Results of Proficiency Test
Fuel Oil
December 2018

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1994 the Institute for Interlaboratory Studies (iis) organizes a proficiency test for Fuel Oil every year and twice per year since 2016. During the annual proficiency testing program of 2018/2019, it was decided to continue twice per year with the round robin for the analyses of Fuel Oil in accordance with the latest applicable version of the specifications ISO 8217 and ASTM D396.
In the main round 131 laboratories in 54 different countries registered for participation. In the round robin for Metals in Fuel Oil 97 laboratories in 43 different countries registered for participation, for the Bromine and p-Value proficiency study 44 laboratories in 20 different countries registered for participation and for the Compatibility proficiency study 53 laboratories in 27 different countries registered for participation. In total 139 participants registered over the 4 sub rounds. See appendix 3 for the number of participants per country for the main round only. In this report, the test results of the December 2018 interlaboratory study on Fuel Oil 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/IEC 17025 accredited laboratory. Depending on the registration it was decided to send one bottle of 1L Fuel Oil, labelled #18265, one bottle of 0.1L Fuel Oil, labelled #18266 specifically prepared for metal determinations, one bottle of 1L Fuel Oil, labelled #18267 specifically obtained for Bromine Number and p-Value determinations and/or one specially prepared filter, labelled #18268 for the determination of Compatibility of residual oils. Participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC 17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by means of questionnaires.

2.2 PROTOCOL

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

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

For this proficiency test four different samples were prepared; a regular Fuel Oil, a Fuel Oil positive on metals, a sample for Bromine Number and p-Value and a prepared filter for the determination of the Compatibility of residual oils.

Approximately 200 liter Fuel Oil was obtained from a supplier in Germany. After heating to 60°C and homogenization, 168 amber glass bottles of 1L were filled and labelled #18265. The homogeneity of these subsamples was checked by determination of Density at 15°C in accordance with ISO12185 on 8 stratified randomly selected samples.

	Density at 15°C in kg/m^3
Sample #18265-1	983.0
Sample #18265-2	983.0
Sample #18265-3	983.1
Sample #18265-4	982.8
Sample #18265-5	983.0
Sample #18265-6	983.0
Sample #18265-7	983.0
Sample #18265-8	983.0

Table 1: homogeneity test results of subsamples #18265

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

	Density at 15°C in kg/m^3
r (observed)	0.23
reference test method	ISO12185:96
0.3 * R (ref. test method)	0.45

Table 2: evaluation of the repeatability of subsamples #18265

The calculated repeatability for Density was in agreement with 0.3 times the corresponding reproducibility of the reference test method. Therefore, homogeneity of the subsamples of #18265 was assumed.

For sample #18266 another batch of 15 litre Fuel Oil obtained from a local supplier was spiked with Aluminum (approx. 14 mg/kg) and Silicon (approx. 16 mg/kg).
After homogenisation 128 plastic PE bottles of 0.1L were filled and labelled #18266.
The homogeneity of the subsamples was checked by determination of Phosphorus and Silicon in accordance with IP501 on 7 stratified randomly selected samples.

	Phosphorus in mg/kg	Silicon in mg/kg
Sample #18266-1	16	6
Sample #18266-2	17	7
Sample #18266-3	16	7
Sample #18266-4	17	7
Sample #18266-5	16	6
Sample #18266-6	17	7
Sample #18266-7	16	7

Table 3: homogeneity test results of subsamples #18266

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

	Phosphorus in mg/kg	Silicon in mg/kg
r (observed)	1.5	1.37
reference test method	IP501:05	IP470:05
0.3 * R (ref. test method)	1.8	1.49

Table 4: evaluation of the repeatabilities of subsamples #18266

The calculated repeatabilities for Phosphorus and Silicon were in agreement with 0.3 times the corresponding reproducibilities of the reference test methods. Therefore, homogeneity of the subsamples of #18266 was assumed.

For the subsamples for the Bromine Number and p-value 70 litre Fuel Oil was obtained from a local supplier. From the batch, after heating to 60°C and homogenization, 68 amber glass bottles of 1L were filled and labelled #18267. The homogeneity of the subsamples #18267 was checked by determination of Density at 15°C in accordance with ISO12185 on 8 stratified randomly selected samples.

	Density at 15°C in kg/m^3
Sample #18267-1	1000.8
Sample #18267-2	1000.8
Sample #18267-3	1000.8
Sample #18267-4	1000.8
Sample #18267-5	1000.8
Sample #18267-6	1000.8
Sample #18267-7	1000.8
Sample #18267-8	1000.8

Table 5: homogeneity test results of subsamples #18267

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

	Density at 15°C in kg/m^3
r (observed)	0.00
reference test method	ISO12185:96
0.3 * R (ref. test method)	0.45

Table 6: evaluation of the repeatability of subsamples #18267

The calculated repeatability for Density was in agreement with 0.3 times the corresponding reproducibility of the reference test method. Therefore, homogeneity of the subsamples of #18267 was assumed.

For the preparation of the samples #18268 two incompatible Fuel Oils were mixed according to ASTM D4740 and the mixture was applied to paper filters as per ASTM D4740. The paper filters with a spot were kept in a tin box, labelled #18268. The homogeneity was done visually and the homogeneity of the samples #18268 was assumed.

Depending on the registration of the participant; one bottle of 1L, labelled #18265, one bottle of 0.1L, labelled #18266, one bottle of 1L, labelled #18267 and/or a tin box with a paper filter labelled #18268 was sent to each of the participating laboratories on November 28, 2018.
An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Fuel Oil, packed in the amber glass and PE bottles was checked. The material has been found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were requested to determine the following parameters:

On sample #18265: Acid Number (Total), API Gravity, Ash Content, Asphaltenes, Calculated Carbon Aromaticity Index (CCAI), Carbon Residue – Micro Method, Conradson Carbon Residue, Density at 15°C, Flash Point PMcc, Heat of Combustion (Gross and Net), Kinematic Viscosity (at 50°C and 100°C), Viscosity Stabinger (at 50°C and 100°C), Nitrogen Content, Pour Point (Lower, Upper and Automated), Sediment by Extraction, Total Sediment (by Hot filtration, Accelerated and Potential), Total Sulphur, Water by Distillation, Water and Sediment, Distillation (IBP, 5% - 50% recovered and FBP) and Total Carbon, Hydrogen and Nitrogen (CHN-analyzer).
Also, some extra questions regarding Acid Number Determination were asked.

On sample #18266: Aluminum, Silicon, Sum of Aluminum and Silicon, Iron, Nickel, Sodium, Vanadium, Calcium, Phosphorus and Zinc content.

On Sample #18267: Bromine Number on distillate <360°C AET and p-Value.

On Sample #18268: Compatibility rating on residual oils.

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 appropriate reference test methods that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

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

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

3.1 STATISTICS

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

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

According to ISO 5725 the original test results per determination were submitted to Dixon's, Grubbs' and/or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

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

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

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis.
The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also, a normal Gauss curve was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

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

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other targets values were used. In some cases a reproducibility based on former iis proficiency tests could be used.

When a laboratory did use a test method with a reproducibility that is significantly different from the reproducibility of the reference test method used in this report, it is strongly advised to recalculate the z-score, while using the reproducibility of the actual test method used, this in order to evaluate whether the reported test result is fit-for-use.

The z-scores were calculated according to:

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

The $z_{(target)}$ scores are listed in the test result tables in appendix 1.

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

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

4 EVALUATION

In this proficiency test several problems were encountered with the dispatch of the samples. Five participants did not report any test results for the main round and eight participants reported the test results after the final reporting date. Nine participants did not report any test results for metals sub round and nine participants reported the test results after the final reporting date. Eleven participants did not report any test results for Bromine sub round and two participants reported the test results after the final reporting date. Eight participants did not report any test results for Compatibility sub round and four participants reported the test results after the final reporting date. Not all laboratories were able to report all analyses requested. Finally, over the four PTs, 134 participants reported in total 2948 numerical test results. Observed were 92 statistically outlying test results, which is 3.1 %. 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 are used by the various laboratories, were taken into account for explaining the observed differences when possible and applicable. These test methods are also listed in the tables together with the reported test results. The abbreviations, used in these tables, are listed in appendix 4.

In the iis PT reports, ASTM test methods are referred to with a number (e.g. D1298) and an added designation for the year that the test method was adopted or revised (e.g. D1298:12b). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D1298:12b(2017)). In the test results tables of appendix 1 only the test method number and year of adoption or revision (e.g. D1298:12b) are used.

Sample #18265:

Acid Number (Total): This determination was problematic depending on type of end point and titration volume used. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D664-A:17a mode BEP at both titration volumes (60mL and 125mL) and IP at 125mL but not with IP at 60mL.
The precision of mode IP, 125mL has been used to calculate the z-scores because this mode was used by majority of the laboratories.
When test results for Buffer End Point (BEP) mode or Inflection Point (IP) mode are evaluated separately the calculated reproducibilities of BEP (60+125mL) results are in agreement with the requirements of ASTM D664-A:17a BEP 60 or 125mL. The calculated reproducibility of the IP (60+125mL) test results is only in agreement with the requirements of ASTM D664:17a IP 125mL, but not with ASTM D664:17a IP 60mL.

API Gravity: This determination was not problematic. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1298:12b(2017).

Ash Content: This determination was problematic at an Ash content of 0.02 %M/M. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with requirements of ISO6245:01 and ASTM D482:13.

Asphaltenes: This determination was problematic. Six statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of IP143:04.

Calculated Carbon Aromaticity Index: This determination was not problematic. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO8217:17.

Carbon Residue Micro Method: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO10370:14.

Conradson Carbon Residue: 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 D189:06(2014).

Density at 15°C: This determination was not problematic. Three statistical outliers were observed. However, 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. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO2719-B:16.

HOC Gross: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D240:17.

HOC Net: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D240:17.

Kin. Visc. at 50°C: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of ISO3104:94.

Kin. Visc. at 100°C: This determination was not problematic. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO3104:94.

Vis. Stab.at 50°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 D7042:16e3.

Vis. Stab.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 D7042:16e3.

Nitrogen: This determination was problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D5762:18a.
When the test results of ASTM D5762 volumetric and gravimetric test methods were evaluated separately, the calculated reproducibility over the volumetric test results was much smaller than the calculated reproducibility over the gravimetric test results. The calculated reproducibility over the volumetric test results is in agreement with the requirements of ASTM D5762:18a.

Pour Point Lower: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ISO3016:94. Rounding to 3 degrees acc. ISO3016:94 may (partly) explain the large variation.

Pour Point Upper: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements ISO3016:94. Rounding to 3 degrees acc. ISO3016:94 may (partly) explain the large variation.

Pour Point Automated: This determination was problematic. No statistical outliers were observed but three test results were excluded. However, the calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ASTM D5950:14.
The large variation may (partly) be explained by possible problems with the detector sensitivity or by not following the test method properly (see Note 8 in ASTM D5950:14).

Sediment by Extraction: 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 D473:07e1(2017).

Sediment (Hot Filtration): This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of IP375:11.

Total Sediment (Accelerated): This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of IP390:11. IP390:11 is identical to ISO10307-2:09 and technically equivalent to ASTM D4870.

Total Sediment (Potential): This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of IP390:11. IP390:11 is identical to ISO10307-2:09 and technically equivalent to ASTM D4870.

Total Sulphur: This determination may be problematic dependent on the test method used. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ISO 8754:03, but not with the more strict requirements of ASTM D4294:16e1.

Water by Distillation: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO3733:99 or ASTM D95:13(2018).

Water and Sediment: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D1796:11(2016).

Vacuum Distillation: This determination may be problematic for 50% recovered and FBP.
In total two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement for IBP, 5%, 10%, 20%, 30% and 40% recovered with the requirements of ASTM D1160:18. The calculated reproducibilities for 50% recovered and FBP are not in agreement with the requirements of ASTM D1160:18.

CHN-Analyzer: This determination was not problematic for Carbon and Hydrogen and problematic for Nitrogen. In total three statistical outliers were observed. However, the calculated reproducibilities for Carbon and Hydrogen after rejection of the statistical outliers are in agreement with the requirements of ASTM D5291-ABC:16. The calculated reproducibility for Nitrogen is not in agreement with the requirements of ASTM D5291-ABC:16.

Sample #18266:

Aluminum: This determination may be problematic for a number of participants.
Five statistical outliers were observed and one other test result was excluded. However, the calculated reproducibility after rejection of the suspect data is in agreement with the requirements of IP470:05 and IP501:05. The average recovery of Aluminum (theoretical increment of 14.2 mg Aluminum/kg) may be good: “< 100%” (the actual blank Aluminum content is unknown).

Silicon: This determination may be problematic depending on the test method used.
Three statistical outliers were observed and four other test results were excluded. However, the calculated reproducibility after rejection of the suspect data is in full agreement with the requirements of IP470:05 but not in agreement with the more strict requirements of IP501:05.
The average recovery of Silicon (theoretical increment of 15.6 mg Silicon/kg) may be insufficient: “< 49%” (the actual blank Silicon content is unknown).

Total Al/Si: This determination may be problematic dependent on test method used.
Five statistical outliers were observed and two other test results were excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of IP470:05 but not with IP501:05.

Iron: This determination was not problematic. Six statistical outliers were observed and three other test results were excluded. However, the calculated reproducibility after rejection of the suspect data is in agreement with the requirements of IP470:05 and IP501:05.

Nickel: This determination was not problematic. Two statistical outliers were observed and two other test results were excluded. However, the calculated reproducibility after rejection of the suspect data is in agreement with the requirements of IP470:05 and IP501:05.

Sodium: This determination was not problematic. Five statistical outliers were observed and one other test result was excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of IP470:05 and IP501:05.

Vanadium: This determination was not problematic. Two statistical outliers were observed and two other test results were excluded. However, the calculated reproducibility after rejection of the suspect data is in agreement with the requirements of IP470:05 and IP501:05.

Calcium: This determination may be problematic dependent on test method used. Three statistical outliers were observed and one other test result was excluded. However, the calculated reproducibility after rejection of the suspect data is in full agreement with the requirements of IP470:05 but not in agreement with the more strict requirements of IP501:05.

Zinc: This determination may be problematic dependent on test method used. Two statistical outliers were observed and one other test result was excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of IP470:05 but not in agreement with the more strict requirements of IP501:05.

Phosphorus: This determination may be problematic dependent on test method used. Three statistical outliers were observed and one other test result was excluded. However, the calculated reproducibility after rejection of the suspect data is in agreement with the requirements of IP501:05 but not in agreement with the more strict requirements of IP500:03.

Finally, it should be noted that proper attention for homogenization is crucial for a material such as Fuel Oil. Due to the nature of the material it is very susceptible to problems when not handled correctly. Practically most test methods for the determination of metals in Fuel Oil have similar statements regarding homogenization. Recommended is the use of a quality control fuel oil with known amounts of metals like Al, Fe, Si and V. This control standard may be of use to detect deviations in metals with respect to the preparation steps.

Sample #18267:

Bromine Number: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1159:07 (2017).

P-Value: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of target test method estimated from the repeatability.

Sample #18268:

Compatibility This determination may be problematic. No statistical outliers were observed but one test result was excluded. All other test results are within the reproducibility range of 1 as per requirements of ASTM D4740:04 (2014).

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant reference test method and the reproducibility as found for the group of participating laboratories. The average results, calculated reproducibilities and reproducibilities derived from literature reference test methods (in casu ASTM and IP reference test methods), are compared in the next tables.

Parameters	unit	n	average	2.8 * sd	R (lit)
Acid Number (Total)	mg KOH/g	70	0.28	0.11	0.18
API Gravity		73	12.3	0.2	0.5
Ash Content	%M/M	94	0.023	0.009	0.005
Asphaltenes	%M/M	56	4.47	1.04	0.89
Calc. Carbon Aromaticity Index		63	845.1	1.3	2.4
Carbon Residue, Micro Method	%M/M	85	11.19	0.80	1.23
Conradson Carbon Residue	%M/M	35	11.58	1.52	1.84
Density at 15°C	kg/m^3	110	983.2	1.2	1.5
Flash Point PMcc	°C	108	117.9	6.6	6
Heat of Combustion Gross	MJ/kg	52	43.06	0.27	0.40
Heat of Combustion Net	MJ/kg	46	40.75	0.27	0.40
Kinematic Viscosity at 50°C	mm^2/s	102	345.3	24.7	25.6
Kinematic Viscosity at 100°C	mm^2/s	79	31.9	1.2	1.6
Viscosity Stabinger at 50°C	mm^2/s	19	347.1	20.2	35.7
Viscosity Stabinger at 100°C	mm^2/s	19	31.8	1.4	2.3
Nitrogen	mg/kg	36	3152	985	838
Pour Point Lower	°C	46	0.1	8.6	6.6
Pour Point Upper	°C	74	2.0	8.7	6.6
Pour Point (automated), Δ3°C	°C	21	-0.6	9.8	6.1
Sediment by Extraction	%M/M	70	0.019	0.018	0.038
Total Sediment (Hot Filtration)	%M/M	74	0.021	0.018	0.042
Total Sediment (Accelerated)	%M/M	62	0.022	0.015	0.043
Total Sediment (Potential)	%M/M	62	0.021	0.013	0.042
Total Sulphur	%M/M	109	1.07	0.09	0.10
Water by Distillation	%V/V	77	0.04	0.07	0.2
Water and Sediment	%V/V	41	0.05	0.08	0.11
Distillation at 10mmHg calculated to 760 mmHg					
Initial Boiling Point	°C	33	215.4	21.1	49
5% recovered	°C	34	263.0	21.3	22.4
10% recovered	°C	34	300.7	18.3	20.9
20% recovered	°C	34	370.8	18.1	20.1
30% recovered	°C	34	431.4	16.1	19.0
40% recovered	°C	34	485.6	14.1	18.3
50% recovered	°C	9	535.9	22.8	18.0
Final Boiling Point	°C	32	521.9	50.4	27
CHN analyser					
Total Carbon	%M/M	23	87.5	1.4	2.4
Total Hydrogen	%M/M	20	10.8	0.5	0.8
Total Nitrogen	%M/M	16	0.38	0.13	0.10

Table 7: comparison of the observed and target reproducibilities of the sample #18265

Parameters	unit	n	average	2.8 * sd	R (lit)
Aluminum as Al	mg/kg	77	14.2	4.4	4.7
Silicon as Si	mg/kg	69	7.6	5.8	5.4
Total Aluminum + Silicon	mg/kg	71	21.7	7.9	7.2
Iron as Fe	mg/kg	74	20.9	4.7	11.7
Nickel as Ni	mg/kg	78	31.7	7.8	15.6
Sodium as Na	mg/kg	78	11.1	3.7	5.5
Vanadium as V	mg/kg	81	117.4	22.2	35.3
Calcium as Ca	mg/kg	77	20.4	6.0	6.1
Zinc as Zn	mg/kg	75	17.4	4.3	5.0
Phosphorus as P	mg/kg	67	15.7	4.3	5.8
Bromine Number	g Br_2/100g	28	7.9	2.2	3.1
p-Value		30	1.34	0.27	0.60
Compatibility	rating	44	3.5	1.5	1

Table 8: summary of test results on Fuel Oil samples #18266, #18267 and #18268.

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

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

	December 2018	June 2018	December 2017	June 2017	December 2016
Number of reporting labs	134	149	143	169	83
Number of test results	2948	2631	3081	3119	1936
Statistical outliers	92	88	133	102	72
Percentage outliers	3.1%	3.3%	4.3%	3.3%	3.7%

Table 9: comparison with previous proficiency tests

In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.
The performance of the determinations of the proficiency tests was compared against the requirements of the respective reference test methods. The conclusions are given the following table.

Determination	December 2018	June 2018	December 2017	June 2017	December 2016
Acid Number (Total)	+	-	++	+	++
API Gravity	++	+	++	++	++
Ash Content	-	-	--	--	--
Asphaltenes	-	-	+/-	-	--
Calc. Carbon Aromaticity Index	+	++	+	+	+
Carbon Residue, Micro Method	+	+	+	+/-	+
Conradson Carbon Residue	+	+/-	+	+	+/-
Density at 15°C	+	+	+/-	+/-	+
Flash Point PMcc	+/-	-	-	+/-	+/-

Determination	December 2018	June 2018	December 2017	June 2017	December 2016
Heat of Combustion Gross	+	+/-	+/-	+	++
Heat of Combustion Net	+	+/-	+/-	+	++
Kinematic Viscosity at 50°C	+/-	+	+	+/-	++
Kinematic Viscosity at 100°C	+	+	-	+	-
Viscosity Stabinger at 50°C	+	++	++	+	+
Viscosity Stabinger at 100°C	+	++	++	++	++
Nitrogen	-	-	-	-	-
Pour Point Lower	-	+/-	-	-	-
Pour Point Upper	-	-	-	-	-
Pour Point (automated), Δ3°C	-	-	-	-	--
Sediment by Extraction	++	+	+	+	++
Total Sediment (Hot Filtration)	++	++	++	++	++
Total Sediment (Accelerated)	++	++	++	++	++
Total Sediment (Potential)	++	++	++	++	++
Total Sulphur	+/-	+/-	+/-	+	+/-
Water by Distillation	++	++	++	++	++
Water and Sediment	+	+	+	+/-	++
Distillation at 10mmHg to AET	+	+/-	+	+/-	-
Total Carbon	+	+	+	+	+
Total Hydrogen	+	+	+	+	+
Total Nitrogen	-	++	-	++	+/-
Aluminum as Al	+/-	-	+	+/-	n.e.
Silicon as Si	+/-	-	+	+	n.e.
Total Aluminum + Silicon	+/-	-	+	+/-	n.e.
Iron as Fe	++	+/-	++	+	+
Nickel as Ni	++	-	+	++	+
Sodium as Na	+	-	+	+	+/-
Vanadium as V	+	+	++	++	+
Calcium as Ca	+/-	-	+/-	+	+/-
Zinc as Zn	+	-	+/-	+	+
Phosphorus as P	+	+/-	-	+	+
Bromine Number	+	n.e.	+	n.e.	+
p-Value	++	n.e.	+	n.e.	+/-
Compatibility	-	n.e.	(-)	n.e.	+/-

Table 10: comparison determinations against the reference test methods

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

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

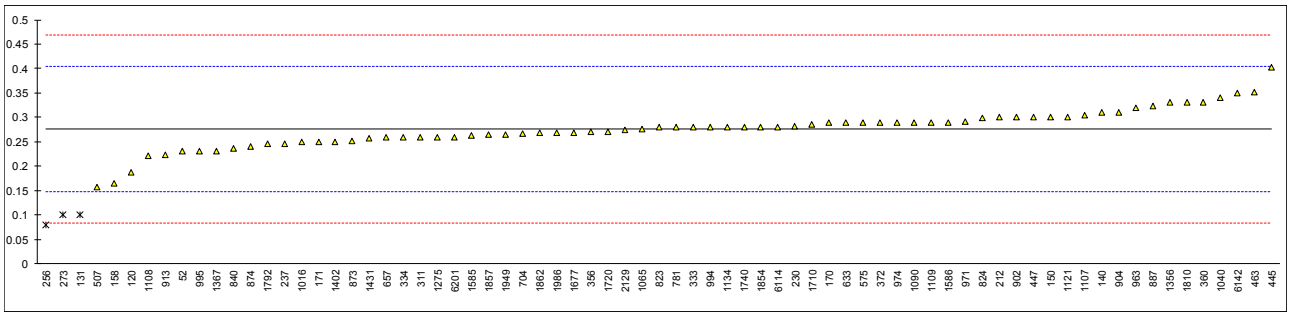
APPENDIX 1

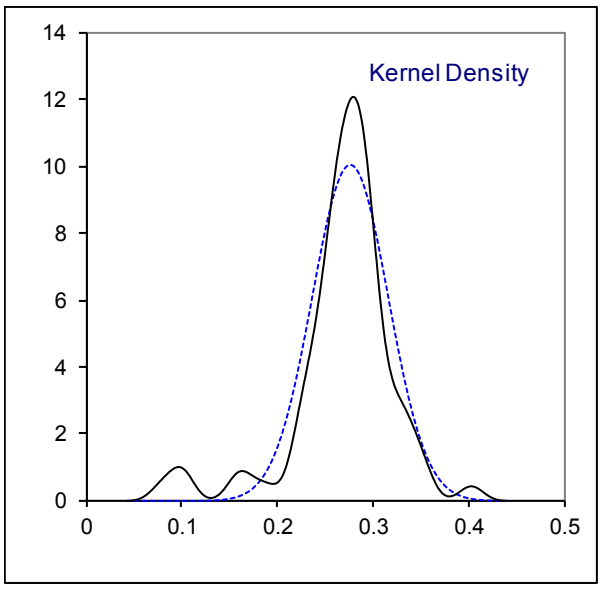
Determination of Acid Number (Total) on sample #18265; results in mg KOH/g

