Results of Proficiency Test
Crude Oil
November 2020

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. M. Meijer
Correctors: ing. A.S. Noordman-de Neef & ing. G.A. Oosterlaken-Buijs
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1 INTRODUCTION

Since 1998 the Institute for Interlaboratory Studies (iis) organizes a proficiency test for Crude Oil every year. During the annual proficiency testing program 2020/2021 it was decided to continue the round robin for the analysis on Crude Oil. In this interlaboratory study 158 laboratories in 53 different countries registered for participation. See appendix 4 for the number of participants per country. In this report the results of the Crude Oil proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory. It was decided to send two different samples of Crude Oil: a 1L bottle labelled #20215 for various analyzes and one 40mL vial labelled #20216 for determination of Mercury (Hg) only. The one liter bottle is a wide-necked bottle to enable use of a large size diameter high speed shear mixer for homogenization. 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 first sample a batch of approximately 200 liters of Crude Oil was obtained from a local refinery. After homogenization 185 wide-neck transparent glass bottles of 1L were filled and labelled #20215. 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 #20215-1	873.17
Sample #20215-2	873.00
Sample #20215-3	873.07
Sample #20215-4	873.15
Sample #20215-5	873.21
Sample #20215-6	873.11
Sample #20215-7	873.36
Sample #20215-8	873.09

Table 1: homogeneity test results of subsamples #20215

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)	0.303
reference test method	ASTM D5002:19
0.3 * R (reference test method)	1.079

Table 2: evaluation of the repeatability of subsamples #20215

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

For the second sample a batch of approximately 18 liters of Crude Oil was obtained from a third party and spiked with Conostan and $HgCl_2$ in Methanol solution especially for Mercury determination. After homogenization 188 amber glass vials of 40mL were filled and labelled #20216.
The homogeneity of the subsamples was checked by determination of Mercury in accordance with ASTM D7623 on 8 stratified randomly selected subsamples.

	Total Mercury in µg/kg
sample #20216-1	19
sample #20216-2	21
sample #20216-3	20
sample #20216-4	20
sample #20216-5	20
sample #20216-6	20
sample #20216-7	20
sample #20216-8	19

Table 3: homogeneity test results of subsamples #20216

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

	Total Mercury in µg/kg
r (observed)	1.8
reference method	Horwitz
0.3 x R (reference method)	4.8

Table 4: evaluation of the repeatability of subsamples #20216

The calculated repeatability was in agreement with 0.3 times the estimated reproducibility using the Horwitz equation. Therefore, homogeneity of the subsamples was assumed.

To each of the participating laboratories one sample labelled #20215 and one sample labelled #20216 were sent on October 14, 2020. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Crude Oil packed in the transparant glass bottles in a red plastic bag and in amber glass vials was checked. The material has been found sufficiently stable for the period of the proficiency test.

2.6 ANALYZES

The participants were requested to determine on sample #20215: 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), Molecular Mass (Average), Pour Point Maximum, Salt as Chloride, Sediment (Extraction method and Membrane filtration), Total Sulfur, Water and Simulated Distillation.
On sample #20216 was requested to determine Total Mercury only.

It was also requested to report some analytical details about Total Acid Number determination.

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 participants 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 test result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report ‘iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation’ of June 2018 (iis-protocol, version 3.5).
For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as ‘<…’ or ‘>…’ were not used in the statistical evaluation.

First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test, a variant of the Kolmogorov-Smirnov test and by the calculation of skewness and kurtosis. Evaluation of the three normality indicators in combination with the visual evaluation of the graphic Kernel density plot, lead to judgement of the normality being either ‘unknown’, ‘OK’, ‘suspect’ or ‘not OK’. After removal of outliers, this check was repeated. If a data set does not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

According to ISO5725 the original test results per determination were submitted to Dixon's, Grubbs' or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

For each assigned value the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. In this PT, the criterion of ISO13528, paragraph 9.2.1. was met for all evaluated tests, therefore, the uncertainty of all assigned values may be negligible and need not be included in the PT report.

Finally, the reproducibilities were calculated from the standard deviations by multiplying them with a factor of 2.8.

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.

Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also, a normal Gauss curve was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

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

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used, 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 interlaboratory study some problems were encountered with the dispatch of the samples due to the COVID-19 pandemic. Therefore, the final reporting date was extended with two weeks. When considering the test results of the two samples together 17 participants reported test results after the final reporting date and 18 participants did not report any test results. Not all participants were able to report all tests requested.
In total 140 reporting laboratories submitted 1212 numerical test results. Observed were 44 outlying test results, which is 3.6%. In proficiency studies 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 reported test results 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. D473) and an added designation for the year that the test method was adopted or revised (e.g. D473:07e1). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D473:07e1(2017)). In the test results tables of appendix 1 only the test method number and year of adoption or revision (e.g. D473:07e1) will be used.

For the evaluation of Total Mercury it was decided to use the Horwitz equation to calculate an estimated reproducibility as ASTM D7623 and UOP938 give only a repeatability. Furthermore, UOP938 as used by most of the laboratories is not intended to use for crude oil. Also, the repeatability of UOP938 is only available for concentrations in µg/L and conversion to µg/kg will lead to extra uncertainty.

Sample #20215

Total Acid Number: This determination was not problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of Inflection Point at titration volume 60 mL and Buffer End Point at titration volume 125 mL from ASTM D664-A:18e2. However, the calculated reproducibility is not in agreement with the requirements for Inflection Point at titration volume 125 mL and Buffer End Point at titration volume 60 mL.
It is observed that two participants reported to have used BEP (pH 11) as determination end point and seven reported to have used BEP (pH 10). In method ASTM D664-A version 2018e2 the Buffer End Point pH=10 has been mentioned.

API Gravity: This determination was not problematic. However, six statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D287:12b(2019).

BS&W: This determination was problematic for a number of laboratories. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D4007:11e1(2016).

Density at 15°C: 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 D5002:19.
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 e.g. §1.3 of ASTM D4052:18a).

Kin.Visc.at 40°C: 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 D445:19a.

Light ends: 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.
This determination was very problematic. In total nine 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 IP344:88(2010).

Average Molecular Mass: This determination may not be problematic, but only six test results were reported. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D2503:92(2016).

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 e.g. §1.3 of ASTM D97:17b).

Salt as Chloride: This determination was not problematic. Two statistical outliers were observed and one other test result was excluded. The calculated reproducibility after the rejection of the suspect data is in agreement with the requirements of ASTM D3230:19.

Sediment (Extraction): This determination was not problematic. No statistical outliers were observed but three test results were excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ASTM D473:07e1(2017).

Sediment (Membrane filtration): This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ASTM D4807:05(2020).

Total Sulfur: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D4294:16e1.

Water: This determination was not problematic. Three statistical outliers were observed and one other test result was excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ASTM D4377:00(2011).

Simulated Distillation: This determination was problematic. Only 15 laboratories reported test results for this determination. In total over eight distillation parameters seven statistical outliers were observed and four other test results were excluded. However, only at 5% recovered the calculated reproducibility after rejection of the suspect data is in (full) agreement with the requirements of ASTM D7169:20e1.

Sample #20216

Total Mercury: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier 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 or as declared by the estimated target reproducibility calculated with the Horwitz equation 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 test methods (in casu ASTM and IP test methods) or estimated by using the Horwitz equation are presented in the next table.

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Acid Number	mg KOH/g	68	0.15	0.07	0.09
API Gravity		86	30.4	0.2	0.5
BS&W	%V/V	59	0.04	0.07	0.11
Density at 15°C	kg/m^3	134	873.4	1.3	3.6
Kinematic Viscosity at 40°C	mm^2/s	78	9.97	1.07	0.84
Methane	%M/M	14	<0.01	n.a.	n.a.
Ethane	%M/M	17	0.018	0.018	0.007
Propane	%M/M	17	0.27	0.10	0.06
iso-Butane	%M/M	17	0.19	0.04	0.03
n-Butane	%M/M	18	0.82	0.28	0.11
iso-Pentane	%M/M	18	0.69	0.17	0.06
n-Pentane	%M/M	18	1.20	0.25	0.12
cyclo-Pentane	%M/M	10	0.068	0.022	0.011
Total Hexanes	%M/M	11	2.81	0.50	0.45
Total of all C1 - C6	%M/M	9	6.18	0.72	0.49
Average Molecular Mass	g/mol	6	235	12	14
Pour Point Maximum	°C	63	-26.4	14.7	18.0
Salt as Chloride	mg/kg	70	10.0	10.6	15.7
Sediment (Extraction method)	%V/V	66	0.007	0.015	0.035
Sediment (Membrane filtration)	%M/M	45	0.015	0.015	0.015
Total Sulfur	%M/M	107	2.63	0.22	0.14
Water	%V/V	112	0.037	0.024	0.037
IBP	°C	12	<36	n.e.	n.e.
5% recovered	°C	12	70	20	20
10% recovered	°C	14	118	28	20
30% recovered	°C	13	254	18	13
50% recovered	°C	14	376	41	16
70% recovered	°C	14	512	65	21
90% recovered	°C	10	675	96	n.a.
FBP	°C	11	>700	n.a.	n.a.
Total Mercury	µg/kg	31	21.1	14.2	16.9

Table 5: reproducibilities of tests on samples #20215 and #20216 (Hg only)

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF NOVEMBER 2020 WITH PREVIOUS PTS

	November 2020	November 2019	November 2018	November 2017	November 2016
Number of reporting laboratories	140	138	143	140	136
Number of test results	1212	1189	1234	1234	1126
Number of statistical outliers	44	32	60	60	60
Percentage of statistical outliers	3.6%	2.7%	4.9%	4.9%	5.3%

Table 6: comparison with previous proficiency tests

In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

The performance of the determinations of the proficiency tests was compared against the requirements of the reference test methods. The conclusions are given in the following table.

Determination	November 2020	November 2019	November 2018	November 2017	November 2016
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 7: comparison determinations against 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

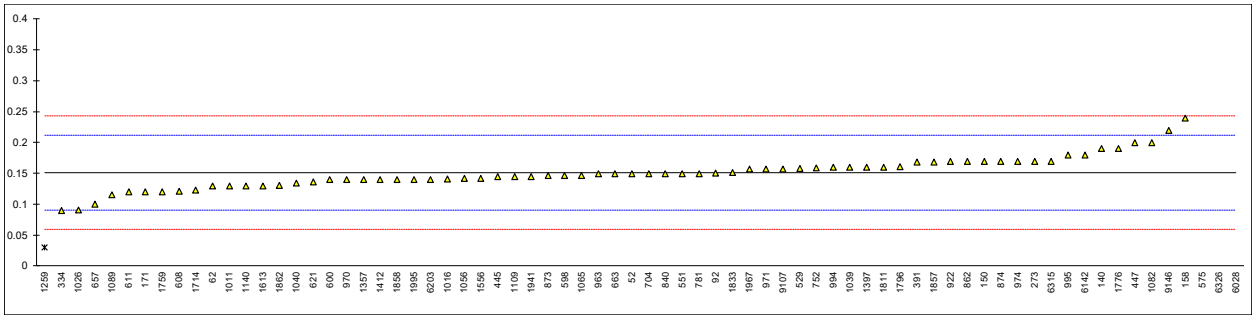
Determination of Total Acid Number on sample #20215; results in mg KOH/g

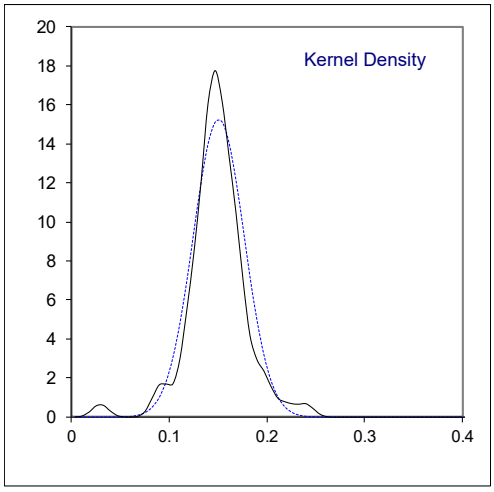
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D664-A	0.15		-0.04	874	D664-A	0.17		0.62
62	D664-A	0.13		-0.69	875		-----		-----
90		-----		-----	904		-----		-----
92	D664-A	0.1505		-0.02	914		-----		-----
120		-----		-----	922	D664-A	0.17		0.62
140	D664-A	0.19		1.28	962		-----		-----
141		-----		-----	963	D664-A	0.15		-0.04
150	D664-A	0.17		0.62	970	D664-A	0.14		-0.36
154		-----		-----	971	D664-A	0.157		0.19
158	D664-A	0.24		2.92	974	D664-A	0.17		0.62
159		-----		-----	988		-----		-----
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994	D664-A	0.16		0.29
171	D664-A	0.12		-1.02	995	D664-A	0.18		0.95
175		-----		-----	997		-----		-----
186		-----		-----	1011	D664-A	0.13		-0.69
203		-----		-----	1016	D664-A	0.141		-0.33
225		-----		-----	1026	D664-A	0.091		-1.97
237		-----		-----	1039	D664-A	0.16		0.29
238		-----		-----	1040	D664-A	0.1345		-0.54
273	D664-A	0.17		0.62	1056	D664-A	0.142		-0.30
311		-----		-----	1065	D664-A	0.147		-0.13
314		-----		-----	1082	ISO6619	0.20		1.60
333		-----		-----	1089	D664-A	0.116		-1.15
334	D664-A	0.09		-2.00	1099		-----		-----
335		-----		-----	1109	D664-B	0.145		-0.20
336		-----		-----	1140	IP177	0.13		-0.69
391	D664-A	0.169		0.59	1229		-----		-----
398		-----		-----	1236		-----		-----
399		-----		-----	1259	D664-A	0.03	C,R(0.01)	-3.97
442		-----		-----	1357	D664-A	0.14		-0.36
444		-----		-----	1397	D664-A	0.16		0.29
445	D664-A	0.145		-0.20	1412	D664-A	0.14		-0.36
446		-----		-----	1556	D664-A	0.142		-0.30
447	D664-A	0.2		1.60	1613	D664-A	0.13		-0.69
485		-----		-----	1635		-----		-----
495		-----		-----	1695		-----		-----
511		-----		-----	1714	In house	0.123		-0.92
525		-----		-----	1724		-----		-----
529	D664-A	0.1579		0.22	1728		-----		-----
541		-----		-----	1749		-----		-----
542		-----		-----	1759	In house	0.12		-1.02
551	D664-A	0.15		-0.04	1776	D664-A	0.19		1.28
553		-----		-----	1796	D664-A	0.161		0.33
557		-----		-----	1810		-----		-----
562		-----		-----	1811	D664-A	0.16		0.29
575	D664-A	0.706	R(0.01)	18.19	1815		-----		-----
593		-----		-----	1833	D664-A	0.152		0.03
596		-----		-----	1842		-----		-----
597		-----		-----	1849		-----		-----
598	D664-A	0.147		-0.13	1857	D664-A	0.169		0.59
599		-----		-----	1858	D664-A	0.14		-0.36
600	D664-A	0.14		-0.36	1862	D664	0.1303		-0.68
603		-----		-----	1941	ISO6619	0.145		-0.20
608	D664-A	0.1215		-0.97	1967	D664-A	0.1569		0.19
609		-----		-----	1984		-----		-----
610		-----		-----	1995	D664-A	0.14		-0.36
611	D664-A	0.120		-1.02	6016		-----		-----
612		-----		-----	6028	D664-A	1.8	C,R(0.01)	54.06
621	D664-A	0.1363		-0.48	6048		-----		-----
657	D664-A	0.10		-1.67	6054		-----		-----
663	D664-A	0.15		-0.04	6142	ISO6618	0.18		0.95
704	D664-A	0.15		-0.04	6203	D664-A	0.140		-0.36
732		-----		-----	6263		-----		-----
739		-----		-----	6290		-----		-----
749		-----		-----	6294		-----		-----
750		-----		-----	6295		-----		-----
752	D664-A	0.159		0.26	6296		-----		-----
753		-----		-----	6315	D664-A	0.170		0.62
781	D664-A	0.15		-0.04	6326	D664-A	1.7447	C,R(0.01)	52.25
785		-----		-----	6356		-----		-----
840	D664-A	0.15		-0.04	6362		-----		-----
862	D664-A	0.17		0.62	9051		-----		-----
873	D664-A	0.147		-0.13	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-----		-----	9107	D664-A	0.1575		0.21
9060		-----		-----	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101		-----		-----	9146	D664Mod.	0.22		2.26

	normality	suspect	
	n	68	
	outliers	4	
	mean (n)	0.1511	
	st.dev. (n)	0.02611	
	R(calc.)	0.0731	
	st.dev.(D664-A:18e2)	0.03050	IP 60mL
	R(D664-A:18e2)	0.0854	IP 60mL
Compare			
	R(D664-A:18e2)	0.0305	IP 125mL
	R(D664-A:18e2)	0.0433	BEP 60mL
	R(D664-A:18e2)	0.0876	BEP 125mL

Lab 1259 first reported 0.003
Lab 6028 first reported 1.88
Lab 6326 first reported 0.46





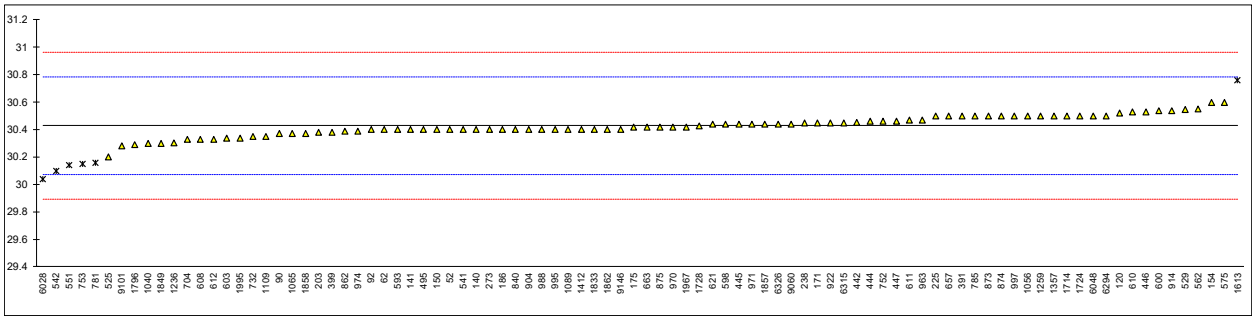
Determination of API Gravity on sample #20215;

