Institute for
Interlaboratory Studies

Results of Proficiency Test
Crude Oil
November 2022

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1998 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Crude Oil every year. During the annual proficiency testing program 2022/2023 it was decided to continue the round robin for the analysis of Crude Oil.

In this interlaboratory study registered for participation:
- 153 laboratories in 53 countries for regular analyzes in Crude Oil iis22R01
- 36 laboratories in 19 countries on the Mercury analyzes in Crude Oil iis22R01Hg

In total 156 laboratories in 53 countries registered for participation in one or two proficiency tests, see appendix 2 for the number of participants per country. In this report the results of the Crude Oil proficiency tests 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.
In this proficiency test the participants received, depending on the registration, one or two different samples of Crude Oil, see table below. A wide-neck bottle is used to enable the use of a large size diameter high speed shear mixer for homogenization.

Sample ID	PT ID	Quantity	Purpose
#22215	iis22R01	1x 1 L	Regular analyzes
#22216	iis22R01Hg	1x 40 mL vial	Hg

Table 1: Crude Oil samples used in iis22R01 and iis22R01Hg PTs

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

For the preparation of the sample for the regular analyzes in Crude Oil a batch of approximately 200 liters of Crude Oil was obtained from a local refinery. After homogenization 180 wide-neck transparent colorless 1 L glass bottles were filled and labelled #22215. The bottles were put into red plastic bags to protect it from light.
The homogeneity of the subsamples was checked by determination of Density at 15 °C in accordance with ASTM D5002 on 8 stratified randomly selected subsamples.

	Density at 15 °C in kg/m^3
sample #22215-1	873.88
sample #22215-2	873.85
sample #22215-3	874.12
sample #22215-4	873.87
sample #22215-5	873.96
sample #22215-6	874.29
sample #22215-7	873.81
sample #22215-8	873.96

Table 2: homogeneity test results of subsamples #22215

From the above test results the repeatability was calculated and compared with 0.3 times the 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)	0.45
reference test method	ASTM D5002:22
0.3 x R (reference test method)	1.08

Table 3: evaluation of the repeatability of subsamples #22215

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

For the preparation of the sample for the Mercury determination in Crude Oil a batch of approximately 13 liters of Crude Oil was obtained from a local refinery. The batch was spiked with Mercury. After homogenization 110 vials of 40 mL were filled and labelled #22216. The homogeneity of the subsamples was checked by the determination of Mercury in accordance with ASTM D7623 on 8 stratified randomly selected subsamples.

	Mercury as Hg in µg/kg
sample #22216-1	29
sample #22216-2	32
sample #22216-3	29
sample #22216-4	29
sample #22216-5	28
sample #22216-6	29
sample #22216-7	29
sample #22216-8	29

Table 4: homogeneity test results of subsamples #22216

From the above test results the repeatability was calculated and compared with 0.3 times the reference method in agreement with the procedure of ISO13528, Annex B2 in the next table.

	Mercury as Hg in µg/kg
r (observed)	3
reference method	Horwitz
0.3 x R (reference method)	7

Table 5: evaluation of the repeatability of subsamples #22216

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

Depending on the registration of the participant the appropriate set of PT samples was sent on October 19, 2022. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Crude Oil packed in the transparent colorless glass bottles and put into red plastic bags to protect it from light 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 #22215: Total Acid Number, API Gravity, BS&W, Density at 15 °C, Kinematic Viscosity at 40 °C, Light ends (Methane, Ethane, Propane, iso-Butane, n-Butane, iso-Pentane, n-Pentane, cyclo-Pentane, Total Hexanes and Total of all C1-C6), Average Molecular Mass, Pour Point Maximum, Salt as Chloride, Sediment (Extraction method and Membrane filtration), Total Sulfur, Water and Simulated Distillation. It was also requested to report some analytical details about Total Acid Number determination.
On sample #22216 it was requested to determine Total Mercury.

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

To get comparable test results a detailed report form and a letter of instructions are prepared. On the report form the reporting units are given as well as the reference test methods (when applicable) 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 analysis and the original test results are placed under 'Remarks' in the result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

The protocol followed in the 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.

The assigned value is determined by consensus based on the test results of the group of participants after rejection of the statistical outliers and/or suspect data.

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner's outlier test can be used. 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 (dotted line) was projected over the Kernel Density Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

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 (derived from e.g. ISO or ASTM test methods), the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation in this interlaboratory study.

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used, like Horwitz or an estimated reproducibility based on former iis proficiency tests.

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 problems were encountered with the dispatch of the samples due to COVID-19 pandemic and the measures taken. Therefore, the reporting time on the data entry portal was extended with another two weeks.
For the sample for the regular analyzes fifteen participants reported the test results after the extended reporting date and twenty other participants did not report any test results.
For the sample for the Mercury determination two participants reported the test result after the extended reporting date and nine other participants did not report any test results.
Not all participants were able to report all tests requested.

In total 136 participants reported 1148 numerical test results. Observed were 49 outlying test results, which is 4.3%. In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

Not all data sets proved to have a normal Gaussian distribution. These are referred to as “not OK” or “suspect”. The statistical evaluation of these data sets should be used with due care, see also paragraph 3.1.

4.1 EVALUATION PER SAMPLE AND PER TEST

In this section the reported test results are discussed per sample and per test. The test methods which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the original data in appendix 1. 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. D287) and an added designation for the year that the test method was adopted or revised (e.g. D287:12b). When a method has been reapproved an “R” will be added and the year of approval (e.g. D287:12bR19).

For Total Mercury it was decided to use the Horwitz equation to calculate an estimated target reproducibility for the calculation of the z-scores because test methods ASTM D7623 and UOP938 mention only a repeatability. Furthermore, test method UOP938, 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.

sample #22215

Total Acid Number: This determination may be problematic depending on the end point and volume used. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D664-A:18e2 Inflection Point 60 mL and Buffer End Point 60 mL but not with the requirements for Inflection Point 125 mL and Buffer End Point 125 mL.

API Gravity: This determination was problematic for a number of laboratories. Eight statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D287:12bR19.

BS&W: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D4007:22.

Density at 15 °C: This determination was not problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5002:22.

Some participants reported to have used test method ASTM D4052. It must be noted that in the scope of this test method it is mentioned that ASTM D5002 is intended for crude oils (see paragraph 1.3 of ASTM D4052:22).

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 D445:21e2.

Light ends: This determination was very problematic. In total three statistical outliers were observed over ten parameters. None of the calculated reproducibilities after rejection of the statistical outliers are in agreement with the requirements of IP344:88R10.
For the evaluation of Light ends test method IP344 is used. Although IP344 is an obsolete test method the reproducibilities are given per individual component. Alternative test methods i.e. ASTM D7900 and EN15199-4 only specify a reproducibility per complete boiling range.

Average Molecular Mass: This determination was not problematic, although only three test results were reported. The calculated reproducibility is in agreement with the requirements of ASTM D2503:92R16.

Pour Point Maximum: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5853-A:17a.
Some participants reported to have used test method ASTM D97. It must be noted that in the scope of ASTM D97 it is mentioned that ASTM D5853 is intended for crude oils (see paragraph 1.3 of ASTM D97:17bR22).

Salt as Chloride: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D3230:19.

Sediment (Extraction method): This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D473:22.

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 D4807:05R20.

Total Sulfur: 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 D4294:21.

Water: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D4377:00R11.

Simulated Distillation: This determination was very problematic. In total over eight distillation parameters fourteen statistical outliers were observed. None of the calculated reproducibilities after rejection of the statistical outliers are in agreement with the requirements of ASTM D7169:20e1.

sample #22216

Total Mercury: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the estimated reproducibility calculated with the Horwitz equation.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the reference test method and the reproducibility as found for the group of participating laboratories. The number of significant test results, the average, the calculated reproducibility (2.8 * standard deviation) and the target reproducibility derived from reference methods are presented in the next tables.

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Acid Number	mg KOH/g	65	0.139	0.075	0.080
API Gravity		82	30.2	0.2	0.5
BS&W	%V/V	52	0.044	0.066	0.114
Density at 15 °C	kg/m^3	123	874.4	1.5	3.6
Kinematic Viscosity at 40 °C	mm^2/s	75	10.292	1.070	0.871
Methane	%M/M	12	<0.01	n.e.	n.e.
Ethane	%M/M	10	<0.01	n.e.	n.e.
Propane	%M/M	17	0.20	0.11	0.04
iso-Butane	%M/M	16	0.16	0.05	0.02
n-Butane	%M/M	16	0.73	0.20	0.10
iso-Pentane	%M/M	15	0.66	0.14	0.06
n-Pentane	%M/M	16	1.14	0.28	0.12
cyclo-Pentane	%M/M	9	0.08	0.06	(0.01)
Total Hexanes	%M/M	10	2.80	0.95	0.45
Total of all C1 - C6	%M/M	8	5.75	1.37	0.48
Average Molecular Mass	g/mol	3	239	9	14
Pour Point Maximum	°C	68	-20.0	13.9	18.0
Salt as Chloride	mg/kg	73	8.6	9.0	13.9
Sediment (Extraction method)	%V/V	53	0.009	0.013	0.035
Sediment (Membrane filtration)	%M/M	35	0.018	0.018	0.016
Total Sulfur	%M/M	96	2.61	0.16	0.14
Water	%V/V	103	0.030	0.023	0.035
IBP	°C	14	<36	n.e.	n.e.
5% recovered	°C	16	67.4	43.2	19.6
10% recovered	°C	15	115.0	39.3	19.5
30% recovered	°C	16	247.4	37.0	13.1

Parameter	unit	n	average	2.8 * sd	R(lit)
50% recovered	°C	16	366.7	45.3	16.4
70% recovered	°C	16	496.1	68.8	21.2
90% recovered	°C	14	644.6	116.8	n.a.
FBP	°C	9	730.7	31.1	n.a.
Total Mercury	µg/kg	27	26.5	8.0	20.5

Table 6: reproducibilities of tests on samples #22215 and #22216 (Hg only)

For results between brackets no z-scores are calculated

Without further statistical calculations it can be concluded that for many tests there is a good compliance of the group of participants with the reference test methods. The problematic tests have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF NOVEMBER 2022 WITH PREVIOUS PTS

	November 2022	November 2021	November 2020	November 2019	November 2018
Number of reporting laboratories	136	155	140	138	143
Number of test results	1148	1281	1212	1189	1234
Number of statistical outliers	49	27	44	32	60
Percentage of statistical outliers	4.3%	2.1%	3.6%	2.7%	4.9%

Table 7: 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 to the requirements of the reference test methods. The conclusions are given in the following table.

Determination	November 2022	November 2021	November 2020	November 2019	November 2018
Total Acid Number	+/-	+	+	-	+
API Gravity	++	++	++	+	+
BS&W	+	+	+	+	+/-
Density at 15 °C	++	++	++	++	++
Kinematic Viscosity at 40 °C	-	-	-	-	-
Light Ends (C1 - C6)	--	--	--	--	--
Average Molecular Mass	+	-	+	+	-
Pour Point Maximum	+	+	+	+	+
Salt as Chloride	+	+	+	+	+
Sediment (Extraction method)	++	++	++	++	++
Sediment (Membrane filtration)	-	-	+/-	-	-
Total Sulfur	-	+	-	-	-
Water	+	+/-	+	+	+
Simulated Distillation	--	--	--	-	--
Total Mercury	++	+	+	+	+

Table 8: comparison of determinations to the reference test methods

The following performance categories were used:

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

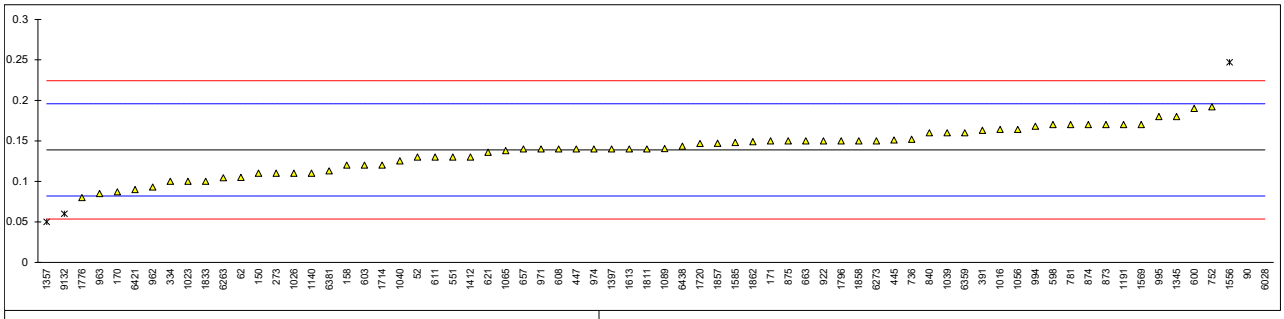
APPENDIX 1

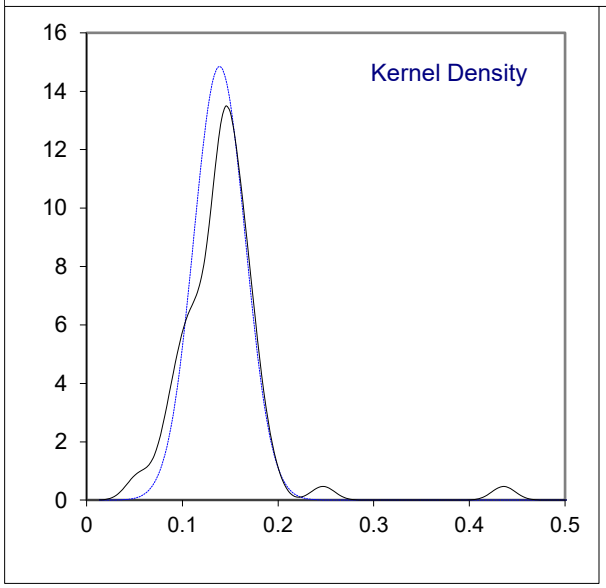
Determination of Total Acid Number on sample #22215; results in mg KOH/g

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D664-A	0.13		-0.31	785		-----		-----
62	D664-A	0.105		-1.19	840	D664-A	0.16		0.74
90	D664-A	0.4358	R(0.01)	10.43	862		-----		-----
92		-----		-----	873	D664-A	0.17		1.09
140	D664-A	<0.1	C	-----	874	D664-A	0.17		1.09
141		-----		-----	875	D664-A	0.15		0.39
150	D664-A	0.11		-1.01	914		-----		-----
154		-----		-----	922	D664-A	0.15		0.39
158	D664-A	0.12		-0.66	962	D664-A	0.093		-1.61
159		-----		-----	963	D664-A	0.085		-1.89
167		-----		-----	970		-----		-----
170	D664-A	0.087		-1.82	971	D664-A	0.14		0.04
171	D664-A	0.15		0.39	974	D664-A	0.14		0.04
172		-----		-----	988		-----		-----
175		-----		-----	991		-----		-----
203		-----		-----	992		-----		-----
225		-----		-----	994	D664-A	0.168		1.02
231		-----		-----	995	D664-A	0.18		1.45
237	D664-B	<0.1		-----	997		-----		-----
238		-----		-----	1016	D664-A	0.164		0.88
273	D664-A	0.11		-1.01	1023	D8045	0.10		-1.37
311		-----		-----	1026	D664-A	0.11		-1.01
314		-----		-----	1039	D664-A	0.16		0.74
328		-----		-----	1040	D664-A	0.1252		-0.48
333		-----		-----	1056	D664-A	0.164		0.88
334	D664-A	0.10		-1.37	1065	D664-A	0.138		-0.03
335		-----		-----	1089	D664-A	0.1405		0.06
355		-----		-----	1140	IP177	0.11		-1.01
391	D664-A	0.163		0.85	1191	ISO6619	0.17		1.09
398		-----		-----	1236		-----		-----
399		-----		-----	1259		-----		-----
442		-----		-----	1320		-----		-----
444		-----		-----	1345	D664-A	0.18		1.45
445	D664-A	0.151		0.43	1357	D664-A	0.05	R(0.05)	-3.12
446		-----		-----	1397	D664-A	0.14		0.04
447	D664-A	0.14		0.04	1412	D664-A	0.13		-0.31
480		-----		-----	1414		-----		-----
495		-----		-----	1488		-----		-----
511		-----		-----	1556	D664-A	0.247	R(0.05)	3.80
525		-----		-----	1557		-----		-----
529		-----		-----	1569	D664-A	0.17		1.09
541		-----		-----	1585	D664-A	0.148		0.32
542		-----		-----	1613	D664-A	0.14		0.04
551	D664-A	0.13	C	-0.31	1695		-----		-----
553		-----		-----	1714	In house	0.12		-0.66
557		-----		-----	1720	D664-A	0.1466		0.27
562		-----		-----	1724		-----		-----
575		-----		-----	1728		-----		-----
588		-----		-----	1759		-----		-----
589		-----		-----	1776	D664-A	0.08		-2.07
590		-----		-----	1796	D664-A	0.15		0.39
593		-----		-----	1810		-----		-----
596		-----		-----	1811	D664-A	0.14		0.04
597		-----		-----	1815		-----		-----
598	D664-A	0.17		1.09	1833	D664-A	0.100		-1.37
599		-----		-----	1849		-----		-----
600	D664-A	0.19		1.80	1857	D664-A	0.147		0.29
603	D664-A	0.12		-0.66	1858	D664-A	0.15		0.39
608	D664-A	0.14		0.04	1862	D664-A	0.149		0.36
609		-----		-----	1984		-----		-----
611	D664-A	0.13		-0.31	6016		-----		-----
612		-----		-----	6028	D664-A	1.1	R(0.01)	33.77
621	D664-A	0.136		-0.10	6263	D664-B	0.1045		-1.21
657	D664-A	0.14		0.04	6273	D664-A	0.15		0.39
663	D664-A	0.15		0.39	6290		-----		-----
704		-----		-----	6295		-----		-----
710		-----		-----	6296		-----		-----
734		-----		-----	6319		-----		-----
736	D664-A	0.152		0.46	6359	D664-A	0.16		0.74
749		-----		-----	6362		-----		-----
750		-----		-----	6381	D664-A	0.113		-0.91
752	D664-A	0.192		1.87	6421	D664-A	0.09		-1.72
753		-----		-----	6438	D664-A	0.1435		0.16
779		-----		-----	6447		-----		-----
781	D664-A	0.170		1.09	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060		-----		-----
9132	D664-A	0.06	C,R(0.05)	-2.77
	normality	OK		
	n	65		
	outliers	5		
	mean (n)	0.1389		
	st.dev. (n)	0.02687		
	R(calc.)	0.0752		
	st.dev.(D664-A:18e2)	0.02846	IP 60mL	
	R(D664-A:18e2)	0.0797	IP 60mL	
Compare				
	R(D664-A:18e2)	0.0279	IP 125mL	
	R(D664-A:18e2)	0.0807	BEP 60mL	
	R(D664-A:18e2)	0.0397	BEP 125mL	

Lab 140 first reported 0.0475
Lab 551 first reported 0.03
Lab 9132 first reported 1.5