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D664-A	0.23		-0.72	902	D664-A	0.30		0.37
120	D664-A	0.188		-1.38	904	D664-A	0.31		0.52
131	D664	0.101	R(0.01)	-2.73	913	D664-A	0.223		-0.83
132		-----		-----	962		-----		-----
133		-----		-----	963	D664-A	0.32		0.68
140	D664-A	0.31		0.52	971	D664-A	0.291		0.23
150	D664-A	0.30		0.37	974	D664-A	0.29		0.21
158	D664-A	0.165		-1.73	994	D664-A	0.28		0.06
159		-----		-----	995	D664-A	0.23		-0.72
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170	D664-A	0.289		0.20	1016	D664-A	0.249		-0.43
171	D664-A	0.25		-0.41	1040	D664-A	0.341		1.01
175		-----		-----	1065	D664-A	0.277		0.01
194		-----		-----	1082		-----		-----
212	D664-A	0.3		0.37	1090	D664-A	0.29		0.21
225		-----		-----	1107	D664-A	0.304		0.43
230	D664-A	0.281		0.07	1108	D664-A	0.221		-0.86
237	D664-A	0.246		-0.47	1109	D664-A	0.29		0.21
238		-----		-----	1121	D664-A	0.30		0.37
253		-----		-----	1126		-----		-----
256	D664	0.08	R(0.01)	-3.06	1134	D664-A	0.28		0.06
273	D664-A	0.10	R(0.01)	-2.74	1191		-----		-----
311	D664-A	0.26		-0.26	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275	IP177	0.26		-0.26
333	D664-A	0.28		0.06	1299		-----		-----
334	D664-A	0.26		-0.26	1356	D664-A	0.33		0.83
336		-----		-----	1367	IP177	0.23		-0.72
337		-----		-----	1381		-----		-----
339		-----		-----	1402	IP177	0.25		-0.41
342		-----		-----	1412		-----		-----
349		-----		-----	1431	D664-A	0.2582		-0.28
351		-----		-----	1543		-----		-----
356	D664-A	0.27		-0.10	1585	D664-A	0.263		-0.21
360	D664-A	0.331		0.85	1586	D664-A	0.29		0.21
370		-----		-----	1648		-----		-----
372	D664-A	0.29		0.21	1677	D664-A	0.2695		-0.11
444		-----		-----	1681		-----		-----
445	D664-A	0.403		1.97	1710	D664-A	0.285		0.13
447	D664-A	0.3		0.37	1720	D664-A	0.27		-0.10
463	D664-A	0.352		1.18	1724		-----	W	-----
507	D664-A	0.1580		-1.84	1740	D664-A	0.28		0.06
541		-----		-----	1792	D664-A	0.245		-0.49
558		-----		-----	1810	D8045	0.33		0.83
575	D664-A	0.29		0.21	1811		-----		-----
605		-----		-----	1849		-----		-----
610		-----		-----	1854	D664-A	0.28		0.06
631		-----		-----	1857	D664-A	0.264		-0.19
633	D664-A	0.29		0.21	1862	D664-A	0.269		-0.12
634		-----		-----	1881		-----		-----
657	D664-A	0.26		-0.26	1906		-----		-----
671		-----		-----	1942		-----		-----
704	D664-A	0.266		-0.16	1949	D664-A	0.265		-0.18
732		-----		-----	1986	D664-A	0.269		-0.12
753		-----		-----	2129	D664-A	0.274		-0.04
781	D664-A	0.28		0.06	6051		-----		-----
798		-----		-----	6075		-----		-----
823	D664-A	0.28		0.06	6092		-----		-----
824	D664-A	0.298		0.34	6112		-----		-----
825		-----		-----	6114	D664-A	0.28		0.06
840	D664-A	0.237		-0.61	6142	IP177	0.35		1.15
842		-----		-----	6154		-----		-----
873	D664-A	0.252		-0.38	6201	D664-A	0.26		-0.26
874	D664-A	0.24		-0.57	6203		-----		-----
887	D664-A	0.324		0.74					

		IP (60 + 125 mL)	BEP (60 + 125 mL)
normality	not OK	Not OK	OK
n	70	47	7
outliers	3	2	0
mean (n)	0.2764	0.2729	0.3051
st.dev. (n)	0.03975	0.03358	0.03763
R(calc.)	0.1113	0.0940	0.1054
st.dev.(D664-A:17a IP 125 mL)	0.06428	---	---
R(D664-A:17a IP 125 mL)	0.1800	0.1795	---
Compare			
R(D664-A:17a IP 60 mL)	0.0715	0.0707	---
R(D664-A:17a BEP 125 mL)	0.1216	---	0.1342
R(D664-A:17a BEP 60 mL)	0.1286	---	0.1417

Lab 1724 first reported 0.839



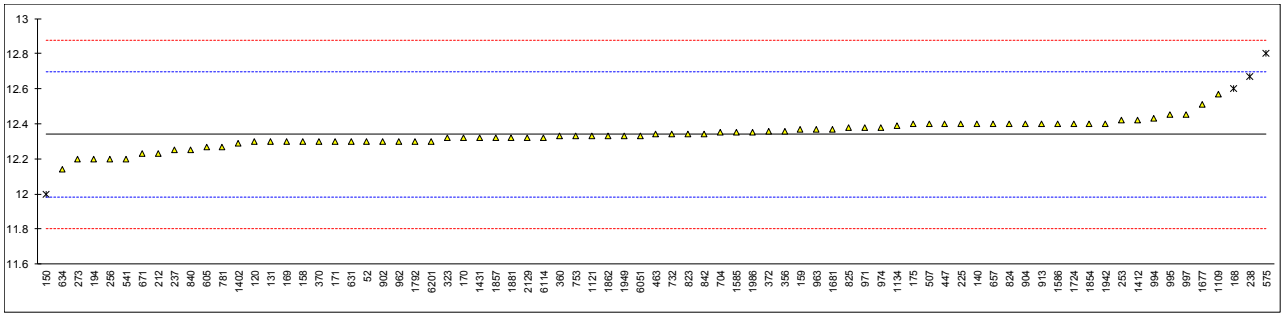


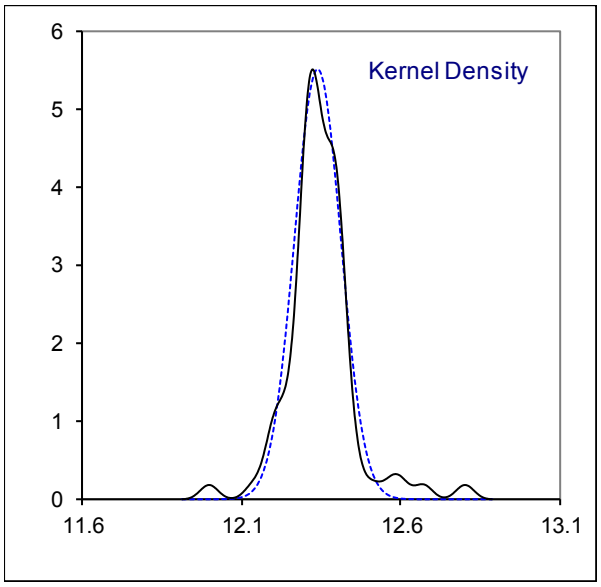
Determination of API Gravity on sample #18265

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4052	12.3		-0.22	902	D1298	12.3		-0.22
120	ISO12185	12.3		-0.22	904	D1298	12.4		0.34
131	D4052	12.3		-0.22	913	D1298	12.40		0.34
132		-----		-----	962	D1298	12.3		-0.22
133		-----		-----	963	D1298	12.37		0.17
140	D4052	12.4		0.34	971	D1298	12.38		0.23
150	D287	12.0	R(0.01)	-1.90	974	Calculation	12.38		0.23
158	D4052	12.3		-0.22	994	D1250	12.43		0.51
159	D4052	12.37		0.17	995	D1250	12.45		0.62
168	D287	12.6	R(0.05)	1.46	996		-----		-----
169	D1298	12.3		-0.22	997	D1250	12.45		0.62
170	D4052	12.32		-0.11	1016		-----		-----
171	D4052	12.3		-0.22	1040		-----		-----
175	D4052	12.4		0.34	1065		-----		-----
194	D4052	12.2		-0.78	1082		-----		-----
212	ISO12185	12.23	C	-0.61	1090		-----		-----
225	D4052	12.4		0.34	1107		-----		-----
230		-----		-----	1108		-----		-----
237	D4052	12.25		-0.50	1109	D287	12.569		1.29
238	D1298	12.67	R(0.01)	1.85	1121	ISO12185	12.33		-0.05
253	D4052	12.42		0.45	1126		-----		-----
256	D1298	12.2		-0.78	1134	D4052	12.39		0.28
273	D4052	12.2		-0.78	1191		-----		-----
311		-----		-----	1205		-----		-----
313		-----		-----	1229		-----		-----
323	D1298	12.32	C	-0.11	1275		-----		-----
333		-----		-----	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367		-----		-----
337		-----		-----	1381		-----		-----
339		-----		-----	1402	D4052	12.29		-0.28
342		-----		-----	1412	D4052	12.42		0.45
349		-----		-----	1431	ISO12185	12.32		-0.11
351		-----		-----	1543		-----		-----
356	D4052	12.36		0.12	1585	ISO12185	12.35		0.06
360	D4052	12.33		-0.05	1586	D4052	12.4		0.34
370	ISO12185	12.30		-0.22	1648		-----		-----
372	D1298	12.36		0.12	1677	D4052	12.51		0.96
444		-----		-----	1681	ISO12185	12.37		0.17
445		-----		-----	1710		-----		-----
447	D1250	12.4		0.34	1720		-----		-----
463	D4052	12.34		0.00	1724	D4052	12.4		0.34
507	D1298	12.40		0.34	1740		-----		-----
541	D4052	12.20		-0.78	1792	D4052	12.3		-0.22
558		-----		-----	1810		-----		-----
575	D1298	12.8	R(0.01)	2.58	1811		-----		-----
605	ISO12185	12.27		-0.39	1849		-----		-----
610		-----		-----	1854	ISO12185	12.4		0.34
631	D1298	12.30		-0.22	1857		12.32		-0.11
633		-----		-----	1862	ISO12185	12.33		-0.05
634	D1298	12.14		-1.12	1881	ISO12185	12.32		-0.11
657	ISO12185	12.4		0.34	1906		-----		-----
671	D1298	12.23		-0.61	1942		12.4		0.34
704	D1298	12.35		0.06	1949	D1298	12.33		-0.05
732	ISO12185	12.34		0.00	1986	D1298	12.35		0.06
753	ISO12185	12.33		-0.05	2129	Calculation	12.32		-0.11
781	ISO12185	12.27		-0.39	6051	ISO12185	12.33		-0.05
798		-----		-----	6075		-----		-----
823	D1298	12.34		0.00	6092		-----		-----
824	D4052	12.4		0.34	6112		-----		-----
825	D4052	12.38		0.23	6114	D4052	12.32		-0.11
840	ISO12185	12.25		-0.50	6142		-----		-----
842	D1298	12.34		0.00	6154		-----		-----
873		-----		-----	6201	D4052	12.30	C	-0.22
874		-----		-----	6203		-----		-----
887		-----		-----					

normality	suspect
n	73
outliers	4
mean (n)	12.339
st.dev. (n)	0.0725
R(calc.)	0.203
st.dev.(D1298:12b)	0.1786
R(D1298:12b)	0.5

Lab 212 first reported 14.2
Lab 323 first reported 14.32
Lab 6201 first reported 0.984



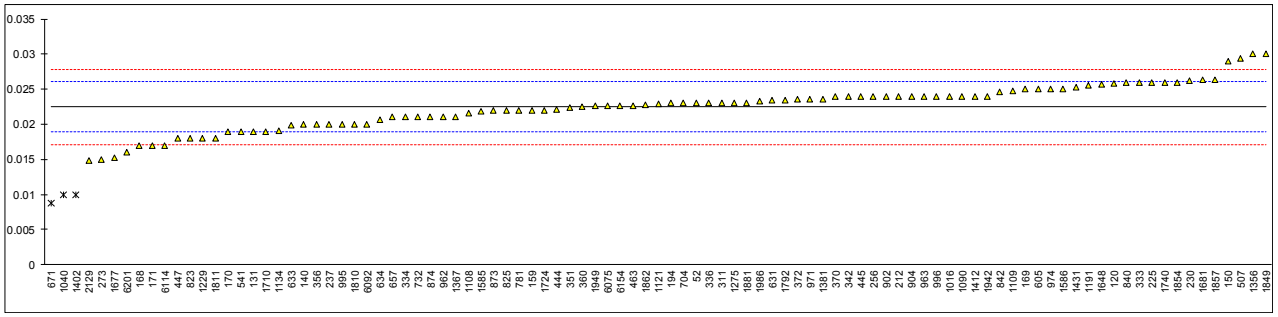


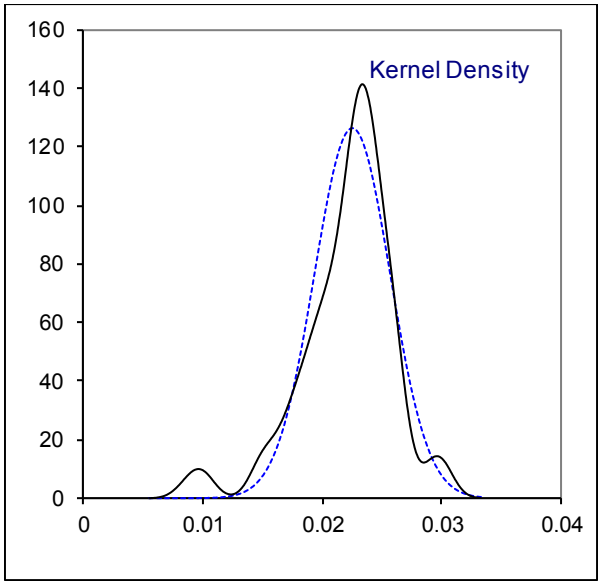
Determination of Ash Content on sample #18265; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D482	0.023		0.28	902	ISO6245	0.024		0.84
120	D482	0.0258		1.85	904	D482	0.024		0.84
131	D482	0.019		-1.96	913		-----		-----
132		-----		-----	962	D482	0.021		-0.84
133		-----		-----	963	ISO6245	0.024		0.84
140	ISO6245	0.020	C	-1.40	971	D482	0.0236		0.62
150	D482	0.029		3.64	974	D482	0.025		1.40
158		-----		-----	994		-----		-----
159	D482	0.022		-0.28	995	D482	0.02		-1.40
168	D482	0.017		-3.08	996	D482	0.024		0.84
169	D482	0.025		1.40	997		-----		-----
170	D482	0.0189		-2.01	1016	D482	0.024		0.84
171	ISO6245	0.017		-3.08	1040	ISO6245	0.01	R(0.05)	-7.00
175		-----		-----	1065		-----		-----
194	D482	0.023		0.28	1082		-----		-----
212	ISO6245	0.024		0.84	1090	ISO6245	0.0240		0.84
225	D482	0.026		1.96	1107		-----		-----
230	ISO6245	0.0262		2.07	1108	ISO6245	0.0216		-0.50
237	D482	0.020		-1.40	1109	D482	0.0247		1.23
238		-----		-----	1121	ISO6245	0.0229		0.23
253		-----		-----	1126		-----		-----
256	ISO6245	0.024		0.84	1134	IP4	0.01909		-1.91
273	D482	0.015	C	-4.20	1191	ISO6245	0.0255		1.68
311	ISO6245	0.023		0.28	1205		-----		-----
313		-----		-----	1229	ISO6245	0.018		-2.52
323		-----		-----	1275	IP4	0.023		0.28
333	ISO6245	0.026		1.96	1299		-----		-----
334	ISO6245	0.021		-0.84	1356	ISO6245	0.03		4.20
336	ISO6245	0.023		0.28	1367	IP4	0.021		-0.84
337		-----		-----	1381	ISO6245	0.0236		0.62
339		-----		-----	1402	IP4	0.010	R(0.05)	-7.00
342	ISO6245	0.024		0.84	1412	D482	0.024		0.84
349		-----		-----	1431	D482	0.0253		1.57
351	ISO6245	0.0224		-0.05	1543		-----		-----
356	ISO6245	0.020		-1.40	1585	D482	0.0219		-0.33
360	ISO6245	0.0225		0.00	1586	D482	0.025		1.40
370	D482	0.0239		0.79	1648	ISO6245	0.0257		1.79
372	ISO6245	0.0236		0.62	1677	D482	0.0152		-4.09
444	D482	0.0221		-0.22	1681	ISO6245	0.0263		2.13
445	IP4	0.024		0.84	1710	ISO6245	0.019		-1.96
447	IP4	0.018		-2.52	1720		-----		-----
463	ISO6245	0.0227		0.11	1724	D482	0.022		-0.28
507	ISO6245	0.0294		3.87	1740	D482	0.026		1.96
541	D482	0.0189		-2.01	1792	D482	0.0234		0.51
558		-----		-----	1810	ISO6245	0.020		-1.40
575		-----		-----	1811	ISO6245	0.018		-2.52
605	ISO6245	0.025		1.40	1849	ISO6245	0.03		4.20
610		-----		-----	1854	ISO6245	0.026		1.96
631	D482	0.0234		0.51	1857	ISO6245	0.0264		2.19
633	D482	0.0198		-1.51	1862	ISO6245	0.0228		0.17
634	D482	0.0206		-1.06	1881	ISO6245	0.023		0.28
657	D482	0.021		-0.84	1906		-----		-----
671	D482	0.00877	R(0.05)	-7.69	1942	D482	0.024		0.84
704	ISO6245	0.023		0.28	1949	ISO6245	0.0226		0.06
732	D482	0.021		-0.84	1986	ISO6245	0.0233		0.45
753		-----		-----	2129	ISO6245	0.0148		-4.31
781	ISO6245	0.022		-0.28	6051		-----		-----
798		-----		-----	6075	D482	0.0226		0.06
823	ISO6245	0.018		-2.52	6092	ISO6245	0.020		-1.40
824		-----		-----	6112		-----		-----
825	D482	0.022		-0.28	6114	D482	0.017		-3.08
840	D482	0.0259		1.91	6142		-----		-----
842	D482	0.0246		1.18	6154	D482	0.0226		0.06
873	ISO6245	0.022		-0.28	6201	ISO6245	0.016		-3.64
874	ISO6245	0.021		-0.84	6203		-----		-----
887		-----		-----					

		Only D482 results:	Only ISO6245 results:
normality	OK	OK	OK
n	94	43	46
outliers	3	1	1
mean (n)	0.0225	0.0224	0.0228
st.dev. (n)	0.00315	0.00301	0.00335
R(calc.)	0.0088	0.0084	0.0094
st.dev.(ISO6245:01)	0.00179	0.00179	0.00179
R(ISO6245:01)	0.005	---	0.005
Compare			
R(D482:13)	0.005	0.005	

Lab 140 first reported 0.007
Lab 273 first reported 0.05



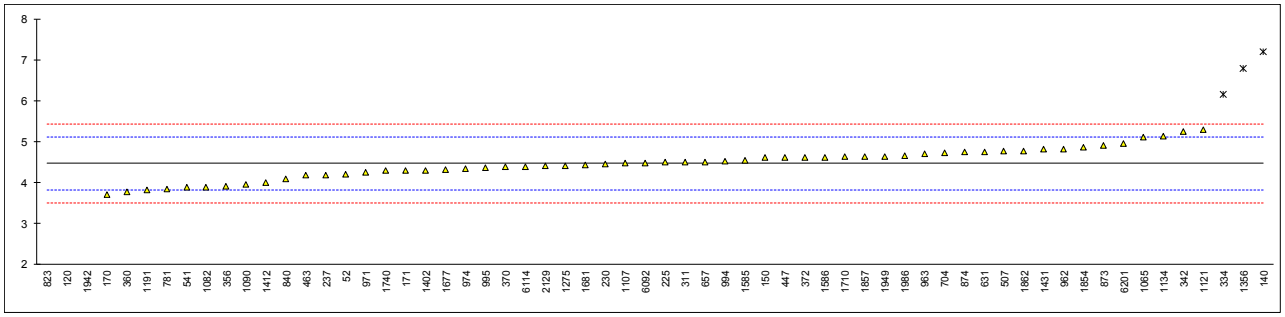


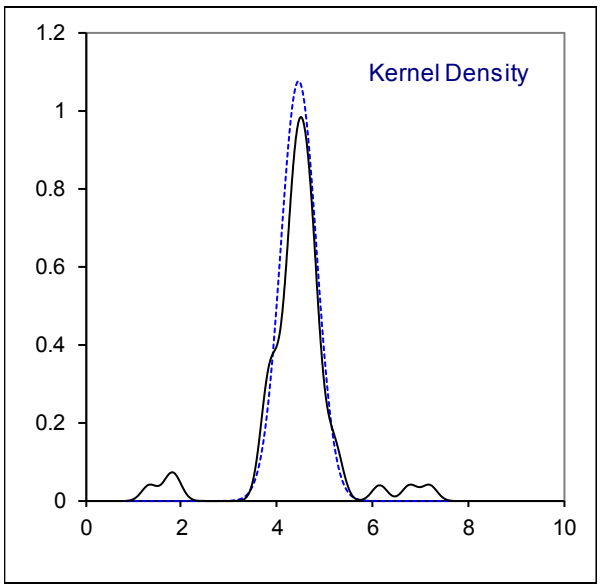
Determination of Asphaltenes on sample #18265; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	IP143	4.2		-0.84	902		-----		-----
120	D6560	1.76	R(0.01)	-8.48	904		-----		-----
131		-----		-----	913		-----		-----
132		-----		-----	962	IP143	4.82		1.11
133		-----		-----	963	IP143	4.7		0.73
140	IP143	7.2	R(0.01)	8.57	971	IP143	4.25		-0.68
150	IP143	4.6	C	0.42	974	IP143	4.35		-0.36
158		-----		-----	994	D6560	4.52		0.17
159		-----		-----	995	IP143	4.36		-0.33
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170	D6560	3.7	C	-2.40	1016		-----		-----
171	IP143	4.3		-0.52	1040		-----		-----
175		-----		-----	1065	IP143	5.12		2.05
194		-----		-----	1082	D6560	3.89		-1.81
212		-----		-----	1090	IP143	3.9597		-1.59
225	D6560	4.5		0.11	1107	IP143	4.47		0.01
230	IP143	4.459		-0.02	1108		-----		-----
237	D6560	4.19		-0.87	1109		-----		-----
238		-----		-----	1121	IP143	5.30		2.61
253		-----		-----	1126		-----		-----
256		-----		-----	1134	IP143	5.1357		2.10
273		-----		-----	1191	D6560	3.82		-2.03
311	IP143	4.5		0.11	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275	IP143	4.414	C	-0.16
333		-----		-----	1299		-----		-----
334	IP143	6.16	R(0.01)	5.31	1356	D6560	6.79	C,R(0.01)	7.28
336		-----		-----	1367		-----		-----
337		-----		-----	1381		-----		-----
339		-----		-----	1402	IP143	4.3		-0.52
342	IP143	5.256		2.47	1412	D6560	4.0		-1.46
349		-----		-----	1431	D6560	4.804		1.06
351		-----		-----	1543		-----		-----
356	IP143	3.9		-1.78	1585	IP143	4.55		0.26
360	IP143	3.77		-2.18	1586	IP143	4.6		0.42
370	IP143	4.38		-0.27	1648		-----		-----
372	IP143	4.6		0.42	1677	IP143	4.312		-0.48
444		-----		-----	1681	IP143	4.43		-0.11
445		-----		-----	1710	INH-459	4.63		0.51
447	IP143	4.6		0.42	1720		-----		-----
463	IP143	4.19		-0.87	1724		-----		-----
507	IP143	4.77		0.95	1740	D6560	4.29		-0.55
541	IP143	3.88		-1.84	1792		-----		-----
558		-----		-----	1810		-----		-----
575		-----		-----	1811		-----		-----
605		-----		-----	1849		-----		-----
610		-----		-----	1854	IP143	4.85		1.20
631	D6560	4.75		0.89	1857	IP143	4.63		0.51
633		-----		-----	1862	IP143	4.78		0.98
634		-----		-----	1881		-----		-----
657	IP143	4.5		0.11	1906		-----		-----
671		-----		-----	1942	IP143	1.9	C,R(0.01)	-8.04
704	IP143	4.72		0.79	1949	IP143	4.64		0.54
732		-----		-----	1986	IP143	4.66		0.61
753		-----		-----	2129	IP143	4.40		-0.21
781	IP143	3.84		-1.96	6051		-----		-----
798		-----		-----	6075		-----		-----
823	IP143	1.35	C,R(0.01)	-9.77	6092	IP143	4.48		0.04
824		-----		-----	6112		-----		-----
825		-----		-----	6114	IP143	4.39		-0.24
840	IP143	4.08		-1.21	6142		-----		-----
842		-----		-----	6154		-----		-----
873	IP143	4.9		1.36	6201	IP143	4.94		1.48
874	IP143	4.74		0.86	6203		-----		-----
887		-----		-----					

normality	OK
n	56
outliers	6
mean (n)	4.466
st.dev. (n)	0.3716
R(calc.)	1.040
st.dev.(IP143:04)	0.3190
R(IP143:04)	0.893

Lab 150 first reported 7.47
Lab 170 first reported 0.3699
Lab 823 first reported 0.497
Lab 1275 first reported 8.7531
Lab 1356 first reported 3.2
Lab 1942 first reported 2.1



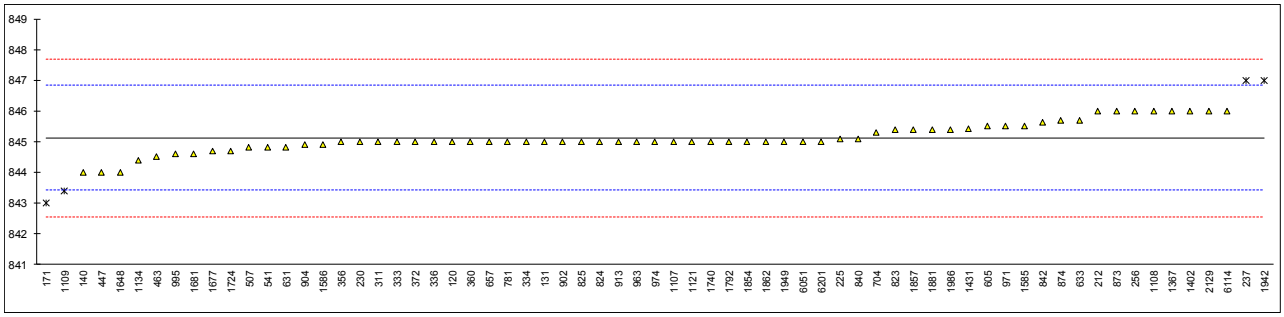


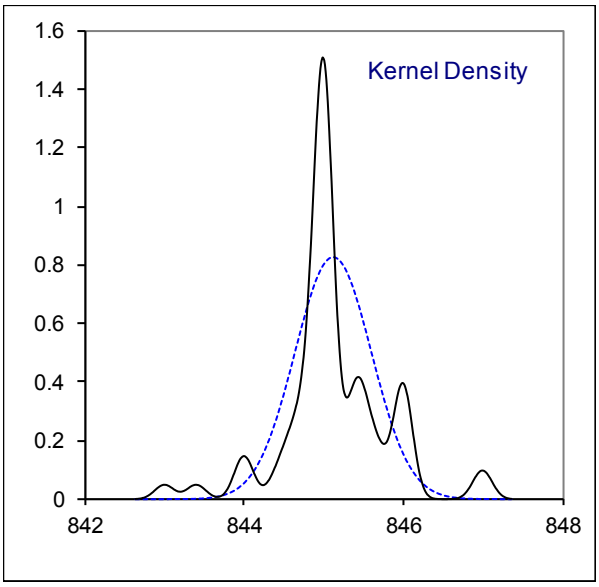
Determination of Calculated Carbon Aromaticity Index on sample #18265

