Results of Proficiency Test
Crude Oil
November 2019

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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 2019/2020, it was decided to continue the round robin for the analyzes of Crude Oil. In this interlaboratory study 155 laboratories in 55 different countries registered for participation. See appendix 4 for the number of participants per country.
In this report, the results of the 2019 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 organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory. It was decided to send two different samples of Crude Oil: approximately 1 liter of Crude Oil labelled #19220 in a one liter wide-necked bottle to enable use of a large size diameter high speed shear mixer for homogenization and one 40 mL vial labelled #19221 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/IEC17043:2010 (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 organization 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

A batch of Crude Oil for the preparation of subsamples #19220 and #19221 was obtained
from a local refinery. Approximately 200 liters of Crude Oil was homogenized and transferred
to 179 wide-neck transparent colorless glass bottles of 1 L and labelled #19220. The bottles
were put into red plastic bags to protect it from light.
The homogeneity of the subsamples #19220 was checked by the determination of Density at
15°C in accordance with ASTM D5002 on 8 stratified randomly selected samples.

	Density at 15°C in kg/m^3
Sample #19220-1	872.96
Sample #19220-2	872.98
Sample #19220-3	872.91
Sample #19220-4	872.88
Sample #19220-5	872.97
Sample #19220-6	872.94
Sample #19220-7	872.89
Sample #19220-8	873.02

Table 1: homogeneity test results of subsamples #19220

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 ISO13528, Annex B2 in the next table.

	Density at 15°C in kg/m^3
r (observed)	0.13
reference test method	ASTM D5002:19
0.3 x R (ref. test method)	1.08

Table 2: evaluation of the repeatability of subsamples #19220

The calculated repeatability was lower than 0.3 times the corresponding reproducibility of the
reference test method. Therefore, homogeneity of the subsamples was assumed.

Because the Crude Oil used for samples #19220 did not contain a detectable concentration
of Mercury, approximately 8 liters of Crude Oil was taken from the original batch and spiked
with approximately 1 gram Conostan Hg standard (100 mg/kg) and 7 mL of 22 µg/mL HgCl$_2$
in Methanol solution especially for Mercury determination. After homogenization 180 amber
glass vials of 40 mL were filled with the spiked Crude Oil and labelled #19221. The
homogeneity of the subsamples #19221 was checked by determination of Mercury in
accordance with ASTM D7623 on 8 stratified randomly selected samples.

	Mercury, Total in µg/kg
sample #19221-1	32
sample #19221-2	31
sample #19221-3	32
sample #19221-4	31
sample #19221-5	32
sample #19221-6	32
sample #19221-7	31
sample #19221-8	31

Table 3: homogeneity test results of subsamples #19221

From the above test results the repeatability was calculated and compared with 0.3 times the target reproducibility estimated from the Horwitz equation in agreement with the procedure of ISO13528, Annex B2 in the next table.

	Mercury, Total in µg/kg
r (observed)	1.5
reference method	Horwitz
0.3 x R (reference method)	7.1

Table 4: evaluation of the repeatability of subsamples #19221

The calculated repeatability was lower than 0.3 times the corresponding estimated reproducibility using the Horwitz equation. Therefore, homogeneity of the subsamples was assumed.

To each of the participating laboratories a set of one bottle of 1 L in a red plastic bag labelled #19220 and one 40 mL amber vial labelled #19221 was sent on October 30, 2019. 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 ANALYZES

The participants were requested to determine on sample #19220: Acid Number (Total), 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, Hexanes, total and total C1-C6), Molecular Mass (Average), Pour Point (Maximum), Salt as Chloride, Sediment (Extraction method and Membrane Filtration), Sulfur (Total), Water and Simulated Distillation. On sample #19221 was requested to determine only Mercury (Total).

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. Also, some analytical details were asked.

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 appropriate 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 reanalyzes). Additional or corrected test results are used for data analyzis 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 organization 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 ISO5725 the original test results per determination were submitted to Dixon's, 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 them with a factor of 2.8.

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported 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. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also a normal Gauss curve was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation of 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 test result tables in appendix 1.

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

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

4   EVALUATION

In this proficiency test some sample dispatch problems were encountered during the execution. The samples to participants in Brazil, Brunei, Egypt, Kazakhstan, Oman, Republic of Dagestan, Russian Federation, Turkey and Vietnam arrived late or did never reach the laboratories in time due to customs clearance and/or transportation problems. Twenty laboratories reported after the deadline and seventeen did not report any test results at all. In total 138 laboratories submitted 1189 numerical test results. Observed were 32 statistically outlying test results, which is 2.7% 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 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 reported test results. The abbreviations, used in these tables, are explained in appendix 5.

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 tables of appendix 1 only the test method number and year of adoption or revision will be used.

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

Sample #19220

Acid Number (Total): This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D664-A:18e2 (Inflection Point 60 mL) or with Inflection Point (125 mL) and Buffer End Point (60 and 125 mL). When the test results are evaluated separately over Inflection Point 60 or 125 mL only the calculated reproducibility is also not in agreement with the respective requirements.

API Gravity: This determination was not problematic. Five 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. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D4007:11e1(2016).

Density at 15°C: 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 D5002:19. Some participants report ASTM D4052 as test method. 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 D4052:18a).

Kin.Visc.at 40°C: This 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 D445:19.

Light ends: This determination was very problematic. In total six statistical outliers were observed. None of the nine calculated reproducibilities after rejection of the statistical outliers are in agreement with the requirements of IP344:88(2010). The variation between the test results of total of all C1–C6 was too large. Therefore no z-scores were calculated.

Molecular Mass: This determination may not be problematic, but only three test results were reported. The calculated reproducibility is in agreement with the requirements of ASTM D2503:92(2016).

Pour Point, Maximum: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5853-A:17a. Some participants reported ASTM D97 as test method. 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 D3230:19.

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

Sediment (Membrane filtration): 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 D4807:05(2015).

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

Water: This determination was not problematic. One statistical outlier was observed and one other test result was excluded. However, the calculated reproducibility after rejection of the suspect data is in full agreement with the requirements of ASTM D4377:00(2011).

Simulated Distillation: This determination was problematic. Only 14 laboratories reported test results for this determination. In total over eight parameters three statistical outliers were observed. However, only the calculated reproducibility of 10% recovered after rejection of the statistical outliers is in agreement with the requirements of ASTM D7169:18.

Sample #19221

Mercury, Total: Regretfully no target reproducibility is available. ASTM D7623 and UOP938 give only a repeatability. Furthermore, UOP938 as used by most of the laboratories is not intended to use for 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.
This determination was not problematic at the Mercury concentration of 31 µg/kg. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the reproducibility estimated using the Horwitz equation.
As UOP938 might give different test results than ASTM D7622 or D7623 these results were also evaluated separately. In this proficiency test UOP938 yields somewhat lower levels of Mercury.

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 result, the calculated reproducibility (2.8 * standard deviation) and the target reproducibility derived from literature reference test methods (in casu ASTM, IP 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	62	0.15	0.11	0.09
API Gravity		84	30.4	0.3	0.5
BS&W	%V/V	64	0.04	0.08	0.10
Density at 15°C	kg/m^3	128	873.3	1.3	3.6
Kinematic Viscosity at 40°C	mm^2/s	83	9.87	1.13	0.84
Methane	%M/M	18	<0.01	n.a.	n.a.
Ethane	%M/M	18	0.021	0.017	0.008
Propane	%M/M	20	0.27	0.12	0.06
iso-Butane	%M/M	20	0.18	0.05	0.03
n-Butane	%M/M	20	0.83	0.24	0.11
iso-Pentane	%M/M	18	0.71	0.11	0.06
n-Pentane	%M/M	18	1.22	0.21	0.13
cyclo-Pentane	%M/M	14	0.063	0.023	0.010
Hexanes, total	%M/M	15	2.69	0.84	0.45
Total of all C1 - C6	%M/M	12	5.92	2.23	(0.49)
Molecular Mass, Average	g/mol	3	236	12	14
Pour Point, Maximum	°C	58	-28.2	15.3	18.0
Salt as Chloride	mg/kg	72	9.2	10.0	14.7
Sediment (Extraction method)	%V/V	59	0.008	0.014	0.035
Sediment (Membrane filtration)	%M/M	41	0.015	0.022	0.015
Sulfur, Total	%M/M	101	2.63	0.17	0.14
Water	%V/V	101	0.034	0.031	0.036
IBP	°C	11	<36	n.a.	n.a.
5% recovered	°C	13	70.3	24.8	19.6
10% recovered	°C	12	115	14	20
30% recovered	°C	14	248	23	13
50% recovered	°C	14	371	31	16
70% recovered	°C	14	507	51	21
90% recovered	°C	13	685	96	n.a.
FBP	°C	10	>710	n.a.	n.a.
Mercury, Total	µg/kg	34	30.8	17.0	23.3

Table 5: performance evaluation sample #19220 and #19221 (Hg only)

Results between brackets should be used with due care.

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 2019 WITH PREVIOUS PTS

	November 2019	November 2018	November 2017	November 2016	November 2015
Number of reporting laboratories	138	143	140	136	129
Number of test results	1189	1234	1234	1126	1077
Number of statistical outliers	32	60	60	60	26
Percentage outliers	2.7%	4.9%	4.9%	5.3%	2.4%

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

Determination	November 2019	November 2018	November 2017	November 2016	November 2015
Acid Number (Total)	-	+	+	+	+
API Gravity	+	+	+	+	+/-
BS&W	+	+/-	+	+	-
Density at 15°C	++	++	++	++	++
Kinematic Viscosity at 40°C	-	-	-	-	-
Light Ends (C1 - C6)	--	--	--	--	+/-
Molecular Mass, Average	+	-	+/-	-	+
Pour Point, Maximum	+	+	+	+	-
Salt as Chloride	+	+	+/-	+	+
Sediment (Extraction method)	++	++	++	++	++
Sediment (Membrane filtration)	-	-	+/-	--	--
Sulfur, Total	-	-	-	-	--
Water	+	+	--	+/-	--
Simulated Distillation	-	--	--	--	--
Mercury, Total	+	+	++	+	--

Table 7: comparison determinations against the reference test methods

In the table above 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 Acid Number (Total) on sample #19220; results in mg KOH/g

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D664-A	0.10		-1.72	988		-----		-----
62		-----		-----	991		-----		-----
90		-----		-----	992		-----		-----
92		-----		-----	994	D664-A	0.17		0.55
120	D664-A	0.104		-1.59	995	D664-A	0.16		0.23
140	D664-A	0.24		2.83	997		-----		-----
150	D664-A	0.11		-1.39	998		-----		-----
154		-----		-----	1011		-----		-----
158		-----		-----	1039	D664-A	0.17		0.55
159	D664-A	0.1692		0.53	1040	D664-A	0.143		-0.32
167	D664-A	0.0585		-3.06	1056	D664-A	0.1401		-0.42
168		-----		-----	1065	D664-A	0.14		-0.42
170	D664-A	0.084		-2.24	1082		-----		-----
171		-----		-----	1089	D664-A	0.168		0.49
175		-----		-----	1106	D664-A	0.1891		1.17
186		-----		-----	1109	D664-A	0.15		-0.09
203		-----		-----	1212	D664-A	0.169		0.52
225		-----		-----	1236		-----		-----
237		-----		-----	1259		-----		-----
238		-----		-----	1357		-----		-----
273	D664-A	0.15		-0.09	1360		-----		-----
311		-----		-----	1397	D664-A	0.16		0.23
314		-----		-----	1412	D664-A	0.16		0.23
332		-----		-----	1554		-----		-----
333		-----		-----	1556	D664-A	0.075		-2.53
334	D664-A	0.08		-2.37	1613	D664-A	0.12		-1.07
335		-----		-----	1654		-----		-----
336		-----		-----	1656	D664-A	<0.1		-----
391	D664-A	0.21		1.85	1695		-----		-----
398		-----		-----	1710	D664-A	0.197		1.43
399		-----		-----	1714	In house	0.10		-1.72
442		-----		-----	1720	D664-A	0.1601		0.23
444		-----		-----	1724		-----		-----
445	D664-A	0.149		-0.13	1728		-----		-----
446		-----		-----	1741	ISO6619	0.153		0.00
447	D664-A	0.17		0.55	1810		-----		-----
485		-----		-----	1811	D664-A	0.18		0.88
511		-----		-----	1815		-----		-----
525		-----		-----	1833		-----		-----
529		-----		-----	1842	In house	0.15		-0.09
541		-----		-----	1849		-----		-----
551		-----		-----	1857	D664-A	0.164		0.36
557		-----		-----	1858	D664-A	0.15		-0.09
575	D664-A	0.132		-0.68	1928		-----		-----
593		-----		-----	1929		-----		-----
597		-----		-----	1950	D664-A	0.152		-0.03
598	D664-A	0.148		-0.16	1957	D664-A	0.15		-0.09
599		-----		-----	1984		-----		-----
600	D664-A	0.149		-0.13	1995	D664	0.11		-1.39
603		-----		-----	6016		-----		-----
608	D664-A	0.111		-1.36	6143		-----		-----
609		-----		-----	6166		-----		-----
610		-----		-----	6170		-----		-----
611	D664-A	0.1837		1.00	6201	D664-A	0.14		-0.42
612		-----		-----	6203	D664-A	0.192		1.27
621	D664-A	0.15		-0.09	6220	D664-A	0.19		1.20
657	D664-A	0.13		-0.74	6234		-----		-----
663	D664-A	0.17		0.55	6238	D664-A	0.24		2.83
704	D664-A	0.221		2.21	6263		-----		-----
732		-----		-----	6273		-----		-----
739		-----		-----	6284		-----		-----
749		-----		-----	6290		-----		-----
750	D664-A	0.12		-1.07	6294		-----		-----
752	D664-A	0.168		0.49	6295		-----		-----
753		-----		-----	6296		-----		-----
781	D664-A	0.15		-0.09	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D664-A	0.22		2.18	9057		-----		-----
862	D664	0.138		-0.48	9060		-----		-----
874		-----		-----	9063		-----		-----
875		-----		-----	9099		-----		-----
904	D664-A	0.21		1.85	9101		-----		-----
922	D664-A	0.16		0.23	9132	D664-A	0.11		-1.39
962	D664-A	0.17		0.55	9141		-----		-----
963	D664-A	0.1625		0.31	9142		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970		-----		-----	9143		-----		-----
971	D664-A	0.140		-0.42	9146	D664Mod.	0.17		0.55
974		-----		-----					

			Only IP – 60 mL	Only IP – 125 mL
normality	OK		OK	suspect
n	62		12	26
outliers	0		0	0
mean (n)	0.1529		0.1445	0.1562
st.dev. (n)	0.03764		0.04727	0.03680
R(calc.)	0.1054		0.1324	0.1030
st.dev.(D664-A:18e2 IP 60mL)	0.03080		0.02941	-----
R(D664-A:18e2 IP 60mL)	0.0862		0.0823	-----
Compare				
R(D664-A:18e2 IP – 125mL)	0.0309		-----	0.0316
R(D664-A:18e2 BEP – 60mL)	0.0887		-----	-----
R(D664-A:18e2 BEP – 125mL)	0.0439		-----	-----

Kernel Density
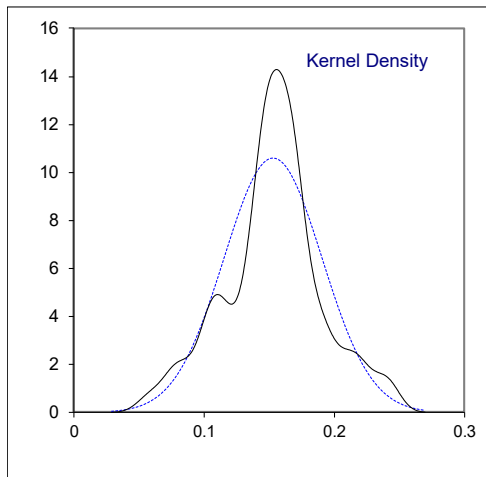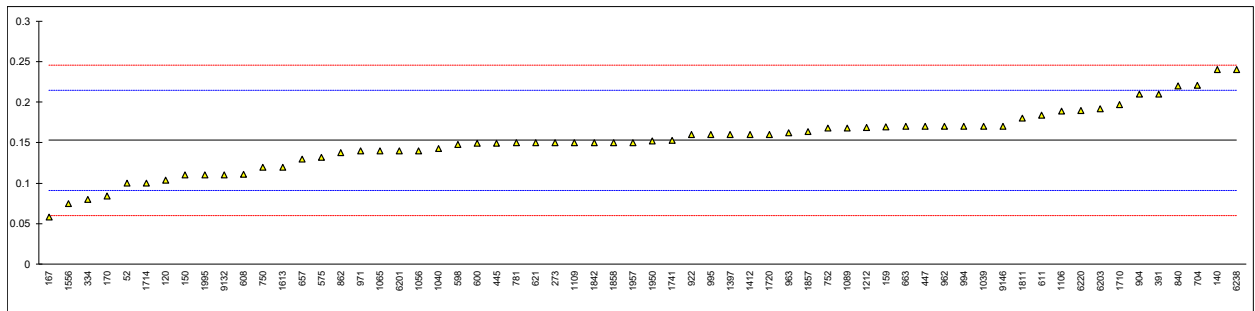
Determination of API Gravity on sample #19220;

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5002	30.4		-0.06	988	D1298	30.4		-0.06
62	D5002	30.4		-0.06	991	Calc.	30.4		-0.06
90	D5002	30.37		-0.23	992	Calc.	30.4		-0.06
92	D5002	30.43		0.11	994	Calc.	30.47		0.33
120	D5002	30.49		0.44	995	D287	30.45		0.22
140	D5002	30.4		-0.06	997	D5002	30.46		0.28
150	D287	30.4		-0.06	998	Calc.	30.47		0.33
154	D287	30.3		-0.62	1011		-----		-----
158		-----		-----	1039		-----		-----
159		-----		-----	1040	D287	30.4		-0.06
167	D5002	30.385		-0.14	1056		-----		-----
168	D287	30.4		-0.06	1065		-----		-----
170		-----		-----	1082		-----		-----
171		-----		-----	1089	D287	30.3		-0.62
175	D5002	30.46		0.28	1106	D5002	30.0	R(0.05)	-2.30
186		-----		-----	1109	D287	30.46		0.28
203	Calc.	30.44		0.16	1212	D5002	30.52		0.61
225	D5002	30.5		0.50	1236	D287	30.159		-1.41
237	D4052	30.34		-0.40	1259		30.47		0.33
238	D5002	30.5		0.50	1357	D287	30.1		-1.74
273		-----		-----	1360		-----		-----
311		-----		-----	1397		-----		-----
314		-----		-----	1412	D5002	30.44		0.16
332		-----		-----	1554		-----		-----
333		-----		-----	1556		-----		-----
334		-----		-----	1613	D5002	30.380		-0.17
335		-----		-----	1654	D4052	30.46		0.28
336		-----		-----	1656	D5002	30.3		-0.62
391		-----		-----	1695		-----		-----
398		-----		-----	1710		-----		-----
399	Calc.	30.31		-0.56	1714	Calc.	30.5		0.50
442	Calc.	30.4920		0.46	1720	D287	31.73	C,R(0.01)	7.39
444		-----		-----	1724	D5002	30.46		0.28
445	D287	30.44		0.16	1728	D5002	30.479		0.38
446	D5002	30.5		0.50	1741		-----		-----
447	D5002	30.54		0.72	1810		-----		-----
485		-----		-----	1811		-----		-----
511		-----		-----	1815		-----		-----
525	D7042	30.12		-1.63	1833		-----		-----
529	D287	30.62		1.17	1842	D4052	30.5		0.50
541	D4052	30.40		-0.06	1849	ISO3675	30.1		-1.74
551		-----		-----	1857	Calc.	30.44		0.16
557		-----		-----	1858	Calc.	30.44		0.16
575	D1298	30.7		1.62	1928		-----		-----
593	D1298	30.21		-1.12	1929		-----		-----
597		-----		-----	1950		-----		-----
598	D5002	30.42		0.05	1957	D5002	30.36		-0.28
599	Calc.	30.50		0.50	1984		-----		-----
600	D5002	30.33		-0.45	1995	D287	30.45		0.22
603		-----		-----	6016		-----		-----
608	Calc.	30.34		-0.40	6143	D1298	30.80	R(0.05)	2.18
609	D5002	30.35		-0.34	6166		-----		-----
610	D5002	30.42		0.05	6170		-----		-----
611	D5002	30.23		-1.01	6201	D4052	30.47		0.33
612	D5002	30.51		0.56	6203		-----		-----
621	D5002	30.44		0.16	6220	D5002	30.44		0.16
657	D5002	30.5		0.50	6234		-----		-----
663	D5002	30.45		0.22	6238	D287	874.1	R(0.01)	4724.66
704	D1298	30.48		0.39	6263		-----		-----
732	D5002	30.37		-0.23	6273		-----		-----
739		-----		-----	6284		-----		-----
749		-----		-----	6290		-----		-----
750		-----		-----	6294	D1298	30.3		-0.62
752	D1250	30.44		0.16	6295		-----		-----
753		-----		-----	6296		-----		-----
781	D5002	30.5		0.50	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D5002	30.35		-0.34	9057		-----		-----
862	D287	30.37		-0.23	9060	Calc.	30.5		0.50
874		-----		-----	9063		-----		-----
875		-----		-----	9099		-----		-----
904	D1298	30.4		-0.06	9101	D1298	30.310		-0.56
922	D4052	30.47		0.33	9132	D1250	30.585		0.98
962	D5002	30.45		0.22	9141	D1298	30.957	R(0.01)	3.06
963	D287	30.44		0.16	9142		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970	Calc.	30.42		0.05	9143	D1298	30.3		-0.62
971	D5002	30.48		0.39	9146	In house	30.2		-1.18
974	Calc.	30.42		0.05					

normality	suspect
n	84
outliers	5
mean (n)	30.411
st.dev. (n)	0.1049
R(calc.)	0.294
st.dev.(D287:12b)	0.1786
R(D287:12b)	0.5