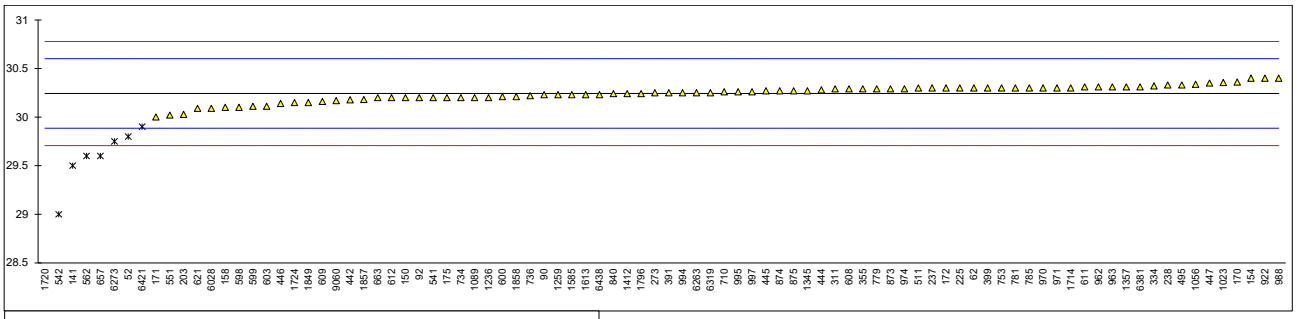
Determination of API Gravity on sample #22215;

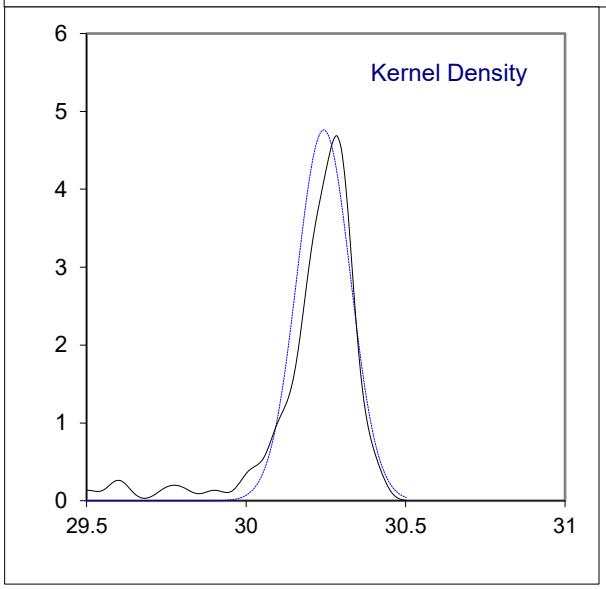
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5002	29.8	R(0.01)	-2.48	785	D287	30.3		0.32
62	D5002	30.3		0.32	840	D5002	30.24		-0.02
90	D5002	30.23		-0.07	862		-----		-----
92	D4052	30.20		-0.24	873	D1298	30.29		0.26
140		-----		-----	874	D1205	30.27		0.15
141	D5002	29.5	R(0.01)	-4.16	875	D5002	30.27		0.15
150	D287	30.2		-0.24	914		-----		-----
154	D287	30.4		0.88	922	D1298	30.4		0.88
158	D5002	30.1		-0.80	962	D287	30.31		0.37
159		-----		-----	963	D5002	30.31		0.37
167		-----		-----	970	D4052	30.3		0.32
170	D5002	30.36		0.65	971	D5002	30.3		0.32
171	D287	30.0		-1.36	974	D5002	30.29		0.26
172	D287	30.3		0.32	988	D1298	30.4		0.88
175	D5002	30.2		-0.24	991		-----		-----
203	Calc.	30.028		-1.21	992		-----		-----
225	D5002	30.3		0.32	994	Calc.	30.25		0.04
231		-----		-----	995	D5002	30.26		0.09
237	D1298	30.3		0.32	997	D5002	30.26		0.09
238	Calc.	30.33		0.49	1016		-----		-----
273	D4052	30.25		0.04	1023	D5002	30.355		0.63
311	Calc.	30.29		0.26	1026		-----		-----
314		-----		-----	1039		-----		-----
328		-----		-----	1040		-----		-----
333		-----		-----	1056	Calc.	30.33739		0.53
334	D287	30.32		0.43	1065		-----		-----
335		-----		-----	1089	D5002	30.2		-0.24
355	D4052	30.29		0.26	1140		-----		-----
391	D287	30.25		0.04	1191		-----		-----
398		-----		-----	1236	D287	30.2		-0.24
399	D4052	30.3		0.32	1259	D4052	30.23		-0.07
442	Calc.	30.1773		-0.37	1320		-----		-----
444	D5002	30.28		0.21	1345	D5002	30.27		0.15
445	D5002	30.27		0.15	1357	D4052	30.31		0.37
446	D5002	30.14		-0.58	1397		-----		-----
447	D5002	30.35		0.60	1412	D5002	30.24		-0.02
480		-----		-----	1414		-----		-----
495	D287	30.33		0.49	1488		-----		-----
511	D1298	30.3		0.32	1556		-----		-----
525		-----		-----	1557		-----		-----
529		-----		-----	1569		-----		-----
541	D5002	30.2		-0.24	1585	D5002	30.23		-0.07
542	D287	29	R(0.01)	-6.96	1613	D5002	30.23		-0.07
551	D287	30.02	C	-1.25	1695		-----		-----
553		-----		-----	1714	D5002	30.3		0.32
557		-----		-----	1720	D5002	27.14	C,R(0.01)	-17.38
562	D1298	29.6	C,R(0.01)	-3.60	1724	D287	30.15		-0.52
575		-----		-----	1728		-----		-----
588		-----		-----	1759		-----		-----
589		-----		-----	1776		-----		-----
590		-----		-----	1796	D1250	30.24		-0.02
593		-----		-----	1810		-----		-----
596		-----		-----	1811		-----		-----
597		-----		-----	1815		-----		-----
598	D5002	30.10		-0.80	1833		-----		-----
599	D1298	30.11		-0.75	1849	D1298	30.15		-0.52
600	D1298	30.21		-0.19	1857	Calc.	30.18		-0.35
603	D4052	30.11		-0.75	1858	Calc.	30.21		-0.19
608	Calc.	30.29		0.26	1862		-----		-----
609	D5002	30.16		-0.47	1984		-----		-----
611	D5002	30.31		0.37	6016		-----		-----
612	D5002	30.20		-0.24	6028	D1298	30.09		-0.86
621	D4052	30.09		-0.86	6263	D4052	30.25		0.04
657	D5002	29.6	C,R(0.01)	-3.60	6273	D5002	29.75	R(0.01)	-2.76
663	D5002	30.2		-0.24	6290		-----		-----
704		-----		-----	6295		-----		-----
710	Calc.	30.26		0.09	6296		-----		-----
734	Calc.	30.20		-0.24	6319	Calc.	30.25		0.04
736	D287	30.22		-0.13	6359		-----		-----
749		-----		-----	6362		-----		-----
750		-----		-----	6381	D5002	30.31		0.37
752		-----		-----	6421	D287	29.9	R(0.01)	-1.92
753	D5002	30.3		0.32	6438	D4052	30.23		-0.07
779	D5002	30.29		0.26	6447		-----		-----
781	D5002	30.30		0.32	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060	D287	30.17		-0.41
9132		-----		-----

normality	OK
n	82
outliers	8
mean (n)	30.243
st.dev. (n)	0.0838
R(calc.)	0.235
st.dev.(D287:12bR19)	0.1786
R(D287:12bR19)	0.5

Lab 551 first reported 29.34
Lab 562 first reported 31.1
Lab 657 first reported 29.2
Lab 1720 first reported 28.559



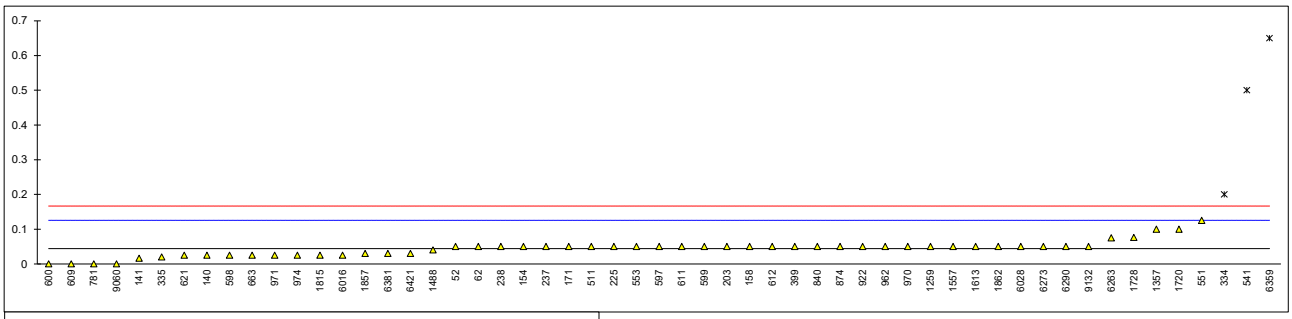


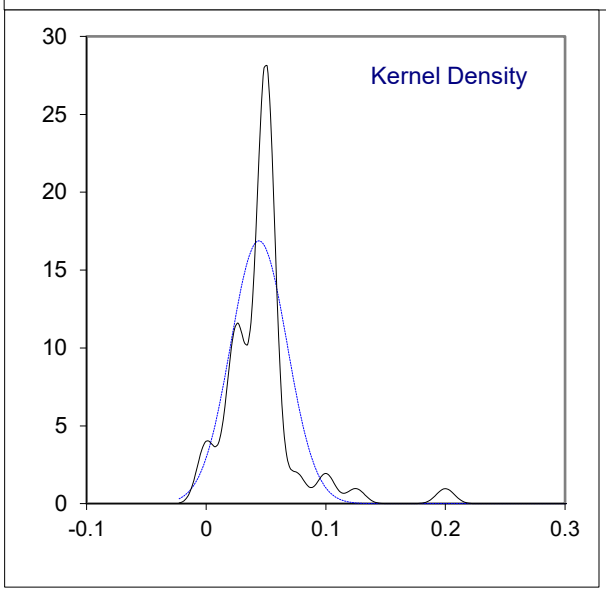
Determination of BS&W on sample #22215; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4007	0.05		0.15	785		-----		-----
62	D4007	0.05		0.15	840	D4007	0.05		0.15
90		-----		-----	862		-----		-----
92		-----		-----	873		-----		-----
140	D4007	0.025		-0.47	874	D4007	0.05		0.15
141	D4007	0.016		-0.69	875		-----		-----
150		-----		-----	914		-----		-----
154	D4007	0.05		0.15	922	D4007	0.05		0.15
158	D4007	0.05		0.15	962	D4007	0.05		0.15
159		-----		-----	963	D4007	<0.1		-----
167		-----		-----	970	D4007	0.05		0.15
170		-----		-----	971	D4007	0.025		-0.47
171	D4007	0.05		0.15	974	D4007	0.025		-0.47
172		-----		-----	988		-----		-----
175		-----		-----	991		-----		-----
203	D4007	0.05		0.15	992		-----		-----
225	D4007	0.05		0.15	994		-----		-----
231		-----		-----	995		-----		-----
237	D4007	0.05		0.15	997		-----		-----
238	D4007	0.05		0.15	1016		-----		-----
273		-----		-----	1023		-----		-----
311		-----		-----	1026		-----		-----
314		-----		-----	1039		-----		-----
328		-----		-----	1040		-----		-----
333		-----		-----	1056		-----		-----
334	D4007	0.20	R(0.01)	3.82	1065		-----		-----
335	D4007	0.02		-0.59	1089		-----		-----
355		-----		-----	1140		-----		-----
391		-----		-----	1191		-----		-----
398		-----		-----	1236		-----		-----
399	D4007	0.05		0.15	1259	ISO9030	0.05		0.15
442		-----		-----	1320		-----		-----
444		-----		-----	1345		-----		-----
445		-----		-----	1357	D4007	0.1	C	1.37
446		-----		-----	1397		-----		-----
447		-----		-----	1412		-----		-----
480		-----		-----	1414		-----		-----
495		-----		-----	1488	ISO3734	0.04		-0.10
511	D4007	0.05		0.15	1556		-----		-----
525		-----		-----	1557	ISO9030	0.05		0.15
529		-----		-----	1569		-----		-----
541	D4007	0.50	R(0.01)	11.16	1585		-----		-----
542	D4007	<0.1		-----	1613	D4007	0.05		0.15
551	D4007	0.125	C	1.98	1695		-----		-----
553	D4007	0.05		0.15	1714		-----		-----
557		-----		-----	1720	D4007	0.1		1.37
562		-----		-----	1724		-----		-----
575		-----		-----	1728		0.076		0.78
588		-----		-----	1759		-----		-----
589		-----		-----	1776		-----		-----
590		-----		-----	1796		-----		-----
593		-----		-----	1810		-----		-----
596	D4007	<0.05		-----	1811		-----		-----
597	D4007	0.05		0.15	1815	D4007	0.025		-0.47
598	D4007	0.025		-0.47	1833		-----		-----
599	D4007	0.05		0.15	1849		-----		-----
600	D4007	0.00		-1.08	1857	Calc.	0.030		-0.34
603		-----		-----	1858		-----		-----
608	D4007	<0.05		-----	1862	D4007	0.05		0.15
609	D4007	0.00		-1.08	1984		-----		-----
611	D4007	0.05		0.15	6016	In house	0.025		-0.47
612	D4007	0.05		0.15	6028	D4007	0.05		0.15
621	D4007	0.025		-0.47	6263	D4007	0.075		0.76
657	D4007	<0.025		-----	6273	D4007	0.05		0.15
663	D4007	0.025		-0.47	6290	D4007	0.05		0.15
704		-----		-----	6295		-----		-----
710		-----		-----	6296		-----		-----
734		-----		-----	6319		-----		-----
736		-----		-----	6359	D4007	0.65	R(0.01)	14.83
749		-----		-----	6362		-----		-----
750		-----		-----	6381	D7829	0.030		-0.34
752		-----		-----	6421	D4007	0.03		-0.34
753		-----		-----	6438		-----		-----
779		-----		-----	6447		-----		-----
781	D4007	0.00		-1.08	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060	D4007	0		-1.08
9132	D4007	0.05		0.15
	normality	not OK		
	n	52		
	outliers	3		
	mean (n)	0.0441		
	st.dev. (n)	0.02362		
	R(calc.)	0.0661		
	st.dev.(D4007:22)	0.04084		
	R(D4007:22)	0.1144		

Lab 551 first reported 0.3
Lab 1357 first reported 0.40





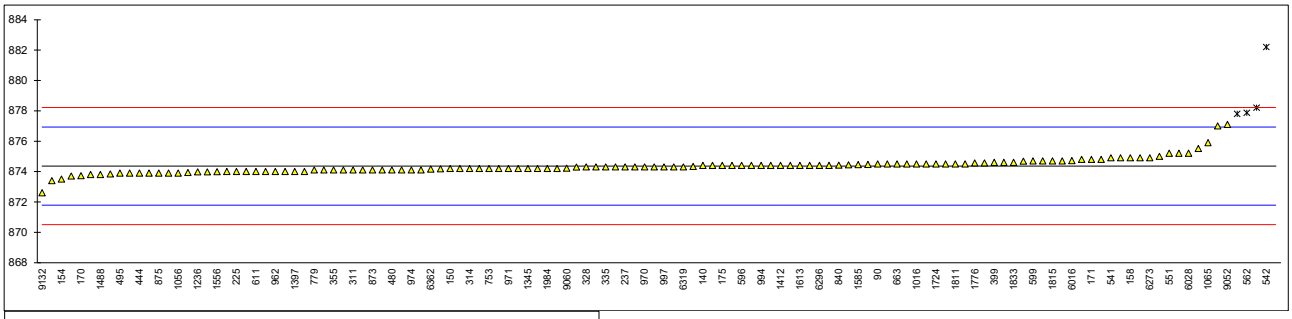
Determination of Density at 15 °C on sample #22215; results in kg/m^3

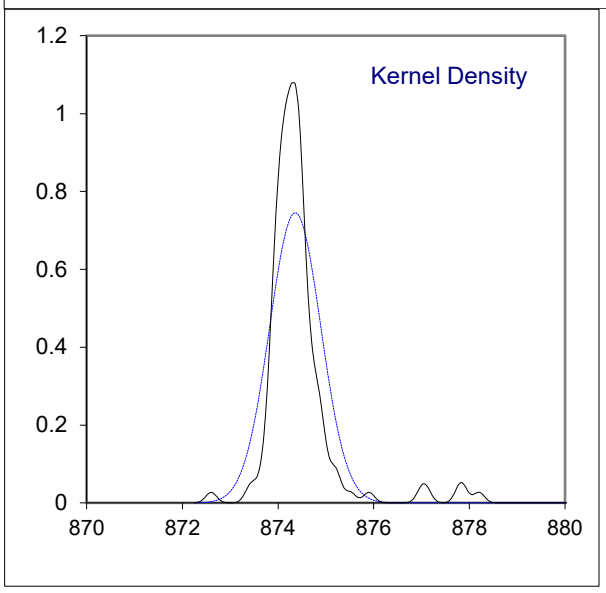
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5002	877.0		2.05	785	D1298	874.3		-0.05
62	D5002	874.0		-0.28	840	D5002	874.42		0.05
90	D5002	874.5		0.11	862		-----		-----
92	D4052	874.1		-0.20	873	D5002	874.1		-0.20
140	D5002	874.4		0.03	874	D5002	874.2		-0.12
141	D5002	878.2	R(0.01)	2.99	875	D5002	873.9		-0.36
150	D5002	874.2	C	-0.12	914		-----		-----
154	D4052	873.5		-0.67	922	D4052	873.7		-0.51
158	D5002	874.9		0.42	962	D5002	874.0		-0.28
159		-----		-----	963	D4052	874.0		-0.28
167		-----		-----	970	D4052	874.3		-0.05
170	D5002	873.72		-0.50	971	D5002	874.2		-0.12
171	D5002	874.8		0.34	974	D5002	874.1		-0.20
172	D5002	874.1	C	-0.20	988	D1298	874.2		-0.12
175	D5002	874.4		0.03	991		-----		-----
203	D5002	875.51		0.89	992		-----		-----
225	D5002	874.0		-0.28	994	D5002	874.4		0.03
231		-----		-----	995	D5002	874.3		-0.05
237	D1298	874.3		-0.05	997	D5002	874.3		-0.05
238	D4052	873.9		-0.36	1016	D4052	874.5		0.11
273	D4052	874.0		-0.28	1023	D5002	873.84		-0.40
311	D5002	874.1		-0.20	1026		-----		-----
314	D5002	874.2		-0.12	1039	ISO12185	873.9		-0.36
328	D5002	874.3		-0.05	1040	ISO12185	874.68		0.25
333	D5002	874.0		-0.28	1056	D5002	873.9		-0.36
334	D5002	873.9		-0.36	1065	D1298	875.9		1.20
335	D5002	874.3		-0.05	1089	D5002	874.9	C	0.42
355	D4052	874.1		-0.20	1140	IP365	874.4		0.03
391	D5002	874.3		-0.05	1191	D5002	874.18		-0.14
398	D5002	874.2		-0.12	1236	D5002	873.98		-0.29
399	D4052	874.6		0.19	1259	ISO12185	874.5		0.11
442	IP365	874.4	C	0.03	1320		-----		-----
444	D5002	873.9	C	-0.36	1345	D5002	874.2		-0.12
445	D5002	874.2		-0.12	1357	D4052	874.1		-0.20
446	D5002	874.9		0.42	1397	ISO12185	874.0		-0.28
447	D5002	873.8	C	-0.43	1412	D5002	874.4		0.03
480	D5002	874.1		-0.20	1414		-----		-----
495	ISO12185	873.9		-0.36	1488	ISO3675	873.80		-0.43
511		-----		-----	1556	ISO12185	873.99		-0.29
525		-----		-----	1557	ISO3675	874.3		-0.05
529		-----		-----	1569	D4052	874.4		0.03
541	D5002	874.9		0.42	1585	D5002	874.46		0.08
542	D5002	882.2	R(0.01)	6.09	1613	D5002	874.4		0.03
551	D5002	875.2	C	0.65	1695	D5002	874.7		0.27
553	D4052	875.0		0.50	1714	D5002	874.2		-0.12
557		-----		-----	1720	D5002	890.40	C,R(0.01)	12.47
562	D4052	877.86	C,R(0.01)	2.72	1724	D5002	874.5		0.11
575		-----		-----	1728	D5002	873.94		-0.33
588		-----		-----	1759		-----		-----
589		-----		-----	1776	ISO12185	874.57		0.16
590		-----		-----	1796	D5002	874.4	C	0.03
593		-----		-----	1810	ISO12185	874.5		0.11
596	D5002	874.4		0.03	1811	D5002	874.5		0.11
597	D1298	874.1		-0.20	1815	ISO12185	874.70		0.27
598	D5002	875.2		0.65	1833	D5002	874.6		0.19
599	D1298	874.7		0.27	1849	ISO12185	874.290		-0.05
600	D1298	874.4		0.03	1857	D5002	874.7		0.27
603	D4052	874.8		0.34	1858	D5002	874.57		0.16
608	D5002	874.1		-0.20	1862	D5002	874.50		0.11
609	D5002	874.4		0.03	1984	D5002	874.2		-0.12
611	D5002	874.0		-0.28	6016	In house	874.72		0.28
612	D5002	874.5		0.11	6028	ISO3675	875.2		0.65
621	D4052	874.8		0.34	6263	D4052	874.0		-0.28
657	D5002	877.8	C,R(0.01)	2.67	6273	D5002	874.9		0.42
663	D5002	874.5		0.11	6290	D5002	874.44		0.06
704		-----		-----	6295	D5002	874.47		0.09
710	ISO12185	874.33		-0.02	6296	D5002	874.40		0.03
734	D4052	874.6		0.19	6319	D1298	874.3		-0.05
736	D1298	874.5		0.11	6359		-----		-----
749		-----		-----	6362	D5002	874.16		-0.15
750		-----		-----	6381	D5002	873.98		-0.29
752	D5002	874.3		-0.05	6421	D5002	874.2		-0.12
753	D5002	874.2		-0.12	6438	D4052	874.4		0.03
779	D5002	874.1		-0.20	6447		-----		-----
781	D5002	874.1		-0.20	9051	In house	873.4		-0.75

lab	method	value	mark	z(targ)
9052	D5002	877.1		2.13
9060	D5002	874.22		-0.11
9132	D5002	872.6		-1.37

normality	not OK
n	123
outliers	5
mean (n)	874.359
st.dev. (n)	0.5352
R(calc.)	1.499
st.dev.(D5002:22)	1.2866
R(D5002:22)	3.602