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	902	ISO8217	845		-0.14
120	ISO8217	845		-0.14	904	ISO8217	844.9		-0.26
131	ISO8217	845		-0.14	913	ISO8217	845		-0.14
132		-----		-----	962		-----		-----
133		-----		-----	963	ISO8217	845		-0.14
140	ISO8217	844		-1.31	971	ISO8217	845.5		0.44
150		-----		-----	974	ISO8217	845		-0.14
158		-----		-----	994		-----		-----
159		-----		-----	995	ISO8217	844.6		-0.61
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170		-----		-----	1016		-----		-----
171	ISO8217	843	R(0.05)	-2.48	1040		-----		-----
175		-----		-----	1065		-----		-----
194		-----		-----	1082		-----		-----
212	ISO8217	846		1.02	1090		-----		-----
225	ISO8217	845.1		-0.03	1107	ISO8217	845		-0.14
230	ISO8217	845		-0.14	1108	ISO8217	846		1.02
237	ISO8217	847	E,R(0.05)	2.19	1109	ISO8217	843.4	R(0.05)	-2.01
238		-----		-----	1121	ISO8217	845		-0.14
253		-----		-----	1126		-----		-----
256	ISO8217	846.0		1.02	1134	ISO8217	844.4		-0.84
273		-----		-----	1191		-----		-----
311	ISO8217	845		-0.14	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275		-----		-----
333	ISO8217	845		-0.14	1299		-----		-----
334	ISO8217	845		-0.14	1356		-----		-----
336	ISO8217	845		-0.14	1367	ISO8217	846		1.02
337		-----		-----	1381		-----		-----
339		-----		-----	1402	ISO8217	846		1.02
342		-----		-----	1412		-----		-----
349		-----		-----	1431	ISO8217	845.42		0.35
351		-----		-----	1543		-----		-----
356	ISO8217	845		-0.14	1585	ISO8217	845.5		0.44
360	ISO8217	845		-0.14	1586	ISO8217	844.9		-0.26
370		-----		-----	1648	ISO8217	844		-1.31
372	ISO8217	845		-0.14	1677	ISO8217	844.7		-0.49
444		-----		-----	1681	ISO8217	844.6		-0.61
445		-----		-----	1710		-----		-----
447	ISO8217	844		-1.31	1720		-----		-----
463	ISO8217	844.5		-0.73	1724	ISO8217	844.7		-0.49
507	ISO8217	844.8		-0.38	1740	ISO8217	845		-0.14
541	ISO8217	844.8		-0.38	1792	ISO8217	845		-0.14
558		-----		-----	1810		-----		-----
575		-----		-----	1811		-----		-----
605	ISO8217	845.5		0.44	1849		-----		-----
610		-----		-----	1854	ISO8217	845		-0.14
631		844.8		-0.38	1857	ISO8217	845.4		0.32
633	ISO8217	845.7		0.67	1862	ISO8217	845		-0.14
634		-----		-----	1881	ISO8217	845.4		0.32
657	ISO8217	845		-0.14	1906		-----		-----
671		-----		-----	1942	ISO8217	847	R(0.05)	2.19
704	ISO8217	845.3		0.21	1949	ISO8217	845		-0.14
732		-----		-----	1986	ISO8217	845.4		0.32
753		-----		-----	2129	ISO8217	846.0		1.02
781	ISO8217	845		-0.14	6051	ISO8217	845		-0.14
798		-----		-----	6075		-----		-----
823	ISO8217	845.4		0.32	6092		-----		-----
824	ISO8217	845		-0.14	6112		-----		-----
825	ISO8217	845.0		-0.14	6114	ISO8217	846		1.02
840	ISO8217	845.1		-0.03	6142		-----		-----
842	ISO8217	845.63		0.59	6154		-----		-----
873	ISO8217	846		1.02	6201	ISO8217	845		-0.14
874	ISO8217	845.7		0.67	6203		-----		-----
887		-----		-----					

normality	OK
n	63
outliers	4
mean (n)	845.123
st.dev. (n)	0.4811
R(calc.)	1.347
st.dev.(ISO8217:17)	0.8571
R(ISO8217:17)	2.40

Lab 237 probably a calc. error, iis calculated 845.06



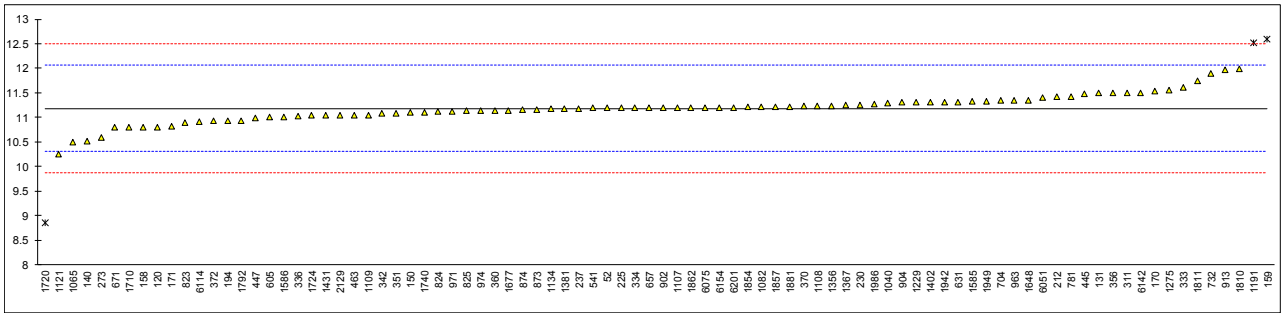


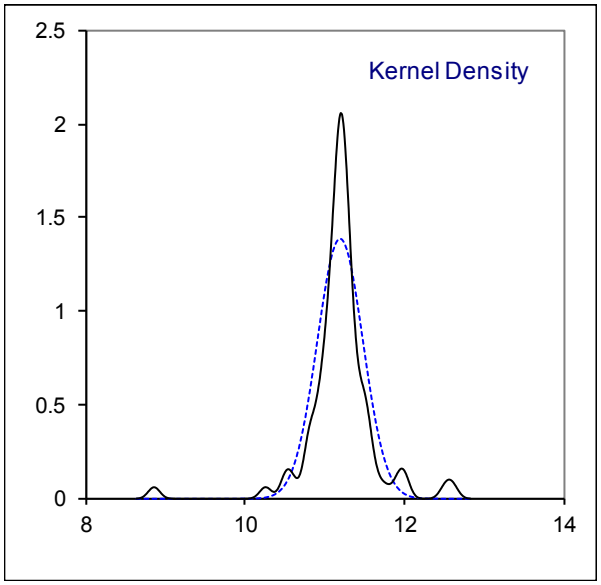
Determination of Carbon Residue - micro method on sample #18265; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4530	11.2		0.03	902	ISO10370	11.2		0.03
120	D4530	10.80		-0.88	904	ISO10370	11.3		0.26
131	D4530	11.49		0.69	913	D4530	11.978		1.81
132		-----		-----	962		-----		-----
133		-----		-----	963	ISO10370	11.35		0.37
140	ISO10370	10.52		-1.52	971	D4530	11.12		-0.15
150	D4530	11.1		-0.20	974	D4530	11.13		-0.13
158	D4530	10.8		-0.88	994		-----		-----
159	D4530	12.6	R(0.01)	3.23	995		-----		-----
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170	D4530	11.5357		0.80	1016		-----		-----
171	ISO10370	10.82		-0.84	1040	ISO10370	11.29		0.24
175		-----		-----	1065	D4530	10.5		-1.57
194	D4530	10.94		-0.56	1082	ISO10370	11.220		0.08
212	ISO10370	11.42		0.53	1090		-----		-----
225	D4530	11.2		0.03	1107	D4530	11.2		0.03
230	ISO10370	11.261		0.17	1108	ISO10370	11.23		0.10
237	D4530	11.18		-0.01	1109	D4530	11.054		-0.30
238		-----		-----	1121	ISO10370	10.25		-2.14
253		-----		-----	1126		-----		-----
256		-----		-----	1134	IP398	11.168		-0.04
273	D4530	10.6		-1.34	1191	ISO10370	12.51	R(0.01)	3.02
311	D4530	11.5		0.72	1205		-----		-----
313		-----		-----	1229	ISO10370	11.3		0.26
323		-----		-----	1275	IP398	11.56		0.85
333	ISO10370	11.62		0.99	1299		-----		-----
334	ISO10370	11.20		0.03	1356	ISO10370	11.24	C	0.12
336	ISO10370	11.02		-0.38	1367	IP398	11.26		0.17
337		-----		-----	1381	ISO10370	11.171		-0.03
339		-----		-----	1402	IP398	11.30		0.26
342	ISO10370	11.09		-0.22	1412		-----		-----
349		-----		-----	1431	D4530	11.05		-0.31
351	ISO10370	11.091		-0.22	1543		-----		-----
356	ISO10370	11.50		0.72	1585	D4530	11.324		0.32
360	ISO10370	11.134		-0.12	1586	D4530	11.00		-0.42
370	D4530	11.229		0.10	1648	ISO10370	11.350		0.37
372	ISO10370	10.93		-0.58	1677	D4530	11.144		-0.10
444		-----		-----	1681		-----		-----
445	IP398	11.47		0.65	1710	ISO10370	10.79		-0.90
447	IP398	10.98		-0.47	1720	D4530	8.85	R(0.01)	-5.34
463	ISO10370	11.053		-0.30	1724	D4530	11.04		-0.33
507		-----		-----	1740	D4530	11.1		-0.20
541	D4530	11.20		0.03	1792	ISO10370	10.94		-0.56
558		-----		-----	1810	ISO10370	11.99		1.84
575		-----		-----	1811	ISO10370	11.74		1.27
605	ISO10370	11.0		-0.42	1849		-----		-----
610		-----		-----	1854	ISO10370	11.21		0.05
631	D4530	11.31		0.28	1857	ISO10370	11.22		0.08
633		-----		-----	1862	ISO10370	11.2		0.03
634		-----		-----	1881	ISO10370	11.22		0.08
657	D4530	11.2		0.03	1906		-----		-----
671	D4530	10.79		-0.90	1942	D4530	11.3		0.26
704	ISO10370	11.338		0.35	1949	ISO10370	11.325		0.32
732	ISO10370	11.90		1.63	1986	ISO10370	11.27		0.19
753		-----		-----	2129	ISO10370	11.05		-0.31
781	ISO10370	11.43		0.56	6051	ISO10370	11.4		0.49
798		-----		-----	6075	D4530	11.20		0.03
823	ISO10370	10.9		-0.65	6092		-----		-----
824	ISO10370	11.12		-0.15	6112		-----		-----
825	D4530	11.13		-0.13	6114	ISO10370	10.920		-0.61
840		-----		-----	6142	ISO10370	11.5		0.72
842		-----		-----	6154	D4530	11.20		0.03
873	ISO10370	11.16		-0.06	6201	ISO10370	11.2		0.03
874	ISO10370	11.15		-0.08	6203		-----		-----
887		-----		-----					

normality	not OK
n	85
outliers	3
mean (n)	11.1861
st.dev. (n)	0.28661
R(calc.)	0.8025
st.dev.(ISO10370:14)	0.43783
R(ISO10370:14)	1.2259

Lab 1356 first reported 9.67

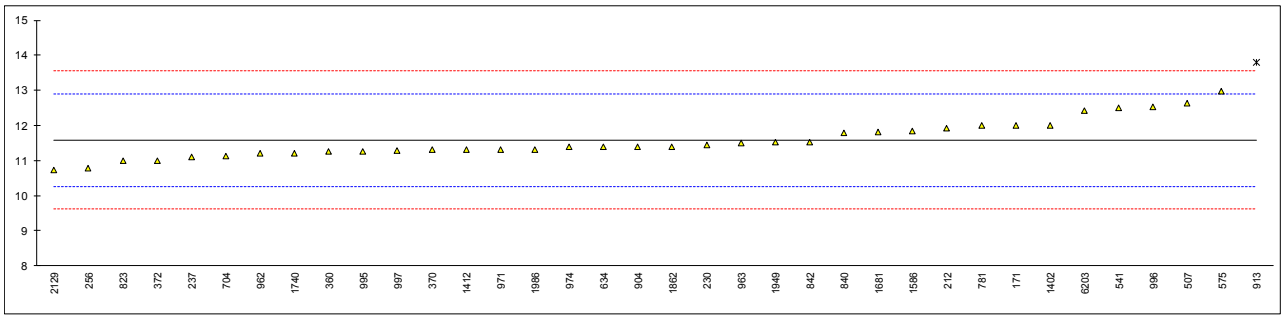


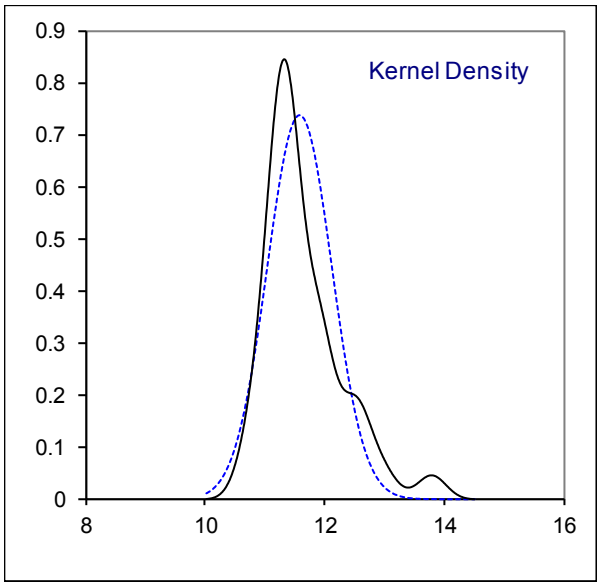


Determination of Conradson Carbon Residue on sample #18265; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	902		-----		-----
120		-----		-----	904	D189	11.4		-0.27
131		-----		-----	913	D189	13.797	R(0.05)	3.38
132		-----		-----	962	D189	11.2		-0.57
133		-----		-----	963	D189	11.50		-0.12
140		-----		-----	971	D189	11.32		-0.39
150		-----		-----	974	D189	11.38		-0.30
158		-----		-----	994		-----		-----
159		-----		-----	995	D189	11.26		-0.48
168		-----		-----	996	D189	12.54		1.46
169		-----		-----	997	D189	11.28		-0.45
170		-----		-----	1016		-----		-----
171	D189	12.0		0.64	1040		-----		-----
175		-----		-----	1065		-----		-----
194		-----		-----	1082		-----		-----
212	D189	11.93		0.54	1090		-----		-----
225		-----		-----	1107		-----		-----
230	D189	11.443		-0.20	1108		-----		-----
237	D189	11.11		-0.71	1109		-----		-----
238		-----		-----	1121		-----		-----
253		-----		-----	1126		-----		-----
256	D189	10.78		-1.21	1134		-----		-----
273		-----		-----	1191		-----		-----
311		-----		-----	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275		-----		-----
333		-----		-----	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367		-----		-----
337		-----		-----	1381		-----		-----
339		-----		-----	1402	IP13	12.0		0.64
342		-----		-----	1412	D189	11.3		-0.42
349		-----		-----	1431		-----		-----
351		-----		-----	1543		-----		-----
356		-----		-----	1585		-----		-----
360	D189	11.25		-0.50	1586	D189	11.85		0.41
370	D189	11.30		-0.42	1648		-----		-----
372	D189	11.0		-0.88	1677		-----		-----
444		-----		-----	1681	D189	11.82		0.37
445		-----		-----	1710		-----		-----
447		-----		-----	1720		-----		-----
463		-----		-----	1724		-----		-----
507	D189	12.643		1.62	1740	D189	11.2		-0.57
541	D189	12.51		1.42	1792		-----		-----
558		-----		-----	1810		-----		-----
575	D189	12.99		2.15	1811		-----		-----
605		-----		-----	1849		-----		-----
610		-----		-----	1854		-----		-----
631		-----		-----	1857		-----		-----
633		-----		-----	1862	D189	11.4		-0.27
634	D189	11.39		-0.29	1881		-----		-----
657		-----		-----	1906		-----		-----
671		-----		-----	1942		-----		-----
704	D189	11.120		-0.70	1949	D189	11.51		-0.10
732		-----		-----	1986	D189	11.32		-0.39
753		-----		-----	2129	D189	10.73		-1.29
781	D189	12.00		0.64	6051		-----		-----
798		-----		-----	6075		-----		-----
823	D189	11.0		-0.88	6092		-----		-----
824		-----		-----	6112		-----		-----
825		-----		-----	6114		-----		-----
840	D189	11.793		0.33	6142		-----		-----
842	D189	11.529		-0.07	6154		-----		-----
873		-----		-----	6201		-----		-----
874		-----		-----	6203	D189	12.42		1.28
887		-----		-----					

normality	OK
n	35
outliers	1
mean (n)	11.5777
st.dev. (n)	0.54127
R(calc.)	1.5156
st.dev.(D189:06)	0.65712
R(D189:06)	1.8399



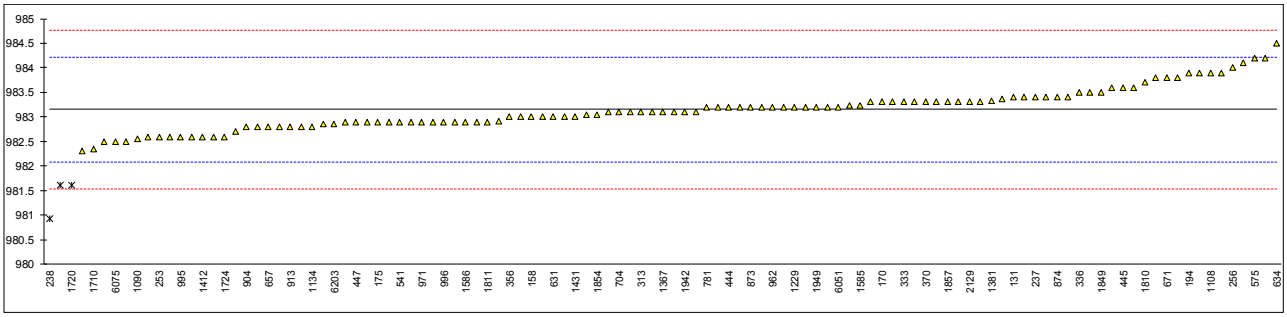


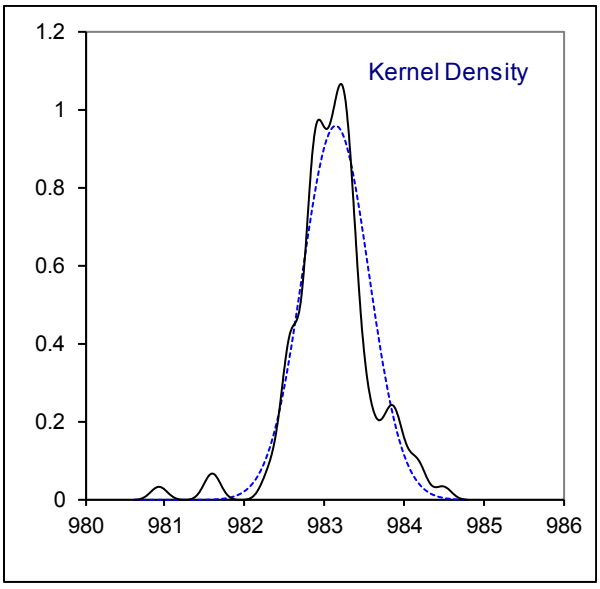
Determination of Density at 15°C on sample #18265; results in kg/m^3

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4052	983.3		0.28	902	ISO12185	983.1		-0.09
120	ISO12185	983.4		0.47	904	ISO12185	982.8		-0.65
131	D4052	983.4		0.47	913	D1298	982.8		-0.65
132		-----		-----	962	D1298	983.2		0.09
133		-----		-----	963	ISO12185	982.9		-0.47
140	D4052	982.6		-1.03	971	IP365	982.9		-0.47
150		-----		-----	974	D1298	982.9		-0.47
158	D4052	983.0		-0.28	994	ISO12185	982.5		-1.21
159	D4052	983.0		-0.28	995	ISO12185	982.6		-1.03
168		-----		-----	996	D4052	982.9		-0.47
169		-----		-----	997	ISO12185	982.6		-1.03
170	D4052	983.3	C	0.28	1016		-----		-----
171		-----		-----	1040	ISO12185	983.8		1.21
175	D4052	982.9		-0.47	1065	D4052	984.2		1.96
194	D4052	983.9		1.40	1082		-----		-----
212	ISO12185	983.6		0.84	1090	ISO12185	982.56		-1.10
225	D4052	982.9		-0.47	1107	D4052	983.2		0.09
230	ISO12185	983.05		-0.19	1108	ISO12185	983.9		1.40
237	D4052	983.4		0.47	1109	D4052	981.6	R(0.05)	-2.89
238	D4052	980.93	R(0.01)	-4.14	1121	ISO12185	982.8		-0.65
253	D4052	982.6		-1.03	1126	ISO12185	983.24		0.17
256	D1298	984.0		1.59	1134	D4052	982.8		-0.65
273	D4052	983.8		1.21	1191	ISO12185	983.4		0.47
311	D4052	982.7		-0.84	1205		-----		-----
313	ISO12185	983.1		-0.09	1229	ISO12185	983.2		0.09
323	ISO12185	983.3		0.28	1275	IP365	982.3		-1.59
333	ISO12185	983.3		0.28	1299		-----		-----
334	ISO12185	983.3		0.28	1356	ISO12185	982.9		-0.47
336	ISO12185	983.5		0.65	1367	IP365	983.1		-0.09
337	ISO12185	983.2		0.09	1381	ISO12185	983.33		0.34
339		-----		-----	1402	IP365	983.5		0.65
342	D4052	982.6		-1.03	1412	D4052	982.6		-1.03
349		-----		-----	1431	ISO12185	983.01		-0.26
351	ISO3675	983.60		0.84	1543		-----		-----
356	ISO12185	983.0		-0.28	1585	ISO12185	983.24		0.17
360	ISO12185	982.9		-0.47	1586	D4052	982.9		-0.47
370	ISO12185	983.3		0.28	1648	ISO12185	982.90		-0.47
372	ISO12185	983.0		-0.28	1677	D4052	982.6		-1.03
444	D4052	983.2		0.09	1681	ISO12185	982.91		-0.45
445	IP365	983.6		0.84	1710	ISO12185	982.35	C	-1.49
447	IP365	982.9		-0.47	1720	D4052	981.6	R(0.05)	-2.89
463	D4052	982.85		-0.56	1724	D4052	982.6		-1.03
507	ISO12185	983.10		-0.09	1740	D4052	983.1		-0.09
541	ISO12185	982.90		-0.47	1792	ISO12185	983.3		0.28
558	D4052	983.4		0.47	1810	ISO12185	983.7		1.03
575	D1298	984.2	C	1.96	1811	ISO12185	982.9		-0.47
605	ISO12185	983.2		0.09	1849	ISO12185	983.5		0.65
610		-----		-----	1854	ISO12185	983.05		-0.19
631	D4052	983.0		-0.28	1857	D1298	983.3		0.28
633	D1298	984.11		1.79	1862	ISO12185	983.2		0.09
634	D1298	984.5		2.52	1881	ISO12185	983.3		0.28
657	ISO12185	982.8		-0.65	1906		-----		-----
671	D1298	983.8		1.21	1942	D7042	983.1		-0.09
704	ISO12185	983.1		-0.09	1949	ISO12185	983.2		0.09
732	ISO12185	982.8		-0.65	1986	ISO12185	983.2		0.09
753	ISO12185	983.2		0.09	2129	D4052	983.3		0.28
781	ISO12185	983.2		0.09	6051	ISO12185	983.2		0.09
798		-----		-----	6075	D4052	982.5		-1.21
823	ISO12185	983.1		-0.09	6092	ISO12185	983.0		-0.28
824	ISO12185	982.8		-0.65	6112		-----		-----
825	ISO12185	982.9		-0.47	6114	ISO12185	983.3		0.28
840	ISO12185	983.36		0.39	6142	ISO12185	983.9		1.40
842	D1298	983.9		1.40	6154	D4052	982.5		-1.21
873	ISO12185	983.2		0.09	6201	ISO12185	983.1		-0.09
874	ISO12185	983.4		0.47	6203	ISO12185	982.85		-0.56
887		-----		-----					

normality	OK
n	110
outliers	3
mean (n)	983.150
st.dev. (n)	0.4173
R(calc.)	1.168
st.dev.(ISO12185:96)	0.5357
R(ISO12185:96)	1.5

Lab 170 first reported 952.6
Lab 575 first reported 980.0
Lab 1710 first reported 978.1