Lab 1720 first reported 31.44
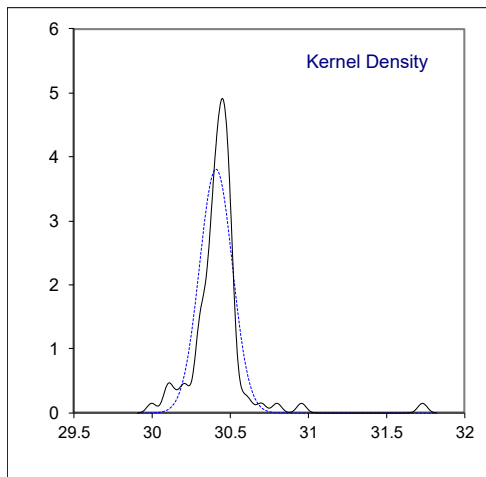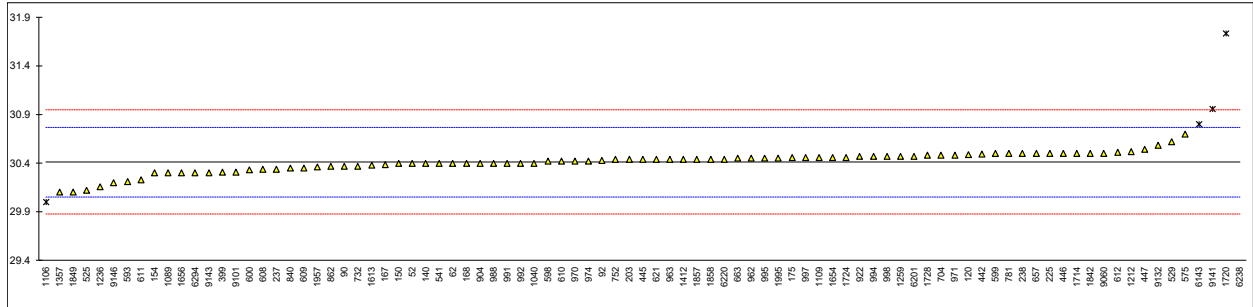
Determination of BS&W on sample #19220; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4007	0.05		0.40	988		-----		-----
62	D4007	0.075		1.12	991		-----		-----
90		-----		-----	992		-----		-----
92		-----		-----	994	D4007	0.025		-0.32
120	D4007	<0.05		-----	995		-----		-----
140	D4007	0.00		-1.04	997		-----		-----
150	D4007	<0.01		-----	998		-----		-----
154	D4007	0.05		0.40	1011		-----		-----
158		-----		-----	1039		-----		-----
159	D4007	0.10		1.83	1040		-----		-----
167	D4007	0.025		-0.32	1056		-----		-----
168		-----		-----	1065		-----		-----
170	D4007	0.05		0.40	1082		-----		-----
171		-----		-----	1089		-----		-----
175		-----		-----	1106	D4007	0.05		0.40
186		-----		-----	1109	D4007	0.05		0.40
203	D4007	0.05		0.40	1212	D4007	0.05		0.40
225	D4007	0.10		1.83	1236		-----		-----
237	D4007	0.00		-1.04	1259	ISO9030	< 0.05		-----
238	D4007	0.025		-0.32	1357	D4007	<0.1		-----
273		-----		-----	1360		-----		-----
311		-----		-----	1397		-----		-----
314		-----		-----	1412		-----		-----
332		-----		-----	1554		0.05		0.40
333		-----		-----	1556		-----		-----
334	D4007	0.036		-0.01	1613	D4007	0.1		1.83
335		-----		-----	1654	D4007	0.05		0.40
336		-----		-----	1656		-----		-----
391		-----		-----	1695		-----		-----
398		-----		-----	1710		-----	W	-----
399		-----		-----	1714		-----		-----
442		-----		-----	1720	D4007	0.10		1.83
444		-----		-----	1724		-----		-----
445	D4007	0.025		-0.32	1728		0.038		0.05
446		-----		-----	1741	ISO9030	0.05		0.40
447		-----		-----	1810		-----		-----
485		-----		-----	1811		-----		-----
511	D4007	0.00		-1.04	1815	D4007	0.0		-1.04
525	D4007	0.025		-0.32	1833		-----		-----
529	D4007	0.05		0.40	1842		-----		-----
541	D4007	<0.025		-----	1849		-----		-----
551		-----		-----	1857		0.048		0.34
557		-----		-----	1858		-----		-----
575		-----		-----	1928		-----		-----
593	D4007	0.00		-1.04	1929		-----		-----
597	D4007	0.00		-1.04	1950		-----		-----
598	D4007	0.025		-0.32	1957	D4007	0.00		-1.04
599	D4007	0.0		-1.04	1984		-----		-----
600		-----		-----	1995		-----		-----
603		-----		-----	6016	D4007	0.025		-0.32
608		-----		-----	6143		-----		-----
609	D4007	0.05		0.40	6166		-----		-----
610	D4007	<0.025		-----	6170	ISO9030	0.05		0.40
611	D4007	0.1		1.83	6201	D4007	0		-1.04
612	D4007	0.0		-1.04	6203	D4007	0.025		-0.32
621	D4007	0.05		0.40	6220	D4007	0.05		0.40
657	D4007	0.025		-0.32	6234		-----		-----
663	D4007	0.025		-0.32	6238	D4007	0.02		-0.47
704	D4007	0.025		-0.32	6263		-----		-----
732		-----		-----	6273		-----		-----
739		-----		-----	6284		-----		-----
749		-----		-----	6290	D4007	0.05		0.40
750		-----		-----	6294	D7829	0.003		-0.96
752		-----		-----	6295		-----		-----
753		-----		-----	6296		-----		-----
781	D4007	0.025		-0.32	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D4007	0.05		0.40	9057		-----		-----
862	D4007	0.05		0.40	9060	D4007	0		-1.04
874		-----		-----	9063		-----		-----
875		-----		-----	9099		-----		-----
904		-----		-----	9101	D4007	0.000		-1.04
922	D4007	0.05		0.40	9132	D4007	0.05		0.40
962	D4007	0.025		-0.32	9141	D4007	0.025	C	-0.32
963	D4007	0.025		-0.32	9142	D4007	0.025		-0.32

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970	D4007	0.025		-0.32	9143	D4007	0.025	C	-0.32
971	D4007	0.025		-0.32	9146	D4007	0.10		1.83
974	D4007	0.025		-0.32					

normality	OK
n	64
outliers	0
mean (n)	0.0362
st.dev. (n)	0.02802
R(calc.)	0.0785
st.dev.(D4007:11e1)	0.03474
R(D4007:11e1)	0.0973

Lab 1710 test result withdrawn, first reported 0.15
Lab 9141 first reported 0.00
Lab 9143 first reported 0.00

Kernel Density
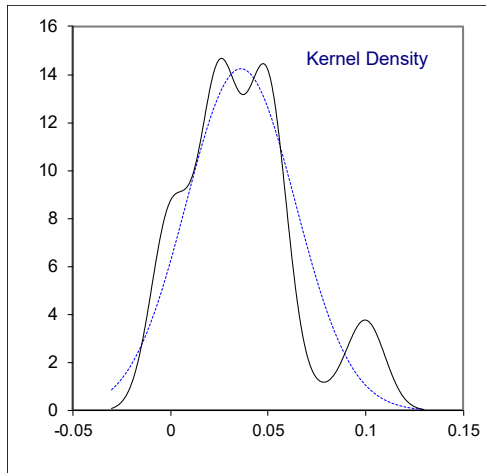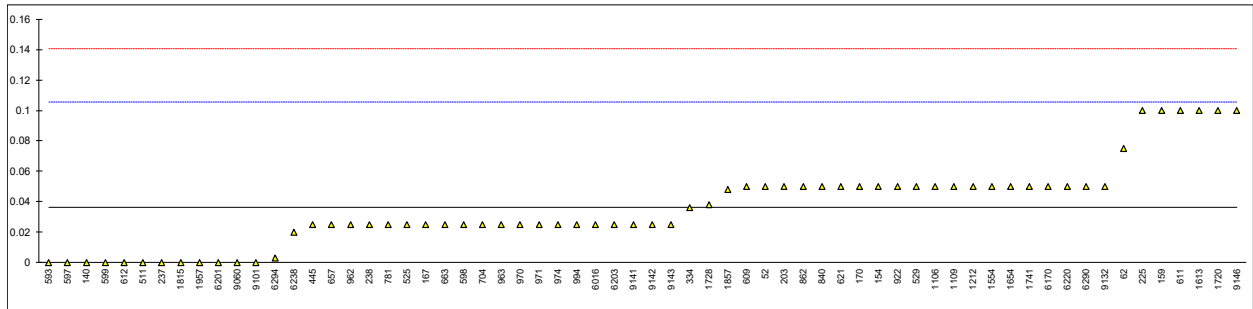
Determination of Density at 15°C on sample #19220; results in kg/m^3

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5002	873.6		0.21	988	D1298	874.2		0.67
62	D5002	873.5		0.13	991	D1298	873.3		-0.03
90	D5002	873.7		0.29	992	D1298	873.4		0.05
92	D5002	873.4		0.05	994	D5002	873.1		-0.18
120	D5002	873.0		-0.26	995	D5002	873.3		-0.03
140	D5002	873.4		0.05	997	D5002	873.2		-0.10
150	D5002	873.0	C	-0.26	998	D5002	873.11		-0.17
154	D5002	874.1		0.60	1011		-----		-----
158		-----		-----	1039	ISO12185	872.9		-0.34
159	D5002	874.2		0.67	1040	ISO12185	873.4		0.05
167	D5002	873.3		-0.03	1056	D5002	872.9		-0.34
168		-----		-----	1065	D4052	873.4		0.05
170	D5002	873.0		-0.26	1082	D5002	872.1		-0.96
171		-----		-----	1089	D5002	874.1		0.60
175	D5002	873.2		-0.10	1106	D5002	875.7	R(0.01)	1.84
186		-----		-----	1109	D5002	873.2		-0.10
203	D5002	873.30		-0.03	1212	D5002	872.9		-0.34
225	D5002	873.0		-0.26	1236	D5002	874.77		1.12
237	D4052	873.4		0.05	1259	ISO3675	873.2		-0.10
238	D5002	873.0	C	-0.26	1357	D5002	875.4	R(0.01)	1.61
273	D5002	873.2		-0.10	1360	ISO12185	873.1		-0.18
311	D5002	873.0		-0.26	1397	ISO12185	873.2		-0.10
314	D5002	873.2		-0.10	1412	D5002	873.3		-0.03
332		-----		-----	1554	ISO12185	873.7		0.29
333	D5002	873.0		-0.26	1556	ISO12185	873.1		-0.18
334	ISO12185	872.9		-0.34	1613	D5002	873.7		0.29
335	D5002	872.9		-0.34	1654	D4052	873.004		-0.26
336	D5002	873.0		-0.26	1656	D5002	873.1		-0.18
391	D5002	872.8		-0.41	1695	D5002	873.45		0.09
398	D1298	872.9		-0.34	1710	ISO12185	873.1		-0.18
399	D5002	874.6		0.99	1714	D5002	873.17		-0.13
442	IP365	872.7		-0.49	1720	D5002	866.9	R(0.01)	-5.01
444	D5002	873.4		0.05	1724	D5002	873.2		-0.10
445	D5002	873.3		-0.03	1728	D5002	873.07		-0.20
446	D5002	873.3		-0.03	1741	D4052	873.5		0.13
447	D5002	872.8		-0.41	1810	ISO12185	873.1		-0.18
485	D5002	873.10		-0.18	1811	D5002	873.3		-0.03
511		-----		-----	1815	ISO12185	873.73		0.31
525	D7042	874.70		1.06	1833		-----		-----
529	D5002	873.1		-0.18	1842	D4052	873.2		-0.10
541	D5002	873.50		0.13	1849	ISO3675	875.1	R(0.05)	1.37
551		-----		-----	1857	D5002	873.3		-0.03
557		-----		-----	1858	D1298	873.3		-0.03
575	D1298	871.9		-1.12	1928	ISO12185	873.2		-0.10
593	D1298	874.55		0.95	1929	ISO12185	873.2		-0.10
597	D1298	873.7		0.29	1950	D5002	873.3		-0.03
598	D5002	873.0		-0.26	1957	D5002	873.4		0.05
599	D1298	873.2		-0.10	1984	D5002	875.725	R(0.01)	1.86
600	D5002	873.9		0.44	1995	D5002	873.2		-0.10
603	D4052	873.3		-0.03	6016	D4052	874.24		0.71
608	D5002	873.8		0.36	6143	D1298	871.8	C	-1.19
609	D5002	873.5		0.13	6166		-----		-----
610	D5002	873.4	C	0.05	6170	ISO3675	872.9		-0.34
611	D5002	874		0.52	6201	D5002	873.21		-0.10
612	D5002	873.8		0.36	6203	D4052	873.12		-0.17
621	D5002	873.3		-0.03	6220	D5002	873.32		-0.01
657	D5002	873.2	C	-0.10	6234		-----		-----
663	D5002	873.24		-0.07	6238	ISO12185	873.7		0.29
704	D1298	873.08		-0.20	6263		-----		-----
732	ISO12185	873.27		-0.05	6273	D1298	872.7		-0.49
739	Gost P 51069	873.7		0.29	6284		-----		-----
749	Gost P 51069	873.6		0.21	6290	D5002	873.9		0.44
750	D1298	873.8		0.36	6294	D1298	874.2		0.67
752	ISO12185	873.3		-0.03	6295	D5002	873.2		-0.10
753		-----		-----	6296	D5002	873.71		0.29
781	D5002	873.1		-0.18	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D5002	873.76		0.33	9057		873.71	C	0.29
862	D5002	873.32	C	-0.01	9060	D5002	873.2		-0.10
874		-----		-----	9063	D5002	873		-0.26
875	D5002	873.6		0.21	9099		-----		-----
904	D5002	873.1		-0.18	9101	D1298	874.48		0.89
922	D4052	873.2		-0.10	9132	D5002	872.334		-0.78
962	D5002	873.2		-0.10	9141	D1298	871.0	R(0.01)	-1.82
963	D5002	873.3		-0.03	9142	D1298	872.9		-0.34

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970	D5002	873.4		0.05	9143	D1298	874.1		0.60
971	D5002	873.1		-0.18	9146		-----		-----
974	D5002	873.4		0.05					

normality		not OK
n		128
outliers		6
mean (n)		873.333
st.dev. (n)		0.4776
R(calc.)		1.337
st.dev.(D5002:19)		1.2850
R(D5002:19)		3.598

Lab 150 first reported 0.8730 kg/m^3
Lab 238 reported 0.8730 kg/m^3
Lab 610 first reported 877.1
Lab 657 first reported 0.8732 kg/m^3
Lab 862 reported 0.87332 kg/m^3
Lab 6143 first reported 0.8718 kg/m^3
Lab 9057 reported 0.87371 kg/m^3
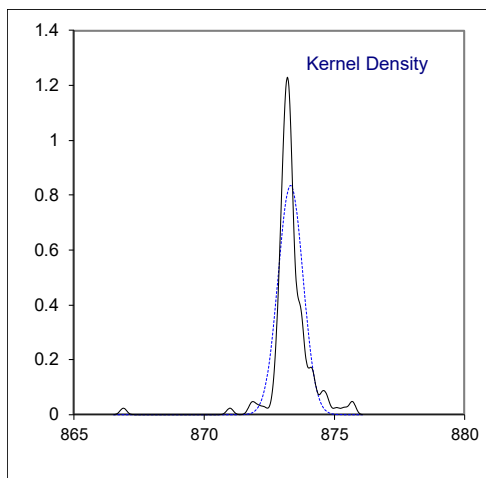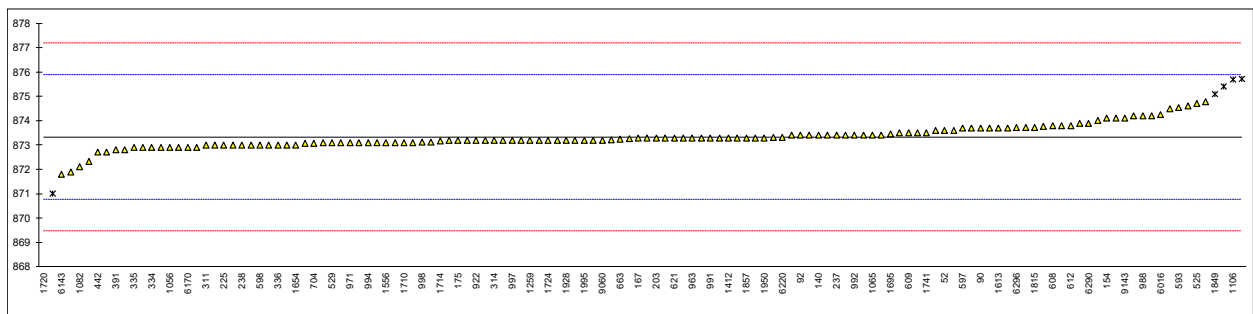
Determination of Kinematic Viscosity at 40°C on sample #19220; results in mm^2/s

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D445	9.676		-0.65	988	D445	9.838		-0.11
62		-----		-----	991	D445	9.659		-0.71
90	D445	9.8350		-0.12	992	D445	9.648		-0.74
92		-----		-----	994	D445	9.634		-0.79
120	D445	10.04		0.57	995	D445	9.685		-0.62
140	D445	10.50		2.11	997	D445	9.674		-0.66
150	D445	9.527		-1.15	998	D445	9.688		-0.61
154		-----		-----	1011		-----		-----
158		-----		-----	1039		-----		-----
159	D445	10.3589		1.64	1040	D445	10.80		3.12
167		-----		-----	1056	D7042	9.4		-1.58
168	D445	10.69		2.75	1065	D445	9.585		-0.96
170	D445	10.0361		0.56	1082		-----		-----
171		-----		-----	1089	D445	9.7296		-0.47
175		-----		-----	1106		-----		-----
186		-----		-----	1109	D445	10.312		1.48
203	D445	9.6472		-0.75	1212		-----		-----
225	D445	10.02		0.50	1236		-----		-----
237	D445	9.621		-0.83	1259	D7042	10.654	C	2.63
238		-----		-----	1357	D445	10.35		1.61
273	D445	10.14		0.91	1360		-----		-----
311		-----		-----	1397	D7042	9.443		-1.43
314		-----		-----	1412	D445	9.801		-0.23
332		-----		-----	1554		-----		-----
333		-----		-----	1556	ISO3104	9.9202		0.17
334		-----		-----	1613	D445	9.380		-1.64
335		-----		-----	1654	D445	10.0482		0.60
336		-----		-----	1656		-----		-----
391		-----		-----	1695		-----		-----
398	D445	9.3921		-1.60	1710		-----		-----
399	D445	9.385		-1.63	1714	D7042	9.4023		-1.57
442		-----		-----	1720	D445	10.21		1.14
444	D445	10.404		1.79	1724		-----		-----
445	D445	10.22		1.17	1728	D445	9.9651		0.32
446		-----		-----	1741	ISO3104	9.646		-0.75
447	D445	9.927		0.19	1810		-----		-----
485		-----		-----	1811		-----		-----
511	D445	9.737		-0.45	1815	ISO3104	10.008		0.46
525	D7042	9.4375		-1.45	1833		-----		-----
529		-----		-----	1842	D445	9.877		0.02
541		-----		-----	1849		-----		-----
551		-----		-----	1857	D445	9.7772		-0.31
557		-----		-----	1858	D445	9.796		-0.25
575	D445	10.012		0.48	1928	D445	9.2334		-2.13
593	D445	10.22		1.17	1929		-----		-----
597		-----		-----	1950	D445	9.805		-0.22
598	D7042	9.3330		-1.80	1957	D7042	9.247		-2.09
599	D7042	9.4421		-1.43	1984		-----		-----
600	D445	10.081		0.71	1995	D7042	9.52		-1.17
603	D445	9.421		-1.51	6016	D445	10.69		2.75
608	D445	10.670		2.68	6143	D445	9.844		-0.09
609		-----		-----	6166		-----		-----
610		-----		-----	6170		-----		-----
611		-----		-----	6201	D445	10.78	C	3.05
612	D445	9.17		-2.35	6203		-----		-----
621	D445	9.717		-0.51	6220	D7042	9.3630		-1.70
657	D445	9.401		-1.57	6234		-----		-----
663	D445	9.4612		-1.37	6238	D445	10.430		1.88
704	D445	9.7248		-0.49	6263		-----		-----
732	D445	9.638		-0.78	6273		-----		-----
739		-----		-----	6284		-----		-----
749		-----		-----	6290	D7042	9.8427		-0.09
750	D445	10.21		1.14	6294	D445	10.22		1.17
752	INH-33	9.488		-1.28	6295		-----		-----
753		-----		-----	6296		-----		-----
781	D445	9.622		-0.83	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D445	9.7423		-0.43	9057		-----		-----
862		-----		-----	9060		-----		-----
874		-----		-----	9063		-----		-----
875	D445	12.0288	R(0.01)	7.24	9099		-----		-----
904	D445	9.750		-0.40	9101		-----		-----
922	D445	10.13		0.87	9132		-----		-----
962	D445	9.682		-0.63	9141		-----		-----
963	D445	9.865		-0.02	9142	D445	10.49		2.08