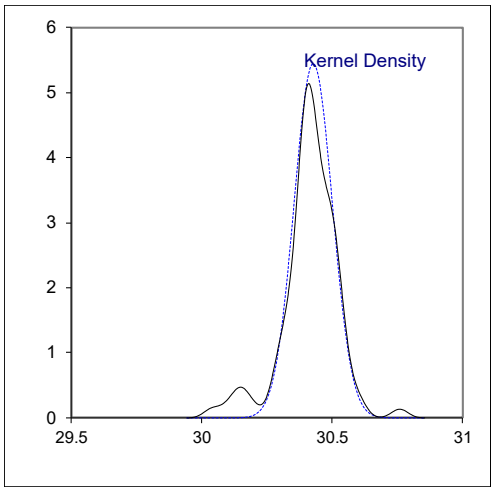
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5002	30.4		-0.16	874	D5002	30.5		0.40
62	D5002	30.4		-0.16	875	D1250	30.42		-0.05
90	D5002	30.37		-0.33	904	D5002	30.4		-0.16
92	D4052	30.40		-0.16	914	D1298	30.54		0.63
120	D5002	30.52		0.51	922	D4052	30.45		0.12
140	D4052	30.4		-0.16	962		-----		-----
141	D5002	30.4		-0.16	963	D5002	30.47		0.23
150	D287	30.4		-0.16	970	D287	30.42		-0.05
154	D287	30.6		0.96	971	D5002	30.44		0.07
158		-----		-----	974	D1298	30.39		-0.21
159		-----		-----	988	D1298	30.4		-0.16
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994		-----		-----
171	D4052	30.45		0.12	995	D287	30.4		-0.16
175	D5002	30.42		-0.05	997	D287	30.5		0.40
186	D4052	30.4		-0.16	1011		-----		-----
203	D5002	30.38		-0.27	1016		-----		-----
225	Calc.	30.5		0.40	1026		-----		-----
237		-----		-----	1039		-----		-----
238	D5002	30.45		0.12	1040	D287	30.3		-0.72
273	D5002	30.4		-0.16	1056	D1298	30.5		0.40
311		-----		-----	1065	D4052	30.37	C	-0.33
314		-----		-----	1082		-----		-----
333		-----		-----	1089	D287	30.4		-0.16
334		-----		-----	1099		-----		-----
335		-----		-----	1109	D287	30.35		-0.44
336		-----		-----	1140		-----		-----
391	D287	30.5		0.40	1229		-----		-----
398		-----		-----	1236	D287	30.303		-0.70
399	Calc.	30.38		-0.27	1259	Calc.	30.50		0.40
442	D4052	30.4549		0.15	1357	D5002	30.5		0.40
444	D5002	30.46		0.18	1397		-----		-----
445	D287	30.44		0.07	1412	D5002	30.4		-0.16
446	D5002	30.53		0.57	1556		-----		-----
447	D5002	30.46		0.18	1613	D5002	30.76	R(0.05)	1.86
485		-----		-----	1635		-----		-----
495	Calc.	30.40		-0.16	1695		-----		-----
511		-----		-----	1714	D5002	30.5		0.40
525	Calc.	30.2		-1.28	1724	D5002	30.5		0.40
529	D287	30.548		0.67	1728	D5002	30.427		-0.01
541	D5002	30.40		-0.16	1749		-----		-----
542	D5002	30.1	R(0.05)	-1.84	1759		-----		-----
551	D5002	30.14	R(0.05)	-1.61	1776		-----		-----
553		-----		-----	1796	D1250	30.29		-0.77
557		-----		-----	1810		-----		-----
562	D1298	30.55		0.68	1811		-----		-----
575	D1298	30.6		0.96	1815		-----		-----
593	D1298	30.4		-0.16	1833	D5002	30.4		-0.16
596		-----		-----	1842		-----		-----
597		-----		-----	1849	ISO3675	30.3		-0.72
598	D5002	30.44		0.07	1857	Calc.	30.44		0.07
599		-----		-----	1858	D1298	30.37		-0.33
600	D5002	30.54		0.63	1862	D5002	30.40		-0.16
603	D4052	30.34		-0.49	1941		-----		-----
608	Calc.	30.33		-0.55	1967	D1298	30.42		-0.05
609		-----		-----	1984		-----		-----
610	D5002	30.53		0.57	1995	Calc.	30.34		-0.49
611	D5002	30.47		0.23	6016		-----		-----
612	D5002	30.33		-0.55	6028	D1298	30.04	R(0.05)	-2.17
621	D5002	30.44		0.07	6048	Calc.	30.5		0.40
657	D5002	30.5		0.40	6054		-----		-----
663	D5002	30.42		-0.05	6142		-----		-----
704	D1298	30.33		-0.55	6203		-----		-----
732	D1298	30.35		-0.44	6263		-----		-----
739		-----		-----	6290		-----		-----
749		-----		-----	6294	D1298	30.5		0.40
750		-----		-----	6295		-----		-----
752	D1250	30.46		0.18	6296		-----		-----
753	D1250	30.15	R(0.05)	-1.56	6315	Calc.	30.45		0.12
781	D5002	30.16	R(0.05)	-1.50	6326	D287	30.44		0.07
785	D1298	30.5		0.40	6356		-----		-----
840	D5002	30.40		-0.16	6362		-----		-----
862	D5002	30.39		-0.21	9051		-----		-----
873	D1298	30.50		0.40	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-----		-----	9107		-----		-----
9060	D5002	30.44		0.07	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101	D1298	30.28085		-0.83	9146	In house	30.4		-0.16

normality	OK
n	86
outliers	6
mean (n)	30.428
st.dev. (n)	0.0733
R(calc.)	0.205
st.dev.(D287:12b)	0.1786
R(D287:12b)	0.5

Lab 1065 first reported 0.8737





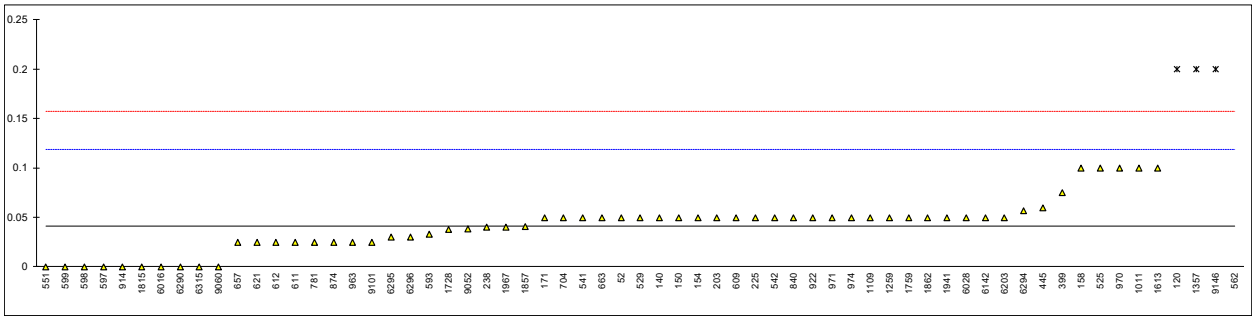
Determination of BS&W on sample #20215; results in %V/V

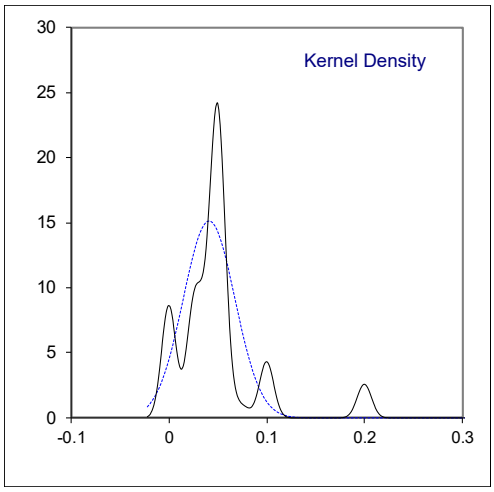
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4007	0.05		0.23	874	D4007	0.025		-0.42
62		-----		-----	875		-----		-----
90		-----		-----	904		-----		-----
92		-----		-----	914	D4007	0.0		-1.07
120	D4007	0.200	R(0.01)	4.11	922	D4007	0.05		0.23
140	D4007	0.05		0.23	962		-----		-----
141	D4007	<0.04		-----	963	D4007	0.025		-0.42
150	D4007	0.05		0.23	970	D4007	0.10		1.52
154	D4007	0.05		0.23	971	D4007	0.050		0.23
158	D4007	0.10		1.52	974	D4007	0.05		0.23
159		-----		-----	988		-----		-----
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994		-----		-----
171	D4007	0.05		0.23	995		-----		-----
175		-----		-----	997		-----		-----
186		-----		-----	1011	D4007	0.100		1.52
203	D4007	0.05		0.23	1016		-----		-----
225	D4007	0.05		0.23	1026		-----		-----
237		-----		-----	1039		-----		-----
238	D4007	0.04		-0.03	1040		-----		-----
273		-----		-----	1056		-----		-----
311		-----		-----	1065		-----		-----
314		-----		-----	1082		-----		-----
333		-----		-----	1089		-----		-----
334		-----		-----	1099		-----		-----
335		-----		-----	1109	D4007	0.05		0.23
336		-----		-----	1140		-----		-----
391		-----		-----	1229		-----		-----
398		-----		-----	1236		-----		-----
399	D4007	0.075		0.87	1259	ISO9030	0.05		0.23
442		-----		-----	1357	D4007	0.20	R(0.01)	4.11
444		-----		-----	1397		-----		-----
445	D4007	0.06		0.49	1412		-----		-----
446		-----		-----	1556		-----		-----
447		-----		-----	1613	D4007	0.1		1.52
485		-----		-----	1635		-----		-----
495		-----		-----	1695		-----		-----
511		-----		-----	1714		-----		-----
525	D4007	0.1	C	1.52	1724		-----		-----
529	D4007	0.05		0.23	1728		0.038		-0.08
541	D4007	0.050		0.23	1749		-----		-----
542	D4007	0.05		0.23	1759	ISO9030	0.05		0.23
551	D4007	0.00		-1.07	1776		-----		-----
553		-----		-----	1796		-----		-----
557		-----		-----	1810		-----		-----
562	D4007	0.45	R(0.01)	10.57	1811		-----		-----
575		-----		-----	1815	D4007	0		-1.07
593	D4007	0.033		-0.21	1833		-----		-----
596		-----		-----	1842		-----		-----
597	D4007	0.00		-1.07	1849		-----		-----
598	D4007	0.00		-1.07	1857		0.041		-0.01
599	D4007	0.00		-1.07	1858		-----		-----
600		-----		-----	1862	D4007	0.05		0.23
603		-----		-----	1941	ISO9030	0.05		0.23
608		-----		-----	1967	D4007	0.04		-0.03
609	D4007	0.05		0.23	1984		-----		-----
610	D4007	<0.05		-----	1995		-----		-----
611	D4007	0.025		-0.42	6016	D4007	0		-1.07
612	D4007	0.025		-0.42	6028	D4007	0.05		0.23
621	D4007	0.025		-0.42	6048		-----		-----
657	D4007	0.025		-0.42	6054		-----		-----
663	D4007	0.05		0.23	6142	D4007	0.05		0.23
704	D4007	0.05		0.23	6203	ISO9030	0.05		0.23
732		-----		-----	6263		-----		-----
739		-----		-----	6290	D4007	0.00		-1.07
749		-----		-----	6294	D4007	0.057		0.41
750		-----		-----	6295	GOST2477	0.03		-0.29
752		-----		-----	6296	GOST2477	0.03		-0.29
753		-----		-----	6315	D4007	0		-1.07
781	D4007	0.025		-0.42	6326	D4007	<0.01		-----
785		-----		-----	6356		-----		-----
840	D4007	0.05		0.23	6362		-----		-----
862		-----		-----	9051		-----		-----
873		-----		-----	9052	In house	0.0385		-0.07

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-----		-----	9107		-----		-----
9060	D4007	0		-1.07	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101	D4007	0.025		-0.42	9146	D4007	0.20	R(0.01)	4.11

normality	OK
n	59
outliers	4
mean (n)	0.0412
st.dev. (n)	0.02639
R(calc.)	0.0739
st.dev.(D4007:11e1)	0.03867
R(D4007:11e1)	0.1083

Lab 525 first reported 99.9





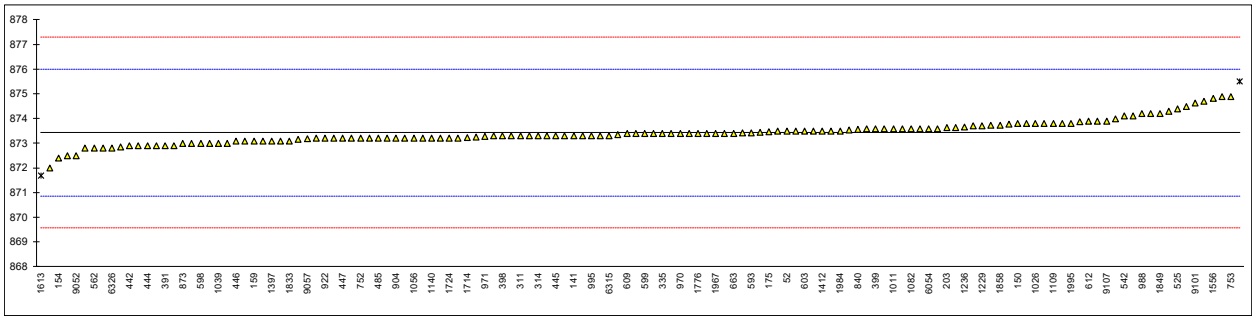
Determination of Density at 15°C on sample #20215; results in kg/m^3

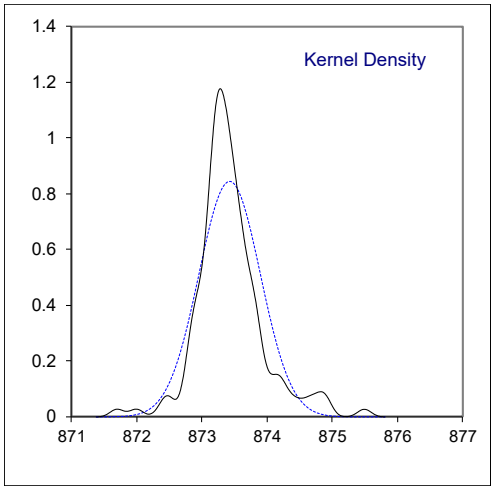
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5002	873.5		0.05	874	D5002	873.1		-0.26
62	D5002	873.3		-0.10	875	D5002	873.3		-0.10
90	D5002	873.7		0.21	904	D5002	873.2		-0.18
92	D4052	873.5		0.05	914	D1298	873.5		0.05
120	D5002	872.9		-0.41	922	D4052	873.2		-0.18
140	D5002	873.3		-0.10	962		-----		-----
141	D5002	873.3		-0.10	963	D5002	873.1		-0.26
150	D4052	873.8		0.29	970	D4052	873.4	C	-0.02
154	D1298	872.4		-0.80	971	D5002	873.29		-0.11
158	D5002	873.2		-0.18	974	D5002	873.6		0.13
159	D4052	873.1		-0.26	988	D1298	874.2		0.60
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994	D5002	873.4		-0.02
171	D4052	873.3		-0.10	995	D5002	873.3		-0.10
175	D5002	873.46		0.02	997	D5002	873.2		-0.18
186		-----		-----	1011	D5002	873.6		0.13
203	D5002	873.63		0.15	1016	D4052	873.6		0.13
225	D4052	873.0		-0.34	1026	D5002	873.8	C	0.29
237		-----		-----	1039	ISO12185	873.0		-0.34
238	D5002	873.0		-0.34	1040	ISO12185	873.9		0.36
273	D5002	873.4		-0.02	1056	D5002	873.2		-0.18
311	D5002	873.3		-0.10	1065		-----		-----
314	D5002	873.3		-0.10	1082	D5002	873.60		0.13
333	D5002	872.9		-0.41	1089	D5002	873.8		0.29
334	ISO12185	873.2		-0.18	1099	D5002	873.2		-0.18
335	D5002	873.4		-0.02	1109	D5002	873.8	C	0.29
336	D5002	873.2		-0.18	1140	IP365	873.2		-0.18
391	D5002	872.9		-0.41	1229	D5002	873.7		0.21
398	D5002	873.3		-0.10	1236	D5002	873.65		0.17
399	D5002	873.6		0.13	1259	D4052	873.0		-0.34
442	IP365	872.9		-0.41	1357	D5002	873.2		-0.18
444	D5002	872.9		-0.41	1397	ISO12185	873.1		-0.26
445	D5002	873.3		-0.10	1412	D5002	873.5		0.05
446	D5002	873.1		-0.26	1556	ISO12185	874.82		1.08
447	D5002	873.2		-0.18	1613	D5002	871.7	R(0.05)	-1.35
485	D5002	873.2		-0.18	1635	D1298	874.3		0.68
495	ISO12185	873.17		-0.20	1695	D1298	873.88		0.35
511		-----		-----	1714	D5002	873.23		-0.16
525	D4052	874.4		0.75	1724	D5002	873.2		-0.18
529	D5002	872.86		-0.44	1728	D5002	873.35		-0.06
541	D5002	873.42		-0.01	1749	ISO12185	873.8		0.29
542	D5002	874.1		0.52	1759	ISO3675	874.2		0.60
551	D5002	874.5		0.83	1776	ISO12185	873.4		-0.02
553		-----		-----	1796	D5002	874.1	C	0.52
557		-----		-----	1810	ISO12185	873.1		-0.26
562	D1298	872.8		-0.49	1811	D5002	873.4		-0.02
575		-----		-----	1815	ISO12185	873.60		0.13
593	D1298	873.422		-0.01	1833	D5002	873.1		-0.26
596	D5002	874.7		0.99	1842		-----		-----
597	D1298	873.8		0.29	1849	ISO3675	874.2		0.60
598	D5002	873.0	C	-0.34	1857	D5002	873.3		-0.10
599	D1298	873.4		-0.02	1858	D1298	873.74		0.24
600	D5002	872.8		-0.49	1862	D5002	873.5		0.05
603	D4052	873.5		0.05	1941	ISO12185	873.2		-0.18
608	D5002	874.0		0.44	1967	D1298	873.4		-0.02
609	D5002	873.4		-0.02	1984	D5002	873.5		0.05
610	D5002	872.8		-0.49	1995	D5002	873.8		0.29
611	D5002	873.20		-0.18	6016	D4052	873.73		0.23
612	D5002	873.9		0.36	6028	ISO3675	875.5	R(0.01)	1.61
621	D5002	873.3		-0.10	6048	ISO12185	873.55		0.09
657	D5002	873.2		-0.18	6054	D5002	873.6		0.13
663	D5002	873.41		-0.02	6142	ISO12185	872.5		-0.72
704	D1298	873.5		0.05	6203	D4052	873.6		0.13
732	D1298	873.4		-0.02	6263		-----		-----
739		-----		-----	6290	D4052	873.77		0.26
749		-----		-----	6294	D1298	872.9		-0.41
750		-----		-----	6295	D5002	873.295		-0.11
752	D5002	873.2		-0.18	6296	D5002	873.64		0.16
753	D5002	874.9		1.14	6315	ISO12185	873.3		-0.10
781	D5002	874.9		1.14	6326	D5002	872.8		-0.49
785		873.4		-0.02	6356		-----		-----
840	D5002	873.56		0.10	6362	D5002	873.45		0.01
862	D5002	873.58		0.12	9051	In house	873.4		-0.02
873	D5002	873.0		-0.34	9052	In house	872.5		-0.72

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		873.18		-0.20	9107	D1298	873.90		0.36
9060	D5002	873.27		-0.13	9141		-----		-----
9063	In house	872		-1.11	9143		-----		-----
9101	D1298	874.64		0.94	9146		-----		-----

normality	suspect
n	134
outliers	2
mean (n)	873.431
st.dev. (n)	0.4716
R(calc.)	1.320
st.dev.(D5002:19)	1.2852
R(D5002:19)	3.599

Lab 598 first reported 0.8730 kg/m^3
Lab 970 first reported 0.8734 kg/m^3
Lab 1026 first reported 0.8738 kg/m^3
Lab 1109 reported 0.8738 kg/m^3
Lab 1796 reported 0.8741 kg/m^3