Lab 150 first reported 0.8742 kg/m^3
Lab 172 first reported 0.8741 kg/m^3
Lab 442 first reported 0.0008744 kg/m^3
Lab 444 first reported 0.8740 kg/m^3
Lab 447 reported 0.8738 kg/m^3
Lab 551 first reported 878.9
Lab 562 first reported 869.8
Lab 657 first reported 879.9
Lab 1089 first reported 08749 kg/m^3
Lab 1720 first reported 885.034
Lab 1796 reported 0.8744 kg/m^3



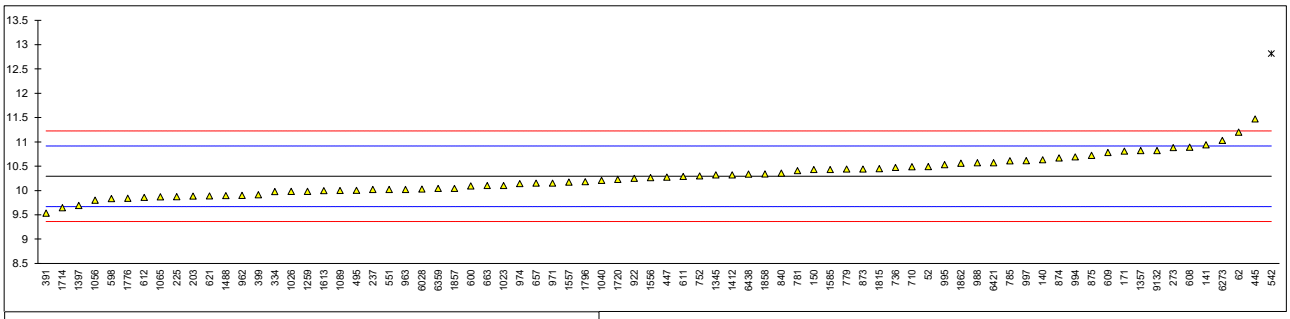


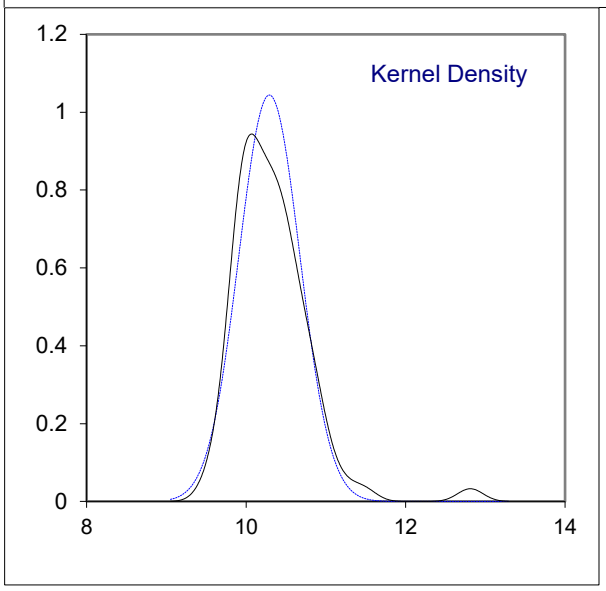
Determination of Kinematic Viscosity at 40 °C on sample #22215; results in mm²/s

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D445	10.49		0.64	785	D445	10.61		1.02
62	D445	11.20		2.92	840	D7042	10.354		0.20
90		-----		-----	862		-----		-----
92		-----		-----	873	D445	10.44		0.47
140	D445	10.63	C	1.09	874	D445	10.67		1.21
141	D7042	10.94		2.08	875	D445	10.72		1.37
150	D445	10.43		0.44	914		-----		-----
154		-----		-----	922	D445	10.25		-0.14
158		-----		-----	962	D445	9.899		-1.27
159		-----		-----	963	D445	10.02		-0.88
167		-----		-----	970		-----		-----
170		-----		-----	971	D445	10.15		-0.46
171	D445	10.81		1.66	974	D445	10.14		-0.49
172		-----		-----	988	D445	10.57		0.89
175		-----		-----	991		-----		-----
203	D445	9.8835		-1.31	992		-----		-----
225	D445	9.872		-1.35	994	D7042	10.69		1.28
231		-----		-----	995	D445	10.53		0.76
237	D445	10.02		-0.88	997	D445	10.611		1.02
238		-----		-----	1016		-----		-----
273	D445	10.88		1.89	1023	D445	10.1		-0.62
311		-----		-----	1026	D445	9.979		-1.01
314		-----		-----	1039		-----		-----
328		-----		-----	1040	D445	10.208		-0.27
333		-----		-----	1056	D445	9.8		-1.58
334	D445	9.976		-1.02	1065	D445	9.870		-1.36
335		-----		-----	1089	D445	9.999		-0.94
355		-----		-----	1140		-----		-----
391	D7042	9.534		-2.44	1191		-----		-----
398		-----		-----	1236		-----		-----
399	D445	9.912		-1.22	1259	D7042	9.982		-1.00
442		-----		-----	1320		-----		-----
444		-----		-----	1345	D445	10.32		0.09
445	D445	11.47		3.79	1357	D445	10.82		1.70
446		-----		-----	1397	D7042	9.690		-1.94
447	D445	10.275		-0.06	1412	D445	10.32		0.09
480		-----		-----	1414		-----		-----
495	D445	10.002		-0.93	1488	ISO3104	9.8914		-1.29
511		-----		-----	1556	ISO3104	10.265		-0.09
525		-----		-----	1557	ISO3104	10.17		-0.39
529		-----		-----	1569		-----		-----
541		-----		-----	1585	D445	10.430		0.44
542	D7042	12.8143	R(0.01)	8.11	1613	D445	9.995		-0.96
551	D445	10.02	C	-0.88	1695		-----		-----
553		-----		-----	1714	D7042	9.6442		-2.08
557		-----		-----	1720	D445	10.228		-0.21
562		-----		-----	1724		-----		-----
575		-----		-----	1728		-----		-----
588		-----		-----	1759		-----		-----
589		-----		-----	1776	ISO3104	9.8382		-1.46
590		-----		-----	1796	D445	10.18		-0.36
593		-----		-----	1810		-----		-----
596		-----		-----	1811		-----		-----
597		-----		-----	1815	ISO3104	10.449		0.50
598	D7042	9.831		-1.48	1833		-----		-----
599		-----		-----	1849		-----		-----
600	D445	10.093		-0.64	1857	D445	10.042		-0.81
603		-----		-----	1858	D445	10.341		0.16
608	D445	10.891		1.92	1862	D445	10.562		0.87
609	D445	10.78		1.57	1984		-----		-----
611	D445	10.29		-0.01	6016		-----	W	-----
612	D7042	9.8551		-1.41	6028	ISO3104	10.03		-0.84
621	D445	9.887		-1.30	6263		-----		-----
657	D445	10.15		-0.46	6273	D7042	11.03		2.37
663	D445	10.10		-0.62	6290		-----		-----
704		-----		-----	6295		-----		-----
710	D445	10.488		0.63	6296		-----		-----
734		-----		-----	6319		-----		-----
736	D445	10.474		0.58	6359	D445	10.04		-0.81
749		-----		-----	6362		-----		-----
750		-----		-----	6381		-----		-----
752	D445	10.298		0.02	6421	D445	10.570		0.89
753		-----		-----	6438	D445	10.338		0.15
779	D445	10.44		0.47	6447		-----		-----
781	D445	10.408		0.37	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060		-----		-----
9132	D7042	10.821		1.70
	normality	OK		
	n	75		
	outliers	1		
	mean (n)	10.2925		
	st.dev. (n)	0.38225		
	R(calc.)	1.0703		
	st.dev.(D445:21e2)	0.31102		
	R(D445:21e2)	0.8708		

Lab 140 first reported 12.1386
Lab 551 first reported 11.8047
Lab 6016 test results withdrawn, reported 11.4705



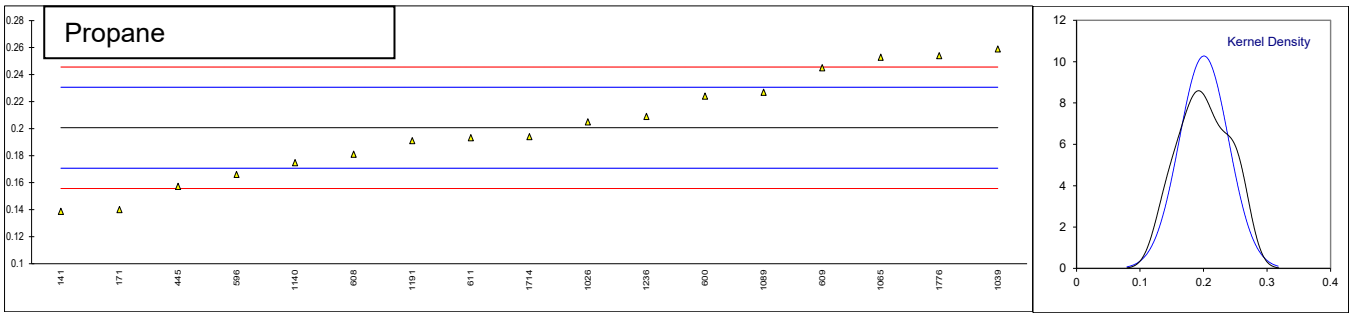


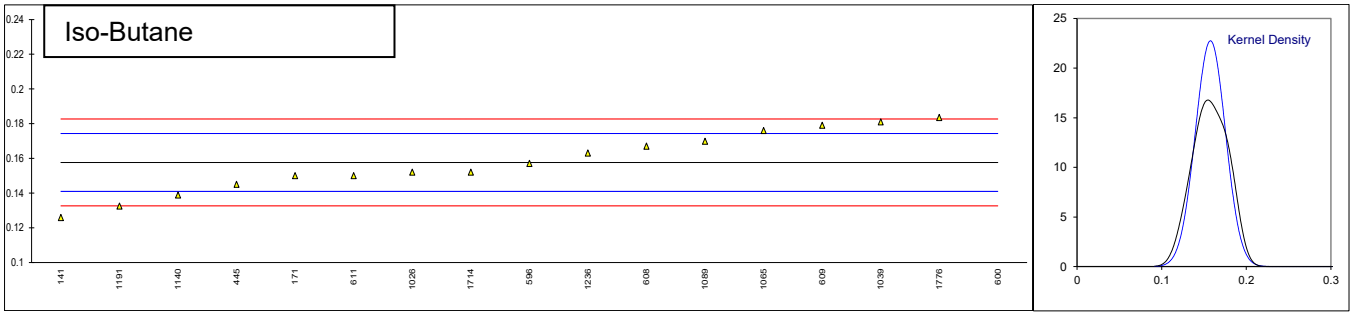
Determination of individual Light ends on sample #22215; results in %M/M

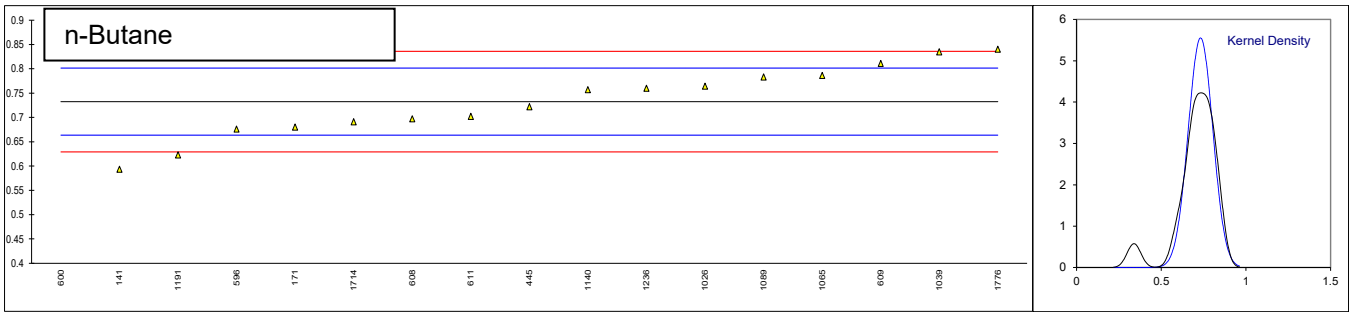
lab	method	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	cyc-Pentane	Hexanes
52		-----	-----	-----	-----	-----	-----	-----	-----	-----
62		-----	-----	-----	-----	-----	-----	-----	-----	-----
90		-----	-----	-----	-----	-----	-----	-----	-----	-----
92		-----	-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----	-----
141	D7169-GPA2186	0.000036	0.00414	0.13874	0.12589	0.59332	0.58708	1.00723	0.107388	2.31259
150		-----	-----	-----	-----	-----	-----	-----	-----	-----
154		-----	-----	-----	-----	-----	-----	-----	-----	-----
158		-----	-----	-----	-----	-----	-----	-----	-----	-----
159		-----	-----	-----	-----	-----	-----	-----	-----	-----
167		-----	-----	-----	-----	-----	-----	-----	-----	-----
170		-----	-----	-----	-----	-----	-----	-----	-----	-----
171		<0.01	<0.01	0.14	0.15	0.68	0.67	1.16	0.07	2.47
172		-----	-----	-----	-----	-----	-----	-----	-----	-----
175		-----	-----	-----	-----	-----	-----	-----	-----	-----
203		-----	-----	-----	-----	-----	-----	-----	-----	-----
225		-----	-----	-----	-----	-----	-----	-----	-----	-----
231		-----	-----	-----	-----	-----	-----	-----	-----	-----
237		-----	-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----	-----
311		-----	-----	-----	-----	-----	-----	-----	-----	-----
314		-----	-----	-----	-----	-----	-----	-----	-----	-----
328		-----	-----	-----	-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	-----	-----	-----
334		-----	-----	-----	-----	-----	-----	-----	-----	-----
335		-----	-----	-----	-----	-----	-----	-----	-----	-----
355		-----	-----	-----	-----	-----	-----	-----	-----	-----
391		-----	-----	-----	-----	-----	-----	-----	-----	-----
398		-----	-----	-----	-----	-----	-----	-----	-----	-----
399		-----	-----	-----	-----	-----	-----	-----	-----	-----
442		-----	-----	-----	-----	-----	-----	-----	-----	-----
444		-----	-----	-----	-----	-----	-----	-----	-----	-----
445	D7900	<0.0001	0.0045	0.1572	0.1450	0.7218	0.6981	1.1856	0.0676	3.3010
446		-----	-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----	-----
480		-----	-----	-----	-----	-----	-----	-----	-----	-----
495		-----	-----	-----	-----	-----	-----	-----	-----	-----
511		-----	-----	-----	-----	-----	-----	-----	-----	-----
525		-----	-----	-----	-----	-----	-----	-----	-----	-----
529		-----	-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----	-----
542		-----	-----	-----	-----	-----	-----	-----	-----	-----
551		-----	-----	-----	-----	-----	-----	-----	-----	-----
553		-----	-----	-----	-----	-----	-----	-----	-----	-----
557		-----	-----	-----	-----	-----	-----	-----	-----	-----
562		-----	-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----	-----
588		-----	-----	-----	-----	-----	-----	-----	-----	-----
589		-----	-----	-----	-----	-----	-----	-----	-----	-----
590		-----	-----	-----	-----	-----	-----	-----	-----	-----
593		-----	-----	-----	-----	-----	-----	-----	-----	-----
596	GPA2186	0.00	0.006	0.166	0.157	0.676	0.695	1.138	-----	-----
597		-----	-----	-----	-----	-----	-----	-----	-----	-----
598		-----	-----	-----	-----	-----	-----	-----	-----	-----
599		-----	-----	-----	-----	-----	-----	-----	-----	-----
600	IP344	0.000	0.000	0.224	0.542 G(1)	0.339 (G1)	0.933 G(1)	1.359	-----	-----
603		-----	-----	-----	-----	-----	-----	-----	-----	-----
608	GPA2186	0.00	0.008	0.181	0.167	0.697	0.705	1.145	-----	-----
609	IP344	<0.01	0.013	0.245	0.179	0.811	0.702	1.198	-----	-----
611	GPA2186	0.0001	0.0095	0.1932	0.1500	0.7021	0.6408	1.0930	-----	-----
612		-----	-----	-----	-----	-----	-----	-----	-----	-----
621		-----	-----	-----	-----	-----	-----	-----	-----	-----
657		-----	-----	-----	-----	-----	-----	-----	-----	-----
663		-----	-----	-----	-----	-----	-----	-----	-----	-----
704		-----	-----	-----	-----	-----	-----	-----	-----	-----
710		-----	-----	-----	-----	-----	-----	-----	-----	-----
734		-----	-----	-----	-----	-----	-----	-----	-----	-----
736		-----	-----	-----	-----	-----	-----	-----	-----	-----
749		-----	-----	-----	-----	-----	-----	-----	-----	-----
750		-----	-----	-----	-----	-----	-----	-----	-----	-----
752		-----	-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----	-----
779		-----	-----	-----	-----	-----	-----	-----	-----	-----
781		-----	-----	-----	-----	-----	-----	-----	-----	-----