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970	D445	9.89		0.07	9143	D7042	10.74	C	2.92
971	D445	9.908		0.13	9146		-----		-----
974	D445	9.892		0.07					

normality	OK
n	83
outliers	1
mean (n)	9.8699
st.dev. (n)	0.40380
R(calc.)	1.1306
st.dev.(D445:19)	0.29825
R(D445:19)	0.8351

Lab 1259 first reported 11.445
Lab 6201 first reported 7.295
Lab 9143 first reported 3.58
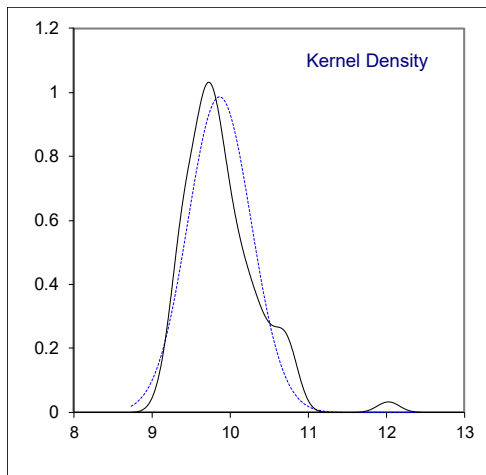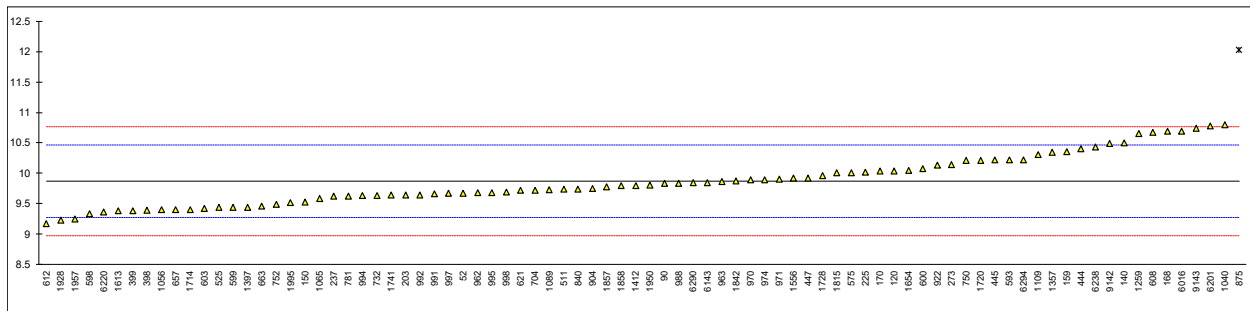
Determination of individual Light ends on sample #19220; results in %M/M

lab	method	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
52		-----	-----	-----	-----	-----	-----	-----	-----	-----
62		-----	-----	-----	-----	-----	-----	-----	-----	-----
90		-----	-----	-----	-----	-----	-----	-----	-----	-----
92		-----	-----	-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----	-----
150		-----	-----	-----	-----	-----	-----	-----	-----	-----
154		-----	-----	-----	-----	-----	-----	-----	-----	-----
158		-----	-----	-----	-----	-----	-----	-----	-----	-----
159		-----	-----	-----	-----	-----	-----	-----	-----	-----
167	D7900	0.000	0.0198	0.2782	0.1928	0.8786	0.7314	1.2709	**0.1448**	2.9801
168		-----	-----	-----	-----	-----	-----	-----	-----	-----
170		-----	-----	-----	-----	-----	-----	-----	-----	-----
171		-----	-----	-----	-----	-----	-----	-----	-----	-----
175		-----	-----	-----	-----	-----	-----	-----	-----	-----
186		-----	-----	-----	-----	-----	-----	-----	-----	-----
203		-----	-----	-----	-----	-----	-----	-----	-----	-----
225		-----	-----	-----	-----	-----	-----	-----	-----	-----
237		-----	-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----	-----
311	D7900/INH-430	<0.01	0.020	0.286	0.180	0.839	0.712	1.226	0.055	2.30
314		-----	-----	-----	-----	-----	-----	-----	-----	-----
332		-----	-----	-----	-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	-----	-----	-----
334		-----	-----	-----	-----	-----	-----	-----	-----	-----
335		-----	-----	-----	-----	-----	-----	-----	-----	-----
336		-----	-----	-----	-----	-----	-----	-----	-----	-----
391		-----	-----	-----	-----	-----	-----	-----	-----	-----
398		-----	-----	-----	-----	-----	-----	-----	-----	-----
399		-----	-----	-----	-----	-----	-----	-----	-----	-----
442	IP344	0.0005	0.0265	0.3274	0.1957	0.9446	0.7282	1.3550	0.0646	2.4996
444		-----	-----	-----	-----	-----	-----	-----	-----	-----
445		-----	-----	-----	-----	-----	-----	-----	-----	-----
446		-----	-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----	-----
485		-----	-----	-----	-----	-----	-----	-----	-----	-----
511		-----	-----	-----	-----	-----	-----	-----	-----	-----
525		-----	-----	-----	-----	-----	-----	-----	-----	-----
529		-----	-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----	-----
551		-----	-----	-----	-----	-----	-----	-----	-----	-----
557		-----	-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----	-----
593		-----	-----	-----	-----	-----	-----	-----	-----	-----
597		-----	-----	-----	-----	-----	-----	-----	-----	-----
598		-----	-----	-----	-----	-----	-----	-----	-----	-----
599		-----	-----	-----	-----	-----	-----	-----	-----	-----
600	In house	0.000	0.013	0.260	0.203	0.945	**0.893**	**1.468**	-----	3.243
603		-----	-----	-----	-----	-----	-----	-----	-----	-----
608	IP344	<0.01	0.0215	0.2925	0.1957	0.8739	0.7361	1.2557	-----	-----
609	IP344	<0.01	0.0095	0.2100	0.1583	0.7605	0.6613	1.1926	-----	-----
610		-----	-----	-----	-----	-----	-----	-----	-----	-----
611	IP344	<0.01	0.0104	0.2007	0.1615	0.7542	0.7126	1.2122	-----	-----
612		-----	-----	-----	-----	-----	-----	-----	-----	-----
621		-----	-----	-----	-----	-----	-----	-----	-----	-----
657		-----	-----	-----	-----	-----	-----	-----	-----	-----
663		-----	-----	-----	-----	-----	-----	-----	-----	-----
704		-----	-----	-----	-----	-----	-----	-----	-----	-----
732		-----	-----	-----	-----	-----	-----	-----	-----	-----
739		-----	-----	-----	-----	-----	-----	-----	-----	-----
749		-----	-----	-----	-----	-----	-----	-----	-----	-----
750		-----	-----	-----	-----	-----	-----	-----	-----	-----
752		-----	-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----	-----
781		-----	-----	-----	-----	-----	-----	-----	-----	-----
785		-----	-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----	-----
862		-----	-----	-----	-----	-----	-----	-----	Spijkenisse	-----
874		-----	-----	-----	-----	-----	-----	-----	-----	-----
875		-----	-----	-----	-----	-----	-----	-----	-----	-----
904		-----	-----	-----	-----	-----	-----	-----	-----	-----
922		-----	-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----	-----	-----	-----

lab	method	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
970		-----	-----	-----	-----	-----	-----	-----	-----	-----
971		-----	-----	-----	-----	-----	-----	-----	-----	-----
974		-----	-----	-----	-----	-----	-----	-----	-----	-----
988		-----	-----	-----	-----	-----	-----	-----	-----	-----
991		-----	-----	-----	-----	-----	-----	-----	-----	-----
992		-----	-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----	-----
995		-----	-----	-----	-----	-----	-----	-----	-----	-----
997		-----	-----	-----	-----	-----	-----	-----	-----	-----
998		-----	-----	-----	-----	-----	-----	-----	-----	-----
1011		-----	-----	-----	-----	-----	-----	-----	-----	-----
1039	D6729	<0.01	0.022	0.311	0.198	0.920	0.756	1.233	**0.138**	2.98
1040	D7169	0.000	0.03095	0.3243	0.20965	0.91635	0.75815	1.28745	0.0637	2.6009
1056		-----	-----	-----	-----	-----	-----	-----	-----	-----
1065		<0.001	0.0220	0.3060	0.1970	0.8900	0.726	1.243	0.072	2.753
1082		-----	0.015	0.275	0.185	0.852	0.708	1.217	0.051	2.601
1089	D5134	0.0000	0.0204	0.2914	0.1946	0.8665	0.7420	1.2374	0.0730	2.5162
1106		-----	-----	-----	-----	-----	-----	-----	-----	-----
1109	IP344	0.001	0.024	0.248	0.152	0.660	**0.552**	**0.919**	0.054	2.284
1212		-----	-----	-----	-----	-----	-----	-----	-----	-----
1236	D5134	<0.001	0.020	0.266	0.177	0.769	0.669	1.101	0.063	2.723
1259		-----	-----	-----	-----	-----	-----	-----	-----	-----
1357		-----	-----	-----	-----	-----	-----	-----	-----	-----
1360		-----	-----	-----	-----	-----	-----	-----	-----	-----
1397		-----	-----	-----	-----	-----	-----	-----	-----	-----
1412	IP344	<0.01	0.026	0.313	0.201	0.881	0.738	1.250	0.075	-----
1554		-----	-----	-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----	-----	-----
1613		-----	-----	-----	-----	-----	-----	-----	-----	-----
1654		-----	-----	-----	-----	-----	-----	-----	-----	-----
1656		-----	-----	-----	-----	-----	-----	-----	-----	-----
1695		-----	-----	-----	-----	-----	-----	-----	-----	-----
1710		-----	-----	-----	-----	-----	-----	-----	-----	-----
1714		-----	-----	0.235	0.166	0.737	0.663	1.116	0.070	2.887 C
1720		-----	-----	-----	-----	-----	-----	-----	-----	-----
1724		-----	-----	-----	-----	-----	-----	-----	-----	-----
1728		-----	-----	-----	-----	-----	-----	-----	-----	-----
1741		-----	-----	-----	-----	-----	-----	-----	-----	-----
1810		-----	-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----	-----
1815		-----	-----	-----	-----	-----	-----	-----	-----	-----
1833		-----	-----	-----	-----	-----	-----	-----	-----	-----
1842	IP601	0.00	0.02	0.28	0.19	0.9	0.75	1.28	0.06	2.55
1849		-----	-----	-----	-----	-----	-----	-----	-----	-----
1857		-----	-----	-----	-----	-----	-----	-----	-----	-----
1858		-----	-----	-----	-----	-----	-----	-----	-----	-----
1928		-----	-----	-----	-----	-----	-----	-----	-----	-----
1929		-----	-----	-----	-----	-----	-----	-----	-----	-----
1950		-----	-----	-----	-----	-----	-----	-----	-----	-----
1957		0.0003	0.0182 C	0.2242 C	0.1678 C	0.7254 C	0.6268 C	1.0555 C	0.0504 C	2.3052 C
1984		-----	-----	-----	-----	-----	-----	-----	-----	-----
1995		-----	-----	-----	-----	-----	-----	-----	-----	-----
6016		-----	-----	-----	-----	-----	-----	-----	-----	-----
6143										
6166		0.00	0.03	0.29	0.19	0.84	0.71	1.22	0.07	-----
6170		-----	-----	-----	-----	-----	-----	-----	-----	-----
6201	D7900	<0.01	<0.01	0.17	0.15	0.70	0.66	1.13	0.06	3.10
6203		-----	-----	-----	-----	-----	-----	-----	-----	-----
6220		-----	-----	-----	-----	-----	-----	-----	-----	-----
6234		-----	-----	-----	-----	-----	-----	-----	-----	-----
6238		-----	-----	-----	-----	-----	-----	-----	-----	-----
6263		-----	-----	-----	-----	-----	-----	-----	-----	-----
6273		-----	-----	-----	-----	-----	-----	-----	-----	-----
6284		-----	-----	-----	-----	-----	-----	-----	-----	-----
6290		-----	-----	-----	-----	-----	-----	-----	-----	-----
6294		-----	-----	-----	-----	-----	-----	-----	-----	-----
6295		-----	-----	-----	-----	-----	-----	-----	-----	-----
6296		-----	-----	-----	-----	-----	-----	-----	-----	-----
9051		-----	-----	-----	-----	-----	-----	-----	-----	-----
9052		-----	-----	-----	-----	-----	-----	-----	-----	-----
9057		-----	-----	-----	-----	-----	-----	-----	-----	-----
9060		-----	-----	-----	-----	-----	-----	-----	-----	-----
9063		-----	-----	-----	-----	-----	-----	-----	-----	-----
9099		-----	-----	-----	-----	-----	-----	-----	-----	-----
9101		-----	-----	-----	-----	-----	-----	-----	-----	-----
9132		-----	-----	-----	-----	-----	-----	-----	-----	-----
9141		-----	-----	-----	-----	-----	-----	-----	-----	-----
9142		-----	-----	-----	-----	-----	-----	-----	-----	-----

lab	method	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
9143		-----	-----	-----	-----	-----	-----	-----	-----	-----
9146		-----	-----	-----	-----	-----	-----	-----	-----	-----

		Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
	normality	n.a.	OK	OK	OK	OK	OK	OK	OK	OK
	n	18	18	20	20	20	18	18	14	15
	outliers	0	0	0	0	0	2	2	2	0
	mean (n)	<0.01	0.0205	0.2694	0.1833	0.8327	0.7105	1.2157	0.0630	2.6882
	st.dev. (n)	n.a.	0.00594	0.04304	0.01806	0.08549	0.03855	0.07388	0.00828	0.29915
	R(calc.)	n.a.	0.0166	0.1205	0.0506	0.2394	0.1079	0.2069	0.0232	0.8376
	st.dev.(IP344:88)	n.a.	0.00286	0.02011	0.00969	0.03925	0.02284	0.04472	0.00353	0.16071
	R(IP344:88)	n.a.	0.0080	0.0563	0.0271	0.1099	0.0639	0.1252	0.0099	0.4500

Bold test results are marked as statistical outliers
Lab 1714 first reported 5.774 for Hexanes
Lab 1957 first reported 0.0170 for Ethane, 0.2294 for Propane, 0.1583 for i-Butane, 0.6816 for n-Butane, 0.6428 for i-Pentane,
1.1105 for n-Pentane, 0.0408 for cyclo-Pentane and 8.0553 for Hexanes
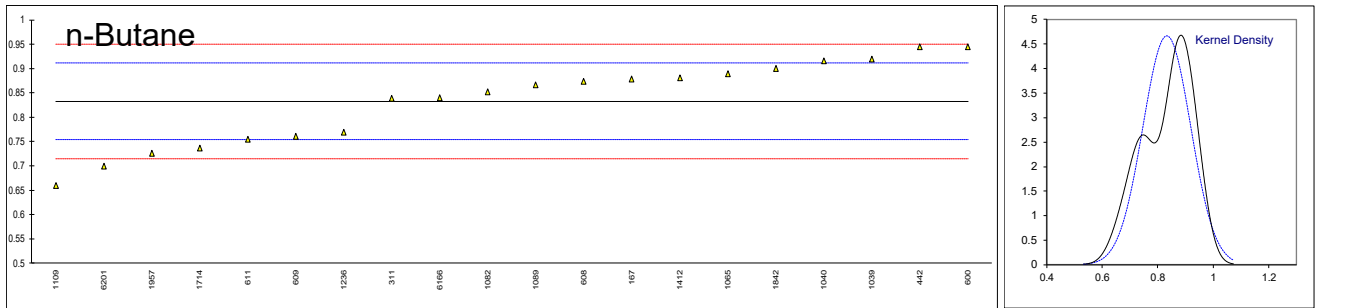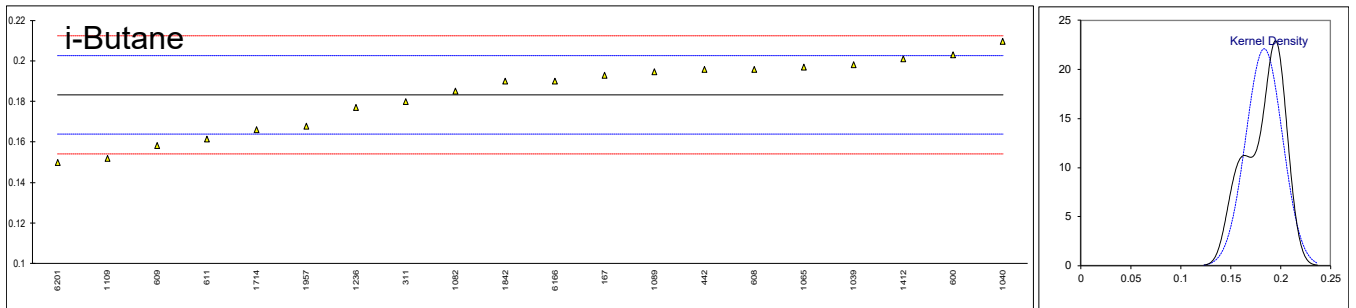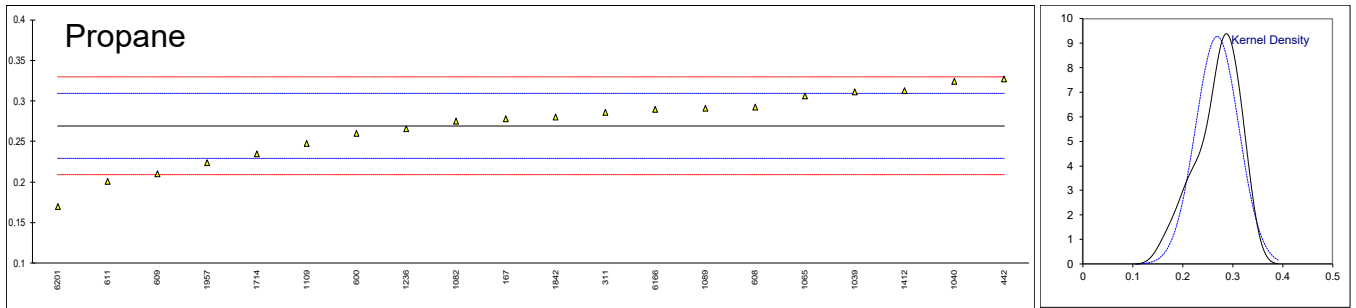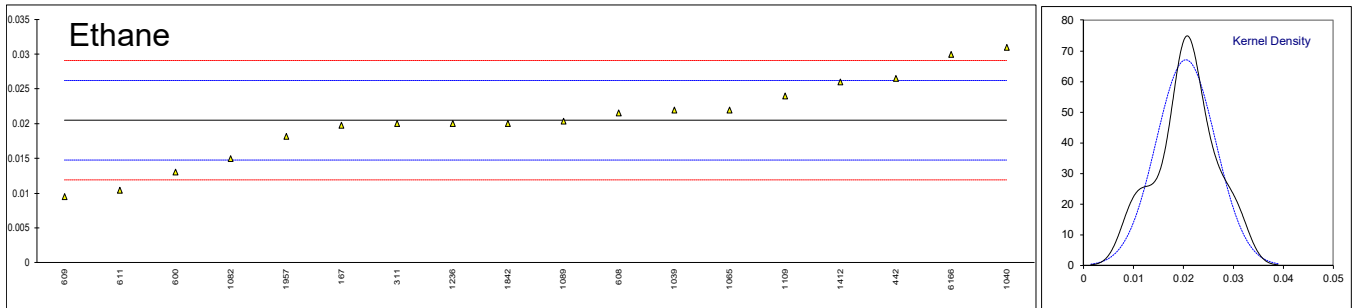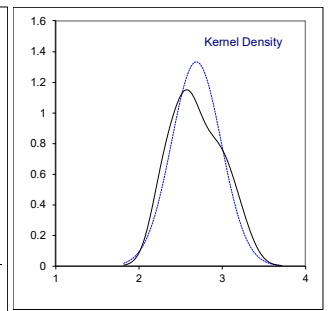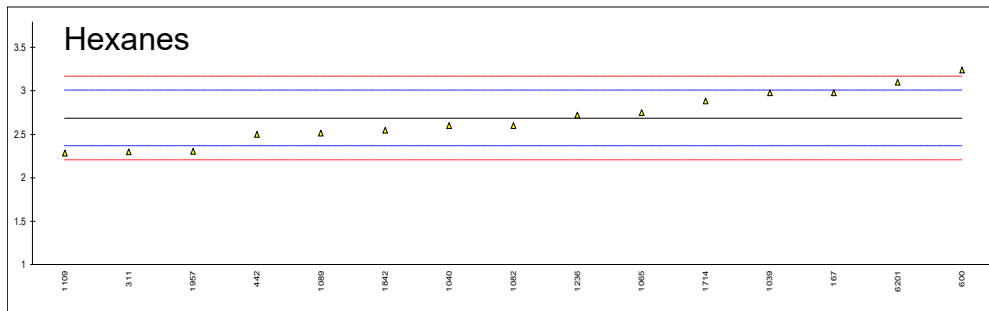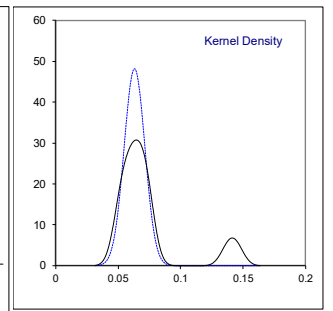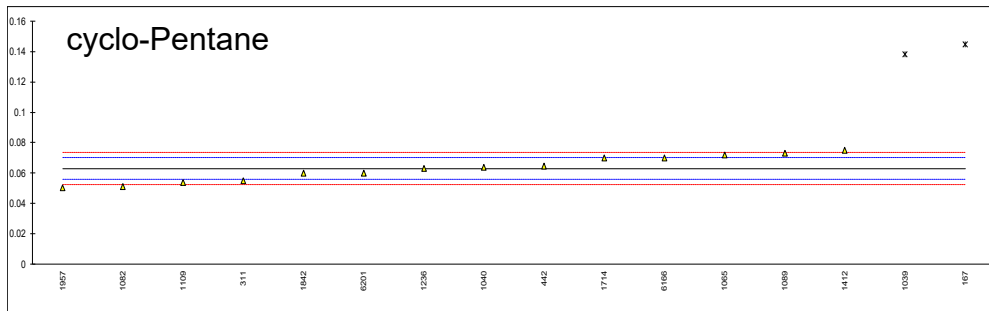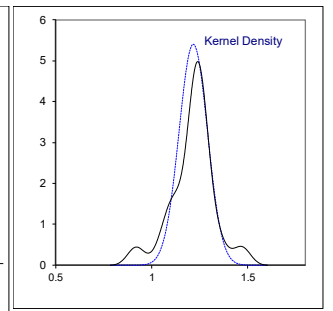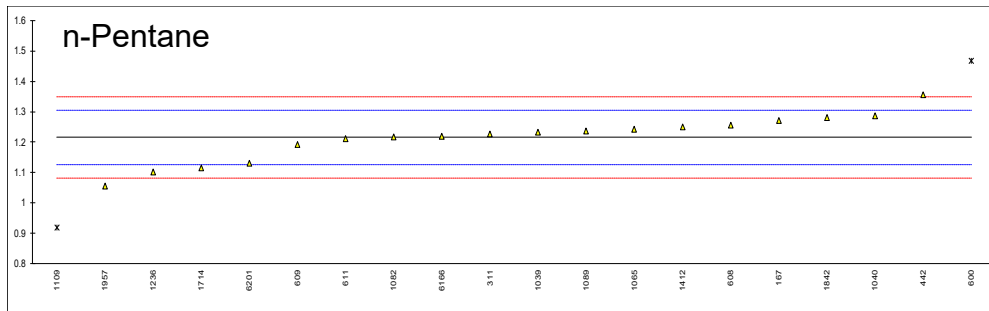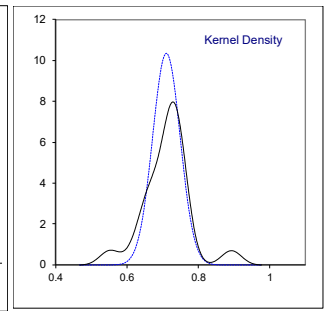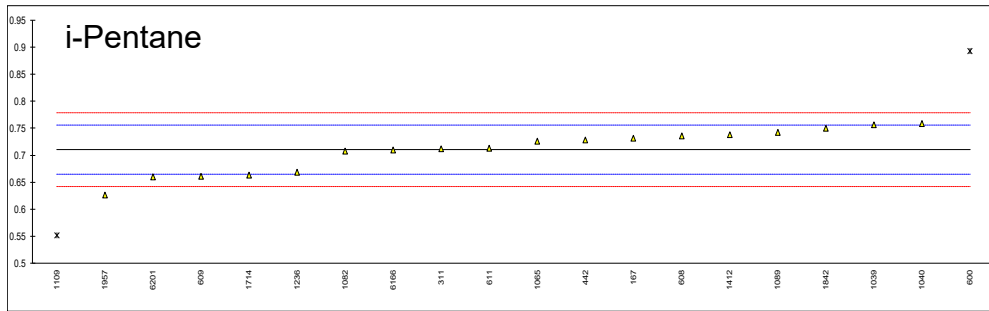
Determination of Total of all C1 – C6 on sample #19220; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988		-----		-----
62		-----		-----	991		-----		-----
90		-----		-----	992		-----		-----
92		-----		-----	994		-----		-----
120		-----		-----	995		-----		-----
140		-----		-----	997		-----		-----
150		-----		-----	998		-----		-----
154		-----		-----	1011		-----		-----
158		-----		-----	1039	D6729	6.56		-----
159		-----		-----	1040	D7169	6.7355		-----
167		-----		-----	1056		-----		-----
168		-----		-----	1065		-----		-----
170		-----		-----	1082		-----		-----
171		-----		-----	1089	D5134	5.9415		-----
175		-----		-----	1106		-----		-----
186		-----		-----	1109	IP344	4.893		-----
203		-----		-----	1212		-----		-----
225		-----		-----	1236	D5134	5.788		-----
237		-----		-----	1259		-----		-----
238		-----		-----	1357		-----		-----
273		-----		-----	1360		-----		-----
311	D7900/INH-430	6.01		-----	1397		-----		-----
314		-----		-----	1412		-----		-----
332		-----		-----	1554		-----		-----
333		-----		-----	1556		-----		-----
334		-----		-----	1613		-----		-----
335		-----		-----	1654		-----		-----
336		-----		-----	1656		-----		-----
391		-----		-----	1695		-----		-----
398		-----		-----	1710		-----		-----
399		-----		-----	1714	In house	5.895	C	-----
442	IP344	6.1447		-----	1720		-----		-----
444		-----		-----	1724		-----		-----
445		-----		-----	1728		-----		-----
446		-----		-----	1741		-----		-----
447		-----		-----	1810		-----		-----
485		-----		-----	1811		-----		-----
511		-----		-----	1815		-----		-----
525		-----		-----	1833		-----		-----
529		-----		-----	1842	IP601	6.55		-----
541		-----		-----	1849		-----		-----
551		-----		-----	1857		-----		-----
557		-----		-----	1858		-----		-----
575		-----		-----	1928		-----		-----
593		-----		-----	1929		-----		-----
597		-----		-----	1950		-----		-----
598		-----		-----	1957		5.1938	C	-----
599		-----		-----	1984		-----		-----
600	In house	7.025		-----	1995		-----		-----
603		-----		-----	6016		-----		-----
608		-----		-----	6143		-----		-----
609		-----		-----	6166		-----		-----
610		-----		-----	6170		-----		-----
611		-----		-----	6201	D7900	4.30		-----
612		-----		-----	6203		-----		-----
621		-----		-----	6220		-----		-----
657		-----		-----	6234		-----		-----
663		-----		-----	6238		-----		-----
704		-----		-----	6263		-----		-----
732		-----		-----	6273		-----		-----
739		-----		-----	6284		-----		-----
749		-----		-----	6290		-----		-----
750		-----		-----	6294		-----		-----
752		-----		-----	6295		-----		-----
753		-----		-----	6296		-----		-----
781		-----		-----	9051		-----		-----
785		-----		-----	9052		-----		-----
840		-----		-----	9057		-----		-----
862		-----		-----	9060		-----		-----
874		-----		-----	9063		-----		-----
875		-----		-----	9099		-----		-----
904		-----		-----	9101		-----		-----
922		-----		-----	9132		-----		-----
962		-----		-----	9141		-----		-----
963		-----		-----	9142		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970		-----		-----	9143		-----		-----
971		-----		-----	9146		-----		-----
974		-----		-----					
	normality	OK							
	n	12							
	outliers	0							
	mean (n)	5.9197							
	st.dev. (n)	0.79636							
	R(calc.)	2.2298							
	st.dev.(IP344:88)	(0.17439)							
	R(IP344:88)	(0.4883)							

