Results of Proficiency Test
Vacuum Gasoil (VGO)
December 2021

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. R.J. Starink
Correctors: ing. C.M. Nijssen-Wester & ing. G.A. Oosterlaken-Buijs
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1 INTRODUCTION

Since 2013 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Vacuum Gasoil (VGO) in accordance with the latest version of ISO8217 every year. During the annual proficiency testing program 2021/2022 it was decided to continue the round robin for the analysis of Vacuum Gasoil.

In this interlaboratory study 64 laboratories in 27 different countries registered for participation. See appendix 2 for the number of participants per country. In this report the results of the Vacuum Gasoil 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 Vacuum Gasoil: a 1L bottle labelled #21250 for various analyzes and a 100mL PE bottle labelled #21251 specifically prepared for metal analyzes.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5). This protocol is electronically available through the iis website www.iisnl.com, from the FAQ page.

2.3 CONFIDENTIALITY STATEMENT

All data presented in this report must be regarded as confidential and for use by the participating companies only. Disclosure of the information in this report is only allowed by means of the entire report. Use of the contents of this report for third parties is only allowed by written permission of the Institute for Interlaboratory Studies. Disclosure of the identity of one or more of the participating companies will be done only after receipt of a written agreement of the companies involved.

2.4 SAMPLES

A batch of approximately 100 liters of Vacuum Gasoil was obtained from a third party. After homogenization 88 amber glass bottles of 1L were filled and labelled #21250.
The homogeneity of the subsamples was checked by determination of Density at 15°C in accordance with ISO12185 on 8 stratified randomly selected subsamples.

	Density at 15°C in kg/m^3
sample #21250-1	923.6
sample #21250-2	923.6
sample #21250-3	923.6
sample #21250-4	923.7
sample #21250-5	923.7
sample #21250-6	923.7
sample #21250-7	923.6
sample #21250-8	923.7

Table 1: homogeneity test results of subsamples #21250

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)	0.2
reference test method	ISO12185:96
0.3 x R (reference test method)	0.5

Table 2: evaluation of the repeatability of subsamples #21250

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

For the preparation of the sample for metal analyzes a batch of approximately 15 liters of Vacuum Gasoil was obtained from a third party and made positive on the metals Aluminum, Silicon, Iron, Nickel, Sodium and Vanadium. After homogenization 88 PE bottles of 100 mL were filled and labelled #21251.
The homogeneity of the subsamples was checked by determination of Iron and Nickel in accordance with IP621 on 8 stratified randomly selected subsamples.

	Iron in mg/kg	Nickel in mg/kg
sample #21251-1	7	8
sample #21251-2	7	8
sample #21251-3	7	8
sample #21251-4	6	7
sample #21251-5	7	8
sample #21251-6	7	8
sample #21251-7	7	8
sample #21251-8	6	7

Table 3: homogeneity test results of subsamples #21251

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

	Iron in mg/kg	Nickel in mg/kg
r (observed)	1	1
reference test method	IP501:05	IP501:05
0.3 x R (reference test method)	1	2

Table 4: evaluation of the repeatabilities of subsamples #21251

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

To each of the participating laboratories one sample VGO labelled #21250 and one sample VGO for metals labelled #21251 were sent on November 3, 2021. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Vacuum Gasoil packed in amber glass bottles and PE bottles was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6 ANALYZES

The participants were requested to determine on sample #21250: Total Acid Number, Aniline Point, Asphaltenes, Carbon Residue (Micro method), Density at 15°C, Flash Point PMcc, Kinematic Viscosity (50°C and 100°C), Nitrogen, Pour Point (Manual and Automated), Total Sulfur, Simulated Distillation and Distillation at 10 mmHg (IBP, 10% rec, 30% rec, 50% rec, 70% rec, 90% rec and FBP).
On sample #21251 was requested to determine: Aluminum, Silicon, Sum of Aluminum and Silicon, Arsenic, Copper, Iron, Nickel, Sodium, Vanadium, Calcium, Phosphorus and Zinc.
It was also requested to report some analytical details on the determination of Total Acid Number.

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

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

3 RESULTS

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

Directly after the deadline a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline, the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results (no reanalyzes). Additional or corrected test results are used for data analysis and the original test results are placed under 'Remarks' in the result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

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

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

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

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner's outlier test can be used. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

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

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

3.2 GRAPHICS

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

Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also, a normal Gauss curve (dotted line) was projected over the Kernel Density Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements (derived from e.g. ISO or ASTM test methods), the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation 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 proficiency test some problems were encountered with the dispatch of the samples due to custom clearance. Fourteen participants reported test results after the final reporting date and one participant did not report any test results. Not all participants were able to report all tests requested.
In total 63 participants reported 1276 numerical test results. Observed were 35 outlying test results which is 2.7%. 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 original data in appendix 1. The abbreviations, used in these tables, are explained in appendix 3.

In the iis PT reports ASTM methods are referred to with a number (e.g. D611) and an added designation for the year that the method was adopted or revised (e.g. D611:12). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D611:12(2016)). In the results tables of appendix 1 only the method number and year of adoption or revision (e.g. D611:12) will be used.

Although VGO is an important feedstock for cracking installations there are only a few analytical test methods specifically designed for the analysis of VGO. Most parameters are to be determined by using methods that are intended for residual fuel oil and blending components. Where applicable precision data for Fuel Oil is used.

sample #21250

Total Acid Number: The majority of laboratories reported to use Inflection Point with titration volume of 125 mL. Therefore, the z-scores were calculated with the reproducibility of ASTM D664-A:18e2 for Inflection Point at titration volume 125 mL.
This determination may be problematic depending on the test method used. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D664-A:18e2 for IP at 125 mL. However, the calculated reproducibility is in agreement with the requirements of ASTM D664-A:18e2 for IP at 60 mL and Buffer End Point at 60 mL but not for BEP at 125 mL. When the test results reported for Inflection Point (60 and 125 mL) were evaluated separately the calculated reproducibility is in agreement with the requirements of IP 60 mL but not for 125 mL.

Aniline Point: This determination was very problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not at all in agreement with the requirements of ASTM D611:12(2016).

Asphaltenes: This determination was not problematic. Almost all reporting participants agreed on a level <0.50 %M/M which is below the application range of test method IP143:04. Therefore, no z-scores were calculated.

Carbon Residue (Micro method): This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D4530:15(2020).

Density at 15°C: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO12185:96.

Flash Point PMcc: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with requirements of ASTM D93-B:20.

Kinematic Viscosity at 50°C: This determination may be problematic for a number of laboratories. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D445:21.

Kinematic Viscosity at 100°C: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D445:21.

Nitrogen: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with ASTM D5762:18a.

Pour Point Manual: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with ASTM D97:17b.

Pour Point Automated: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with ASTM D5950:14(2020).

Total Sulfur: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D4294:21.

Simulated Distillation: This determination was not problematic. In total six statistical outliers were observed over seven parameters. All the calculated reproducibilities, except for 10% recovered, after rejection of the statistical outliers are in agreement with the requirements of ASTM D6352:19e1.

Distillation at 10 mmHg as AET: This determination was not problematic. In total four statistical outliers were observed over seven parameters. All the calculated reproducibilities, except for 90% recovered, after rejection of the statistical outliers are in agreement with the requirements of ASTM D1160:18.

sample #21251

Aluminum: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of IP501:05(2019).

Silicon: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of IP501:05(2019).

Sum of Aluminum and Silicon: This determination may be problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of IP501:05(2019).

Arsenic: This determination was not problematic. All of the reporting participants agreed on a level <1 mg/kg. Therefore, no z-scores were calculated.

Copper: This determination was not problematic. All of the reporting participants agreed on a level <1 mg/kg. Therefore, no z-scores were calculated.

Iron: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of IP501:05(2019).

Nickel: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of IP501:05(2019).

Sodium: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical oulier is in agreement with the requirements of IP501:05(2019).

Vanadium: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of IP501:05(2019).

Calcium: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of IP501:05(2019).

Phosphorus: This determination was not problematic. Almost all of the reporting participants agreed on a level <1 mg/kg. Therefore, no z-scores were calculated.

Zinc: This determination was not problematic. Almost all of the reporting participants agreed on a level <1 mg/kg. Therefore, no z-scores were calculated.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Acid Number	mg KOH/g	45	0.38	0.14	0.08
Aniline Point	°C	18	91.4	2.2	1
Asphaltenes	%M/M	37	<0.50	n.e.	n.e.
Carbon Residue (Micro method)	%M/M	48	0.45	0.20	0.16

Parameter	unit	n	average	2.8 * sd	R(lit)
Density at 15°C	kg/m^3	58	911.6	1.4	1.5
Flash Point PMcc	°C	48	177.3	8.6	10
Kinematic Viscosity at 50°C	mm^2/s	51	50.068	3.396	4.236
Kinematic Viscosity at 100°C	mm^2/s	53	8.845	0.436	1.067
Nitrogen	mg/kg	35	1469	336	391
Pour Point Manual	°C	50	39.0	6.4	9
Pour Point Automated, 3°C int.	°C	16	39.6	6.5	6.1
Total Sulfur	%M/M	60	0.39	0.03	0.04
Simulated Distillation					
Initial Boiling Point	°C	14	253.3	23.0	49.1
Temp 10% recovered	°C	14	362.4	8.0	7.1
Temp 30% recovered	°C	14	414.2	5.5	5.9
Temp 50% recovered	°C	14	449.9	6.5	6.4
Temp 70% recovered	°C	14	491.0	6.5	7.2
Temp 90% recovered	°C	15	544.6	9.1	10.5
Final Boiling Point	°C	14	620.6	30.1	38.1
Distillation at 10 mmHg as AET					
Initial Boiling Point	°C	33	267.6	47.1	49.5
Temp 10% recovered	°C	33	379.2	13.9	18.3
Temp 30% recovered	°C	33	423.3	8.5	12.1
Temp 50% recovered	°C	33	455.4	9.9	11.6
Temp 70% recovered	°C	32	491.9	8.7	9.9
Temp 90% recovered	°C	31	543.6	14.1	9.6
Final Boiling Point	°C	30	553.0	25.2	26.9

Table 5: reproducibilities of tests on sample #21250

Parameter	unit	n	average	2.8 * sd	R(lit)
Aluminum as Al	mg/kg	42	8.9	1.6	3.0
Silicon as Si	mg/kg	34	6.2	5.7	2.1
Sum of Aluminum and Silicon	mg/kg	34	14.7	7.7	3.6
Arsenic as As	mg/kg	9	<1	n.e.	n.e.
Copper as Cu	mg/kg	32	<1	n.e.	n.e.
Iron as Fe	mg/kg	46	8.0	2.9	3.0
Nickel as Ni	mg/kg	47	8.3	3.2	5.4
Sodium as Na	mg/kg	44	11.1	3.2	4.0
Vanadium as V	mg/kg	48	10.4	2.8	6.9
Calcium as Ca	mg/kg	36	2.8	1.7	1.3
Phosphorus as P	mg/kg	33	<1	n.e.	n.e.
Zinc as Zn	mg/kg	39	<1	n.e.	n.e.

Table 6: reproducibilities of tests on sample #21251

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF DECEMBER 2021 WITH PREVIOUS PTS

	December 2021	December 2020	December 2019	December 2018	December 2017
Number of reporting laboratories	63	64	63	66	74
Number of test results	1276	1172	1211	1113	1275
Number of statistical outliers	35	37	69	39	61
Percentage of statistical outliers	2.7%	3.2%	5.7%	3.5%	4.8%

Table 7: comparison with previous proficiency tests

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

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

Determination	December 2021	December 2020	December 2019	December 2018	December 2017
Total Acid Number	-	-	-	++	+
Aniline Point	--	-	--	--	--
Asphaltenes	n.e.	n.e.	n.e.	(--)	(--)
Carbon Residue (Micro method)	-	-	+	-	+/-
Density at 15°C	+/-	+	+/-	+/-	+/-
Flash Point PMcc	+	+	+	+/-	+
Kinematic Viscosity at 50°C	+	++	++	++	++
Kinematic Viscosity at 100°C	++	++	++	++	++
Nitrogen	+	-	+	+	-
Pour Point Manual	+	++	+	++	++
Pour Point Automated 3°C int.	+/-	+/-	-	+	++
Total Sulfur	+	+/-	+/-	+/-	+
Simulated Distillation	+	-	-	+	-
Distillation at 10 mmHg as AET	+	+/-	+/-	+	+
Aluminum as Al	+	+/-	+/-	n.a.	n.a.
Silicon as Si	--	--	-	n.e.	n.e.
Sum of Aluminum and Silicon	--	-	+/-	n.a.	n.a.
Arsenic as As	n.e.	n.e.	--	n.e.	n.e.
Copper as Cu	n.e.	+/-	++	n.e.	n.e.
Iron as Fe	+/-	+/-	+/-	+	+
Nickel as Ni	+	+	+	+	++
Sodium as Na	+	+/-	+/-	++	++

Determination	December 2021	December 2020	December 2019	December 2018	December 2017
Vanadium as V	++	++	+/-	+	++
Calcium as Ca	-	n.e.	+/-	-	+/-
Phosphorus as P	n.e.	n.e.	+	n.a.	n.a.
Zinc as Zn	n.e.	n.e.	-	n.a.	n.a.

Table 8: comparison determinations against the reference test methods

Results between brackets should be used with due care because the assigned value was below the application range

The following performance categories were used:

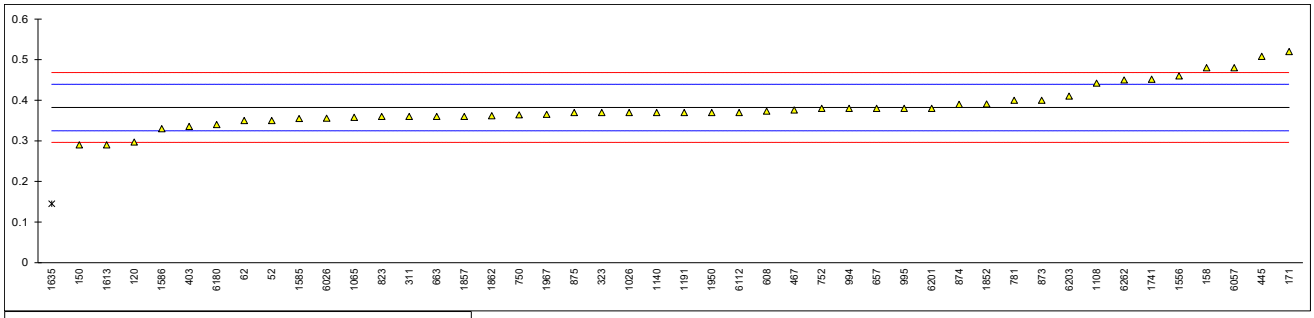
- ++ : group performed much better than the reference test method
- + : group performed better than the reference test method
- +/- : group performance equals the reference test method
- - : group performed worse than the reference test method
- -- : group performed much worse than the reference test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

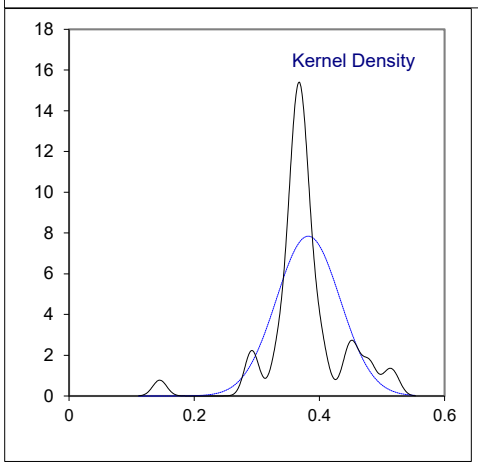
APPENDIX 1

Determination of Total Acid Number on sample #21250; results in mg KOH/g

lab	method	value	mark	z(targ)	end point	volume	remarks
52	D664-A	0.35		-1.13	Inflection Point	125 mL	
62	D664-A	0.35		-1.13	---	---	
120	D664-A	0.297		-2.98	Buffer End Point pH 10	60 mL	
140		-----		-----	---	---	
150	D664-A	0.29		-3.22	---	---	
154		-----		-----	---	---	
158		0.48	C	3.41	Inflection Point	125 mL	First reported 0.75
159		-----		-----	---	---	
171	D664-A	0.52		4.80	---	---	
225		-----		-----	---	---	
311	D664-A	0.36		-0.78	---	---	
313		-----		-----	---	---	
317		-----		-----	---	---	
323	D664-A	0.37		-0.43	---	---	
333		-----		-----	---	---	
356		-----		-----	---	---	
381		-----		-----	---	---	
403	D664-A	0.3354		-1.64	Buffer End Point pH 11	125 mL	
445	D664-A	0.508		4.38	Buffer End Point pH 10	60 mL	
467	D664-A	0.376		-0.22	---	---	
608	D664-A	0.373		-0.33	Inflection Point	125 mL	
657	D664-A	0.38		-0.08	Inflection Point	125 mL	
663	D664-A	0.36		-0.78	Inflection Point	125 mL	
710		-----		-----	---	---	
750	D664-A	0.364		-0.64	Inflection Point	60 mL	
752	D664-A	0.38		-0.08	Inflection Point	60 mL	
753		-----		-----	---	---	
778		-----		-----	---	---	
781	D664-A	0.40		0.62	Inflection Point	125 mL	
785		-----		-----	---	---	
798		-----		-----	---	---	
823	D664-A	0.36		-0.78	Inflection Point	125 mL	
872		-----		-----	---	---	
873	D664-A	0.40		0.62	Buffer End Point pH 10	125 mL	
874	D664-A	0.39		0.27	Buffer End Point pH 10	125 mL	
875	D664	0.37		-0.43	---	---	
994	D664-A	0.38		-0.08	Inflection Point	125 mL	
995	D664-A	0.38		-0.08	Inflection Point	125 mL	
1026	D664-A	0.37		-0.43	Buffer End Point pH 10	125 mL	
1065	D664-A	0.358		-0.85	---	---	
1081		-----		-----	---	---	
1108	D664-A	0.4422		2.09	Inflection Point	125 mL	
1140	IP177	0.37		-0.43	Inflection Point	125 mL	
1191	ISO6618	0.37		-0.43	---	---	
1510		-----		-----	---	---	
1556	D664-A	0.46		2.71	---	---	
1585	D664-A	0.355		-0.95	Inflection Point	125 mL	
1586	D664-A	0.33		-1.83	Inflection Point	125 mL	
1613	D664-A	0.29		-3.22	Inflection Point	125 mL	
1635	D664-A	0.145	R(0.01)	-8.28	---	---	
1676		-----		-----	---	---	
1741	ISO6619	0.452		2.43	Inflection Point	125 mL	
1852	D664-A	0.391		0.30	Inflection Point	125 mL	
1857	D664-A	0.360		-0.78	Inflection Point	125 mL	
1862	D664-A	0.362		-0.71	Inflection Point	125 mL	
1950	D664-A	0.37		-0.43	Inflection Point	125 mL	
1967	D664-A	0.365		-0.60	Buffer End Point pH 10	---	
6026	D664-A	0.3556		-0.93	Buffer End Point pH 10	125 mL	
6057	D664-A	0.48		3.41	Inflection Point	60 mL	
6112	D664-A	0.37		-0.43	Inflection Point	125 mL	
6180	D664-A	0.34		-1.48	---	---	
6201	D664-A	0.38		-0.08	Inflection Point	125 mL	
6203	D664-A	0.41		0.97	---	---	
6262	D664-A	0.45		2.36	Inflection Point	125 mL	

