	-----	-----	-----	-----	-----	-----	-----	-----	-----
9135	-----	-----	-----	-----	-----	-----	-----	-----	-----
9136	-----	-----	-----	-----	-----	-----	-----	-----	-----
9139	-----	-----	-----	-----	-----	-----	-----	-----	-----
9142	-----	-----	-----	-----	-----	-----	-----	-----	-----
9143	-----	-----	-----	-----	-----	-----	-----	-----	-----
9146	-----	-----	-----	-----	-----	-----	-----	-----	-----
9151	-----	-----	-----	-----	-----	-----	-----	-----	-----
9152	-----	-----	-----	-----	-----	-----	-----	-----	-----

z-scores of Simulated Distillation on sample #18215

lab	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
52	-----	-----	-----	-----	-----	-----	-----	-----
62	-----	-----	-----	-----	-----	-----	-----	-----
90	-----	-----	-----	-----	-----	-----	-----	-----
92	-----	-----	-----	-----	-----	-----	-----	-----
120	-----	-----	-----	-----	-----	-----	-----	-----
131	-----	-----	-----	-----	-----	-----	-----	-----
140	-----	-----	-----	-----	-----	-----	-----	-----
150	-----	-0.88	-0.64	0.89	1.36	1.71	-----	-----
154	-----	-----	-----	-----	-----	-----	-----	-----
158	-----	2.41	2.06	1.05	-1.02	-2.34	-----	-----
159	-----	-----	-----	-----	-----	-----	-----	-----
167	-----	0.07	-0.03	-2.42	-2.50	-2.46	-----	-----
168	-----	-----	-----	-----	-----	-----	-----	-----
170	-----	-----	-----	-----	-----	-----	-----	-----
171	-----	-0.44	-0.95	0.34	0.35	0.42	-----	-----
175	-----	-----	-----	-----	-----	-----	-----	-----
186	-----	-----	-----	-----	-----	-----	-----	-----
203	-----	-----	-----	-----	-----	-----	-----	-----
225	-----	-----	-----	-----	-----	-----	-----	-----
238	-----	-----	-----	-----	-----	-----	-----	-----
273	-----	-----	-----	-----	-----	-----	-----	-----
311	-----	0.85	1.56	4.08	5.13	6.30	-----	-----
314	-----	-----	-----	-----	-----	-----	-----	-----
332	-----	-----	-----	-----	-----	-----	-----	-----
333	-----	-----	-----	-----	-----	-----	-----	-----
334	-----	-----	-----	-----	-----	-----	-----	-----
335	-----	-----	-----	-----	-----	-----	-----	-----
336	-----	-----	-----	-----	-----	-----	-----	-----
391	-----	-----	-----	-----	-----	-----	-----	-----
398	-----	-----	-----	-----	-----	-----	-----	-----
399	-----	-----	-----	-----	-----	-----	-----	-----
442	-----	-----	-----	-----	-----	-----	-----	-----
444	-----	-----	-----	-----	-----	-----	-----	-----
445	-----	-0.15	0.41	31.01	>59.68	>28.42	-----	-----
446	-----	-----	-----	-----	-----	-----	-----	-----
447	-----	-----	-----	-----	-----	-----	-----	-----
485	-----	-----	-----	-----	-----	-----	-----	-----
511	-----	-----	-----	-----	-----	-----	-----	-----
525	-----	-----	-----	-----	-----	-----	-----	-----
529	-----	-----	-----	-----	-----	-----	-----	-----
541	-----	-----	-----	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----	-----	-----	-----
557	-----	-----	-----	-----	-----	-----	-----	-----
574	-----	-----	-----	-----	-----	-----	-----	-----
575	-----	-----	-----	-----	-----	-----	-----	-----
593	-----	-----	-----	-----	-----	-----	-----	-----
595	-----	-----	-----	-----	-----	-----	-----	-----
598	-----	-----	-----	-----	-----	-----	-----	-----
599	-----	-----	-----	-----	-----	-----	-----	-----
600	-----	-----	-----	-----	-----	-----	-----	-----
603	-----	-----	-----	-----	-----	-----	-----	-----
605	-----	-----	-----	-----	-----	-----	-----	-----
608	-----	0.65	0.57	0.25	-2.46	-4.51	-----	-----
609	-----	-----	-----	-----	-----	-----	-----	-----
610	-----	-----	-----	-----	-----	-----	-----	-----
611	-----	-----	-----	-----	-----	-----	-----	-----
612	-----	-----	-----	-----	-----	-----	-----	-----
657	-----	2.49	1.35	1.08	0.01	-0.44	-----	-----
663	-----	-----	-----	-----	-----	-----	-----	-----
704	-----	-----	-----	-----	-----	-----	-----	-----
732	-----	-----	-----	-----	-----	-----	-----	-----
739	-----	-----	-----	-----	-----	-----	-----	-----
749	-----	-----	-----	-----	-----	-----	-----	-----
750	-----	-----	-----	-----	-----	-----	-----	-----
751	-----	-----	-----	-----	-----	-----	-----	-----
752	-----	-----	-----	-----	-----	-----	-----	-----
753	-----	-----	-----	-----	-----	-----	-----	-----
781	-----	1.15	-0.29	-3.53	-5.09	-6.62	-----	-----
785	-----	-----	-----	-----	-----	-----	-----	-----
840	-----	-----	-----	-----	-----	-----	-----	-----
862	-----	-0.58	0.45	-----	-----	-----	-----	-----
874	-----	-----	-----	-----	-----	-----	-----	-----
875	-----	-----	-----	-----	-----	-----	-----	-----
904	-----	-----	-----	-----	-----	-----	-----	-----
922	-----	-----	-----	-----	-----	-----	-----	-----
962	-----	-----	-----	-----	-----	-----	-----	-----
963	-----	-----	-----	-----	-----	-----	-----	-----
970	-----	-----	-----	-----	-----	-----	-----	-----