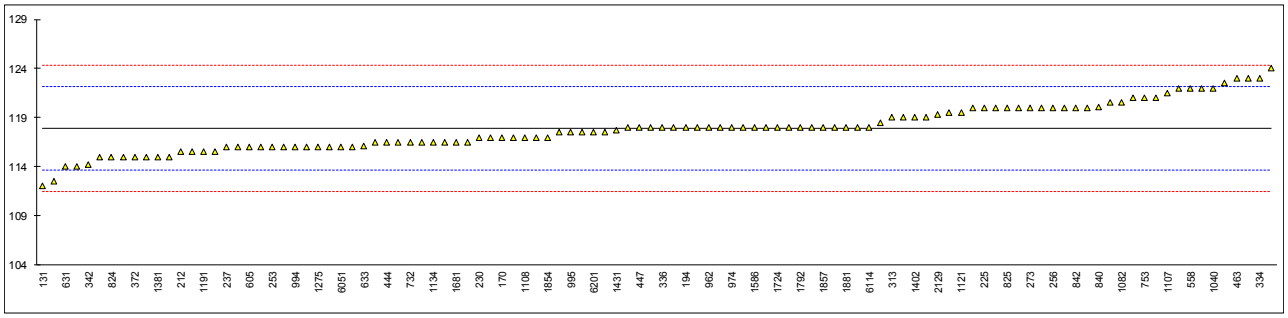


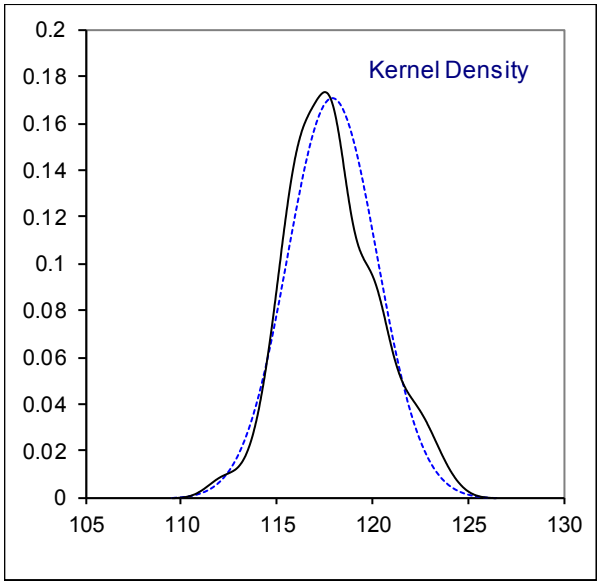
Determination of Flash Point PMcc on sample #18265; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D93-B	112.5		-2.52	902	D93-B	116.0		-0.88
120		117		-0.42	904	ISO2719-B	117		-0.42
131	D93-B	112.0		-2.75	913	D93-B	120		0.98
132		-----		-----	962	D93-B	118.0		0.05
133		-----		-----	963	ISO2719-B	118.0		0.05
140	D93-B	115		-1.35	971	D93-B	116.5		-0.65
150	D93-B	118.0		0.05	974	D93-B	118.0		0.05
158	D93-B	119.5		0.75	994	D93-B	116.0		-0.88
159		-----		-----	995	ISO2719-B	117.5		-0.18
168	D93-B	118.0		0.05	996	D93-B	116.0		-0.88
169	D93-B	115.0		-1.35	997	ISO2719-B	117.5		-0.18
170	D93-B	117.0		-0.42	1016		-----		-----
171	ISO2719	121.0		1.45	1040	ISO2719-B	122.0		1.92
175	D93-B	116		-0.88	1065	D93-A	121		1.45
194	D93-B	118.0		0.05	1082	ISO2719-A	120.5		1.22
212	ISO2719-B	115.5		-1.12	1090		-----		-----
225	D93-B	120.0		0.98	1107	D93-B	121.5		1.68
230	ISO2719-B	117.0		-0.42	1108	ISO2719-B	117.0		-0.42
237	D93-B	116		-0.88	1109	D93-B	>110		-----
238	D93-B	118.0		0.05	1121	ISO2719-B	119.5		0.75
253	D93-B	116.0		-0.88	1126	ISO2719-B	122.5		2.15
256	D93-B	120.0		0.98	1134	D93-B	116.5		-0.65
273	D93-B	120.0	C	0.98	1191	ISO2719-A	115.5		-1.12
311	D93-B	118.5		0.28	1205	D93-B	115.0		-1.35
313	ISO2719-B	119.0		0.52	1229	ISO2719-A	119.0		0.52
323		-----		-----	1275	ISO2719-B	116.0		-0.88
333	ISO2719-B	117.5		-0.18	1299		-----		-----
334	ISO2719-B	123.0		2.38	1356	ISO2719-A	115.5		-1.12
336	ISO2719-B	118.0		0.05	1367	D93-B	117.0		-0.42
337		-----		-----	1381	D93-B	115.00		-1.35
339		-----		-----	1402	IP34-B	119.0		0.52
342	ISO2719-B	114.2		-1.72	1412	D93-B	116.5		-0.65
349		-----		-----	1431	D93-B	117.7		-0.09
351	ISO2719-B	120.50		1.22	1543		-----		-----
356	ISO2719-B	123.0		2.38	1585	D93-B	118.0		0.05
360	ISO2719-B	120.0		0.98	1586	D93-B	118.0		0.05
370	D93-B	120.0		0.98	1648	ISO2719-B	119.0		0.52
372	ISO2719-B	115.0		-1.35	1677	D93-B	118.0		0.05
444	D93-B	116.5		-0.65	1681	ISO2719-B	116.5		-0.65
445	D93-B	116.5		-0.65	1710		-----		-----
447	D93-B	118.0		0.05	1720		-----		-----
463	ISO2719-B	123.0		2.38	1724	D93-B	118		0.05
507	ISO2719-B	>110.0		-----	1740	D93-B	118		0.05
541	D93-B	116.50		-0.65	1792	ISO2719-B	118.0		0.05
558	D93-B	122		1.92	1810	D93-B	115		-1.35
575	D93-B	124		2.85	1811	ISO2719-A	118.0		0.05
605	ISO2719-B	116.0		-0.88	1849	ISO2719-B	116.5		-0.65
610		-----		-----	1854	ISO2719-B	117		-0.42
631	D93-B	114.0		-1.82	1857	ISO2719-B	118.0		0.05
633	D93-B	116.1		-0.84	1862	ISO2719-B	118.0		0.05
634	D93-B	118.0		0.05	1881	ISO2719-B	118.0		0.05
657	D93-B	120		0.98	1906		-----		-----
671	D93-B	>110		-----	1942		-----		-----
704	D93-B	116.0		-0.88	1949	ISO2719-B	118.0		0.05
732	ISO2719-B	116.5		-0.65	1986	ISO2719-B	116.0		-0.88
753	ISO2719-B	121.0		1.45	2129	ISO2719-B	119.31		0.66
781	ISO2719-B	120.0		0.98	6051	ISO2719-B	116.0		-0.88
798		-----		-----	6075		-----		-----
823	ISO2719-B	122.0		1.92	6092	D93-B	114		-1.82
824	ISO2719-B	115.0		-1.35	6112		-----		-----
825	D93-B	120.0		0.98	6114	D93-B	118.0		0.05
840	D93-B	120.1		1.03	6142	ISO2719-B	116.0		-0.88
842	D93-B	120.0		0.98	6154		-----		-----
873	ISO2719-B	120.0		0.98	6201	D93-B	117.5		-0.18
874	ISO2719-B	122.0		1.92	6203	ISO2719-B	117.5		-0.18
887	D93-B	115.5		-1.12					

normality	OK
n	108
outliers	0
mean (n)	117.893
st.dev. (n)	2.3393
R(calc.)	6.550
st.dev.(ISO2719-B:16)	2.1429
R(ISO2719-B:16)	6

Lab 273 first reported 98



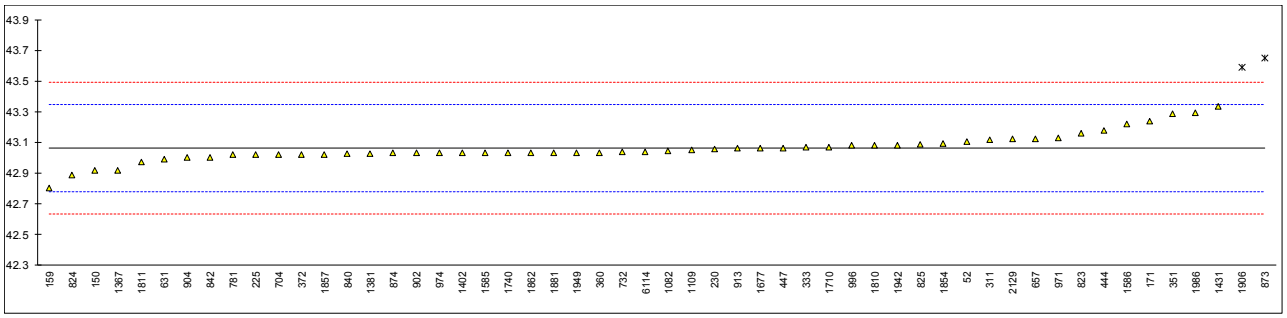


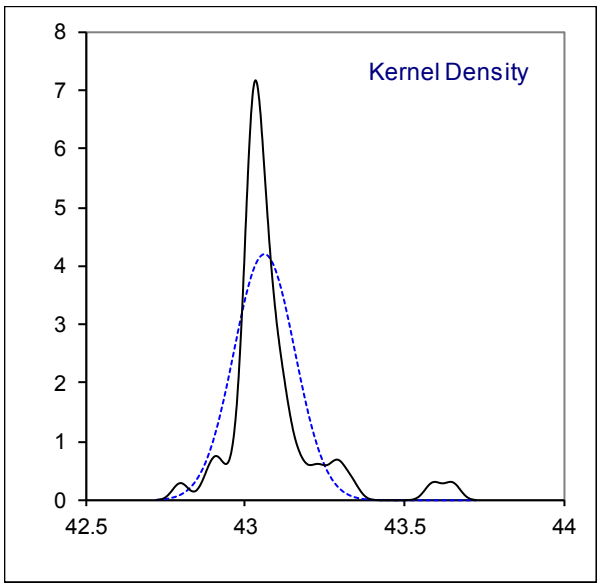
Determination of Heat of Combustion Gross on sample #18265; results in MJ/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D240	43.105		0.30	902	D4868	43.03		-0.23
120		-----		-----	904	D4868	43.0		-0.44
131		-----		-----	913	D4868	43.06		-0.02
132		-----		-----	962		-----		-----
133		-----		-----	963		-----		-----
140		-----		-----	971	D240	43.130		0.47
150	D240	42.915		-1.03	974	D4868	43.03		-0.23
158		-----		-----	994		-----		-----
159		42.8		-1.84	995		-----		-----
168		-----		-----	996	D4868	43.08		0.12
169		-----		-----	997		-----		-----
170		-----		-----	1016		-----		-----
171	D240	43.240		1.24	1040		-----		-----
175		-----		-----	1065		-----		-----
194		-----		-----	1082		43.0475		-0.10
212		-----		-----	1090		-----		-----
225	D4868	43.02		-0.30	1107		-----		-----
230	D4868	43.057		-0.04	1108		-----		-----
237		-----		-----	1109	D4868	43.053		-0.07
238		-----		-----	1121		-----		-----
253		-----		-----	1126		-----		-----
256		-----		-----	1134		-----		-----
273		-----		-----	1191		-----		-----
311	D240	43.120		0.40	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275		-----		-----
333	D240	43.070		0.05	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367		42.919		-1.00
337		-----		-----	1381	D240	43.0295		-0.23
339		-----		-----	1402	D240	43.03		-0.23
342		-----		-----	1412		-----		-----
349		-----		-----	1431	D240	43.334		1.90
351	D4868	43.288		1.58	1543		-----		-----
356		-----		-----	1585	D4868	43.030		-0.23
360	D240	43.0304		-0.22	1586		43.22	C	1.10
370		-----		-----	1648		-----		-----
372	D4868	43.02		-0.30	1677	D4868	43.06		-0.02
444		43.178	C	0.81	1681		-----		-----
445		-----		-----	1710	D4809	43.070		0.05
447	D240	43.065		0.02	1720		-----		-----
463		-----		-----	1724		-----		-----
507		-----		-----	1740	D240	43.030		-0.23
541		-----		-----	1792		-----		-----
558		-----		-----	1810	D240	43.08		0.12
575		-----		-----	1811		42.973		-0.63
605		-----		-----	1849		-----		-----
610		-----		-----	1854	D240	43.096		0.24
631	D4868	42.993		-0.49	1857	D4868	43.02		-0.30
633		-----		-----	1862	D4868	43.03		-0.23
634		-----		-----	1881	D4868	43.030		-0.23
657	D240	43.125		0.44	1906		43.59	R(0.01)	3.69
671		-----		-----	1942	D240	43.08		0.12
704	D4868	43.02		-0.30	1949	D4868	43.03		-0.23
732		43.04		-0.16	1986	D4868	43.29		1.59
753		-----		-----	2129	D240	43.1219		0.42
781	D4868	43.02		-0.30	6051		-----		-----
798		-----		-----	6075		-----		-----
823	D240	43.162		0.70	6092		-----		-----
824	D240	42.885		-1.24	6112		-----		-----
825	D240	43.090	C	0.19	6114	D4868	43.04		-0.16
840	D240	43.027		-0.25	6142		-----		-----
842	D240	43.000		-0.44	6154		-----		-----
873	ISO8217(H)	43.65	R(0.01)	4.11	6201		-----		-----
874	D4864	43.03		-0.23	6203		-----		-----
887		-----		-----					

normality	not OK
n	52
outliers	2
mean (n)	43.0624
st.dev. (n)	0.09524
R(calc.)	0.2667
st.dev.(D240:17)	0.14286
R(D240:17)	0.40

Lab 444 first reported 43.842
Lab 825 first reported 10291.7 Kcal/kg
Lab 1586 first reported 45.14



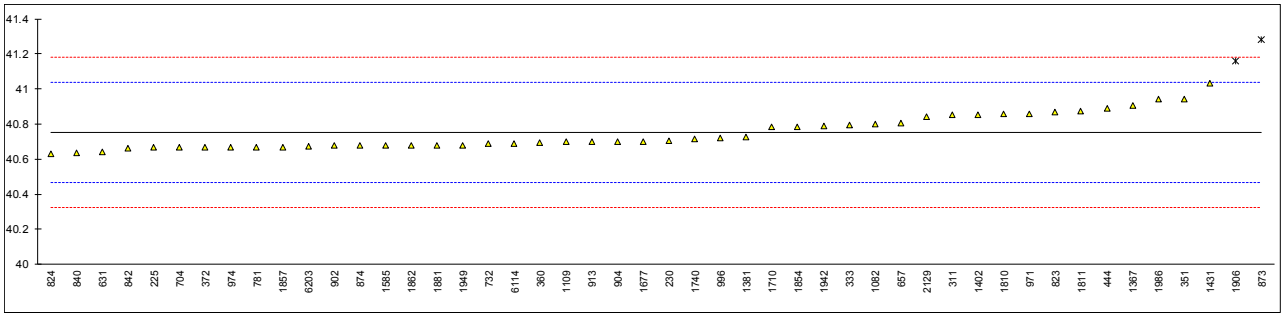


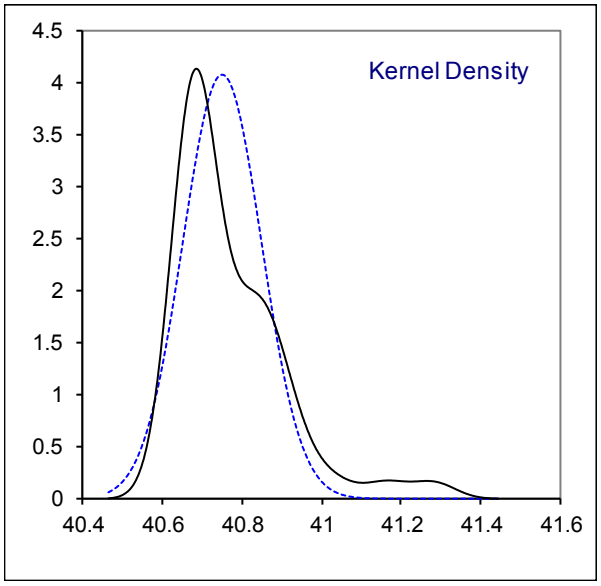
Determination of Heat of Combustion Net on sample #18265; results in MJ/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	902	D4868	40.68		-0.50
120		-----		-----	904	D4868	40.7		-0.36
131		-----		-----	913	D4868	40.70		-0.36
132		-----		-----	962		-----		-----
133		-----		-----	963		-----		-----
140		-----		-----	971	D240	40.859		0.76
150		-----		-----	974	D4868	40.67		-0.57
158		-----		-----	994		-----		-----
159		-----		-----	995		-----		-----
168		-----		-----	996	D4868	40.72		-0.22
169		-----		-----	997		-----		-----
170		-----		-----	1016		-----		-----
171		-----		-----	1040		-----		-----
175		-----		-----	1065		-----		-----
194		-----		-----	1082		40.7981		0.33
212		-----		-----	1090		-----		-----
225	D4868	40.67		-0.57	1107		-----		-----
230	D4868	40.705		-0.32	1108		-----		-----
237		-----		-----	1109	D4868	40.699		-0.36
238		-----		-----	1121		-----		-----
253		-----		-----	1126		-----		-----
256		-----		-----	1134		-----		-----
273		-----		-----	1191		-----		-----
311	D240	40.850		0.69	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275		-----		-----
333	D240	40.795		0.31	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367		40.903		1.06
337		-----		-----	1381	D240	40.7250		-0.18
339		-----		-----	1402	D240	40.855		0.73
342		-----		-----	1412		-----		-----
349		-----		-----	1431	D240	41.030		1.95
351	D4868	40.944		1.35	1543		-----		-----
356		-----		-----	1585	D4868	40.680		-0.50
360	D240	40.6920		-0.41	1586		-----		-----
370		-----		-----	1648		-----		-----
372	D4868	40.67		-0.57	1677	D4868	40.70		-0.36
444		40.887	C	0.95	1681		-----		-----
445		-----		-----	1710	D4809	40.782		0.22
447		-----		-----	1720		-----		-----
463		-----		-----	1724		-----		-----
507		-----		-----	1740	D240	40.716		-0.24
541		-----		-----	1792		-----		-----
558		-----		-----	1810	D240	40.857		0.74
575		-----		-----	1811		40.873		0.85
605		-----		-----	1849		-----		-----
610		-----		-----	1854	D240	40.784		0.23
631	D4868	40.643		-0.76	1857	D4868	40.67		-0.57
633		-----		-----	1862	D4868	40.68		-0.50
634		-----		-----	1881	D4868	40.680		-0.50
657	D240	40.805		0.38	1906		41.16	R(0.01)	2.86
671		-----		-----	1942	D240	40.79		0.27
704	D4868	40.67		-0.57	1949	D4868	40.68		-0.50
732		40.69		-0.43	1986	D4868	40.94		1.32
753		-----		-----	2129	D240	40.841		0.63
781	D4868	40.67		-0.57	6051		-----		-----
798		-----		-----	6075		-----		-----
823	D240	40.870		0.83	6092		-----		-----
824	D240	40.628	C	-0.86	6112		-----		-----
825		-----		-----	6114	D4868	40.69		-0.43
840	D240	40.638		-0.79	6142		-----		-----
842	D240	40.660		-0.64	6154		-----		-----
873	ISO8217(H)	41.28	R(0.01)	3.70	6201		-----		-----
874	D4864	40.68		-0.50	6203		40.675		-0.53
887		-----		-----					

normality	OK
n	46
outliers	2
mean (n)	40.7510
st.dev. (n)	0.09813
R(calc.)	0.2748
st.dev.(D240:17)	0.14286
R(D240:17)	0.40

Lab 444 first reported 41.548
Lab 824 first reported 41.769

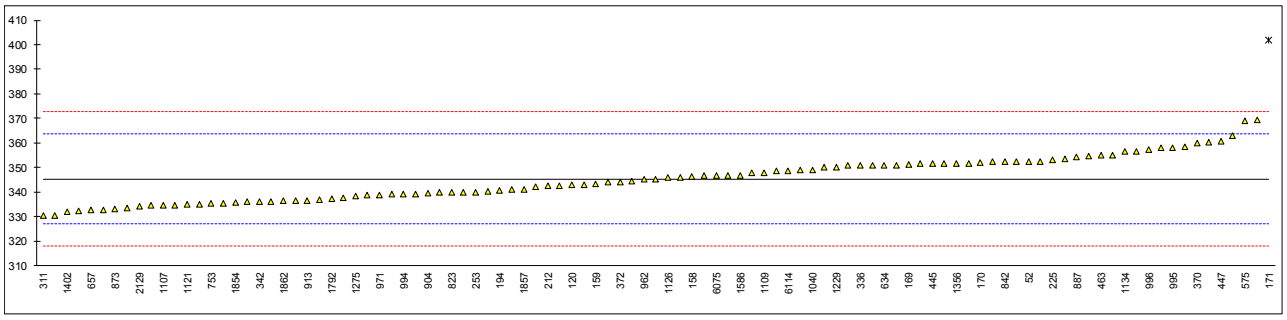


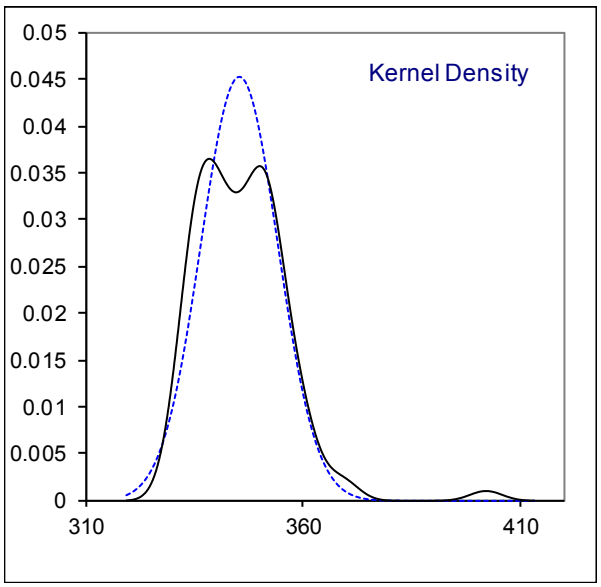


Determination of Kinematic Viscosity at 50°C on sample #18265; results in mm^2/s

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D445	352.5		0.78	902	D445	343.1		-0.25
120	ISO3104	342.8		-0.28	904	D445	339.5		-0.64
131	D445	356.5		1.22	913	D445	336.6		-0.96
132		-----		-----	962	D445	345.3		0.00
133		-----		-----	963	ISO3104	343.9		-0.16
140	ISO3104	369.2		2.61	971	D445	338.9		-0.71
150		-----		-----	974	D445	342.2		-0.34
158	D445	346.2		0.09	994	D445	339.3		-0.66
159	D445	343.4		-0.21	995	ISO3104	358.2		1.41
168	D445	347.9		0.28	996	D445	357.4		1.32
169	D445	351.0661		0.63	997		-----		-----
170	D445	351.85		0.71	1016		-----		-----
171	ISO3104	402.0	R(0.01)	6.21	1040	ISO3104	348.8		0.38
175	D445	337.7		-0.84	1065	D445	360.48		1.66
194	D445	340.7		-0.51	1082		-----		-----
212	ISO3104	342.4		-0.32	1090		-----		-----
225	D445	353.3		0.87	1107	D445	334.6		-1.18
230	ISO3104	352.46		0.78	1108	ISO3104	351.5		0.68
237	D445	354.7		1.03	1109	D445	347.98		0.29
238		-----		-----	1121	ISO3104	335.0		-1.13
253	D445	340.00		-0.58	1126	ISO3104	345.84		0.06
256	D445	344.6		-0.08	1134	IP71	356.44		1.22
273		-----		-----	1191	ISO3104	350.94		0.61
311	D445	330.5		-1.63	1205		-----		-----
313	ISO3104	334.5		-1.19	1229	ISO3104	350.2		0.53
323	ISO3104	342.7		-0.29	1275	IP71	338.39		-0.76
333	ISO3104	350.2		0.53	1299		-----		-----
334	ISO3104	348.8		0.38	1356	ISO3104	351.7		0.70
336	ISO3104	350.8		0.60	1367	IP71	332.2		-1.44
337		-----		-----	1381	ISO3104	351.70		0.70
339		-----		-----	1402	IP71	331.9		-1.47
342	ISO3104	336.2		-1.00	1412	D445	339.9		-0.60
349		-----		-----	1431	D445	350.71		0.59
351	ISO3104	352.50		0.78	1543		-----		-----
356	ISO3104	340.0		-0.58	1585	D445	334.80		-1.15
360	ISO3104	340.27		-0.56	1586	D445	346.8		0.16
370	D445	360.13		1.62	1648	ISO3104	357.9		1.38
372	ISO3104	344.0		-0.15	1677	D445	339.32		-0.66
444		-----		-----	1681	ISO3104	353.37		0.88
445	IP71	351.6		0.69	1710		-----		-----
447	D445	360.7		1.68	1720		-----		-----
463	ISO3104	354.95		1.05	1724	D445	339.2		-0.67
507	ISO3104	352.22		0.75	1740	D445	348.5		0.35
541	D445	345.34		0.00	1792	ISO3104	337.30		-0.88
558		-----		-----	1810		-----		-----
575	D445	368.94		2.59	1811		-----		-----
605	ISO3104	333.4		-1.31	1849		-----		-----
610		-----		-----	1854	ISO3104	335.6		-1.07
631	D445	346.0		0.07	1857	ISO3104	341.06		-0.47
633	D445	355.20		1.08	1862	ISO3104	336.5		-0.97
634	D445	351.0		0.62	1881	ISO3104	340.92		-0.48
657	D445	332.9		-1.36	1906		-----		-----
671	D445	346.55		0.13	1942		-----		-----
704	D445	336.31		-0.99	1949	ISO3104	335.97		-1.03
732	D445	362.9		1.92	1986	ISO3104	336.5		-0.97
753	ISO3104	335.4		-1.09	2129	ISO3104	334.29		-1.21
781	ISO3104	338.6		-0.74	6051	ISO3104	336.9		-0.92
798		-----		-----	6075	D445	346.7		0.15
823	ISO3104	340.0		-0.58	6092	D445	335.0		-1.13
824	ISO3104	335.5		-1.08	6112		-----		-----
825	D445	351.04		0.62	6114	D445	348.56		0.35
840	D445	351.67		0.69	6142	ISO3104	358.6		1.45
842	D445	352.28		0.76	6154	D445	346.7		0.15
873	ISO3104	333.05		-1.35	6201	ISO3104	330.6		-1.61
874	ISO3104	332.93		-1.36	6203		-----		-----
887	D445	354.3		0.98					

normality	OK
n	102
outliers	1
mean (n)	345.3375
st.dev. (n)	8.81869
R(calc.)	24.6923
st.dev.(ISO3104:94)	9.12678
R(ISO3104:94)	25.5550