		IP (60+125 mL) only	BEP (60+125 mL) only
normality	suspect	OK	not OK
n	45	25	8
outliers	1	0	0
mean (n)	0.3823	0.3844	0.3776
st.dev. (n)	0.05087	0.04484	0.06169
R(calc.)	0.1424	0.1255	0.1727
st.dev.(D664-A:18e2 IP 125 mL)	0.02866	0.02882	-----
R(D664-A:18e2 IP 125 mL)	0.0803	0.0807	-----
compare			
R(D664-A:18e2 IP 60 mL)	0.1828	0.1836	-----
R(D664-A:18e2 BEP 60 mL)	0.2169	-----	0.2143
R(D664-A:18e2 BEP 125 mL)	0.1150	-----	0.1135

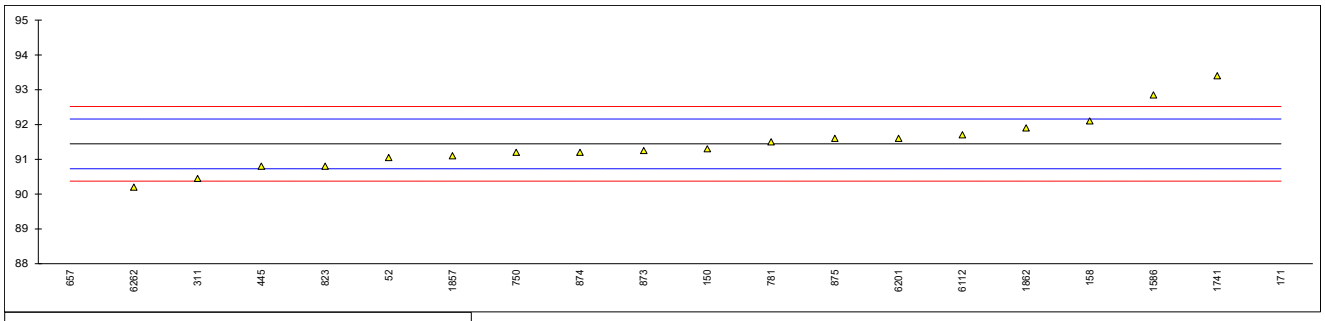


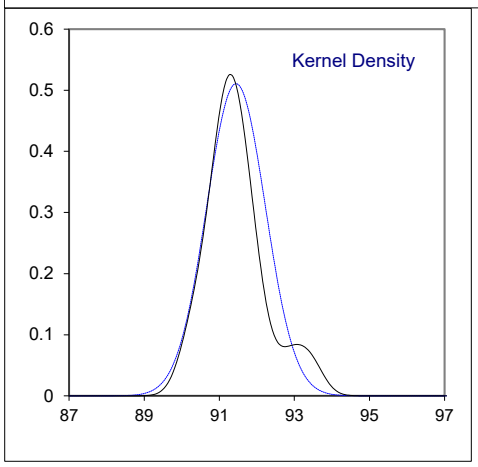


Determination of Aniline Point on sample #21250; results in °C

lab	method	value	mark	z(targ)	of n-heptane	remarks
52	D611-E	91.05		-1.10	69.30	
62		-----		-----	-----	
120		-----		-----	-----	
140		-----		-----	-----	
150	D611-E	91.3		-0.40	-----	
154		-----		-----	-----	
158	D611-E	92.10		1.84	-----	
159		-----		-----	-----	
171	D611-E	106.55	R(0.01)	42.30	-----	
225		-----		-----	-----	
311	D611-E	90.45		-2.78	69.3	
313		-----		-----	-----	
317		-----		-----	-----	
323		-----		-----	-----	
333		-----		-----	-----	
356		-----		-----	-----	
381		-----		-----	-----	
403		-----		-----	-----	
445	D611	90.80		-1.80	69.10	
467		-----		-----	-----	
608		-----		-----	-----	
657	D611-B	84.87	C,R(0.01)	-18.41	69.4	First reported 81.85
663		-----		-----	-----	
710		-----		-----	-----	
750	D611-E	91.2		-0.68	69.50	
752		-----		-----	-----	
753		-----		-----	-----	
778		-----		-----	-----	
781	D611-E	91.50		0.16	69.10	
785		-----		-----	-----	
798		-----		-----	-----	
823	D611-E	90.8		-1.80	-----	
872		-----		-----	-----	
873	D611-E	91.25		-0.54	69.3	
874	D611-E	91.20		-0.68	69.35	
875	D611-E	91.6		0.44	-----	
994		-----		-----	-----	
995		-----		-----	-----	
1026		-----		-----	-----	
1065		-----		-----	-----	
1081		-----		-----	-----	
1108		-----		-----	-----	
1140		-----		-----	-----	
1191		-----		-----	-----	
1510		-----		-----	-----	
1556		-----		-----	-----	
1585		-----		-----	-----	
1586	D611-A	92.85		3.94	-----	
1613		-----		-----	-----	
1635		-----		-----	-----	
1676		-----		-----	-----	
1741	D611-B	93.4	C	5.48	-----	First reported 95.7
1852		-----		-----	-----	
1857	D611-E	91.10		-0.96	69.10	
1862	D611-B	91.90		1.28	-----	
1950		-----		-----	-----	
1967		-----		-----	-----	
6026		-----		-----	-----	
6057		-----		-----	-----	
6112	D611-E	91.7		0.72	-----	
6180		-----		-----	-----	
6201	D611-A	91.60		0.44	-----	
6203		-----		-----	-----	
6262	D611-A	90.2		-3.48	69.4	

	normality	suspect	OK
	n	18	10
	outliers	2	0
	mean (n)	91.444	69.285
	st.dev. (n)	0.7812	0.1415
	R(calc.)	2.187	0.396
	st.dev.(D611:12)	0.3571	0.1786
	R(D611:12)	1	0.5
Compare			
	R(iis20G08)	1.795	





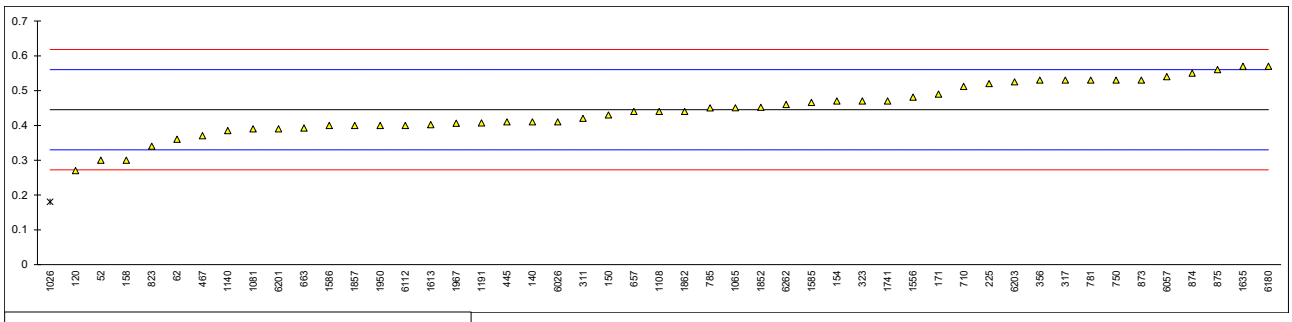
Determination of Asphaltenes on sample #21250; results in %M/M

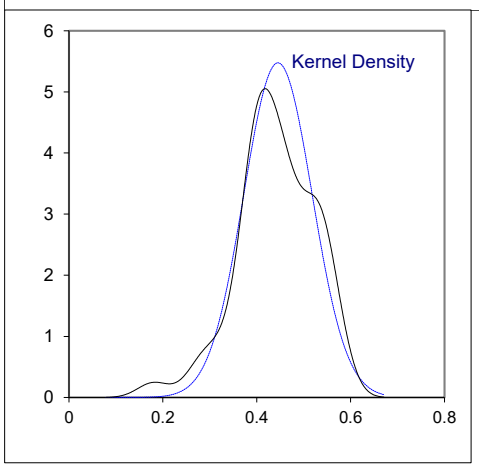
lab	method	value	mark	z(targ)	remarks
52	IP143	0.40		-----	
62		-----		-----	
120		-----		-----	
140		-----		-----	
150	IP143	0.20		-----	
154	IP143	<0.05		-----	
158	D6560	0.05		-----	
159		-----		-----	
171	IP143	0.20		-----	
225		-----		-----	
311		-----		-----	
313		-----		-----	
317		-----		-----	
323	IP143	< 0.5		-----	
333		-----		-----	
356	IP143	Below 0.50		-----	
381	INH-642	0.0281		-----	
403		-----		-----	
445	IP143	0.12		-----	
467	IP143	0.184		-----	
608	D6560	0.045		-----	
657	IP143	<0.50		-----	
663		-----		-----	
710		-----		-----	
750	D6560	0.0312		-----	
752	INH-642	0.0325		-----	
753		-----		-----	
778		-----		-----	
781	INH-642	0.0342		-----	
785	INH-642	0.0348		-----	
798		-----		-----	
823	IP143	0.23		-----	
872		-----		-----	
873	IP143	<0.50		-----	
874	IP143	0.033		-----	
875	IP143	<0.50		-----	
994	IP143	<0.5		-----	
995	IP143	<0.5		-----	
1026	IP143	0.15		-----	
1065		-----		-----	
1081		-----		-----	
1108		-----		-----	
1140	IP143	0.995		-----	Possibly a false positive test result?
1191		-----		-----	
1510	IP143	0.03		-----	
1556	IP143	0.03		-----	
1585	IP143	0.04		-----	
1586	IP143	0.03		-----	
1613	D6560	0.060		-----	
1635	IP143	0.04		-----	
1676		-----		-----	
1741		-----		-----	
1852	DIN51595	0.07		-----	
1857	In house	0.0341		-----	
1862	D6560	0.041		-----	
1950	IP143	0.039		-----	
1967		-----		-----	
6026	In house	0.0324		-----	
6057		-----		-----	
6112		-----		-----	
6180		-----		-----	
6201	IP143	0.20		-----	
6203	IP143	0.039		-----	
6262	In house	0.0236		-----	
	n	37			
	mean (n)	<0.50			Precision applicable between 0.50 – 30 %M/M

Determination of Carbon Residue (Micro method) on sample #21250; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D4530	0.30		-2.52	
62	D4530	0.36	C	-1.48	First reported 0.16
120	D4530	0.27		-3.04	
140	D4530	0.41		-0.61	
150	D4530	0.43		-0.26	
154	D4530	0.47		0.43	
158	D4530	0.30		-2.52	
159		-----		-----	
171	D4530	0.49		0.78	
225	D4530	0.52		1.30	
311	D4530	0.42		-0.44	
313		-----		-----	
317	D4530	0.53		1.47	
323	D4530	0.47		0.43	
333		-----		-----	
356	D4530	0.53		1.47	
381		-----		-----	
403		-----		-----	
445	D4530	0.41		-0.61	
467	D4530	0.370		-1.31	
608		-----		-----	
657	D4530	0.44		-0.09	
663	D4530	0.392		-0.92	
710	ISO10370	0.512		1.16	
750	D189	0.53		1.47	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	D4530	0.53		1.47	
785	D4530	0.45		0.08	
798		-----		-----	
823	ISO10370	0.34	C	-1.83	First reported 076
872		-----		-----	
873	D4530	0.53		1.47	
874	D4530	0.55		1.82	
875	D4530	0.56		1.99	
994		-----		-----	
995		-----		-----	
1026	D4530	0.18	R(0.05)	-4.60	
1065	D4530	0.4507		0.10	
1081	ISO10370	0.39	C	-0.96	First reported 3.9
1108	D4530	0.44		-0.09	
1140	D4530	0.385		-1.04	
1191	ISO10370	0.4071		-0.66	
1510		-----		-----	
1556	ISO10370	0.481		0.62	
1585	D4530	0.466		0.36	
1586	D4530	0.40		-0.78	
1613	D4530	0.4017		-0.75	
1635	D4530	0.57		2.17	
1676		-----		-----	
1741	ISO10370	0.47		0.43	
1852	ISO10370	0.45167		0.11	
1857	D4530	0.400		-0.78	
1862	D4530	0.44		-0.09	
1950	D4530	0.40		-0.78	
1967	D4530	0.4063		-0.67	
6026	ISO10370	0.41		-0.61	
6057	D4530	0.54		1.65	
6112	ISO10370	0.40		-0.78	
6180	ISO10370	0.57		2.17	
6201	D4530	0.39		-0.96	
6203	D4530	0.525		1.39	
6262	D4530	0.46		0.26	

normality	OK
n	48
outliers	1
mean (n)	0.4452
st.dev. (n)	0.07288
R(calc.)	0.2041
st.dev.(D4530:15)	0.05760
R(D4530:15)	0.1613
Compare	
R(ISO10370:14)	0.0449

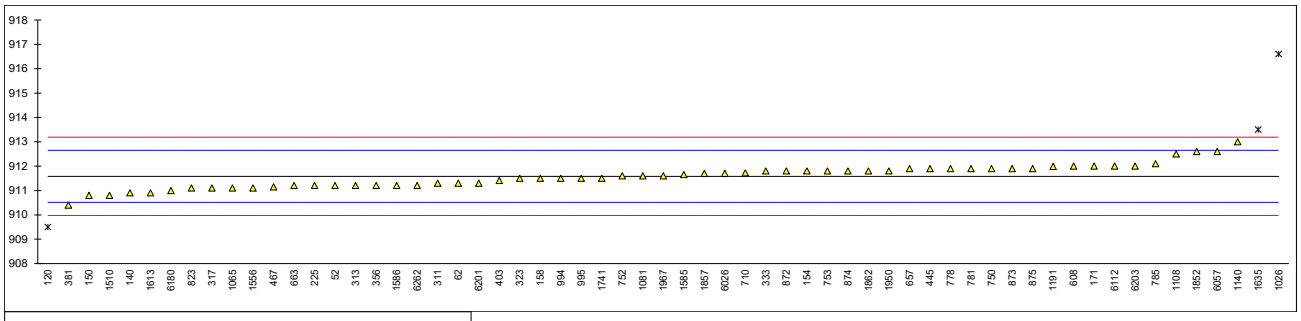


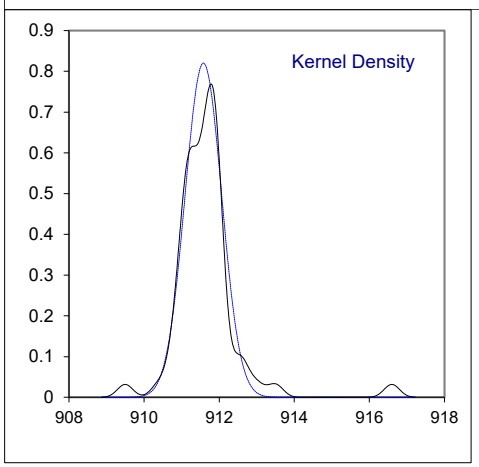


Determination of Density at 15°C on sample #21250; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
52	D4052	911.2		-0.72	
62	D4052	911.3		-0.53	
120	D4052	909.5	R(0.05)	-3.89	
140	D4052	910.9		-1.28	
150	D4052	910.8	C	-1.46	First reported 0.9076 kg/L
154	D4052	911.8		0.40	
158	D4052	911.5	C	-0.16	First reported 915.3
159		-----		-----	
171	ISO12185	912.0		0.78	
225	D4052	911.2		-0.72	
311	D1298	911.3		-0.53	
313	D1298	911.2		-0.72	
317	ISO12185	911.1		-0.90	
323	ISO12185	911.5		-0.16	
333	ISO12185	911.8		0.40	
356	ISO12185	911.2		-0.72	
381	ISO12185	910.4		-2.21	
403	ISO12185	911.41		-0.32	
445	IP365	911.9		0.59	
467	ISO12185	911.15		-0.81	
608	D4052	912.0		0.78	
657	D4052	911.9		0.59	
663	D4052	911.20		-0.72	
710	D1298	911.72		0.26	
750	D1298	911.9		0.59	
752	D1298	911.6		0.03	
753	ISO12185	911.8		0.40	
778	ISO12185	911.9		0.59	
781	ISO12185	911.9		0.59	
785	D1298	912.1		0.96	
798		-----		-----	
823	ISO12185	911.1		-0.90	
872	ISO12185	911.8		0.40	
873	ISO12185	911.9		0.59	
874	ISO12185	911.8		0.40	
875	ISO12185	911.9		0.59	
994	ISO12185	911.5		-0.16	
995	ISO12185	911.5		-0.16	
1026	D4052	916.6	R(0.01)	9.36	
1065	D4052	911.1		-0.90	
1081	D4052	911.6		0.03	
1108	D1298	912.5	C	1.71	First reported 0.9132 kg/m^3
1140	IP365	913.0		2.64	
1191	ISO12185	911.99		0.76	
1510	ISO12185	910.8		-1.46	
1556	ISO12185	911.1		-0.90	
1585	ISO12185	911.65		0.12	
1586	D4052	911.2		-0.72	
1613	D1298	910.9		-1.28	
1635	D1298	913.5	R(0.05)	3.58	
1676		-----		-----	
1741	ISO12185	911.5		-0.16	
1852	ISO12185	912.6		1.90	
1857	ISO12185	911.70		0.22	
1862	D4052	911.8		0.40	
1950	ISO12185	911.8		0.40	
1967	D1298	911.6		0.03	
6026	D4052	911.7		0.22	
6057	ISO12185	912.6		1.90	
6112	ISO12185	912.0		0.78	
6180	ISO12185	911.0		-1.09	
6201	D5002	911.3		-0.53	
6203	ISO12185	912.0		0.78	
6262	D4052	911.2		-0.72	

normality	OK
n	58
outliers	3
mean (n)	911.58
st.dev. (n)	0.486
R(calc.)	1.36
st.dev.(ISO12185:96)	0.536
R(ISO12185:96)	1.5