Lab 1714 first reported 8.782
Lab 1957 first reported 10.9360
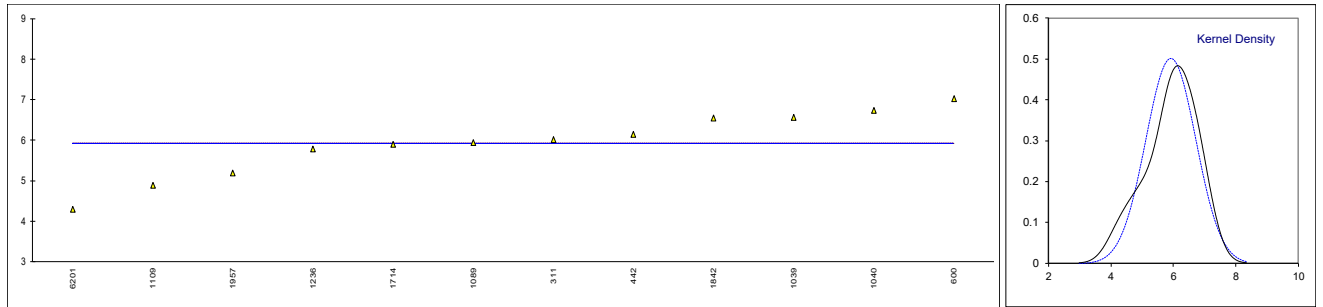
Determination of Molecular Mass, Average on sample #19220; results in g/mol

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988		-----		-----
62		-----		-----	991		-----		-----
90		-----		-----	992		-----		-----
92		-----		-----	994		-----		-----
120		-----		-----	995		-----		-----
140		-----		-----	997		-----		-----
150		-----		-----	998		-----		-----
154		-----		-----	1011		-----		-----
158		-----		-----	1039		-----		-----
159		-----		-----	1040		-----		-----
167		-----		-----	1056		-----		-----
168		-----		-----	1065		-----		-----
170		-----		-----	1082		-----		-----
171		-----		-----	1089		-----		-----
175		-----		-----	1106		-----		-----
186		-----		-----	1109		-----		-----
203		-----		-----	1212		-----		-----
225		-----		-----	1236	In house	233.29		-0.58
237		-----		-----	1259		-----		-----
238		-----		-----	1357		-----		-----
273		-----		-----	1360		-----		-----
311		-----		-----	1397		-----		-----
314		-----		-----	1412		-----		-----
332		-----		-----	1554		-----		-----
333		-----		-----	1556		-----		-----
334		-----		-----	1613		-----		-----
335		-----		-----	1654		-----		-----
336		-----		-----	1656		-----		-----
391		-----		-----	1695		-----		-----
398		-----		-----	1710		-----		-----
399		-----		-----	1714		-----		-----
442		-----		-----	1720		-----		-----
444		-----		-----	1724		-----		-----
445		-----		-----	1728		-----		-----
446		-----		-----	1741		-----		-----
447		-----		-----	1810		-----		-----
485		-----		-----	1811		-----		-----
511		-----		-----	1815		-----		-----
525	D2503	234.25		-0.39	1833		-----		-----
529		-----		-----	1842		-----		-----
541		-----		-----	1849		-----		-----
551		-----		-----	1857		-----		-----
557		-----		-----	1858		-----		-----
575		-----		-----	1928		-----		-----
593		-----		-----	1929		-----		-----
597		-----		-----	1950		-----		-----
598		-----		-----	1957		-----		-----
599		-----		-----	1984		-----		-----
600		-----		-----	1995		-----		-----
603		-----		-----	6016		-----		-----
608		-----		-----	6143		-----		-----
609		241		0.96	6166		-----		-----
610		-----		-----	6170		-----		-----
611		-----		-----	6201		-----		-----
612		-----		-----	6203		-----		-----
621		-----		-----	6220		-----		-----
657		-----		-----	6234		-----		-----
663		-----		-----	6238		-----		-----
704		-----		-----	6263		-----		-----
732		-----		-----	6273		-----		-----
739		-----		-----	6284		-----		-----
749		-----		-----	6290		-----		-----
750		-----		-----	6294		-----		-----
752		-----		-----	6295		-----		-----
753		-----		-----	6296		-----		-----
781		-----		-----	9051		-----		-----
785		-----		-----	9052		-----		-----
840		-----		-----	9057		-----		-----
862		-----		-----	9060		-----		-----
874		-----		-----	9063		-----		-----
875		-----		-----	9099		-----		-----
904		-----		-----	9101		-----		-----
922		-----		-----	9132		-----		-----
962		-----		-----	9141		-----		-----
963		-----		-----	9142		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970		-----		-----	9143		-----		-----
971		-----		-----	9146		-----		-----
974		-----		-----					

normality	unknown
n	3
outliers	0
mean (n)	236.18
st.dev. (n)	4.202
R(calc.)	11.76
st.dev.(D2503:92)	5
R(D2503:92)	14
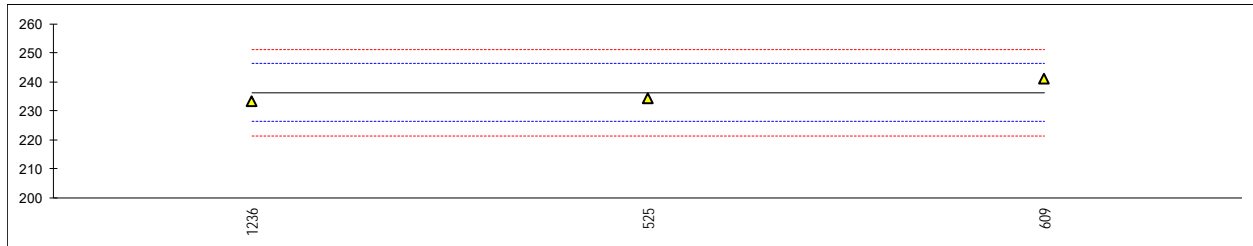
Determination of Pour Point, Maximum on sample #19220; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5853-A	-24		0.65	988	D5853-A	-33		-0.75
62		-----		-----	991	D5853-A	-30		-0.28
90	D5853-A	< -36		-----	992	D5853-A	-30		-0.28
92	D5853-A	<-24		-----	994	D5853-A	-33		-0.75
120	D5853-A	-36		-1.21	995	D5853-A	-30		-0.28
140	D97	<-30		-----	997	D5853-A	-30		-0.28
150	D97	-33		-0.75	998	D5853-A	-27		0.19
154		-----		-----	1011		-----		-----
158		-----		-----	1039	D5853-A	<-36		-----
159	D5853-A	-37		-1.37	1040	D5853-A	-15.0		2.05
167	D97	<-30		-----	1056	D5853-A	-24		0.65
168		-----		-----	1065	D5853-A	-30.0		-0.28
170	D5853-A	<-24.0		-----	1082		-----		-----
171		-----		-----	1089	D5853-A	-30	C	-0.28
175		-----		-----	1106	D5853-A	-27.0		0.19
186		-----		-----	1109		-----		-----
203	D5853-A	-26		0.34	1212		-----		-----
225	D5853-A	-33		-0.75	1236		-----		-----
237		-----		-----	1259	D5853-A	-21		1.12
238		-----		-----	1357		-----		-----
273		-----		-----	1360		-----		-----
311		-----		-----	1397		-----		-----
314		-----		-----	1412	D5853-A	-36		-1.21
332		-----		-----	1554		-----		-----
333		-----		-----	1556	D5853-A	-39		-1.68
334	D5853-A	-51	C,R(0.01)	-3.55	1613	D5853-A	<-24		-----
335		-----		-----	1654	D5853-A	-30.0		-0.28
336		-----		-----	1656		-----		-----
391	D5853-A	<-36		-----	1695		-----		-----
398		-----		-----	1710	D5853-A	-24		0.65
399	D5853-A	<-36		-----	1714	D5853-A	<= -36		-----
442		-----		-----	1720	D5853-A	-21.0		1.12
444		-----		-----	1724		-----		-----
445		-----		-----	1728	D5853-A	-30		-0.28
446		-----		-----	1741	D5853-A	-36		-1.21
447	D5853-A	-33		-0.75	1810		-----		-----
485		-----		-----	1811		-----		-----
511		-----		-----	1815	D5853-A	-30.0		-0.28
525		-----		-----	1833		-----		-----
529	D97	-21		1.12	1842		-----		-----
541		-----		-----	1849		-----		-----
551		-----		-----	1857	D5853-A	-27		0.19
557		-----		-----	1858	D5853-A	-33		-0.75
575	D5853-A	-24		0.65	1928		-----		-----
593		-----		-----	1929		-----		-----
597		-----		-----	1950		-----		-----
598	D5853-A	-15.0		2.05	1957		-----		-----
599		-----		-----	1984	D5853-A	<-21		-----
600	D5853-A	<-36		-----	1995	D5950	-21		1.12
603		-----		-----	6016	D5853	-27		0.19
608	D5853-A	-24		0.65	6143	D97	-30	C	-0.28
609		-----		-----	6166		-----		-----
610		-----		-----	6170		-----		-----
611		-----		-----	6201	D5853-A	-27		0.19
612	D5853-A	-27.0		0.19	6203		-----		-----
621	D5853-A	-18		1.59	6220	D97	-24		0.65
657	D5853-A	<-36		-----	6234		-----		-----
663	D5853-A	-33		-0.75	6238	ISO3016	-30		-0.28
704	D5853-A	-30		-0.28	6263		-----		-----
732	D5853-A	-33		-0.75	6273		-----		-----
739		-----		-----	6284		-----		-----
749		-----		-----	6290	D97	-27.7		0.08
750	D5853-A	-24		0.65	6294		-----		-----
752	D5853-A	-27		0.19	6295		-----		-----
753		-----		-----	6296		-----		-----
781	D5853-A	-30		-0.28	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D5853-A	-15		2.05	9057		-36		-1.21
862	D5853-A	-30		-0.28	9060		-----		-----
874		-----		-----	9063		-----		-----
875		-----		-----	9099		-----		-----
904	D5853-A	<-36		-----	9101	D5853-A	-24		0.65
922	D97	-27		0.19	9132		-----		-----
962	D5853-A	-27		0.19	9141		-----		-----
963	D5853-A	-30		-0.28	9142		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970	D5853-A	-33		-0.75	9143		-----		-----
971	D5853-A	<-36		-----	9146		-----		-----
974	D5853-A	-33		-0.75					

normality	OK
n	58
outliers	1
mean (n)	-28.20
st.dev. (n)	5.477
R(calc.)	15.34
st.dev.(D5853-A:17a)	6.429
R(D5853-A:17a)	18.0

Lab 334 first reported -54
Lab 1089 first reported 30
Lab 6143 first reported 30
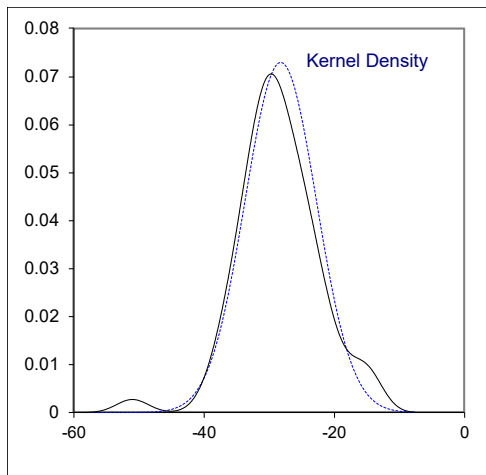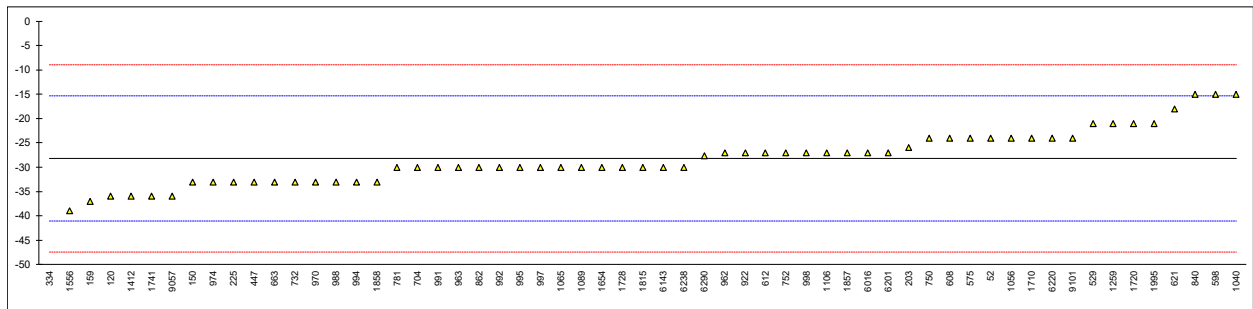
Determination of Salt as Chloride on sample #19220; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988	D3230	6.0		-0.61
62		-----		-----	991	D3230	16.2		1.33
90		-----		-----	992	D3230	16.5		1.39
92		-----		-----	994	D3230	16.0		1.30
120		-----		-----	995	D3230	16		1.30
140		-----		-----	997		-----		-----
150	D3230	13.6		0.84	998		-----		-----
154		-----		-----	1011		-----		-----
158		-----		-----	1039	In house	11.90		0.51
159	D3230	2.0		-1.37	1040	D3230	9.3		0.02
167		-----		-----	1056	D3230	9.39		0.04
168		-----		-----	1065		-----		-----
170		-----		-----	1082	D3230	9		-0.04
171		-----		-----	1089	D3230	10.47		0.24
175		-----		-----	1106		-----		-----
186		-----		-----	1109		-----		-----
203		-----		-----	1212	D3230	2.06		-1.36
225		-----		-----	1236	D3230	8.154		-0.20
237		-----		-----	1259	D3230	6.87		-0.44
238		-----		-----	1357	D3230	12.06		0.55
273		-----		-----	1360		9.73		0.10
311	D3230	6		-0.61	1397		-----		-----
314		-----		-----	1412	D3230	13.1		0.74
332		-----		-----	1554		-----		-----
333		-----		-----	1556	D3230	8.9		-0.06
334		-----		-----	1613	D3230	16.33		1.36
335		-----		-----	1654	D3230	12.35		0.60
336		-----		-----	1656		-----		-----
391		-----		-----	1695	D3230	8.93		-0.05
398		-----		-----	1710	D3230	14.0		0.92
399		-----		-----	1714	D6470	33.64	R(0.01)	4.66
442	IP265	11.3785		0.42	1720	D3230	8.80		-0.08
444	IP265	0.2		-1.72	1724		-----		-----
445	IP265	9.0		-0.04	1728		9.8		0.11
446		-----		-----	1741	D3230	6.0		-0.61
447		-----		-----	1810	D3230	6.7		-0.48
485	D3230	7.2		-0.38	1811	D3230	6.7		-0.48
511		-----		-----	1815	D3230	13.71		0.86
525		-----		-----	1833		-----		-----
529	D3230	8.99		-0.04	1842	IP265	12		0.53
541	D3230	7.21		-0.38	1849	D3230	4.78		-0.84
551		-----		-----	1857		-----		-----
557		-----		-----	1858	D3230	10		0.15
575		-----		-----	1928		9.88		0.13
593	D3230	4.729		-0.85	1929		13.16		0.76
597		-----		-----	1950	D3230	8.9		-0.06
598	D3230	15.1		1.12	1957		-----		-----
599		-----		-----	1984		-----		-----
600	D3230	4.0		-0.99	1995	D3230	8.7		-0.10
603		-----		-----	6016	D3230	8.3		-0.17
608		-----		-----	6143		-----		-----
609		-----		-----	6166		-----		-----
610		-----		-----	6170		-----		-----
611		-----		-----	6201	D3230	6.8		-0.46
612		-----		-----	6203	D3230	10.53		0.25
621	D3230	9.0		-0.04	6220	D3230	5.9	C	-0.63
657	D3230	12		0.53	6234		-----		-----
663		-----		-----	6238	D3230	6		-0.61
704	D3230	11.3		0.40	6263		-----		-----
732	GOST21534-A	16.3		1.35	6273		-----		-----
739	GOST21534	8.08		-0.21	6284		-----		-----
749	GOST21534	7.19		-0.38	6290	D3230	9.0		-0.04
750	D3230	6		-0.61	6294		-----		-----
752	D3230	4.6		-0.88	6295		-----		-----
753		-----		-----	6296		-----		-----
781	D3230	6.5		-0.51	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D6470	6.2		-0.57	9057		10		0.15
862		-----		-----	9060	D3230	7		-0.42
874		-----		-----	9063		-----		-----
875	D3230	11.0		0.34	9099		-----		-----
904	D3230	10.8		0.31	9101		-----		-----
922	D3230	8.2		-0.19	9132	D3230	6.541		-0.51
962		-----		-----	9141		-----		-----
963	D3230	8.8		-0.08	9142		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970	D3230	9.13		-0.01	9143		-----		-----
971		-----		-----	9146	In house	6.3		-0.55
974	D3230	9.13		-0.01					

normality		OK
n		72
outliers		1
mean (n)		9.200
st.dev. (n)		3.5553
R(calc.)		9.955
st.dev.(D3230:19)		5.2452
R(D3230:19)		14.687