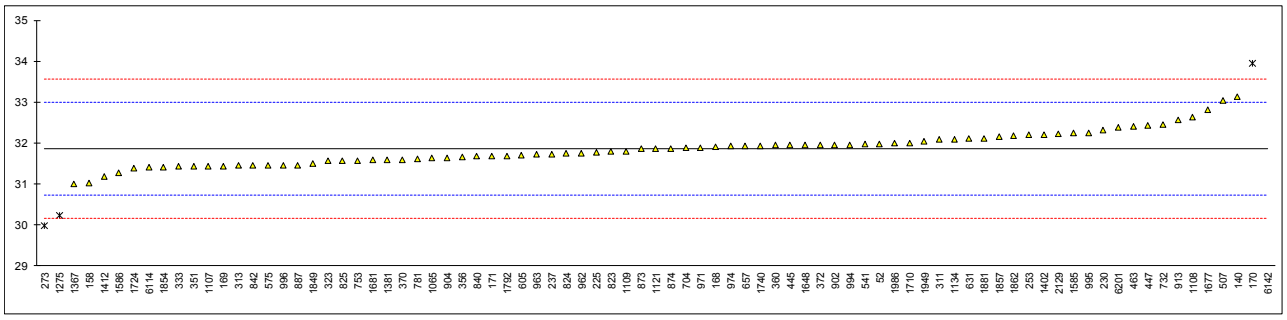


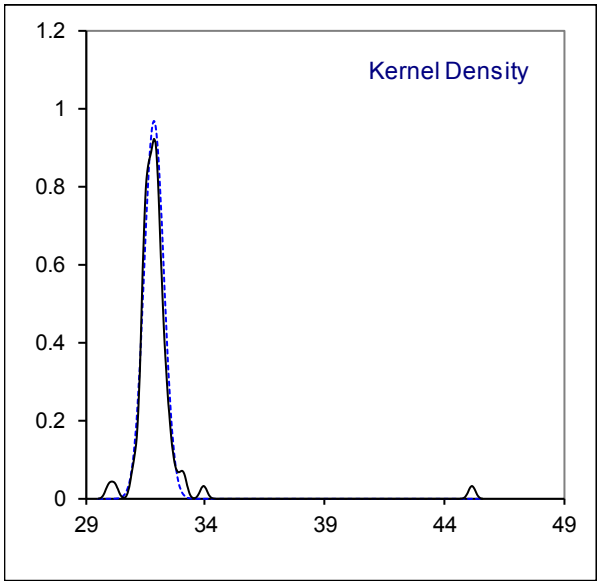


Determination of Kinematic Viscosity at 100°C on sample #18265; results in mm^2/s

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D445	31.97		0.19	902	D445	31.96		0.17
120		-----		-----	904	D445	31.64		-0.39
131		-----		-----	913	D445	32.56		1.23
132		-----		-----	962	D445	31.74		-0.21
133		-----		-----	963	ISO3104	31.72		-0.25
140	ISO3104	33.13		2.23	971	D445	31.89		0.05
150		-----		-----	974	D445	31.92		0.10
158	D445	31.03		-1.46	994	D445	31.96		0.17
159		-----		-----	995	ISO3104	32.25		0.68
168	D445	31.91		0.09	996	D445	31.45		-0.72
169	D445	31.4396		-0.74	997		-----		-----
170	D445	33.94	R(0.01)	3.65	1016		-----		-----
171	ISO3104	31.69		-0.30	1040		-----		-----
175		-----		-----	1065	D445	31.63		-0.40
194		-----		-----	1082		-----		-----
212		-----		-----	1090		-----		-----
225	D445	31.78		-0.14	1107	D445	31.43		-0.76
230	D445	32.305		0.78	1108	ISO3104	32.64		1.37
237	D445	31.73		-0.23	1109	D445	31.80		-0.11
238		-----		-----	1121	ISO3104	31.86		0.00
253	D445	32.20		0.60	1126		-----		-----
256		-----		-----	1134	IP71	32.09		0.40
273	D445	29.97	R(0.01)	-3.32	1191		-----		-----
311	D445	32.08		0.39	1205		-----		-----
313	ISO3104	31.45		-0.72	1229		-----		-----
323	ISO3104	31.57		-0.51	1275	IP71	30.23	R(0.05)	-2.86
333	ISO3104	31.42		-0.77	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367	IP71	31.00		-1.51
337		-----		-----	1381	ISO3104	31.588		-0.48
339		-----		-----	1402	IP71	32.20		0.60
342		-----		-----	1412	D445	31.17		-1.21
349		-----		-----	1431		-----		-----
351	ISO3104	31.425		-0.76	1543		-----		-----
356	ISO3104	31.65		-0.37	1585	D445	32.248		0.68
360	ISO3104	31.942		0.14	1586	D445	31.28		-1.02
370	D445	31.594		-0.47	1648	ISO3104	31.95		0.16
372	ISO3104	31.96		0.17	1677	D445	32.82165		1.69
444		-----		-----	1681	ISO3104	31.581		-0.49
445	IP71	31.95		0.16	1710	ISO3104	32.00		0.25
447	D445	32.43		1.00	1720		-----		-----
463	ISO3104	32.411		0.97	1724	D445	31.38		-0.84
507	ISO3104	33.042		2.08	1740	D445	31.93		0.12
541	D445	31.967		0.19	1792	ISO3104	31.69		-0.30
558		-----		-----	1810		-----		-----
575	D445	31.45		-0.72	1811		-----		-----
605	ISO3104	31.70		-0.28	1849	ISO3104	31.49		-0.65
610		-----		-----	1854	ISO3104	31.41		-0.79
631	D445	32.101		0.42	1857	ISO3104	32.158		0.52
633		-----		-----	1862	ISO3104	32.189		0.58
634		-----		-----	1881	ISO3104	32.120		0.46
657	D445	31.93		0.12	1906		-----		-----
671		-----		-----	1942		-----		-----
704	D445	31.887		0.05	1949	ISO3104	32.043		0.32
732	D445	32.46		1.05	1986	ISO3104	31.99		0.23
753	ISO3104	31.575		-0.50	2129	ISO3104	32.213		0.62
781	ISO3104	31.60		-0.46	6051		-----		-----
798		-----		-----	6075		-----		-----
823	ISO3104	31.80		-0.11	6092		-----		-----
824	ISO3104	31.74		-0.21	6112		-----		-----
825	D445	31.573		-0.50	6114	D445	31.404		-0.80
840	D445	31.669		-0.34	6142	ISO3104	45.19	R(0.01)	23.41
842	D445	31.45		-0.72	6154		-----		-----
873	ISO3104	31.855		-0.01	6201	ISO3104	32.39		0.93
874	ISO3104	31.861		0.00	6203		-----		-----
887	D445	31.46		-0.70					

normality	OK
n	79
outliers	4
mean (n)	31.8604
st.dev. (n)	0.41176
R(calc.)	1.1529
st.dev.(ISO3104:94)	0.56943
R(ISO3104:94)	1.5944

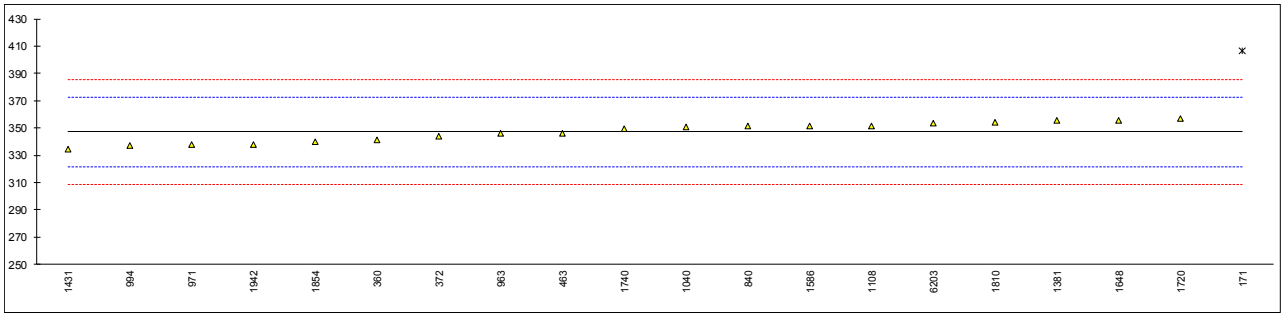


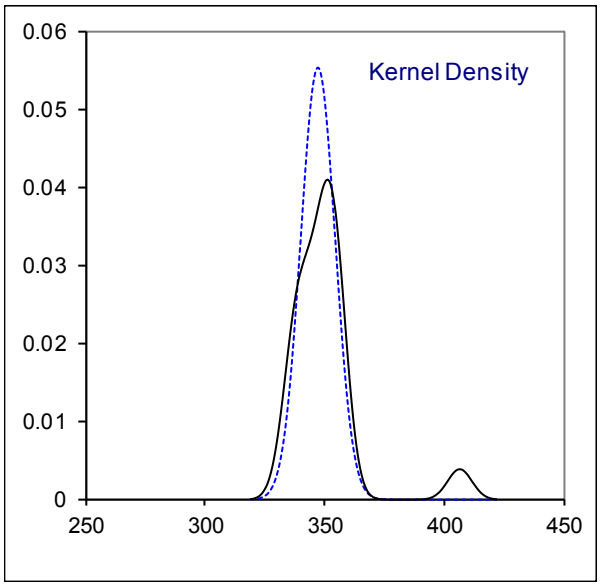


Determination of Viscosity Stabinger at 50°C on sample #18265; results in mm^2/s

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	902		-----		-----
120		-----		-----	904		-----		-----
131		-----		-----	913		-----		-----
132		-----		-----	962		-----		-----
133		-----		-----	963	D7042	345.9		-0.09
140		-----		-----	971	D7042	337.7		-0.74
150		-----		-----	974		-----		-----
158		-----		-----	994	D7042	337.4		-0.76
159		-----		-----	995		-----		-----
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170		-----		-----	1016		-----		-----
171	D7042	406.5	R(0.01)	4.66	1040	D7042	350.8		0.29
175		-----		-----	1065		-----		-----
194		-----		-----	1082		-----		-----
212		-----		-----	1090		-----		-----
225		-----		-----	1107		-----		-----
230		-----		-----	1108	D7042	351.7		0.36
237		-----		-----	1109		-----		-----
238		-----		-----	1121		-----		-----
253		-----		-----	1126		-----		-----
256		-----		-----	1134		-----		-----
273		-----		-----	1191		-----		-----
311		-----		-----	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275		-----		-----
333		-----		-----	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367		-----		-----
337		-----		-----	1381	D7042	355.39		0.65
339		-----		-----	1402		-----		-----
342		-----		-----	1412		-----		-----
349		-----		-----	1431	D7042	334.15		-1.01
351		-----		-----	1543		-----		-----
356		-----		-----	1585		-----		-----
360	D7042	341.37		-0.45	1586	D7042	351.6		0.35
370		-----		-----	1648	D7042	355.8		0.68
372	D7042	344.2		-0.23	1677		-----		-----
444		-----		-----	1681		-----		-----
445		-----		-----	1710		-----		-----
447		-----		-----	1720	D7042	356.7		0.75
463	D7042	346.06		-0.08	1724		-----		-----
507		-----		-----	1740	D7042	349.1		0.16
541		-----		-----	1792		-----		-----
558		-----		-----	1810	D7042	354.26		0.56
575		-----		-----	1811		-----		-----
605		-----		-----	1849		-----		-----
610		-----		-----	1854	D7042	339.7		-0.58
631		-----		-----	1857		-----		-----
633		-----		-----	1862		-----		-----
634		-----		-----	1881		-----		-----
657		-----		-----	1906		-----		-----
671		-----		-----	1942	D7042	338.1		-0.70
704		-----		-----	1949		-----		-----
732		-----		-----	1986		-----		-----
753		-----		-----	2129		-----		-----
781		-----		-----	6051		-----		-----
798		-----		-----	6075		-----		-----
823		-----		-----	6092		-----		-----
824		-----		-----	6112		-----		-----
825		-----		-----	6114		-----		-----
840	D7042	351.40		0.34	6142		-----		-----
842		-----		-----	6154		-----		-----
873		-----		-----	6201		-----		-----
874		-----		-----	6203	D7042	353.2		0.48
887		-----		-----					

normality	OK
n	19
outliers	1
mean (n)	347.0806
st.dev. (n)	7.19687
R(calc.)	20.1512
st.dev.(D7042:16e3)	12.75521
R(D7042:16e3)	35.7146

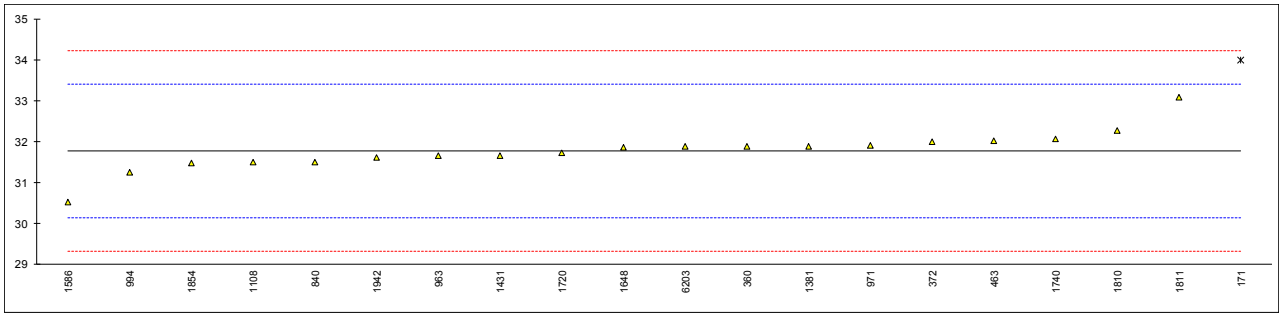


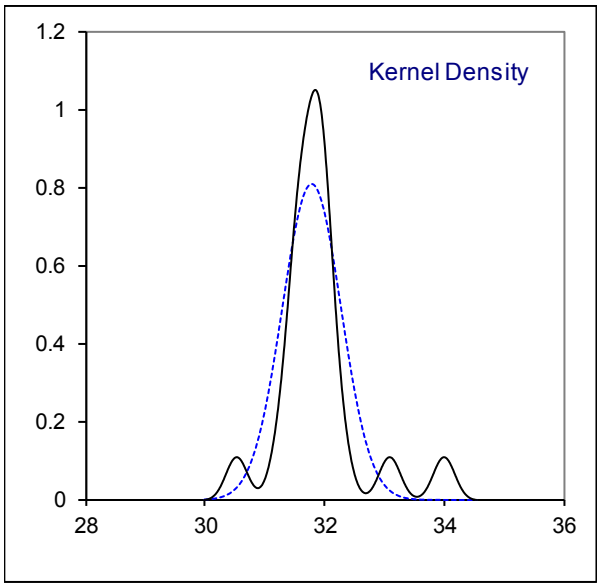


Determination of Viscosity Stabinger at 100°C on sample #18265; results in mm^2/s

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	902		-----		-----
120		-----		-----	904		-----		-----
131		-----		-----	913		-----		-----
132		-----		-----	962		-----		-----
133		-----		-----	963	D7042	31.65		-0.15
140		-----		-----	971	D7042	31.91		0.17
150		-----		-----	974		-----		-----
158		-----		-----	994	D7042	31.24		-0.65
159		-----		-----	995		-----		-----
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170		-----		-----	1016		-----		-----
171	D7042	33.99	R(0.01)	2.72	1040		-----		-----
175		-----		-----	1065		-----		-----
194		-----		-----	1082		-----		-----
212		-----		-----	1090		-----		-----
225		-----		-----	1107		-----		-----
230		-----		-----	1108	D7042	31.50		-0.34
237		-----		-----	1109		-----		-----
238		-----		-----	1121		-----		-----
253		-----		-----	1126		-----		-----
256		-----		-----	1134		-----		-----
273		-----		-----	1191		-----		-----
311		-----		-----	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275		-----		-----
333		-----		-----	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367		-----		-----
337		-----		-----	1381	D7042	31.888		0.14
339		-----		-----	1402		-----		-----
342		-----		-----	1412		-----		-----
349		-----		-----	1431	D7042	31.654		-0.15
351		-----		-----	1543		-----		-----
356		-----		-----	1585		-----		-----
360	D7042	31.885		0.14	1586	D7042	30.52		-1.54
370		-----		-----	1648	D7042	31.86		0.11
372	D7042	32.00		0.28	1677		-----		-----
444		-----		-----	1681		-----		-----
445		-----		-----	1710		-----		-----
447		-----		-----	1720	D7042	31.72		-0.07
463	D7042	32.019		0.30	1724		-----		-----
507		-----		-----	1740	D7042	32.06		0.35
541		-----		-----	1792		-----		-----
558		-----		-----	1810	D7042	32.27		0.61
575		-----		-----	1811	D7042	33.08		1.60
605		-----		-----	1849		-----		-----
610		-----		-----	1854	D7042	31.47		-0.37
631		-----		-----	1857		-----		-----
633		-----		-----	1862		-----		-----
634		-----		-----	1881		-----		-----
657		-----		-----	1906		-----		-----
671		-----		-----	1942	D7042	31.60		-0.21
704		-----		-----	1949		-----		-----
732		-----		-----	1986		-----		-----
753		-----		-----	2129		-----		-----
781		-----		-----	6051		-----		-----
798		-----		-----	6075		-----		-----
823		-----		-----	6092		-----		-----
824		-----		-----	6112		-----		-----
825		-----		-----	6114		-----		-----
840	D7042	31.500		-0.34	6142		-----		-----
842		-----		-----	6154		-----		-----
873		-----		-----	6201		-----		-----
874		-----		-----	6203	D7042	31.88		0.13
887		-----		-----					

normality	not OK
n	19
outliers	1
mean (n)	31.7740
st.dev. (n)	0.49274
R(calc.)	1.3797
st.dev.(D7042:16e3)	0.81546
R(D7042:16e3)	2.2833



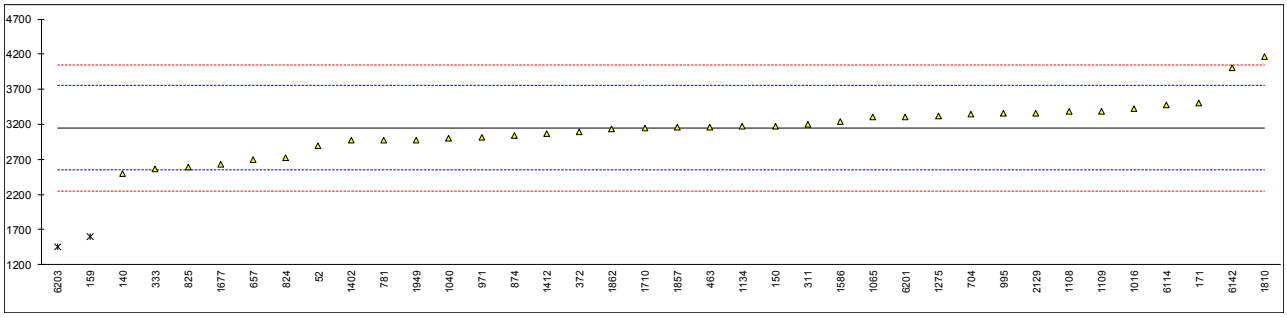


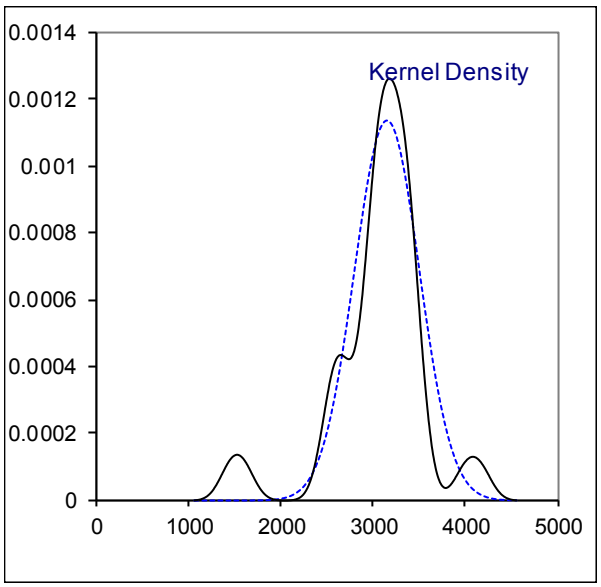
Determination of Nitrogen on sample #18265; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4629	2900		-0.84	902		-----		-----
120		-----		-----	904		-----		-----
131		-----		-----	913		-----		-----
132		-----		-----	962		-----		-----
133		-----		-----	963		-----		-----
140	D5762 Gravimetric	2500		-2.18	971	D5762 Gravimetric	3012		-0.47
150	D5762 Volumetric	3178		0.09	974		-----		-----
158		-----		-----	994		-----		-----
159	D4629	1600	R(0.01)	-5.18	995		3362		0.70
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170		-----		-----	1016	D5762 Gravimetric	3430		0.93
171	D5762	3500		1.16	1040	D4629	2997.79		-0.51
175		-----		-----	1065	D5762 Gravimetric	3300		0.49
194		-----		-----	1082		-----		-----
212		-----		-----	1090		-----		-----
225		-----		-----	1107		-----		-----
230		-----		-----	1108	D5762 Gravimetric	3380		0.76
237		-----		-----	1109	D4629	3385		0.78
238		-----		-----	1121		-----		-----
253		-----		-----	1126		-----		-----
256		-----		-----	1134	D5762 Gravimetric	3168.365		0.06
273		-----		-----	1191		-----		-----
311	D5762 Volumetric	3200		0.16	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275	IP379	3314.08		0.54
333	D5762 Volumetric	2570		-1.94	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367		-----		-----
337		-----		-----	1381		-----		-----
339		-----		-----	1402	D5762 Volumetric	2969.91		-0.61
342		-----		-----	1412	D5762 Gravimetric	3071		-0.27
349		-----		-----	1431		-----		-----
351		-----		-----	1543		-----		-----
356		-----		-----	1585		-----		-----
360		-----		-----	1586	D5762 Volumetric	3234		0.27
370		-----		-----	1648		-----		-----
372	D5762 Volumetric	3100		-0.17	1677	D5762 Gravimetric	2635		-1.73
444		-----		-----	1681		-----		-----
445		-----		-----	1710	INH-11794	3140		-0.04
447		-----		-----	1720		-----		-----
463	D5762 Gravimetric	3160		0.03	1724		-----		-----
507		-----		-----	1740		-----		-----
541		-----		-----	1792		-----		-----
558		-----		-----	1810	D4629	4169	C	3.40
575		-----		-----	1811		-----		-----
605		-----		-----	1849		-----		-----
610		-----		-----	1854		-----		-----
631		-----		-----	1857	D5762 Gravimetric	3155		0.01
633		-----		-----	1862	D5762 Volumetric	3133		-0.06
634		-----		-----	1881		-----		-----
657	D5762 Volumetric	2700		-1.51	1906		-----		-----
671		-----		-----	1942		-----		-----
704	D5762 Volumetric	3348		0.66	1949	D5762 Volumetric	2980		-0.57
732		-----		-----	1986		-----		-----
753		-----		-----	2129	D3228	3363		0.71
781	D3228	2980		-0.57	6051		-----		-----
798		-----		-----	6075		-----		-----
823		-----		-----	6092		-----		-----
824	D5762 Volumetric	2720		-1.44	6112		-----		-----
825	D5762 Gravimetric	2590		-1.88	6114	D5762 Gravimetric	3478		1.09
840		-----		-----	6142		4000		2.83
842		-----		-----	6154		-----		-----
873		-----		-----	6201	D5762 Gravimetric	3300		0.49
874	D5762 Volumetric	3044		-0.36	6203	D5762 Gravimetric	1450	R(0.01)	-5.68
887		-----		-----					

		D5762 Volumetric only	D5762 Gravimetric only
normality	suspect	OK	OK
n	36	12	13
outliers	2	0	1
mean (n)	3151.86	3014.74	3090.72
st.dev. (n)	351.731	239.159	324.714
R(calc.)	984.85	669.64	909.20
st.dev.(D5762:18a)	299.429	286.400	293.618
R(D5762:18a)	838.40	801.92	822.13