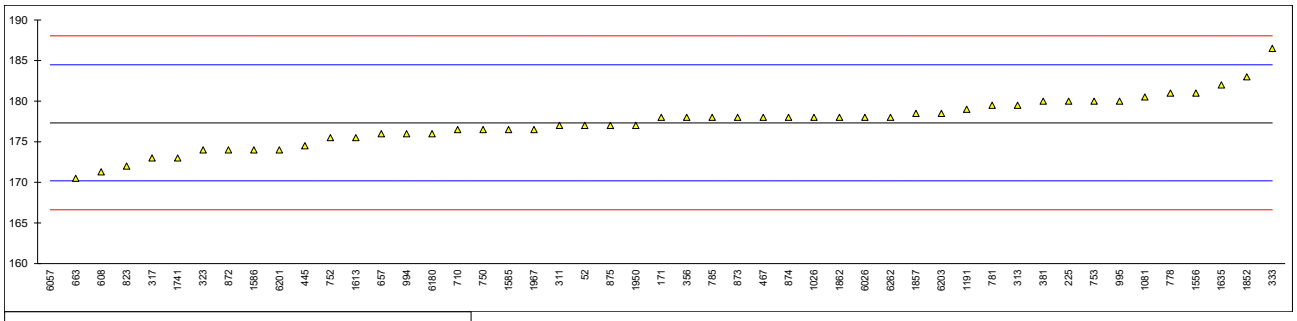


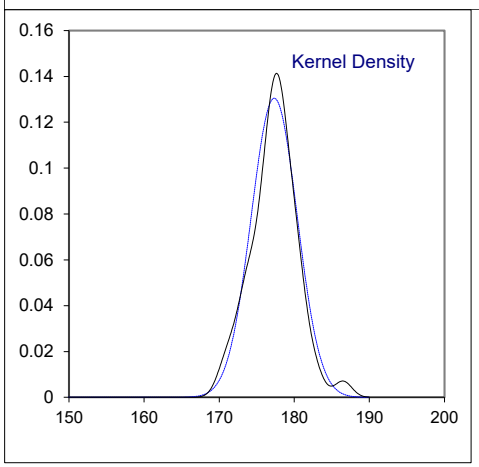


Determination of Flash Point PMcc on sample #21250; results in °C

lab	method	value	mark	z(targ)	remarks
52	D93-A	177.0		-0.10	
62		-----		-----	
120	D93-B	>163.0		-----	
140		-----		-----	
150	D93-B	>110		-----	
154	D93-B	>110		-----	
158	D93-B	>110		-----	
159	D93-B	>110		-----	
171	D93-B	178.0		0.18	
225	D93-A	180.0		0.74	
311	D93-B	177.0		-0.10	
313	D93-B	179.5		0.60	
317	D93-B	173.0		-1.22	
323	D93-B	174.0		-0.94	
333	D93-B	186.5		2.56	
356	D93-B	178.0		0.18	
381	D93-B	180		0.74	
403		-----		-----	
445	D93-B	174.5		-0.80	
467	D93-B	178.0		0.18	
608	D93-B	171.3		-1.69	
657	D93-B	176		-0.38	
663	D93-B	170.5		-1.92	
710	D93-B	176.5		-0.24	
750	D93-B	176.5		-0.24	
752	D93-B	175.5		-0.52	
753	D93-A	180.0		0.74	
778	D93-B	181		1.02	
781	D93-B	179.5		0.60	
785	D93-B	178.0		0.18	
798		-----		-----	
823	ISO2719	172.0		-1.50	
872	D93-B	174.0		-0.94	
873	D93-B	178.0		0.18	
874	D93-B	178.0		0.18	
875	D93-B	177.0		-0.10	
994	D93-B	176.0		-0.38	
995	D93-B	180.0		0.74	
1026	D93-A	178		0.18	
1065		-----		-----	
1081	D93-B	180.5		0.88	
1108		-----		-----	
1140	D93-B	>140		-----	
1191	ISO2719	179.0		0.46	
1510		-----		-----	
1556	ISO2719	181.0		1.02	
1585	D93-B	176.5		-0.24	
1586	D93-B	174.0		-0.94	
1613	D93-B	175.5		-0.52	
1635	D93-B	182		1.30	
1676		-----		-----	
1741	ISO2719	173		-1.22	
1852	ISO2719	183		1.58	
1857	D93-B	178.5		0.32	
1862	D93-B	178.0		0.18	
1950	D93-B	177.0		-0.10	
1967	D93-B	176.5		-0.24	
6026	D93-B	178.0		0.18	
6057	D93-B	133.0	R(0.01)	-12.42	
6112		-----		-----	
6180	D93-B	176.0		-0.38	
6201	ISO2719-B	174.0		-0.94	
6203	D93-B	178.5		0.32	
6262	D93-B	178.0		0.18	

normality	OK
n	48
outliers	1
mean (n)	177.340
st.dev. (n)	3.0578
R(calc.)	8.563
st.dev.(D93-B:20)	3.5714
R(D93-B:20)	10

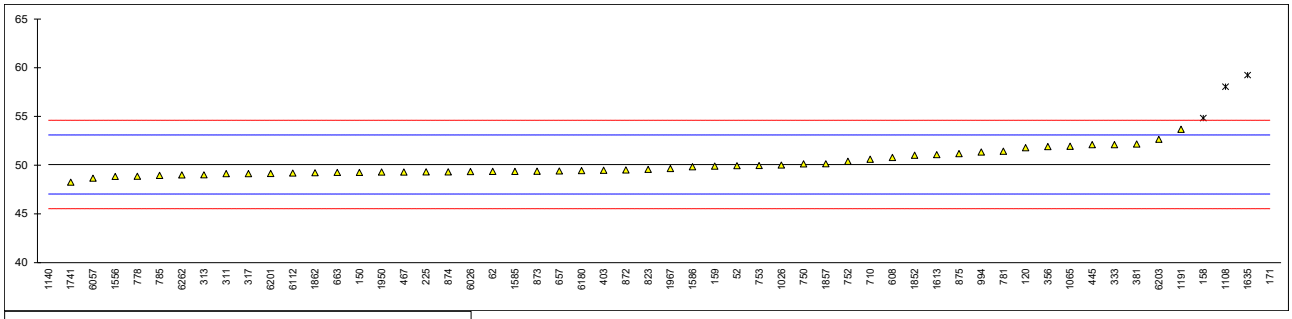


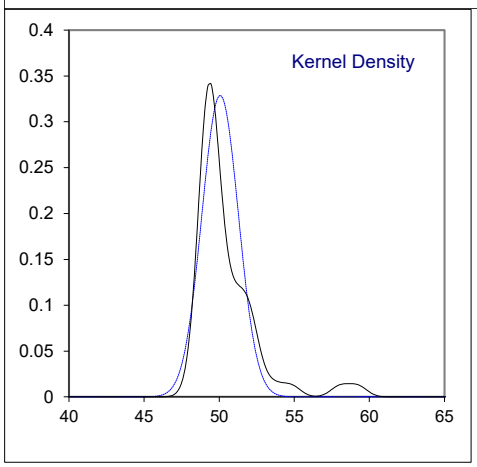


Determination of Kinematic Viscosity at 50°C on sample #21250; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
52	D445	49.94		-0.08	
62	D445	49.35		-0.47	
120	D445	51.79		1.14	
140		-----		-----	
150	D445	49.25	C	-0.54	First reported 58.9
154		-----		-----	
158	D445	54.82	R(0.05)	3.14	
159	D445	49.90		-0.11	
171	D445	71.34	R(0.01)	14.06	
225	D445	49.30		-0.51	
311	D445	49.12		-0.63	
313	D445	49.00		-0.71	
317	D445	49.12		-0.63	
323		-----		-----	
333	D445	52.10		1.34	
356	D445	51.91		1.22	
381	D445	52.17		1.39	
403	D445	49.47		-0.40	
445	D445	52.10		1.34	
467	ISO3104	49.293		-0.51	
608	D445	50.782		0.47	
657	D445	49.39		-0.45	
663	D445	49.240		-0.55	
710	D445	50.612		0.36	
750	D445	50.12		0.03	
752	D445	50.39		0.21	
753	D445	49.96		-0.07	
778	D445	48.85		-0.80	
781	D445	51.42		0.89	
785	D445	48.94		-0.75	
798		-----		-----	
823	ISO3104	49.57		-0.33	
872	D445	49.50		-0.38	
873	D445	49.37		-0.46	
874	D445	49.31		-0.50	
875	D445	51.18		0.74	
994	D445	51.34		0.84	
995		-----		-----	
1026	ISO3104	50.0		-0.04	
1065	D445	51.94		1.24	
1081		-----		-----	
1108	D445	58.04	R(0.01)	5.27	
1140	D445	23.319	R(0.01)	-17.68	
1191	ISO3104	53.674		2.38	
1510		-----		-----	
1556	ISO3104	48.844		-0.81	
1585	D445	49.358		-0.47	
1586	D445	49.84		-0.15	
1613	D445	51.07		0.66	
1635	D445	59.24	R(0.01)	6.06	
1676		-----		-----	
1741	ISO3104	48.25		-1.20	
1852	ISO3104	51.02		0.63	
1857	D445	50.141		0.05	
1862	D445	49.21		-0.57	
1950	D445	49.29		-0.51	
1967	D445	49.651		-0.28	
6026	D445	49.33		-0.49	
6057	D445	48.65		-0.94	
6112	D445	49.18		-0.59	
6180	D445	49.44		-0.41	
6201	D445	49.14		-0.61	
6203	D7042	52.640		1.70	
6262	D445	48.996		-0.71	

normality	suspect
n	51
outliers	5
mean (n)	50.0677
st.dev. (n)	1.21290
R(calc.)	3.3961
st.dev.(D445:21)	1.51294
R(D445:21)	4.2362

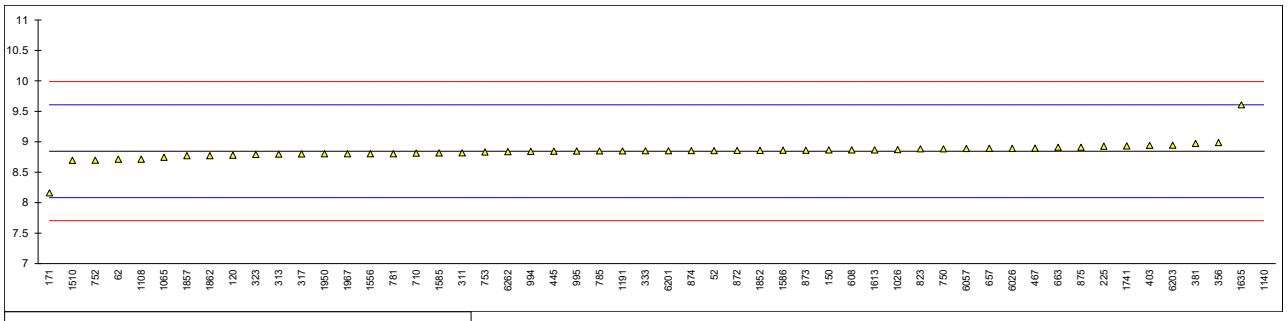


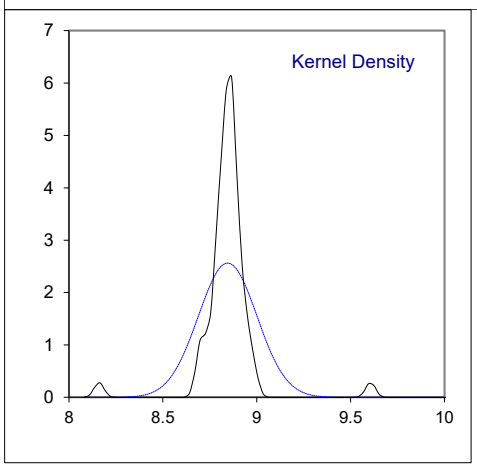


Determination of Kinematic Viscosity at 100°C on sample #21250; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
52	D445	8.855		0.03	
62	D445	8.714		-0.34	
120	D445	8.77949		-0.17	
140		-----		-----	
150	D445	8.867		0.06	
154		-----		-----	
158		-----		-----	
159		-----		-----	
171	D445	8.160		-1.80	
225	D445	8.927		0.22	
311	D445	8.819		-0.07	
313	D445	8.796		-0.13	
317	D445	8.801		-0.12	
323	D445	8.792		-0.14	
333	D445	8.852		0.02	
356	D445	8.986		0.37	
381	D445	8.973		0.34	
403	D445	8.942		0.25	
445	D445	8.844		0.00	
467	ISO3104	8.8945		0.13	
608	D445	8.867		0.06	
657	D445	8.892		0.12	
663	D445	8.9088		0.17	
710	D445	8.8126		-0.09	
750	D445	8.883		0.10	
752	D445	8.698		-0.39	
753	D445	8.832		-0.03	
778		-----		-----	
781	D445	8.804		-0.11	
785	D445	8.849		0.01	
798		-----		-----	
823	D445	8.882		0.10	
872	D445	8.857		0.03	
873	D445	8.862		0.04	
874	D445	8.853		0.02	
875	D445	8.91		0.17	
994	D445	8.843		-0.01	
995	D445	8.847		0.01	
1026	D445	8.87		0.07	
1065	D445	8.745		-0.26	
1081		-----		-----	
1108	D445	8.715		-0.34	
1140	D445	15.152	R(0.01)	16.56	
1191	ISO3104	8.8505		0.01	
1510	D445	8.694		-0.40	
1556	ISO3104	8.8033		-0.11	
1585	D445	8.815		-0.08	
1586	D445	8.861		0.04	
1613	D445	8.867		0.06	
1635	D445	9.606		2.00	
1676		-----		-----	
1741	ISO3104	8.932		0.23	
1852	ISO3104	8.859		0.04	
1857	D445	8.7725		-0.19	
1862	D445	8.773		-0.19	
1950	D445	8.803		-0.11	
1967	D445	8.803		-0.11	
6026	D445	8.892		0.12	
6057	D445	8.889		0.12	
6112		-----		-----	
6180		-----		-----	
6201	D445	8.852		0.02	
6203	D7042	8.9445		0.26	
6262	D445	8.8367		-0.02	

normality	not OK
n	53
outliers	1
mean (n)	8.8450
st.dev. (n)	0.15576
R(calc.)	0.4361
st.dev.(D445:21)	0.38097
R(D445:21)	1.0667

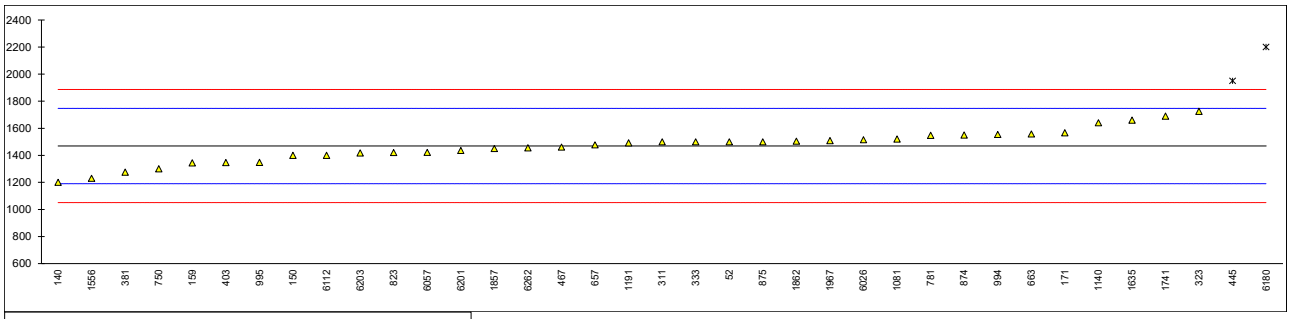


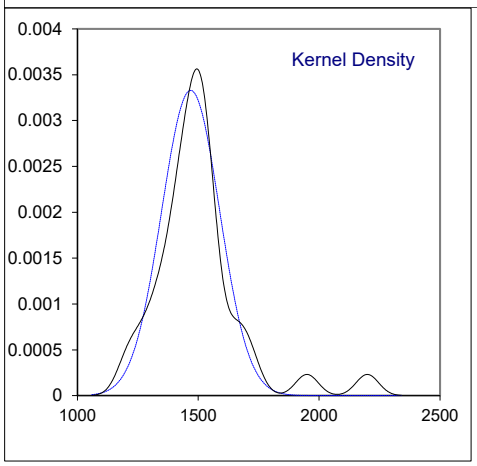


Determination of Nitrogen on sample #21250; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52	D4629	1500		0.22	
62		-----		-----	
120		-----		-----	
140	D5762 Gravimetric	1200		-1.93	
150	D5762 Volumetric	1400		-0.49	
154		-----		-----	
158		-----		-----	
159	D4629	1344		-0.89	
171	D5762	1566.2		0.70	
225		-----		-----	
311	D5762 Volumetric	1500		0.22	
313		-----		-----	
317		-----		-----	
323	D5762 Gravimetric	1725		1.84	
333	D5762 Gravimetric	1500		0.22	
356		-----		-----	
381	D4629	1275		-1.39	
403	D5762 Gravimetric	1346.6		-0.88	
445	D5762 Gravimetric	1950	R(0.05)	3.45	
467	D5762 Gravimetric	1460		-0.06	
608		-----		-----	
657	D5762 Gravimetric	1477		0.06	
663	D5762 Gravimetric	1557		0.63	
710		-----		-----	
750	D5762 Gravimetric	1300		-1.21	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	D5762 Gravimetric	1547		0.56	
785		-----		-----	
798		-----		-----	
823	D5762 Gravimetric	1420		-0.35	
872		-----		-----	
873		-----		-----	
874	D5762 Volumetric	1550		0.58	
875	D5762 Volumetric	1500		0.22	
994	D5762 Volumetric	1554		0.61	
995	D3228	1347		-0.87	
1026		-----		-----	
1065		-----		-----	
1081	D4629	1520		0.37	
1108		-----		-----	
1140	D4629	1639.9		1.23	
1191	D5762 Gravimetric	1492		0.17	
1510		-----		-----	
1556	D5762 Volumetric	1230		-1.71	
1585		-----		-----	
1586		-----		-----	
1613		-----		-----	
1635	D5762 Gravimetric	1660		1.37	
1676		-----		-----	
1741	D5762 Gravimetric	1689		1.58	
1852		-----		-----	
1857	D5762 Gravimetric	1450		-0.13	
1862	D5762 Gravimetric	1504		0.25	
1950		-----		-----	
1967	D5762 Gravimetric	1508		0.28	
6026	D5762 Gravimetric	1515		0.33	
6057	D5762 Gravimetric	1421		-0.34	
6112	D5762 Volumetric	1400		-0.49	
6180	D5291	2200	R(0.01)	5.24	
6201	D5762	1435		-0.24	
6203	D4629	1417		-0.37	
6262	D4629	1455		-0.10	

normality	OK
n	35
outliers	2
mean (n)	1468.71
st.dev. (n)	119.862
R(calc.)	335.61
st.dev.(D5762:18a)	139.527
R(D5762:18a)	390.68