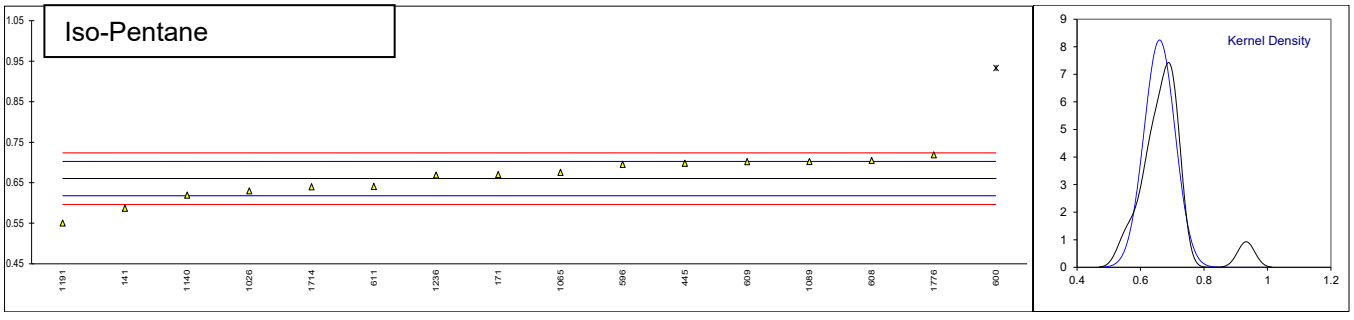
lab	method	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	cyc-Pentane	Hexanes
785		-----	-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----	-----
862		-----	-----	-----	-----	-----	-----	-----	-----	-----
873		-----	-----	-----	-----	-----	-----	-----	-----	-----
874		-----	-----	-----	-----	-----	-----	-----	-----	-----
875		-----	-----	-----	-----	-----	-----	-----	-----	-----
914		-----	-----	-----	-----	-----	-----	-----	-----	-----
922		-----	-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----	-----	-----	-----
970		-----	-----	-----	-----	-----	-----	-----	-----	-----
971		-----	-----	-----	-----	-----	-----	-----	-----	-----
974		-----	-----	-----	-----	-----	-----	-----	-----	-----
988		-----	-----	-----	-----	-----	-----	-----	-----	-----
991		-----	-----	-----	-----	-----	-----	-----	-----	-----
992		-----	-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----	-----
995		-----	-----	-----	-----	-----	-----	-----	-----	-----
997		-----	-----	-----	-----	-----	-----	-----	-----	-----
1016		-----	-----	-----	-----	-----	-----	-----	-----	-----
1023		-----	-----	-----	-----	-----	-----	-----	-----	-----
1026		0.000	0.010	0.205	0.152	0.764	0.630	1.071	0.110	3.060
1039		-----	0.015	0.259	0.181	0.835	-----	-----	-----	-----
1040		-----	-----	-----	-----	-----	-----	-----	-----	-----
1056		-----	-----	-----	-----	-----	-----	-----	-----	-----
1065		0.0000	0.0156	0.2529	0.176	0.7863	0.6757	1.1123	0.0582	2.6119
1089	D5134	0.0000	0.0112	0.2269	0.1698	0.7832	0.7023	1.1836	0.0713	2.4622
1140		-----	-----	0.1747	0.1388	0.7569	0.6193	1.2586	0.0912	3.240
1191		-----	0.0110	0.1910	0.1325	0.6228	0.5505	0.9323	0.0494	2.9292
1236	D5134	0	0.009	0.209	0.163	0.760	0.669	1.127	0.058	2.800
1259		-----	-----	-----	-----	-----	-----	-----	-----	-----
1320		-----	-----	-----	-----	-----	-----	-----	-----	-----
1345		-----	-----	-----	-----	-----	-----	-----	-----	-----
1357		-----	-----	-----	-----	-----	-----	-----	-----	-----
1397		-----	-----	-----	-----	-----	-----	-----	-----	-----
1412		-----	-----	-----	-----	-----	-----	-----	-----	-----
1414		-----	-----	-----	-----	-----	-----	-----	-----	-----
1488		-----	-----	-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----	-----	-----
1557		-----	-----	-----	-----	-----	-----	-----	-----	-----
1569		-----	-----	-----	-----	-----	-----	-----	-----	-----
1585		-----	-----	-----	-----	-----	-----	-----	-----	-----
1613		-----	-----	-----	-----	-----	-----	-----	-----	-----
1695		-----	-----	-----	-----	-----	-----	-----	-----	-----
1714		-----	-----	0.194	0.152	0.691	0.640	1.050	-----	2.775
1720		-----	-----	-----	-----	-----	-----	-----	-----	-----
1724		-----	-----	-----	-----	-----	-----	-----	-----	-----
1728		-----	-----	-----	-----	-----	-----	-----	-----	-----
1759		-----	-----	-----	-----	-----	-----	-----	-----	-----
1776	EN15199	0.0141	<0,01	0.2539	0.1835	0.8404	0.7187	1.2254	-----	-----
1796		-----	-----	-----	-----	-----	-----	-----	-----	-----
1810		-----	-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----	-----
1815		-----	-----	-----	-----	-----	-----	-----	-----	-----
1833		-----	-----	-----	-----	-----	-----	-----	-----	-----
1849		-----	-----	-----	-----	-----	-----	-----	-----	-----
1857		-----	-----	-----	-----	-----	-----	-----	-----	-----
1858		-----	-----	-----	-----	-----	-----	-----	-----	-----
1862		-----	-----	-----	-----	-----	-----	-----	-----	-----
1984		-----	-----	-----	-----	-----	-----	-----	-----	-----
6016		-----	-----	-----	-----	-----	-----	-----	-----	-----
6028		-----	-----	-----	-----	-----	-----	-----	-----	-----
6263		-----	-----	-----	-----	-----	-----	-----	-----	-----
6273		-----	-----	-----	-----	-----	-----	-----	-----	-----
6290		-----	-----	-----	-----	-----	-----	-----	-----	-----
6295		-----	-----	-----	-----	-----	-----	-----	-----	-----
6296		-----	-----	-----	-----	-----	-----	-----	-----	-----
6319		-----	-----	-----	-----	-----	-----	-----	-----	-----
6359		-----	-----	-----	-----	-----	-----	-----	-----	-----
6362		-----	-----	-----	-----	-----	-----	-----	-----	-----
6381		-----	-----	-----	-----	-----	-----	-----	-----	-----
6421		-----	-----	-----	-----	-----	-----	-----	-----	-----
6438		-----	-----	-----	-----	-----	-----	-----	-----	-----
6447		-----	-----	-----	-----	-----	-----	-----	-----	-----
9051		-----	-----	-----	-----	-----	-----	-----	-----	-----
9052		-----	-----	-----	-----	-----	-----	-----	-----	-----
9060		-----	-----	-----	-----	-----	-----	-----	-----	-----
9132		-----	-----	-----	-----	-----	-----	-----	-----	-----

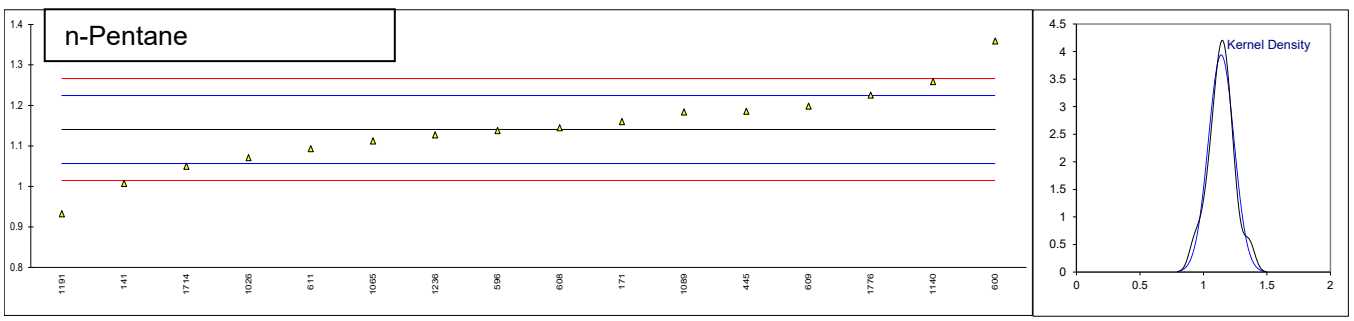
	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	cyc-Pentane	Hexanes
normality	unknown	OK	OK	OK	OK	OK	OK	OK	OK
n	12	10	17	16	16	15	16	9	10
outliers	n.a.	n.a.	0	1	1	1	0	0	0
mean (n)	<0.01	<0.01	0.2007	0.1577	0.7326	0.6602	1.1404	0.0759	2.7962
st.dev. (n)	n.a.	n.a.	0.03882	0.01753	0.07188	0.04837	0.10128	0.02193	0.33753
R(calc.)	n.a.	n.a.	0.1087	0.0491	0.2013	0.1354	0.2836	0.0614	0.9451
st.dev.(IP344:88R10)	n.a.	n.a.	0.01498	0.00833	0.03453	0.02122	0.04195	(0.00426)	0.16071
R(IP344:88R10)	n.a.	n.a.	0.0419	0.0233	0.0967	0.0594	0.1175	(0.0119)	0.4500

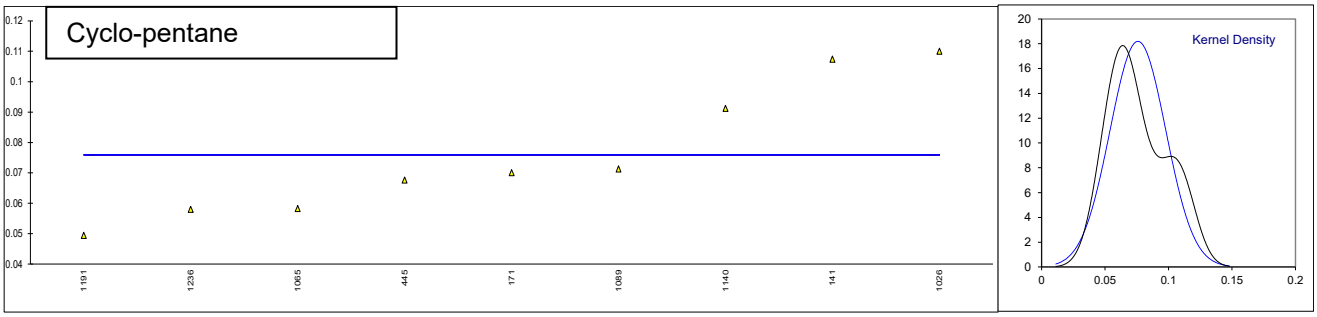


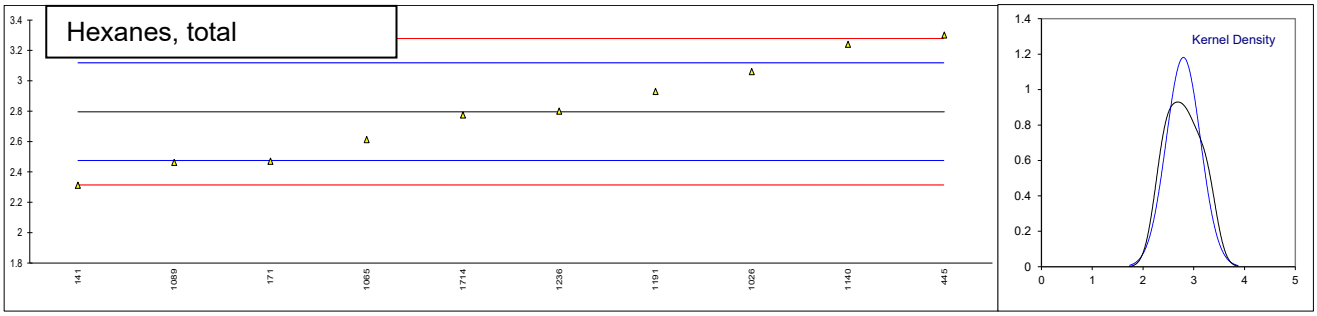









Cyclo-pentane
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
1191
1236
1065
445
171
1089
1140
141
1026
Kernel Density
20
18
16
14
12
10
8
6
4
2
0
0
0.05
0.1
0.15
0.2

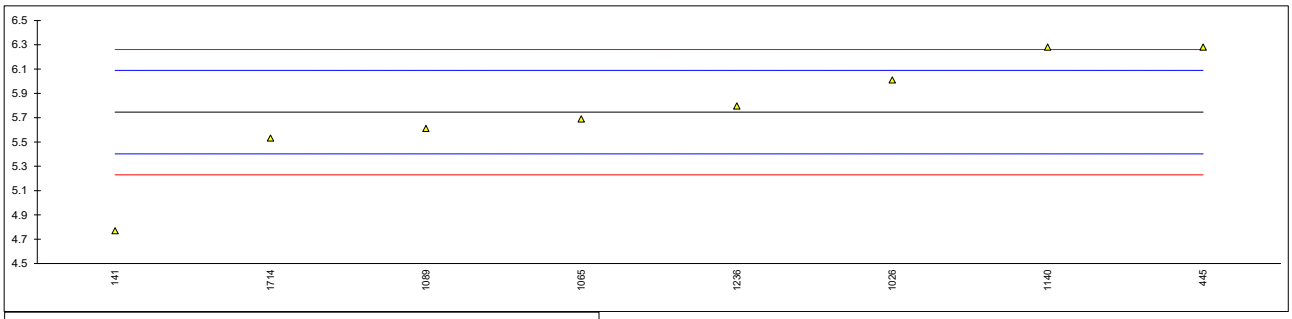

Hexanes, total
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
141
1089
171
1065
1714
1236
1191
1026
1140
445
Kernel Density
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
1
2
3
4
5

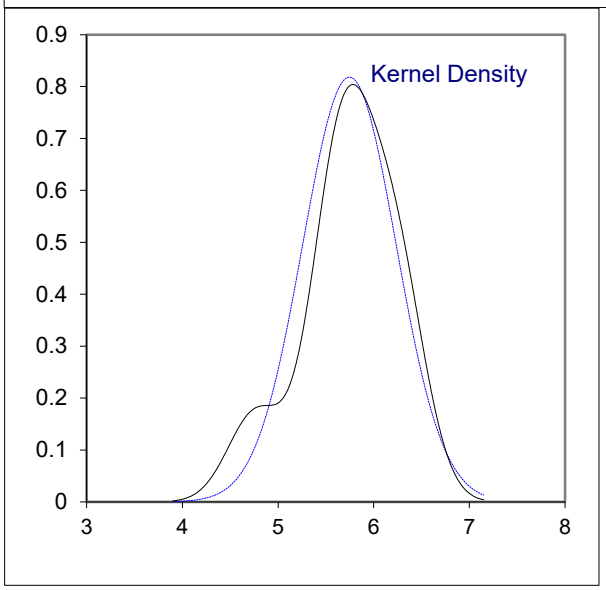
Determination of Total of all C1 – C6 on sample #22215; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	785		-----		-----
62		-----		-----	840		-----		-----
90		-----		-----	862		-----		-----
92		-----		-----	873		-----		-----
140		-----		-----	874		-----		-----
141	D7169-GPA2186	4.76903		-5.68	875		-----		-----
150		-----		-----	914		-----		-----
154		-----		-----	922		-----		-----
158		-----		-----	962		-----		-----
159		-----		-----	963		-----		-----
167		-----		-----	970		-----		-----
170		-----		-----	971		-----		-----
171		-----		-----	974		-----		-----
172		-----		-----	988		-----		-----
175		-----		-----	991		-----		-----
203		-----		-----	992		-----		-----
225		-----		-----	994		-----		-----
231		-----		-----	995		-----		-----
237		-----		-----	997		-----		-----
238		-----		-----	1016		-----		-----
273		-----		-----	1023		-----		-----
311		-----		-----	1026		6.010		1.54
314		-----		-----	1039		-----		-----
328		-----		-----	1040		-----		-----
333		-----		-----	1056		-----		-----
334		-----		-----	1065		5.6889		-0.33
335		-----		-----	1089	D5134	5.6105		-0.79
355		-----		-----	1140	D7900	6.28		3.11
391		-----		-----	1191	D5134M	-----		-----
398		-----		-----	1236	D5134	5.796		0.29
399		-----		-----	1259		-----		-----
442		-----		-----	1320		-----		-----
444		-----		-----	1345		-----		-----
445	D7900	6.2808		3.11	1357		-----		-----
446		-----		-----	1397		-----		-----
447		-----		-----	1412		-----		-----
480		-----		-----	1414		-----		-----
495		-----		-----	1488		-----		-----
511		-----		-----	1556		-----		-----
525		-----		-----	1557		-----		-----
529		-----		-----	1569		-----		-----
541		-----		-----	1585		-----		-----
542		-----		-----	1613		-----		-----
551		-----		-----	1695		-----		-----
553		-----		-----	1714	In house	5.532		-1.24
557		-----		-----	1720		-----		-----
562		-----		-----	1724		-----		-----
575		-----		-----	1728		-----		-----
588		-----		-----	1759		-----		-----
589		-----		-----	1776		-----		-----
590		-----		-----	1796		-----		-----
593		-----		-----	1810		-----		-----
596		-----		-----	1811		-----		-----
597		-----		-----	1815		-----		-----
598		-----		-----	1833		-----		-----
599		-----		-----	1849		-----		-----
600		-----		-----	1857		-----		-----
603		-----		-----	1858		-----		-----
608		-----		-----	1862		-----		-----
609		-----		-----	1984		-----		-----
611		-----		-----	6016		-----		-----
612		-----		-----	6028		-----		-----
621		-----		-----	6263		-----		-----
657		-----		-----	6273		-----		-----
663		-----		-----	6290		-----		-----
704		-----		-----	6295		-----		-----
710		-----		-----	6296		-----		-----
734		-----		-----	6319		-----		-----
736		-----		-----	6359		-----		-----
749		-----		-----	6362		-----		-----
750		-----		-----	6381		-----		-----
752		-----		-----	6421		-----		-----
753		-----		-----	6438		-----		-----
779		-----		-----	6447		-----		-----
781		-----		-----	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060		-----		-----
9132		-----		-----

normality	unknown
n	8
outliers	0
mean (n)	5.7459
st.dev. (n)	0.48774
R(calc.)	1.3657
st.dev.(IP344:88R10)	0.17189
R(IP344:88R10)	0.4813