Lab 1810 first reported 0.2169

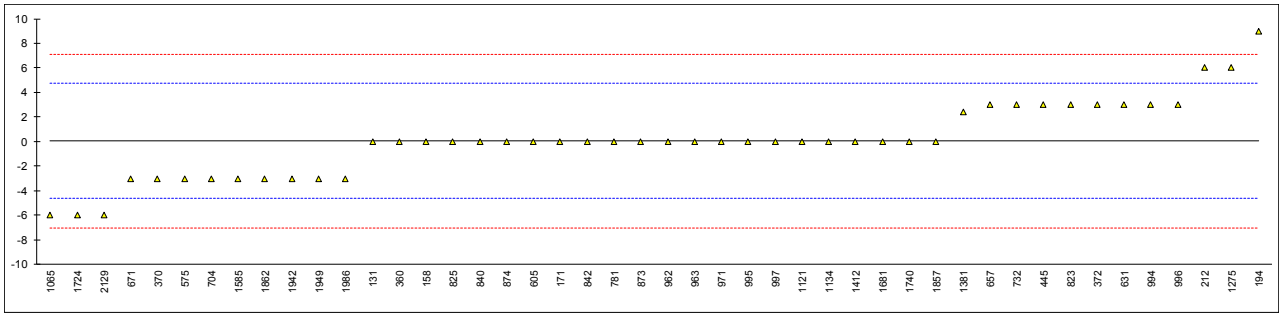


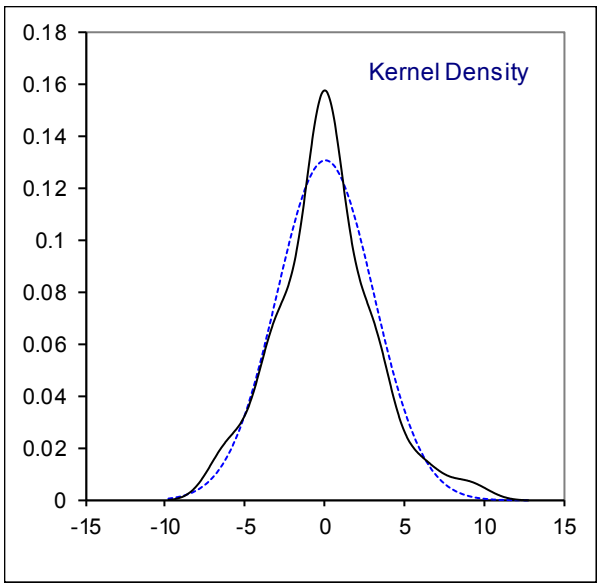


Determination of Pour Point (Lower) on sample #18265; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	902		-----		-----
120		-----		-----	904		-----		-----
131	D97	0		-0.02	913		-----		-----
132		-----		-----	962	D97	0		-0.02
133		-----		-----	963	ISO3016	0		-0.02
140		-----		-----	971	D97	0		-0.02
150		-----		-----	974		-----		-----
158	D97	0		-0.02	994	D97	3		1.25
159		-----		-----	995	ISO3016	0		-0.02
168		-----		-----	996	D97	3		1.25
169		-----		-----	997	ISO3016	0		-0.02
170		-----		-----	1016		-----		-----
171	ISO3016	0		-0.02	1040		-----		-----
175		-----		-----	1065	D97	-6.0		-2.57
194	D97	9		3.80	1082		-----		-----
212	ISO3016	6		2.53	1090		-----		-----
225		-----		-----	1107		-----		-----
230		-----		-----	1108		-----		-----
237		-----		-----	1109		-----		-----
238		-----		-----	1121	ISO3016	0		-0.02
253		-----		-----	1126		-----		-----
256		-----		-----	1134	D97	0		-0.02
273		-----		-----	1191		-----		-----
311		-----		-----	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275	IP15	6.0		2.53
333		-----		-----	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367		-----		-----
337		-----		-----	1381	ISO3016	2.4		1.00
339		-----		-----	1402		-----		-----
342		-----		-----	1412	D97	0		-0.02
349		-----		-----	1431		-----		-----
351		-----		-----	1543		-----		-----
356		-----		-----	1585	D97	-3		-1.30
360	ISO3016	0		-0.02	1586		-----		-----
370	D97	-3		-1.30	1648		-----		-----
372	ISO3016	3		1.25	1677		-----		-----
444		-----		-----	1681	ISO3016	0		-0.02
445	D97	3		1.25	1710		-----		-----
447		-----		-----	1720		-----		-----
463		-----		-----	1724	D97	-6		-2.57
507		-----		-----	1740	D97	0		-0.02
541		-----		-----	1792		-----		-----
558		-----		-----	1810		-----		-----
575	D97	-3		-1.30	1811		-----		-----
605	ISO3016	0		-0.02	1849		-----		-----
610		-----		-----	1854		-----		-----
631	D97	3		1.25	1857	ISO3016	0		-0.02
633		-----		-----	1862	ISO3016	-3		-1.30
634		-----		-----	1881		-----		-----
657	D97	3		1.25	1906		-----		-----
671	D97	-3.0		-1.30	1942	D97	-3		-1.30
704	D97	-3		-1.30	1949	ISO3016	-3		-1.30
732	D97	3.0		1.25	1986	ISO3016	-3		-1.30
753		-----		-----	2129	ISO3016	-6		-2.57
781	ISO3016	0		-0.02	6051		-----		-----
798		-----		-----	6075		-----		-----
823	ISO3016	3		1.25	6092		-----		-----
824		-----		-----	6112		-----		-----
825	D97	0		-0.02	6114		-----		-----
840	ISO3016	0		-0.02	6142		-----		-----
842	D97	0		-0.02	6154		-----		-----
873	ISO3016	0		-0.02	6201		-----		-----
874	ISO3016	0		-0.02	6203		-----		-----
887		-----		-----					

normality	OK
n	46
outliers	0
mean (n)	0.05
st.dev. (n)	3.054
R(calc.)	8.55
st.dev.(ISO3016:94)	2.354
R(ISO3016:94)	6.59



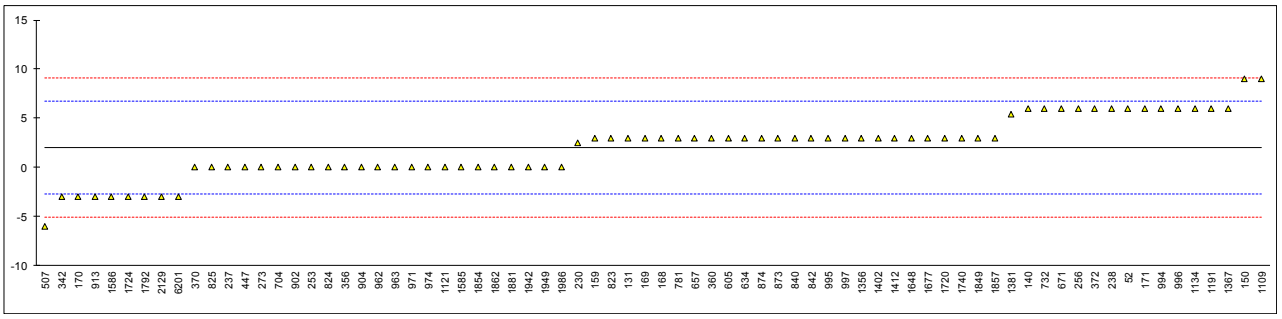


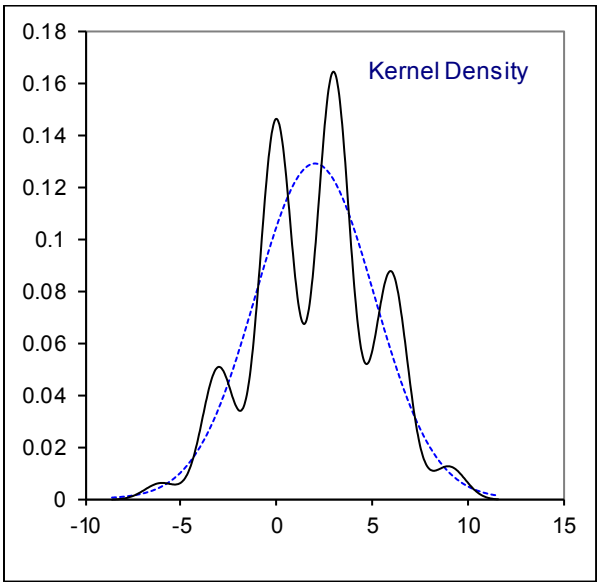
Determination of Pour Point (Upper) on sample #18265; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D97	6		1.69	902	ISO3016	0		-0.85
120		-----		-----	904	D97	0		-0.85
131	D97	3		0.42	913	D97	-3		-2.13
132		-----		-----	962	D97	0		-0.85
133		-----		-----	963	ISO3016	0		-0.85
140	ISO3016	6		1.69	971	D97	0		-0.85
150	D97	9		2.97	974	D97	0		-0.85
158		-----		-----	994	D97	6		1.69
159	D97	3		0.42	995	ISO3016	3		0.42
168	D97	3		0.42	996	D97	6		1.69
169	D97	3		0.42	997	ISO3016	3		0.42
170	D97	-3		-2.13	1016		-----		-----
171	ISO3016	6		1.69	1040		-----		-----
175		-----		-----	1065		-----		-----
194		-----		-----	1082		-----		-----
212		-----		-----	1090		-----		-----
225		-----		-----	1107		-----		-----
230	ISO3016	2.5		0.21	1108		-----		-----
237	D97	0		-0.85	1109	D97	9		2.97
238	D97	6		1.69	1121	ISO3016	0		-0.85
253	D97	0		-0.85	1126		-----		-----
256	D97	6		1.69	1134	D97	6		1.69
273	D97	0	C	-0.85	1191	ISO3016	6		1.69
311		-----		-----	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275		-----		-----
333		-----		-----	1299		-----		-----
334		-----		-----	1356	ISO3016	3		0.42
336		-----		-----	1367	D97	6		1.69
337		-----		-----	1381	ISO3016	5.4		1.44
339		-----		-----	1402	D97	3		0.42
342	ISO3016	-3		-2.13	1412	D97	3		0.42
349		-----		-----	1431		-----		-----
351		-----		-----	1543		-----		-----
356	ISO3016	0		-0.85	1585	D97	0		-0.85
360	ISO3016	3		0.42	1586	D97	-3		-2.13
370	D97	0		-0.85	1648	ISO3016	3		0.42
372	ISO3016	6		1.69	1677	D97	3		0.42
444		-----		-----	1681		-----		-----
445		-----		-----	1710		-----		-----
447	D97	0		-0.85	1720	D97	3		0.42
463		-----		-----	1724	D97	-3		-2.13
507	ISO3016	-6.0		-3.40	1740	D97	3		0.42
541		-----		-----	1792	ISO3016	-3		-2.13
558		-----		-----	1810		-----		-----
575		-----		-----	1811		-----		-----
605	ISO3016	3		0.42	1849	ISO3016	3		0.42
610		-----		-----	1854	ISO3016	0		-0.85
631		-----		-----	1857	ISO3016	3		0.42
633		-----		-----	1862	ISO3016	0		-0.85
634	D97	3		0.42	1881	ISO3016	0		-0.85
657	D97	3		0.42	1906		-----		-----
671	D97	6.0		1.69	1942	D97	0		-0.85
704	D97	0		-0.85	1949	ISO3016	0		-0.85
732	D97	6.0		1.69	1986	ISO3016	0		-0.85
753		-----		-----	2129	ISO3016	-3		-2.13
781	ISO3016	3		0.42	6051		-----		-----
798		-----		-----	6075		-----		-----
823	ISO3016	3		0.42	6092		-----		-----
824	ISO3016	0		-0.85	6112		-----		-----
825	D97	0		-0.85	6114		-----		-----
840	D97	3		0.42	6142		-----		-----
842	D97	3		0.42	6154		-----		-----
873	ISO3016	3		0.42	6201	ISO3016	-3		-2.13
874	ISO3016	3		0.42	6203		-----		-----
887		-----		-----					

normality	OK
n	74
outliers	0
mean (n)	2.01
st.dev. (n)	3.094
R(calc.)	8.66
st.dev.(ISO3016:94)	2.354
R(ISO3016:94)	6.59

Lab 273 first reported -9



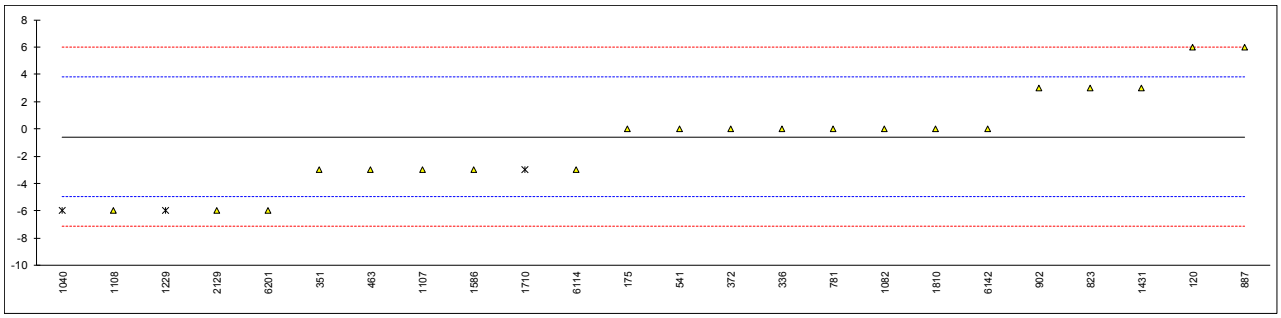


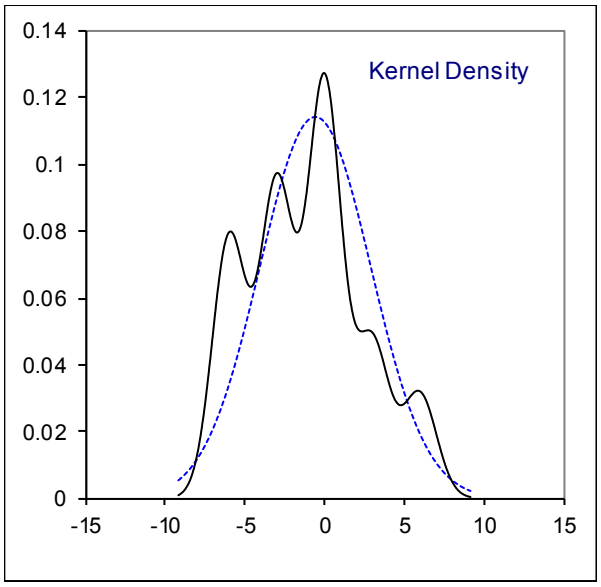
Determination of Pour Point (Automated), 3°C interval on sample #18265; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	902	D6892	3		1.64
120	D5950	6		3.02	904		-----		-----
131		-----		-----	913		-----		-----
132		-----		-----	962		-----		-----
133		-----		-----	963		-----		-----
140		-----		-----	971		-----		-----
150		-----		-----	974		-----		-----
158		-----		-----	994		-----		-----
159		-----		-----	995		-----		-----
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170		-----		-----	1016		-----		-----
171		-----		-----	1040	ISO3016	-6	ex	-2.49
175	D5950	0		0.26	1065		-----		-----
194		-----		-----	1082	D5950	0		0.26
212		-----		-----	1090		-----		-----
225		-----		-----	1107	D5950	-3		-1.11
230		-----		-----	1108	D5950	-6		-2.49
237		-----		-----	1109		-----		-----
238		-----		-----	1121		-----		-----
253		-----		-----	1126		-----		-----
256		-----		-----	1134		-----		-----
273		-----		-----	1191		-----		-----
311		-----		-----	1205		-----		-----
313		-----		-----	1229	ISO3016	-6	ex	-2.49
323		-----		-----	1275		-----		-----
333		-----		-----	1299		-----		-----
334		-----		-----	1356		-----		-----
336	D5950	0		0.26	1367		-----		-----
337		-----		-----	1381		-----		-----
339		-----		-----	1402		-----		-----
342		-----		-----	1412		-----		-----
349		-----		-----	1431	D5950	3		1.64
351	D6749	-3.0		-1.11	1543		-----		-----
356		-----		-----	1585		-----		-----
360		-----		-----	1586	D5950	-3		-1.11
370		-----		-----	1648		-----		-----
372	D5950	0		0.26	1677		-----		-----
444		-----		-----	1681		-----		-----
445		-----		-----	1710	D97	-3	ex	-1.11
447		-----		-----	1720		-----		-----
463	D6892	-3		-1.11	1724		-----		-----
507		-----		-----	1740		-----		-----
541	D5950	0		0.26	1792		-----		-----
558		-----		-----	1810	D5950	0		0.26
575		-----		-----	1811		-----		-----
605		-----		-----	1849		-----		-----
610		-----		-----	1854		-----		-----
631		-----		-----	1857		-----		-----
633		-----		-----	1862		-----		-----
634		-----		-----	1881		-----		-----
657		-----		-----	1906		-----		-----
671		-----		-----	1942		-----		-----
704		-----		-----	1949		-----		-----
732		-----		-----	1986		-----		-----
753		-----		-----	2129	D5950	-6		-2.49
781	D5950	0		0.26	6051		-----		-----
798		-----		-----	6075		-----		-----
823	D5950	3		1.64	6092		-----		-----
824		-----		-----	6112		-----		-----
825		-----		-----	6114	D5950	-3		-1.11
840		-----		-----	6142	D5950	0		0.26
842		-----		-----	6154		-----		-----
873		-----		-----	6201	D5950	-6		-2.49
874		-----		-----	6203		-----		-----
887	D6749	6		3.02					

normality	OK
n	21
outliers	0 (+3ex)
mean (n)	-0.57
st.dev. (n)	3.501
R(calc.)	9.80
st.dev.(D5950:14)	2.179
R(D5950:14)	6.1

Labs 1040, 1229 and 1710 test results excluded, manual method

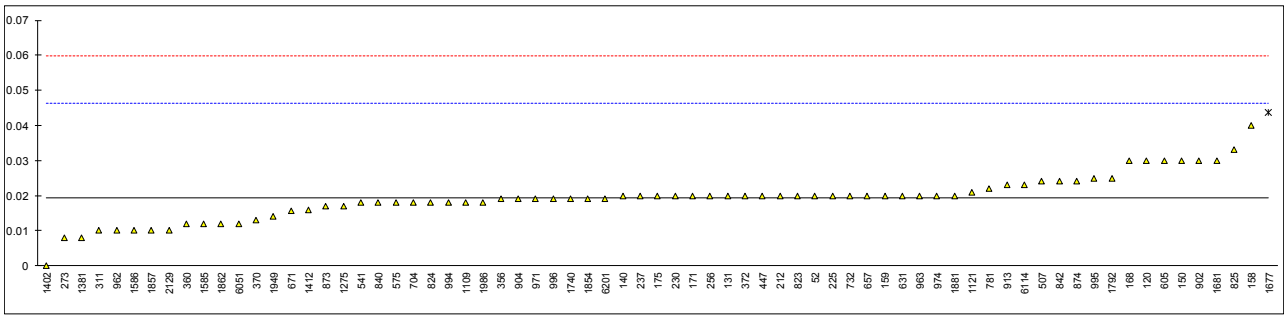


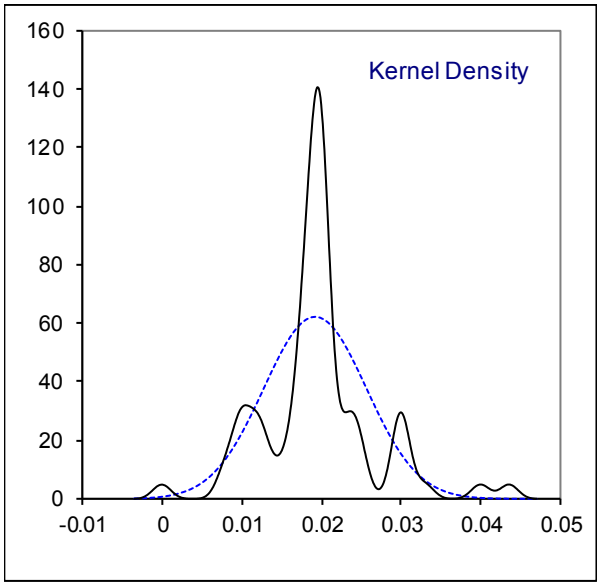


Determination of Sediment by Extraction on sample #18265; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D473	0.02		0.06	902	D473	0.03		0.79
120	D473	0.03		0.79	904	D473	0.019		-0.02
131	D473	0.02		0.06	913	D473	0.023		0.28
132		-----		-----	962	D473	0.01		-0.68
133		-----		-----	963	D473	0.02		0.06
140	D473	0.02		0.06	971	D473	0.019		-0.02
150	D473	0.03		0.79	974	D473	0.020		0.06
158	D473	0.04		1.53	994	D473	0.018		-0.09
159	D473	0.02		0.06	995	D473	0.025		0.42
168	D473	0.03		0.79	996	D473	0.019		-0.02
169		-----		-----	997		-----		-----
170		-----		-----	1016		-----		-----
171	D473	0.02		0.06	1040		-----		-----
175	D473	0.020		0.06	1065		-----		-----
194		-----		-----	1082		-----		-----
212	D473	0.02		0.06	1090		-----		-----
225	D473	0.020		0.06	1107		-----		-----
230	D473	0.02		0.06	1108		-----		-----
237	D473	0.02		0.06	1109	D473	0.018		-0.09
238		-----		-----	1121	D473	0.021		0.13
253		-----		-----	1126		-----		-----
256	D473	0.020		0.06	1134		-----		-----
273	D473	0.008		-0.83	1191		-----		-----
311	D473	0.01		-0.68	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275	IP53	0.017		-0.17
333		-----		-----	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367		-----		-----
337		-----		-----	1381	ISO3735	0.008		-0.83
339		-----		-----	1402	IP53	0.00		-1.42
342		-----		-----	1412	D473	0.016		-0.24
349		-----		-----	1431		-----		-----
351		-----		-----	1543		-----		-----
356	D473	0.019		-0.02	1585	D473	0.012		-0.54
360	D473	0.012		-0.54	1586	D473	0.01		-0.68
370	D473	0.013		-0.46	1648		-----		-----
372	D473	0.02		0.06	1677	D473	0.0436	R(0.05)	1.80
444		-----		-----	1681	D473	0.030		0.79
445		-----		-----	1710		-----		-----
447	D473	0.02		0.06	1720		-----		-----
463		-----		-----	1724		-----		-----
507	D473	0.024		0.35	1740	ISO3735	0.019		-0.02
541	D473	0.018		-0.09	1792	D473	0.025		0.42
558		-----		-----	1810		-----		-----
575	D473	0.018		-0.09	1811		-----		-----
605	D473	0.03		0.79	1849		-----		-----
610		-----		-----	1854	D473	0.019		-0.02
631	D473	0.02		0.06	1857	D473	0.010		-0.68
633		-----		-----	1862	D473	0.012		-0.54
634		-----		-----	1881	D473	0.020		0.06
657	D473	0.02		0.06	1906		-----		-----
671	D473	0.0156		-0.27	1942		-----		-----
704	D473	0.018		-0.09	1949	D473	0.014		-0.39
732	D473	0.020		0.06	1986	ISO3735	0.018		-0.09
753		-----		-----	2129	D473	0.010		-0.68
781	D473	0.022		0.20	6051	D473	0.012		-0.54
798		-----		-----	6075		-----		-----
823	D473	0.02		0.06	6092		-----		-----
824	D473	0.018		-0.09	6112		-----		-----
825	D473	0.033		1.02	6114	D473	0.023		0.28
840	D473	0.018		-0.09	6142		-----		-----
842	D473	0.024		0.35	6154		-----		-----
873	D473	0.017		-0.17	6201	D473	0.019		-0.02
874	D473	0.024		0.35	6203		-----		-----
887		-----		-----					

normality	suspect
n	70
outliers	1
mean (n)	0.0193
st.dev. (n)	0.00645
R(calc.)	0.0181
st.dev.(D473:07e1)	0.01354
R(D473:07e1)	0.0379

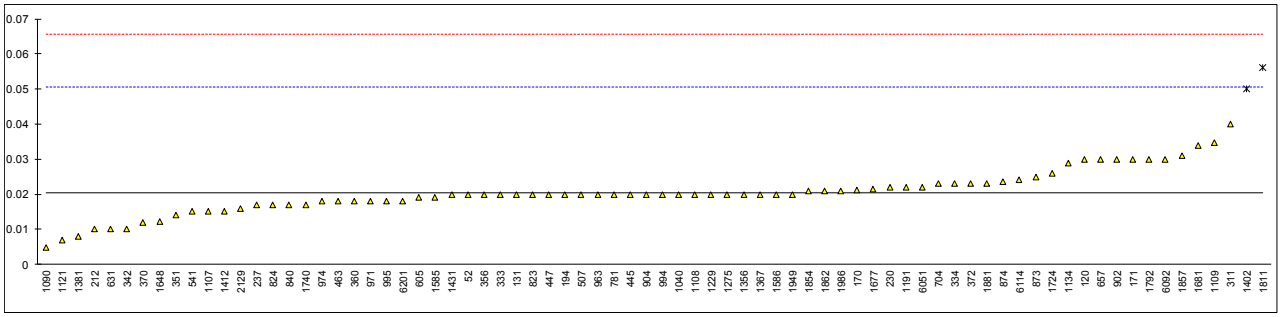


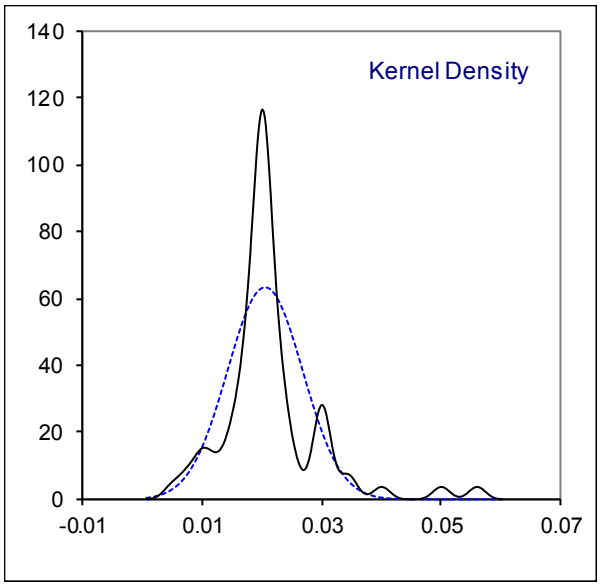


Determination of Total Sediment (Hot filtration) of sample #18265; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4870	0.02		-0.03	902	IP375	0.03		0.64
120	D4870	0.03		0.64	904	IP375	0.02		-0.03
131	D4870	0.02		-0.03	913		-----		-----
132		-----		-----	962		-----		-----
133		-----		-----	963	IP375	0.02		-0.03
140	D4870	<0.01		-----	971	IP375	0.018		-0.16
150		-----		-----	974	IP375	0.018		-0.16
158		-----		-----	994	IP375	0.02		-0.03
159		-----		-----	995	IP375	0.018		-0.16
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170	D4870	0.0212		0.05	1016		-----		-----
171	IP375	0.03		0.64	1040	ISO10307-1	0.02		-0.03
175		-----		-----	1065		-----		-----
194	ISO10307-1	0.02		-0.03	1082		-----		-----
212	ISO10307-1	0.01		-0.70	1090	ISO10307-1	0.0048		-1.04
225		-----		-----	1107	IP375	0.015		-0.36
230	ISO10307-1	0.022		0.10	1108	ISO10307-1	0.020		-0.03
237	D4870	0.017		-0.23	1109	D4870	0.0348		0.95
238		-----		-----	1121	IP375	0.007		-0.90
253		-----		-----	1126		-----		-----
256		-----		-----	1134	IP375	0.029		0.57
273		-----		-----	1191	ISO10307-1	0.022		0.10
311	IP375	0.04		1.30	1205		-----		-----
313		-----		-----	1229	ISO10307-1	0.02		-0.03
323		-----		-----	1275	IP375	0.02		-0.03
333	ISO10307-1	0.02		-0.03	1299		-----		-----
334	IP375	0.023		0.17	1356	ISO10307-1	0.02		-0.03
336	IP375	<0.01		-----	1367	IP375	0.02		-0.03
337		-----		-----	1381	ISO10307-1	0.008		-0.83
339		-----		-----	1402	IP375	0.05	R(0.01)	1.97
342	ISO10307-1	0.01		-0.70	1412	IP375	0.015		-0.36
349		-----		-----	1431	D4870	0.0199		-0.04
351	ISO10307-1	0.014		-0.43	1543		-----		-----
356	IP375	0.02		-0.03	1585	IP375	0.019		-0.10
360	IP375	0.018		-0.16	1586	IP375	0.02		-0.03
370	IP375	0.012		-0.56	1648	ISO10307-1	0.0123		-0.54
372	IP375	0.023		0.17	1677	IP375	0.0215		0.07
444		-----		-----	1681	ISO10307-1	0.034		0.90
445	IP375	0.02		-0.03	1710		-----		-----
447	IP375	0.02		-0.03	1720		-----		-----
463	ISO10307-1	0.018		-0.16	1724	IP375	0.026		0.37
507	IP375	0.020		-0.03	1740	IP375	0.017		-0.23
541	D4870	0.015		-0.36	1792	IP375	0.030		0.64
558		-----		-----	1810		-----		-----
575		-----		-----	1811	IP375	0.056	R(0.01)	2.37
605	ISO10307-1	0.019		-0.10	1849		-----		-----
610		-----		-----	1854		0.021		0.04
631	D4870	0.010		-0.70	1857	IP375	0.031		0.70
633		-----		-----	1862	IP375	0.021		0.04
634		-----		-----	1881	IP375	0.023		0.17
657	IP375	0.03		0.64	1906		-----		-----
671		-----		-----	1942		-----		-----
704	IP375	0.023		0.17	1949	IP375	0.020		-0.03
732		-----		-----	1986	ISO10307-1	0.021		0.04
753		-----		-----	2129	IP375	0.016		-0.30
781	IP375	0.02		-0.03	6051	IP375	0.022		0.10
798		-----		-----	6075		-----		-----
823	ISO10307-1	0.02		-0.03	6092	IP375	0.03		0.64
824	ISO10307-1	0.017		-0.23	6112		-----		-----
825		-----		-----	6114	ISO10307-1	0.024		0.24
840	ISO10307-1	0.017		-0.23	6142		-----		-----
842		-----		-----	6154		-----		-----
873	IP375	0.0249		0.30	6201	IP375	0.018		-0.16
874	IP375	0.0237		0.22	6203		-----		-----
887		-----		-----					

normality	suspect
n	74
outliers	2
mean (n)	0.0205
st.dev. (n)	0.00631
R(calc.)	0.0177
st.dev.(IP375:11)	0.01502
R(IP375:11)	0.0421