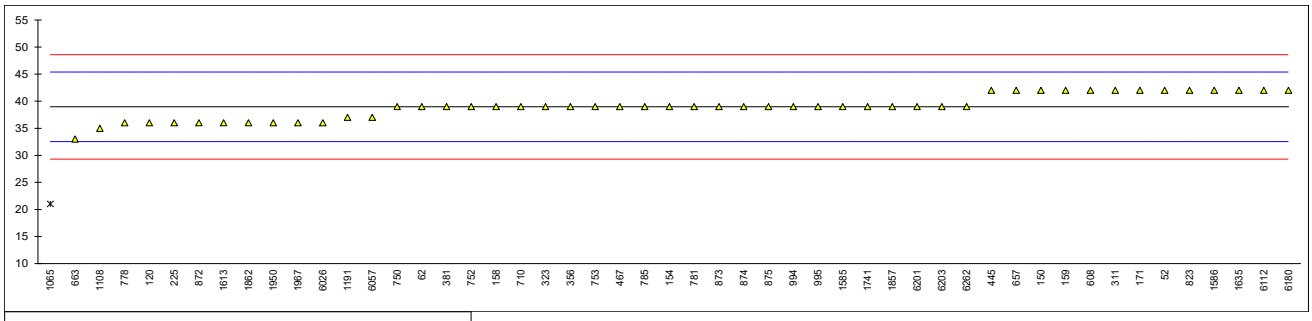


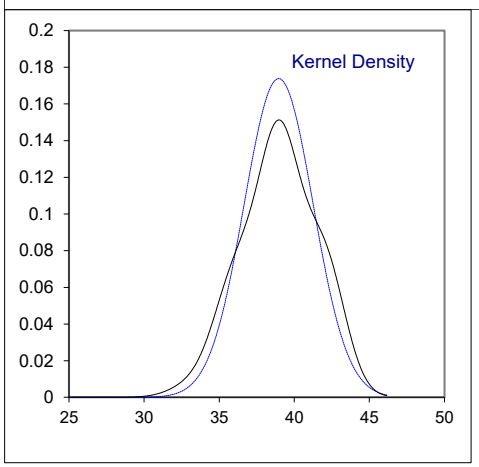


Determination of Pour Point Manual on sample #21250; results in °C

lab	method	value	mark	z(targ)	remarks
52	D97	42		0.95	
62	D97	39		0.01	
120	D97	36.0		-0.92	
140		-----		-----	
150	D97	42		0.95	
154	D97	39		0.01	
158		39		0.01	
159	D97	42.0		0.95	
171	D97	42		0.95	
225	D97	36		-0.92	
311	D97	42		0.95	
313		-----		-----	
317		-----		-----	
323	D97	39		0.01	
333		-----		-----	
356	D97	39		0.01	
381	ISO3016	39		0.01	
403		-----		-----	
445	D97	42		0.95	
467	ISO3016	39		0.01	
608	D97	42		0.95	
657	D97	42		0.95	
663	D97	33		-1.85	
710	D97	39		0.01	
750	D97	39		0.01	
752	D97	39		0.01	
753	D97	39		0.01	
778	D97	36		-0.92	
781	D97	39		0.01	
785	D97	39		0.01	
798		-----		-----	
823	ISO3016	42		0.95	
872	D97	36		-0.92	
873	D97	39		0.01	
874	D97	39		0.01	
875	D97	39		0.01	
994	D97	39		0.01	
995	D97	39.0		0.01	
1026		-----		-----	
1065	In house	21	R(0.01)	-5.59	
1081		-----		-----	
1108	D97	35		-1.23	
1140		-----		-----	
1191	ISO3016	37		-0.61	
1510		-----		-----	
1556		-----		-----	
1585	D97	39		0.01	
1586	D97	42		0.95	
1613	D97	36		-0.92	
1635	D97	42		0.95	
1676		-----		-----	
1741	ISO3016	39		0.01	
1852		-----		-----	
1857	D97	39		0.01	
1862	D97	36		-0.92	
1950	D97	36		-0.92	
1967	D97	36		-0.92	
6026	D97	36		-0.92	
6057	D97	37		-0.61	
6112	D97	42		0.95	
6180	D97	42		0.95	
6201	D97	39		0.01	
6203	D97	39		0.01	
6262	D97	39		0.01	

normality	OK
n	50
outliers	1
mean (n)	38.96
st.dev. (n)	2.294
R(calc.)	6.42
st.dev.(D97:17b)	3.214
R(D97:17b)	9

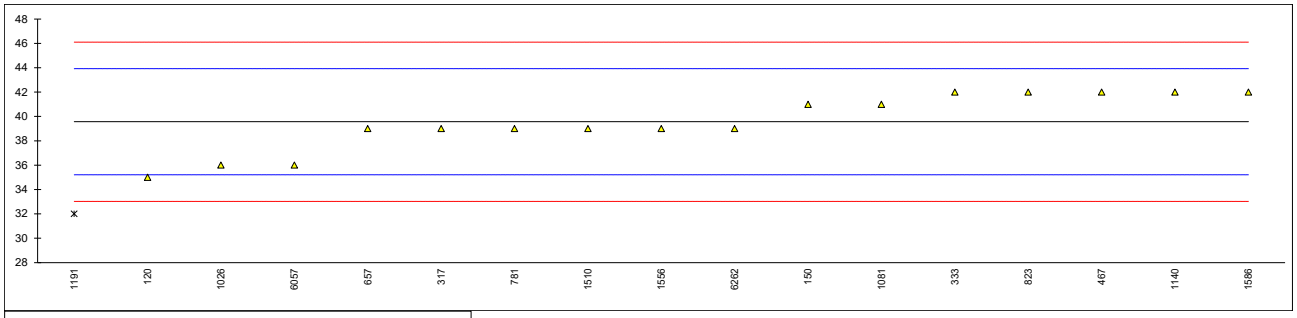


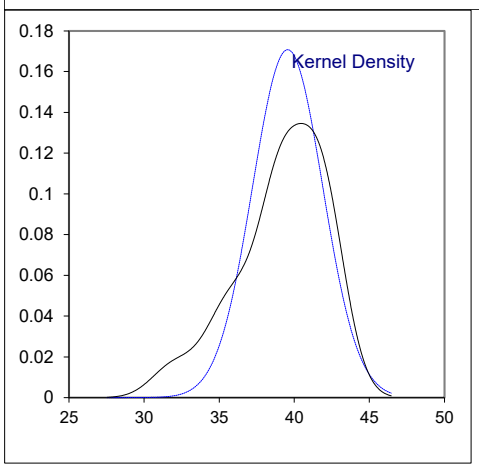


Determination of Pour Point Automated 3°C interval on sample #21250; results in °C

lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62		-----		-----	
120	D5950	35.0		-2.09	
140		-----		-----	
150	D5950	41		0.66	
154		-----		-----	
158		-----		-----	
159		-----		-----	
171		-----		-----	
225		-----		-----	
311		-----		-----	
313		-----		-----	
317	D5771	39.0		-0.26	
323		-----		-----	
333	D5950	42		1.12	
356		-----		-----	
381		-----		-----	
403		-----		-----	
445		-----		-----	
467	D6892	42		1.12	
608		-----		-----	
657	D5950	39		-0.26	
663		-----		-----	
710		-----		-----	
750		-----		-----	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	D5950	39		-0.26	
785		-----		-----	
798		-----		-----	
823	D5950	42		1.12	
872		-----		-----	
873		-----		-----	
874		-----		-----	
875		-----		-----	
994		-----		-----	
995		-----		-----	
1026	D5950	36		-1.64	
1065		-----		-----	
1081	D5950	41		0.66	
1108		-----		-----	
1140	D5950	42.0		1.12	
1191	D5950	32	G(0.05)	-3.47	
1510	D5950	39		-0.26	
1556	ISO3016	39		-0.26	
1585		-----		-----	
1586	D5950	42		1.12	
1613		-----		-----	
1635		-----		-----	
1676		-----		-----	
1741		-----		-----	
1852		-----		-----	
1857		-----		-----	
1862		-----		-----	
1950		-----		-----	
1967		-----		-----	
6026		-----		-----	
6057	D5950	36		-1.64	
6112		-----		-----	
6180		-----		-----	
6201		-----		-----	
6203		-----		-----	
6262	D5950	39		-0.26	

normality	OK
n	16
outliers	1
mean (n)	39.56
st.dev. (n)	2.337
R(calc.)	6.54
st.dev.(D5950:14)	2.179
R(D5950:14)	6.1

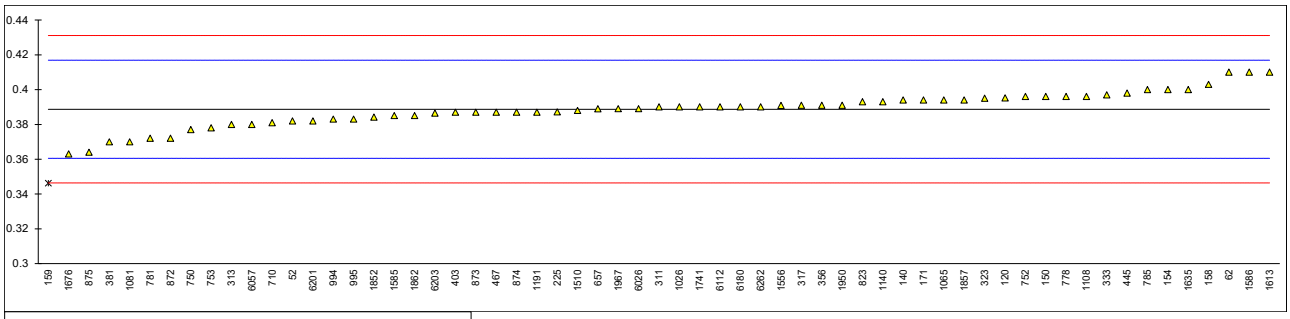


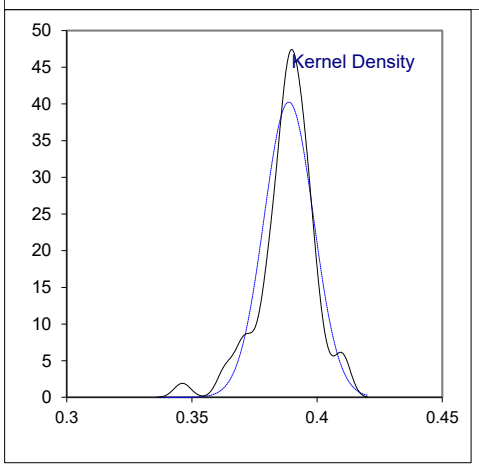


Determination of Total Sulfur on sample #21250; results in %M/M

lab	method	value	mark	z(targ)	remarks
52	D4294	0.382		-0.48	
62	D4294	0.410		1.51	
120	D4294	0.39516		0.46	
140	D4294	0.394	C	0.37	First reported 0.314
150	D4294	0.396		0.52	
154	D4294	0.400		0.80	
158	D4294	0.403		1.01	
159	D4294	0.3462	R(0.01)	-3.01	
171	D4294	0.394		0.37	
225	D4294	0.38713		-0.11	
311	ISO8754	0.39		0.09	
313	ISO8754	0.38		-0.62	
317	D2622	0.391		0.16	
323	D4294	0.395		0.45	
333	D4294	0.397		0.59	
356	D4294	0.391		0.16	
381	ISO8754	0.37		-1.33	
403	ISO8754	0.387		-0.12	
445	D4294	0.398		0.66	
467	D4294	0.387		-0.12	
608		-----		-----	
657	D4294	0.3889		0.01	
663		-----		-----	
710	D4294	0.381		-0.55	
750	D4294	0.377		-0.83	
752	ISO8754	0.396		0.52	
753	D4294	0.378		-0.76	
778	D4294	0.396		0.52	
781	D4294	0.372		-1.18	
785	D4294	0.400		0.80	
798		-----		-----	
823	ISO8754	0.393		0.30	
872	D4294	0.372		-1.18	
873	D4294	0.387		-0.12	
874	D4294	0.387		-0.12	
875	D4294	0.364		-1.75	
994	D4294	0.383		-0.40	
995	D4294	0.383		-0.40	
1026	D2622	0.39		0.09	
1065	D4294	0.394		0.37	
1081	D4294	0.370	C	-1.33	First reported 3.7
1108	D4294	0.396		0.52	
1140	IP336	0.393		0.30	
1191	ISO8754	0.387		-0.12	
1510	IP336	0.388		-0.05	
1556	ISO8754	0.3909		0.16	
1585	D4294	0.385		-0.26	
1586	D4294	0.41		1.51	
1613	D4294	0.410		1.51	
1635	D4294	0.40		0.80	
1676	ISO8754	0.3630		-1.82	
1741	ISO8754	0.39	C	0.09	First reported 2.12
1852	ISO8754	0.38416		-0.32	
1857	D4294	0.3940		0.37	
1862	ISO8754	0.385		-0.26	
1950	D4294	0.391		0.16	
1967	D4294	0.389		0.02	
6026	D4294	0.389		0.02	
6057	D4294	0.38		-0.62	
6112	D4294	0.39		0.09	
6180	D4294	0.390		0.09	
6201	D4294	0.382		-0.48	
6203	D2622	0.3865		-0.16	
6262	D4294	0.39		0.09	

normality	OK
n	60
outliers	1
mean (n)	0.3887
st.dev. (n)	0.00991
R(calc.)	0.0277
st.dev.(D4294:21)	0.01411
R(D4294:21)	0.0395





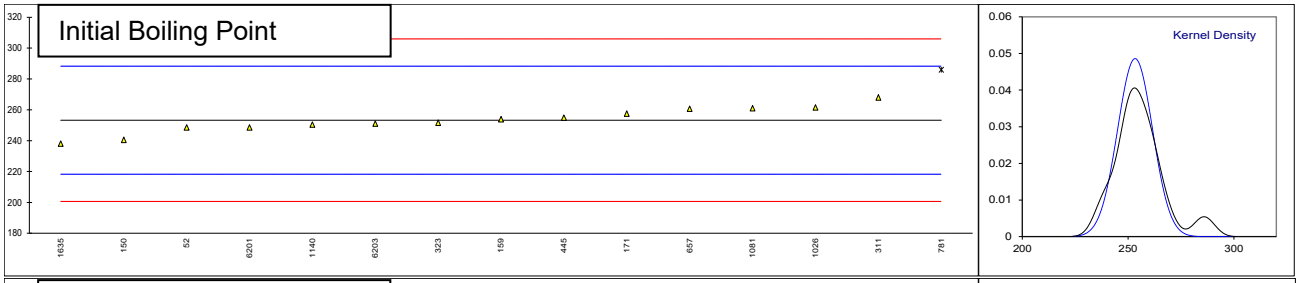
Determination of Simulated Distillation on sample #21250; result in °C