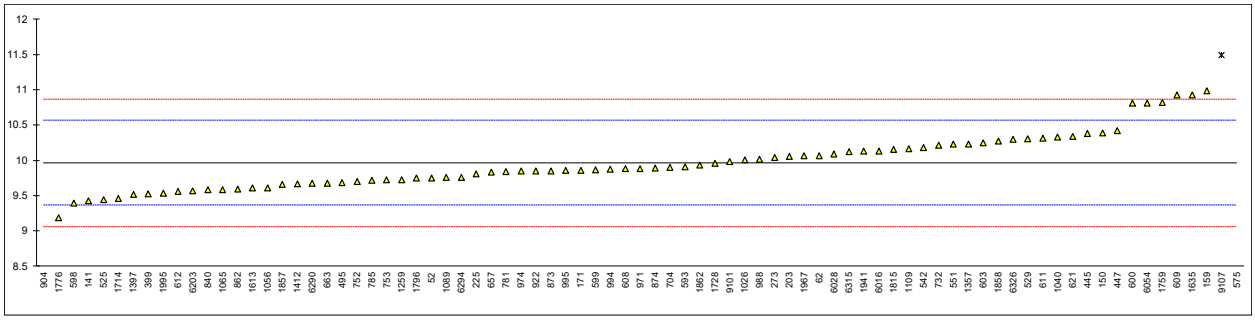
Determination of Kinematic Viscosity at 40°C on sample #20215; results in mm²/s

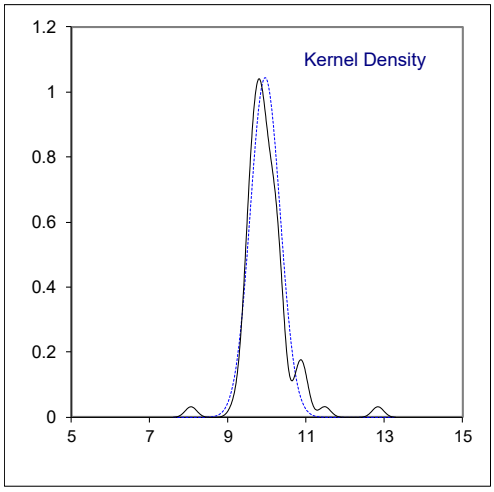
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D445	9.754		-0.70	874	D445	9.894		-0.24
62	D445	10.07		0.35	875		-----		-----
90		-----		-----	904	D445	8.067	C,R(0.01)	-6.30
92		-----		-----	914		-----		-----
120		-----		-----	922	D445	9.853		-0.37
140		-----		-----	962		-----		-----
141	D7042	9.429		-1.78	963		-----		-----
150	D445	10.39		1.41	970		-----		-----
154		-----		-----	971	D445	9.886		-0.26
158		-----		-----	974	D445	9.849		-0.39
159	D445	10.99		3.40	988	D445	10.02		0.18
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994	D445	9.873		-0.31
171	D445	9.860		-0.35	995	D445	9.859		-0.35
175		-----		-----	997		-----		-----
186		-----		-----	1011		-----		-----
203	D445	10.061		0.32	1016		-----		-----
225	D445	9.810		-0.52	1026	D445	10.01		0.15
237		-----		-----	1039		-----		-----
238		-----		-----	1040	D445	10.3355		1.23
273	D445	10.04		0.25	1056	D7042	9.6094		-1.18
311		-----		-----	1065	D445	9.590		-1.25
314		-----		-----	1082		-----		-----
333		-----		-----	1089	D445	9.759		-0.68
334		-----		-----	1099		-----		-----
335		-----		-----	1109	D445	10.170		0.68
336		-----		-----	1140		-----		-----
391		-----		-----	1229		-----		-----
398		-----		-----	1236		-----		-----
399	D445	9.530		-1.45	1259	D445	9.727		-0.79
442		-----		-----	1357	D445	10.23		0.88
444		-----		-----	1397	D7042	9.523		-1.47
445	D445	10.38		1.38	1412	D445	9.666		-0.99
446		-----		-----	1556		-----		-----
447	D445	10.425		1.53	1613	D445	9.607		-1.19
485		-----		-----	1635	D7042	10.93	C	3.20
495	ISO3104	9.685		-0.93	1695		-----		-----
511		-----		-----	1714	D7042	9.4599		-1.68
525	D445	9.4451		-1.73	1724		-----		-----
529	D445	10.310	C	1.15	1728	D445	9.960		-0.02
541		-----		-----	1749		-----		-----
542	D7042	10.183		0.72	1759	In house	10.82		2.84
551	D445	10.23		0.88	1776	D7042	9.1870		-2.58
553		-----		-----	1796	D445	9.749		-0.72
557		-----		-----	1810		-----		-----
562		-----		-----	1811		-----		-----
575	D445	12.85	R(0.01)	9.58	1815	ISO3104	10.155		0.63
593	D445	9.906		-0.20	1833		-----		-----
596		-----		-----	1842		-----		-----
597		-----		-----	1849		-----		-----
598	D7042	9.3962		-1.89	1857	D445	9.6638		-1.00
599	D7042	9.8665		-0.33	1858	D445	10.271		1.02
600	D445	10.81		2.81	1862	D445	9.9349		-0.10
603	D445	10.25		0.95	1941	ISO3104	10.13		0.55
608	D445	9.884		-0.27	1967	D445	10.065		0.33
609	D445	10.93		3.20	1984		-----		-----
610		-----		-----	1995	D7042	9.54		-1.41
611	D445	10.3151		1.16	6016	D445	10.13		0.55
612	D7042	9.5651		-1.33	6028	ISO3104	10.09	C	0.41
621	D445	10.340		1.24	6048		-----		-----
657	D445	9.834		-0.44	6054	D445	10.816		2.83
663	D445	9.6784		-0.95	6142		-----		-----
704	D445	9.8983		-0.22	6203	D7042	9.569		-1.32
732	D445	10.212		0.82	6263		-----		-----
739		-----		-----	6290	D7042	9.6772		-0.96
749		-----		-----	6294	D445	9.76		-0.68
750		-----		-----	6295		-----		-----
752	D445	9.705		-0.86	6296		-----		-----
753	D445	9.726		-0.79	6315	ISO3104	10.1210		0.52
781	D445	9.845		-0.40	6326	D445	10.30		1.11
785		9.722		-0.81	6356		-----		-----
840	D445	9.5885		-1.25	6362		-----		-----
862	D445	9.5929		-1.24	9051		-----		-----
873	D445	9.855		-0.37	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-----		-----	9107	D445	11.49	R(0.05)	5.06
9060		-----		-----	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101	D445	9.98157		0.05	9146		-----		-----

normality	OK
n	78
outliers	3
mean (n)	9.9652
st.dev. (n)	0.38165
R(calc.)	1.0686
st.dev.(D445:19a)	0.30113
R(D445:19a)	0.8432

Lab 529 first reported 12.16
Lab 904 first reported 7.539
Lab 1635 first reported 11.47
Lab 6028 first reported 15.86





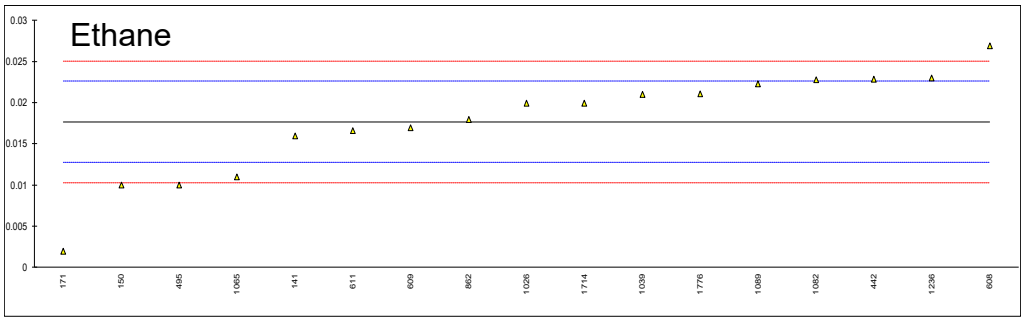
Determination of individual Light ends on sample #20215; results in %M/M

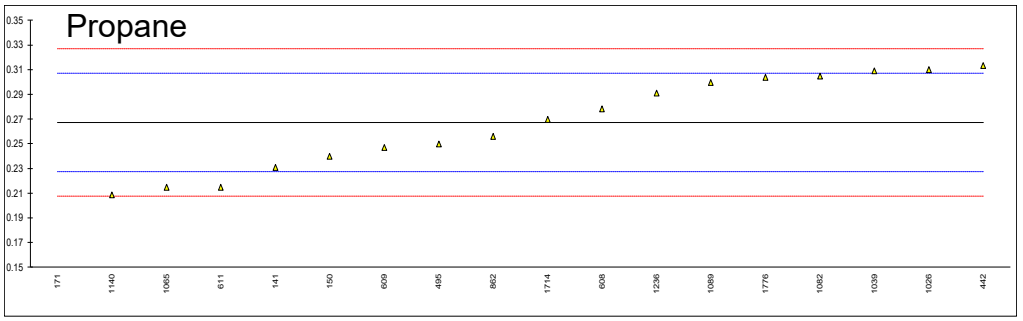
lab	method	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	cy-Pentane	Hexanes
52		-----	-----	-----	-----	-----	-----	-----	-----	-----
62		-----	-----	-----	-----	-----	-----	-----	-----	-----
90		-----	-----	-----	-----	-----	-----	-----	-----	-----
92		-----	-----	-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----	-----
141	D7196/GPA2186	0.000	0.016	0.231	0.166	0.743	0.650	1.107	0.068	**1.984**
150	D7900	<0.01	0.01	0.24	0.18	0.87	0.73	1.29	0.08	2.97
154		-----	-----	-----	-----	-----	-----	-----	-----	-----
158		-----	-----	-----	-----	-----	-----	-----	-----	-----
159		-----	-----	-----	-----	-----	-----	-----	-----	-----
167		-----	-----	-----	-----	-----	-----	-----	-----	-----
168		-----	-----	-----	-----	-----	-----	-----	-----	-----
170		-----	-----	-----	-----	-----	-----	-----	-----	-----
171	D7900	<0.01	0.002	**0.091**	**0.106**	0.566	0.618	1.086	0.079	3.0325
175		-----	-----	-----	-----	-----	-----	-----	-----	-----
186		-----	-----	-----	-----	-----	-----	-----	-----	-----
203		-----	-----	-----	-----	-----	-----	-----	-----	-----
225		-----	-----	-----	-----	-----	-----	-----	-----	-----
237		-----	-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----	-----
311		-----	-----	-----	-----	-----	-----	-----	-----	-----
314		-----	-----	-----	-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	-----	-----	-----
334		-----	-----	-----	-----	-----	-----	-----	-----	-----
335		-----	-----	-----	-----	-----	-----	-----	-----	-----
336		-----	-----	-----	-----	-----	-----	-----	-----	-----
391		-----	-----	-----	-----	-----	-----	-----	-----	-----
398		-----	-----	-----	-----	-----	-----	-----	-----	-----
399		-----	-----	-----	-----	-----	-----	-----	-----	-----
442		0.0003	0.0229	0.3136	0.1981	0.9148	0.7312	1.3242	0.0666	2.5989
444		-----	-----	-----	-----	-----	-----	-----	-----	-----
445		-----	-----	-----	-----	-----	-----	-----	-----	-----
446		-----	-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----	-----
485		-----	-----	-----	-----	-----	-----	-----	-----	-----
495		<0.01	0.01	0.2498	0.1757	0.8108	0.7047	1.1989	0.0653	**3.9617**
511		-----	-----	-----	-----	-----	-----	-----	-----	-----
525		-----	-----	-----	-----	-----	-----	-----	-----	-----
529		-----	-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----	-----
542		-----	-----	-----	-----	-----	-----	-----	-----	-----
551		-----	-----	-----	-----	-----	-----	-----	-----	-----
553		-----	-----	-----	-----	-----	-----	-----	-----	-----
557		-----	-----	-----	-----	-----	-----	-----	-----	-----
562		-----	-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----	-----
593		-----	-----	-----	-----	-----	-----	-----	-----	-----
596		-----	-----	-----	-----	-----	-----	-----	-----	-----
597		-----	-----	-----	-----	-----	-----	-----	-----	-----
598		-----	-----	-----	-----	-----	-----	-----	-----	-----
599		-----	-----	-----	-----	-----	-----	-----	-----	-----
600		-----	-----	-----	-----	-----	-----	-----	-----	-----
603		-----	-----	-----	-----	-----	-----	-----	-----	-----
608	IP344	0.00008	0.0269	0.2782	0.2068	0.8125	0.5567	1.2619	-----	**96.85623**
609		<0.01	0.017	0.247	0.172	0.794	0.684	1.215	-----	-----
610		-----	-----	-----	-----	-----	-----	-----	-----	-----
611	IP344	<0.01	0.0166	0.2151	0.1633	0.7395	0.6621	1.1305	-----	-----
612		-----	-----	-----	-----	-----	-----	-----	-----	-----
621		-----	-----	-----	-----	-----	-----	-----	-----	-----
657		-----	-----	-----	-----	-----	-----	-----	-----	-----
663		-----	-----	-----	-----	-----	-----	-----	-----	-----
704		-----	-----	-----	-----	-----	-----	-----	-----	-----
732		-----	-----	-----	-----	-----	-----	-----	-----	-----
739		-----	-----	-----	-----	-----	-----	-----	-----	-----
749		-----	-----	-----	-----	-----	-----	-----	-----	-----
750		-----	-----	-----	-----	-----	-----	-----	-----	-----
752		-----	-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----	-----
781		-----	-----	-----	-----	-----	-----	-----	-----	-----
785		-----	-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----	-----
862	IP344	0.00	0.018	0.256	0.172	0.787	0.693	1.167	0.064	2.747
873		-----	-----	-----	-----	-----	-----	-----	-----	-----

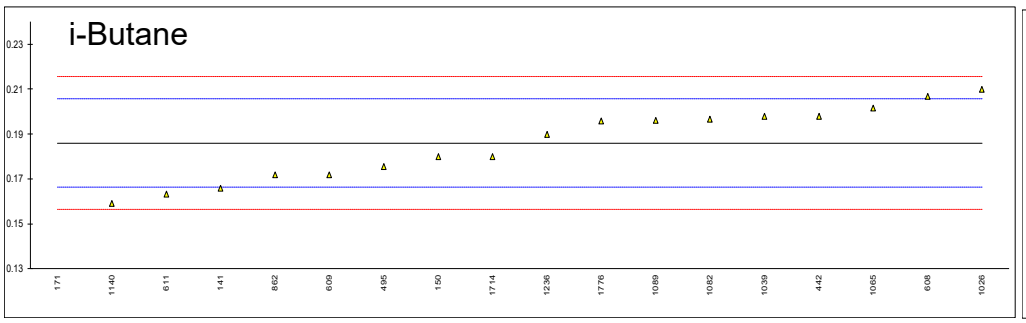
lab	method	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	cy-Pentane	Hexanes
874		-----	-----	-----	-----	-----	-----	-----	-----	-----
875		-----	-----	-----	-----	-----	-----	-----	-----	-----
904		-----	-----	-----	-----	-----	-----	-----	-----	-----
914		-----	-----	-----	-----	-----	-----	-----	-----	-----
922		-----	-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----	-----	-----	-----
970		-----	-----	-----	-----	-----	-----	-----	-----	-----
971		-----	-----	-----	-----	-----	-----	-----	-----	-----
974		-----	-----	-----	-----	-----	-----	-----	-----	-----
988		-----	-----	-----	-----	-----	-----	-----	-----	-----
991		-----	-----	-----	-----	-----	-----	-----	-----	-----
992		-----	-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----	-----
995		-----	-----	-----	-----	-----	-----	-----	-----	-----
997		-----	-----	-----	-----	-----	-----	-----	-----	-----
1011		-----	-----	-----	-----	-----	-----	-----	-----	-----
1016		-----	-----	-----	-----	-----	-----	-----	-----	-----
1026	IP601	<0.01	0.02	0.31	0.21	0.96	0.82	1.39	<0.01	**3.79**
1039	IP601	0	0.021	0.309	0.198	0.973	0.742	1.212	**0.118**	2.971
1040		-----	-----	-----	-----	-----	-----	-----	-----	-----
1056		-----	-----	-----	-----	-----	-----	-----	-----	-----
1065		-----	0.011	0.2147	0.2017	0.6734	0.5832	0.996	-----	2.7201
1082		-----	0.0228	0.3047	0.1967	0.8926	0.7258	1.2426	0.0542	2.61
1089	D5134	0.0003	0.0223	0.2998	0.1963	0.8680	0.7398	1.2330	0.0721	2.5084
1099		-----	-----	-----	-----	-----	-----	-----	-----	-----
1109		-----	-----	-----	-----	-----	-----	-----	-----	-----
1140		-----	-----	0.2089	0.1592	0.7739	0.6881	1.1831	-----	2.918
1229		-----	-----	-----	-----	-----	-----	-----	-----	-----
1236		0.00035	0.023	0.291	0.190	0.826	0.703	1.160	0.069	2.864
1259		-----	-----	-----	-----	-----	-----	-----	-----	-----
1357	IP344	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1397		-----	-----	-----	-----	-----	-----	-----	-----	-----
1412		-----	-----	-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----	-----	-----
1613	IP344	-----	-----	-----	-----	-----	-----	-----	-----	-----
1635		-----	-----	-----	-----	-----	-----	-----	-----	-----
1695		-----	-----	-----	-----	-----	-----	-----	-----	-----
1714	In house	0.00	0.02	0.27	0.18	0.83	0.71	1.20	0.06	2.93
1724		-----	-----	-----	-----	-----	-----	-----	-----	-----
1728		-----	-----	-----	-----	-----	-----	-----	-----	-----
1749		-----	-----	-----	-----	-----	-----	-----	-----	-----
1759		-----	-----	-----	-----	-----	-----	-----	-----	-----
1776		-----	0.0211	0.3040	0.1959	0.9082	0.7242	1.2447	-----	-----
1796		-----	-----	-----	-----	-----	-----	-----	-----	-----
1810		-----	-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----	-----
1815		-----	-----	-----	-----	-----	-----	-----	-----	-----
1833		-----	-----	-----	-----	-----	-----	-----	-----	-----
1842		-----	-----	-----	-----	-----	-----	-----	-----	-----
1849		-----	-----	-----	-----	-----	-----	-----	-----	-----
1857		-----	-----	-----	-----	-----	-----	-----	-----	-----
1858		-----	-----	-----	-----	-----	-----	-----	-----	-----
1862		-----	-----	-----	-----	-----	-----	-----	-----	-----
1941		-----	-----	-----	-----	-----	-----	-----	-----	-----
1967		-----	-----	-----	-----	-----	-----	-----	-----	-----
1984		-----	-----	-----	-----	-----	-----	-----	-----	-----
1995		-----	-----	-----	-----	-----	-----	-----	-----	-----
6016		-----	-----	-----	-----	-----	-----	-----	-----	-----
6028		-----	-----	-----	-----	-----	-----	-----	-----	-----
6048		-----	-----	-----	-----	-----	-----	-----	-----	-----
6054		-----	-----	-----	-----	-----	-----	-----	-----	-----
6142		-----	-----	-----	-----	-----	-----	-----	-----	-----
6203		-----	-----	-----	-----	-----	-----	-----	-----	-----
6263		-----	-----	-----	-----	-----	-----	-----	-----	-----
6290		-----	-----	-----	-----	-----	-----	-----	-----	-----
6294		-----	-----	-----	-----	-----	-----	-----	-----	-----
6295		-----	-----	-----	-----	-----	-----	-----	-----	-----
6296		-----	-----	-----	-----	-----	-----	-----	-----	-----
6315		-----	-----	-----	-----	-----	-----	-----	-----	-----
6326		-----	-----	-----	-----	-----	-----	-----	-----	-----
6356		-----	-----	-----	-----	-----	-----	-----	-----	-----
6362		-----	-----	-----	-----	-----	-----	-----	-----	-----
9051		-----	-----	-----	-----	-----	-----	-----	-----	-----
9052		-----	-----	-----	-----	-----	-----	-----	-----	-----
9057		-----	-----	-----	-----	-----	-----	-----	-----	-----
9060		-----	-----	-----	-----	-----	-----	-----	-----	-----
9063		-----	-----	-----	-----	-----	-----	-----	-----	-----