Lab 6220 first reported 59

Kernel Density
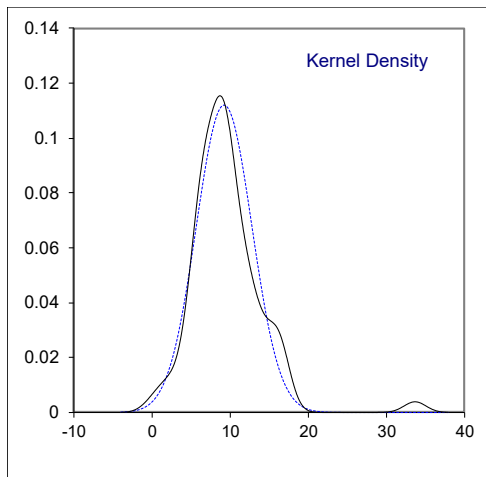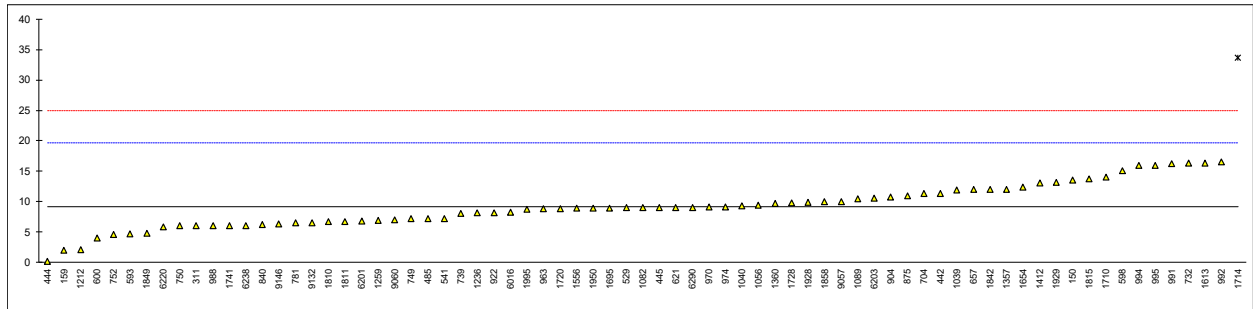
Determination of Sediment (Extraction method) on sample #19220; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D473	0.02		0.94	988	D473	0.01		0.14
62	D473	0.01		0.14	991	D473	0.008		-0.02
90	D473	0.010		0.14	992	D473	0.006		-0.18
92	D473	0.006		-0.18	994	D473	0.008		-0.02
120	D473	0.0975	R(0.01)	7.12	995	D473	0.007		-0.10
140	D473	0.00		-0.66	997	D473	0.008		-0.02
150	D473	0.01		0.14	998	D473	0.0035		-0.38
154	D473	0.01		0.14	1011		-----		-----
158		-----		-----	1039		-----		-----
159	D473	0.01		0.14	1040		-----		-----
167		-----		-----	1056		-----		-----
168	D473	<0.01		-----	1065		-----		-----
170	D473	0.0100		0.14	1082		-----		-----
171		-----		-----	1089	D473	0.00		-0.66
175		-----		-----	1106		-----		-----
186		-----		-----	1109	D473	0.009		0.06
203	D473	0.009		0.06	1212	D473	0.006		-0.18
225		-----		-----	1236		-----		-----
237	D473	0.00875		0.04	1259		-----		-----
238		-----		-----	1357		-----		-----
273	D473	0.01		0.14	1360		-----		-----
311	D473	<0.01		-----	1397		-----		-----
314		-----		-----	1412	D473	0.009		0.06
332		-----		-----	1554		-----		-----
333	D473	<0.01		-----	1556		-----		-----
334	D473	0.008		-0.02	1613	D473	0.010		0.14
335	D473	<0.01		-----	1654		-----		-----
336	D473	<0.01		-----	1656	D473	<0.01		-----
391		-----		-----	1695	D473	0.0066		-0.13
398		-----		-----	1710		-----		-----
399		-----		-----	1714		-----		-----
442		-----		-----	1720		-----		-----
444	D473	0.0276	C	1.54	1724		-----		-----
445	D473	<0.01		-----	1728	D473	0.008		-0.02
446	D473	0		-0.66	1741		-----		-----
447	D473	0.01		0.14	1810		-----		-----
485	D473	0.0061		-0.17	1811		-----		-----
511	D473	0.00897		0.06	1815	ISO3735	0.0004		-0.63
525		-----		-----	1833		-----		-----
529		-----		-----	1842		-----		-----
541	D473	<0.01		-----	1849		-----		-----
551		-----		-----	1857	D473	0.003		-0.42
557		-----		-----	1858	D473	0.0072		-0.08
575	D473	0.003		-0.42	1928		-----		-----
593	D473	0.007		-0.10	1929		-----		-----
597		-----		-----	1950	D473	0.007		-0.10
598		-----		-----	1957		-----		-----
599		-----		-----	1984		-----		-----
600		-----		-----	1995		-----		-----
603	D473	<0.01		-----	6016		-----		-----
608		-----		-----	6143		-----		-----
609		-----		-----	6166		-----		-----
610		-----		-----	6170		-----		-----
611		-----		-----	6201	D473	<0.01		-----
612		-----		-----	6203	D473	0.0024		-0.47
621	D473	0.0084		0.01	6220	D473	0.025	C	1.34
657	D473	0.005		-0.26	6234		-----		-----
663	D473	0.002		-0.50	6238	D473	0.01		0.14
704	D473	0.0083		0.00	6263		-----		-----
732	D473	0.007		-0.10	6273		-----		-----
739		-----		-----	6284		-----		-----
749		-----		-----	6290		-----		-----
750	GOST 6370	0.017		0.70	6294	D473	0.003		-0.42
752	D473	0.011		0.22	6295		-----		-----
753		-----		-----	6296		-----		-----
781	D473	0.01		0.14	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D473	0.002		-0.50	9057		-----		-----
862	D473	0.004		-0.34	9060		-----		-----
874		-----		-----	9063		-----		-----
875	D473	0.0058		-0.20	9099		-----		-----
904	D473	0.0109		0.21	9101		-----		-----
922	D473	0.008		-0.02	9132		-----		-----
962	D473	0.010		0.14	9141		-----		-----
963	D473	0.012		0.30	9142		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970		-----		-----	9143		-----		-----
971	D473	0.014		0.46	9146		-----		-----
974	D473	0.010		0.14					

normality	not OK
n	59
outliers	1
mean (n)	0.00825
st.dev. (n)	0.005128
R(calc.)	0.01436
st.dev.(D473:07e1)	0.012537
R(D473:07e1)	0.03510

Lab 444 first reported 0.033
Lab 6220 first reported 0.035
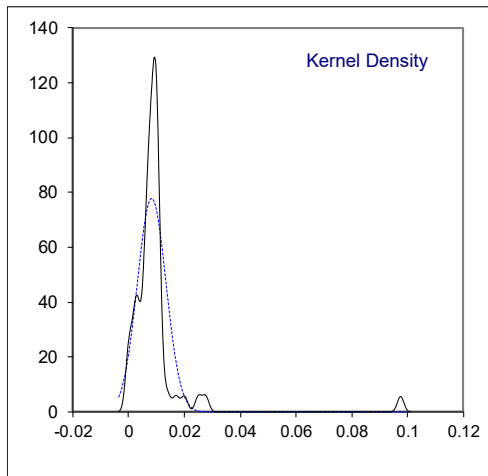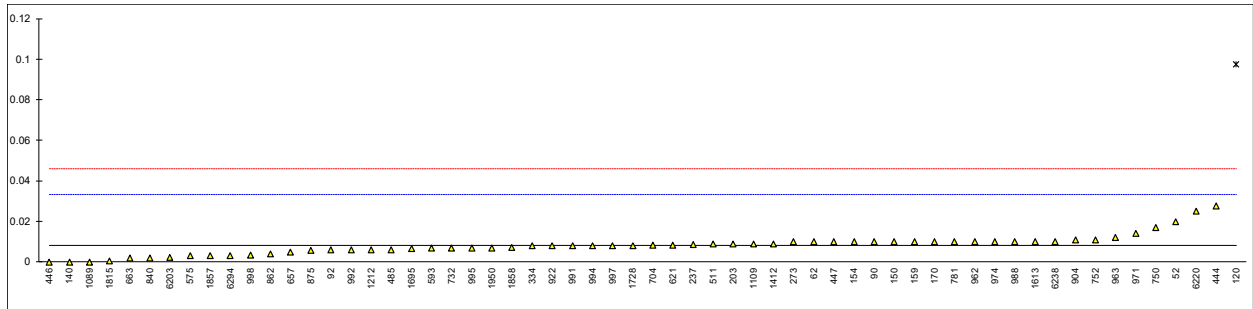
Determination of Sediment (Membrane filtration) on sample #19220; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4807	0.023		1.50	988		-----		-----
62	D4807	0.01		-1.01	991		-----		-----
90	D4807	0.0115		-0.72	992		-----		-----
92	D4807	0.007		-1.59	994	D4807	0.017		0.34
120		-----		-----	995	D4807	0.015		-0.04
140	D4807	0.002		-2.55	997		-----		-----
150	D4807	0.026	C	2.08	998		-----		-----
154		-----		-----	1011		-----		-----
158		-----		-----	1039	D4807	0.029		2.66
159		-----		-----	1040	D4807	0.013		-0.43
167		-----		-----	1056		-----		-----
168		-----		-----	1065		-----		-----
170		-----		-----	1082		-----		-----
171		-----		-----	1089		-----		-----
175		-----		-----	1106		-----		-----
186		-----		-----	1109	D4807	0.0125		-0.53
203	D4807	0.0184		0.61	1212		-----		-----
225		-----		-----	1236		-----		-----
237	D4807	0.015		-0.04	1259		-----		-----
238		-----		-----	1357	D4807	0.018		0.54
273		-----		-----	1360		0.0071		-1.57
311		-----		-----	1397		-----		-----
314		-----		-----	1412	D4807	0.019		0.73
332		-----		-----	1554		-----		-----
333		-----		-----	1556		-----		-----
334	D4807	0.0155		0.05	1613		-----		-----
335		-----		-----	1654		-----		-----
336		-----		-----	1656		-----		-----
391		-----		-----	1695		-----		-----
398	D4807	0.011		-0.82	1710		-----		-----
399	D4807	0.03	C	2.85	1714	D4807	0.012		-0.62
442		-----		-----	1720		-----		-----
444		-----		-----	1724		-----		-----
445		-----		-----	1728		-----		-----
446	D4807	0.058	R(0.01)	8.25	1741	D4807	0.0132		-0.39
447	D4807	0.039		4.59	1810	D4807	0.008		-1.39
485		-----		-----	1811		-----		-----
511		-----		-----	1815		-----		-----
525		-----		-----	1833		-----		-----
529		-----		-----	1842		-----		-----
541	D4807	0.0095		-1.10	1849		-----		-----
551		-----		-----	1857		-----		-----
557		-----		-----	1858		-----		-----
575		-----		-----	1928		0.0057		-1.84
593		-----		-----	1929		0.0061		-1.76
597		-----		-----	1950		-----		-----
598		-----		-----	1957	D4807	0.011		-0.82
599		-----		-----	1984	D4807	0.0145		-0.14
600	D4807	0.030		2.85	1995		-----		-----
603		-----		-----	6016		-----		-----
608	D4807	0.046	C,R(0.05)	5.94	6143		-----		-----
609		-----		-----	6166		-----		-----
610		-----		-----	6170		-----		-----
611	D4807	0.0157		0.09	6201	D4807	0.010	C	-1.01
612		-----		-----	6203	D4807	0.0049		-1.99
621		-----		-----	6220		-----		-----
657		-----		-----	6234		-----		-----
663	D4807	0.0084		-1.32	6238		-----		-----
704		-----		-----	6263		-----		-----
732	D4807	0.016		0.15	6273		-----		-----
739	GOST6370	0.0108		-0.85	6284		-----		-----
749	GOST6370	0.0116		-0.70	6290		-----		-----
750		-----		-----	6294		-----		-----
752		-----		-----	6295		-----		-----
753		-----		-----	6296		-----		-----
781	D4807	0.012		-0.62	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D4807	0.0288		2.62	9057		-----		-----
862		-----		-----	9060		-----		-----
874		-----		-----	9063		-----		-----
875		-----		-----	9099		-----		-----
904		-----		-----	9101		-----		-----
922		-----		-----	9132		-----		-----
962		-----		-----	9141		-----		-----
963	D4807	0.015		-0.04	9142		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970		-----		-----	9143		-----		-----
971	D4807	0.020		0.92	9146	D4807	0.022		1.31
974		-----		-----					

normality	suspect
n	41
outliers	2
mean (n)	0.01522
st.dev. (n)	0.007989
R(calc.)	0.02237
st.dev.(D4807:05)	0.005182
R(D4807:05)	0.01451

Lab 150 first reported 0.034
Lab 399 first reported 0.09
Lab 608 first reported 0.0817
Lab 6201 first reported 0.049
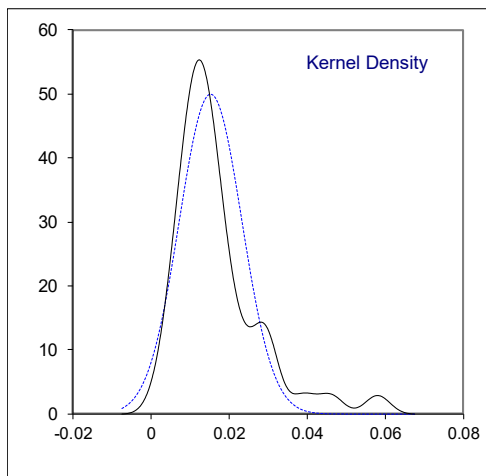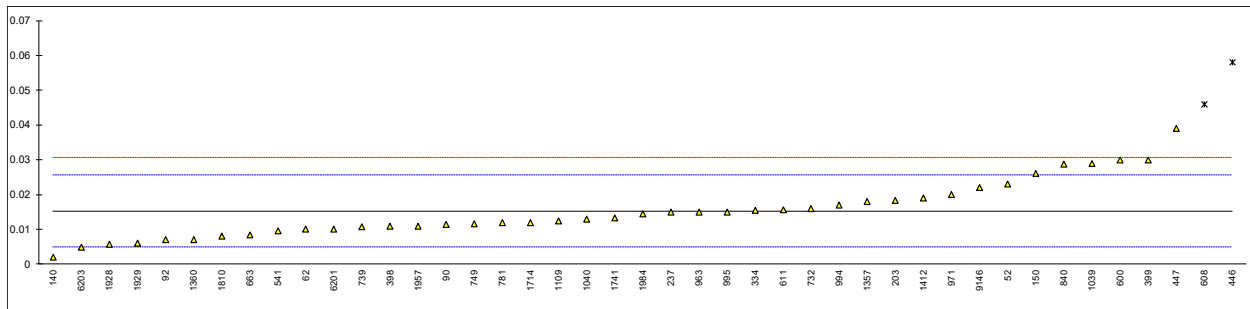
Determination of Sulfur, Total on sample #19220; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4294	2.61		-0.44	988	D4294	2.68		1.00
62	D4294	2.698		1.38	991	D4294	2.655		0.49
90	D4294	2.6654		0.70	992	D4294	2.673		0.86
92	D4294	2.651		0.41	994	D4294	2.63		-0.03
120	D4294	2.549		-1.70	995	D4294	2.627		-0.09
140	D4294	2.67		0.80	997	D4294	2.682		1.05
150	D4294	2.67		0.80	998	D4294	2.7781		3.03
154	D4294	2.46		-3.54	1011		-----		-----
158		-----		-----	1039	ISO8754	2.659		0.57
159	D4294	2.73459		2.13	1040	ISO8754	2.640		0.18
167	D4294	2.6809		1.02	1056	D4294	2.784		3.15
168	D4294	2.63	C	-0.03	1065	D4294	2.60		-0.65
170	D4294	2.72475		1.93	1082	ISO8754	2.596		-0.73
171		-----		-----	1089	D4294	2.698		1.38
175	D4294	2.673		0.86	1106		-----		-----
186		-----		-----	1109		-----		-----
203	D4294	2.5155		-2.39	1212	D4294	2.61		-0.44
225		-----		-----	1236		-----		-----
237	D4294	2.689		1.19	1259	ISO8754	2.589		-0.88
238	D4294	2.597		-0.71	1357	D4294	2.597		-0.71
273	D4294	2.6		-0.65	1360	ISO8754	2.59		-0.85
311	D4294	2.64		0.18	1397		-----		-----
314		-----		-----	1412	D4294	2.67		0.80
332		-----		-----	1554		-----		-----
333		-----		-----	1556	ISO8754	2.656		0.51
334	D4294	2.56		-1.47	1613	D4294	2.654		0.47
335	D4294	2.608		-0.48	1654	ISO8754	2.65		0.38
336		-----		-----	1656	D4294	2.62		-0.24
391	ISO8754	2.62		-0.24	1695	D4294	2.593		-0.79
398		-----		-----	1710	D4294	2.60		-0.65
399	D4294	2.64		0.18	1714	D2622	2.58		-1.06
442	IP336	2.556		-1.56	1720	D4294	2.571		-1.25
444	D2622	2.727		1.97	1724	D4294	2.59		-0.85
445	D4294	2.633		0.03	1728	D4294	2.61		-0.44
446		-----		-----	1741	ISO8754	2.680		1.00
447	IP336	2.66		0.59	1810	D2622	2.68		1.00
485	D4294	2.590		-0.85	1811	D4294	2.640		0.18
511		-----		-----	1815	D7039	2.5647		-1.38
525		-----		-----	1833		-----		-----
529	D4294	2.71		1.62	1842	D2622	2.55		-1.68
541		-----		-----	1849	ISO8754	2.55		-1.68
551		-----		-----	1857	D4294	2.604		-0.57
557		-----		-----	1858	D4294	2.629		-0.05
575	D4294	2.7058		1.54	1928	ISO8754	2.59		-0.85
593	D4294	2.6293		-0.04	1929	ISO8754	2.57		-1.27
597		-----		-----	1950	D4294	2.628		-0.07
598	D4294	3.003	R(0.01)	7.68	1957		-----		-----
599		-----		-----	1984		-----		-----
600	D4294	2.1	R(0.01)	-10.98	1995	D4294	2.51		-2.51
603		-----		-----	6016	D4294	2.67756		0.95
608	D4294	2.6438		0.26	6143	D2622	2.6772		0.95
609	D4294	2.64		0.18	6166		-----		-----
610		-----		-----	6170	D4294	2.60		-0.65
611		-----		-----	6201	D4294	2.626		-0.11
612		-----		-----	6203	D2622	2.6425		0.23
621	D4294	2.561		-1.45	6220	D4294	2.50		-2.71
657	D4294	2.62	C	-0.24	6234		-----		-----
663		-----		-----	6238	ISO8754	2.54		-1.89
704	D4294	2.665		0.69	6263		-----		-----
732	D4294	2.598		-0.69	6273		-----		-----
739	D4294	2.645		0.28	6284		-----		-----
749	D4294	2.654		0.47	6290		-----		-----
750	D4294	2.65		0.38	6294	D4294	2.698		1.38
752	ISO8754	2.563		-1.41	6295	D4294	2.667		0.74
753		-----		-----	6296	D4294	2.669		0.78
781	D4294	2.67		0.80	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D4294	2.556		-1.56	9057		-----		-----
862	D2622	2.776		2.99	9060		-----		-----
874		-----		-----	9063		-----		-----
875	D4294	2.71		1.62	9099		-----		-----
904		-----		-----	9101	D4294	3.0670	C,R(0.01)	9.00
922	D4294	2.696		1.33	9132		-----		-----
962	D4294	2.51		-2.51	9141		-----		-----
963	D4294	2.59		-0.85	9142		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970	D4294	2.61		-0.44	9143		-----		-----
971	D4294	2.62		-0.24	9146	In house	2.7		1.42
974	D4294	2.62		-0.24					

normality	OK
n	101
outliers	3
mean (n)	2.6314
st.dev. (n)	0.05974
R(calc.)	0.1673
st.dev.(D4294:16e1)	0.04842
R(D4294:16e1)	0.1356