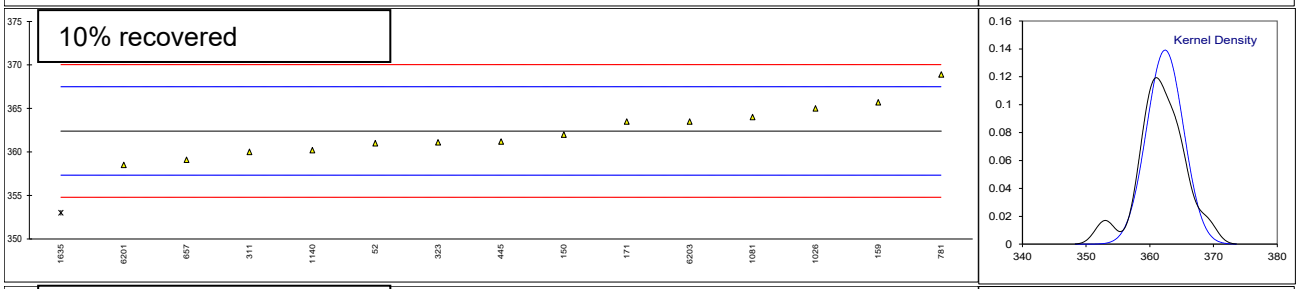
lab	method	IBP	10%	30%	50%	70%	90%	FBP
52	D6352	248.5	361.0	412.5	447.0	487.5	543.0	621.0
62		-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----
150	D6352	240.5 C	362.0 C	415.0 C	451.5 C	493.0 C	547.5 C	629.0 C
154		-----	-----	-----	-----	-----	-----	-----
158		-----	-----	-----	-----	-----	-----	-----
159	D2887	253.9	365.7	415.5	452.0	490.6	539.3	578.2 G(5)
171	D6352	257.5	363.5	414.5	450.5	492.0	547.5	633.5
225		-----	-----	-----	-----	-----	-----	-----
311	D7169	268.0	360.0	416.0	452.5	494.0	547.5	620.0
313		-----	-----	-----	-----	-----	-----	-----
317		-----	-----	-----	-----	-----	-----	-----
323	D6352	251.6	361.1	411.9	445.2	484.6 G(5)	539.8	618.3
333		-----	-----	-----	-----	-----	-----	-----
356		-----	-----	-----	-----	-----	-----	-----
381		-----	-----	-----	-----	-----	-----	-----
403		-----	-----	-----	-----	-----	-----	-----
445	D7169	254.9	361.2	412.4	448.3	490.1	544.4	626.8
467		-----	-----	-----	-----	-----	-----	-----
608		-----	-----	-----	-----	-----	-----	-----
657	D6352	260.6	359.1	411.1	447.1	490.5	549.4	620.6 C
663		-----	-----	-----	-----	-----	-----	-----
710		-----	-----	-----	-----	-----	-----	-----
750		-----	-----	-----	-----	-----	-----	-----
752		-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----
778		-----	-----	-----	-----	-----	-----	-----
781	D6352	285.9 G(5)	368.9	416.4	450.4	489.7	542.5	605.6
785		-----	-----	-----	-----	-----	-----	-----
798		-----	-----	-----	-----	-----	-----	-----
823		-----	-----	-----	-----	-----	-----	-----
872		-----	-----	-----	-----	-----	-----	-----
873		-----	-----	-----	-----	-----	-----	-----
874		-----	-----	-----	-----	-----	-----	-----
875		-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----
995		-----	-----	-----	-----	-----	-----	-----
1026	EN15199	261.5	365.0	417.0	452.0	491.0	542.0	610.0
1065		-----	-----	-----	-----	-----	-----	-----
1081	IP480	261	364	416	452	494	548	619
1108		-----	-----	-----	-----	-----	-----	-----
1140	D7169	250.4	360.2	414.0	451.6	493.0	544.8	615.2
1191		-----	-----	-----	-----	-----	-----	-----
1510		-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----
1585		-----	-----	-----	-----	-----	-----	-----
1586		-----	-----	-----	-----	-----	-----	-----
1613		-----	-----	-----	-----	-----	-----	-----
1635	D2887	238	353 G(5)	407 G(5)	443 G(5)	486	541	601
1676		-----	-----	-----	-----	-----	-----	-----
1741		-----	-----	-----	-----	-----	-----	-----
1852		-----	-----	-----	-----	-----	-----	-----
1857		-----	-----	-----	-----	-----	-----	-----
1862		-----	-----	-----	-----	-----	-----	-----
1950		-----	-----	-----	-----	-----	-----	-----
1967		-----	-----	-----	-----	-----	-----	-----
6026		-----	-----	-----	-----	-----	-----	-----
6057		-----	-----	-----	-----	-----	-----	-----
6112		-----	-----	-----	-----	-----	-----	-----
6180		-----	-----	-----	-----	-----	-----	-----
6201	D7500	248.5	358.5	411.5	448.0	490.5	545.5	641.5
6203	D6352	251.0	363.5	415.0	450.5	492.5	547.5	626.5
6262		-----	-----	-----	-----	-----	-----	-----
	normality	OK	OK	OK	OK	OK	OK	OK
	n	14	14	14	14	14	15	14
	outliers	1	1	1	1	1	0	1
	mean (n)	253.28	362.41	414.20	449.90	491.03	544.65	620.57
	st.dev. (n)	8.214	2.867	1.973	2.336	2.315	3.239	10.763
	R(calc.)	23.00	8.03	5.52	6.54	6.48	9.07	30.14
	st.dev.(D6352:19e1)	17.536	2.536	2.107	2.286	2.571	3.750	13.607
	R(D6352:19e1)	49.1	7.1	5.9	6.4	7.2	10.5	38.1

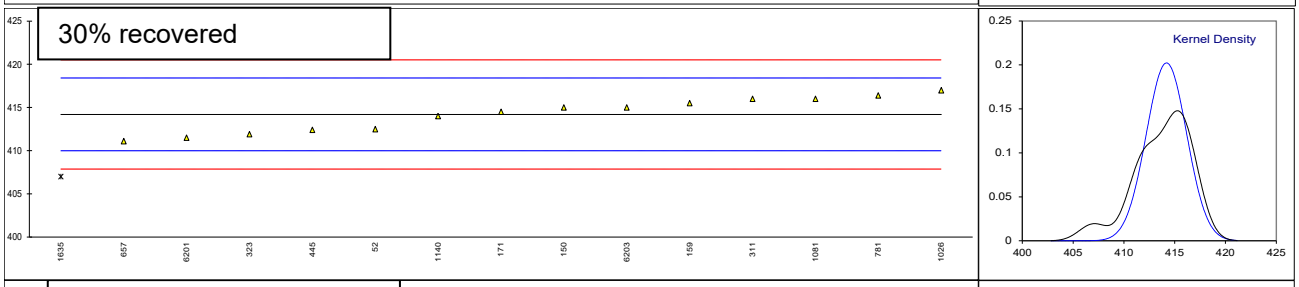
Lab 150: First reported respectively 212.0 ,322.5, 381.5, 420.5, 464.5, 534.5, 696.5
Lab 657: First reported 671.7

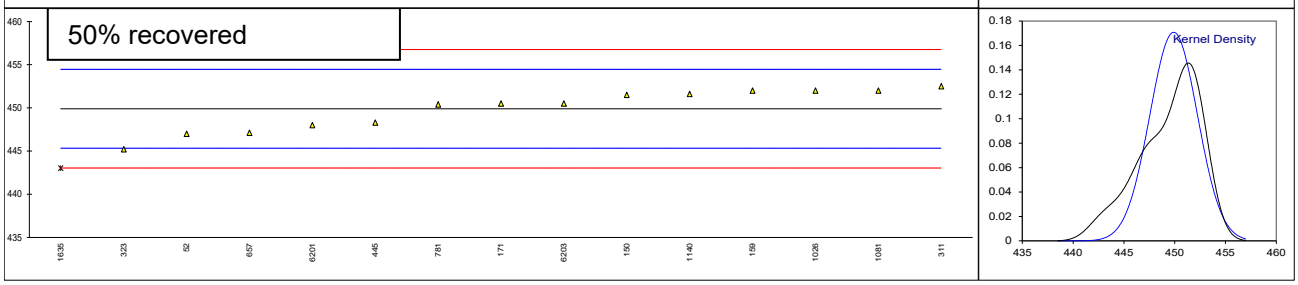
Z-scores

lab	IBP	10%	30%	50%	70%	90%	FBP
52	-0.27	-0.55	-0.81	-1.27	-1.37	-0.44	0.03
62	-----	-----	-----	-----	-----	-----	-----
120	-----	-----	-----	-----	-----	-----	-----
140	-----	-----	-----	-----	-----	-----	-----
150	-0.73	-0.16	0.38	0.70	0.77	0.76	0.62
154	-----	-----	-----	-----	-----	-----	-----
158	-----	-----	-----	-----	-----	-----	-----
159	0.04	1.30	0.62	0.92	-0.17	-1.43	-3.11
171	0.24	0.43	0.14	0.26	0.38	0.76	0.95
225	-----	-----	-----	-----	-----	-----	-----
311	0.84	-0.95	0.85	1.14	1.16	0.76	-0.04
313	-----	-----	-----	-----	-----	-----	-----
317	-----	-----	-----	-----	-----	-----	-----
323	-0.10	-0.52	-1.09	-2.06	-2.50	-1.29	-0.17
333	-----	-----	-----	-----	-----	-----	-----
356	-----	-----	-----	-----	-----	-----	-----
381	-----	-----	-----	-----	-----	-----	-----
403	-----	-----	-----	-----	-----	-----	-----
445	0.09	-0.48	-0.85	-0.70	-0.36	-0.07	0.46
467	-----	-----	-----	-----	-----	-----	-----
608	-----	-----	-----	-----	-----	-----	-----
657	0.42	-1.30	-1.47	-1.22	-0.21	1.27	0.00
663	-----	-----	-----	-----	-----	-----	-----
710	-----	-----	-----	-----	-----	-----	-----
750	-----	-----	-----	-----	-----	-----	-----
752	-----	-----	-----	-----	-----	-----	-----
753	-----	-----	-----	-----	-----	-----	-----
778	-----	-----	-----	-----	-----	-----	-----
781	1.86	2.56	1.04	0.22	-0.52	-0.57	-1.10
785	-----	-----	-----	-----	-----	-----	-----
798	-----	-----	-----	-----	-----	-----	-----
823	-----	-----	-----	-----	-----	-----	-----
872	-----	-----	-----	-----	-----	-----	-----
873	-----	-----	-----	-----	-----	-----	-----
874	-----	-----	-----	-----	-----	-----	-----
875	-----	-----	-----	-----	-----	-----	-----
994	-----	-----	-----	-----	-----	-----	-----
995	-----	-----	-----	-----	-----	-----	-----
1026	0.47	1.02	1.33	0.92	-0.01	-0.71	-0.78
1065	-----	-----	-----	-----	-----	-----	-----
1081	0.44	0.63	0.85	0.92	1.16	0.89	-0.12
1108	-----	-----	-----	-----	-----	-----	-----
1140	-0.16	-0.87	-0.09	0.74	0.77	0.04	-0.39
1191	-----	-----	-----	-----	-----	-----	-----
1510	-----	-----	-----	-----	-----	-----	-----
1556	-----	-----	-----	-----	-----	-----	-----
1585	-----	-----	-----	-----	-----	-----	-----
1586	-----	-----	-----	-----	-----	-----	-----
1613	-----	-----	-----	-----	-----	-----	-----
1635	-0.87	-3.71	-3.42	-3.02	-1.96	-0.97	-1.44
1676	-----	-----	-----	-----	-----	-----	-----
1741	-----	-----	-----	-----	-----	-----	-----
1852	-----	-----	-----	-----	-----	-----	-----
1857	-----	-----	-----	-----	-----	-----	-----
1862	-----	-----	-----	-----	-----	-----	-----
1950	-----	-----	-----	-----	-----	-----	-----
1967	-----	-----	-----	-----	-----	-----	-----
6026	-----	-----	-----	-----	-----	-----	-----
6057	-----	-----	-----	-----	-----	-----	-----
6112	-----	-----	-----	-----	-----	-----	-----
6180	-----	-----	-----	-----	-----	-----	-----
6201	-0.27	-1.54	-1.28	-0.83	-0.21	0.23	1.54
6203	-0.13	0.43	0.38	0.26	0.57	0.76	0.44
6262	-----	-----	-----	-----	-----	-----	-----


Initial Boiling Point
Kernel Density


10% recovered
Kernel Density


30% recovered
Kernel Density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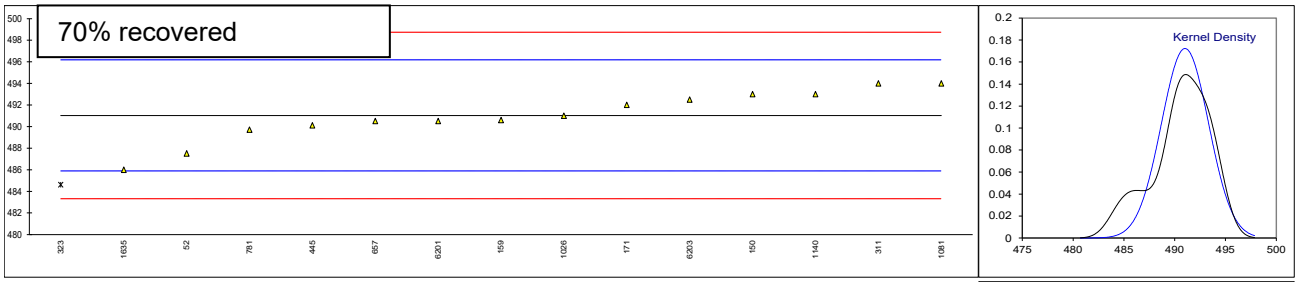
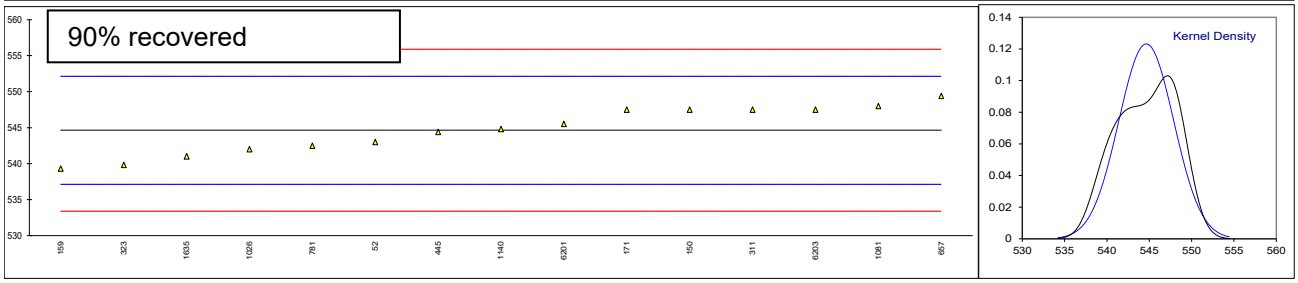
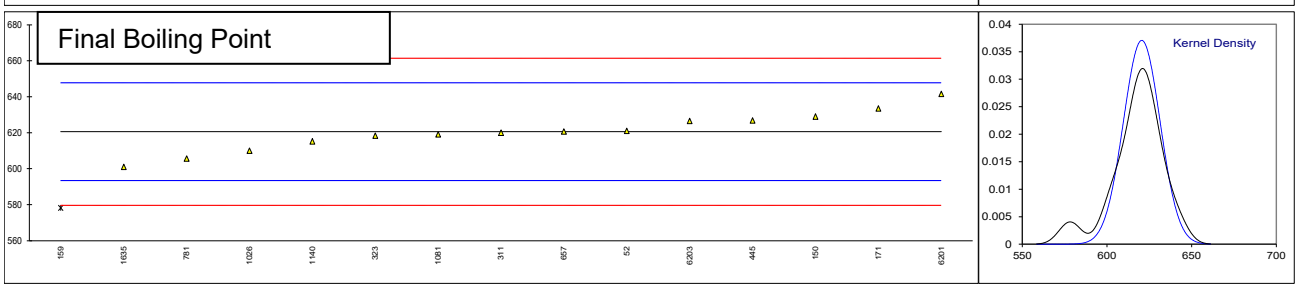
Kernel Density


70% recovered
Kernel Density


90% recovered
Kernel Density


Final Boiling Point
Kernel Density

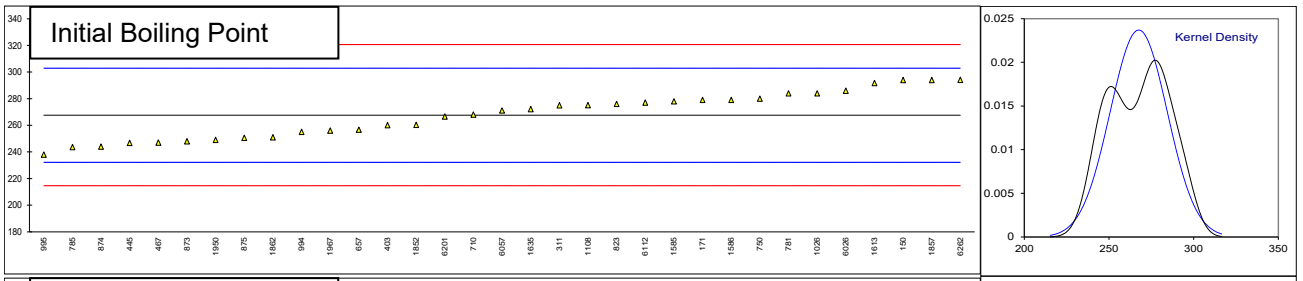
Determination of Distillation at 10 mmHg as AET on sample #21250; result in °C

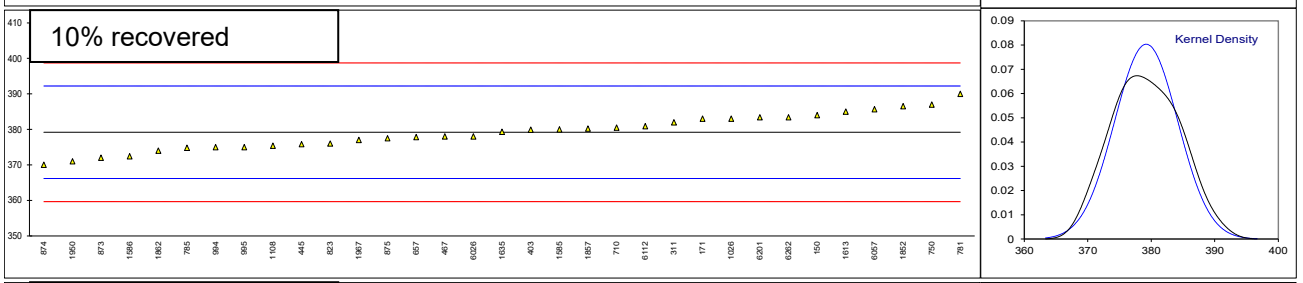
lab	method	IBP	10%	30%	50%	70%	90%	FBP
52		-----	-----	-----	-----	-----	-----	-----
62		-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----
150	D1160	294	384	424	456	493	547	554
154		-----	-----	-----	-----	-----	-----	-----
158		-----	-----	-----	-----	-----	-----	-----
159		-----	-----	-----	-----	-----	-----	-----
171	D1160	279	383	428	460	494	548	557
225		-----	-----	-----	-----	-----	-----	-----
311	D1160	275	382	424	455	490	547	558
313		-----	-----	-----	-----	-----	-----	-----
317		-----	-----	-----	-----	-----	-----	-----
323		-----	-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	-----
356		-----	-----	-----	-----	-----	-----	-----
381		-----	-----	-----	-----	-----	-----	-----
403	D1160	260.1	379.9	422.9	453.9	489.6	538.9	577.9
445	D1160	246.7	375.8	421.4	454.8	492.5	543.8	549.9
467	D1160	247.0	378.0	420.0	454.0	490.0	541.0	543.0
608		-----	-----	-----	-----	-----	-----	-----
657	D1160	256.7	377.8	423.2	456.5	495.3	549.7	550.7
663		-----	-----	-----	-----	-----	-----	-----
710	D1160	268.0	380.5	423.4	456.5	491.4	537.0	545.0
750	D1160	280	387	428	459	492	546	554
752		-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----
778		-----	-----	-----	-----	-----	-----	-----
781	D1160	284	390	431	461	495	549	554
785	D1160	243.6	374.8	423.9	456.3	494.1	-----	520.4 R(5)
798		-----	-----	-----	-----	-----	-----	-----
823	D1160	276	376	420	453	491	543	556
872		-----	-----	-----	-----	-----	-----	-----
873	D1160	248	372	422	446	481 R(5)	536	548
874	D1160	244	370	421	448	486	538	550
875	D1160	250.6	377.5	421.5	458.1	492.9	526.9 R(5)	528.5
994	D1160	255.0	375.0	421.0	456.0	493.0	545.0	555.0
995	D1160	238.0	375.0	421.0	455.0	491.0	548.0	553.0
1026	D1160	284	383	425	455	488	535	568
1065		-----	-----	-----	-----	-----	-----	-----
1081		-----	-----	-----	-----	-----	-----	-----
1108	D1160	275.2 C	375.4 C	418.2 C	451.7 C	487.8 C	540.3 C	561.2 C
1140		-----	-----	-----	-----	-----	-----	-----
1191		-----	-----	-----	-----	-----	-----	-----
1510		-----	-----	-----	-----	-----	-----	-----
1556		-----	-----	-----	-----	-----	-----	-----
1585	D1160	278	380	425	457	494	546	554
1586	D1160	279.0	372.4	418.7	451.0	486.3	532.4	534.0
1613	D1160	291.7	385.0	422.0	455.3	496.3	548.4	549.5
1635	D1160	272.2	379.3	424.7	457.0	493.5	544.5	565.8
1676		-----	-----	-----	-----	-----	-----	-----
1741		-----	-----	-----	-----	-----	-----	-----
1852	D1160	260.4	386.5	427.6	459.4	494.9	543.9	-----
1857	D1160	294.0	380.2	422.2	452.5	489.0	540.4	550.7
1862	D1160	251	374	421	457	492	547	554
1950	D1160	249	371	419	450	486	540	552
1967	D1160	256	377	423	457	493	546	555
6026	D1160	286	378	423	453	489	542	552
6057	D1160	271.1	385.7	428.8	462.7	498.7	556.4	593.4 R(5)
6112	D1160	277.1	380.9	423.6	456.4	493.3	541.5	553.1
6180		-----	-----	-----	-----	-----	-----	-----
6201	D1160	266.5	383.4	426.3	458.5	495.1	547.1	556.1
6203		-----	-----	-----	-----	-----	-----	-----
6262	D1160	294.1	383.4	425.6	457.1	493.5	544.0	549.1
	normality	OK	OK	OK	OK	OK	OK	not OK
	n	33	33	33	33	32	31	30
	outliers	0	0	0	0	1	1	2
	mean (n)	267.61	379.20	423.33	455.45	491.91	543.62	552.95
	st.dev. (n)	16.834	4.965	3.042	3.536	3.090	5.038	9.016
	R(calc.)	47.14	13.90	8.52	9.90	8.65	14.11	25.25
	st.dev.(D1160:18)	17.660	6.519	4.328	4.144	3.553	3.438	9.605
	R(D1160:18)	49.45	18.25	12.12	11.60	9.95	9.63	26.89