lab	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
971	-----	-0.17	-1.18	-1.97	-1.85	-2.68	-----	-----
974	-----	-----	-----	-----	-----	-----	-----	-----
988	-----	-----	-----	-----	-----	-----	-----	-----
991	-----	-----	-----	-----	-----	-----	-----	-----
992	-----	-----	-----	-----	-----	-----	-----	-----
994	-----	-----	-----	-----	-----	-----	-----	-----
995	-----	-----	-----	-----	-----	-----	-----	-----
997	-----	-----	-----	-----	-----	-----	-----	-----
1011	-----	-----	-----	-----	-----	-----	-----	-----
1016	-----	-----	-----	-----	-----	-----	-----	-----
1039	-----	-0.77	-0.62	-0.03	0.59	1.17	-----	-----
1040	-----	-0.90	-1.50	1.47	3.12	4.90	-----	-----
1056	-----	-----	-----	-----	-----	-----	-----	-----
1065	-----	-----	-----	-----	-----	-----	-----	-----
1089	-----	-----	-----	-----	-----	-----	-----	-----
1106	-----	-----	-----	-----	-----	-----	-----	-----
1109	-----	-----	-----	-----	-----	-----	-----	-----
1148	-----	-----	-----	-----	-----	-----	-----	-----
1236	-----	-----	-----	-----	-----	-----	-----	-----
1248	-----	-----	-----	-----	-----	-----	-----	-----
1259	-----	-----	-----	-----	-----	-----	-----	-----
1272	-----	-----	-----	-----	-----	-----	-----	-----
1300	-----	-----	-----	-----	-----	-----	-----	-----
1379	-----	-----	-----	-----	-----	-----	-----	-----
1397	-----	-----	-----	-----	-----	-----	-----	-----
1412	-----	-----	-----	-----	-----	-----	-----	-----
1543	-----	-----	-----	-----	-----	-----	-----	-----
1544	-----	-----	-----	-----	-----	-----	-----	-----
1556	-----	-----	-----	-----	-----	-----	-----	-----
1557	-----	-----	-----	-----	-----	-----	-----	-----
1654	-----	-----	-----	-----	-----	-----	-----	-----
1656	-----	-----	-----	-----	-----	-----	-----	-----
1695	-----	-----	-----	-----	-----	-----	-----	-----
1714	-----	-2.98	-4.08	-2.85	-0.02	1.53	-----	-----
1720	-----	-----	-----	-----	-----	-----	-----	-----
1724	-----	-----	-----	-----	-----	-----	-----	-----
1728	-----	-----	-----	-----	-----	-----	-----	-----
1749	-----	-----	-----	-----	-----	-----	-----	-----
1776	-----	-----	-----	-----	-----	-----	-----	-----
1796	-----	-----	-----	-----	-----	-----	-----	-----
1810	-----	-----	-----	-----	-----	-----	-----	-----
1811	-----	-----	-----	-----	-----	-----	-----	-----
1815	-----	-----	-----	-----	-----	-----	-----	-----
1842	-----	-0.15	-0.59	0.98	1.80	1.87	-----	-----
1849	-----	-----	-----	-----	-----	-----	-----	-----
1858	-----	-----	-----	-----	-----	-----	-----	-----
1862	-----	-----	-----	-----	-----	-----	-----	-----
1930	-----	-----	-----	-----	-----	-----	-----	-----
1957	-----	-----	-----	-----	-----	-----	-----	-----
1960	-----	-----	-----	-----	-----	-----	-----	-----
1984	-----	-----	-----	-----	-----	-----	-----	-----
1995	-----	-----	-----	-----	-----	-----	-----	-----
6016	-----	-----	-----	-----	-----	-----	-----	-----
6021	-----	-----	-----	-----	-----	-----	-----	-----
6163	-----	-----	-----	-----	-----	-----	-----	-----
6188	-----	-----	-----	-----	-----	-----	-----	-----
6201	-----	-0.58	-0.59	0.66	0.61	0.82	-----	-----
6203	-----	-----	-----	-----	-----	-----	-----	-----
9051	-----	-----	-----	-----	-----	-----	-----	-----
9052	-----	-----	-----	-----	-----	-----	-----	-----
9057	-----	-----	-----	-----	-----	-----	-----	-----
9060	-----	-----	-----	-----	-----	-----	-----	-----
9063	-----	-----	-----	-----	-----	-----	-----	-----
9099	-----	-----	-----	-----	-----	-----	-----	-----
9100	-----	-----	-----	-----	-----	-----	-----	-----
9101	-----	-----	-----	-----	-----	-----	-----	-----
9132	-----	-----	-----	-----	-----	-----	-----	-----
9133	-----	-----	-----	-----	-----	-----	-----	-----
9134	-----	-----	-----	-----	-----	-----	-----	-----
9135	-----	-----	-----	-----	-----	-----	-----	-----
9136	-----	-----	-----	-----	-----	-----	-----	-----
9139	-----	-----	-----	-----	-----	-----	-----	-----
9142	-----	-----	-----	-----	-----	-----	-----	-----
9143	-----	-----	-----	-----	-----	-----	-----	-----
9146	-----	-----	-----	-----	-----	-----	-----	-----
9151	-----	-----	-----	-----	-----	-----	-----	-----
9152	-----	-----	-----	-----	-----	-----	-----	-----