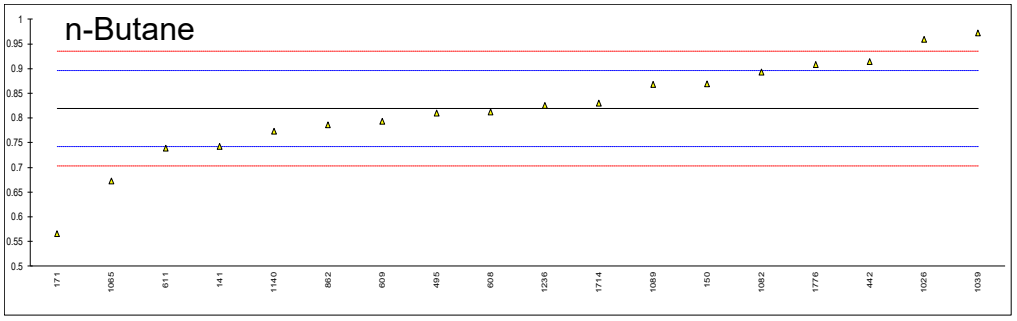
lab	method	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	cy-Pentane	Hexanes
9101		-----	-----	-----	-----	-----	-----	-----	-----	-----
9107		-----	-----	-----	-----	-----	-----	-----	-----	-----
9141		-----	-----	-----	-----	-----	-----	-----	-----	-----
9143		-----	-----	-----	-----	-----	-----	-----	-----	-----
9146		-----	-----	-----	-----	-----	-----	-----	-----	-----
	normality	n.a.	OK	OK	OK	suspect	OK	OK	OK	OK
	n	14	17	17	17	18	18	18	10	11
	outliers	0	0	1	1	0	0	0	1	4
	mean (n)	<0.01	0.0177	0.2672	0.1860	0.8190	0.6925	1.2023	0.0678	2.8064
	st.dev. (n)	n.a.	0.00630	0.03709	0.01598	0.10071	0.06197	0.09065	0.00790	0.17817
	R(calc.)	n.a.	0.0176	0.1038	0.0447	0.2820	0.1735	0.2538	0.0221	0.4989
	st.dev.(IP344:88)	n.a.	0.00246	0.01995	0.00983	0.03861	0.02226	0.04423	0.00380	0.16071
	R(IP344:88)	n.a.	0.0069	0.0558	0.0275	0.1081	0.0623	0.1238	0.0106	0.4500

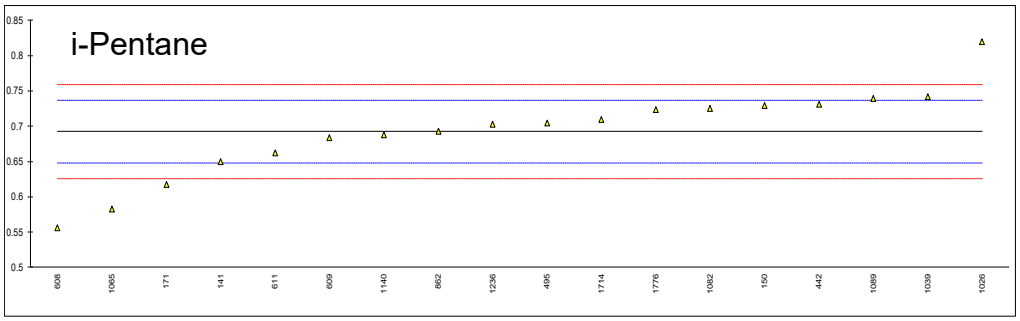
Test results in bold are identified as statistical outliers
Underlined test results are corrected by the participants after notification by iis of suspect test result
Lab 495 first reported <0.01 Ethane
Lab 608 first reported 0.0052 Ethane, 0.1416 Propane, 0.1145 i-Butane, 0.5860 n-Butane, 0.4957 i-Pentane, 1.0598 n-Pentane, 97.5971 Hexanes, total
Lab 609 first reported 0.007 Ethane, 0.168 Propane, 0.139 i-Butane, 0.655 n-Butane, 0.627 i-Pentane
Lab 1026 first reported 0.28 cyclo-Pentane
Lab 1236 first reported 0.009 cyclo-Pentane, 2.477 Hexanes, total

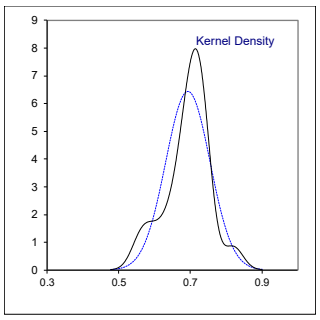


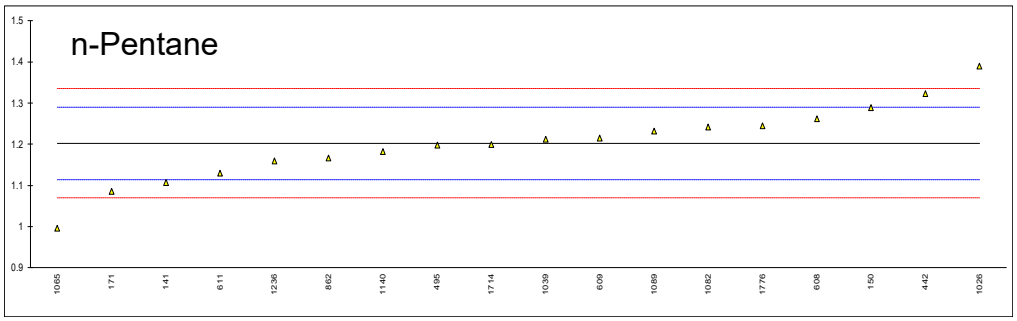


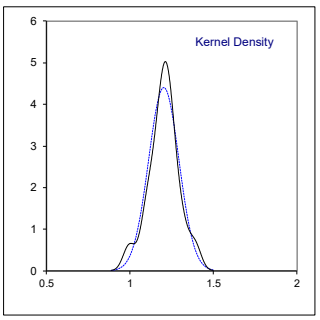


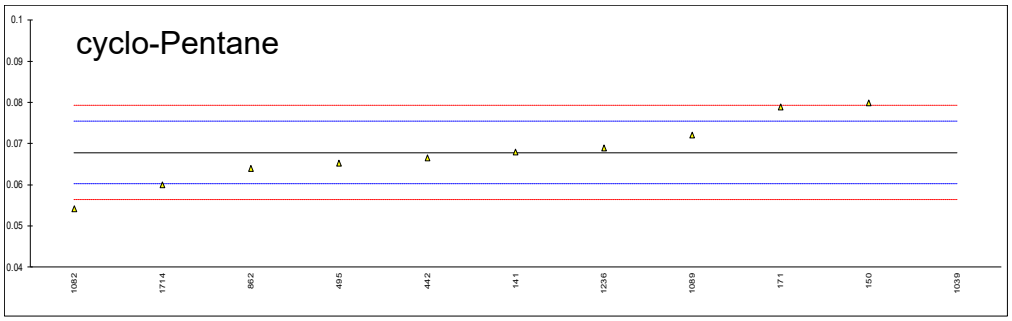


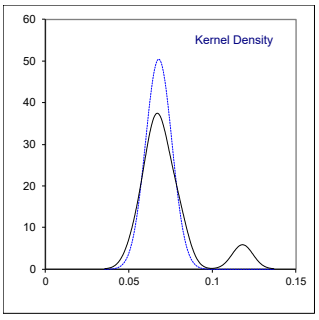

i-Pentane
608 1065 171 141 611 609 1140 862 1236 495 1714 1776 1082 150 442 1089 1039 1026

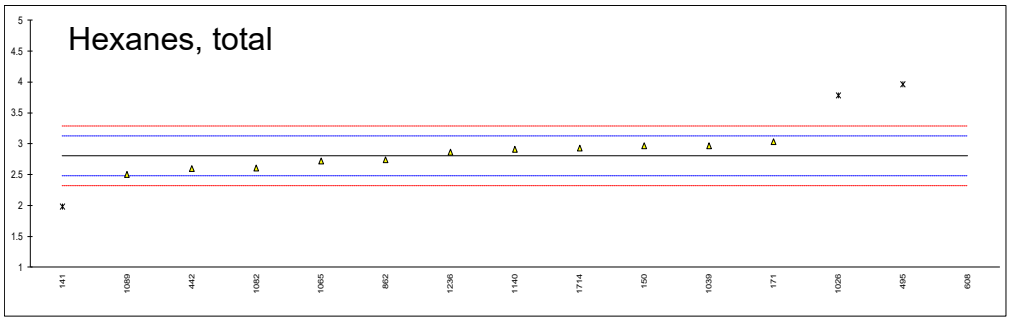

Kernel Density

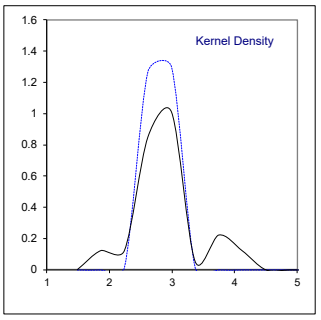

n-Pentane
1065 171 141 611 1236 862 1140 495 1714 1039 609 1089 1082 1776 608 150 442 1026


Kernel Density


cyclo-Pentane
1082 1714 862 495 442 141 1236 1089 171 150 1039


Kernel Density


Hexanes, total
141 1089 442 1062 1065 862 1236 1140 1714 150 1039 171 1026 495 608


Kernel Density

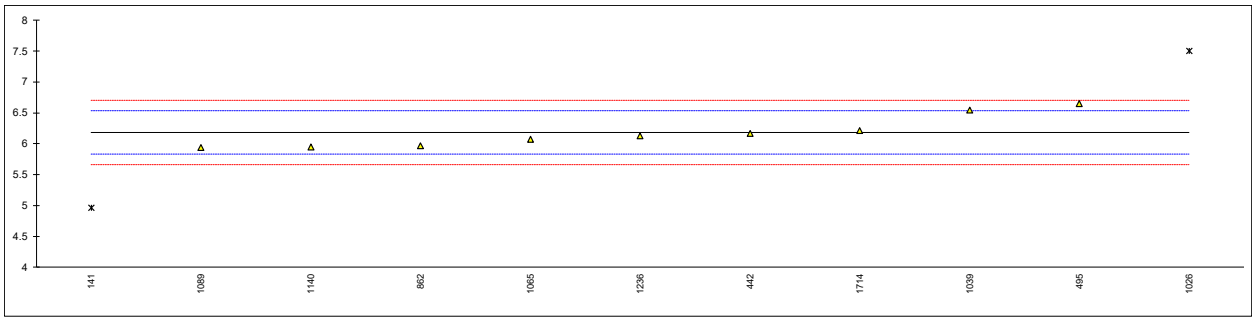
Determination of Total of all C1 – C6 on sample #20215; results in %M/M

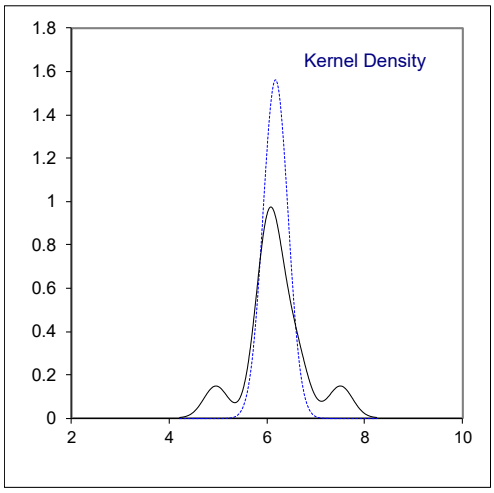
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	874		-----		-----
62		-----		-----	875		-----		-----
90		-----		-----	904		-----		-----
92		-----		-----	914		-----		-----
120		-----		-----	922		-----		-----
140		-----		-----	962		-----		-----
141	D7196/GPA2186	4.964	D(0.05)	-7.00	963		-----		-----
150		-----		-----	970		-----		-----
154		-----		-----	971		-----		-----
158		-----		-----	974		-----		-----
159		-----		-----	988		-----		-----
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994		-----		-----
171		-----		-----	995		-----		-----
175		-----		-----	997		-----		-----
186		-----		-----	1011		-----		-----
203		-----		-----	1016		-----		-----
225		-----		-----	1026	IP601	7.51	D(0.05)	7.63
237		-----		-----	1039	IP601	6.544		2.08
238		-----		-----	1040		-----		-----
273		-----		-----	1056		-----		-----
311		-----		-----	1065	IP344	6.0705	C	-0.65
314		-----		-----	1082		-----		-----
333		-----		-----	1089	D5134	5.9400		-1.39
334		-----		-----	1099		-----		-----
335		-----		-----	1109		-----		-----
336		-----		-----	1140	D7900	5.949		-1.34
391		-----		-----	1229		-----		-----
398		-----		-----	1236		6.127	C	-0.32
399		-----		-----	1259		-----		-----
442		6.1734		-0.05	1357	IP344	n.a.		-----
444		-----		-----	1397		-----		-----
445		-----		-----	1412		-----		-----
446		-----		-----	1556		-----		-----
447		-----		-----	1613		-----		-----
485		-----		-----	1635		-----		-----
495		6.6489		2.68	1695		-----		-----
511		-----		-----	1714	In house	6.22		0.21
525		-----		-----	1724		-----		-----
529		-----		-----	1728		-----		-----
541		-----		-----	1749		-----		-----
542		-----		-----	1759		-----		-----
551		-----		-----	1776		-----		-----
553		-----		-----	1796		-----		-----
557		-----		-----	1810		-----		-----
562		-----		-----	1811		-----		-----
575		-----		-----	1815		-----		-----
593		-----		-----	1833		-----		-----
596		-----		-----	1842		-----		-----
597		-----		-----	1849		-----		-----
598		-----		-----	1857		-----		-----
599		-----		-----	1858		-----		-----
600		-----		-----	1862		-----		-----
603		-----		-----	1941		-----		-----
608		-----		-----	1967		-----		-----
609		-----		-----	1984		-----		-----
610		-----		-----	1995		-----		-----
611		-----		-----	6016		-----		-----
612		-----		-----	6028		-----		-----
621		-----		-----	6048		-----		-----
657		-----		-----	6054		-----		-----
663		-----		-----	6142		-----		-----
704		-----		-----	6203		-----		-----
732		-----		-----	6263		-----		-----
739		-----		-----	6290		-----		-----
749		-----		-----	6294		-----		-----
750		-----		-----	6295		-----		-----
752		-----		-----	6296		-----		-----
753		-----		-----	6315		-----		-----
781		-----		-----	6326		-----		-----
785		-----		-----	6356		-----		-----
840		-----		-----	6362		-----		-----
862	IP344	5.972		-1.21	9051		-----		-----
873		-----		-----	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-----		-----	9107		-----		-----
9060		-----		-----	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101		-----		-----	9146		-----		-----

normality	suspect
n	9
outliers	2
mean (n)	6.1828
st.dev. (n)	0.25568
R(calc.)	0.7159
st.dev.(IP344:88)	0.17403
R(IP344:88)	0.4873

Lab 1065 first reported 2.68
Lab 1236 first reported 5.676





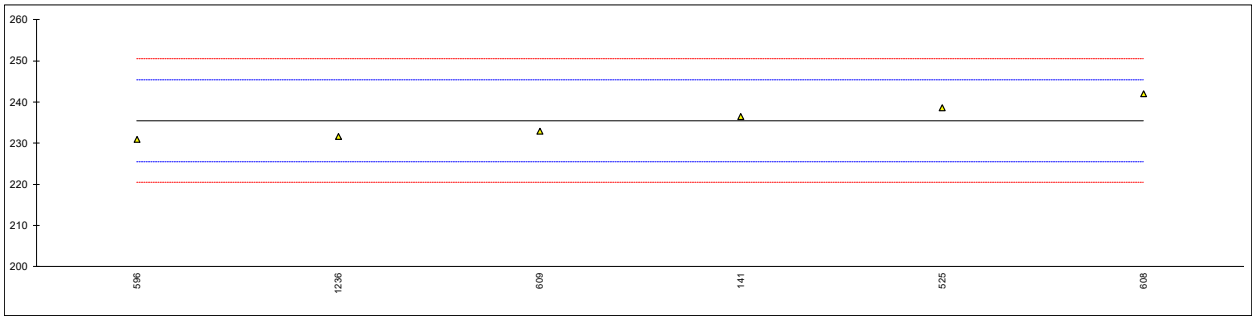
Determination of Average Molecular Mass on sample #20215; results in g/mol

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	874		-----		-----
62		-----		-----	875		-----		-----
90		-----		-----	904		-----		-----
92		-----		-----	914		-----		-----
120		-----		-----	922		-----		-----
140		-----		-----	962		-----		-----
141	INH-2001	236.5		0.21	963		-----		-----
150		-----		-----	970		-----		-----
154		-----		-----	971		-----		-----
158		-----		-----	974		-----		-----
159		-----		-----	988		-----		-----
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994		-----		-----
171		-----		-----	995		-----		-----
175		-----		-----	997		-----		-----
186		-----		-----	1011		-----		-----
203		-----		-----	1016		-----		-----
225		-----		-----	1026		-----		-----
237		-----		-----	1039		-----		-----
238		-----		-----	1040		-----		-----
273		-----		-----	1056		-----		-----
311		-----		-----	1065		-----		-----
314		-----		-----	1082		-----		-----
333		-----		-----	1089		-----		-----
334		-----		-----	1099		-----		-----
335		-----		-----	1109		-----		-----
336		-----		-----	1140		-----		-----
391		-----		-----	1229		-----		-----
398		-----		-----	1236	In house	231.69		-0.76
399		-----		-----	1259		-----		-----
442		-----		-----	1357	D2503	n.a.		-----
444		-----		-----	1397		-----		-----
445		-----		-----	1412		-----		-----
446		-----		-----	1556		-----		-----
447		-----		-----	1613		-----		-----
485		-----		-----	1635		-----		-----
495		-----		-----	1695		-----		-----
511		-----		-----	1714		-----		-----
525	INH-2001	238.6	C	0.63	1724		-----		-----
529		-----		-----	1728		-----		-----
541		-----		-----	1749		-----		-----
542		-----		-----	1759		-----		-----
551		-----		-----	1776		-----		-----
553		-----		-----	1796		-----		-----
557		-----		-----	1810		-----		-----
562		-----		-----	1811		-----		-----
575		-----		-----	1815		-----		-----
593		-----		-----	1833		-----		-----
596	INH-2001	231		-0.89	1842		-----		-----
597		-----		-----	1849		-----		-----
598		-----		-----	1857		-----		-----
599		-----		-----	1858		-----		-----
600		-----		-----	1862		-----		-----
603		-----		-----	1941		-----		-----
608	INH-2001	242		1.31	1967		-----		-----
609	In house	233		-0.49	1984		-----		-----
610		-----		-----	1995		-----		-----
611		-----		-----	6016		-----		-----
612		-----		-----	6028		-----		-----
621		-----		-----	6048		-----		-----
657		-----		-----	6054		-----		-----
663		-----		-----	6142		-----		-----
704		-----		-----	6203		-----		-----
732		-----		-----	6263		-----		-----
739		-----		-----	6290		-----		-----
749		-----		-----	6294		-----		-----
750		-----		-----	6295		-----		-----
752		-----		-----	6296		-----		-----
753		-----		-----	6315		-----		-----
781		-----		-----	6326		-----		-----
785		-----		-----	6356		-----		-----
840		-----		-----	6362		-----		-----
862		-----		-----	9051		-----		-----
873		-----		-----	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-----		-----	9107		-----		-----
9060		-----		-----	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101		-----		-----	9146		-----		-----

normality	unknown
n	6
outliers	0
mean (n)	235.47
st.dev. (n)	4.333
R(calc.)	12.13
st.dev.(D2503:92)	5
R(D2503:92)	14