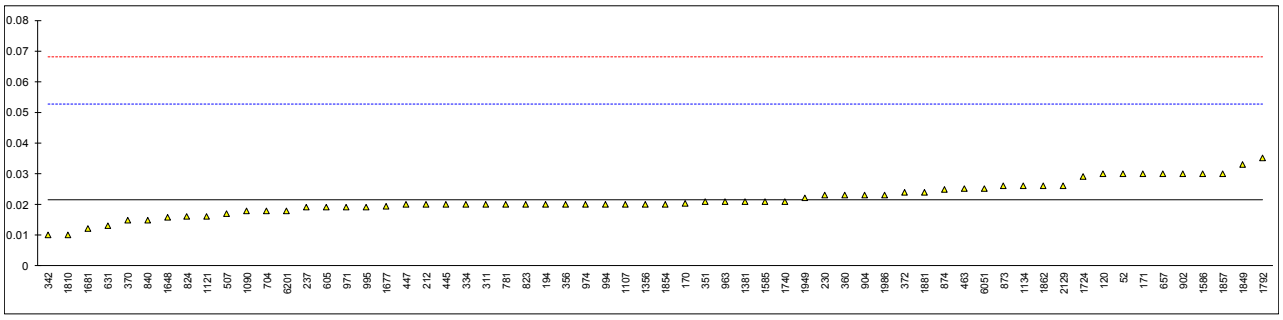


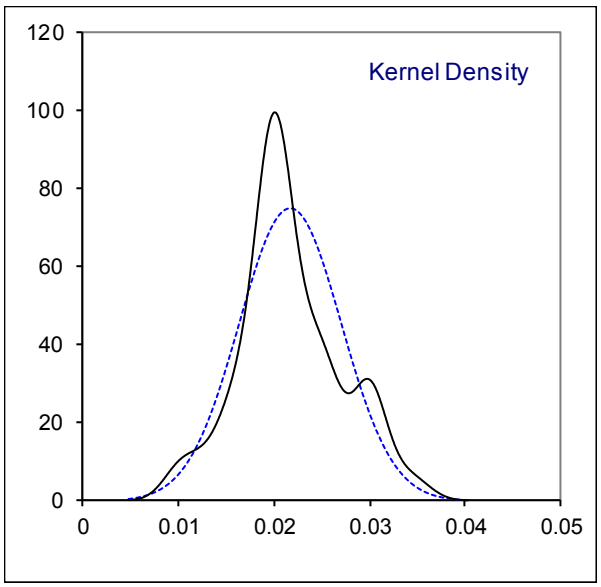


Determination of Total Sediment (Accelerated) of sample #18265; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4870	0.03		0.54	902	IP390	0.03		0.54
120	D4870	0.03		0.54	904	ISO10307-2	0.023		0.09
131		-----		-----	913		-----		-----
132		-----		-----	962		-----		-----
133		-----		-----	963	IP390	0.021		-0.04
140	ISO10307-2	<0.01		-----	971	IP390	0.019		-0.17
150		-----		-----	974	IP390	0.020		-0.11
158		-----		-----	994	IP390	0.02		-0.11
159		-----		-----	995	IP390	0.019		-0.17
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170	D4870	0.0203		-0.09	1016		-----		-----
171	IP390	0.03		0.54	1040		-----		-----
175		-----		-----	1065		-----		-----
194	ISO10307-2	0.02		-0.11	1082		-----		-----
212	ISO10307-2	0.02		-0.11	1090	ISO10307-2	0.0179		-0.24
225		-----		-----	1107	IP390	0.020		-0.11
230	ISO10307-2	0.023		0.09	1108		-----		-----
237	D4870	0.019		-0.17	1109		-----		-----
238		-----		-----	1121	IP390	0.016		-0.37
253		-----		-----	1126		-----		-----
256		-----		-----	1134	IP390	0.026		0.28
273		-----		-----	1191		-----		-----
311	IP390	0.02		-0.11	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275		-----		-----
333		-----		-----	1299		-----		-----
334	IP390	0.02		-0.11	1356	ISO10307-2	0.02		-0.11
336	IP390	<0.01		-----	1367		-----		-----
337		-----		-----	1381	ISO10307-2	0.021		-0.04
339		-----		-----	1402		-----		-----
342	ISO10307-2	0.01		-0.75	1412		-----		-----
349		-----		-----	1431		-----		-----
351	ISO10307-2	0.021		-0.04	1543		-----		-----
356	IP390	0.02		-0.11	1585	IP390	0.021		-0.04
360	IP390	0.023		0.09	1586	IP390	0.03		0.54
370	IP390	0.015		-0.43	1648	ISO10307-2	0.0157		-0.38
372	IP390	0.024		0.15	1677	IP390	0.0193		-0.15
444		-----		-----	1681	ISO10307-2	0.012		-0.62
445	IP390	0.02		-0.11	1710		-----		-----
447	IP390	0.02		-0.11	1720		-----		-----
463	ISO10307-2	0.025		0.22	1724	IP390	0.029		0.48
507	IP390	0.017		-0.30	1740	IP390	0.021		-0.04
541		-----		-----	1792	IP390	0.035		0.86
558		-----		-----	1810	ISO10307-2	0.010		-0.75
575		-----		-----	1811		-----		-----
605	ISO10307-2	0.019		-0.17	1849	ISO10307-2	0.033		0.73
610		-----		-----	1854		0.020		-0.11
631	D4870	0.013		-0.56	1857	IP390	0.030		0.54
633		-----		-----	1862	IP390	0.026		0.28
634		-----		-----	1881	IP390	0.024		0.15
657	IP390	0.03		0.54	1906		-----		-----
671		-----		-----	1942		-----		-----
704	IP390	0.018		-0.24	1949	IP390	0.022		0.02
732		-----		-----	1986	ISO10307-2	0.023		0.09
753		-----		-----	2129	IP390	0.026		0.28
781	IP390	0.02		-0.11	6051	IP390	0.025		0.22
798		-----		-----	6075		-----		-----
823	ISO10307-2	0.02		-0.11	6092		-----		-----
824	ISO10307-2	0.016		-0.37	6112		-----		-----
825		-----		-----	6114		-----		-----
840	ISO10307-2	0.015		-0.43	6142		-----		-----
842		-----		-----	6154		-----		-----
873	IP390	0.0260		0.28	6201	IP390	0.018		-0.24
874	IP390	0.0249		0.21	6203		-----		-----
887		-----		-----					

normality	OK
n	62
outliers	0
mean (n)	0.0216
st.dev. (n)	0.00534
R(calc.)	0.0150
st.dev.(IP390:11)	0.01545
R(IP390:11)	0.0433

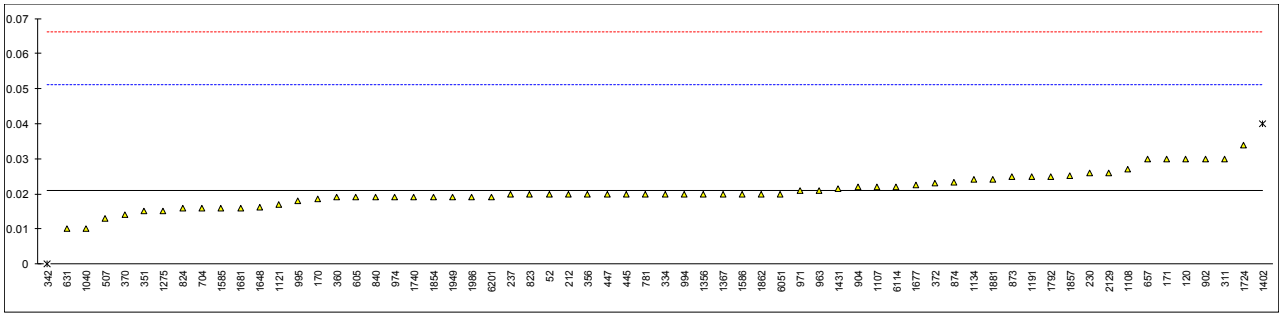


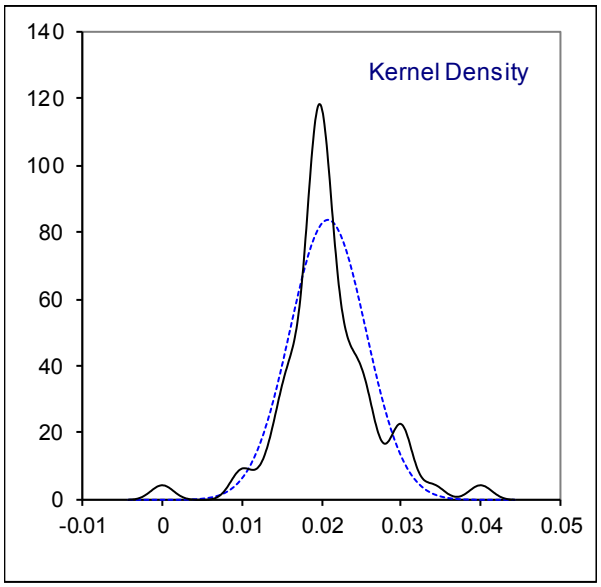


Determination of Total Sediment (Potential) of sample #18265; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4870	0.02		-0.05	902	IP390	0.03		0.61
120	D4870	0.03		0.61	904	IP390	0.022		0.08
131		-----		-----	913		-----		-----
132		-----		-----	962		-----		-----
133		-----		-----	963	IP390	0.021		0.01
140		-----		-----	971	IP390	0.021		0.01
150		-----		-----	974	IP390	0.019		-0.12
158		-----		-----	994	IP390	0.02		-0.05
159		-----		-----	995	IP390	0.018		-0.19
168		-----		-----	996		-----		-----
169		-----		-----	997		-----		-----
170	D4870	0.0185		-0.15	1016		-----		-----
171	IP390	0.03		0.61	1040	ISO10307-2	0.01		-0.71
175		-----		-----	1065		-----		-----
194		-----		-----	1082		-----		-----
212	ISO10307-2	0.02		-0.05	1090		-----		-----
225		-----		-----	1107	IP390	0.022		0.08
230	ISO10307-2	0.026		0.34	1108	ISO10307-2	0.027		0.41
237	D4870	0.02		-0.05	1109		-----		-----
238		-----		-----	1121	IP390	0.017		-0.25
253		-----		-----	1126		-----		-----
256		-----		-----	1134	IP390	0.024		0.21
273		-----		-----	1191	ISO10307-2	0.025		0.28
311	IP390	0.03		0.61	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275	IP390	0.015		-0.38
333		-----		-----	1299		-----		-----
334	IP390	0.02		-0.05	1356	ISO10307-2	0.02		-0.05
336	IP390	<0.01		-----	1367	IP390	0.02		-0.05
337		-----		-----	1381		-----		-----
339		-----		-----	1402	IP390	0.04	R(0.05)	1.27
342	ISO10307-2	0.00	R(0.05)	-1.37	1412		-----		-----
349		-----		-----	1431	D4870	0.0216		0.05
351	ISO10307-2	0.015		-0.38	1543		-----		-----
356	IP390	0.02		-0.05	1585	IP390	0.016		-0.32
360	IP390	0.019		-0.12	1586	IP390	0.02		-0.05
370	IP390	0.014		-0.45	1648	ISO10307-2	0.0162		-0.31
372	IP390	0.023		0.14	1677	IP390	0.0226		0.12
444		-----		-----	1681	ISO10307-2	0.016		-0.32
445	IP390	0.02		-0.05	1710		-----		-----
447	IP390	0.02		-0.05	1720		-----		-----
463		-----		-----	1724	IP390	0.034		0.87
507	IP390	0.013		-0.52	1740	IP390	0.019		-0.12
541		-----		-----	1792	IP390	0.025		0.28
558		-----		-----	1810		-----		-----
575		-----		-----	1811		-----		-----
605	ISO10307-2	0.019		-0.12	1849		-----		-----
610		-----		-----	1854		0.019		-0.12
631	D4870	0.010		-0.71	1857	IP390	0.0251		0.28
633		-----		-----	1862	IP390	0.020		-0.05
634		-----		-----	1881	IP390	0.024		0.21
657	IP390	0.03		0.61	1906		-----		-----
671		-----		-----	1942		-----		-----
704	IP390	0.016		-0.32	1949	IP390	0.019		-0.12
732		-----		-----	1986	ISO10307-2	0.019		-0.12
753		-----		-----	2129	IP390	0.026		0.34
781	IP390	0.02		-0.05	6051	IP390	0.020		-0.05
798		-----		-----	6075		-----		-----
823	ISO10307-2	0.02		-0.05	6092		-----		-----
824	ISO10307-2	0.016		-0.32	6112		-----		-----
825		-----		-----	6114	ISO10307-2	0.022		0.08
840	ISO10307-2	0.019		-0.12	6142		-----		-----
842		-----		-----	6154		-----		-----
873	IP390	0.0248		0.26	6201	IP390	0.019		-0.12
874	IP390	0.0234		0.17	6203		-----		-----
887		-----		-----					

normality	OK
n	62
outliers	2
mean (n)	0.0208
st.dev. (n)	0.00477
R(calc.)	0.0134
st.dev.(IP390:11)	0.01515
R(IP390:11)	0.0424

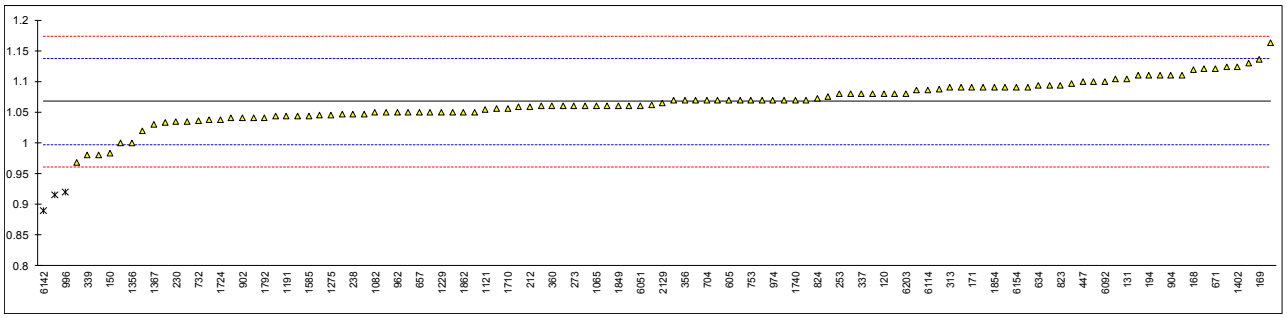


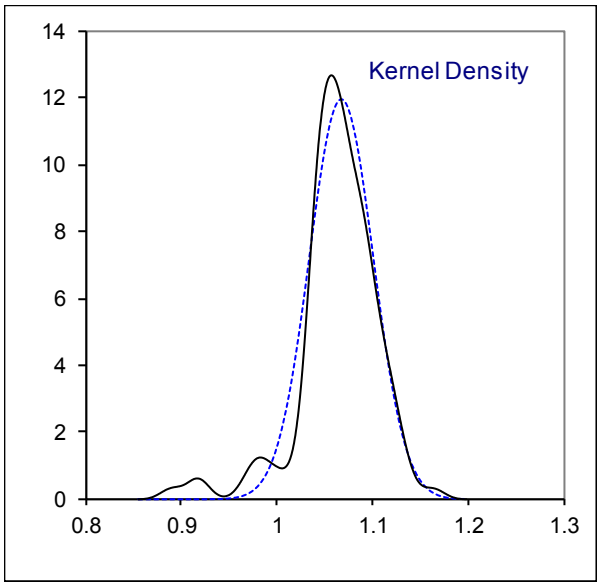


Determination of Total Sulphur on sample #18265; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4294	1.09		0.65	902	ISO8754	1.04		-0.77
120	ISO8754	1.08		0.37	904	D4294	1.11		1.22
131	D4294	1.1043		1.05	913		-----		-----
132		-----		-----	962	D4294	1.05		-0.48
133		-----		-----	963	ISO8754	1.07		0.08
140	D4294	0.968		-2.81	971	D4294	1.061		-0.17
150	D4294	0.983		-2.38	974	D4294	1.07		0.08
158	D4294	1.08		0.37	994	D4294	1.05		-0.48
159	D4294	1.06		-0.20	995	ISO8754	1.038		-0.82
168	D4294	1.1187		1.46	996	D4294	0.920	R(0.01)	-4.17
169	D4294	1.13556		1.94	997	ISO8754	1.035		-0.91
170	D4294	1.0940		0.76	1016	ISO8754	1.060		-0.20
171	D4294	1.09		0.65	1040	ISO8754	1.09		0.65
175	D4294	1.11		1.22	1065	D4294	1.06		-0.20
194	D4294	1.11		1.22	1082	ISO8754	1.049		-0.51
212	ISO8754	1.059		-0.23	1090		-----		-----
225	D4294	1.08		0.37	1107	ISO8754	1.056		-0.31
230	ISO8754	1.035		-0.91	1108	ISO8754	1.07		0.08
237	D4294	1.0492		-0.51	1109	D2622	1.091		0.68
238	D4294	1.046		-0.60	1121	ISO8754	1.054		-0.37
253	D4294	1.08		0.37	1126	In house	0.9156	R(0.01)	-4.29
256		-----		-----	1134	IP336	1.045		-0.63
273	D4294	1.06		-0.20	1191	ISO8754	1.043		-0.68
311	ISO8754	1.07		0.08	1205	ISO14596	1.097		0.85
313	ISO8754	1.09		0.65	1229	ISO8754	1.05		-0.48
323	D2622	1.12		1.50	1275	IP336	1.045		-0.63
333		-----		-----	1299	ISO8754	1.076		0.25
334	D4294	1.019		-1.36	1356	ISO8754	1.0		-1.90
336	D4294	1.08		0.37	1367	IP336	1.03		-1.05
337	D2622	1.08		0.37	1381	ISO8754	1.069		0.05
339	In house	0.98		-2.47	1402	IP336	1.1236		1.60
342	ISO8754	1.11		1.22	1412		-----		-----
349		-----		-----	1431	D4294	1.123		1.58
351	ISO8754	1.100		0.93	1543		-----		-----
356	ISO8754	1.07		0.08	1585	D4294	1.044		-0.65
360	ISO8754	1.060		-0.20	1586	D4294	1.05		-0.48
370	D4294	1.13		1.78	1648	ISO8754	1.033		-0.97
372	ISO8754	1.07		0.08	1677	D4294	1.0596		-0.21
444	D2622	1.043		-0.68	1681		-----		-----
445	IP336	1.00		-1.90	1710	INH-14596	1.056		-0.31
447	IP336	1.10		0.93	1720	D4294	1.040		-0.77
463	D4294	1.04		-0.77	1724	IP336	1.038		-0.82
507		-----		-----	1740	D4294	1.07		0.08
541		-----		-----	1792	ISO8754	1.04		-0.77
558		-----		-----	1810	D4294	1.11		1.22
575		-----		-----	1811	ISO8754	1.06		-0.20
605	ISO8754	1.07		0.08	1849	ISO8754	1.06		-0.20
610		-----		-----	1854	ISO8754	1.09		0.65
631	D4294	1.104		1.05	1857	ISO8754	1.058		-0.26
633		-----		-----	1862	D4294	1.05		-0.48
634	D4294	1.0931		0.74	1881	ISO8754	1.046		-0.60
657	D4294	1.05		-0.48	1906	D5623	0.98		-2.47
671	D4294	1.12		1.50	1942	D4294	1.07		0.08
704	ISO8754	1.07		0.08	1949	ISO8754	1.043		-0.68
732	D4294	1.036		-0.88	1986	ISO8754	1.06		-0.20
753	ISO8754	1.07		0.08	2129	ISO8754	1.065		-0.06
781	ISO8754	1.07		0.08	6051	D4294	1.06		-0.20
798		-----		-----	6075	D4294	1.09		0.65
823	ISO8754	1.094		0.76	6092	D4294	1.10		0.93
824	ISO8754	1.073		0.17	6112		-----		-----
825	D4294	1.088		0.59	6114	D4294	1.086		0.54
840	D4294	1.163		2.72	6142	ISO8754	0.89	R(0.01)	-5.02
842	D4294	1.086		0.54	6154	D4294	1.09		0.65
873	D4294	1.05		-0.48	6201	ISO8754	1.05		-0.48
874	D4294	1.046		-0.60	6203	D2622	1.08		0.37
887		-----		-----					

normality	suspect
n	109
outliers	3
mean (n)	1.0671
st.dev. (n)	0.03329
R(calc.)	0.0932
st.dev.(ISO8754:03)	0.03530
R(ISO8754:03)	0.0988
Compare	
R(D4294:16e1)	0.0758

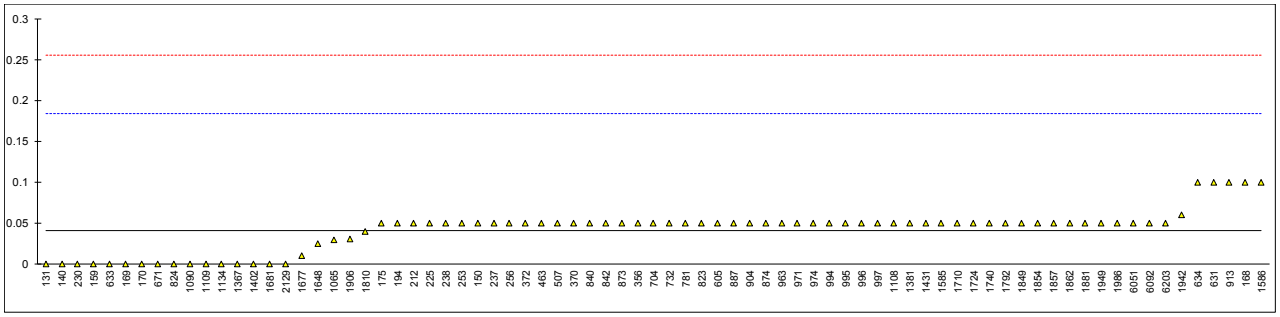


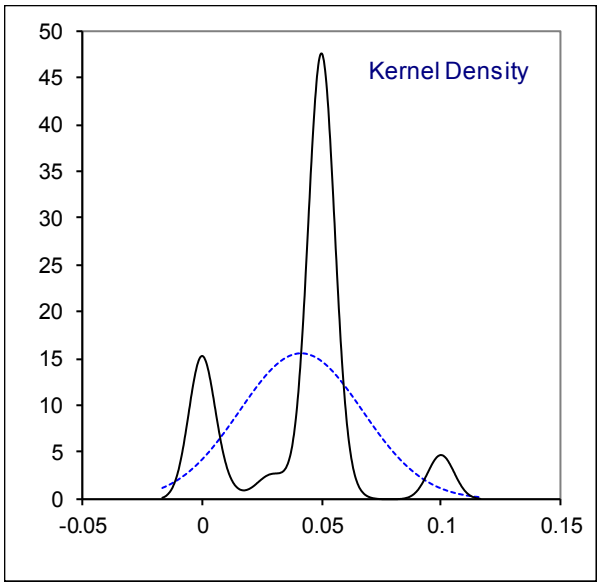


Determination of Water by distillation on sample #18265; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D95	<0.05		-----	902	ISO3733	<0,1		-----
120	ISO3733	<0.05		-----	904	D95	0.05		0.12
131	D95	0		-0.58	913	D95	0.10		0.82
132		-----		-----	962	D95	<0.05		-----
133		-----		-----	963	ISO3733	0.05		0.12
140	D95	0.00		-0.58	971	D95	0.05		0.12
150	D95	0.05		0.12	974	D95	0.05		0.12
158		-----		-----	994	D95	0.05		0.12
159	D95	0.0		-0.58	995	ISO3733	0.05		0.12
168	D95	0.1		0.82	996	D95	0.05		0.12
169	D95	0.000		-0.58	997	ISO3733	0.05		0.12
170	D95	0.00		-0.58	1016		-----		-----
171	D95	<0.025		-----	1040		-----		-----
175	D95	0.05		0.12	1065	D95	0.03		-0.16
194	D95	0.05		0.12	1082		-----		-----
212	ISO3733	0.05		0.12	1090	ISO3733	0		-0.58
225	D95	0.05		0.12	1107		-----		-----
230	ISO3733	0.00		-0.58	1108	ISO3733	0.05		0.12
237	D95	0.05		0.12	1109	D95	0.00		-0.58
238	D95	0.05		0.12	1121	ISO3733	<0.05		-----
253	D95	0.05		0.12	1126	D95	<0.05		-----
256	D95	0.05		0.12	1134	ISO3733	0		-0.58
273	D95	<0.05		-----	1191		-----		-----
311	D95	<0.05		-----	1205		-----		-----
313	D95	<0.05		-----	1229		-----		-----
323		-----		-----	1275	IP74	<0.10		-----
333	ISO3733	<0.05		-----	1299		-----		-----
334	D95	<0.1		-----	1356	ISO3733	<0.03		-----
336	D95	<0.10		-----	1367	D95	0.00		-0.58
337		-----		-----	1381	ISO3733	0.05		0.12
339		-----		-----	1402	IP74	0.00		-0.58
342		-----		-----	1412	D95	<0.05		-----
349	D95	<0,1		-----	1431	D95	0.05		0.12
351	ISO3733	<0.05		-----	1543		-----		-----
356	ISO3733	0.05		0.12	1585	D95	0.05		0.12
360	ISO3733	< 0.05		-----	1586	D95	0.10		0.82
370	D95	0.05		0.12	1648	ISO3733	0.025		-0.23
372	ISO3733	0.05		0.12	1677	D95	0.01		-0.44
444		-----		-----	1681	ISO3733	0.0		-0.58
445	D95	<0.05		-----	1710	ISO9029	0.05		0.12
447	D95	<0.05		-----	1720		-----		-----
463	D95	0.05		0.12	1724	D95	0.05		0.12
507	ISO3733	0.050		0.12	1740	D95	0.05		0.12
541	D95	<0.05		-----	1792	ISO3733	0.05		0.12
558		-----		-----	1810		0.04		-0.02
575	D95	<0.05		-----	1811		-----		-----
605	ISO3733	0.05		0.12	1849	EN1428	0.05		0.12
610		-----		-----	1854	D95	0.05		0.12
631	D95	0.10		0.82	1857	ISO3733	0.05		0.12
633	D95	0		-0.58	1862	D95	0.05		0.12
634	D95	0.10		0.82	1881	D95	0.05		0.12
657	D95	<0.05		-----	1906	D6304-C	0.031		-0.15
671	D95	0		-0.58	1942	D95	0.06		0.26
704	ISO3733	0.05		0.12	1949	ISO3733	0.05		0.12
732	D95	0.05		0.12	1986	ISO3733	0.05		0.12
753		-----		-----	2129	ISO3733	0.00		-0.58
781	ISO3733	0.05		0.12	6051	ISO3733	0.05		0.12
798		-----		-----	6075	D95	<0.05		-----
823	ISO3733	0.05		0.12	6092	D95	0.05		0.12
824	ISO3733	0.00		-0.58	6112		-----		-----
825	D95	L0.05		-----	6114	D95	<0.05		-----
840	D95	0.05		0.12	6142		-----		-----
842	D95	0.05		0.12	6154	D95	<0.05		-----
873	ISO3733	0.05		0.12	6201	ISO3733	<0.1		-----
874	ISO3733	0.05		0.12	6203	D95	0.05		0.12
887	D95	0.05		0.12					

normality	OK
n	77
outliers	0
mean (n)	0.0415
st.dev. (n)	0.02568
R(calc.)	0.0719
st.dev.(ISO3733:99)	0.07143
R(ISO3733:99)	0.2
Compare	
R(D95:13e1)	0.2