Determination of Average Molecular Mass on sample #22215; results in g/mol

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	785		-----		-----
62		-----		-----	840		-----		-----
90		-----		-----	862		-----		-----
92		-----		-----	873		-----		-----
140		-----		-----	874		-----		-----
141		242.61		0.68	875		-----		-----
150		-----		-----	914		-----		-----
154		-----		-----	922		-----		-----
158		-----		-----	962		-----		-----
159		-----		-----	963		-----		-----
167		-----		-----	970		-----		-----
170		-----		-----	971		-----		-----
171		-----		-----	974		-----		-----
172		-----		-----	988		-----		-----
175		-----		-----	991		-----		-----
203		-----		-----	992		-----		-----
225		-----		-----	994		-----		-----
231		-----		-----	995		-----		-----
237		-----		-----	997		-----		-----
238		-----		-----	1016		-----		-----
273		-----		-----	1023		239.1		-0.02
311		-----		-----	1026		-----		-----
314		-----		-----	1039		-----		-----
328		-----		-----	1040		-----		-----
333		-----		-----	1056		-----		-----
334		-----		-----	1065		-----		-----
335		-----		-----	1089		-----		-----
355		-----		-----	1140		-----		-----
391		-----		-----	1191		-----		-----
398		-----		-----	1236	In house	235.91		-0.66
399		-----		-----	1259		-----		-----
442		-----		-----	1320		-----		-----
444		-----		-----	1345		-----		-----
445		-----		-----	1357		-----		-----
446		-----		-----	1397		-----		-----
447		-----		-----	1412		-----		-----
480		-----		-----	1414		-----		-----
495		-----		-----	1488		-----		-----
511		-----		-----	1556		-----		-----
525		-----		-----	1557		-----		-----
529		-----		-----	1569		-----		-----
541		-----		-----	1585		-----		-----
542		-----		-----	1613		-----		-----
551		-----		-----	1695		-----		-----
553		-----		-----	1714		-----		-----
557		-----		-----	1720		-----		-----
562		-----		-----	1724		-----		-----
575		-----		-----	1728		-----		-----
588		-----		-----	1759		-----		-----
589		-----		-----	1776		-----		-----
590		-----		-----	1796		-----		-----
593		-----		-----	1810		-----		-----
596		-----		-----	1811		-----		-----
597		-----		-----	1815		-----		-----
598		-----		-----	1833		-----		-----
599		-----		-----	1849		-----		-----
600		-----		-----	1857		-----		-----
603		-----		-----	1858		-----		-----
608		-----		-----	1862		-----		-----
609		-----		-----	1984		-----		-----
611		-----		-----	6016		-----		-----
612		-----		-----	6028		-----		-----
621		-----		-----	6263		-----		-----
657		-----		-----	6273		-----		-----
663		-----		-----	6290		-----		-----
704		-----		-----	6295		-----		-----
710		-----		-----	6296		-----		-----
734		-----		-----	6319		-----		-----
736		-----		-----	6359		-----		-----
749		-----		-----	6362		-----		-----
750		-----		-----	6381		-----		-----
752		-----		-----	6421		-----		-----
753		-----		-----	6438		-----		-----
779		-----		-----	6447		-----		-----
781		-----		-----	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060		-----		-----
9132		-----		-----

normality	unknown
n	3
outliers	0
mean (n)	239.21
st.dev. (n)	3.351
R(calc.)	9.38
st.dev.(D2503:92R16)	5
R(D2503:92R16)	14

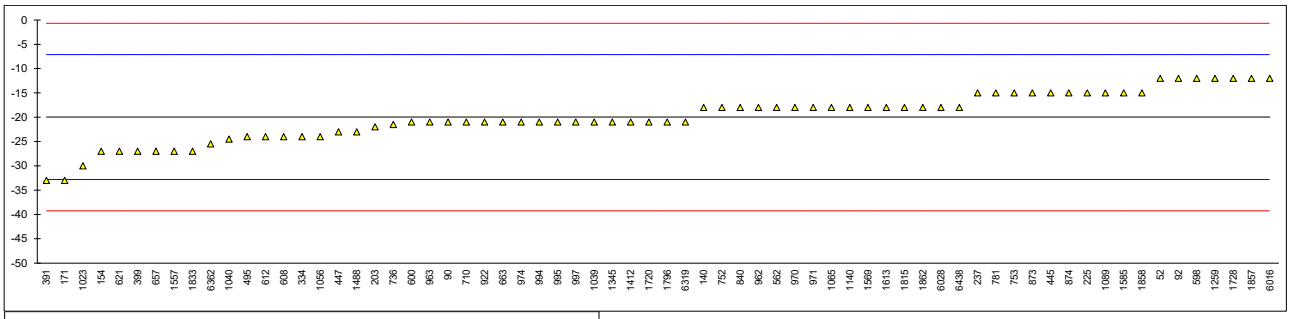
Determination of Pour Point Maximum on sample #22215; results in °C

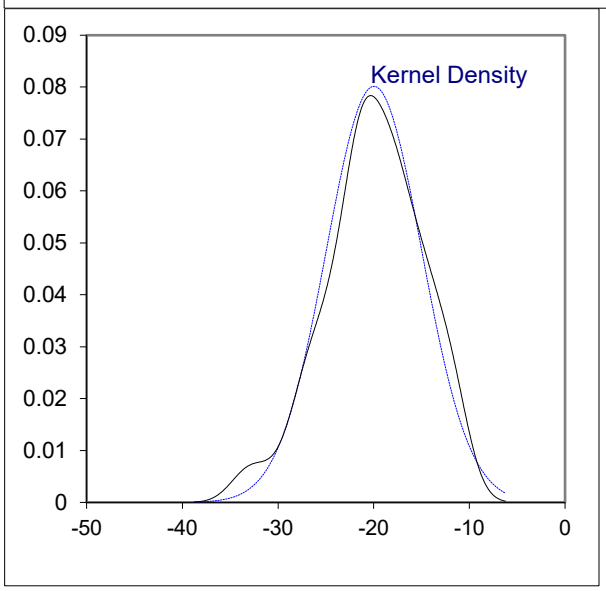
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5853-A	-12		1.24	785		-----		-----
62		-----		-----	840	D5853-A	-18		0.31
90	D5853-A	-21		-0.16	862		-----		-----
92	D5853-A	-12		1.24	873	D5853-A	-15		0.77
140	D97	-18		0.31	874	D5853-A	-15		0.77
141		-----		-----	875		-----		-----
150	D5853-A	<-24		-----	914		-----		-----
154	D97	-27		-1.09	922	D97	-21		-0.16
158		-----		-----	962	D5853-A	-18		0.31
159		-----		-----	963	D5853-A	-21		-0.16
167		-----		-----	970	D5853-A	-18		0.31
170	D5853-A	<-30		-----	971	D5853-A	-18		0.31
171	D5853-A	-33		-2.03	974	D5853-A	-21		-0.16
172		-----		-----	988		-----		-----
175		-----		-----	991		-----		-----
203	D5853-A	-22		-0.32	992		-----		-----
225	D5853-A	-15		0.77	994	D5853-A	-21		-0.16
231		-----		-----	995	D5853-A	-21		-0.16
237	D5853-A	-15		0.77	997	D5853-A	-21		-0.16
238		-----		-----	1016		-----		-----
273		-----		-----	1023	D5853-A	-30		-1.56
311		-----		-----	1026		-----		-----
314		-----		-----	1039	D5853-A	-21		-0.16
328		-----		-----	1040	D5853-A	-24.5	C	-0.71
333		-----		-----	1056	D5853-A	-24		-0.63
334	D97	-24		-0.63	1065	D5853-A	-18		0.31
335		-----		-----	1089	D5853-A	-15		0.77
355		-----		-----	1140	D5950	-18.0		0.31
391	D5853-A	-33		-2.03	1191		-----		-----
398		-----		-----	1236		-----		-----
399	D5853-A	-27		-1.09	1259	D5853-A	-12		1.24
442		-----		-----	1320		-----		-----
444		-----		-----	1345	D5853-A	-21		-0.16
445	D97	-15		0.77	1357		-----		-----
446		-----		-----	1397		-----		-----
447	D5853-A	-23		-0.47	1412	D5853-A	-21		-0.16
480		-----		-----	1414		-----		-----
495	D5853-A	-24		-0.63	1488	ISO3016	-23		-0.47
511		-----		-----	1556		-----		-----
525		-----		-----	1557	ISO3016	-27		-1.09
529		-----		-----	1569	D5950	-18		0.31
541		-----		-----	1585	D5853-A	-15		0.77
542	D97	< -24		-----	1613	D5853-A	-18		0.31
551		-----		-----	1695		-----		-----
553		-----		-----	1714	D5853-A	<-36		-----
557		-----		-----	1720	D5853-A	-21		-0.16
562	D97	-18		0.31	1724		-----		-----
575		-----		-----	1728	D5853-A	-12		1.24
588		-----		-----	1759		-----		-----
589		-----		-----	1776		-----		-----
590		-----		-----	1796	D5853-A	-21		-0.16
593		-----		-----	1810		-----		-----
596		-----		-----	1811		-----		-----
597		-----		-----	1815	D5853-A	-18.0		0.31
598	D5853-A	-12		1.24	1833	D5853-A	-27		-1.09
599		-----		-----	1849		-----		-----
600	D5853-A	-21		-0.16	1857	D5853-A	-12		1.24
603		-----		-----	1858	D5853-A	-15		0.77
608	D5853-A	-24		-0.63	1862	D5853-A	-18		0.31
609		-----		-----	1984	D5853-A	<-21		-----
611		-----		-----	6016	D5853	-12.0		1.24
612	D5853-A	-24		-0.63	6028	D97	-18.0		0.31
621	D5853-A	-27		-1.09	6263		-----		-----
657	D5853-A	-27		-1.09	6273		-----		-----
663	D5853-A	-21		-0.16	6290		-----		-----
704		-----		-----	6295		-----		-----
710	D5853-A	-21		-0.16	6296		-----		-----
734		-----		-----	6319	D5853-A	-21		-0.16
736	D5853-A	-21.5		-0.24	6359		-----		-----
749		-----		-----	6362	D5853-A	-25.5		-0.86
750		-----		-----	6381	D5853-A	<-30		-----
752	D5853-A	-18		0.31	6421	D5853-A	<-36		-----
753	D5853-A	-15		0.77	6438	D5853-A	-18		0.31
779		-----		-----	6447		-----		-----
781	D5853-A	-15		0.77	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060		-----		-----
9132		-----		-----

normality	OK
n	68
outliers	0
mean (n)	-19.96
st.dev. (n)	4.979
R(calc.)	13.94
st.dev.(D5853-A:17a)	6.429
R(D5853-A:17a)	18.0

Lab 1040 first reported 24.5



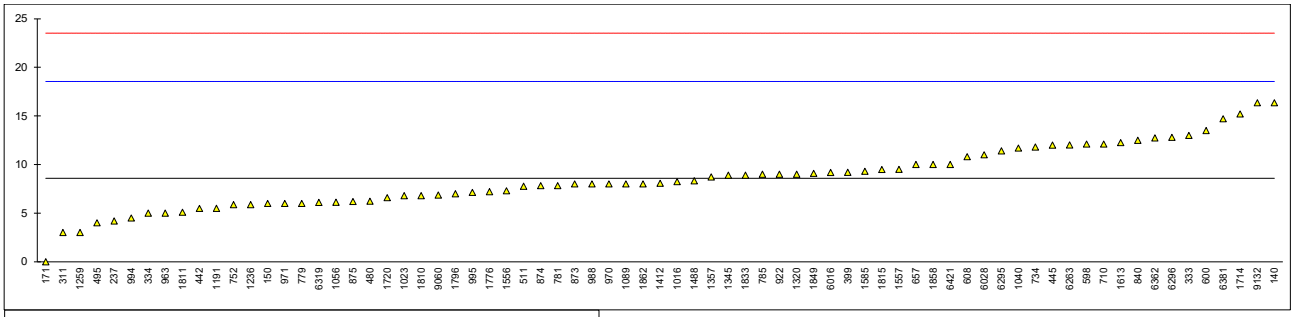


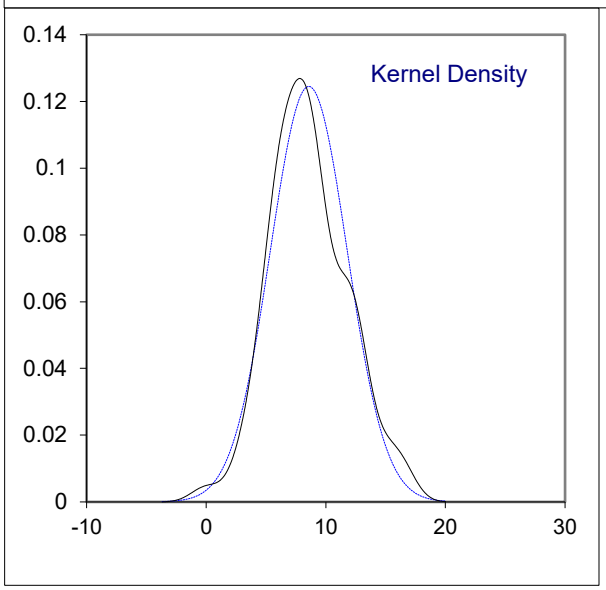
Determination of Salt as Chloride on sample #22215; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	785	D3230	9.0		0.08
62		-----		-----	840	D6470	12.5		0.79
90		-----		-----	862		-----		-----
92		-----		-----	873	D3230	8		-0.12
140	D3230	16.35		1.56	874	D3230	7.82		-0.15
141		-----		-----	875	D3230	6.2		-0.48
150	D3230	6		-0.52	914		-----		-----
154		-----		-----	922	D3230	9.0		0.08
158		-----		-----	962		-----		-----
159		-----		-----	963	D3230	5.0		-0.72
167		-----		-----	970	D3230	8.0		-0.12
170		-----		-----	971	D3230	6		-0.52
171	D3230	0		-1.72	974		-----		-----
172		-----		-----	988	D3230	8		-0.12
175		-----		-----	991		-----		-----
203		-----		-----	992		-----		-----
225		-----		-----	994	D3230	4.5		-0.82
231		-----		-----	995	D3230	7.13		-0.29
237	D3230	4.2		-0.88	997		-----		-----
238		-----		-----	1016	D3230	8.23		-0.07
273		-----		-----	1023	D3230	6.80		-0.36
311	D3230	3		-1.12	1026		-----		-----
314		-----		-----	1039		-----		-----
328		-----		-----	1040	D3230	11.7		0.63
333	D3230	13		0.89	1056	D3230	6.12		-0.49
334	D3230	5		-0.72	1065		-----		-----
335		-----		-----	1089	D3230	8.0		-0.12
355		-----		-----	1140		-----		-----
391		-----		-----	1191	D3230	5.5		-0.62
398		-----		-----	1236	D3230	5.876		-0.54
399	D3230	9.2		0.12	1259	D3230	3		-1.12
442	IP265	5.476		-0.62	1320	In house	9		0.08
444		-----		-----	1345	D3230	8.9		0.06
445	IP265	12.0		0.69	1357	D3230	8.71		0.03
446		-----		-----	1397		-----		-----
447		-----		-----	1412	D3230	8.06		-0.10
480	D3230	6.23		-0.47	1414		-----		-----
495	D3230	4.0		-0.92	1488	In house	8.32		-0.05
511	D3230	7.77		-0.16	1556	D3230	7.3		-0.26
525		-----		-----	1557	D3230	9.5		0.18
529		-----		-----	1569		-----		-----
541		-----		-----	1585	D3230	9.3		0.14
542		-----		-----	1613	D3230	12.25		0.74
551		-----		-----	1695		-----		-----
553		-----		-----	1714	D6470	15.20		1.33
557		-----		-----	1720	D6470	6.59		-0.40
562		-----		-----	1724		-----		-----
575		-----		-----	1728		-----		-----
588		-----		-----	1759		-----		-----
589		-----		-----	1776	D3230	7.2		-0.28
590		-----		-----	1796	D3230	7		-0.32
593		-----		-----	1810	D3230	6.8		-0.36
596		-----		-----	1811	D3230	5.09		-0.70
597		-----		-----	1815	D3230	9.49		0.18
598	D3230	12.1		0.71	1833	D3230	8.9		0.06
599		-----		-----	1849	D3230	9.1		0.10
600	D3230	13.5		0.99	1857		-----		-----
603		-----		-----	1858	D3230	10		0.28
608	D3230	10.8		0.45	1862	D3230	8.0		-0.12
609		-----		-----	1984		-----		-----
611		-----		-----	6016	GOST21534	9.18		0.12
612		-----		-----	6028	IP77	11.0		0.49
621		-----		-----	6263	D3230	12.01		0.69
657	D3230	10		0.28	6273		-----		-----
663		-----		-----	6290		-----		-----
704		-----		-----	6295	GOST R21534	11.4		0.57
710	GOST21534-A	12.1		0.71	6296	D3230	12.8		0.85
734	GOST21534-A	11.8		0.65	6319	D3230	6.1		-0.50
736		-----		-----	6359		-----		-----
749		-----		-----	6362	D3230	12.73		0.83
750		-----		-----	6381	GOST21534	14.7		1.23
752	D3230	5.87		-0.54	6421	D3230	10		0.28
753		-----		-----	6438		-----		-----
779	D3230	6.0		-0.52	6447		-----		-----
781	D3230	7.83		-0.15	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060	D3230	6.86		-0.35
9132	D3230	16.3477		1.56

normality	OK
n	73
outliers	0
mean (n)	8.581
st.dev. (n)	3.2052
R(calc.)	8.974
st.dev.(D3230:19)	4.9785
R(D3230:19)	13.940





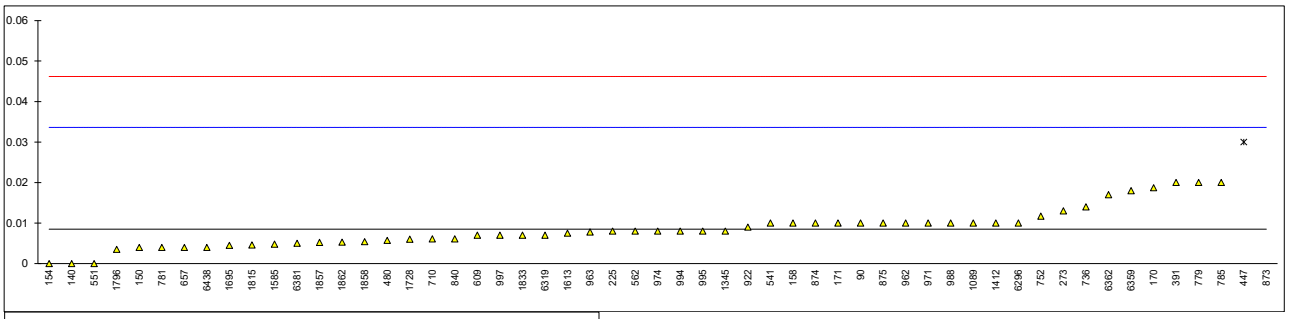
Determination of Sediment (Extraction method) on sample #22215; results in %V/V