Lab 525 first reported 639.638

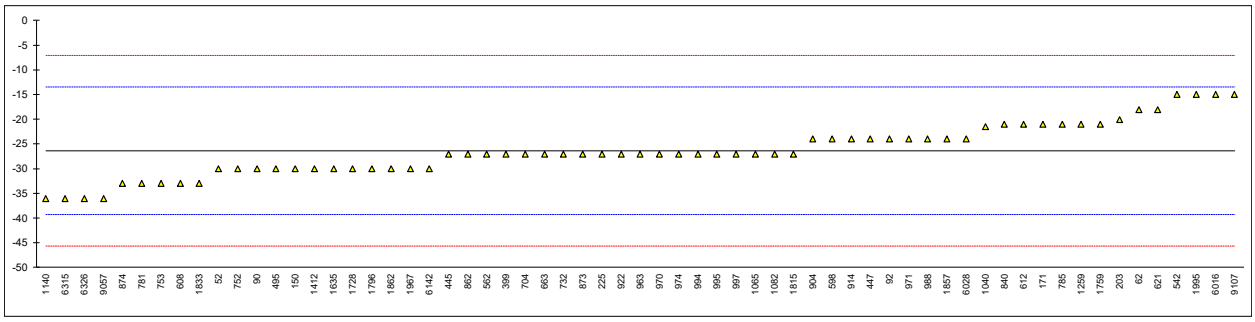


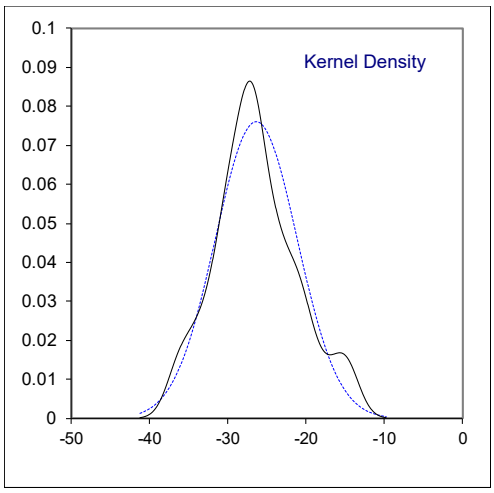
Determination of Pour Point Maximum on sample #20215; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5853-A	-30		-0.56	874	D5853-A	-33		-1.03
62	D97	-18		1.30	875		-----		-----
90	D5853-A	-30		-0.56	904	D5853-A	-24		0.37
92	D5853-A	-24		0.37	914	D5853-A	-24		0.37
120		-----		-----	922	D97	-27		-0.10
140		-----		-----	962		-----		-----
141		-----		-----	963	D5853-A	-27		-0.10
150	D97	-30		-0.56	970	D5853-A	-27		-0.10
154	D97	<-24		-----	971	D5853-A	-24		0.37
158		-----		-----	974	D5853-A	-27		-0.10
159		-----		-----	988	D5853-A	-24		0.37
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994	D5853-A	-27		-0.10
171	D97	-21		0.84	995	D5853-A	-27		-0.10
175		-----		-----	997	D5853-A	-27		-0.10
186		-----		-----	1011		-----		-----
203	D5853-A	-20		0.99	1016		-----		-----
225	D5853-A	-27		-0.10	1026		-----		-----
237		-----		-----	1039	D5853-A	<-36		-----
238		-----		-----	1040	D5853-A	-21.5		0.76
273		-----		-----	1056		-----		-----
311		-----		-----	1065	D5950	-27.0		-0.10
314		-----		-----	1082	D5950	-27		-0.10
333		-----		-----	1089		-----		-----
334		-----		-----	1099		-----		-----
335		-----		-----	1109		-----		-----
336		-----		-----	1140	D5950	-36.0		-1.50
391		-----		-----	1229		-----		-----
398		-----		-----	1236		-----		-----
399	D5853-A	-27		-0.10	1259	D5853-A	-21		0.84
442		-----		-----	1357	D5853-A	n.a.		-----
444		-----		-----	1397		-----		-----
445	D5853-A	-27		-0.10	1412	D5853-A	-30		-0.56
446		-----		-----	1556		-----		-----
447	D5853-A	-24		0.37	1613	D5853-A	<-24		-----
485		-----		-----	1635	D5853-A	-30		-0.56
495	D5853-A	-30.0		-0.56	1695		-----		-----
511		-----		-----	1714	D5853-A	<-36		-----
525		-----		-----	1724		-----		-----
529		-----		-----	1728	D5853-A	-30		-0.56
541		-----		-----	1749		-----		-----
542	D97	-15		1.77	1759	D5853-A	-21		0.84
551		-----		-----	1776		-----		-----
553		-----		-----	1796	D5853-A	-30		-0.56
557		-----		-----	1810		-----		-----
562	D97	-27		-0.10	1811		-----		-----
575		-----		-----	1815	D5853-A	-27		-0.10
593		-----		-----	1833	D5853-A	-33		-1.03
596		-----		-----	1842		-----		-----
597		-----		-----	1849		-----		-----
598	D5853-A	-24		0.37	1857	D5853-A	-24		0.37
599		-----		-----	1858		-----		-----
600	D5853-A	<-36		-----	1862	D5853-A	-30		-0.56
603		-----		-----	1941		-----		-----
608	D5853-A	-33		-1.03	1967	D5853-A	-30		-0.56
609		-----		-----	1984		-----		-----
610		-----		-----	1995		-15		1.77
611		-----		-----	6016	D5853-A	-15		1.77
612	D5853-A	-21.0		0.84	6028	D97	-24		0.37
621	D5853-A	-18.0		1.30	6048		-----		-----
657	D5853-A	<-36		-----	6054		-----		-----
663	D5853-A	-27		-0.10	6142	D5853-A	-30		-0.56
704	D5853-A	-27		-0.10	6203		-----		-----
732	D5853-A	-27		-0.10	6263		-----		-----
739		-----		-----	6290		-----		-----
749		-----		-----	6294		-----		-----
750		-----		-----	6295		-----		-----
752	D5853-A	-30		-0.56	6296		-----		-----
753	D5853-A	-33		-1.03	6315	D5853-A	-36		-1.50
781	D5853-A	-33		-1.03	6326		-36		-1.50
785	D97	-21		0.84	6356		-----		-----
840	D5853-A	-21		0.84	6362		-----		-----
862	D5853-A	-27		-0.10	9051		-----		-----
873	D5853-A	-27		-0.10	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-36		-1.50	9107	D5853-A	-15		1.77
9060		-----		-----	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101		-----		-----	9146		-----		-----

normality	OK
n	63
outliers	0
mean (n)	-26.37
st.dev. (n)	5.239
R(calc.)	14.67
st.dev.(D5853-A:17a)	6.429
R(D5853-A:17a)	18.0





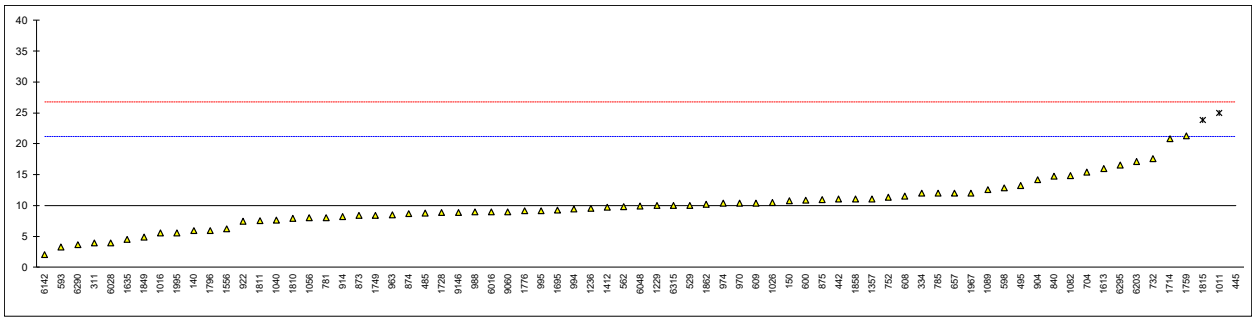
Determination of Salt as Chloride on sample #20215; results in mg/kg

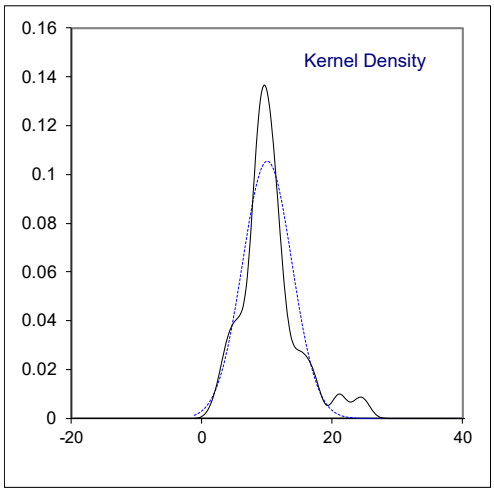
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	874	D3230	8.7		-0.24
62		-----		-----	875	D3230	11.0		0.17
90		-----		-----	904	D3230	14.2		0.75
92		-----		-----	914	D3230	8.2		-0.33
120		-----		-----	922	D3230	7.5		-0.45
140	D3230	6		-0.72	962		-----		-----
141		-----		-----	963	D3230	8.5		-0.27
150	D3230	10.8		0.14	970	D3230	10.45		0.08
154		-----		-----	971		-----		-----
158		-----		-----	974	D3230	10.45		0.08
159		-----		-----	988	D3230	9.0		-0.18
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994	D3230	9.5		-0.09
171	D3230	<1.0		-----	995	D3230	9.21		-0.15
175		-----		-----	997		-----		-----
186		-----		-----	1011	D3230	25	R(0.05)	2.68
203		-----		-----	1016	D3230	5.6		-0.79
225		-----		-----	1026	D3230	10.5	C	0.08
237		-----		-----	1039		-----		-----
238		-----		-----	1040	D3230	7.7		-0.42
273		-----		-----	1056	D3230	8.02		-0.36
311	D3230	4		-1.08	1065		-----		-----
314		-----		-----	1082	D3230	14.88		0.87
333		-----		-----	1089	D3230	12.59		0.46
334	D3230	12		0.35	1099		-----		-----
335		-----		-----	1109		-----		-----
336		-----		-----	1140		-----		-----
391		-----		-----	1229	D3230	10		0.00
398		-----		-----	1236	D3230	9.535		-0.09
399		-----		-----	1259		-----		-----
442	IP265	11.1		0.19	1357	D3230	11.11		0.19
444		-----		-----	1397		-----		-----
445	IP265	74	ex	11.44	1412	D3230	9.8		-0.04
446		-----		-----	1556	D3230	6.22		-0.68
447		-----		-----	1613	D3230	15.976		1.06
485	D3230	8.82		-0.22	1635	D3230	4.575		-0.97
495	D3230	13.31		0.59	1695	D3230	9.27		-0.13
511		-----		-----	1714	D6470	20.84		1.93
525		-----		-----	1724		-----		-----
529	D3230	10.034		0.00	1728		8.9		-0.20
541		-----		-----	1749	D3230	8.47		-0.28
542		-----		-----	1759	In house	21.2766		2.01
551		-----		-----	1776	D3230	9.2		-0.15
553		-----		-----	1796	D3230	6		-0.72
557		-----		-----	1810	D3230	8.0		-0.36
562	D3230	9.81		-0.04	1811	D3230	7.58		-0.44
575		-----		-----	1815	D3230	23.84	R(0.05)	2.47
593	D3230	3.322		-1.20	1833		-----		-----
596		-----		-----	1842		-----		-----
597		-----		-----	1849	D3230	4.94		-0.91
598	D3230	12.9		0.51	1857		-----		-----
599		-----		-----	1858	D3230	11.1		0.19
600	D3230	10.9		0.16	1862	D3230	10.2		0.03
603		-----		-----	1941		-----		-----
608	D3230	11.5889		0.28	1967	D3230	12		0.35
609	D3230	10.45		0.08	1984		-----		-----
610		-----		-----	1995	D3230	5.6		-0.79
611		-----		-----	6016	D3230	9.0		-0.18
612		-----		-----	6028	D3230	4.0		-1.08
621		-----		-----	6048	D3230	9.99		-0.01
657	D3230	12		0.35	6054		-----		-----
663		-----		-----	6142	D3230	2.1		-1.42
704	D3230	15.4		0.96	6203	D3230	17.17		1.28
732	GOST21534(A)	17.58		1.35	6263		-----		-----
739		-----		-----	6290	D3230	3.696		-1.13
749		-----		-----	6294		-----		-----
750		-----		-----	6295	D3230	16.6		1.18
752	D3230	11.4		0.25	6296		-----		-----
753		-----		-----	6315	DIN51418-2	10		0.00
781	D3230	8.1		-0.34	6326		-----		-----
785		12		0.35	6356		-----		-----
840	D6470	14.8		0.85	6362		-----		-----
862		-----		-----	9051		-----		-----
873	D3230	8.4		-0.29	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-----		-----	9107		-----		-----
9060	D3230	9		-0.18	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101		-----		-----	9146	In house	8.9		-0.20

normality	suspect
n	70
outliers	2 +1ex
mean (n)	10.025
st.dev. (n)	3.7858
R(calc.)	10.600
st.dev.(D3230:19)	5.5944
R(D3230:19)	15.664

Lab 445 test result excluded, reported in a different unit: mg/L
Lab 1026 first reported 10448 mg/kg





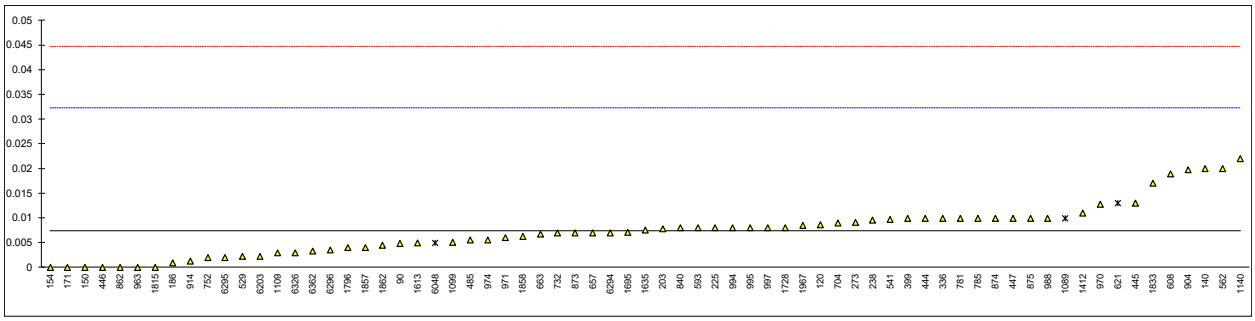
Determination of Sediment (Extraction method) on sample #20215; results in %V/V

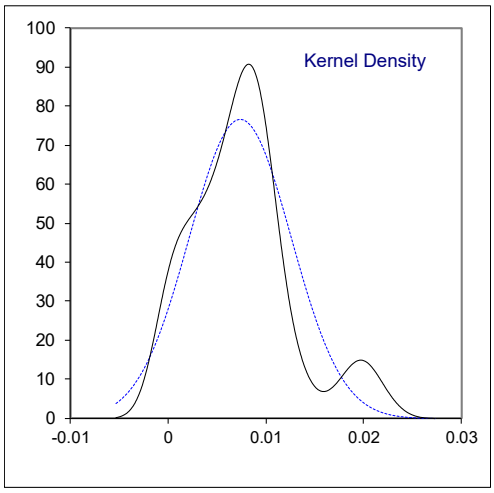
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D473	<0.01		-----	874	D473	0.01		0.21
62		-----		-----	875	D473	0.01		0.21
90	D473	0.0048		-0.21	904	D473	0.0198		1.00
92		-----		-----	914	D473	0.0013		-0.49
120	D473	0.0087		0.11	922	D473	<0.01		-----
140	D473	0.02		1.01	962		-----		-----
141		-----		-----	963	D473	0.0		-0.59
150	D473	0		-0.59	970	D473	0.01284		0.44
154	D473	0		-0.59	971	D473	0.006		-0.11
158		-----		-----	974	D473	0.0056		-0.14
159		-----		-----	988	D473	0.01		0.21
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994	D473	0.008		0.05
171	D473	0		-0.59	995	D473	0.008		0.05
175		-----		-----	997	D473	0.008		0.05
186	D473	0.001		-0.51	1011		-----		-----
203	D473	0.0078		0.03	1016		-----		-----
225	D473	0.008		0.05	1026		-----		-----
237		-----		-----	1039		-----		-----
238	D473	0.0096		0.18	1040		-----		-----
273	D473	0.0091		0.14	1056		-----		-----
311	D473	<0.01		-----	1065		-----		-----
314		-----		-----	1082		-----		-----
333	D473	<0.01		-----	1089	D473	0.01	ex	0.21
334		-----		-----	1099	D473	0.0051		-0.18
335	D473	< 0.01		-----	1109	D473	0.003		-0.35
336	D473	0.01		0.21	1140	D473	0.022		1.17
391		-----		-----	1229		-----		-----
398		-----		-----	1236		-----		-----
399	D473	0.01		0.21	1259		-----		-----
442		-----		-----	1357	D473	n.a.		-----
444	D473	0.01	C	0.21	1397		-----		-----
445	D473	0.013		0.45	1412	D473	0.011		0.29
446	D473	0		-0.59	1556		-----		-----
447	D473	0.01		0.21	1613	D473	0.005		-0.19
485	D473	0.0056		-0.14	1635	D473	0.0076		0.02
495		-----		-----	1695	D473	0.00711		-0.02
511		-----		-----	1714		-----		-----
525		-----		-----	1724		-----		-----
529	D473	0.0022		-0.42	1728	D473	0.008		0.05
541	D473	0.0097		0.19	1749		-----		-----
542		-----		-----	1759		-----		-----
551		-----		-----	1776		-----		-----
553		-----		-----	1796	D473	0.004		-0.27
557		-----		-----	1810		-----		-----
562	D473	0.02		1.01	1811		-----		-----
575		-----		-----	1815	ISO3735	0		-0.59
593	D473	0.008		0.05	1833	D473	0.017		0.77
596		-----		-----	1842		-----		-----
597		-----		-----	1849		-----		-----
598		-----		-----	1857	D473	0.004		-0.27
599		-----		-----	1858	D473	0.0063		-0.09
600		-----		-----	1862	D473	0.0045		-0.23
603	D473	< 0.01		-----	1941		-----		-----
608	D473	0.0189		0.92	1967	D473	0.0085		0.09
609		-----		-----	1984		-----		-----
610		-----		-----	1995		-----		-----
611		-----		-----	6016		-----		-----
612		-----		-----	6028		-----		-----
621	D473	0.013	ex	0.45	6048	ISO3735	0.005	ex	-0.19
657	D473	0.007		-0.03	6054		-----		-----
663	D473	0.0068		-0.05	6142		-----		-----
704	D473	0.009		0.13	6203	D473	0.0022		-0.42
732	D473	0.007		-0.03	6263		-----		-----
739		-----		-----	6290		-----		-----
749		-----		-----	6294	D473	0.007		-0.03
750		-----		-----	6295	D473	0.0020		-0.43
752	D473	0.002		-0.43	6296	D473	0.0036		-0.30
753		-----		-----	6315		-----		-----
781	D473	0.01		0.21	6326	D473	0.003		-0.35
785		0.01		0.21	6356		-----		-----
840	D473	0.008		0.05	6362	D473	0.0033		-0.33
862	D473	0.000		-0.59	9051		-----		-----
873	D473	0.007		-0.03	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-----		-----	9107		-----		-----
9060		-----		-----	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101		-----		-----	9146		-----		-----

normality	OK
n	66
outliers	0 +3ex
mean (n)	0.00738
st.dev. (n)	0.005216
R(calc.)	0.01461
st.dev.(D473:07e1)	0.012458
R(D473:07e1)	0.03488