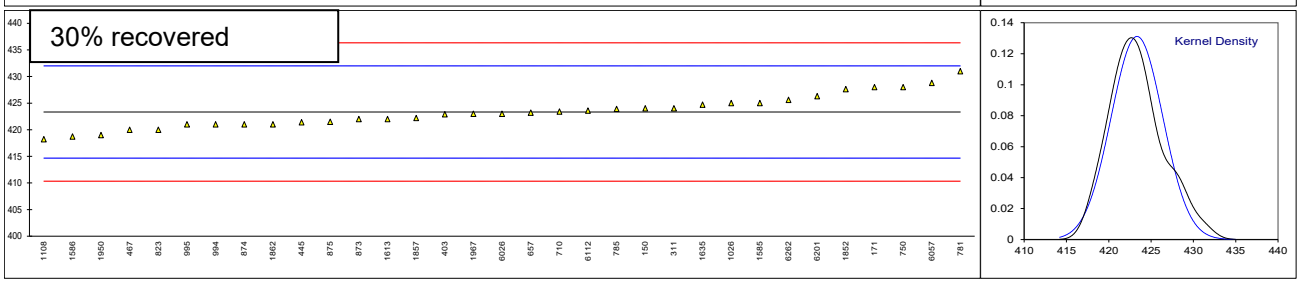
Lab 1108: First reported respectively 190.4, 370.4, 413.1, 441.4, 473.5, 512.8,536.2

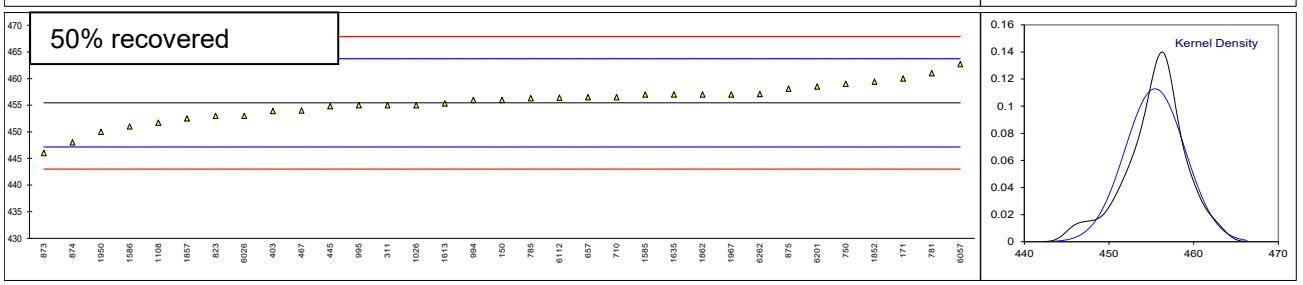
z-scores

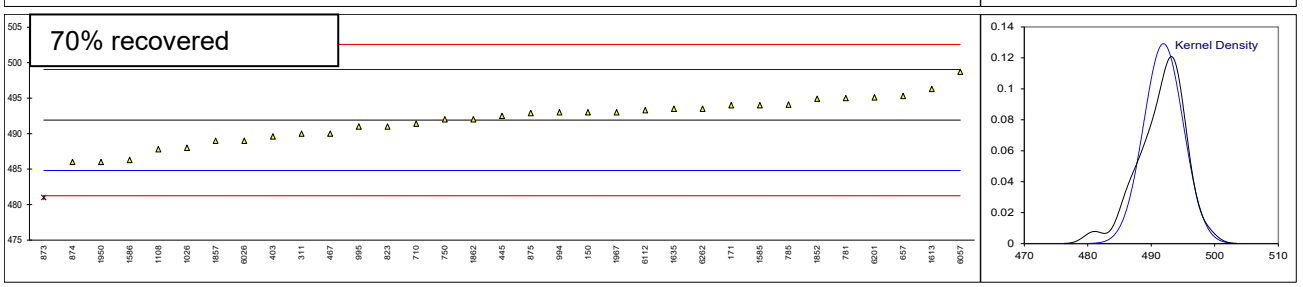
lab	IBP	10%	30%	50%	70%	90%	FBP
52	-----	-----	-----	-----	-----	-----	-----
62	-----	-----	-----	-----	-----	-----	-----
120	-----	-----	-----	-----	-----	-----	-----
140	-----	-----	-----	-----	-----	-----	-----
150	1.49	0.74	0.15	0.13	0.31	0.98	0.11
154	-----	-----	-----	-----	-----	-----	-----
158	-----	-----	-----	-----	-----	-----	-----
159	-----	-----	-----	-----	-----	-----	-----
171	0.65	0.58	1.08	1.10	0.59	1.27	0.42
225	-----	-----	-----	-----	-----	-----	-----
311	0.42	0.43	0.15	-0.11	-0.54	0.98	0.53
313	-----	-----	-----	-----	-----	-----	-----
317	-----	-----	-----	-----	-----	-----	-----
323	-----	-----	-----	-----	-----	-----	-----
333	-----	-----	-----	-----	-----	-----	-----
356	-----	-----	-----	-----	-----	-----	-----
381	-----	-----	-----	-----	-----	-----	-----
403	-0.43	0.11	-0.10	-0.37	-0.65	-1.37	2.60
445	-1.18	-0.52	-0.45	-0.16	0.17	0.05	-0.32
467	-1.17	-0.18	-0.77	-0.35	-0.54	-0.76	-1.04
608	-----	-----	-----	-----	-----	-----	-----
657	-0.62	-0.21	-0.03	0.25	0.95	1.77	-0.23
663	-----	-----	-----	-----	-----	-----	-----
710	0.02	0.20	0.02	0.25	-0.14	-1.93	-0.83
750	0.70	1.20	1.08	0.86	0.02	0.69	0.11
752	-----	-----	-----	-----	-----	-----	-----
753	-----	-----	-----	-----	-----	-----	-----
778	-----	-----	-----	-----	-----	-----	-----
781	0.93	1.66	1.77	1.34	0.87	1.56	0.11
785	-1.36	-0.67	0.13	0.21	0.62	-----	-3.39
798	-----	-----	-----	-----	-----	-----	-----
823	0.48	-0.49	-0.77	-0.59	-0.26	-0.18	0.32
872	-----	-----	-----	-----	-----	-----	-----
873	-1.11	-1.10	-0.31	-2.28	-3.07	-2.22	-0.52
874	-1.34	-1.41	-0.54	-1.80	-1.66	-1.64	-0.31
875	-0.96	-0.26	-0.42	0.64	0.28	-4.86	-2.55
994	-0.71	-0.64	-0.54	0.13	0.31	0.40	0.21
995	-1.68	-0.64	-0.54	-0.11	-0.26	1.27	0.01
1026	0.93	0.58	0.39	-0.11	-1.10	-2.51	1.57
1065	-----	-----	-----	-----	-----	-----	-----
1081	-----	-----	-----	-----	-----	-----	-----
1108	0.43	-0.58	-1.19	-0.90	-1.16	-0.97	0.86
1140	-----	-----	-----	-----	-----	-----	-----
1191	-----	-----	-----	-----	-----	-----	-----
1510	-----	-----	-----	-----	-----	-----	-----
1556	-----	-----	-----	-----	-----	-----	-----
1585	0.59	0.12	0.39	0.38	0.59	0.69	0.11
1586	0.65	-1.04	-1.07	-1.07	-1.58	-3.26	-1.97
1613	1.36	0.89	-0.31	-0.04	1.23	1.39	-0.36
1635	0.26	0.02	0.32	0.38	0.45	0.26	1.34
1676	-----	-----	-----	-----	-----	-----	-----
1741	-----	-----	-----	-----	-----	-----	-----
1852	-0.41	1.12	0.99	0.95	0.84	0.08	-----
1857	1.49	0.15	-0.26	-0.71	-0.82	-0.94	-0.23
1862	-0.94	-0.80	-0.54	0.38	0.02	0.98	0.11
1950	-1.05	-1.26	-1.00	-1.31	-1.66	-1.05	-0.10
1967	-0.66	-0.34	-0.08	0.38	0.31	0.69	0.21
6026	1.04	-0.18	-0.08	-0.59	-0.82	-0.47	-0.10
6057	0.20	1.00	1.26	1.75	1.91	3.72	4.21
6112	0.54	0.26	0.06	0.23	0.39	-0.62	0.02
6180	-----	-----	-----	-----	-----	-----	-----
6201	-0.06	0.64	0.69	0.74	0.90	1.01	0.33
6203	-----	-----	-----	-----	-----	-----	-----
6262	1.50	0.64	0.52	0.40	0.45	0.11	-0.40

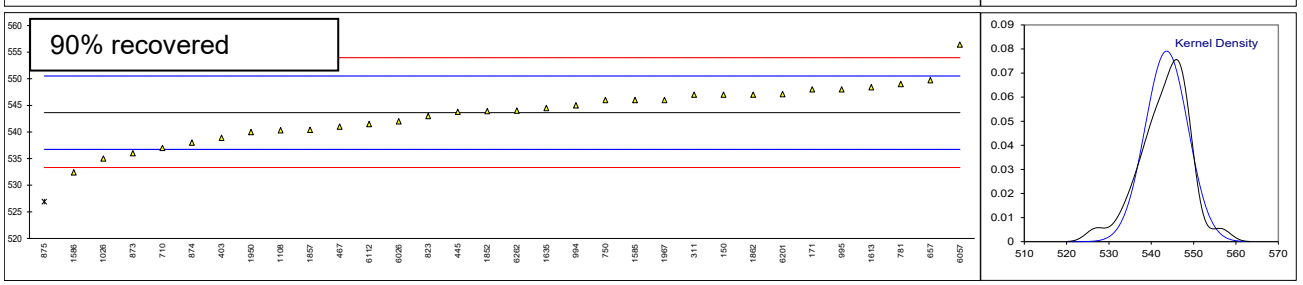

Initial Boiling Point
Kernel Density

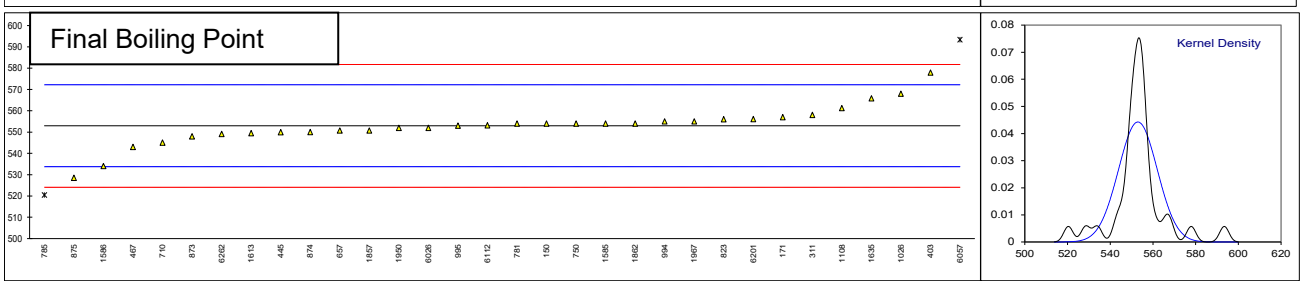

10% recovered
Kernel Density


30% recovered
Kernel Density


50% recovered
Kernel Density


70% recovered
Kernel Density

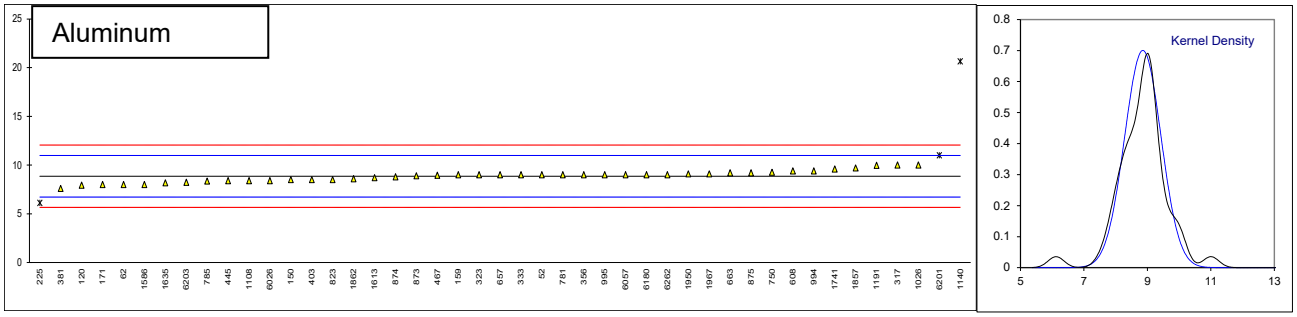

90% recovered
Kernel Density

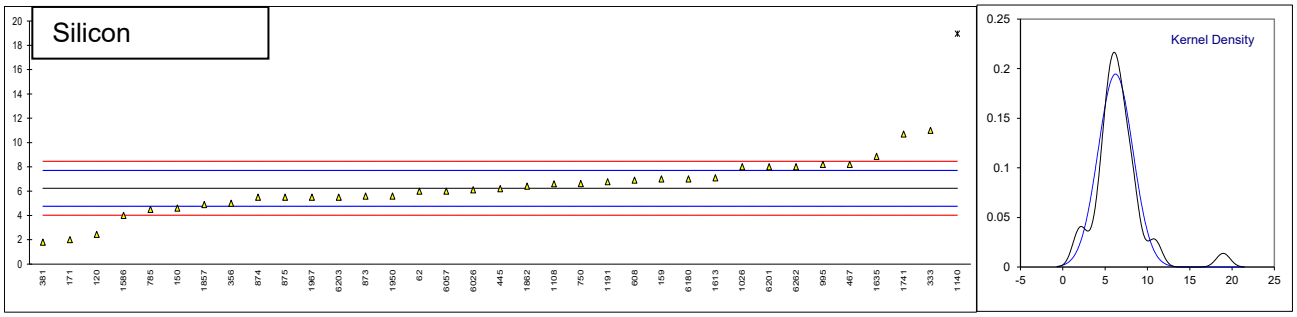

Final Boiling Point
Kernel Density

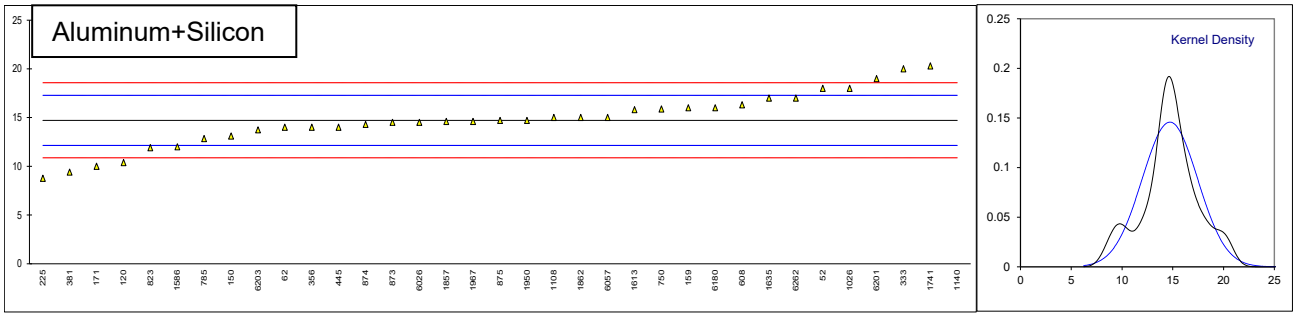
Determination of Aluminum as Al, Silicon as Si and sum Al and Si on sample #21251; results in mg/kg