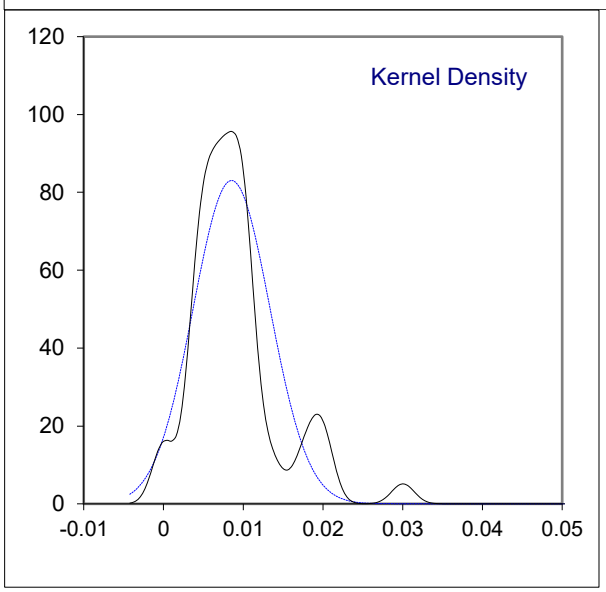
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D473	<0.01		-----	785	D473	0.02		0.91
62		-----		-----	840	D473	0.0061		-0.19
90	D473	0.01		0.12	862		-----		-----
92		-----		-----	873	D473	0.14	R(0.01)	10.47
140	D473	0		-0.68	874	D473	0.01		0.12
141		-----		-----	875	D473	0.01		0.12
150	D473	0.004	C	-0.36	914		-----		-----
154	D473	0.0		-0.68	922	D473	0.009		0.04
158	D473	0.01		0.12	962	D473	0.01		0.12
159		-----		-----	963	D473	0.0078		-0.06
167		-----		-----	970		-----		-----
170	D473	0.0187		0.81	971	D473	0.010		0.12
171	D473	0.01		0.12	974	D473	0.008		-0.04
172	D473	<0.01	C	-----	988	D473	0.01		0.12
175		-----		-----	991		-----		-----
203		-----		-----	992		-----		-----
225	D473	0.008		-0.04	994	D473	0.008		-0.04
231		-----		-----	995	D473	0.008		-0.04
237	D473	<0.01		-----	997	D473	0.007		-0.12
238		-----		-----	1016		-----		-----
273	D473	0.013		0.36	1023		-----		-----
311	D473	<0.01		-----	1026		-----		-----
314		-----		-----	1039		-----		-----
328	D473	<0.01		-----	1040		-----		-----
333	D473	<0.01		-----	1056		-----		-----
334	D473	<0.01		-----	1065		-----		-----
335		-----		-----	1089	D473	0.01		0.12
355	D473	<0.01		-----	1140		-----		-----
391	D473	0.02		0.91	1191		-----		-----
398		-----		-----	1236		-----		-----
399		-----		-----	1259		-----		-----
442		-----		-----	1320		-----		-----
444		-----		-----	1345	D473	0.008		-0.04
445	D473	<0.01		-----	1357	D473	NA		-----
446		-----		-----	1397		-----		-----
447	D473	0.03	R(0.01)	1.71	1412	D473	0.010		0.12
480	D473	0.00574		-0.22	1414		-----		-----
495		-----		-----	1488		-----		-----
511		-----		-----	1556		-----		-----
525		-----		-----	1557		-----		-----
529		-----		-----	1569		-----		-----
541	D473	0.01		0.12	1585	D473	0.0048		-0.30
542		-----		-----	1613	D473	0.0075		-0.08
551	D473	0		-0.68	1695	D473	0.004479		-0.32
553		-----		-----	1714		-----		-----
557		-----		-----	1720		-----		-----
562	D473	0.008		-0.04	1724		-----		-----
575		-----		-----	1728	D473	0.006		-0.20
588		-----		-----	1759		-----		-----
589		-----		-----	1776		-----		-----
590		-----		-----	1796	D473	0.0035		-0.40
593		-----		-----	1810		-----		-----
596		-----		-----	1811		-----		-----
597		-----		-----	1815	ISO3735	0.0046		-0.31
598		-----		-----	1833	D473	0.007		-0.12
599		-----		-----	1849		-----		-----
600		-----		-----	1857	D473	0.0052		-0.26
603		-----		-----	1858	D473	0.0054		-0.25
608		-----		-----	1862	D473	0.0053		-0.26
609	D473	0.007		-0.12	1984		-----		-----
611		-----		-----	6016		-----		-----
612		-----		-----	6028		-----		-----
621	D473	<0.01		-----	6263		-----		-----
657	D473	0.004		-0.36	6273		-----		-----
663		-----		-----	6290		-----		-----
704		-----		-----	6295		-----		-----
710	D473	0.0061		-0.19	6296	D473	0.01		0.12
734		-----		-----	6319	D473	0.007		-0.12
736	D473	0.014		0.44	6359	D473	0.018		0.76
749		-----		-----	6362	D473	0.017		0.68
750		-----		-----	6381	D473	0.005		-0.28
752	D473	0.0117		0.25	6421		-----		-----
753		-----		-----	6438	D473	0.004		-0.36
779	D473	0.02		0.91	6447		-----		-----
781	D473	0.004		-0.36	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060		-----		-----
9132		-----		-----

normality	OK
n	53
outliers	2
mean (n)	0.00851
st.dev. (n)	0.004803
R(calc.)	0.01345
st.dev.(D473:22)	0.012561
R(D473:22)	0.03517

Lab 150 first reported 0.02
Lab 172 first reported 0.02





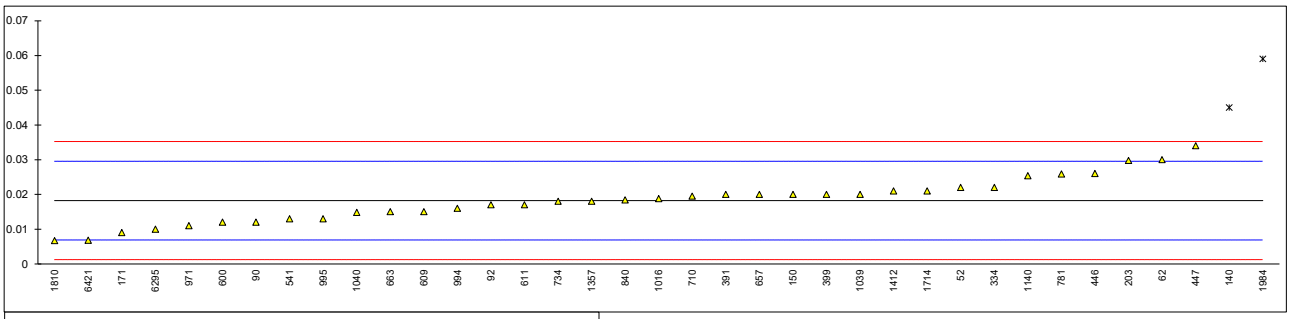
Determination of Sediment (Membrane filtration) on sample #22215; results in %M/M

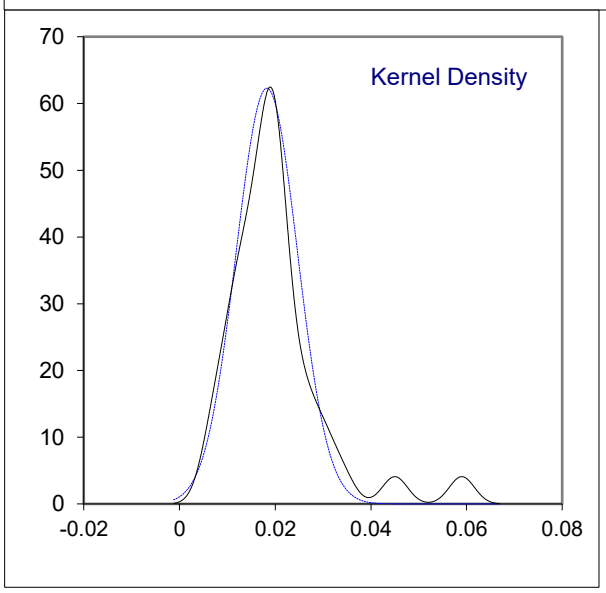
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4807	0.022		0.66	785		-----		-----
62	D4807	0.030	C	2.08	840	D4807	0.0184		0.03
90	D4807	0.012		-1.10	862		-----		-----
92	D4807	0.017		-0.22	873		-----		-----
140	D4807	0.045	C,R(0.01)	4.72	874		-----		-----
141		-----		-----	875		-----		-----
150	D4807	0.02		0.31	914		-----		-----
154		-----		-----	922		-----		-----
158		-----		-----	962		-----		-----
159		-----		-----	963		-----		-----
167		-----		-----	970		-----		-----
170		-----		-----	971	D4807	0.011		-1.28
171	D4807	0.009		-1.63	974		-----		-----
172		-----		-----	988		-----		-----
175		-----		-----	991		-----		-----
203	D4807	0.0298		2.04	992		-----		-----
225		-----		-----	994	D4807	0.016		-0.39
231		-----		-----	995	D4807	0.013		-0.92
237		-----		-----	997		-----		-----
238		-----		-----	1016	D4807	0.0188		0.10
273		-----		-----	1023		-----		-----
311		-----		-----	1026		-----		-----
314		-----		-----	1039	D4807	0.020		0.31
328		-----		-----	1040	D4807	0.0148		-0.61
333		-----		-----	1056		-----		-----
334	D4807	0.022		0.66	1065		-----		-----
335		-----		-----	1089		-----		-----
355		-----		-----	1140	IP375	0.0254		1.26
391	D4807	0.02		0.31	1191		-----		-----
398		-----		-----	1236		-----		-----
399	D4807	0.02		0.31	1259		-----		-----
442		-----		-----	1320		-----		-----
444		-----		-----	1345		-----		-----
445		-----		-----	1357	D4807	0.018		-0.04
446	D4807	0.026		1.37	1397		-----		-----
447	D4807	0.034		2.78	1412	D4807	0.021		0.49
480		-----		-----	1414		-----		-----
495		-----		-----	1488		-----		-----
511		-----		-----	1556		-----		-----
525		-----		-----	1557		-----		-----
529		-----		-----	1569		-----		-----
541	D4807	0.013		-0.92	1585		-----		-----
542		-----		-----	1613		-----		-----
551		-----		-----	1695		-----		-----
553		-----		-----	1714	D4807	0.021		0.49
557		-----		-----	1720		-----		-----
562		-----		-----	1724		-----		-----
575		-----		-----	1728		-----		-----
588		-----		-----	1759		-----		-----
589		-----		-----	1776		-----		-----
590		-----		-----	1796		-----		-----
593		-----		-----	1810	D4807	0.0067		-2.03
596		-----		-----	1811		-----		-----
597		-----		-----	1815		-----		-----
598		-----		-----	1833		-----		-----
599		-----		-----	1849		-----		-----
600	D4807	0.012		-1.10	1857		-----		-----
603		-----		-----	1858		-----		-----
608		-----		-----	1862		-----		-----
609	D4807	0.015		-0.57	1984	D4807	0.059	R(0.01)	7.19
611	D4807	0.017		-0.22	6016		-----		-----
612		-----		-----	6028		-----		-----
621		-----		-----	6263		-----		-----
657	D4807	0.020		0.31	6273		-----		-----
663	D4807	0.015		-0.57	6290		-----		-----
704		-----		-----	6295	GOST R6370	0.01		-1.45
710	D4807	0.0195		0.22	6296		-----		-----
734	GOST6370	0.018		-0.04	6319		-----		-----
736		-----		-----	6359		-----		-----
749		-----		-----	6362		-----		-----
750		-----		-----	6381		-----		-----
752		-----		-----	6421	D4807	0.0068		-2.02
753		-----		-----	6438		-----		-----
779		-----		-----	6447		-----		-----
781	D4807	0.0259		1.35	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060		-----		-----
9132		-----		-----

normality	OK
n	35
outliers	2
mean (n)	0.01823
st.dev. (n)	0.006405
R(calc.)	0.01793
st.dev.(D4807:05R20)	0.005671
R(D4807:05R20)	0.01588

Lab 62 first reported 0.040
Lab 140 first reported 0.072



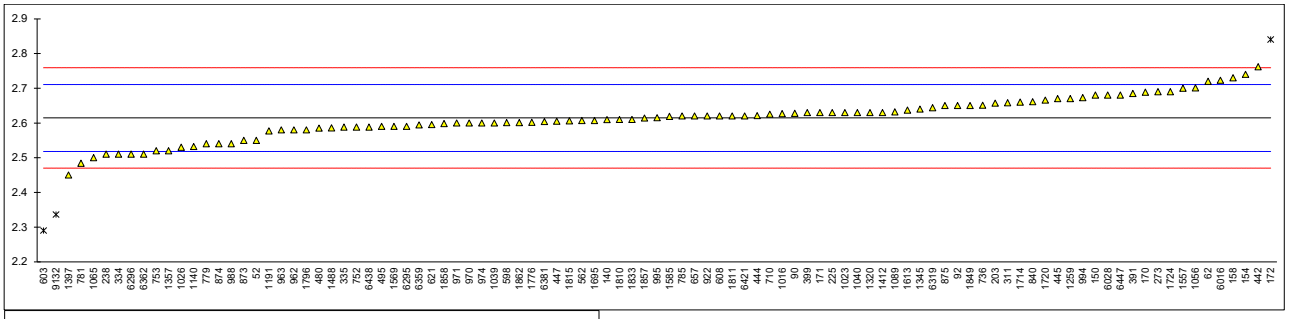


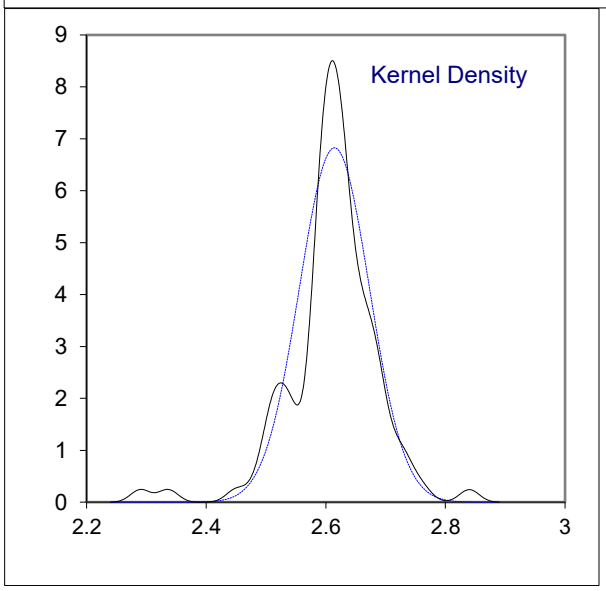
Determination of Total Sulfur on sample #22215; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4294	2.55		-1.34	785	D4294	2.62		0.12
62	D4294	2.72		2.19	840	D4294	2.661		0.97
90	D4294	2.6278		0.28	862		-----		-----
92	D4294	2.650		0.74	873	D4294	2.55		-1.34
140	D4294	2.6094		-0.10	874	D4294	2.54		-1.54
141		-----		-----	875	D4294	2.65		0.74
150	D4294	2.68		1.36	914		-----		-----
154	D4294	2.74		2.60	922	D4294	2.62		0.12
158	D4294	2.73		2.40	962	D4294	2.58		-0.71
159		-----		-----	963	D4294	2.58		-0.71
167		-----		-----	970	D4294	2.60		-0.30
170	D4294	2.6885		1.54	971	D4294	2.60		-0.30
171	D4294	2.63		0.32	974	D4294	2.60		-0.30
172	D4294	2.84	R(0.05)	4.68	988	D4294	2.54		-1.54
175		-----		-----	991		-----		-----
203	D4294	2.657		0.88	992		-----		-----
225	D4294	2.63		0.32	994	D4294	2.673		1.21
231		-----		-----	995	D4294	2.615		0.01
237		-----		-----	997		-----		-----
238	D4294	2.510		-2.17	1016	D2622	2.627		0.26
273	D4294	2.69	C	1.57	1023	IP336	2.63		0.32
311	D4294	2.658		0.90	1026	D2622	2.53		-1.75
314		-----		-----	1039	D2622	2.60		-0.30
328		-----		-----	1040	ISO8754	2.630		0.32
333		-----		-----	1056	D4294	2.701		1.80
334	D4294	2.51		-2.17	1065	D4294	2.50		-2.37
335	D4294	2.588		-0.55	1089	D4294	2.632		0.36
355		-----		-----	1140	IP336	2.532		-1.71
391	ISO8754	2.685		1.46	1191	ISO8754	2.577		-0.78
398		-----		-----	1236		-----		-----
399	D4294	2.63		0.32	1259	D4294	2.67		1.15
442	IP336	2.762		3.06	1320	ISO8754	2.63		0.32
444	D2622	2.6210		0.14	1345	D4294	2.64		0.53
445	D4294	2.67		1.15	1357	D4294	2.52		-1.96
446		-----		-----	1397	D2622	2.45		-3.41
447	IP336	2.605		-0.20	1412	D4294	2.630		0.32
480	D4294	2.585		-0.61	1414		-----		-----
495	ISO8754	2.59		-0.51	1488	ISO8754	2.586		-0.59
511		-----		-----	1556		-----	W	-----
525		-----		-----	1557	ISO8754	2.70		1.77
529		-----		-----	1569	ISO8754	2.59		-0.51
541		-----		-----	1585	D4294	2.619		0.09
542		-----		-----	1613	D4294	2.637		0.47
551		-----		-----	1695	D4294	2.607		-0.15
553		-----		-----	1714	D2622	2.66		0.95
557		-----		-----	1720	D4294	2.666		1.07
562	D4294	2.607		-0.15	1724	D4294	2.69		1.57
575		-----		-----	1728		-----		-----
588		-----		-----	1759		-----		-----
589		-----		-----	1776	ISO8754	2.602		-0.26
590		-----		-----	1796	D4294	2.58		-0.71
593		-----		-----	1810	D4294	2.61		-0.09
596		-----		-----	1811	D4294	2.62		0.12
597		-----		-----	1815	D7039	2.606		-0.17
598	D4294	2.601		-0.28	1833	IP336	2.61		-0.09
599		-----		-----	1849	ISO8754	2.65		0.74
600		-----		-----	1857	D4294	2.614		-0.01
603	D4294	2.29	R(0.01)	-6.73	1858	D4294	2.598		-0.34
608	D4294	2.62		0.12	1862	D4294	2.601		-0.28
609		-----		-----	1984		-----		-----
611		-----		-----	6016	D4294	2.7231		2.25
612		-----		-----	6028	D4294	2.68		1.36
621	D4294	2.595		-0.40	6263		-----		-----
657	D4294	2.62		0.12	6273		-----		-----
663		-----		-----	6290		-----		-----
704		-----		-----	6295	GOST R51947	2.59		-0.51
710	D4294	2.625		0.22	6296	D4294	2.51		-2.17
734		-----		-----	6319	D4294	2.644		0.61
736	D4294	2.651		0.76	6359	D2622	2.5941		-0.42
749		-----		-----	6362	D4294	2.51		-2.17
750		-----		-----	6381	D4294	2.604		-0.22
752	D4294	2.588		-0.55	6421	D4294	2.62		0.12
753	D4294	2.52		-1.96	6438	D4294	2.588		-0.55
779	D4294	2.54		-1.54	6447	D2622	2.68		1.36
781	D4294	2.484		-2.71	9051		-----		-----

lab	method	value	mark	z(targ)
9052		-----		-----
9060		-----		-----
9132	D4294	2.3362	R(0.01)	-5.77
	normality	OK		
	n	96		
	outliers	3		
	mean (n)	2.6144		
	st.dev. (n)	0.05843		
	R(calc.)	0.1636		
	st.dev.(D4294:21)	0.04821		
	R(D4294:21)	0.1350		

Lab 273 first reported 2.19
Lab 1556 test result withdrawn, reported 2.7954





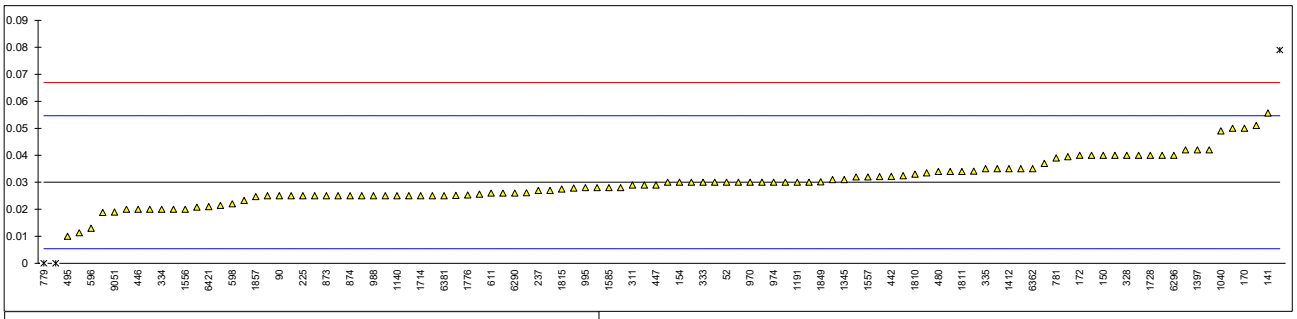
Determination of Water on sample #22215; results in %V/V