Lab 444 first reported 0.15
Lab 621, 1089 and 6048 test result excluded, reported in a different unit: %M/M





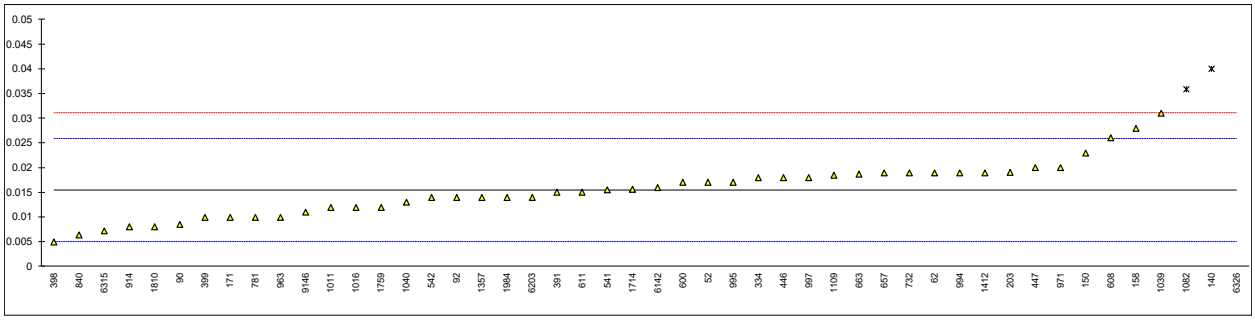
Determination of Sediment (Membrane filtration) on sample #20215; results in %M/M

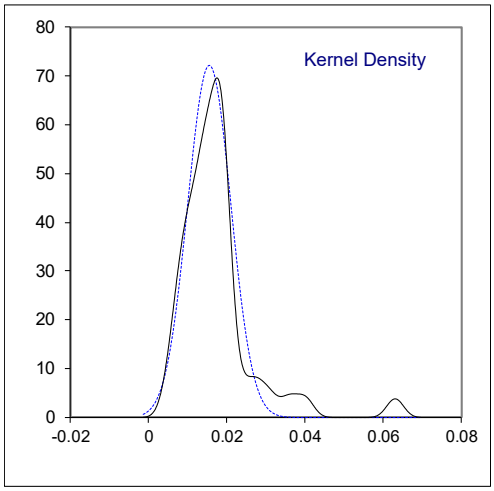
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4807	0.017		0.30	874		-----		-----
62	D4807	0.019		0.68	875		-----		-----
90	D4807	0.0085		-1.33	904		-----		-----
92	D4807	0.014		-0.27	914	D4807	0.008		-1.42
120		-----		-----	922		-----		-----
140		0.04	R(0.05)	4.71	962		-----		-----
141		-----		-----	963	D4807	0.01		-1.04
150	D4807	0.023		1.45	970		-----		-----
154		-----		-----	971	D4807	0.020		0.88
158	D4807	0.028	C	2.41	974		-----		-----
159		-----		-----	988		-----		-----
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994	D4807	0.019		0.68
171	D4807	0.010		-1.04	995	D4807	0.017		0.30
175		-----		-----	997	D4807	0.018		0.49
186		-----		-----	1011	D4807	0.012		-0.66
203	D4807	0.0191		0.70	1016	D4807	0.012		-0.66
225		-----		-----	1026		-----		-----
237		-----		-----	1039	D4807	0.031		2.98
238		-----		-----	1040	D4807	0.013		-0.47
273		-----		-----	1056		-----		-----
311		-----		-----	1065		-----		-----
314		-----		-----	1082	D4807	0.03582811	R(0.05)	3.91
333		-----		-----	1089		-----		-----
334	D4807	0.018		0.49	1099		-----		-----
335		-----		-----	1109	D4807	0.0185		0.59
336		-----		-----	1140		-----		-----
391	D4807	0.015		-0.08	1229		-----		-----
398	D4807	0.005		-2.00	1236		-----		-----
399	D4807	0.01		-1.04	1259		-----		-----
442		-----		-----	1357	D4807	0.014		-0.27
444		-----		-----	1397		-----		-----
445		-----		-----	1412	D4807	0.019		0.68
446	D4807	0.018		0.49	1556		-----		-----
447	D4807	0.020		0.88	1613	D4807	--		-----
485		-----		-----	1635		-----		-----
495		-----		-----	1695		-----		-----
511		-----		-----	1714	D4807	0.0156		0.03
525		-----		-----	1724		-----		-----
529		-----		-----	1728		-----		-----
541	D4807	0.0155		0.01	1749		-----		-----
542	D4807	0.01399		-0.28	1759	D4807	0.012		-0.66
551		-----		-----	1776		-----		-----
553		-----		-----	1796		-----		-----
557		-----		-----	1810	D4807	0.008		-1.42
562		-----		-----	1811		-----		-----
575		-----		-----	1815		-----		-----
593		-----		-----	1833		-----		-----
596		-----		-----	1842		-----		-----
597		-----		-----	1849		-----		-----
598		-----		-----	1857		-----		-----
599		-----		-----	1858		-----		-----
600	D4807	0.017		0.30	1862		-----		-----
603		-----		-----	1941		-----		-----
608	D4807	0.026	C	2.03	1967		-----		-----
609		-----		-----	1984	D4807	0.014		-0.27
610		-----		-----	1995		-----		-----
611	D4807	0.015		-0.08	6016		-----		-----
612		-----		-----	6028		-----		-----
621		-----		-----	6048		-----		-----
657	D4807	0.019	C	0.68	6054		-----		-----
663	D4807	0.0187		0.63	6142	D4807	0.015989		0.11
704		-----		-----	6203	D4807	0.014		-0.27
732	D4807	0.019		0.68	6263		-----		-----
739		-----		-----	6290		-----		-----
749		-----		-----	6294		-----		-----
750		-----		-----	6295		-----		-----
752		-----		-----	6296		-----		-----
753		-----		-----	6315	D4807	0.0072		-1.58
781	D4807	0.010		-1.04	6326	D4807	0.063	C,R(0.01)	9.12
785		-----		-----	6356		-----		-----
840	D4807	0.0064		-1.73	6362		-----		-----
862		-----		-----	9051		-----		-----
873		-----		-----	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-----		-----	9107		-----		-----
9060		-----		-----	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101		-----		-----	9146	D4807	0.011		-0.85

normality	OK
n	45
outliers	3
mean (n)	0.01543
st.dev. (n)	0.005523
R(calc.)	0.01546
st.dev.(D4807:05)	0.005218
R(D4807:05)	0.01461

Lab 158 first reported 0.033
Lab 608 first reported 0.04
Lab 657 first reported 0.044
Lab 6326 first reported 0.096





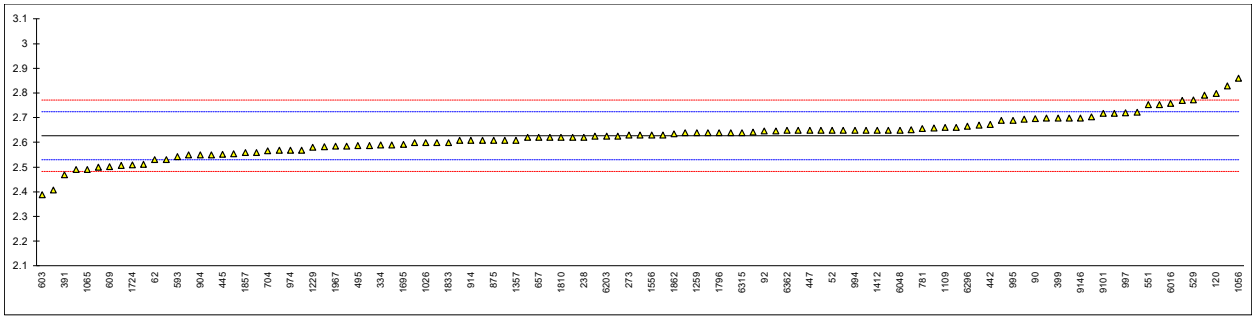
Determination of Total Sulfur on sample #20215; results in %M/M

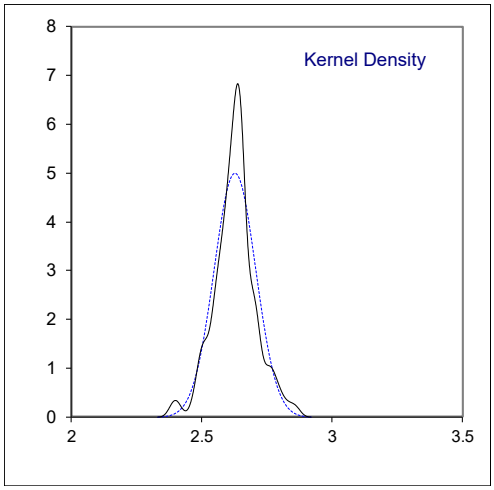
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4294	2.65		0.47	874	D4294	2.56		-1.39
62	D4294	2.53		-2.01	875	D4294	2.61		-0.36
90	D4294	2.698		1.46	904	D4294	2.55		-1.60
92	D4294	2.6479		0.43	914	D4294	2.61		-0.36
120	D4294	2.79948		3.56	922	D4294	2.65		0.47
140		2.61		-0.36	962		-----		-----
141		-----		-----	963	D4294	2.59		-0.77
150	D4294	2.70		1.51	970	D4294	2.60		-0.56
154	D4294	2.69		1.30	971	D4294	2.62		-0.15
158	D4294	2.55		-1.60	974	D4294	2.57		-1.18
159	D4294	2.49		-2.84	988	D4294	2.65		0.47
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994	D4294	2.65		0.47
171	D4294	2.63		0.06	995	D4294	2.69		1.30
175	D4294	2.662		0.72	997	D4294	2.72		1.92
186		-----		-----	1011	D4294	2.61	C	-0.36
203	D4294	2.511		-2.40	1016	D2622	2.648		0.43
225	D4294	2.64		0.27	1026	D2622	2.6		-0.56
237		-----		-----	1039	ISO14596	2.53		-2.01
238	D4294	2.622		-0.11	1040	ISO8754	2.555		-1.49
273	D4294	2.63		0.06	1056	D4294	2.86		4.81
311	ISO8754	2.61		-0.36	1065	D4294	2.49		-2.84
314		-----		-----	1082	ISO8754	2.627		0.00
333		-----		-----	1089	D4294	2.65		0.47
334	ISO8754	2.59		-0.77	1099	D4294	2.507		-2.48
335		-----		-----	1109	D2622	2.661		0.70
336		-----		-----	1140	IP336	2.62		-0.15
391	D4294	2.47		-3.25	1229	ISO8754	2.58		-0.98
398		-----		-----	1236		-----		-----
399	D4294	2.70		1.51	1259	D4294	2.64		0.27
442	IP336	2.674		0.97	1357	D4294	2.61		-0.36
444	D2622	2.643	C	0.33	1397		-----		-----
445	D4294	2.553		-1.53	1412	D4294	2.65		0.47
446		-----		-----	1556	ISO8754	2.63		0.06
447	IP336	2.65		0.47	1613	D4294	2.64		0.27
485	D4294	2.583		-0.91	1635	D4294	2.653		0.53
495	ISO8754	2.588		-0.81	1695	D4294	2.593		-0.71
511		-----		-----	1714	D2622	2.70		1.51
525		-----		-----	1724	D4294	2.51		-2.42
529	D4294	2.7727		3.01	1728	D4294	2.63		0.06
541		-----		-----	1749	D4294	2.570		-1.18
542		-----		-----	1759		-----		-----
551	D4294	2.753		2.60	1776	ISO8754	2.626		-0.02
553		-----		-----	1796	D4294	2.64		0.27
557		-----		-----	1810	D4294	2.62		-0.15
562		-----		-----	1811	D4294	2.600		-0.56
575	D4294	2.7534		2.61	1815	D7039	2.7185		1.89
593	D4294	2.5432		-1.74	1833	IP336	2.60		-0.56
596		-----		-----	1842		-----		-----
597		-----		-----	1849		-----		-----
598	D4294	2.829	C	4.17	1857	D4294	2.559		-1.41
599		-----		-----	1858	D4294	2.64		0.27
600		-----		-----	1862	D4294	2.635		0.16
603	D4294	2.39		-4.90	1941	ISO8754	2.55		-1.60
608	D4294	2.7919		3.41	1967	D4294	2.586		-0.85
609	D4294	2.503		-2.57	1984		-----		-----
610		-----		-----	1995	D4294	2.65		0.47
611		-----		-----	6016	D4294	2.75904		2.73
612		-----		-----	6028	ISO8754	2.77		2.95
621	D4294	2.501		-2.61	6048	D4294	2.65		0.47
657	D4294	2.62		-0.15	6054		-----		-----
663		-----		-----	6142	ISO8754	2.62	C	-0.15
704	D4294	2.566		-1.26	6203	D2622	2.6260		-0.02
732	D4294	2.703		1.57	6263		-----		-----
739		-----		-----	6290		-----		-----
749		-----		-----	6294	D4294	2.586		-0.85
750		-----		-----	6295	GOST R51947	2.6587		0.65
752	D4294	2.67		0.89	6296	GOST R51947	2.6672		0.83
753	D4294	2.589		-0.79	6315	D2622	2.64		0.27
781	D4294	2.656		0.60	6326	D4294	2.4072	C	-4.55
785		2.65		0.47	6356		-----		-----
840	D4294	2.7229		1.98	6362	D4294	2.64915		0.45
862	D2622	2.694		1.38	9051		-----		-----
873	D4294	2.57		-1.18	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		-----		-----	9107		-----		-----
9060		-----		-----	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101	D4294	2.71729		1.86	9146	In house	2.7		1.51

normality	suspect
n	107
outliers	0
mean (n)	2.6272
st.dev. (n)	0.07987
R(calc.)	0.2236
st.dev.(D4294:16e1)	0.04837
R(D4294:16e1)	0.1354

Lab 444 first reported 3.095
Lab 598 first reported 2.29
Lab 1011 first reported 2.39
Lab 6142 first reported 26205
Lab 6326 first reported 0.71





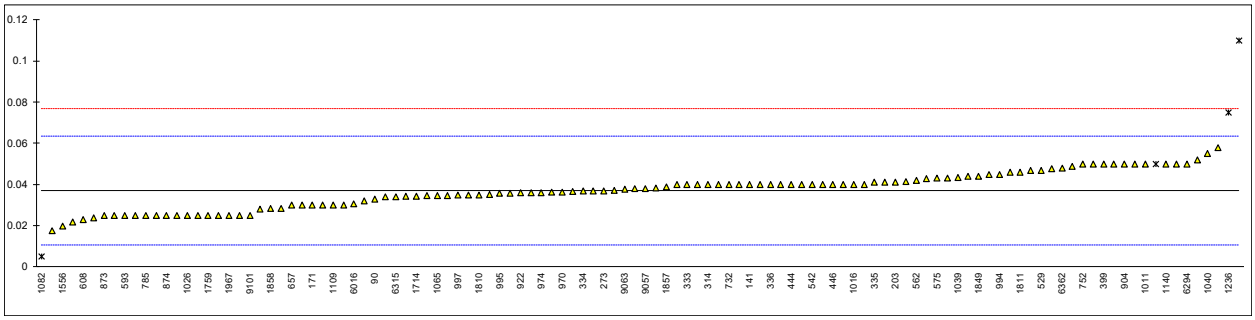
Determination of Water on sample #20215; results in %V/V