Lab 168 first reported 2.86
Lab 657 first reported 2.03
Lab 9101 first reported 3.18234

Kernel Density
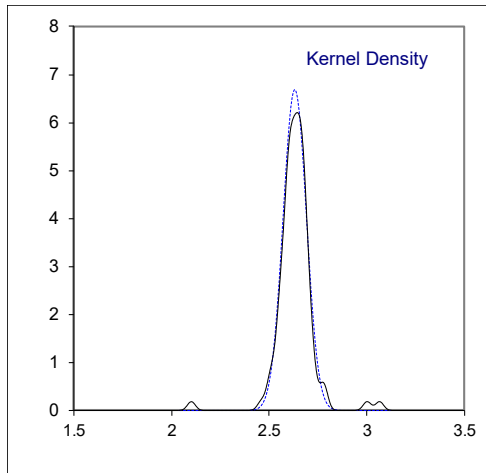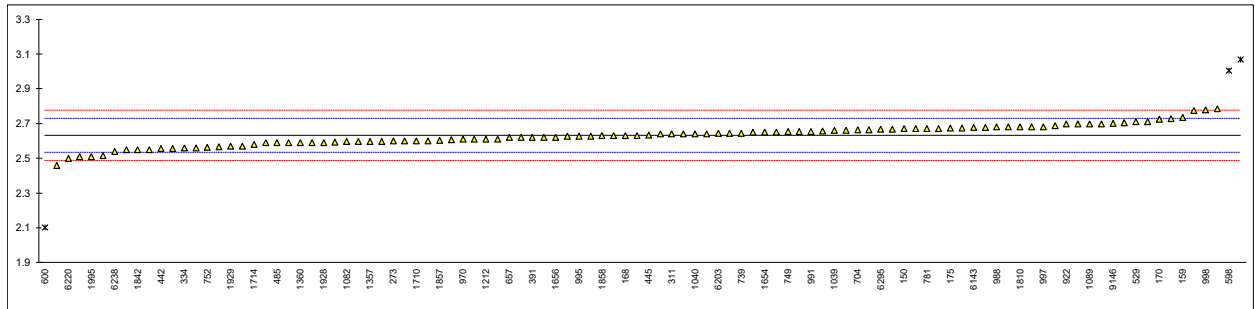
Determination of Water on sample #19220; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4928	0.03		-0.35	988	D4006	0.025		-0.74
62	D4377	0.035		0.04	991	D4006	0.025		-0.74
90	D4928	0.034		-0.04	992	D4006	0.025		-0.74
92	D4377	0.037		0.19	994	D4928	0.03		-0.35
120	D6304	0.026		-0.66	995	D4928	0.0276	C	-0.53
140	D4928	0.04		0.43	997	D4928	0.0253		-0.71
150	D4928	0.0355		0.08	998		-----		-----
154	D4006	0.025		-0.74	1011		-----		-----
158		-----		-----	1039	D4928	0.0416		0.55
159	D4377	0.02505		-0.73	1040	D4377	0.0555		1.63
167		-----		-----	1056	D4928	0.04		0.43
168	D4006	<0.01		-----	1065	D4928	0.0345		0.00
170		-----		-----	1082	ISO10336	0.058		1.82
171		-----		-----	1089	D4928	0.04		0.43
175		-----		-----	1106		-----		-----
186		-----		-----	1109	D4377	0.04		0.43
203	D4928	0.0285		-0.46	1212	D6304	0.036		0.12
225		-----		-----	1236	D4928	0.0377		0.25
237	D4006	0.025		-0.74	1259	D4006	<0.05		-----
238		-----		-----	1357		-----		-----
273	D4928	0.026		-0.66	1360	D4377	0.04		0.43
311		-----		-----	1397		-----		-----
314	D4928	0.03		-0.35	1412	D4928	0.039		0.35
332		-----		-----	1554		-----		-----
333	D4377	0.05		1.20	1556	D6304	0.03		-0.35
334	D4377	0.029		-0.43	1613	D95	<0.05		-----
335	D4377	0.0454		0.85	1654		-----		-----
336	ISO10337	0.029	ex	-0.43	1656	D4377	0.03		-0.35
391	D4377	0.05		1.20	1695	D4006	0.025		-0.74
398	D4928	0.051		1.28	1710	ISO9029	<0.025		-----
399	D4377	0.05		1.20	1714	D4006	0.039		0.35
442	IP386	0.0368		0.18	1720		-----		-----
444	D4928	0.034		-0.04	1724	D4377	0.04721		0.99
445	D4928	0.034		-0.04	1728		-----		-----
446	D4928	0.035		0.04	1741	D4006	0.0		-2.67
447	IP386	0.021		-1.05	1810	D4377	0.046		0.89
485	D4377	0.0368		0.18	1811	D4377	0.044		0.74
511		-----		-----	1815	D4377	0.0323		-0.17
525	D4928	0.0191		-1.19	1833		-----		-----
529	D4377	0.03753		0.24	1842	D95	<0.05		-----
541	D4928	0.033		-0.12	1849	D4928	0.0327		-0.14
551		-----		-----	1857	D4377	0.047		0.97
557		-----		-----	1858	D4006	0.025		-0.74
575	D4377	0.0315		-0.23	1928	D4377	0.05		1.20
593	D4006	<0.025	C	-----	1929	D4377	0.05		1.20
597		-----		-----	1950	D4377	0.045		0.81
598	D4377	0.0193		-1.18	1957	D4928	0.04		0.43
599		-----		-----	1984	D4377	0.054		1.51
600	D4928	0.0289		-0.43	1995	D6304	0.4	R(0.01)	28.32
603	D4006	<0.01		-----	6016	ISO10337	0.03		-0.35
608	D4377	0.0395		0.39	6143		-----		-----
609		-----		-----	6166		-----		-----
610	D6304	0.006931		-2.14	6170	D4006	0.050		1.20
611	D4377	0.0278		-0.52	6201	D4377	0.032		-0.19
612		-----		-----	6203		0.025		-0.74
621	D6304	0.023		-0.89	6220	D4928	0.025		-0.74
657	D4377	0.03		-0.35	6234		-----		-----
663	D4377	0.0384		0.30	6238		-----		-----
704	D4377	0.033		-0.12	6263		-----		-----
732	GOST33700	0.025		-0.74	6273		-----		-----
739	GOST2477	0.03		-0.35	6284		-----		-----
749	GOST2477	0.03		-0.35	6290	D4377	0.03		-0.35
750	D4006	0.025		-0.74	6294	D4006	0.0225	C	-0.93
752	D4006	0.025		-0.74	6295	D4377	0.07		2.75
753		-----		-----	6296	D4377	0.0619		2.12
781	D4006	0.025		-0.74	9051		-----		-----
785		-----		-----	9052		-----		-----
840	D4928	0.041		0.50	9057		0.0493		1.15
862	D4006	<0.025		-----	9060	D4377	0.03		-0.35
874		-----		-----	9063	D4377	0.019		-1.20
875		-----		-----	9099		-----		-----
904	D4928	0.042		0.58	9101	D4006	0.05		1.20
922	D4928	0.03		-0.35	9132		-----		-----
962		-----		-----	9141	D4006	0.025	C	-0.74
963	D4377	0.030		z:-0.35	9142	D4006	0.025		-0.74

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
970	D4928	0.0382		0.29	9143	D4006	0.025	C	-0.74
971	D4928	0.040		0.43	9146	In house	<0.1		-----
974	D4928	0.0375		0.23					

normality	suspect
n	101
outliers	1 +1ex
mean (n)	0.03449
st.dev. (n)	0.011042
R(calc.)	0.03092
st.dev.(D4377:00)	0.012905
R(D4377:00)	0.03613

Lab 336 excluded as reported in a different unit: 0.029 %M/M
Lab 593 first reported 0.00
Lab 995 first reported 276 %V/V
Lab 6294 first reported 0
Lab 9141 first reported 0.00
Lab 9143 first reported 0.00
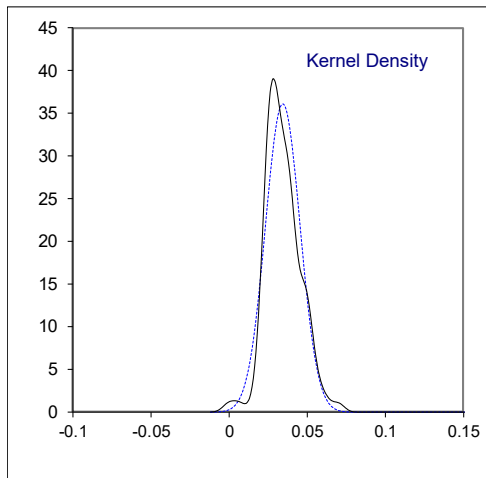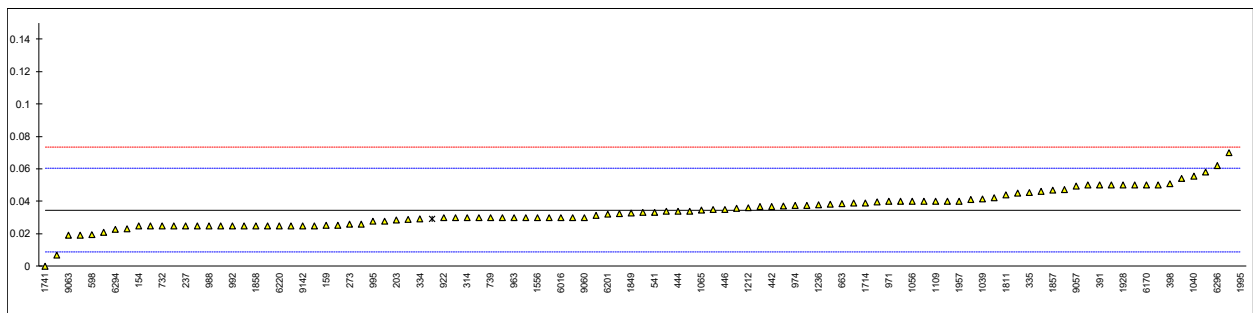
## Determination of Simulated Distillation on sample #19220; results in °C

lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP	tot recovery
52		-----	-----	-----	-----	-----	-----	-----	-----	-----
62		-----	-----	-----	-----	-----	-----	-----	-----	-----
90		-----	-----	-----	-----	-----	-----	-----	-----	-----
92		-----	-----	-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----	-----
150	D7169	<36.0	69.0	114.5	253.0	378.0	517.5	708.0	>720.0	91.0
154		-----	-----	-----	-----	-----	-----	-----	-----	-----
158		-----	-----	-----	-----	-----	-----	-----	-----	-----
159		-----	-----	-----	-----	-----	-----	-----	-----	-----
167	D7169	<30.0	79.98	118.17	237.92	354.12	481.48	646.03	>720.00	96.71
168		-----	-----	-----	-----	-----	-----	-----	-----	-----
170		-----	-----	-----	-----	-----	-----	-----	-----	-----
171		-----	-----	-----	-----	-----	-----	-----	-----	-----
175		-----	-----	-----	-----	-----	-----	-----	-----	-----
186		-----	-----	-----	-----	-----	-----	-----	-----	-----
203		-----	-----	-----	-----	-----	-----	-----	-----	-----
225		-----	-----	-----	-----	-----	-----	-----	-----	-----
237		-----	-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----	-----
311	D7169	<36.0	86.5	125.5	263.0	390.5	535.5	>720.0	>720.0	-----
314		-----	-----	-----	-----	-----	-----	-----	-----	-----
332		-----	-----	-----	-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	-----	-----	-----
334		-----	-----	-----	-----	-----	-----	-----	-----	-----
335		-----	-----	-----	-----	-----	-----	-----	-----	-----
336		-----	-----	-----	-----	-----	-----	-----	-----	-----
391		-----	-----	-----	-----	-----	-----	-----	-----	-----
398		-----	-----	-----	-----	-----	-----	-----	-----	-----
399		-----	-----	-----	-----	-----	-----	-----	-----	-----
442		-----	-----	-----	-----	-----	-----	-----	-----	-----
444		-----	-----	-----	-----	-----	-----	-----	-----	-----
445	D7169	-0.5	68.7	117.7	254.9	369.9	492.5	636.9	735.6	85.4
446		-----	-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----	-----
485		-----	-----	-----	-----	-----	-----	-----	-----	-----
511		-----	-----	-----	-----	-----	-----	-----	-----	-----
525		-----	-----	-----	-----	-----	-----	-----	-----	-----
529		-----	-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----	-----
551		-----	-----	-----	-----	-----	-----	-----	-----	-----
557		-----	-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----	-----
593		-----	-----	-----	-----	-----	-----	-----	-----	-----
597		-----	-----	-----	-----	-----	-----	-----	-----	-----
598		-----	-----	-----	-----	-----	-----	-----	-----	-----
599		-----	-----	-----	-----	-----	-----	-----	-----	-----
600		-----	-----	-----	-----	-----	-----	-----	-----	-----
603		-----	-----	-----	-----	-----	-----	-----	-----	-----
608	D2887	4.5	71.5	112.3	245.3	355.2	488.7	653.2	714.8	-----
609		-----	-----	-----	-----	-----	-----	-----	-----	-----
610		-----	-----	-----	-----	-----	-----	-----	-----	-----
611		-----	-----	-----	-----	-----	-----	-----	-----	-----
612		-----	-----	-----	-----	-----	-----	-----	-----	-----
621		-----	-----	-----	-----	-----	-----	-----	-----	-----
657		-----	-----	-----	-----	-----	-----	-----	-----	-----
663		-----	-----	-----	-----	-----	-----	-----	-----	-----
704		-----	-----	-----	-----	-----	-----	-----	-----	-----
732		-----	-----	-----	-----	-----	-----	-----	-----	-----
739		-----	-----	-----	-----	-----	-----	-----	-----	-----
749		-----	-----	-----	-----	-----	-----	-----	-----	-----
750		-----	-----	-----	-----	-----	-----	-----	-----	-----
752		-----	-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----	-----
781		-----	-----	-----	-----	-----	-----	-----	-----	-----
785		-----	-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----	-----
862		-----	-----	-----	-----	-----	-----	-----	-----	-----
874		-----	-----	-----	-----	-----	-----	-----	-----	-----
875		-----	-----	-----	-----	-----	-----	-----	-----	-----
904		-----	-----	-----	-----	-----	-----	-----	-----	-----
922		-----	-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----	-----	-----	-----

lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP	tot recovery
970		-----	-----	-----	-----	-----	-----	-----	-----	-----
971	D7169	<36	80.1	111.5	242.6	361.9	490.6	654.9	775.0	99.49
974		-----	-----	-----	-----	-----	-----	-----	-----	-----
988		-----	-----	-----	-----	-----	-----	-----	-----	-----
991		-----	-----	-----	-----	-----	-----	-----	-----	-----
992		-----	-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----	-----
995		-----	-----	-----	-----	-----	-----	-----	-----	-----
997		-----	-----	-----	-----	-----	-----	-----	-----	-----
998		-----	-----	-----	-----	-----	-----	-----	-----	-----
1011		-----	-----	-----	-----	-----	-----	-----	-----	-----
1039	EN15199-3	-16.4	64.4	110.3	248.7	372.9	508.7	693.8	-----	93.9
1040	D7169	-11.7	68.7	105.9	248.2	381.75	532.2	739.2	-----	90.65
1056		-----	-----	-----	-----	-----	-----	-----	-----	-----
1065		-----	**36.0**	**78.2**	239.4	361.6	492.4	662.0	-----	97.5
1082	EN15199-3	-0.5	68.7	117.7	260.6	387.2	529.5	710.9	>736.0	-----
1089		-----	-----	-----	-----	-----	-----	-----	-----	-----
1106		-----	-----	-----	-----	-----	-----	-----	-----	-----
1109	D7169	<36.0	70.0	117.4	246.8	363.8	488.4	656.6	744.4	100.0
1212		-----	-----	-----	-----	-----	-----	-----	-----	-----
1236		-----	-----	-----	-----	-----	-----	-----	-----	-----
1259		-----	-----	-----	-----	-----	-----	-----	-----	-----
1357		-----	-----	-----	-----	-----	-----	-----	-----	-----
1360		-----	-----	-----	-----	-----	-----	-----	-----	-----
1397		-----	-----	-----	-----	-----	-----	-----	-----	-----
1412		-----	-----	-----	-----	-----	-----	-----	-----	-----
1554		-----	-----	-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----	-----	-----
1613		-----	-----	-----	-----	-----	-----	-----	-----	-----
1654		-----	-----	-----	-----	-----	-----	-----	-----	-----
1656		-----	-----	-----	-----	-----	-----	-----	-----	-----
1695		-----	-----	-----	-----	-----	-----	-----	-----	-----
1710		-----	-----	-----	-----	-----	-----	-----	-----	-----
1714	D7169	37.0	49.61	**92.10**	234.2	368.2	507.2	702.9	-----	92.09
1720		-----	-----	-----	-----	-----	-----	-----	-----	-----
1724		-----	-----	-----	-----	-----	-----	-----	-----	-----
1728		-----	-----	-----	-----	-----	-----	-----	-----	-----
1741		-----	-----	-----	-----	-----	-----	-----	-----	-----
1810		-----	-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----	-----
1815		-----	-----	-----	-----	-----	-----	-----	-----	-----
1833		-----	-----	-----	-----	-----	-----	-----	-----	-----
1842	D7169	0	69	111	246	375	515	725	745	91
1849		-----	-----	-----	-----	-----	-----	-----	-----	-----
1857		-----	-----	-----	-----	-----	-----	-----	-----	-----
1858		-----	-----	-----	-----	-----	-----	-----	-----	-----
1928		-----	-----	-----	-----	-----	-----	-----	-----	-----
1929		-----	-----	-----	-----	-----	-----	-----	-----	-----
1950		-----	-----	-----	-----	-----	-----	-----	-----	-----
1957		-----	-----	-----	-----	-----	-----	-----	-----	-----
1984		-----	-----	-----	-----	-----	-----	-----	-----	-----
1995		-----	-----	-----	-----	-----	-----	-----	-----	-----
6016		-----	-----	-----	-----	-----	-----	-----	-----	-----
6143		-----	-----	-----	-----	-----	-----	-----	-----	-----
6166		-----	-----	-----	-----	-----	-----	-----	-----	-----
6170		-----	-----	-----	-----	-----	-----	-----	-----	-----
6201	D7169	<36.0	67.0	115.0	247.0	375.0	522.0	716.0	>720	90.3
6203		-----	-----	-----	-----	-----	-----	-----	-----	-----
6220		-----	-----	-----	-----	-----	-----	-----	-----	-----
6234		-----	-----	-----	-----	-----	-----	-----	-----	-----
6238		-----	-----	-----	-----	-----	-----	-----	-----	-----
6263		-----	-----	-----	-----	-----	-----	-----	-----	-----
6273		-----	-----	-----	-----	-----	-----	-----	-----	-----
6284		-----	-----	-----	-----	-----	-----	-----	-----	-----
6290		-----	-----	-----	-----	-----	-----	-----	-----	-----
6294		-----	-----	-----	-----	-----	-----	-----	-----	-----
6295		-----	-----	-----	-----	-----	-----	-----	-----	-----
6296		-----	-----	-----	-----	-----	-----	-----	-----	-----
9051		-----	-----	-----	-----	-----	-----	-----	-----	-----
9052		-----	-----	-----	-----	-----	-----	-----	-----	-----
9057		-----	-----	-----	-----	-----	-----	-----	-----	-----
9060		-----	-----	-----	-----	-----	-----	-----	-----	-----
9063		-----	-----	-----	-----	-----	-----	-----	-----	-----
9099		-----	-----	-----	-----	-----	-----	-----	-----	-----
9101		-----	-----	-----	-----	-----	-----	-----	-----	-----
9132		-----	-----	-----	-----	-----	-----	-----	-----	-----
9141		-----	-----	-----	-----	-----	-----	-----	-----	-----
9142		-----	-----	-----	-----	-----	-----	-----	-----	-----

lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP	tot recovery
9143		-----	-----	-----	-----	-----	-----	-----	-----	-----
9146		-----	-----	-----	-----	-----	-----	-----	-----	-----

		IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
	normality	unknown	not OK	OK	OK	OK	OK	OK	n.a.
	n	11	13	12	14	14	14	13	10
	outliers	0	1	2	0	0	0	0	0
	mean (n)	<36	70.25	114.75	247.69	371.08	507.26	685.03	>710
	st.dev. (n)	n.a.	8.844	5.050	8.154	11.127	18.354	34.377	n.a.
	R(calc.)	n.a.	24.76	14.14	22.83	31.15	51.39	96.26	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 test results are marked as statistical outliers
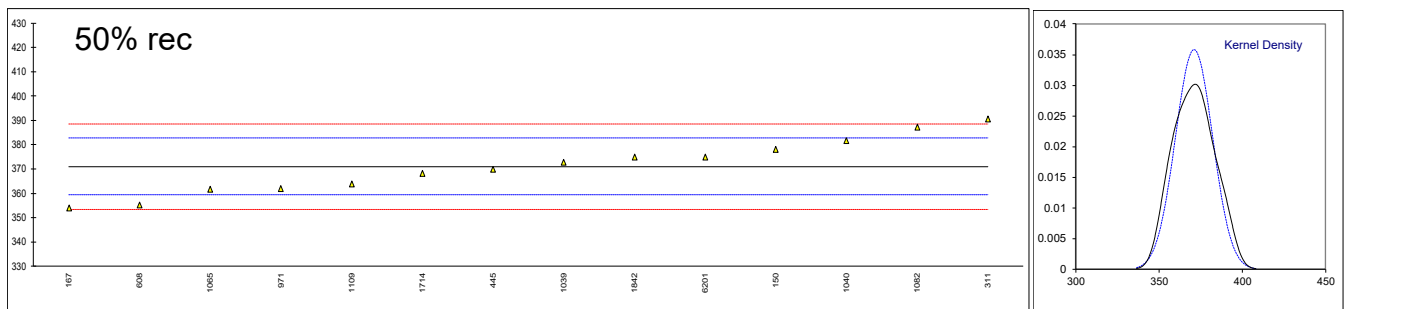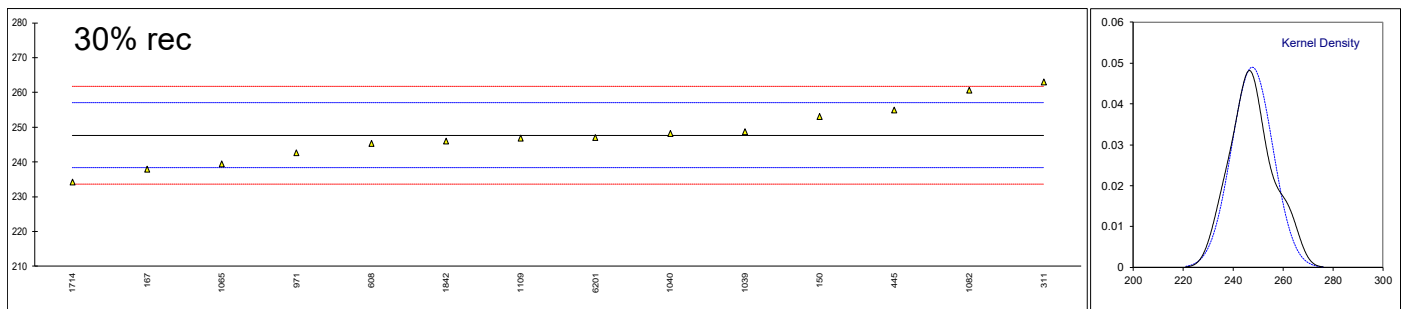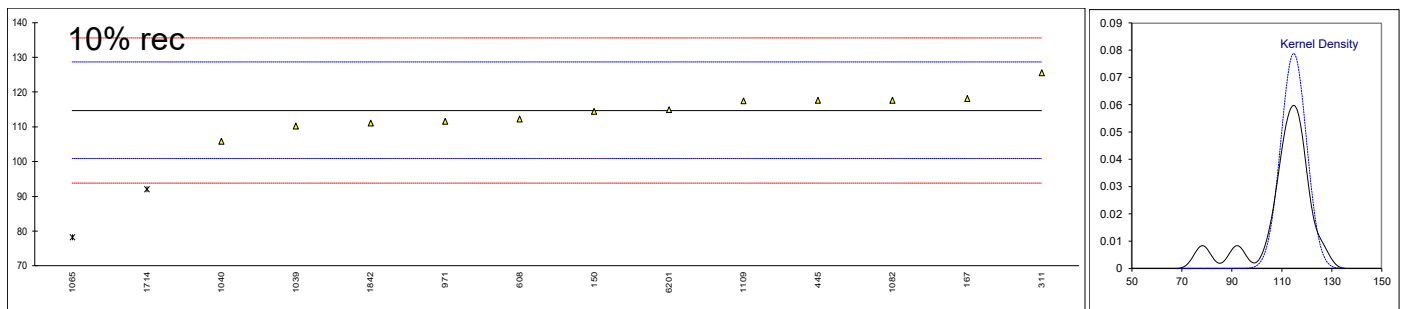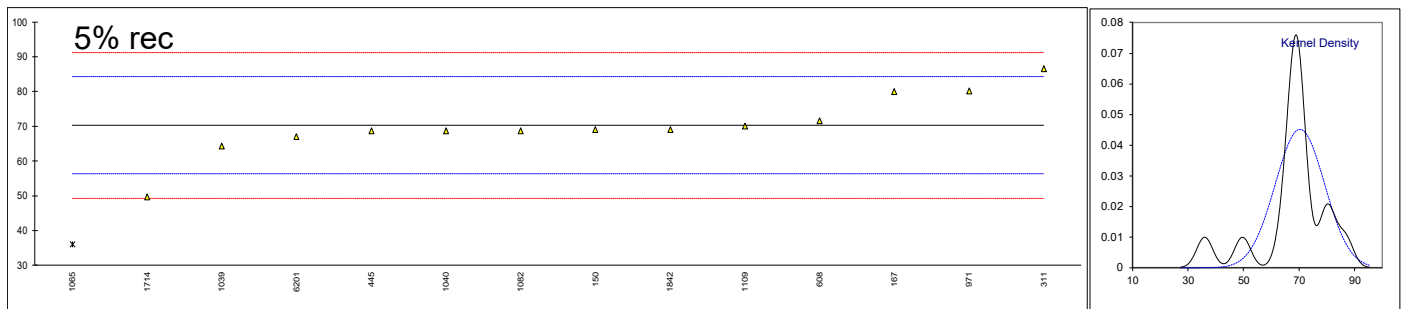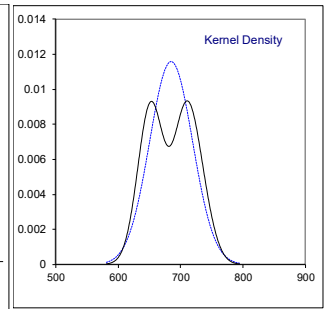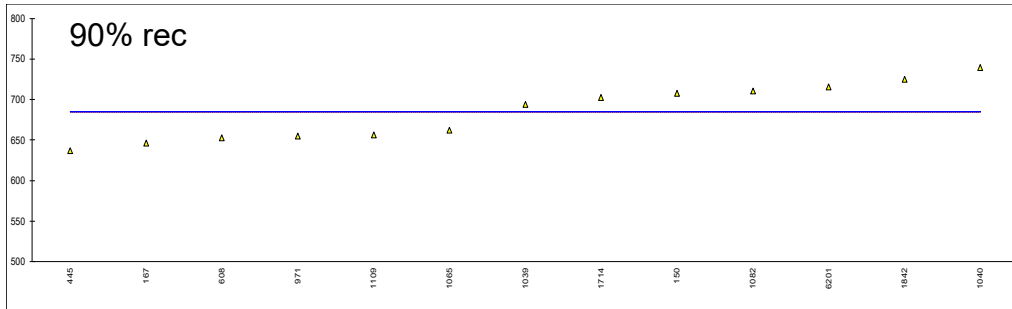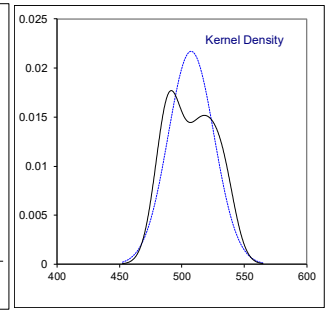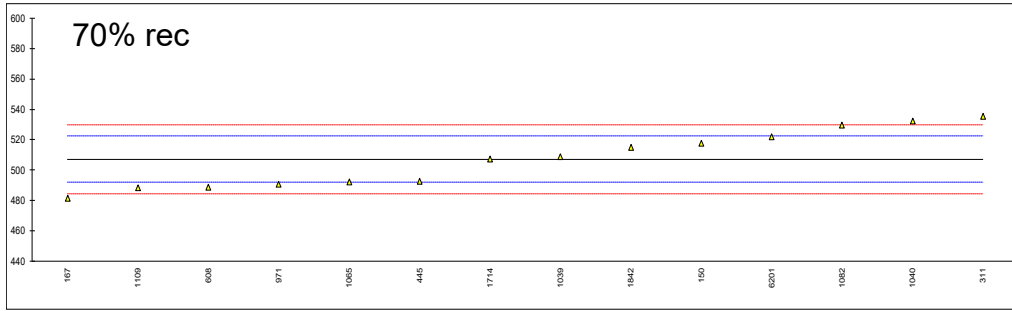
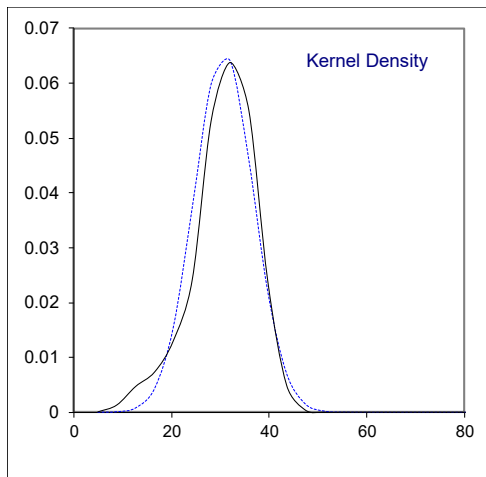## Determination of Mercury, Total on sample #19221 results in µg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	988		-----		-----
62		-----		-----	991		-----		-----
90		-----		-----	992		-----		-----
92		-----		-----	994		-----		-----
120		-----		-----	995		-----		-----
140	UOP938	38.7		0.95	997		-----		-----
150	UOP938	29.5		-0.16	998		-----		-----
154		-----		-----	1011		-----		-----
158		-----		-----	1039	UOP938	36		0.62
159		-----		-----	1040		-----		-----
167		-----		-----	1056		-----		-----
168		-----		-----	1065		-----		-----
170		-----		-----	1082	In house	29		-0.22
171		-----		-----	1089	In house	34.0		0.38
175		-----		-----	1106		-----		-----
186		-----		-----	1109		-----		-----
203		-----		-----	1212	DMA80	35.9		0.61
225		-----		-----	1236	UOP938	31.585		0.09
237		-----		-----	1259		-----		-----
238		-----		-----	1357	UOP938	28.2		-0.31
273		-----		-----	1360		-----		-----
311	D7623	32		0.14	1397	In house	30.8		0.00
314		-----		-----	1412		-----		-----
333	EPA7423	35		0.50	1554		-----		-----
334	In house	37		0.74	1556		-----		-----
335		-----		-----	1613		-----		-----
336		-----		-----	1654		-----		-----
391		-----		-----	1656	UOP938	13		-2.14
398		-----		-----	1695		-----		-----
399		-----		-----	1710	UOP938	32.2		0.17
442		-----		-----	1714	DMA80	32		0.14
444	UOP938	36.69		0.71	1720		-----		-----
445		-----		-----	1724		-----		-----
446		-----		-----	1728		-----		-----
447		-----		-----	1741		-----		-----
485		-----		-----	1810		-----		-----
511		-----		-----	1811		-----		-----
525		-----		-----	1815		-----		-----
529		-----		-----	1833		-----		-----
541		-----		-----	1842	D7622	30		-0.10
551		-----		-----	1849		-----		-----
557		-----		-----	1857	UOP938	26.45		-0.52
575		-----		-----	1858		-----		-----
593		-----		-----	1928		-----		-----
597		-----		-----	1929		-----		-----
598	UOP938	19.645		-1.34	1950	UOP938	33.5		0.32
599	D7622	41.6		1.30	1957	UOP938	19.0		-1.42
600	D7622	36.81		0.72	1984		-----		-----
603		-----		-----	1995		-----		-----
608		-----		-----	6016		-----		-----
609	In house	37.4	C	0.79	6143		-----		-----
610		-----		-----	6166		-----		-----
611		-----		-----	6170	In house	982	R(0.01)	114.28
612	D7622	33.75		0.35	6201	UOP938	36.0		0.62
621		-----		-----	6203		-----		-----
657		-----		-----	6220		-----		-----
663	UOP938	26.97		-0.46	6234		-----		-----
704		-----		-----	6238		-----		-----
732		-----		-----	6263		-----		-----
739		-----		-----	6273	UOP938	33.204		0.29
749		-----		-----	6284		-----		-----
750	UOP938	26.6		-0.51	6290		-----		-----
752		-----		-----	6294		-----		-----
753		-----		-----	6295		-----		-----
781	D7622	29.5		-0.16	6296		-----		-----
785		-----		-----	9051		-----		-----
840		-----		-----	9052		-----		-----
862	UOP938	27.95		-0.34	9057		-----		-----
874		-----		-----	9060		-----		-----
875		-----		-----	9063		-----		-----
904		-----		-----	9099		-----		-----
922		-----		-----	9101		-----		-----
962		-----		-----	9132	D7623	29.7		-0.13
963	UOP938	22.2		-1.03	9141		-----		-----
970		-----		-----	9142		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
971		-----		-----	9143		-----		-----
974	UOP938	25.71		-0.61	9146		-----		-----

			UOP938 only:	D7622 or D7623 only:
normality		suspect	OK	unknown
n		34	19	7
outliers		1	0	0
mean (n)		30.811	28.584	33.337
st.dev. (n)		6.0853	6.7567	4.4978
R(calc.)		17.039	18.919	12.594
st.dev.(Horwitz)		8.3233	7.8095	8.8996
R(Horwitz)		23.305	21.867	24.919

Lab 609 first reported 57.0
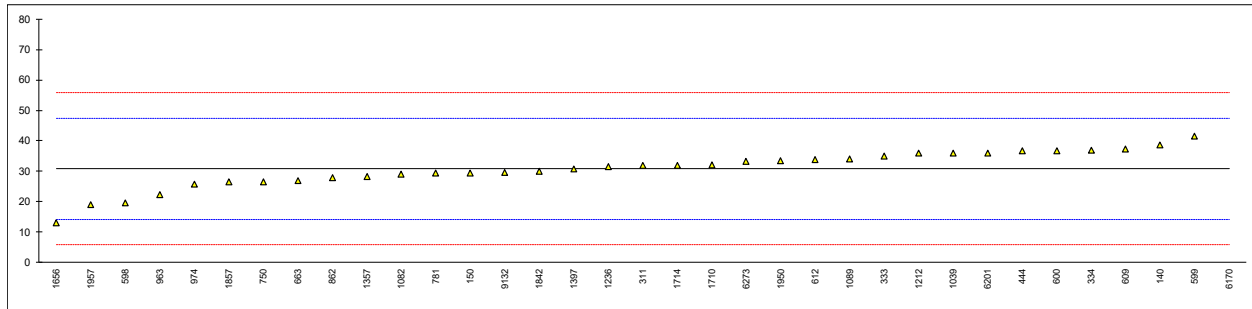
APPENDIX 2

z-scores of the determination of individual Light ends on sample #19220

lab	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
52	-----	-----	-----	-----	-----	-----	-----	-----	-----
62	-----	-----	-----	-----	-----	-----	-----	-----	-----
90	-----	-----	-----	-----	-----	-----	-----	-----	-----
92	-----	-----	-----	-----	-----	-----	-----	-----	-----
120	-----	-----	-----	-----	-----	-----	-----	-----	-----
140	-----	-----	-----	-----	-----	-----	-----	-----	-----
150	-----	-----	-----	-----	-----	-----	-----	-----	-----
154	-----	-----	-----	-----	-----	-----	-----	-----	-----
158	-----	-----	-----	-----	-----	-----	-----	-----	-----
159	-----	-----	-----	-----	-----	-----	-----	-----	-----
167	-----	-0.25	0.44	0.99	1.17	0.92	1.23	23.17	1.82
168	-----	-----	-----	-----	-----	-----	-----	-----	-----
170	-----	-----	-----	-----	-----	-----	-----	-----	-----
171	-----	-----	-----	-----	-----	-----	-----	-----	-----
175	-----	-----	-----	-----	-----	-----	-----	-----	-----
186	-----	-----	-----	-----	-----	-----	-----	-----	-----
203	-----	-----	-----	-----	-----	-----	-----	-----	-----
225	-----	-----	-----	-----	-----	-----	-----	-----	-----
237	-----	-----	-----	-----	-----	-----	-----	-----	-----
238	-----	-----	-----	-----	-----	-----	-----	-----	-----
273	-----	-----	-----	-----	-----	-----	-----	-----	-----
311	-----	-0.18	0.82	-0.34	0.16	0.07	0.23	-2.26	-2.42
314	-----	-----	-----	-----	-----	-----	-----	-----	-----
332	-----	-----	-----	-----	-----	-----	-----	-----	-----
333	-----	-----	-----	-----	-----	-----	-----	-----	-----
334	-----	-----	-----	-----	-----	-----	-----	-----	-----
335	-----	-----	-----	-----	-----	-----	-----	-----	-----
336	-----	-----	-----	-----	-----	-----	-----	-----	-----
391	-----	-----	-----	-----	-----	-----	-----	-----	-----
398	-----	-----	-----	-----	-----	-----	-----	-----	-----
399	-----	-----	-----	-----	-----	-----	-----	-----	-----
442	-----	2.10	2.88	1.29	2.85	0.78	3.11	0.46	-1.17
444	-----	-----	-----	-----	-----	-----	-----	-----	-----
445	-----	-----	-----	-----	-----	-----	-----	-----	-----
446	-----	-----	-----	-----	-----	-----	-----	-----	-----
447	-----	-----	-----	-----	-----	-----	-----	-----	-----
485	-----	-----	-----	-----	-----	-----	-----	-----	-----
511	-----	-----	-----	-----	-----	-----	-----	-----	-----
525	-----	-----	-----	-----	-----	-----	-----	-----	-----
529	-----	-----	-----	-----	-----	-----	-----	-----	-----
541	-----	-----	-----	-----	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----	-----	-----	-----	-----
557	-----	-----	-----	-----	-----	-----	-----	-----	-----
575	-----	-----	-----	-----	-----	-----	-----	-----	-----
593	-----	-----	-----	-----	-----	-----	-----	-----	-----
597	-----	-----	-----	-----	-----	-----	-----	-----	-----
598	-----	-----	-----	-----	-----	-----	-----	-----	-----
599	-----	-----	-----	-----	-----	-----	-----	-----	-----
600	-----	-2.63	-0.47	2.04	2.86	7.99	5.64	-----	3.45
603	-----	-----	-----	-----	-----	-----	-----	-----	-----
608	-----	0.35	1.15	1.29	1.05	1.12	0.89	-----	-----
609	-----	-3.85	-2.96	-2.58	-1.84	-2.15	-0.52	-----	-----
610	-----	-----	-----	-----	-----	-----	-----	-----	-----
611	-----	-3.54	-3.42	-2.25	-2.00	0.09	-0.08	-----	-----
612	-----	-----	-----	-----	-----	-----	-----	-----	-----
621	-----	-----	-----	-----	-----	-----	-----	-----	-----
657	-----	-----	-----	-----	-----	-----	-----	-----	-----
663	-----	-----	-----	-----	-----	-----	-----	-----	-----
704	-----	-----	-----	-----	-----	-----	-----	-----	-----
732	-----	-----	-----	-----	-----	-----	-----	-----	-----
739	-----	-----	-----	-----	-----	-----	-----	-----	-----
749	-----	-----	-----	-----	-----	-----	-----	-----	-----
750	-----	-----	-----	-----	-----	-----	-----	-----	-----
752	-----	-----	-----	-----	-----	-----	-----	-----	-----
753	-----	-----	-----	-----	-----	-----	-----	-----	-----
781	-----	-----	-----	-----	-----	-----	-----	-----	-----
785	-----	-----	-----	-----	-----	-----	-----	-----	-----
840	-----	-----	-----	-----	-----	-----	-----	-----	-----
862	-----	-----	-----	-----	-----	-----	-----	-----	-----
874	-----	-----	-----	-----	-----	-----	-----	-----	-----
875	-----	-----	-----	-----	-----	-----	-----	-----	-----
904	-----	-----	-----	-----	-----	-----	-----	-----	-----
922	-----	-----	-----	-----	-----	-----	-----	-----	-----
962	-----	-----	-----	-----	-----	-----	-----	-----	-----
963	-----	-----	-----	-----	-----	-----	-----	-----	-----