lab	method	Al	mark	z(targ)	Si	mark	z(targ)	Sum Al+Si	mark	z(targ)
52	IP501	9		0.14	<10		-----	18		2.56
62	IP501	8		-0.80	6		-0.32	14		-0.56
120	IP501	7.933		-0.86	2.441		-5.13	10.374		-3.38
140		-----		-----	-----		-----	-----		-----
150	IP501	8.5	C	-0.33	4.6	C	-2.21	13.1	C	-1.26
154		-----		-----	-----		-----	-----		-----
158		-----		-----	-----		-----	-----		-----
159	IP501	9		0.14	7		1.03	16		1.00
171	IP501	8		-0.80	2		-5.73	10		-3.67
225	IP501	6.12	R(0.01)	-2.57	<10		-----	8.76		-4.63
311		-----		-----	-----		-----	-----		-----
313		-----		-----	-----		-----	-----		-----
317	IP501	10		1.08	<10		-----	<15		-----
323	IP501	9		0.14	< 10		-----	< 19		-----
333	IP501	9.0		0.14	11.0		6.44	20		4.11
356	IP501	9		0.14	5		-1.67	14		-0.56
381	IP501	7.6		-1.18	1.8		-6.00	9.4		-4.14
403	IP501	8.5		-0.33	-----		-----	-----		-----
445	IP501	8.4		-0.43	6.2		-0.05	14		-0.56
467	IP501	8.96		0.10	8.20		2.65	-----		-----
608	IP501	9.4		0.51	6.9		0.90	16.3		1.23
657	IP501	9		0.14	<10		-----	<15		-----
663	IP501	9.2		0.32	<10		-----	-----		-----
710		-----		-----	-----		-----	-----		-----
750	IP501	9.26		0.38	6.62		0.52	15.88		0.91
752		-----		-----	-----		-----	-----		-----
753		-----		-----	-----		-----	-----		-----
778		-----		-----	-----		-----	-----		-----
781	IP501	9		0.14	<10		-----	<15		-----
785	IP470	8.35		-0.47	4.5		-2.35	12.85		-1.45
798		-----		-----	-----		-----	-----		-----
823	IP501	8.5	C	-0.33	<10		-----	11.9	C	-2.19
872		-----		-----	-----		-----	-----		-----
873	IP470	8.9		0.04	5.6		-0.86	14.5		-0.17
874	IP501	8.8		-0.05	5.5		-1.00	14.3		-0.32
875	IP501	9.2		0.32	5.5		-1.00	14.7		-0.01
994	IP501	9.4		0.51	<10		-----	-----		-----
995	IP470	9.0		0.14	8.2		2.65	-----		-----
1026	IP501	10		1.08	8		2.38	18		2.56
1065		-----		-----	-----		-----	-----		-----
1081		-----		-----	-----		-----	-----		-----
1108	IP470	8.4		-0.43	6.6		0.49	15.0		0.22
1140	IP501	20.64	R(0.01)	11.06	18.95	R(0.01)	17.19	39.59	R(0.01)	19.35
1191	IP501	9.97		1.05	6.77		0.72	-----		-----
1510		-----		-----	-----		-----	-----		-----
1556		-----		-----	-----		-----	-----		-----
1585		-----		-----	-----		-----	-----		-----
1586	IP501	8		-0.80	4		-3.03	12		-2.11
1613	IP501	8.7		-0.14	7.1		1.17	15.8		0.84
1635	IP501	8.17		-0.64	8.86		3.54	17.00		1.78
1676		-----		-----	-----		-----	-----		-----
1741	IP501	9.60		0.70	10.70		6.03	20.3		4.35
1852		-----		-----	-----		-----	-----		-----
1857	IP501	9.7		0.79	4.9		-1.81	14.6		-0.09
1862	IP501	8.6		-0.24	6.4		0.22	15.0		0.22
1950	IP470	9.1		0.23	5.6		-0.86	14.7		-0.01
1967	IP470	9.1		0.23	5.5		-1.00	14.6		-0.09
6026	IP470	8.4		-0.43	6.1		-0.19	14.5		-0.17
6057	IP501	9		0.14	6		-0.32	15		0.22
6112		-----		-----	-----		-----	-----		-----
6180	IP501	9		0.14	7		1.03	16		1.00
6201	IP501	11	R(0.05)	2.01	8		2.38	19		3.33
6203	IP501	8.24		-0.58	5.50		-1.00	13.74		-0.76
6262	IP501	9		0.14	8		2.38	17		1.78
	normality	OK			OK			OK		
	n	42			34			34		
	outliers	3			1			1		
	mean (n)	8.854			6.238			14.715		
	st.dev. (n)	0.5697			2.0497			2.7361		
	R(calc.)	1.595			5.739			7.661		
	st.dev.(IP501:05)	1.0657			0.7396			1.2852		
	R(IP501:05)	2.984			2.071			3.599		

Lab 150: First reported respectively 11.9, 12.8, 25
Lab 823: first reported respectively 6.5, 9.9


Aluminum
Kernel Density


Silicon
Kernel Density


Aluminum+Silicon
Kernel Density

Determination of Arsenic as As on sample #21251; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62		-----		-----	
120		-----		-----	
140		-----		-----	
150	IP501	<1		-----	
154		-----		-----	
158		-----		-----	
159		-----		-----	
171		0		-----	
225		-----		-----	
311		-----		-----	
313		-----		-----	
317		-----		-----	
323		-----		-----	
333		-----		-----	
356		-----		-----	
381	INH-118	0.038		-----	
403		-----		-----	
445		-----		-----	
467		-----		-----	
608		-----		-----	
657		-----		-----	
663		-----		-----	
710		-----		-----	
750		-----		-----	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	UOP986	0.066		-----	
785		-----		-----	
798		-----		-----	
823	IP501	0.1		-----	
872		-----		-----	
873		-----		-----	
874		-----		-----	
875		-----		-----	
994		-----		-----	
995		-----		-----	
1026		-----		-----	
1065		-----		-----	
1081		<0.1		-----	
1108		-----		-----	
1140		-----		-----	
1191		-----		-----	
1510		-----		-----	
1556		-----		-----	
1585		-----		-----	
1586		-----		-----	
1613		-----		-----	
1635		-----		-----	
1676		-----		-----	
1741		-----		-----	
1852		-----		-----	
1857	UOP986	0.0365		-----	
1862		-----		-----	
1950		-----		-----	
1967		-----		-----	
6026		-----		-----	
6057		-----		-----	
6112		-----		-----	
6180		-----		-----	
6201	In house	<1		-----	
6203	In house	<1		-----	
6262		-----		-----	
	n	9			
	mean (n)	<1			

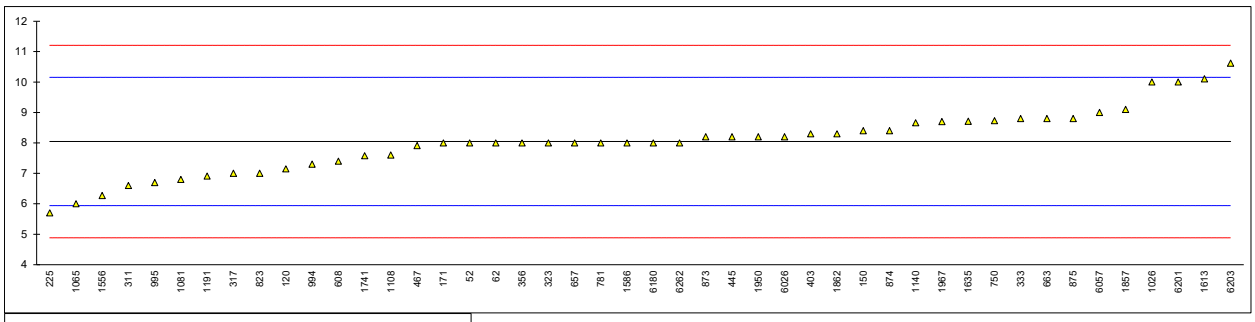
Determination of Copper as Cu on sample #21251; results in mg/kg

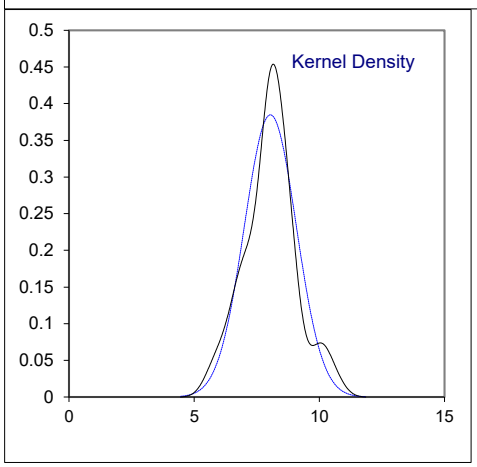
lab	method	value	mark	z(targ)	remarks
52		-----		-----	
62		-----		-----	
120		-----		-----	
140		-----		-----	
150	IP501	<1		-----	
154		-----		-----	
158		-----		-----	
159		-----		-----	
171	IP621	0		-----	
225	IP501	0.30		-----	
311	IP621	<01		-----	
313		-----		-----	
317		-----		-----	
323	IP501	< 1		-----	
333		-----		-----	
356		-----		-----	
381		-----		-----	
403		-----		-----	
445	IP501	0.16		-----	
467		-----		-----	
608	IP501	0.03		-----	
657	IP501	<1		-----	
663		-----		-----	
710		-----		-----	
750		-----		-----	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	IP501	<1		-----	
785	IP470	0.03		-----	
798		-----		-----	
823	IP501	0.3		-----	
872		-----		-----	
873	IP621	<1		-----	
874	IP501	<1		-----	
875	IP501	0.1		-----	
994	IP501	<1		-----	
995	IP470	0.6		-----	
1026		-----		-----	
1065		-----		-----	
1081	IP621	<0.1		-----	
1108		-----		-----	
1140		-----		-----	
1191	In house	0.01		-----	
1510		-----		-----	
1556	IP621	0.011		-----	
1585		-----		-----	
1586	IP501	<1		-----	
1613	IP501	0.7		-----	
1635	D5185	<0,1		-----	
1676		-----		-----	
1741	IP501	<1		-----	
1852		-----		-----	
1857	IP621	<0.1		-----	
1862	IP621	<0.1		-----	
1950	IP621	<0.1		-----	
1967	IP621	less 0.1		-----	
6026	IP470	Less 0.1		-----	
6057	IP501	1		-----	
6112		-----		-----	
6180	IP501	<0.1		-----	
6201	IP501	<0.1		-----	
6203		-----		-----	
6262	IP501	<1		-----	
	n	32			
	mean (n)	<1			

Determination of Iron as Fe on sample #21251; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52	IP501	8		-0.04	
62	IP501	8		-0.04	
120	IP501	7.147		-0.85	
140		-----		-----	
150	IP501	8.4		0.34	
154		-----		-----	
158		-----		-----	
159		-----		-----	
171	IP501	8		-0.04	
225	IP501	5.70		-2.23	
311	IP621	6.6		-1.37	
313		-----		-----	
317	IP501	7		-0.99	
323	IP501	8		-0.04	
333	IP501	8.8		0.71	
356	IP501	8		-0.04	
381		-----		-----	
403	D7111	8.3		0.24	
445	IP501	8.2		0.15	
467	IP501	7.91		-0.13	
608	IP501	7.4		-0.61	
657	IP501	8		-0.04	
663	IP501	8.8		0.71	
710		-----		-----	
750	IP501	8.73		0.65	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	IP501	8		-0.04	
785		-----		-----	
798		-----		-----	
823	IP501	7.0		-0.99	
872		-----		-----	
873	IP621	8.2		0.15	
874	IP501	8.4		0.34	
875	IP501	8.8		0.71	
994	IP501	7.3		-0.71	
995	IP470	6.7		-1.28	
1026	IP501	10		1.85	
1065	IP470	6.0		-1.94	
1081	IP501	6.8		-1.18	
1108	IP470	7.6		-0.42	
1140	IP501	8.663		0.58	
1191	ISO10478	6.91		-1.08	
1510		-----		-----	
1556	IP621	6.27	C	-1.69	First reported 2.492
1585		-----		-----	
1586	IP501	8		-0.04	
1613	IP501	10.1		1.95	
1635	IP501	8.71		0.63	
1676		-----		-----	
1741	IP501	7.58		-0.44	
1852		-----		-----	
1857	IP501	9.1		1.00	
1862	IP501	8.3		0.24	
1950	IP470	8.2		0.15	
1967	IP470	8.7		0.62	
6026	IP470	8.2		0.15	
6057	IP501	9		0.90	
6112		-----		-----	
6180	IP501	8		-0.04	
6201	IP501	10		1.85	
6203	IP501	10.62		2.44	
6262	IP501	8		-0.04	

normality	OK
n	46
outliers	0
mean (n)	8.047
st.dev. (n)	1.0372
R(calc.)	2.904
st.dev.(IP501:05)	1.0543
R(IP501:05)	2.952

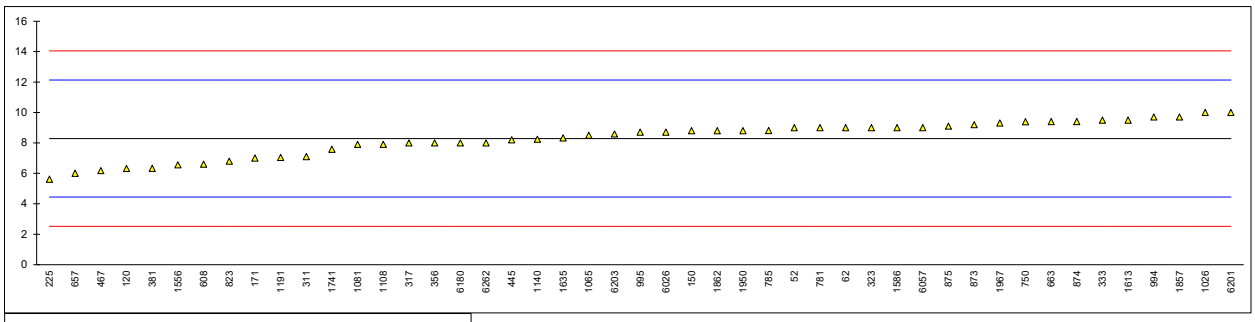

12
11
10
9
8
7
6
5
4
225 1065 1556 311 995 1081 1191 317 823 120 994 608 1741 1108 467 171 52 62 356 323 657 781 1586 6180 6262 873 445 1950 6026 403 1862 150 874 1140 1967 1635 750 333 663 875 6057 1857 1026 6201 1613 6203

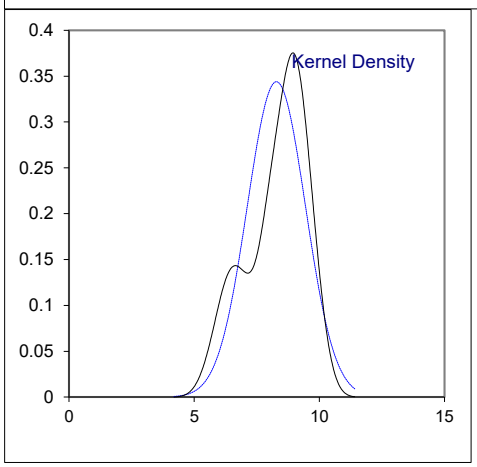

Kernel Density
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5
10
15

Determination of Nickel as Ni on sample #21251; results in mg/kg

lab	method	value	mark	z(targ)	Remarks
52	IP501	9		0.37	
62	IP501	9		0.37	
120	IP501	6.316		-1.03	
140		-----		-----	
150	IP501	8.8		0.27	
154		-----		-----	
158		-----		-----	
159		-----		-----	
171	IP501	7		-0.67	
225	IP501	5.62		-1.39	
311	IP621	7.1		-0.62	
313		-----		-----	
317	IP501	8		-0.15	
323	IP501	9		0.37	
333	IP501	9.5		0.63	
356	IP501	8		-0.15	
381	IP501	6.33		-1.02	
403		-----		-----	
445	IP501	8.2		-0.05	
467	IP501	6.18		-1.10	
608	IP501	6.6		-0.88	
657	IP501	6		-1.19	
663	IP501	9.4		0.58	
710		-----		-----	
750	IP501	9.39		0.57	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	IP501	9		0.37	
785	IP470	8.81		0.27	
798		-----		-----	
823	IP501	6.8		-0.77	
872		-----		-----	
873	IP621	9.2		0.47	
874	IP501	9.4		0.58	
875	IP501	9.1		0.42	
994	IP501	9.7		0.73	
995	IP470	8.7		0.21	
1026	IP501	10		0.89	
1065	IP470	8.5		0.11	
1081	IP501	7.9		-0.20	
1108	D5708	7.9		-0.20	
1140	IP501	8.236		-0.03	
1191	ISO10478	7.04		-0.65	
1510		-----		-----	
1556	IP621	6.56	C	-0.90	First reported 2.619
1585		-----		-----	
1586	IP501	9		0.37	
1613	IP501	9.5		0.63	
1635	IP501	8.33		0.02	
1676		-----		-----	
1741	IP501	7.58		-0.37	
1852		-----		-----	
1857	IP501	9.7		0.73	
1862	IP501	8.8		0.27	
1950	IP470	8.8		0.27	
1967	IP470	9.3		0.53	
6026	IP470	8.7		0.21	
6057	IP501	9		0.37	
6112		-----		-----	
6180	IP501	8		-0.15	
6201	IP501	10		0.89	
6203	IP501	8.59		0.16	
6262	IP501	8		-0.15	

normality	OK
n	47
outliers	0
mean (n)	8.289
st.dev. (n)	1.1601
R(calc.)	3.248
st.dev.(IP501:05)	1.9217
R(IP501:05)	5.381

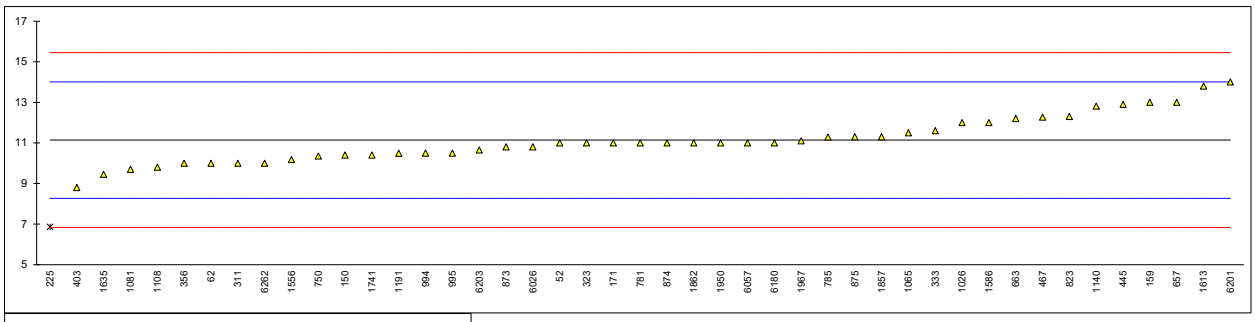

16
14
12
10
8
6
4
2
0
225 657 467 120 381 1556 608 823 171 1191 311 1741 1081 1108 317 356 6180 6262 445 1140 1635 1065 6203 995 6026 150 1862 1950 785 52 781 62 323 1586 6057 875 873 1967 750 663 874 333 1613 994 1857 1026 6201