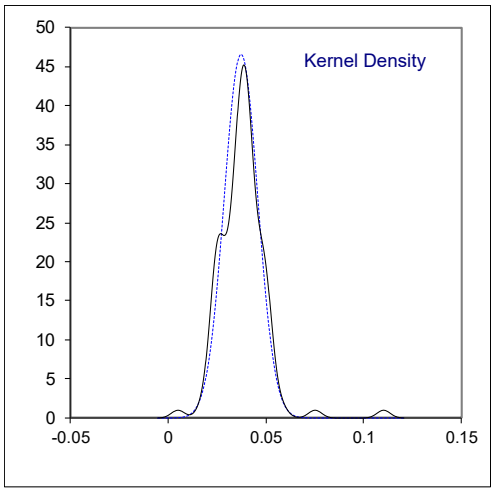
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4928	0.04		0.21	874	D4006	0.025		-0.92
62	D4928	0.04		0.21	875		-----		-----
90	D4928	0.033		-0.32	904	D4928	0.05		0.97
92	E203	0.050		0.97	914		-----		-----
120		-----		-----	922	D4928	0.036		-0.09
140	D4928	0.04		0.21	962		-----		-----
141	D4928	0.04		0.21	963	D4377	0.025		-0.92
150	D4928	0.040		0.21	970	D4928	0.0365		-0.05
154	D4928	0.04		0.21	971	D4928	0.038		0.06
158	D4928	0.04		0.21	974	D4928	0.0362		-0.08
159		-----		-----	988	D4006	0.025		-0.92
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994	D4928	0.045		0.59
171	D4377	0.03		-0.54	995	D4928	0.0358		-0.11
175		-----		-----	997	D4928	0.0349		-0.17
186	D4928	0.05		0.97	1011	D6304	0.05		0.97
203	D4928	0.0413		0.31	1016	D4377	0.04		0.21
225	D4006	0.025		-0.92	1026	D4006	0.025		-0.92
237		-----		-----	1039	D4928	0.0436		0.48
238	D4006	0.030		-0.54	1040	D4377	0.055		1.35
273	D4928	0.037		-0.01	1056	D4928	0.0415		0.33
311	D4928	0.04		0.21	1065	D6304	0.03472		-0.19
314	D4928	0.04		0.21	1082	ISO10336	0.005	R(0.05)	-2.43
333	D4377	0.04		0.21	1089	D4928	0.05	ex	0.97
334	D4377	0.0369		-0.02	1099	D4006	0.032		-0.39
335	D4377	0.0412		0.30	1109	D4377	0.03		-0.54
336	D4377	0.04		0.21	1140	IP358	0.050		0.97
391	D4377	0.05		0.97	1229	D6304	0.044		0.51
398	D4928	0.052		1.12	1236	D4928	0.075	R(0.01)	2.86
399	D4006	0.05		0.97	1259	D4006	<0.05		-----
442	IP386	0.03998		0.21	1357	D4928	0.022		-1.15
444	D4928	0.04		0.21	1397		-----		-----
445	D4377	0.046		0.67	1412	D4928	0.036		-0.09
446	D4928	0.04		0.21	1556	D6304	0.02	C	-1.30
447	IP386	0.034		-0.24	1613	D4006	<0.05		-----
485	D4928	0.0344		-0.21	1635		-----		-----
495	D6304	0.035		-0.17	1695	D4006	0.025		-0.92
511		-----		-----	1714	D6304	0.0345		-0.20
525	D6304	0.047724		0.80	1724	D4377	0.04884		0.88
529	D4928	0.047		0.74	1728	D4006	0.03		-0.54
541	D4928	0.037		-0.01	1749	ISO12937	0.0358		-0.11
542	D4928	0.04		0.21	1759	D4006	0.025		-0.92
551		-----		-----	1776	D6304	0.0428		0.42
553		-----		-----	1796		-----		-----
557		-----		-----	1810	D4377	0.035		-0.17
562	D4377	0.042		0.36	1811	D4377	0.046		0.67
575	D4377	0.0432		0.45	1815	D4377	0.0412		0.30
593	D4006	0.025		-0.92	1833	D4377	0.0348		-0.18
596		-----		-----	1842		-----		-----
597		-----		-----	1849	D4928	0.044		0.51
598	D4377	0.024		-1.00	1857	D4377	0.0389		0.13
599		-----		-----	1858	D4006	0.0284		-0.66
600	D4928	0.0352		-0.15	1862	D4377	0.0433		0.46
603		-----		-----	1941	ISO9029	0.025		-0.92
608	D4928	0.023		-1.07	1967	D4006	0.025		-0.92
609	D4377	0.03		-0.54	1984	D4377	0.110	R(0.01)	5.50
610	D4377	<0.02		-----	1995	D6304	0.04		0.21
611	D4377	0.02810		-0.69	6016	ISO10337	0.03077		-0.49
612		-----		-----	6028	D95	0.05	C	0.97
621	D4006	0.04		0.21	6048		-----		-----
657	D4377	0.03		-0.54	6054		-----		-----
663	D4377	0.0372		0.00	6142	IP386	0.058		1.57
704	D4377	0.047		0.74	6203	ISO9029	0.025		-0.92
732	D4377	0.040		0.21	6263		-----		-----
739		-----		-----	6290	D6304	0.0176		-1.48
749		-----		-----	6294	D4006	0.05		0.97
750		-----		-----	6295		-----		-----
752	D4377	0.050		0.97	6296		-----		-----
753	D4006	0.025		-0.92	6315	DIN51777C	0.034		-0.24
781	D4928	0.045		0.59	6326		-----		-----
785	D4006	0.025		-0.92	6356		-----		-----
840	D4928	0.0368		-0.03	6362	D4377	0.048		0.82
862	D4006	<0.025		-----	9051	In house	0.0347		-0.19
873	D4006	0.025		-0.92	9052	In house	0.0385		0.10

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		0.038		0.06	9107	D6304	0.0364		-0.06
9060	D4928	0.0284		-0.66	9141		-----		-----
9063	In house	0.0379		0.05	9143		-----		-----
9101	D4006	0.025		-0.92	9146	In house	<0.1		-----

normality	OK
n	112
outliers	3 +1ex
mean (n)	0.03720
st.dev. (n)	0.008573
R(calc.)	0.02400
st.dev.(D4377:00)	0.013233
R(D4377:00)	0.03705

Lab 1089 test result excluded, reported in a different unit: %M/M
Lab 1556 first reported 0.08
Lab 6028 first reported 0





Determination of Simulated Distillation on sample #20215; results in °C

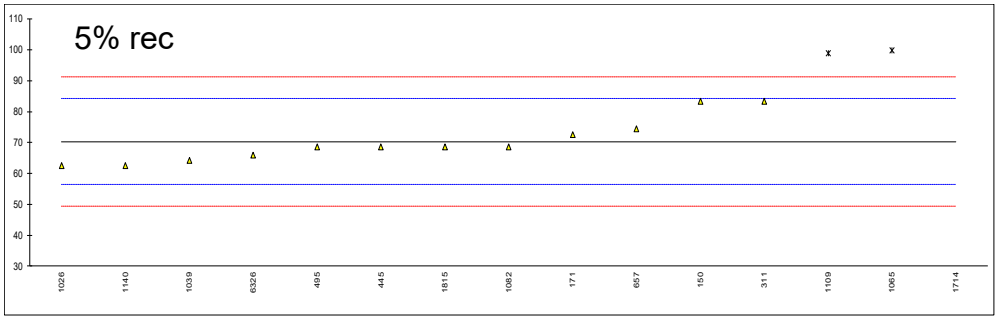
lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP	tot rec.
52		-----	-----	-----	-----	-----	-----	-----	-----	-----
62		-----	-----	-----	-----	-----	-----	-----	-----	-----
90		-----	-----	-----	-----	-----	-----	-----	-----	-----
92		-----	-----	-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----	-----
141		-----	-----	-----	-----	-----	-----	-----	-----	-----
150	D7169	<36.0	83.4	126.4	260.0	387.0	529.6	>720.0	>720.0	89.5
154		-----	-----	-----	-----	-----	-----	-----	-----	-----
158		-----	-----	-----	-----	-----	-----	-----	-----	-----
159		-----	-----	-----	-----	-----	-----	-----	-----	-----
167		-----	-----	-----	-----	-----	-----	-----	-----	-----
168		-----	-----	-----	-----	-----	-----	-----	-----	-----
170		-----	-----	-----	-----	-----	-----	-----	-----	-----
171	D7169	32.9	72.6	117.4	257.8	390.4	543.5	-----	-----	87.00
175		-----	-----	-----	-----	-----	-----	-----	-----	-----
186		-----	-----	-----	-----	-----	-----	-----	-----	-----
203		-----	-----	-----	-----	-----	-----	-----	-----	-----
225		-----	-----	-----	-----	-----	-----	-----	-----	-----
237		-----	-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----	-----
311	D7169	<36.0	83.5	124.0	258.5	385.0	526.0	>720	>720	92.1
314		-----	-----	-----	-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	-----	-----	-----
334		-----	-----	-----	-----	-----	-----	-----	-----	-----
335		-----	-----	-----	-----	-----	-----	-----	-----	-----
336		-----	-----	-----	-----	-----	-----	-----	-----	-----
391		-----	-----	-----	-----	-----	-----	-----	-----	-----
398		-----	-----	-----	-----	-----	-----	-----	-----	-----
399		-----	-----	-----	-----	-----	-----	-----	-----	-----
442		-----	-----	-----	-----	-----	-----	-----	-----	-----
444		-----	-----	-----	-----	-----	-----	-----	-----	-----
445	D7169	-0.5	68.7	115.6	244.3	361.5	486.8	631.1	733.1	92.5
446		-----	-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----	-----
485		-----	-----	-----	-----	-----	-----	-----	-----	-----
495	D7169	-0.5	68.7	110.6	256.2	373.8	499.3	650.0	747.7	97.55
511		-----	-----	-----	-----	-----	-----	-----	-----	-----
525		-----	-----	-----	-----	-----	-----	-----	-----	-----
529		-----	-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----	-----
542		-----	-----	-----	-----	-----	-----	-----	-----	-----
551		-----	-----	-----	-----	-----	-----	-----	-----	-----
553		-----	-----	-----	-----	-----	-----	-----	-----	-----
557		-----	-----	-----	-----	-----	-----	-----	-----	-----
562		-----	-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----	-----
593		-----	-----	-----	-----	-----	-----	-----	-----	-----
596		-----	-----	-----	-----	-----	-----	-----	-----	-----
597		-----	-----	-----	-----	-----	-----	-----	-----	-----
598		-----	-----	-----	-----	-----	-----	-----	-----	-----
599		-----	-----	-----	-----	-----	-----	-----	-----	-----
600		-----	-----	-----	-----	-----	-----	-----	-----	-----
603		-----	-----	-----	-----	-----	-----	-----	-----	-----
608		-----	-----	-----	-----	-----	-----	-----	-----	-----
609		-----	-----	-----	-----	-----	-----	-----	-----	-----
610		-----	-----	-----	-----	-----	-----	-----	-----	-----
611		-----	-----	-----	-----	-----	-----	-----	-----	-----
612		-----	-----	-----	-----	-----	-----	-----	-----	-----
621		-----	-----	-----	-----	-----	-----	-----	-----	-----
657	D7169	<-36	74.5	114.5	247.0	370.0	505.5	701.0	713.0	91.6
663		-----	-----	-----	-----	-----	-----	-----	-----	-----
704		-----	-----	-----	-----	-----	-----	-----	-----	-----
732		-----	-----	-----	-----	-----	-----	-----	-----	-----
739		-----	-----	-----	-----	-----	-----	-----	-----	-----
749		-----	-----	-----	-----	-----	-----	-----	-----	-----
750		-----	-----	-----	-----	-----	-----	-----	-----	-----
752		-----	-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----	-----
781		-----	-----	-----	-----	-----	-----	-----	-----	-----
785		-----	-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----	-----
862		-----	-----	-----	-----	-----	-----	-----	-----	-----
873		-----	-----	-----	-----	-----	-----	-----	-----	-----

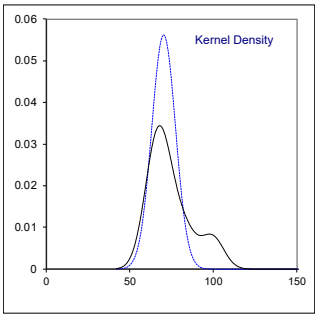
lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP	tot rec.
874		-----	-----	-----	-----	-----	-----	-----	-----	-----
875		-----	-----	-----	-----	-----	-----	-----	-----	-----
904		-----	-----	-----	-----	-----	-----	-----	-----	-----
914		-----	-----	-----	-----	-----	-----	-----	-----	-----
922		-----	-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----	-----	-----	-----
970		-----	-----	-----	-----	-----	-----	-----	-----	-----
971		-----	-----	-----	-----	-----	-----	-----	-----	-----
974		-----	-----	-----	-----	-----	-----	-----	-----	-----
988		-----	-----	-----	-----	-----	-----	-----	-----	-----
991		-----	-----	-----	-----	-----	-----	-----	-----	-----
992		-----	-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----	-----
995		-----	-----	-----	-----	-----	-----	-----	-----	-----
997		-----	-----	-----	-----	-----	-----	-----	-----	-----
1011		-----	-----	-----	-----	-----	-----	-----	-----	-----
1016		-----	-----	-----	-----	-----	-----	-----	-----	-----
1026	D7169	-18.5	62.50	97.00	**212**	345	473	670.00	706.50	100
1039	EN15119-1	-15.9	64.3	110.3	251.8	378.0	518.1	710.6	-----	92.9
1040		-----	-----	-----	-----	-----	-----	-----	-----	-----
1056		-----	-----	-----	-----	-----	-----	-----	-----	-----
1065		-----	**100.0**	138.2	257.8	371.2	491.4	643.0	739.8	100.0
1082	EN15199-3	-11.7000	68.7100	117.6500	261.8176	388.9977	532.2237	720.1766	>736	-----
1089		-----	-----	-----	-----	-----	-----	-----	-----	-----
1099		-----	-----	-----	-----	-----	-----	-----	-----	-----
1109	D7169	<36.0	**99.0**	126.6	244.0	356.4	478.8	633.4	739.4	100.0
1140		-----	62.6	128.0	263.8	398.4	546.0	-----	-----	89.7
1229		-----	-----	-----	-----	-----	-----	-----	-----	-----
1236		-----	-----	-----	-----	-----	-----	-----	-----	-----
1259		-----	-----	-----	-----	-----	-----	-----	-----	-----
1357		-----	-----	-----	-----	-----	-----	-----	-----	-----
1397		-----	-----	-----	-----	-----	-----	-----	-----	-----
1412		-----	-----	-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----	-----	-----
1613		-----	-----	-----	-----	-----	-----	-----	-----	-----
1635		-----	-----	-----	-----	-----	-----	-----	-----	-----
1695		-----	-----	-----	-----	-----	-----	-----	-----	-----
1714	D7169	205 ex	**212**	**235**	**284**	357 ex	458 ex	609 ex	**647**	85 ex
1724		-----	-----	-----	-----	-----	-----	-----	-----	-----
1728		-----	-----	-----	-----	-----	-----	-----	-----	-----
1749		-----	-----	-----	-----	-----	-----	-----	-----	-----
1759		-----	-----	-----	-----	-----	-----	-----	-----	-----
1776		-----	-----	-----	-----	-----	-----	-----	-----	-----
1796		-----	-----	-----	-----	-----	-----	-----	-----	-----
1810		-----	-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----	-----
1815	D7169	-0.5	68.7	117.6	254.0	381.8	522.3	710.9	>720.0	90.7
1833		-----	-----	-----	-----	-----	-----	-----	-----	-----
1842		-----	-----	-----	-----	-----	-----	-----	-----	-----
1849		-----	-----	-----	-----	-----	-----	-----	-----	-----
1857		-----	-----	-----	-----	-----	-----	-----	-----	-----
1858		-----	-----	-----	-----	-----	-----	-----	-----	-----
1862		-----	-----	-----	-----	-----	-----	-----	-----	-----
1941		-----	-----	-----	-----	-----	-----	-----	-----	-----
1967		-----	-----	-----	-----	-----	-----	-----	-----	-----
1984		-----	-----	-----	-----	-----	-----	-----	-----	-----
1995		-----	-----	-----	-----	-----	-----	-----	-----	-----
6016		-----	-----	-----	-----	-----	-----	-----	-----	-----
6028		-----	-----	-----	-----	-----	-----	-----	-----	-----
6048		-----	-----	-----	-----	-----	-----	-----	-----	-----
6054		-----	-----	-----	-----	-----	-----	-----	-----	-----
6142		-----	-----	-----	-----	-----	-----	-----	-----	-----
6203		-----	-----	-----	-----	-----	-----	-----	-----	-----
6263		-----	-----	-----	-----	-----	-----	-----	-----	-----
6290		-----	-----	-----	-----	-----	-----	-----	-----	-----
6294		-----	-----	-----	-----	-----	-----	-----	-----	-----
6295		-----	-----	-----	-----	-----	-----	-----	-----	-----
6296		-----	-----	-----	-----	-----	-----	-----	-----	-----
6315		-----	-----	-----	-----	-----	-----	-----	-----	-----
6326	D7169	-9.0	66.0	114.0	250.0	374.5	509.0	678.0	>720.0	93.5
6356		-----	-----	-----	-----	-----	-----	-----	-----	-----
6362		-----	-----	-----	-----	-----	-----	-----	-----	-----
9051		-----	-----	-----	-----	-----	-----	-----	-----	-----
9052		-----	-----	-----	-----	-----	-----	-----	-----	-----
9057		-----	-----	-----	-----	-----	-----	-----	-----	-----
9060		-----	-----	-----	-----	-----	-----	-----	-----	-----
9063		-----	-----	-----	-----	-----	-----	-----	-----	-----

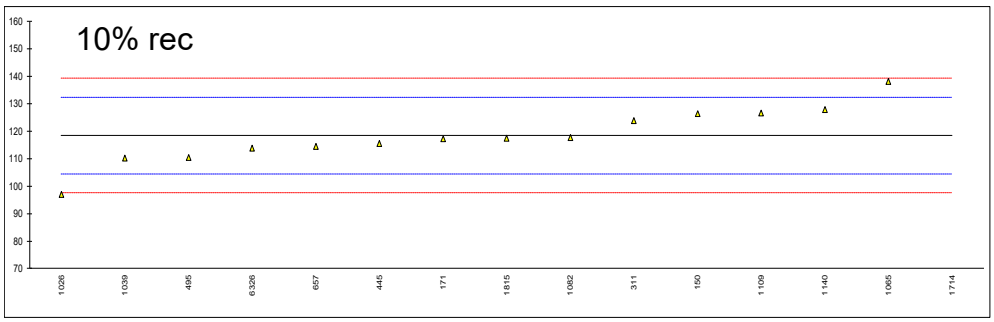
lab	method	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP	tot rec.
9101		-----	-----	-----	-----	-----	-----	-----	-----	-----
9107		-----	-----	-----	-----	-----	-----	-----	-----	-----
9141		-----	-----	-----	-----	-----	-----	-----	-----	-----
9143		-----	-----	-----	-----	-----	-----	-----	-----	-----
9146		-----	-----	-----	-----	-----	-----	-----	-----	-----
	normality	not OK	suspect	suspect	OK	OK	OK	OK	n.a.	
	n	12	12	14	13	14	14	10	11	
	outliers	0 +1ex	3	1	2	0 +1ex	0 +1ex	0 +1ex	1	
	mean (n)	<36	70.35	118.42	254.39	375.86	511.54	674.82	>700	
	st.dev. (n)	n.e.	7.094	9.907	6.514	14.515	23.367	34.341	n.a.	
	R(calc.)	n.e.	19.86	27.74	18.24	40.64	65.43	96.15	n.a.	
	st.dev.(D7169:20e1)	n.e.	7	6.964	4.679	5.857	7.571	n.a.	n.a.	
	R(D7169:20e1)	n.e.	19.6	19.5	13.1	16.4	21.2	n.a.	n.a	

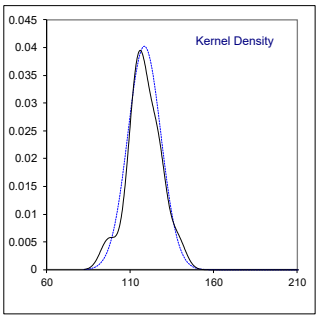
Test results in bold are statistical outliers

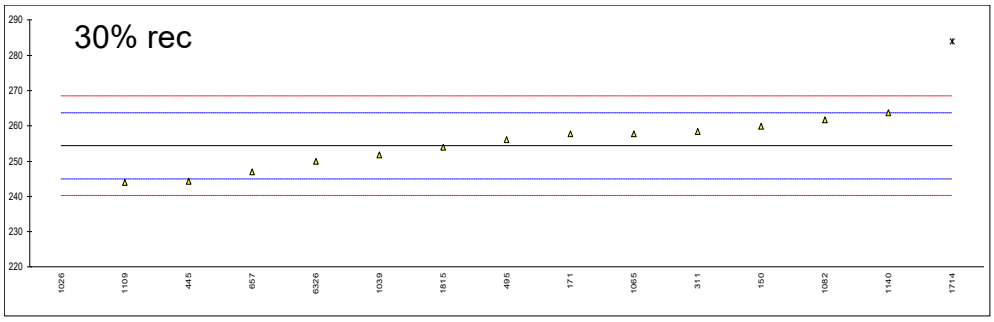
Lab 1714 test results excluded for IBP, 50%, 70% and 90% recovered and Total recovery due to statistical outliers in other related distillation parameters