APPENDIX 4

Number of participants per country

1 lab in ARGENTINA
2 labs in AUSTRALIA
2 labs in AZERBAIJAN
2 labs in BRAZIL
1 lab in BRUNEI
2 labs in BULGARIA
4 labs in CANADA
2 labs in CHINA, People's Republic
2 labs in COLOMBIA
1 lab in COTE D'IVOIRE
2 labs in CROATIA
2 labs in CZECH REPUBLIC
1 lab in DAGESTAN, Republic of
2 labs in ECUADOR
2 labs in EGYPT
1 lab in ESTONIA
6 labs in FRANCE
3 labs in GEORGIA
3 labs in GERMANY
1 lab in ISRAEL
3 labs in ITALY
2 labs in KAZAKHSTAN
1 lab in LATVIA
1 lab in LITHUANIA
11 labs in MALAYSIA
2 labs in MEXICO
7 labs in NETHERLANDS
6 labs in NIGERIA
4 labs in NORWAY
7 labs in OMAN
1 lab in PAKISTAN
1 lab in PERU
2 labs in POLAND
1 lab in PORTUGAL
2 labs in ROMANIA
14 labs in RUSSIAN FEDERATION
2 labs in SAUDI ARABIA
2 labs in SERBIA
1 lab in SINGAPORE
1 lab in SOUTH AFRICA
1 lab in ST. LUCIA - WEST INDIES
2 labs in SUDAN
2 labs in SWEDEN
1 lab in THAILAND
4 labs in TURKEY
2 labs in TURKMENISTAN
1 lab in UKRAINE
2 labs in UNITED ARAB EMIRATES
11 labs in UNITED KINGDOM
13 labs in UNITED STATES OF AMERICA
1 lab in VIETNAM

APPENDIX 5

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	= possibly an error in calculations
U	= test result possibly reported in a different unit
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
SDS	= Safety Data Sheet

Literature

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