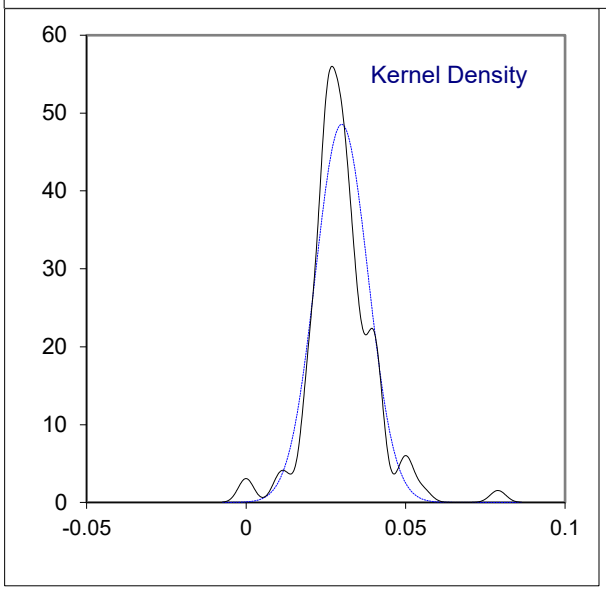
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4928	0.03		0.00	785	D4006	<0.025		-----
62	D4377	0.04		0.81	840	D4928	0.0321		0.17
90	D6304	0.025		-0.41	862		-----		-----
92	D4377	0.031		0.08	873	D4006	0.025		-0.41
140	D4928	0.0188		-0.91	874	D4006	0.025		-0.41
141	D4928	0.055623		2.08	875	D4006	0.025		-0.41
150	D4928	0.04		0.81	914		-----		-----
154	D4928	0.03		0.00	922	D4928	0.025		-0.41
158	D4928	0.03		0.00	962	D4377	0.0324		0.19
159		-----		-----	963	D4377	0.0335		0.28
167		-----		-----	970	D6304	0.03		0.00
170	D4006	0.05		1.62	971	D4928	0.030		0.00
171		-----		-----	974	D4928	0.03		0.00
172	D4928	0.04		0.81	988	D4006	0.025		-0.41
175	D4006	0	R(0.05)	-2.44	991		-----		-----
203	D4928	0.0208		-0.75	992		-----		-----
225	D4006	0.025		-0.41	994	D4006	<0.05		-----
231		-----		-----	995	D4928	0.028		-0.16
237	D6304	0.0270		-0.24	997	D4928	0.025		-0.41
238	D4006	0.050		1.62	1016	D4377	0.035		0.40
273	D4928	0.026		-0.33	1023	D4928	0.02783		-0.18
311	D4928	0.029		-0.08	1026		-----		-----
314	D4928	0.03		0.00	1039	D4928	0.03		0.00
328	D4377	0.04		0.81	1040	DIN51777	0.049		1.54
333	D4377	0.03		0.00	1056	D4928	0.0395		0.77
334	D4377	0.02		-0.81	1065	D6304	0.0280		-0.16
335	D4377	0.035		0.40	1089	D4377	0.034		0.32
355	D4006	<0.02		-----	1140	IP74	0.025		-0.41
391	D4377	0.042		0.97	1191	ISO10336	0.03		0.00
398	D4928	0.051		1.70	1236	D4928	0.0233		-0.54
399	D4006	0.025		-0.41	1259	D4006	<0,05		-----
442	IP386	0.0322		0.18	1320	E203	0.0341		0.33
444	D4928	0.0214		-0.70	1345	D4928	0.031		0.08
445	D4928	0.032		0.16	1357	D4928	0.025		-0.41
446	D4928	0.02		-0.81	1397	D6304	0.042		0.97
447	IP386	0.029		-0.08	1412	D4928	0.035		0.40
480	D4928	0.034		0.32	1414		-----		-----
495	D6304	0.01		-1.62	1488		-----		-----
511		-----		-----	1556	D6304	0.02		-0.81
525		-----		-----	1557	D4377	0.032		0.16
529		-----		-----	1569	D95	<0.10		-----
541	D4928	0.04		0.81	1585	D6304	0.0280		-0.16
542	D4928	0.03		0.00	1613	D4006	<0.05		-----
551	D4377	0.02		-0.81	1695	D4928	0.028		-0.16
553	E203	0.079	R(0.01)	3.98	1714	D6304	0.025		-0.41
557		-----		-----	1720	D4006	<0.05		-----
562		-----		-----	1724	D4377	0.035		0.40
575		-----		-----	1728	D4006	0.04	C	0.81
588		-----		-----	1759		-----		-----
589		-----		-----	1776	D6304	0.0253		-0.38
590		-----		-----	1796		-----		-----
593		-----		-----	1810	D4377	0.033		0.24
596	D4928	0.013		-1.38	1811	D4377	0.034		0.32
597		-----		-----	1815	D4377	0.0275		-0.20
598	D4928	0.022		-0.65	1833	D4377	0.037		0.57
599		-----		-----	1849	D4928	0.0302		0.02
600	D4928	0.02		-0.81	1857	D6304	0.0247		-0.43
603		-----		-----	1858	D4006	0.025		-0.41
608	D4928	0.02		-0.81	1862	D4928	0.0261		-0.32
609		-----		-----	1984	D4377	0.042		0.97
611	D4928	0.026		-0.33	6016	ISO10337	0.027		-0.24
612		-----		-----	6028		-----		-----
621	D4377	0.029		-0.08	6263	D6304	0.02511		-0.40
657	D4377	0.04		0.81	6273		-----		-----
663	D4377	0.030		0.00	6290	ISO10336	0.026		-0.33
704		-----		-----	6295	D4377	0.04		0.81
710	D4006	<0.05		-----	6296	D4377	0.040		0.81
734	D4006	<0.05		-----	6319	D4006	<0.05		-----
736	D4006	<0.05		-----	6359	D4928	0.03		0.00
749		-----		-----	6362	D4377	0.035		0.40
750		-----		-----	6381	D4006	0.025		-0.41
752	D4006	0.025		-0.41	6421	D4377	0.021		-0.73
753	D4006	0.025		-0.41	6438	D4006	<0.025		-----
779	D4006	0	R(0.05)	-2.44	6447		-----		-----
781	D4928	0.039		0.73	9051		0.019		-0.89

lab	method	value	mark	z(targ)
9052	In house	0.0113		-1.52
9060	D4928	0.0256		-0.36
9132		-----		-----

normality	OK
n	103
outliers	3
mean (n)	0.03001
st.dev. (n)	0.008216
R(calc.)	0.02300
st.dev.(D4377:00R11)	0.012320
R(D4377:00R11)	0.03450

Lab 1728 first reported 0.07



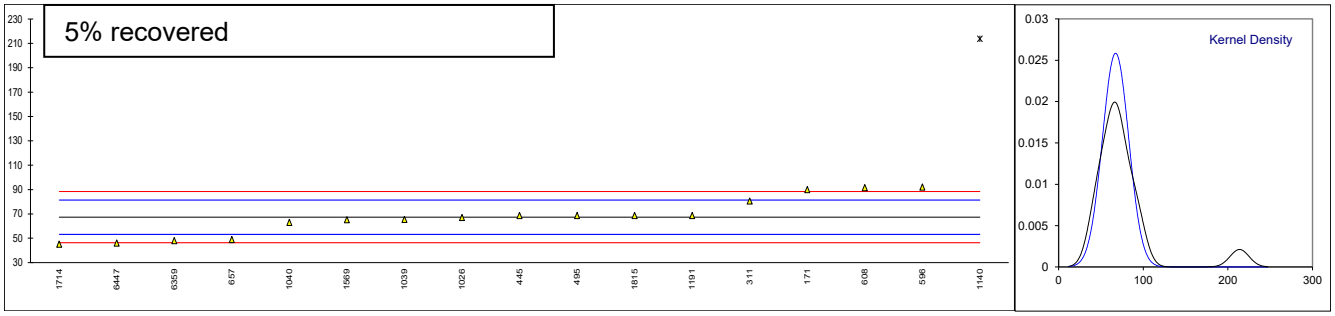


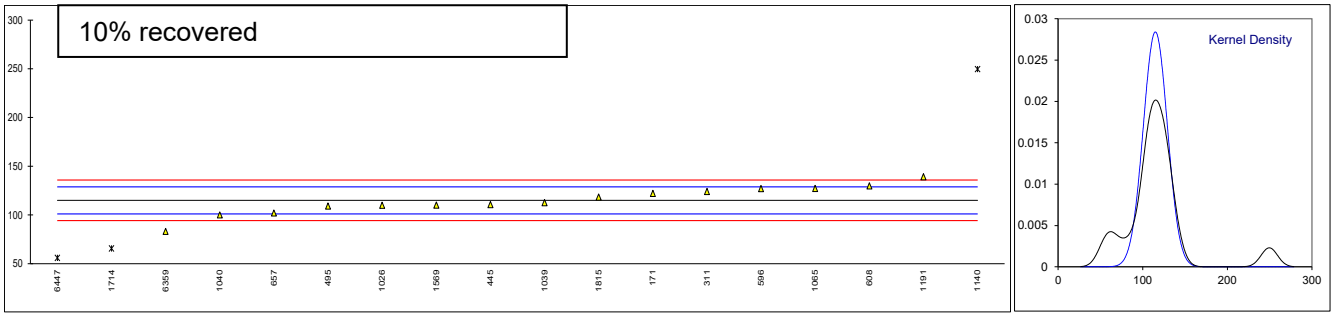
Determination of Simulated Distillation on sample #22215; results in °C

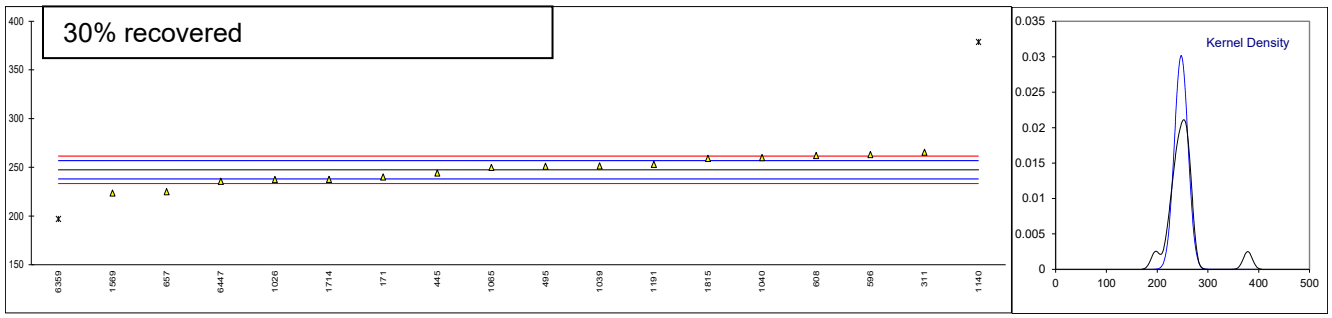
lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP	tot rec. (%M/M)
52		-----	-----	-----	-----	-----	-----	-----	-----	-----
62		-----	-----	-----	-----	-----	-----	-----	-----	-----
90		-----	-----	-----	-----	-----	-----	-----	-----	-----
92		-----	-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----	-----
141		-----	-----	-----	-----	-----	-----	-----	-----	-----
150		-----	-----	-----	-----	-----	-----	-----	-----	-----
154		-----	-----	-----	-----	-----	-----	-----	-----	-----
158		-----	-----	-----	-----	-----	-----	-----	-----	-----
159		-----	-----	-----	-----	-----	-----	-----	-----	-----
167		-----	-----	-----	-----	-----	-----	-----	-----	-----
170		-----	-----	-----	-----	-----	-----	-----	-----	-----
171	D7169	35.0	90.0	122.0	240.0	348.5	463.0	608.5	713.5	100.00
172		-----	-----	-----	-----	-----	-----	-----	-----	-----
175		-----	-----	-----	-----	-----	-----	-----	-----	-----
203		-----	-----	-----	-----	-----	-----	-----	-----	-----
225		-----	-----	-----	-----	-----	-----	-----	-----	-----
231		-----	-----	-----	-----	-----	-----	-----	-----	-----
237		-----	-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----	-----
311	D7169	<36.0	80.5	124.0	265.5	397.5	546.5	>720.0	>720.0	89.98
314		-----	-----	-----	-----	-----	-----	-----	-----	-----
328		-----	-----	-----	-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	-----	-----	-----
334		-----	-----	-----	-----	-----	-----	-----	-----	-----
335		-----	-----	-----	-----	-----	-----	-----	-----	-----
355		-----	-----	-----	-----	-----	-----	-----	-----	-----
391		-----	-----	-----	-----	-----	-----	-----	-----	-----
398		-----	-----	-----	-----	-----	-----	-----	-----	-----
399		-----	-----	-----	-----	-----	-----	-----	-----	-----
442		-----	-----	-----	-----	-----	-----	-----	-----	-----
444		-----	-----	-----	-----	-----	-----	-----	-----	-----
445	D7169	-11.7	68.7	110.6	244.1	362.6	486.9	631.7	733.4	59.4
446		-----	-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----	-----
480		-----	-----	-----	-----	-----	-----	-----	-----	-----
495	EN15199-3	0	68.7	109.1	251.0	377.9	515.2	702.8	736.1	91.63
511		-----	-----	-----	-----	-----	-----	-----	-----	-----
525		-----	-----	-----	-----	-----	-----	-----	-----	-----
529		-----	-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----	-----
542		-----	-----	-----	-----	-----	-----	-----	-----	-----
551		-----	-----	-----	-----	-----	-----	-----	-----	-----
553		-----	-----	-----	-----	-----	-----	-----	-----	-----
557		-----	-----	-----	-----	-----	-----	-----	-----	-----
562		-----	-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----	-----
588		-----	-----	-----	-----	-----	-----	-----	-----	-----
589		-----	-----	-----	-----	-----	-----	-----	-----	-----
590		-----	-----	-----	-----	-----	-----	-----	-----	-----
593		-----	-----	-----	-----	-----	-----	-----	-----	-----
596	D7169	80.95 f+?	92.01	127.11	263.06	373.47	483.20	651.57	747.06	-----
597		-----	-----	-----	-----	-----	-----	-----	-----	-----
598		-----	-----	-----	-----	-----	-----	-----	-----	-----
599		-----	-----	-----	-----	-----	-----	-----	-----	-----
600		-----	-----	-----	-----	-----	-----	-----	-----	-----
603		-----	-----	-----	-----	-----	-----	-----	-----	-----
608	D7169	80.74 f+?	91.53	129.77	262.16	369.46	489.23	653.20	740.80	-----
609		-----	-----	-----	-----	-----	-----	-----	-----	-----
611		-----	-----	-----	-----	-----	-----	-----	-----	-----
612		-----	-----	-----	-----	-----	-----	-----	-----	-----
621		-----	-----	-----	-----	-----	-----	-----	-----	-----
657	D7169	<36	49.0	102.0	225.0	335.0	460.0	620.0	720.0	100
663		-----	-----	-----	-----	-----	-----	-----	-----	-----
704		-----	-----	-----	-----	-----	-----	-----	-----	-----
710		-----	-----	-----	-----	-----	-----	-----	-----	-----
734		-----	-----	-----	-----	-----	-----	-----	-----	-----
736		-----	-----	-----	-----	-----	-----	-----	-----	-----
749		-----	-----	-----	-----	-----	-----	-----	-----	-----
750		-----	-----	-----	-----	-----	-----	-----	-----	-----
752		-----	-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----	-----
779		-----	-----	-----	-----	-----	-----	-----	-----	-----

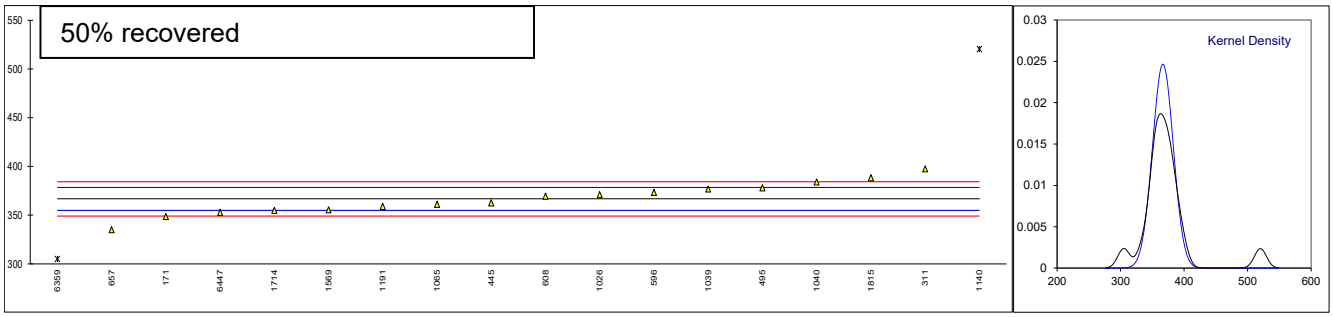
lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP	tot rec. (%M/M)
781		-----	-----	-----	-----	-----	-----	-----	-----	-----
785		-----	-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----	-----
862		-----	-----	-----	-----	-----	-----	-----	-----	-----
873		-----	-----	-----	-----	-----	-----	-----	-----	-----
874		-----	-----	-----	-----	-----	-----	-----	-----	-----
875		-----	-----	-----	-----	-----	-----	-----	-----	-----
914		-----	-----	-----	-----	-----	-----	-----	-----	-----
922		-----	-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----	-----	-----	-----
970		-----	-----	-----	-----	-----	-----	-----	-----	-----
971		-----	-----	-----	-----	-----	-----	-----	-----	-----
974		-----	-----	-----	-----	-----	-----	-----	-----	-----
988		-----	-----	-----	-----	-----	-----	-----	-----	-----
991		-----	-----	-----	-----	-----	-----	-----	-----	-----
992		-----	-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----	-----
995		-----	-----	-----	-----	-----	-----	-----	-----	-----
997		-----	-----	-----	-----	-----	-----	-----	-----	-----
1016		-----	-----	-----	-----	-----	-----	-----	-----	-----
1023		-----	-----	-----	-----	-----	-----	-----	-----	-----
1026	EN15199-3	-10.0	67.0	110.0	237.5	371.0	513.5	-----	718.5	88.1
1039	EN15199-3	-11.1	65.4	112.5	251.4	376.8	515.6	704.2	-----	93.5
1040	D7169	-12	63	100	260	384	521	712	not detec.	93.7
1056		-----	-----	-----	-----	-----	-----	-----	-----	-----
1065		-----	-----	127.2	249.8	361.0	478.6	622.4	734.6	100
1089		-----	-----	-----	-----	-----	-----	-----	-----	-----
1140	D7169	183.2 f+?	213.8 G(1)	249.6 G(1)	378.6 G(1)	520.4 G(1)	712.4 G(1)	-----	-----	70.5
1191	EN15199-3	-0.4900	68.7100	139.1000	253.0302	358.9216	483.1204	630.4086	732.5980	-----
1236		-----	-----	-----	-----	-----	-----	-----	-----	-----
1259		-----	-----	-----	-----	-----	-----	-----	-----	-----
1320		-----	-----	-----	-----	-----	-----	-----	-----	-----
1345		-----	-----	-----	-----	-----	-----	-----	-----	-----
1357		-----	-----	-----	-----	-----	-----	-----	-----	-----
1397		-----	-----	-----	-----	-----	-----	-----	-----	-----
1412		-----	-----	-----	-----	-----	-----	-----	-----	-----
1414		-----	-----	-----	-----	-----	-----	-----	-----	-----
1488		-----	-----	-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----	-----	-----
1557		-----	-----	-----	-----	-----	-----	-----	-----	-----
1569	EN15199-3	-11.2	65.2	110.1	223.5	355.4	491.1	649.1	>744.9	97.8
1585		-----	-----	-----	-----	-----	-----	-----	-----	-----
1613		-----	-----	-----	-----	-----	-----	-----	-----	-----
1695		-----	-----	-----	-----	-----	-----	-----	-----	-----
1714	In house	28.4	45.1	65.5 G(5)	237.7	354.8	480.4	641.7	>750	99.5
1720		-----	-----	-----	-----	-----	-----	-----	-----	-----
1724		-----	-----	-----	-----	-----	-----	-----	-----	-----
1728		-----	-----	-----	-----	-----	-----	-----	-----	-----
1759		-----	-----	-----	-----	-----	-----	-----	-----	-----
1776		-----	-----	-----	-----	-----	-----	-----	-----	-----
1796		-----	-----	-----	-----	-----	-----	-----	-----	-----
1810		-----	-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----	-----
1815	D7169	-0.50	68.70	118.25	259.05	388.45	530.30	>720.0	>720.0	88.35
1833		-----	-----	-----	-----	-----	-----	-----	-----	-----
1849		-----	-----	-----	-----	-----	-----	-----	-----	-----
1857		-----	-----	-----	-----	-----	-----	-----	-----	-----
1858		-----	-----	-----	-----	-----	-----	-----	-----	-----
1862		-----	-----	-----	-----	-----	-----	-----	-----	-----
1984		-----	-----	-----	-----	-----	-----	-----	-----	-----
6016		-----	-----	-----	-----	-----	-----	-----	-----	-----
6028		-----	-----	-----	-----	-----	-----	-----	-----	-----
6263		-----	-----	-----	-----	-----	-----	-----	-----	-----
6273		-----	-----	-----	-----	-----	-----	-----	-----	-----
6290		-----	-----	-----	-----	-----	-----	-----	-----	-----
6295		-----	-----	-----	-----	-----	-----	-----	-----	-----
6296		-----	-----	-----	-----	-----	-----	-----	-----	-----
6319		-----	-----	-----	-----	-----	-----	-----	-----	-----
6359	D7169	29	48	83	197 G(5)	305 G(5)	420 G(5)	554	642 G(1)	100
6362		-----	-----	-----	-----	-----	-----	-----	-----	-----
6381		-----	-----	-----	-----	-----	-----	-----	-----	-----
6421		-----	-----	-----	-----	-----	-----	-----	-----	-----
6438		-----	-----	-----	-----	-----	-----	-----	-----	-----
6447	D7169	28.3	46.1	55.9 G(5)	235.6	352.9	480.5	643.1	-----	-----
9051		-----	-----	-----	-----	-----	-----	-----	-----	-----
9052		-----	-----	-----	-----	-----	-----	-----	-----	-----