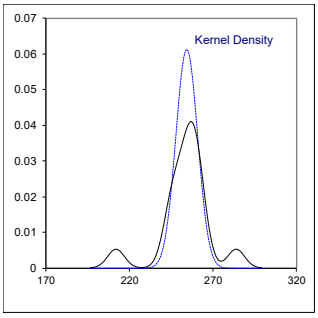


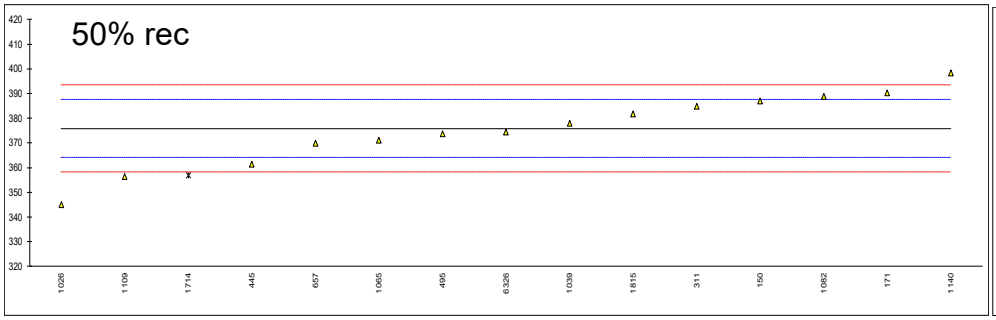


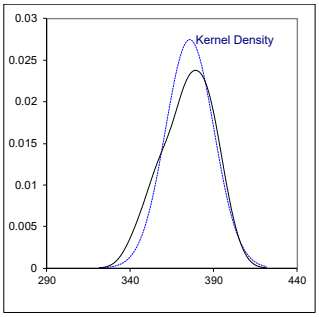


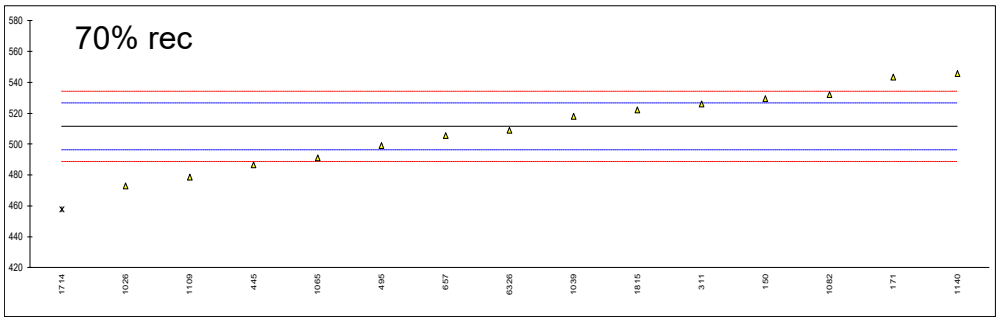


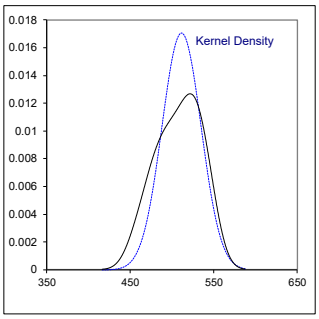


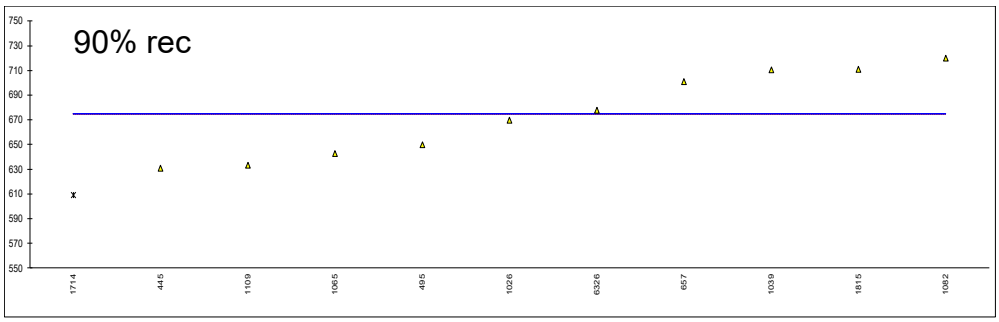


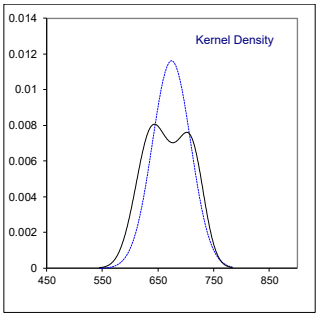


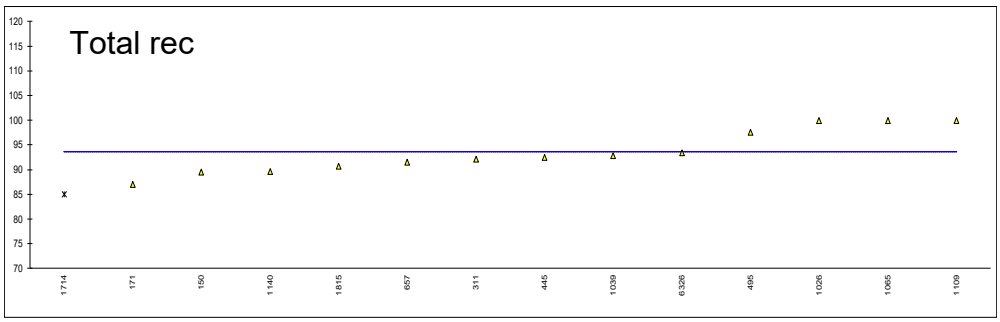


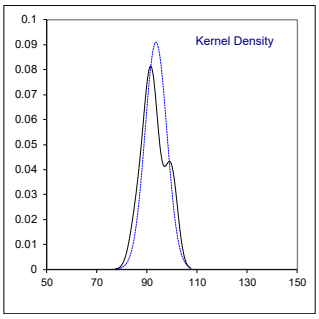

70% rec
580
560
540
520
500
480
460
440
420
1714
1026
1109
445
1065
495
657
6326
1039
1815
311
150
1082
171
1140


Kernel Density
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
350
450
550
650


90% rec
750
730
710
690
670
650
630
610
590
570
550
1714
445
1109
1065
495
1026
6326
657
1039
1815
1082


Kernel Density
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
450
550
650
750
850


Total rec
120
115
110
105
100
95
90
85
80
75
70
1714
171
150
1140
1815
657
311
445
1039
6326
495
1026
1065
1109


Kernel Density
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
50
70
90
110
130
150

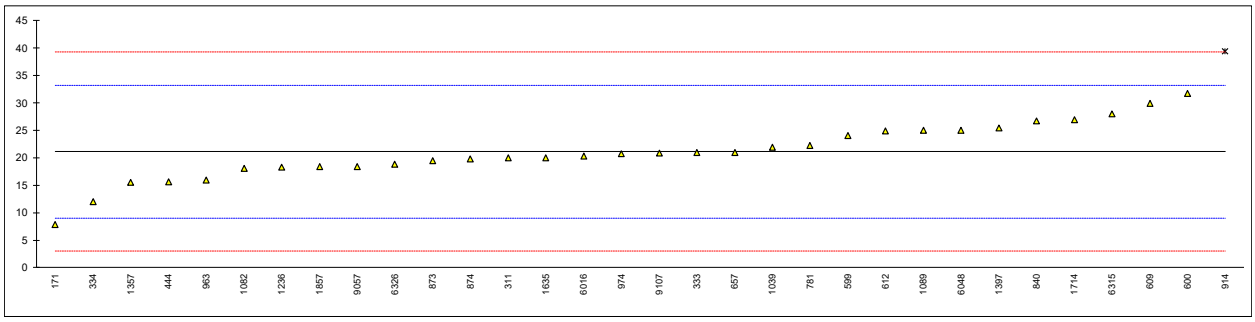
Determination of Total Mercury on sample #20216 results in µg/kg

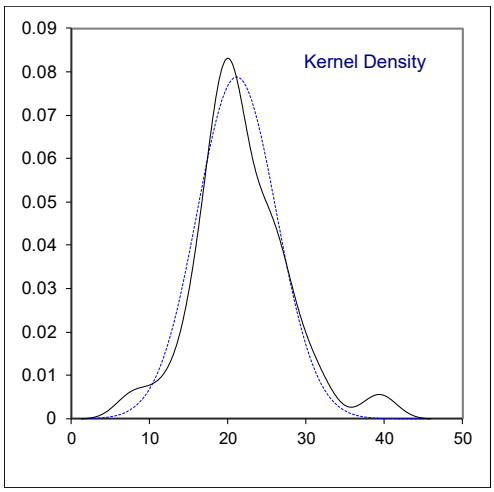
lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	874	UOP938	19.8		-0.22
62		-----		-----	875		-----		-----
90		-----		-----	904		-----		-----
92		-----		-----	914	UOP938	39.4	R(0.05)	3.02
120		-----		-----	922		-----		-----
140		-----		-----	962		-----		-----
141		-----		-----	963	UOP938	15.98		-0.85
150		-----		-----	970		-----		-----
154		-----		-----	971		-----		-----
158		-----		-----	974	UOP938	20.745		-0.06
159		-----		-----	988		-----		-----
167		-----		-----	991		-----		-----
168		-----		-----	992		-----		-----
170		-----		-----	994		-----		-----
171	UOP938	7.87		-2.20	995		-----		-----
175		-----		-----	997		-----		-----
186		-----		-----	1011		-----		-----
203		-----		-----	1016		-----		-----
225		-----		-----	1026		-----		-----
237		-----		-----	1039	UOP938	22		0.14
238		-----		-----	1040		-----		-----
273		-----		-----	1056		-----		-----
311	D7623	20		-0.19	1065		-----		-----
314		-----		-----	1082	In house	18.1		-0.50
333	EPA	21		-0.02	1089	In house	25		0.64
334	In house	12		-1.51	1099		-----		-----
335		-----		-----	1109		-----		-----
336		-----		-----	1140		-----		-----
391		-----		-----	1229		-----		-----
398		-----		-----	1236	In house	18.37		-0.46
399		-----		-----	1259		-----		-----
442		-----		-----	1357	UOP938	15.6		-0.92
444	UOP938	15.6999		-0.90	1397	In house	25.5		0.72
445		-----		-----	1412		-----		-----
446		-----		-----	1556		-----		-----
447		-----		-----	1613		--		-----
485		-----		-----	1635	In house	20.06		-0.18
495		-----		-----	1695		-----		-----
511		-----		-----	1714	In house	27		0.97
525		-----		-----	1724		-----		-----
529		-----		-----	1728		-----		-----
541		-----		-----	1749		-----		-----
542		-----		-----	1759		-----		-----
551		-----		-----	1776		-----		-----
553		-----		-----	1796		-----		-----
557		-----		-----	1810		-----		-----
562		-----		-----	1811		-----		-----
575		-----		-----	1815		-----		-----
593		-----		-----	1833		-----		-----
596		-----		-----	1842		-----		-----
597		-----		-----	1849		-----		-----
598		-----		-----	1857	UOP938	18.42		-0.45
599	D7622	24.1		0.49	1858		-----		-----
600	D7622	31.79		1.76	1862		-----		-----
603		-----		-----	1941		-----		-----
608		-----		-----	1967		-----		-----
609	D7622	29.9		1.45	1984		-----		-----
610		-----		-----	1995		-----		-----
611		-----		-----	6016	D7622	20.340		-0.13
612	UOP938	24.99		0.64	6028		-----		-----
621		-----		-----	6048	D7623	25		0.64
657	UOP938	21		-0.02	6054		-----		-----
663		-----		-----	6142		-----		-----
704		-----		-----	6203		-----		-----
732		-----		-----	6263		-----		-----
739		-----		-----	6290		-----		-----
749		-----		-----	6294		-----		-----
750		-----		-----	6295		-----		-----
752		-----		-----	6296		-----		-----
753		-----		-----	6315	In house	28		1.14
781	D7622	22.3		0.19	6326	UOP938	18.9		-0.37
785		-----		-----	6356		-----		-----
840	EPA7471B	26.8		0.94	6362		-----		-----
862		-----		-----	9051		-----		-----
873	UOP938	19.5		-0.27	9052		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
9057		18.48	C	-0.44	9107	UOP938	20.9		-0.04
9060		-----		-----	9141		-----		-----
9063		-----		-----	9143		-----		-----
9101		-----		-----	9146		-----		-----

normality	OK
n	31
outliers	1
mean (n)	21.134
st.dev. (n)	5.0625
R(calc.)	14.175
st.dev.(Horwitz)	6.0424
R(Horwitz)	16.919

Lab 9057 first reported 186.24





APPENDIX 2

z-scores of the determination of individual Light ends on sample #20215

lab	Methane	Ethane	Propane	i-Butane	n-Butane	i-Pentane	n-Pentane	Cy-Pentane	Hexanes
141	-----	-0.68	-1.82	-2.03	-1.97	-1.91	-2.16	0.05	-5.12
150	-----	-3.12	-1.36	-0.61	1.32	1.68	1.98	3.20	1.02
171	-----	-6.37	-8.83	-8.14	-6.55	-3.35	-2.63	2.94	1.41
442	-----	2.12	2.33	1.23	2.48	1.74	2.76	-0.32	-1.29
495	-----	-3.12	-0.87	-1.05	-0.21	0.55	-0.08	-0.66	7.19
608	-----	3.74	0.55	2.12	-0.17	-6.10	1.35	-----	585.20
609	-----	-0.28	-1.01	-1.42	-0.65	-0.38	0.29	-----	-----
611	-----	-0.44	-2.61	-2.31	-2.06	-1.37	-1.62	-----	-----
862	-----	0.13	-0.56	-1.42	-0.83	0.02	-0.80	-1.00	-0.37
1026	-----	0.94	2.14	2.44	3.65	5.73	4.24	<-15.20	6.12
1039	-----	1.35	2.09	1.22	3.99	2.22	0.22	13.20	1.02
1065	-----	-2.71	-2.63	1.60	-3.77	-4.91	-4.67	-----	-0.54
1082	-----	2.08	1.88	1.09	1.91	1.49	0.91	-3.58	-1.22
1089	-----	1.87	1.63	1.05	1.27	2.12	0.69	1.13	-1.85
1140	-----	-----	-2.92	-2.72	-1.17	-0.20	-0.43	-----	0.69
1236	-----	2.16	1.19	0.41	0.18	0.47	-0.96	0.31	0.36
1714	-----	0.94	0.14	-0.61	0.28	0.78	-0.05	-2.06	0.77
1776	-----	1.39	1.84	1.01	2.31	1.42	0.96	-----	-----

Lab 1026 possibly a false negative test result at cyclo-Pentane
Please note: the table in this appendix only shows participants that reported (numeric) test results

z-scores of the determination of Simulated Distillation on sample #20215

lab	IBP	5% rec	10% rec	30% rec	50% rec	70% rec	90% rec	FBP
150	-----	1.86	1.15	1.20	1.90	2.39	-----	-----
171	-----	0.32	-0.15	0.73	2.48	4.22	-----	-----
311	-----	1.88	0.80	0.88	1.56	1.91	-----	-----
445	-----	-0.24	-0.40	-2.16	-2.45	-3.27	-----	-----
495	-----	-0.24	-1.12	0.39	-0.35	-1.62	-----	-----
657	-----	0.59	-0.56	-1.58	-1.00	-0.80	-----	-----
1026	-----	-1.12	-3.08	-9.06	-5.27	-5.09	-----	-----
1039	-----	-0.86	-1.17	-0.55	0.37	0.87	-----	-----
1065	-----	4.24	2.84	0.73	-0.80	-2.66	-----	-----
1082	-----	-0.23	-0.11	1.59	2.24	2.73	-----	-----
1109	-----	4.09	1.17	-2.22	-3.32	-4.32	-----	-----
1140	-----	-1.11	1.38	2.01	3.85	4.55	-----	-----
1714	-----	20.24	16.74	6.33	-3.22	-7.07	-----	-----
1815	-----	-0.24	-0.12	-0.08	1.01	1.42	-----	-----
6326	-----	-0.62	-0.63	-0.94	-0.23	-0.34	-----	-----

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

APPENDIX 3

Analytical details Total Acid Number determination

lab	determination of end point	volume of titration solvent
92	Inflection Point	125 mL
140	Inflection Point	125 mL
150	Inflection Point	60 mL
158	Inflection Point	125 mL
334	Inflection Point	125 mL
445	Inflection Point	60 mL
525	Buffer End Point pH 11	---
529	Inflection Point	60 mL
575	Buffer End Point pH10	60 mL
598	Inflection Point	125 mL
600	Inflection Point	125 mL
608	Inflection Point	125 mL
611	Inflection Point	125 mL
621	Inflection Point	125 mL
657	Inflection Point	125 mL
663	Inflection Point	125 mL
704	Inflection Point	125 mL
752	Inflection Point	125 mL
781	Inflection Point	125 mL
840	Buffer End Point pH 10	125 mL
873	Inflection Point	125 mL
874	Buffer End Point (pH 10)	125 mL
914	Inflection Point	60 mL
922	Inflection Point	125 mL
962	Inflection Point	60 mL
963	Inflection Point	60 mL
971	Inflection Point	125 mL
974	Inflection Point	125 mL
994	Inflection Point	125 mL
995	Inflection Point	125 mL
1026	Buffer End Point pH 10	125 mL
1039	Inflection Point	125 mL
1040	Inflection Point	60 mL
1056	Inflection Point	60 mL
1082	Inflection Point	---
1089	Inflection Point	125 mL
1109	Inflection Point	125 mL
1140	Inflection Point	125 mL
1259	Inflection Point	60 mL
1357	Inflection Point	125 mL
1397	Inflection Point	125 mL
1412	Inflection Point	125 mL
1556	Buffer End Point pH 10	125 mL
1613	Inflection Point	125 mL
1714	Inflection Point	---
1759	Buffer End Point pH 11	100 mL
1776	Buffer End Point pH 10	125 mL
1796	Inflection Point	125 mL
1833	Inflection Point	125 mL
1857	Inflection Point	125 mL
1858	Buffer End Point pH 10	125 mL
1941	Inflection Point	60 mL
1995	Inflection Point	125 mL
6028	Inflection Point	125 mL
6203	Inflection Point	125 mL
6315	Inflection Point	60 mL
9052	---	60 mL
9107	Inflection Point	125 mL

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

APPENDIX 4

Number of participants per country

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

APPENDIX 5

Abbreviations

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
E	= 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
SDS	= Safety Data Sheet

Literature

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018
2 ASTM E178:16
3 ASTM E1301:95(2003)
4 ISO5725:86
5 ISO5725, parts 1-6, 1994
6 ISO13528:05
7 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
8 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
9 IP367:84
10 DIN38402 T41/42
11 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
12 J.N. Miller, Analyst, 118, 455, (1993)
13 Analytical Methods Committee, Technical Brief, No 4, January 2001
14 P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst 2002, 127, 1359-1364, (2002)
15 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)
16 Horwitz, W and Albert, R, J. AOAC Int, 79, 3, 589, (1996)