lab	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
970	-----	-----	-----	-----	-----	-----	-----	-----	-----
971	-----	-----	-----	-----	-----	-----	-----	-----	-----
974	-----	-----	-----	-----	-----	-----	-----	-----	-----
988	-----	-----	-----	-----	-----	-----	-----	-----	-----
991	-----	-----	-----	-----	-----	-----	-----	-----	-----
992	-----	-----	-----	-----	-----	-----	-----	-----	-----
994	-----	-----	-----	-----	-----	-----	-----	-----	-----
995	-----	-----	-----	-----	-----	-----	-----	-----	-----
997	-----	-----	-----	-----	-----	-----	-----	-----	-----
998	-----	-----	-----	-----	-----	-----	-----	-----	-----
1011	-----	-----	-----	-----	-----	-----	-----	-----	-----
1039	-----	0.52	2.07	1.52	2.23	1.99	0.39	21.24	1.82
1040	-----	3.65	2.73	2.73	2.13	2.09	1.60	0.20	-0.54
1056	-----	-----	-----	-----	-----	-----	-----	-----	-----
1065	-----	0.52	1.82	1.42	1.46	0.68	0.61	2.55	0.40
1082	-----	-1.93	0.28	0.18	0.49	-0.11	0.03	-3.39	-0.54
1089	-----	-0.04	1.09	1.17	0.86	1.38	0.49	2.84	-1.07
1106	-----	-----	-----	-----	-----	-----	-----	-----	-----
1109	-----	1.22	-1.07	-3.23	-4.40	-6.94	-6.63	-2.54	-2.52
1212	-----	-----	-----	-----	-----	-----	-----	-----	-----
1236	-----	-0.18	-0.17	-0.65	-1.62	-1.82	-2.56	0.01	0.22
1259	-----	-----	-----	-----	-----	-----	-----	-----	-----
1357	-----	-----	-----	-----	-----	-----	-----	-----	-----
1360	-----	-----	-----	-----	-----	-----	-----	-----	-----
1397	-----	-----	-----	-----	-----	-----	-----	-----	-----
1412	-----	1.92	2.17	1.83	1.23	1.21	0.77	3.40	-----
1554	-----	-----	-----	-----	-----	-----	-----	-----	-----
1556	-----	-----	-----	-----	-----	-----	-----	-----	-----
1613	-----	-----	-----	-----	-----	-----	-----	-----	-----
1654	-----	-----	-----	-----	-----	-----	-----	-----	-----
1656	-----	-----	-----	-----	-----	-----	-----	-----	-----
1695	-----	-----	-----	-----	-----	-----	-----	-----	-----
1710	-----	-----	-----	-----	-----	-----	-----	-----	-----
1714	-----	-----	-1.71	-1.78	-2.44	-2.08	-2.23	1.99	1.24
1720	-----	-----	-----	-----	-----	-----	-----	-----	-----
1724	-----	-----	-----	-----	-----	-----	-----	-----	-----
1728	-----	-----	-----	-----	-----	-----	-----	-----	-----
1741	-----	-----	-----	-----	-----	-----	-----	-----	-----
1810	-----	-----	-----	-----	-----	-----	-----	-----	-----
1811	-----	-----	-----	-----	-----	-----	-----	-----	-----
1815	-----	-----	-----	-----	-----	-----	-----	-----	-----
1833	-----	-----	-----	-----	-----	-----	-----	-----	-----
1842	-----	-0.18	0.53	0.70	1.72	1.73	1.44	-0.84	-0.86
1849	-----	-----	-----	-----	-----	-----	-----	-----	-----
1857	-----	-----	-----	-----	-----	-----	-----	-----	-----
1858	-----	-----	-----	-----	-----	-----	-----	-----	-----
1928	-----	-----	-----	-----	-----	-----	-----	-----	-----
1929	-----	-----	-----	-----	-----	-----	-----	-----	-----
1950	-----	-----	-----	-----	-----	-----	-----	-----	-----
1957	-----	-0.81	-2.25	-1.60	-2.73	-3.66	-3.58	-3.56	-2.38
1984	-----	-----	-----	-----	-----	-----	-----	-----	-----
1995	-----	-----	-----	-----	-----	-----	-----	-----	-----
6016	-----	-----	-----	-----	-----	-----	-----	-----	-----
6143	-----	-----	-----	-----	-----	-----	-----	-----	-----
6166	-----	3.32	1.02	0.70	0.19	-0.02	0.10	1.99	-----
6170	-----	-----	-----	-----	-----	-----	-----	-----	-----
6201	-----	-----	-4.94	-3.43	-3.38	-2.21	-1.92	-0.84	2.56
6203	-----	-----	-----	-----	-----	-----	-----	-----	-----
6220	-----	-----	-----	-----	-----	-----	-----	-----	-----
6234	-----	-----	-----	-----	-----	-----	-----	-----	-----
6238	-----	-----	-----	-----	-----	-----	-----	-----	-----
6263	-----	-----	-----	-----	-----	-----	-----	-----	-----
6273	-----	-----	-----	-----	-----	-----	-----	-----	-----
6284	-----	-----	-----	-----	-----	-----	-----	-----	-----
6290	-----	-----	-----	-----	-----	-----	-----	-----	-----
6294	-----	-----	-----	-----	-----	-----	-----	-----	-----
6295	-----	-----	-----	-----	-----	-----	-----	-----	-----
6296	-----	-----	-----	-----	-----	-----	-----	-----	-----
9051	-----	-----	-----	-----	-----	-----	-----	-----	-----
9052	-----	-----	-----	-----	-----	-----	-----	-----	-----
9057	-----	-----	-----	-----	-----	-----	-----	-----	-----
9060	-----	-----	-----	-----	-----	-----	-----	-----	-----
9063	-----	-----	-----	-----	-----	-----	-----	-----	-----
9099	-----	-----	-----	-----	-----	-----	-----	-----	-----
9101	-----	-----	-----	-----	-----	-----	-----	-----	-----
9132	-----	-----	-----	-----	-----	-----	-----	-----	-----
9141	-----	-----	-----	-----	-----	-----	-----	-----	-----
9142	-----	-----	-----	-----	-----	-----	-----	-----	-----

lab	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
9143	-----	-----	-----	-----	-----	-----	-----	-----	-----
9146	-----	-----	-----	-----	-----	-----	-----	-----	-----

z-scores of the determination of Simulated Distillation on sample #19220

lab	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
52	-----	-----	-----	-----	-----	-----	-----	-----
62	-----	-----	-----	-----	-----	-----	-----	-----
90	-----	-----	-----	-----	-----	-----	-----	-----
92	-----	-----	-----	-----	-----	-----	-----	-----
120	-----	-----	-----	-----	-----	-----	-----	-----
140	-----	-----	-----	-----	-----	-----	-----	-----
150	-----	-0.18	-0.04	1.14	1.18	1.35	-----	-----
154	-----	-----	-----	-----	-----	-----	-----	-----
158	-----	-----	-----	-----	-----	-----	-----	-----
159	-----	-----	-----	-----	-----	-----	-----	-----
167	-----	1.39	0.49	-2.09	-2.90	-3.41	-----	-----
168	-----	-----	-----	-----	-----	-----	-----	-----
170	-----	-----	-----	-----	-----	-----	-----	-----
171	-----	-----	-----	-----	-----	-----	-----	-----
175	-----	-----	-----	-----	-----	-----	-----	-----
186	-----	-----	-----	-----	-----	-----	-----	-----
203	-----	-----	-----	-----	-----	-----	-----	-----
225	-----	-----	-----	-----	-----	-----	-----	-----
237	-----	-----	-----	-----	-----	-----	-----	-----
238	-----	-----	-----	-----	-----	-----	-----	-----
273	-----	-----	-----	-----	-----	-----	-----	-----
311	-----	2.32	1.54	3.27	3.32	3.73	-----	-----
314	-----	-----	-----	-----	-----	-----	-----	-----
332	-----	-----	-----	-----	-----	-----	-----	-----
333	-----	-----	-----	-----	-----	-----	-----	-----
334	-----	-----	-----	-----	-----	-----	-----	-----
335	-----	-----	-----	-----	-----	-----	-----	-----
336	-----	-----	-----	-----	-----	-----	-----	-----
391	-----	-----	-----	-----	-----	-----	-----	-----
398	-----	-----	-----	-----	-----	-----	-----	-----
399	-----	-----	-----	-----	-----	-----	-----	-----
442	-----	-----	-----	-----	-----	-----	-----	-----
444	-----	-----	-----	-----	-----	-----	-----	-----
445	-----	-0.22	0.42	1.54	-0.20	-1.95	-----	-----
446	-----	-----	-----	-----	-----	-----	-----	-----
447	-----	-----	-----	-----	-----	-----	-----	-----
485	-----	-----	-----	-----	-----	-----	-----	-----
511	-----	-----	-----	-----	-----	-----	-----	-----
525	-----	-----	-----	-----	-----	-----	-----	-----
529	-----	-----	-----	-----	-----	-----	-----	-----
541	-----	-----	-----	-----	-----	-----	-----	-----
551	-----	-----	-----	-----	-----	-----	-----	-----
557	-----	-----	-----	-----	-----	-----	-----	-----
575	-----	-----	-----	-----	-----	-----	-----	-----
593	-----	-----	-----	-----	-----	-----	-----	-----
597	-----	-----	-----	-----	-----	-----	-----	-----
598	-----	-----	-----	-----	-----	-----	-----	-----
599	-----	-----	-----	-----	-----	-----	-----	-----
600	-----	-----	-----	-----	-----	-----	-----	-----
603	-----	-----	-----	-----	-----	-----	-----	-----
608	-----	0.18	-0.35	-0.51	-2.71	-2.45	-----	-----
609	-----	-----	-----	-----	-----	-----	-----	-----
610	-----	-----	-----	-----	-----	-----	-----	-----
611	-----	-----	-----	-----	-----	-----	-----	-----
612	-----	-----	-----	-----	-----	-----	-----	-----
621	-----	-----	-----	-----	-----	-----	-----	-----
657	-----	-----	-----	-----	-----	-----	-----	-----
663	-----	-----	-----	-----	-----	-----	-----	-----
704	-----	-----	-----	-----	-----	-----	-----	-----
732	-----	-----	-----	-----	-----	-----	-----	-----
739	-----	-----	-----	-----	-----	-----	-----	-----
749	-----	-----	-----	-----	-----	-----	-----	-----
750	-----	-----	-----	-----	-----	-----	-----	-----
752	-----	-----	-----	-----	-----	-----	-----	-----
753	-----	-----	-----	-----	-----	-----	-----	-----
781	-----	-----	-----	-----	-----	-----	-----	-----
785	-----	-----	-----	-----	-----	-----	-----	-----
840	-----	-----	-----	-----	-----	-----	-----	-----
862	-----	-----	-----	-----	-----	-----	-----	-----
874	-----	-----	-----	-----	-----	-----	-----	-----

lab	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
875	-----	-----	-----	-----	-----	-----	-----	-----
904	-----	-----	-----	-----	-----	-----	-----	-----
922	-----	-----	-----	-----	-----	-----	-----	-----
962	-----	-----	-----	-----	-----	-----	-----	-----
963	-----	-----	-----	-----	-----	-----	-----	-----
970	-----	-----	-----	-----	-----	-----	-----	-----
971	-----	1.41	-0.47	-1.09	-1.57	-2.20	-----	-----
974	-----	-----	-----	-----	-----	-----	-----	-----
988	-----	-----	-----	-----	-----	-----	-----	-----
991	-----	-----	-----	-----	-----	-----	-----	-----
992	-----	-----	-----	-----	-----	-----	-----	-----
994	-----	-----	-----	-----	-----	-----	-----	-----
995	-----	-----	-----	-----	-----	-----	-----	-----
997	-----	-----	-----	-----	-----	-----	-----	-----
998	-----	-----	-----	-----	-----	-----	-----	-----
1011	-----	-----	-----	-----	-----	-----	-----	-----
1039	-----	-0.84	-0.64	0.22	0.31	0.19	-----	-----
1040	-----	-0.22	-1.27	0.11	1.82	3.29	-----	-----
1056	-----	-----	-----	-----	-----	-----	-----	-----
1065	-----	-4.89	-5.25	-1.77	-1.62	-1.96	-----	-----
1082	-----	-0.22	0.42	2.76	2.75	2.94	-----	-----
1089	-----	-----	-----	-----	-----	-----	-----	-----
1106	-----	-----	-----	-----	-----	-----	-----	-----
1109	-----	-0.04	0.38	-0.19	-1.24	-2.49	-----	-----
1212	-----	-----	-----	-----	-----	-----	-----	-----
1236	-----	-----	-----	-----	-----	-----	-----	-----
1259	-----	-----	-----	-----	-----	-----	-----	-----
1357	-----	-----	-----	-----	-----	-----	-----	-----
1360	-----	-----	-----	-----	-----	-----	-----	-----
1397	-----	-----	-----	-----	-----	-----	-----	-----
1412	-----	-----	-----	-----	-----	-----	-----	-----
1554	-----	-----	-----	-----	-----	-----	-----	-----
1556	-----	-----	-----	-----	-----	-----	-----	-----
1613	-----	-----	-----	-----	-----	-----	-----	-----
1654	-----	-----	-----	-----	-----	-----	-----	-----
1656	-----	-----	-----	-----	-----	-----	-----	-----
1695	-----	-----	-----	-----	-----	-----	-----	-----
1710	-----	-----	-----	-----	-----	-----	-----	-----
1714	-----	-2.95	-3.25	-2.88	-0.49	-0.01	-----	-----
1720	-----	-----	-----	-----	-----	-----	-----	-----
1724	-----	-----	-----	-----	-----	-----	-----	-----
1728	-----	-----	-----	-----	-----	-----	-----	-----
1741	-----	-----	-----	-----	-----	-----	-----	-----
1810	-----	-----	-----	-----	-----	-----	-----	-----
1811	-----	-----	-----	-----	-----	-----	-----	-----
1815	-----	-----	-----	-----	-----	-----	-----	-----
1833	-----	-----	-----	-----	-----	-----	-----	-----
1842	-----	-0.18	-0.54	-0.36	0.67	1.02	-----	-----
1849	-----	-----	-----	-----	-----	-----	-----	-----
1857	-----	-----	-----	-----	-----	-----	-----	-----
1858	-----	-----	-----	-----	-----	-----	-----	-----
1928	-----	-----	-----	-----	-----	-----	-----	-----
1929	-----	-----	-----	-----	-----	-----	-----	-----
1950	-----	-----	-----	-----	-----	-----	-----	-----
1957	-----	-----	-----	-----	-----	-----	-----	-----
1984	-----	-----	-----	-----	-----	-----	-----	-----
1995	-----	-----	-----	-----	-----	-----	-----	-----
6016	-----	-----	-----	-----	-----	-----	-----	-----
6143	-----	-----	-----	-----	-----	-----	-----	-----
6166	-----	-----	-----	-----	-----	-----	-----	-----
6170	-----	-----	-----	-----	-----	-----	-----	-----
6201	-----	-0.46	0.04	-0.15	0.67	1.95	-----	-----
6203	-----	-----	-----	-----	-----	-----	-----	-----
6220	-----	-----	-----	-----	-----	-----	-----	-----
6234	-----	-----	-----	-----	-----	-----	-----	-----
6238	-----	-----	-----	-----	-----	-----	-----	-----
6263	-----	-----	-----	-----	-----	-----	-----	-----
6273	-----	-----	-----	-----	-----	-----	-----	-----
6284	-----	-----	-----	-----	-----	-----	-----	-----
6290	-----	-----	-----	-----	-----	-----	-----	-----
6294	-----	-----	-----	-----	-----	-----	-----	-----
6295	-----	-----	-----	-----	-----	-----	-----	-----
6296	-----	-----	-----	-----	-----	-----	-----	-----
9051	-----	-----	-----	-----	-----	-----	-----	-----
9052	-----	-----	-----	-----	-----	-----	-----	-----
9057	-----	-----	-----	-----	-----	-----	-----	-----
9060	-----	-----	-----	-----	-----	-----	-----	-----
9063	-----	-----	-----	-----	-----	-----	-----	-----

lab	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
9099	-----	-----	-----	-----	-----	-----	-----	-----
9101	-----	-----	-----	-----	-----	-----	-----	-----
9132	-----	-----	-----	-----	-----	-----	-----	-----
9141	-----	-----	-----	-----	-----	-----	-----	-----
9142	-----	-----	-----	-----	-----	-----	-----	-----
9143	-----	-----	-----	-----	-----	-----	-----	-----
9146	-----	-----	-----	-----	-----	-----	-----	-----

APPENDIX 3
Analytical details Acid Number (Total) determination

lab	determination of end point	volume of titration solvent
52	Inflection Point	125 mL
62	---	---
90	---	---
92	---	---
120	Buffer End Point (pH 10)	125 mL
140	Inflection Point	125 mL
150	Inflection Point	60 mL
154	---	---
158	---	---
159	---	---
167	Inflection Point	60 mL
168	---	---
170	Inflection Point	60 mL
171	---	---
175	---	---
186	---	---
203	---	---
225	---	---
237	---	---
238	---	---
273	Inflection Point	60 mL
311	---	---
314	---	---
332	---	---
333	---	---
334	Inflection Point	125 mL
335	---	---
336	---	---
391	Inflection Point	60 mL
398	---	---
399	---	---
442	---	---
444	---	---
445	Inflection Point	60 mL
446	---	---
447	Inflection Point	125 mL
485	---	---
511	---	---
525	---	---
529	---	---
541	---	---
551	---	---
557	---	---
575	Buffer End Point (pH 10)	60 mL
593	---	---
597	---	---
598	Inflection Point	125 mL
599	---	---
600	Inflection Point	125 mL
603	---	---
608	Buffer End Point (pH 11)	125 mL
609	---	---
610	---	---
611	Inflection Point	125 mL
612	---	---
621	---	---
657	Inflection Point	125 mL
663	Inflection Point	125 mL
704	Inflection Point	125 mL
732	---	---
739	---	---
749	---	---
750	Inflection Point	60 mL
752	---	---

lab	determination of end point	volume of titration solvent
753	---	---
781	---	---
785	---	---
840	---	---
862	---	---
874	---	---
875	---	---
904	Inflection Point	60 mL
922	Inflection Point	125 mL
962	---	---
963	Inflection Point	60 mL
970	---	---
971	Inflection Point	125 mL
974	---	---
988	---	---
991	---	---
992	---	---
994	Inflection Point	125 mL
995	Inflection Point	125 mL
997	---	---
998	---	---
1011	---	---
1039	Inflection Point	125 mL
1040	Inflection Point	60 mL
1056	Inflection Point	60 mL
1065	---	---
1082	---	---
1089	Inflection Point	125 mL
1106	---	---
1109	Inflection Point	125 mL
1212	Inflection Point	125 mL
1236	---	---
1259	Inflection Point	125 mL
1357	---	---
1360	---	---
1397	---	---
1412	---	---
1554	---	---
1556	Inflection Point	125 mL
1613	Inflection Point	125 mL
1654	---	---
1656	Inflection Point	125 mL
1695	---	---
1710	Inflection Point	60 mL
1714	---	---
1720	---	---
1724	---	---
1728	---	---
1741	---	---
1810	---	---
1811	---	---
1815	---	---
1833	---	---
1842	---	---
1849	---	---
1857	Inflection Point	125 mL
1858	Inflection Point	125 mL
1928	---	---
1929	---	---
1950	Inflection Point	125 mL
1957	---	---
1984	---	---
1995	---	---
6016	---	---
6143	---	---
6166	---	---
6170	---	---
6201	Inflection Point	125 mL
6203	Inflection Point	125 mL
6220	Inflection Point	125 mL
6234	---	---
6238	---	---
6263	---	---
6273	---	---
6284	---	---
6290	---	---
6294	---	---
6295	---	---

lab	determination of end point	volume of titration solvent
6296	---	---
9051	---	---
9052	---	---
9057	---	---
9060	---	---
9063	---	---
9099	---	---
9101	---	---
9132	---	---
9141	---	---
9142	---	---
9143	---	---
9146	---	---

APPENDIX 4

Number of participants per country

```
 1 lab in  AFGHANISTAN
 1 lab in  ARGENTINA
 1 lab in  AUSTRALIA
 2 labs in AZERBAIJAN
 2 labs in BRAZIL
 1 lab in  BRUNEI
 2 labs in BULGARIA
 4 labs in CANADA
 1 lab in  CHINA, People's Republic
 1 lab in  COLOMBIA
 1 lab in  CONGO Brazzaville
 1 lab in  COTE D'IVOIRE
 3 labs in CROATIA
 2 labs in CZECH REPUBLIC
 2 labs in ECUADOR
 3 labs in EGYPT
 1 lab in  FINLAND
 6 labs in FRANCE
 2 labs in GEORGIA
 1 lab in  GERMANY
 1 lab in  HUNGARY
 1 lab in  INDONESIA
 1 lab in  IRAQ
 1 lab in  ISRAEL
 3 labs in ITALY
 1 lab in  JORDAN
 3 labs in KAZAKHSTAN
13 labs in MALAYSIA
 2 labs in MEXICO
 6 labs in NETHERLANDS
 7 labs in NIGERIA
 4 labs in NORWAY
 5 labs in OMAN
 1 lab in  PAKISTAN
 1 lab in  PERU
 4 labs in POLAND
 1 lab in  PORTUGAL
 2 labs in ROMANIA
13 labs in RUSSIAN FEDERATION
 2 labs in SAUDI ARABIA
 1 lab in  SERBIA
 1 lab in  SINGAPORE
 3 labs in SLOVAKIA
 1 lab in  SOUTH AFRICA
 1 lab in  ST. LUCIA - WEST INDIES
 1 lab in  SUDAN
 2 labs in SWEDEN
```

```
        1 lab in   THAILAND
        5 labs in  TURKEY
        2 labs in  TURKMENISTAN
        1 lab in   UKRAINE
        2 labs in  UNITED ARAB EMIRATES
       11 labs in  UNITED KINGDOM
       12 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
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

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