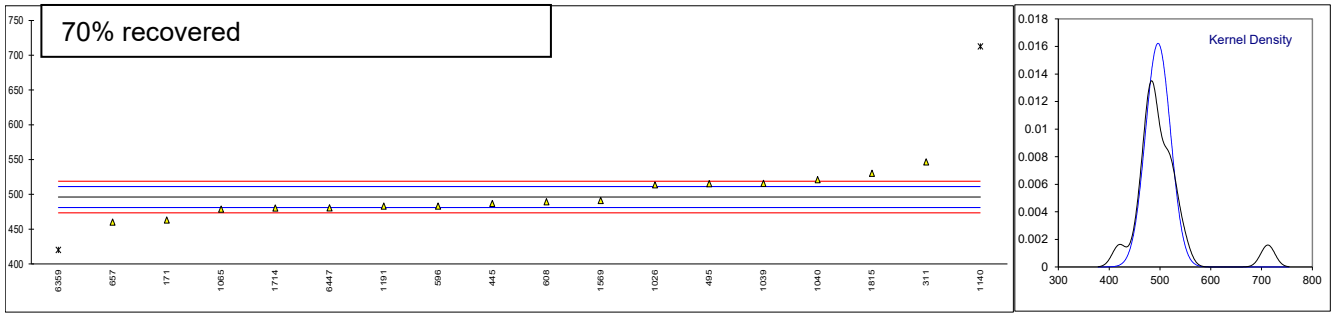
lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP	tot rec. (%M/M)
9060		-----	-----	-----	-----	-----	-----	-----	-----	-----
9132		-----	-----	-----	-----	-----	-----	-----	-----	-----
	normality	OK	OK	OK	OK	OK	OK	OK	OK	
	n	14	16	15	16	16	16	14	9	
	outliers	n.a.	1	3	2	2	2	0	1	
	mean (n)	<36	67.35	114.98	247.40	366.73	496.13	644.62	730.73	
	st.dev. (n)	n.a.	15.430	14.047	13.220	16.178	24.582	41.707	11.091	
	R(calc.)	n.a.	43.20	39.33	37.02	45.30	68.83	116.78	31.05	
	st.dev.(D7169:20e1)	n.a.	7.000	6.964	4.679	5.857	7.571	n.a.	n.a.	
	R(D7169:20e1)	n.a.	19.6	19.5	13.1	16.4	21.2	n.a.	n.a.	

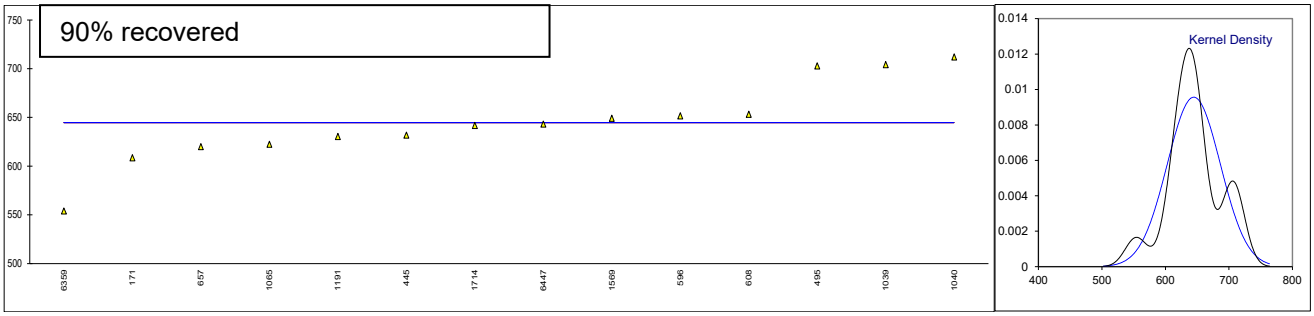


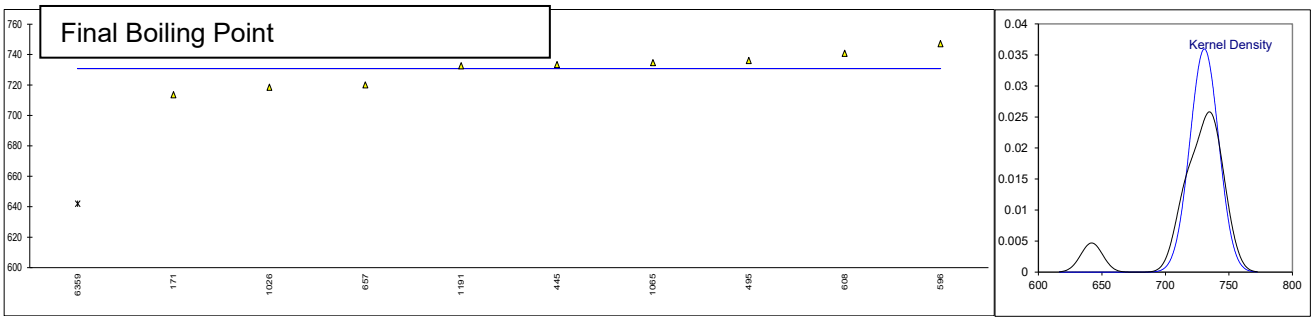








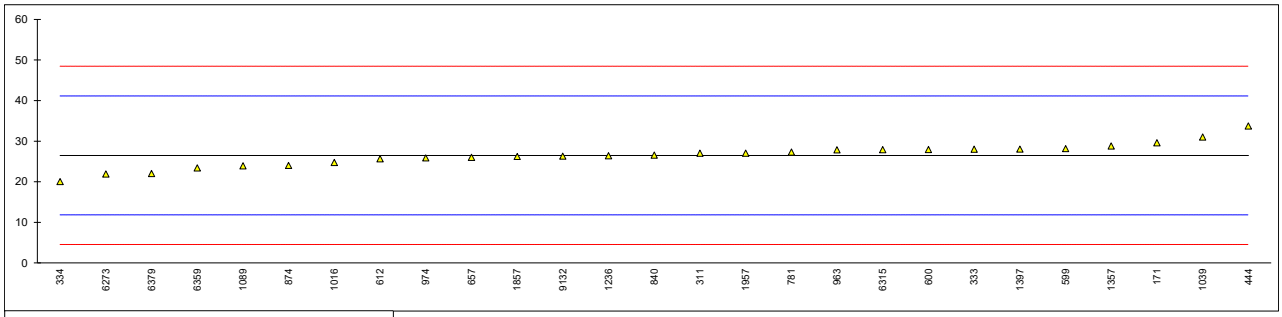

90% recovered
750
700
650
600
550
500
6359
171
657
1065
1191
445
1714
6447
1569
596
608
495
1039
1040
Kernel Density
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
400
500
600
700
800

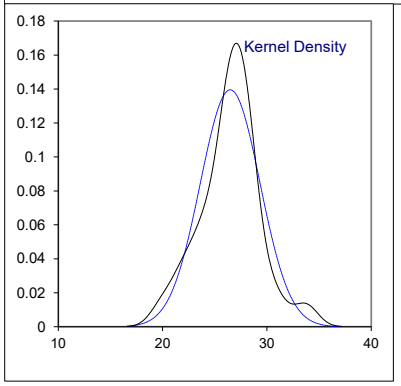

Final Boiling Point
760
740
720
700
680
660
640
620
600
6359
171
1026
657
1191
445
1065
495
608
596
Kernel Density
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
600
650
700
750
800

Determination of Total Mercury on sample #22216 results in µg/kg

lab	method	value	mark	z(targ)	remarks
140		-----		-----	
150		-----		-----	
171	UOP938	29.6		0.43	
311	UOP938	27		0.07	
333	INH-09003	28		0.21	
334	INH-09003	20		-0.89	
444	UOP938	33.73		0.99	
598		-----		-----	
599	D7622	28.15		0.23	
600	D7622	27.92		0.20	
609		-----		-----	
612	D7622	25.63		-0.12	
657	UOP938	26		-0.07	
663		-----		-----	
750		-----		-----	
781	UOP938	27.3		0.11	
840	UOP938	26.56		0.01	
862		-----		-----	
873		-----		-----	
874	UOP938	24.017		-0.34	
914		-----		-----	
963	UOP938	27.84		0.18	
974	UOP938	25.85		-0.09	
1016	UOP938	24.715		-0.24	
1039	UOP938	31		0.62	
1089	In house	23.9		-0.35	
1236	In house	26.4		-0.01	
1357	UOP938	28.8	C	0.32	First reported 13.1
1397	In house	28.04		0.21	
1857	UOP938	26.22		-0.04	
1957	UOP938	27.01		0.07	
6273	UOP938	21.9		-0.63	
6315	D7623	27.9		0.19	
6359		23.4		-0.42	
6379	In house	22		-0.61	
9132	D7623	26.3		-0.03	

normality	suspect
n	27
outliers	0
mean (n)	26.488
st.dev. (n)	2.8597
R(calc.)	8.007
st.dev.(Horwitz)	7.3203
R(Horwitz)	20.497





APPENDIX 2

z-scores of the determination of individual Light ends on sample #22215

lab	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	cyc-Pentane	Hexanes
141	-----	-----	-4.14	-3.81	-4.03	-3.45	-3.17	-----	-3.01
171	-----	-----	-4.05	-0.92	-1.52	0.46	0.47	-----	-2.03
445	-----	-----	-2.90	-1.52	-0.31	1.78	1.08	-----	3.14
596	-----	-----	-2.32	-0.08	-1.64	1.64	-0.06	-----	-----
600	-----	-----	1.56	46.12	-11.40	12.85	5.21	-----	-----
608	-----	-----	-1.31	1.12	-1.03	2.11	0.11	-----	-----
609	-----	-----	2.96	2.56	2.27	1.97	1.37	-----	-----
611	-----	-----	-0.50	-0.92	-0.88	-0.92	-1.13	-----	-----
1026	-----	-----	0.29	-0.68	0.91	-1.42	-1.65	-----	1.64
1039	-----	-----	3.89	2.80	2.97	-----	-----	-----	-----
1065	-----	-----	3.49	2.20	1.56	0.73	-0.67	-----	-1.15
1089	-----	-----	1.75	1.46	1.47	1.98	1.03	-----	-2.08
1140	-----	-----	-1.73	-2.26	0.71	-1.93	2.82	-----	2.76
1191	-----	-----	-0.65	-3.02	-3.18	-5.17	-4.96	-----	0.83
1236	-----	-----	0.56	0.64	0.79	0.41	-0.32	-----	0.02
1714	-----	-----	-0.45	-0.68	-1.20	-0.95	-2.15	-----	-0.13
1776	-----	-----	3.55	3.10	3.12	2.76	2.03	-----	-----

Please note: the table in this appendix only shows participants that reported test results

z-scores of the determination of Simulated Distillation on sample #22215

lab	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
171	-----	3.24	1.01	-1.58	-3.11	-4.38	-----	-----
311	-----	1.88	1.29	3.87	5.25	6.65	-----	-----
445	-----	0.19	-0.63	-0.71	-0.71	-1.22	-----	-----
495	-----	0.19	-0.84	0.77	1.91	2.52	-----	-----
596	-----	3.52	1.74	3.35	1.15	-1.71	-----	-----
608	-----	3.45	2.12	3.15	0.47	-0.91	-----	-----
657	-----	-2.62	-1.86	-4.79	-5.42	-4.77	-----	-----
1026	-----	-0.05	-0.72	-2.12	0.73	2.29	-----	-----
1039	-----	-0.28	-0.36	0.85	1.72	2.57	-----	-----
1040	-----	-0.62	-2.15	2.69	2.95	3.28	-----	-----
1065	-----	-----	1.75	0.51	-0.98	-2.32	-----	-----
1140	-----	20.92	19.33	28.04	26.24	28.56	-----	-----
1191	-----	0.19	3.46	1.20	-1.33	-1.72	-----	-----
1569	-----	-0.31	-0.70	-5.11	-1.93	-0.66	-----	-----
1714	-----	-3.18	-7.11	-2.07	-2.04	-2.08	-----	-----
1815	-----	0.19	0.47	2.49	3.71	4.51	-----	-----
6359	-----	-2.76	-4.59	-10.77	-10.54	-10.06	-----	-----
6447	-----	-3.04	-8.48	-2.52	-2.36	-2.06	-----	-----

Please note: the table in this appendix only shows participants that reported test results

APPENDIX 3

Analytical details Total Acid Number determination

lab	determination of end point	volume of titration solvent
90	60 mL	Inflection Point
154	60 mL	---
158	125 mL	Inflection Point
170	60 mL	Inflection Point
237	125 mL	Inflection Point
273	125 mL	Inflection Point
334	125 mL	Inflection Point
445	60 mL	---
551	125 mL	Inflection Point
598	125 mL	Inflection Point
600	125 mL	Inflection Point
608	125 mL	Inflection Point
611	60 mL	Inflection Point
621	60 mL	Inflection Point
657	125 mL	Inflection Point
663	60 mL	Inflection Point
736	125 mL	Inflection Point
752	60 mL	Inflection Point
781	125 mL	Inflection Point
840	60 mL	Inflection Point
873	125 mL	Inflection Point
874	125 mL	Buffer End Point pH10
922	125 mL	Inflection Point
963	60 mL	Inflection Point
971	125 mL	Inflection Point
974	125 mL	Inflection Point
994	125 mL	Buffer End Point pH 10
995	125 mL	Inflection Point
1026	125 mL	Buffer End Point pH 10
1039	125 mL	Inflection Point
1040	60 mL	Inflection Point
1056	60 mL	Inflection Point
1089	125 mL	Inflection Point
1140	125 mL	Inflection Point
1345	125 mL	Inflection Point
1357	125 mL	Inflection Point
1412	125 mL	---
1556	125 mL	Inflection Point
1569	125 mL	Inflection Point
1585	125 mL	Inflection Point
1613	125 mL	Inflection Point
1720	60 mL	Buffer End Point pH 11
1776	125 mL	Buffer End Point pH 10
1833	125 mL	Buffer End Point pH 10
1857	125 mL	Inflection Point
1858	125 mL	Inflection Point
1862	125 mL	Inflection Point
6028	60 mL	Inflection Point
6263	60 mL	Inflection Point
6273	125 mL	Inflection Point
6359	60 mL	Buffer End Point pH 10
6381	60 mL	Buffer End Point pH 10
6438	60 mL	Inflection Point
9132	60 mL	Inflection Point

Please note: the table in this appendix only shows participants that reported analytical details

APPENDIX 4

Number of participants per country

1 lab in	ALBANIA
2 labs in	ARGENTINA
3 labs in	AZERBAIJAN
3 labs in	BRAZIL
2 labs in	BULGARIA
4 labs in	CANADA
1 lab in	CHILE
1 lab in	CHINA, People's Republic
1 lab in	COLOMBIA
1 lab in	COTE D'IVOIRE
2 labs in	CROATIA
2 labs in	CZECH REPUBLIC
4 labs in	ECUADOR
1 lab in	EGYPT
2 labs in	FINLAND
5 labs in	FRANCE
3 labs in	GEORGIA
3 labs in	GERMANY
1 lab in	INDIA
1 lab in	INDONESIA
1 lab in	ISRAEL
3 labs in	ITALY
1 lab in	JORDAN
5 labs in	KAZAKHSTAN
1 lab in	LIBERIA
12 labs in	MALAYSIA
2 labs in	MEXICO
7 labs in	NETHERLANDS
2 labs in	NIGERIA
5 labs in	NORWAY
4 labs in	OMAN
1 lab in	PAKISTAN
1 lab in	PERU
7 labs in	POLAND
1 lab in	ROMANIA
16 labs in	RUSSIAN FEDERATION
4 labs in	SAUDI ARABIA
2 labs in	SERBIA
1 lab in	SINGAPORE
1 lab in	SLOVAKIA
1 lab in	SOUTH AFRICA
1 lab in	SPAIN
1 lab in	SUDAN
2 labs in	SWEDEN
1 lab in	THAILAND
1 lab in	TUNISIA
3 labs in	TURKEY
3 labs in	TURKMENISTAN
1 lab in	UKRAINE
2 labs in	UNITED ARAB EMIRATES
8 labs in	UNITED KINGDOM
11 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)/G(1)	= outlier in Grubbs' outlier test
G(0.05)/G(5)	= 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	= calculation difference between reported test result and result calculated by iis
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
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

Literature

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