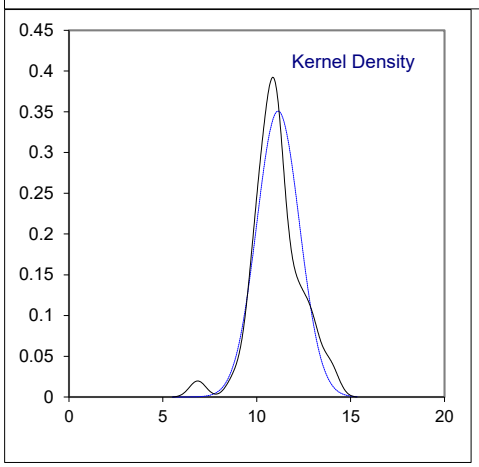

Kernel Density
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
5
10
15

Determination of Sodium as Na on sample #21251; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52	IP501	11		-0.10	
62	IP501	10		-0.80	
120		-----		-----	
140		-----		-----	
150	IP501	10.4		-0.52	
154		-----		-----	
158		-----		-----	
159	IP501	13		1.30	
171	IP501	11		-0.10	
225	IP501	6.86	R(0.05)	-2.98	
311	IP621	10.0		-0.80	
313		-----		-----	
317		-----		-----	
323	IP501	11		-0.10	
333	IP501	11.6		0.32	
356	IP501	10		-0.80	
381		-----		-----	
403	D7111	8.8		-1.63	
445	IP501	12.9		1.23	
467	IP501	12.27		0.79	
608		-----		-----	
657	IP501	13		1.30	
663	IP501	12.2		0.74	
710		-----		-----	
750	IP501	10.35		-0.55	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	IP501	11		-0.10	
785	IP470	11.29		0.10	
798		-----		-----	
823	IP501	12.3		0.81	
872		-----		-----	
873	IP621	10.8		-0.24	
874	IP501	11.0		-0.10	
875	IP501	11.3		0.11	
994	IP501	10.5		-0.45	
995	IP470	10.5		-0.45	
1026	IP501	12		0.60	
1065	IP501	11.5		0.25	
1081	IP501	9.7		-1.00	
1108	D5708	9.8		-0.93	
1140	IP501	12.81		1.16	
1191	ISO10478	10.49		-0.45	
1510		-----		-----	
1556	IP621	10.18	C	-0.67	First reported 4.12
1585		-----		-----	
1586	IP501	12		0.60	
1613	IP501	13.8		1.85	
1635	IP501	9.45		-1.18	
1676		-----		-----	
1741	IP501	10.4		-0.52	
1852		-----		-----	
1857	IP501	11.3		0.11	
1862	IP501	11.0		-0.10	
1950	IP470	11.0		-0.10	
1967	IP470	11.1		-0.03	
6026	IP470	10.8		-0.24	
6057	IP501	11		-0.10	
6112		-----		-----	
6180	IP501	11		-0.10	
6201	IP501	14		1.99	
6203	IP501	10.65		-0.34	
6262	IP501	10		-0.80	

normality	OK
n	44
outliers	1
mean (n)	11.141
st.dev. (n)	1.1374
R(calc.)	3.185
st.dev.(IP501:05)	1.4345
R(IP501:05)	4.016

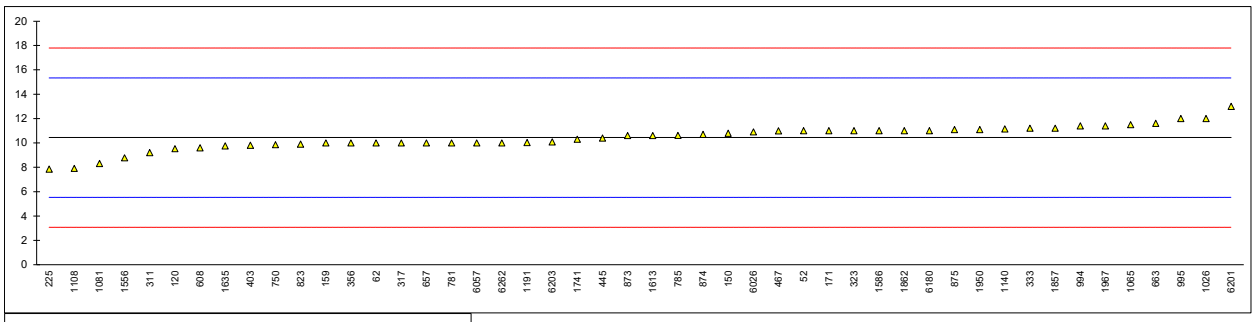

17
15
13
11
9
7
5
225 403 1635 1081 1108 356 62 311 6262 1556 750 150 1741 1191 994 995 6203 873 6026 52 323 171 781 874 1862 1950 6057 6180 1967 785 875 1857 1065 333 1026 1586 663 467 823 1140 445 159 657 1613 6201

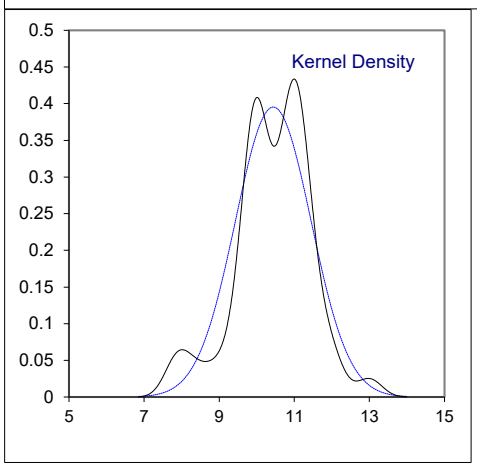

Kernel Density
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0 5 10 15 20

Determination of Vanadium as V on sample #21251; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52	IP501	11		0.23	
62	IP501	10		-0.18	
120	IP501	9.529		-0.37	
140		-----		-----	
150	IP501	10.8		0.15	
154		-----		-----	
158		-----		-----	
159	IP501	10		-0.18	
171	IP501	11		0.23	
225	IP501	7.85		-1.06	
311	IP621	9.2		-0.51	
313		-----		-----	
317	IP501	10		-0.18	
323	IP501	11		0.23	
333	IP501	11.2		0.31	
356	IP501	10		-0.18	
381		-----		-----	
403	D7111	9.8		-0.26	
445	IP501	10.4		-0.02	
467	IP470	10.99		0.22	
608	IP501	9.6		-0.34	
657	IP501	10		-0.18	
663	IP501	11.6		0.47	
710		-----		-----	
750	IP501	9.85		-0.24	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	IP501	10		-0.18	
785	IP470	10.61		0.07	
798		-----		-----	
823	IP501	9.9		-0.22	
872		-----		-----	
873	IP621	10.6		0.07	
874	IP501	10.7		0.11	
875	IP501	11.1		0.27	
994	IP501	11.4		0.39	
995	IP470	12		0.64	
1026	IP501	12		0.64	
1065	IP470	11.5		0.43	
1081	IP501	8.3		-0.87	
1108	D5708	7.9		-1.04	
1140	IP501	11.15		0.29	
1191	ISO10478	10.03		-0.17	
1510		-----		-----	
1556	IP621	8.78	C	-0.68	First reported 3.455
1585		-----		-----	
1586	IP501	11		0.23	
1613	IP501	10.6		0.07	
1635	IP501	9.76		-0.28	
1676		-----		-----	
1741	IP501	10.3		-0.06	
1852		-----		-----	
1857	IP501	11.2		0.31	
1862	IP501	11.0		0.23	
1950	IP470	11.1		0.27	
1967	IP470	11.4		0.39	
6026	IP470	10.9		0.19	
6057	IP501	10		-0.18	
6112		-----		-----	
6180	IP501	11		0.23	
6201	IP501	13		1.04	
6203	IP501	10.08		-0.15	
6262	IP501	10		-0.18	

normality	suspect
n	48
outliers	0
mean (n)	10.440
st.dev. (n)	1.0094
R(calc.)	2.826
st.dev.(IP501:05)	2.4510
R(IP501:05)	6.863

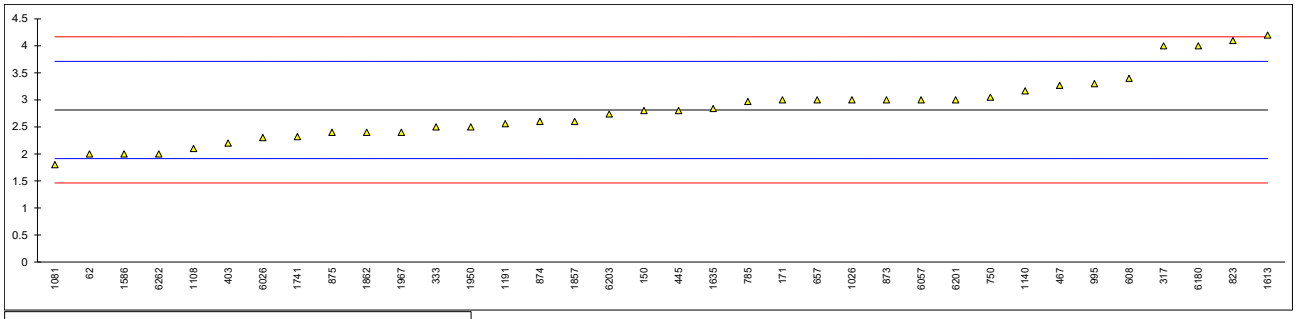

20
18
16
14
12
10
8
6
4
2
0
225 1108 1081 1556 311 120 608 1635 403 750 823 159 356 62 317 657 781 6057 6262 1191 6203 1741 445 873 1613 785 874 150 6026 467 52 171 323 1586 1862 6180 875 1950 1140 333 1857 994 1967 1065 663 995 1026 6201

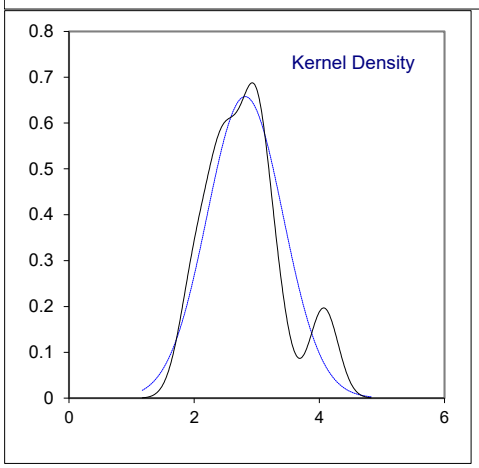

Kernel Density
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
5 7 9 11 13 15

Determination of Calcium as Ca on sample #21251; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52	IP501	<3		-----	
62	IP501	2		-1.81	
120		-----		-----	
140		-----		-----	
150	IP501	2.8		-0.03	
154		-----		-----	
158		-----		-----	
159		-----		-----	
171	IP501	3		0.41	
225	IP501	<3		-----	
311		-----		-----	
313		-----		-----	
317	IP501	4		2.63	
323	IP501	< 3		-----	
333	IP501	2.5		-0.70	
356	IP501	<3		-----	
381		-----		-----	
403	D7111	2.2		-1.36	
445	IP501	2.8		-0.03	
467	IP501	3.27		1.01	
608	IP501	3.4		1.30	
657	IP501	3		0.41	
663	IP501	<3		-----	
710		-----		-----	
750	IP501	3.05		0.52	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	IP501	<3		-----	
785	IP470	2.97		0.35	
798		-----		-----	
823	IP501	4.1		2.85	
872		-----		-----	
873	IP621	3.0		0.41	
874	IP501	2.6		-0.48	
875	IP501	2.4		-0.92	
994	IP501	<3		-----	
995	IP470	3.3		1.08	
1026	IP501	3		0.41	
1065		-----		-----	
1081	IP501	1.8		-2.25	
1108	IP470	2.1		-1.59	
1140	IP501	3.167		0.78	
1191	In house	2.56		-0.56	
1510		-----		-----	
1556		-----		-----	
1585		-----		-----	
1586	IP501	2		-1.81	
1613	IP501	4.2		3.07	
1635	IP501	2.84		0.06	
1676		-----		-----	
1741	IP501	2.32		-1.10	
1852		-----		-----	
1857	IP501	2.6		-0.48	
1862	IP501	2.4		-0.92	
1950	IP470	2.5		-0.70	
1967	IP470	2.4		-0.92	
6026	IP470	2.3		-1.14	
6057	IP501	3		0.41	
6112		-----		-----	
6180	IP501	4		2.63	
6201	IP501	3		0.41	
6203	IP501	2.74		-0.17	
6262	IP501	2		-1.81	

normality	OK
n	36
outliers	0
mean (n)	2.814
st.dev. (n)	0.6065
R(calc.)	1.698
st.dev.(IP501:05)	0.4506
R(IP501:05)	1.262


4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1081
62
1586
6262
1108
403
6026
1741
875
1862
1967
333
1950
1191
874
1857
6203
150
445
1635
785
171
657
1026
873
6057
6201
750
1140
467
995
608
317
6180
823
1613


Kernel Density
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
2
4
6

Determination of Phosphorus as P on sample #21251; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52	IP501	<1		-----	
62	IP501	<1		-----	
120		-----		-----	
140		-----		-----	
150	IP501	<1		-----	
154		-----		-----	
158		-----		-----	
159		-----		-----	
171	IP501	0		-----	
225	IP501	0.35		-----	
311		-----		-----	
313		-----		-----	
317	IP501	<1		-----	
323	IP501	< 1		-----	
333	IP501	0.6		-----	
356	IP501	1		-----	
381		-----		-----	
403		-----		-----	
445	IP501	0.6		-----	
467	IP501	0.65		-----	
608	IP501	0.1		-----	
657	IP501	1		-----	
663	IP501	<1		-----	
710		-----		-----	
750	IP501	0.45		-----	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	IP501	<1		-----	
785		-----		-----	
798		-----		-----	
823	IP501	0.6		-----	
872		-----		-----	
873	IP500	<1		-----	
874	IP501	<1		-----	
875	IP501	0.4		-----	
994	IP501	<1		-----	
995		-----		-----	
1026	IP501	1		-----	
1065		-----		-----	
1081		-----		-----	
1108		-----		-----	
1140	IP501	0.567		-----	
1191	IP501	0.44		-----	
1510		-----		-----	
1556		-----		-----	
1585		-----		-----	
1586	IP501	1		-----	
1613		-----		-----	
1635	IP501	<1,0		-----	
1676		-----		-----	
1741	IP501	0.495		-----	
1852		-----		-----	
1857	IP501	0.4		-----	
1862	IP501	0.5		-----	
1950		-----		-----	
1967	IP501	less 1		-----	
6026		-----		-----	
6057	IP501	2		-----	
6112		-----		-----	
6180	IP501	<1		-----	
6201	IP501	4		-----	Possibly a false postive test result?
6203	IP501	0.35		-----	
6262	IP501	<1		-----	
	n	33			
	mean (n)	<1			

Determination of Zinc as Zn on sample #21251; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52	IP501	<1		-----	
62	IP501	<1		-----	
120	IP501	0.442		-----	
140		-----		-----	
150	IP501	<1		-----	
154		-----		-----	
158		-----		-----	
159		-----		-----	
171	IP501	0		-----	
225	IP501	0.35		-----	
311		-----		-----	
313		-----		-----	
317	IP501	3		-----	Possibly a false positive test result?
323	IP501	< 1		-----	
333	IP501	0.6		-----	
356	IP501	1		-----	
381		-----		-----	
403		-----		-----	
445	IP501	0.4		-----	
467	IP501	0.67		-----	
608	IP501	0.2		-----	
657	IP501	<1		-----	
663	IP501	<1		-----	
710		-----		-----	
750	IP501	0.39		-----	
752		-----		-----	
753		-----		-----	
778		-----		-----	
781	IP501	<1		-----	
785	IP470	0.71		-----	
798		-----		-----	
823	IP501	0.6		-----	
872		-----		-----	
873	IP621	<1		-----	
874	IP501	0.5		-----	
875	IP501	<1		-----	
994	IP501	<1		-----	
995	IP470	0.7		-----	
1026	IP501	1		-----	
1065		-----		-----	
1081		-----		-----	
1108	IP470	0.4		-----	
1140	IP501	0.409		-----	
1191	IP501	0.17		-----	
1510		-----		-----	
1556		-----		-----	
1585		-----		-----	
1586	IP501	2		-----	Possibly a false positive test result?
1613	IP501	<1.0		-----	
1635	IP501	<1,0		-----	
1676		-----		-----	
1741	IP501	<1		-----	
1852		-----		-----	
1857	IP501	0.5		-----	
1862	IP501	0.3		-----	
1950	IP470	0.5		-----	
1967	IP470	0.5		-----	
6026	IP470	0.4		-----	
6057	IP501	2		-----	Possibly a false positive test result?
6112		-----		-----	
6180	IP501	<1		-----	
6201	IP501	<1		-----	
6203	IP501	0.37		-----	
6262	IP501	<1		-----	
	n	39			
	mean (n)	<1			

APPENDIX 2

Number of participants per country

1 lab in	AUSTRIA
1 lab in	AZERBAIJAN
2 labs in	BELGIUM
2 labs in	CANADA
1 lab in	COTE D'IVOIRE
1 lab in	CROATIA
1 lab in	ESTONIA
1 lab in	FINLAND
1 lab in	FRANCE
1 lab in	GEORGIA
2 labs in	GERMANY
2 labs in	GREECE
1 lab in	ISRAEL
1 lab in	JORDAN
1 lab in	KAZAKHSTAN
1 lab in	KOREA, Republic of
1 lab in	MALAYSIA
2 labs in	MALTA
6 labs in	NETHERLANDS
2 labs in	ROMANIA
17 labs in	RUSSIAN FEDERATION
2 labs in	SERBIA
1 lab in	SINGAPORE
2 labs in	SWEDEN
1 lab in	THAILAND
3 labs in	UNITED KINGDOM
7 labs in	UNITED STATES OF AMERICA

APPENDIX 3

Abbreviations

C	= final test result after checking of first reported suspect test result
D(0.01) or D(1)	= outlier in Dixon's outlier test
D(0.05) or D(5)	= straggler in Dixon's outlier test
G(0.01) or G(1)	= outlier in Grubbs' outlier test
G(0.05) or G(5)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
E	= calculation difference between reported test result and result calculated by iis
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

Literature

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7 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
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12 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)