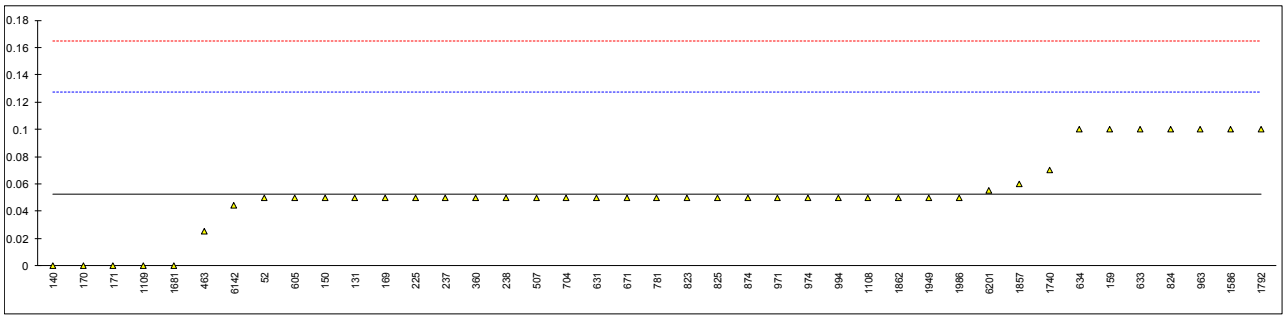


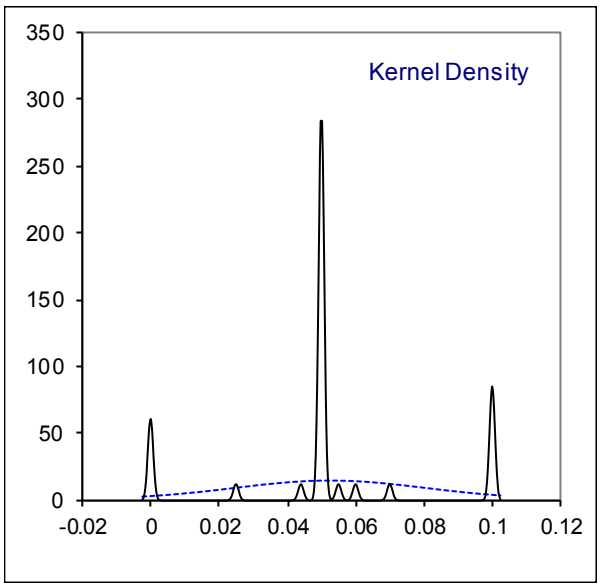


Determination of Water and Sediment on sample #18265; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D1796	0.05		-0.07	902		-----		-----
120	D1796	<0.05		-----	904		-----		-----
131	D1796	0.050		-0.07	913		-----		-----
132		-----		-----	962		-----		-----
133		-----		-----	963	D1796	0.10		1.27
140	D1796	0.00		-1.40	971	D1796	0.05		-0.07
150	D1796	0.05		-0.07	974	D1796	0.05		-0.07
158		-----		-----	994	D1796	0.05		-0.07
159	D1796	0.10		1.27	995		-----		-----
168		-----		-----	996		-----		-----
169	D1796	0.050		-0.07	997		-----		-----
170	D1796	0.00		-1.40	1016		-----		-----
171	D1796	0.00		-1.40	1040		-----		-----
175		-----		-----	1065		-----		-----
194		-----		-----	1082		-----		-----
212		-----		-----	1090		-----		-----
225	D1796	0.05		-0.07	1107		-----		-----
230		-----		-----	1108	D1796	0.05		-0.07
237	D1796	0.05		-0.07	1109	D1796	0.00		-1.40
238	D1796	0.05		-0.07	1121		-----		-----
253		-----		-----	1126		-----		-----
256		-----		-----	1134		-----		-----
273		-----		-----	1191		-----		-----
311		-----		-----	1205		-----		-----
313		-----		-----	1229		-----		-----
323		-----		-----	1275		-----		-----
333		-----		-----	1299		-----		-----
334		-----		-----	1356		-----		-----
336		-----		-----	1367		-----		-----
337		-----		-----	1381		-----		-----
339		-----		-----	1402		-----		-----
342		-----		-----	1412		-----		-----
349		-----		-----	1431		-----		-----
351		-----		-----	1543		-----		-----
356		-----		-----	1585		-----		-----
360	D1796	0.050		-0.07	1586	D1796	0.10		1.27
370		-----		-----	1648		-----		-----
372		-----		-----	1677		-----		-----
444		-----		-----	1681	D1796	0.00		-1.40
445		-----		-----	1710		-----		-----
447		-----		-----	1720		-----		-----
463	D1796	0.025		-0.73	1724		-----		-----
507	D1796	0.050		-0.07	1740	D1796	0.07		0.47
541	D1796	<0.1		-----	1792	D1796	0.1		1.27
558		-----		-----	1810		-----		-----
575		-----		-----	1811		-----		-----
605	D1796	0.05		-0.07	1849		-----		-----
610		-----		-----	1854		-----		-----
631	D1796	0.05		-0.07	1857	Calculation	0.06		0.20
633	D1796	0.10		1.27	1862	D1796	0.05		-0.07
634	D1796	0.10		1.27	1881		-----		-----
657	D1796	<0.025		-----	1906		-----		-----
671	D1796	0.05		-0.07	1942		-----		-----
704	D1796	0.05		-0.07	1949	D1796	0.05		-0.07
732		-----		-----	1986	ISO3734	0.05		-0.07
753		-----		-----	2129		-----		-----
781	D1796	0.050		-0.07	6051		-----		-----
798		-----		-----	6075		-----		-----
823	D1796	0.05		-0.07	6092		-----		-----
824	D1796	0.10		1.27	6112		-----		-----
825	D1796	0.05		-0.07	6114		-----		-----
840		-----		-----	6142	ISO3734	0.044		-0.23
842		-----		-----	6154		-----		-----
873		-----		-----	6201	D1796	0.055		0.07
874	D1796	0.05		-0.07	6203		-----		-----
887		-----		-----					

normality	OK
n	41
outliers	0
mean (n)	0.0525
st.dev. (n)	0.02780
R(calc.)	0.0779
st.dev.(D1796:11)	0.03750
R(D1796:11)	0.1050



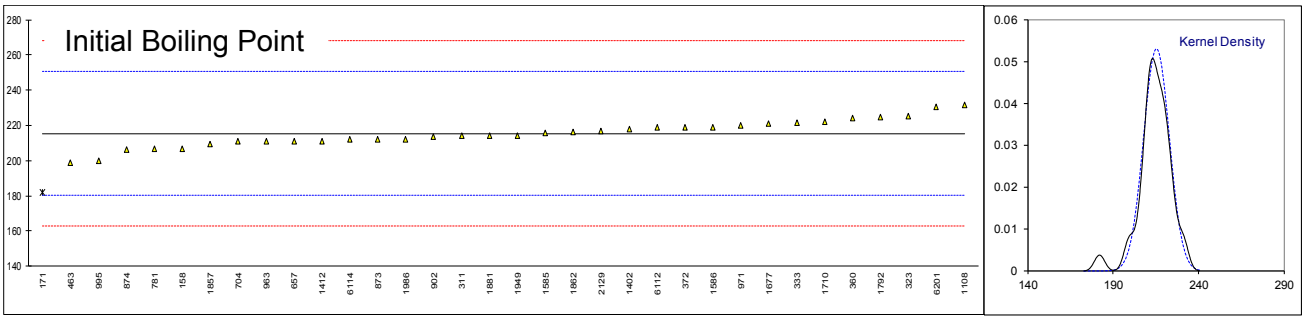


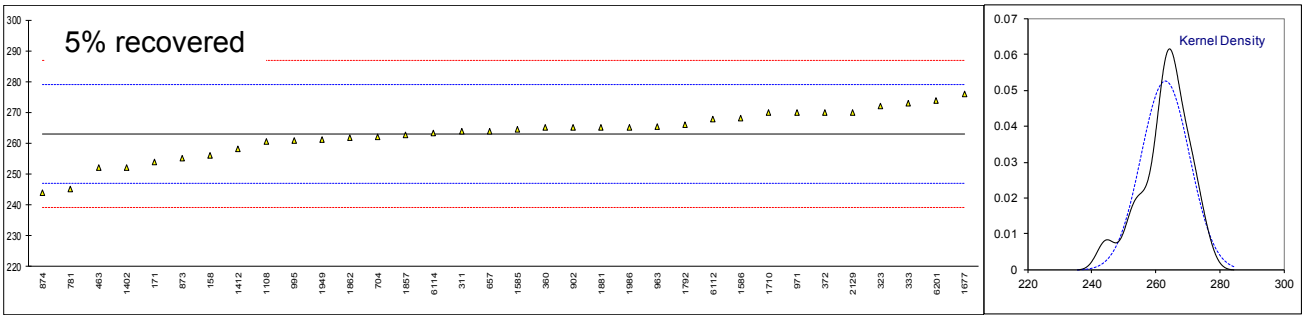
Vacuum Distillation according to ASTM D1160 (as AET) on sample #18265, results in °C

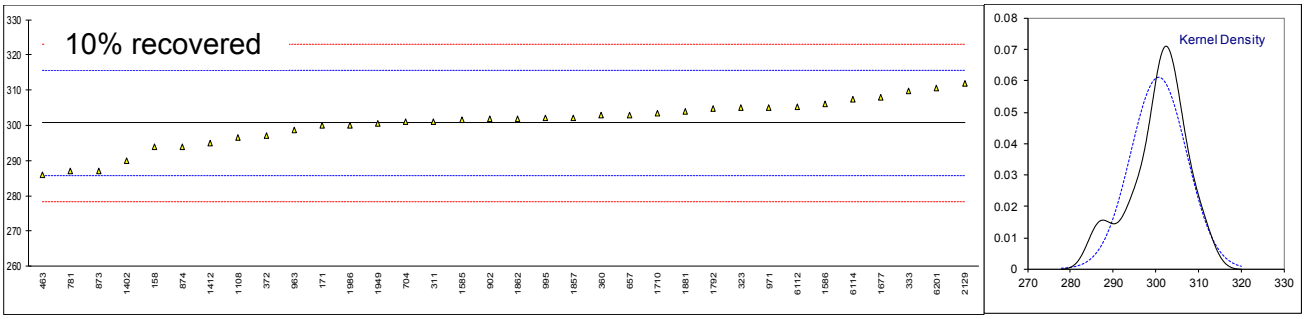
lab	method	IBP	5%rec	10%rec	20%rec	30%rec	40%rec	50%rec	FBP
52		-----	-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----	-----
131		-----	-----	-----	-----	-----	-----	-----	-----
132		-----	-----	-----	-----	-----	-----	-----	-----
133		-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----
150		-----	-----	-----	-----	-----	-----	-----	-----
158	D1160	207	256	294	366	428	483	-----	528
159		-----	-----	-----	-----	-----	-----	-----	-----
168		-----	-----	-----	-----	-----	-----	-----	-----
169		-----	-----	-----	-----	-----	-----	-----	-----
170		-----	-----	-----	-----	-----	-----	-----	-----
171	D1160	**182**	254	300	383	445	499	-----	512
175		-----	-----	-----	-----	-----	-----	-----	-----
194		-----	-----	-----	-----	-----	-----	-----	-----
212		-----	-----	-----	-----	-----	-----	-----	-----
225		-----	-----	-----	-----	-----	-----	-----	-----
230		-----	-----	-----	-----	-----	-----	-----	-----
237		-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----
253		-----	-----	-----	-----	-----	-----	-----	-----
256		-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----
311	D1160	214	264	301	369	431	486	-----	513
313		-----	-----	-----	-----	-----	-----	-----	-----
323	D1160	225	272	305	375	436	489	-----	533
333	D1160	221.8	272.8	309.9	379.0	434.8	488.7	547.0	**589.0**
334		-----	-----	-----	-----	-----	-----	-----	-----
336		-----	-----	-----	-----	-----	-----	-----	-----
337		-----	-----	-----	-----	-----	-----	-----	-----
339		-----	-----	-----	-----	-----	-----	-----	-----
342		-----	-----	-----	-----	-----	-----	-----	-----
349		-----	-----	-----	-----	-----	-----	-----	-----
351		-----	-----	-----	-----	-----	-----	-----	-----
356		-----	-----	-----	-----	-----	-----	-----	-----
360	D1160	224	265	303	372	433	486	-----	520
370		-----	-----	-----	-----	-----	-----	-----	-----
372	D1160	219	270	297	369	430	487	-----	533
444		-----	-----	-----	-----	-----	-----	-----	-----
445		-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----
463	D1160	199	252	286	361	422	478	535	550
507		-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----
558		-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----
605		-----	-----	-----	-----	-----	-----	-----	-----
610		-----	-----	-----	-----	-----	-----	-----	-----
631		-----	-----	-----	-----	-----	-----	-----	-----
633		-----	-----	-----	-----	-----	-----	-----	-----
634		-----	-----	-----	-----	-----	-----	-----	-----
657	D1160	211	264	303	372	432	486	-----	513
671		-----	-----	-----	-----	-----	-----	-----	-----
704	D1160	211.0	262.0	301.0	370.0	430.0	485.0	---	523.0
732		-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----
781	D1160	207	245	287	360	426	480	-----	490
798		-----	-----	-----	-----	-----	-----	-----	-----
823		-----	-----	-----	-----	-----	-----	-----	-----
824		-----	-----	-----	-----	-----	-----	-----	-----
825		-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----
842		-----	-----	-----	-----	-----	-----	-----	-----
873	D1160	212	255	287	359	422	478	-----	490
874	D1160	206	244	294	360	424	480	-----	490
887		-----	-----	-----	-----	-----	-----	-----	-----
902	D1160	213.4	265.0	301.8	373.6	430.0	487.1	-----	518.8
904		-----	-----	-----	-----	-----	-----	-----	-----
913		-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----
963	D1160	211.0	265.5	298.7	372.3	425.1	478.0	533.7	549.1
971	D1160	220	270	305	376	436	490	540	550
974		-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----
995		200.0	261.0	302.0	373.0	438.0	485.0	-----	521.0
996		-----	-----	-----	-----	-----	-----	-----	-----

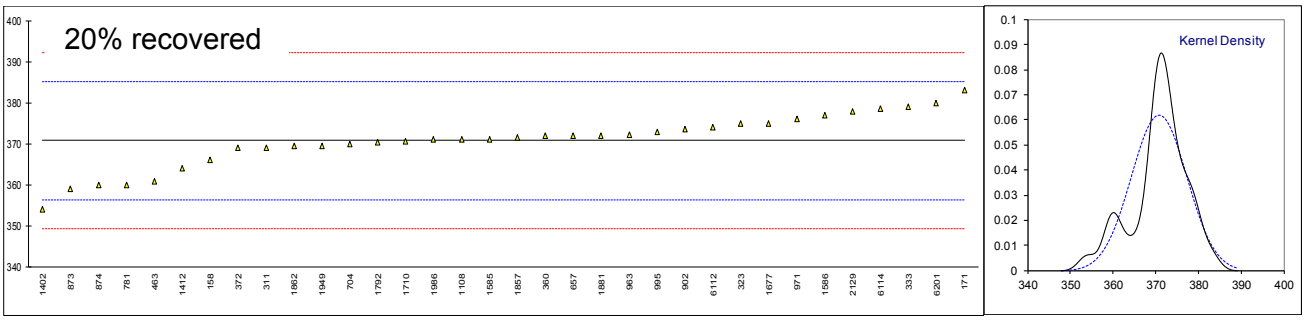
lab	method	IBP	5%rec	10%rec	20%rec	30%rec	40%rec	50%rec	FBP
997		-----	-----	-----	-----	-----	-----	-----	-----
1016		-----	-----	-----	-----	-----	-----	-----	-----
1040		-----	-----	-----	-----	-----	-----	-----	-----
1065		-----	-----	-----	-----	-----	-----	-----	-----
1082		-----	-----	-----	-----	-----	-----	-----	-----
1090		-----	-----	-----	-----	-----	-----	-----	-----
1107		-----	-----	-----	-----	-----	-----	-----	-----
1108	D1160	231.5	260.5	296.5	371.1	428.5	484.2	-----	523.1
1109		-----	-----	-----	-----	-----	-----	-----	-----
1121		-----	-----	-----	-----	-----	-----	-----	-----
1126		-----	-----	-----	-----	-----	-----	-----	-----
1134		-----	-----	-----	-----	-----	-----	-----	-----
1191		-----	-----	-----	-----	-----	-----	-----	-----
1205		-----	-----	-----	-----	-----	-----	-----	-----
1229		-----	-----	-----	-----	-----	-----	-----	-----
1275		-----	-----	-----	-----	-----	-----	-----	-----
1299		-----	-----	-----	-----	-----	-----	-----	-----
1356		-----	-----	-----	-----	-----	-----	-----	-----
1367		-----	-----	-----	-----	-----	-----	-----	-----
1381		-----	-----	-----	-----	-----	-----	-----	-----
1402	D1160	218	252	290	354	418	476	-----	524
1412	D1160	211.0	258.0	295.0	364.0	426.0	482.0	525.0	-----
1431		-----	-----	-----	-----	-----	-----	-----	-----
1543		-----	-----	-----	-----	-----	-----	-----	-----
1585		215.5	264.5	301.5	371.1	433.1	485.2	-----	515.6
1586	D1160	219	268	306	377	440	491	-----	511
1648		-----	-----	-----	-----	-----	-----	-----	-----
1677	D1160	221	276	308	375	435	491	541	554
1681		-----	-----	-----	-----	-----	-----	-----	-----
1710	D1160	221.9 C	269.8	303.5	370.6	431.3	483.8	-----	518
1720		-----	-----	-----	-----	-----	-----	-----	-----
1724		-----	-----	-----	-----	-----	-----	-----	-----
1740		-----	-----	-----	-----	-----	-----	-----	-----
1792		224.6	266.0	304.7	370.4	434.3	487.4	534.2	549.6
1810		-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----
1849		-----	-----	-----	-----	-----	-----	-----	-----
1854		-----	-----	-----	-----	-----	-----	-----	-----
1857	D1160	209.5	262.7	302.0	371.6	432.9	486.6	-----	519.7
1862		216.5	261.8	301.8	369.4	429.6	483.3	-----	514.2
1881	D1160	214	265	304	372	429	483	523	523
1906		-----	-----	-----	-----	-----	-----	-----	-----
1942		-----	-----	-----	-----	-----	-----	-----	-----
1949	D1160	214.4	261.3	300.5	369.4	429.1	484.0	-----	515.2
1986	D1160	212	265	300	371	430	483	-----	515
2129	D1160	217	270	312	378	442	495	----- W	503
6051		-----	-----	-----	-----	-----	-----	-----	-----
6075		-----	-----	-----	-----	-----	-----	-----	-----
6092		-----	-----	-----	-----	-----	-----	-----	-----
6112		218.7	267.7	305.4	374.0	432.0	484.9	-----	518.7
6114	D1160	211.8	263.4	307.4	378.5	436.8	488.9	-----	504.7
6142		-----	-----	-----	-----	-----	-----	-----	-----
6154		-----	-----	-----	-----	-----	-----	-----	-----
6201	D1160	230.4	273.9	310.5	380.0	435.6	494.4	544.4	558.2
6203		-----	-----	-----	-----	-----	-----	-----	-----
normality		OK	OK	OK	OK	OK	OK	OK	OK
n		33	34	34	34	34	34	9	32
outliers		1	0	0	0	0	0	0	1
mean (n)		215.39	263.03	300.71	370.79	431.36	485.57	535.92	521.90
st.dev. (n)		7.523	7.593	6.537	6.453	5.764	5.045	8.155	17.999
R(calc.)		21.06	21.26	18.30	18.07	16.14	14.13	22.83	50.40
st.dev.(D1160:18)		17.500	7.988	7.446	7.162	6.792	6.538	6.438	9.643
R(D1160:18)		49	22.37	20.87	20.05	19.02	18.31	18.03	27

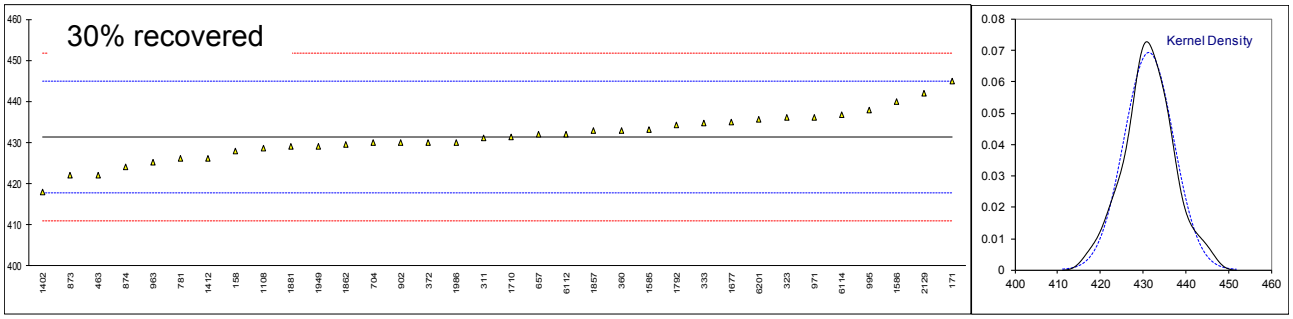
Lab 1710 first reported 120.5
Lab 2129 first reported 503
The reported results underlined and bold are statistical outliers

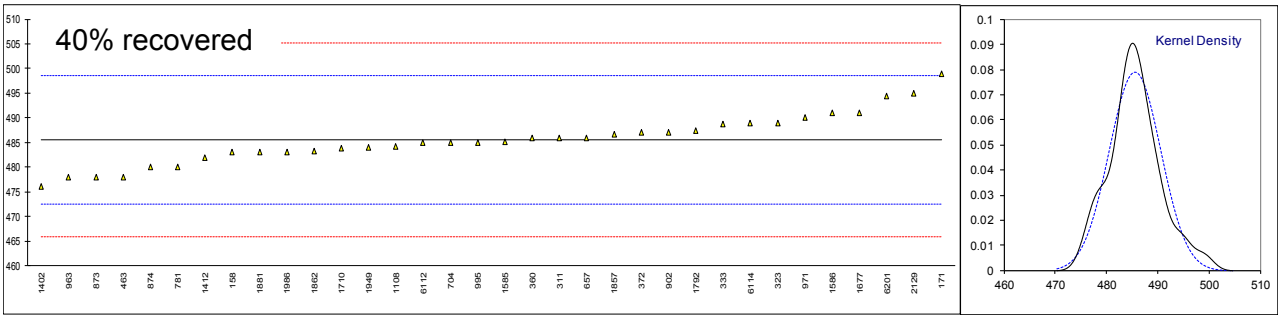

Initial Boiling Point
Kernel Density

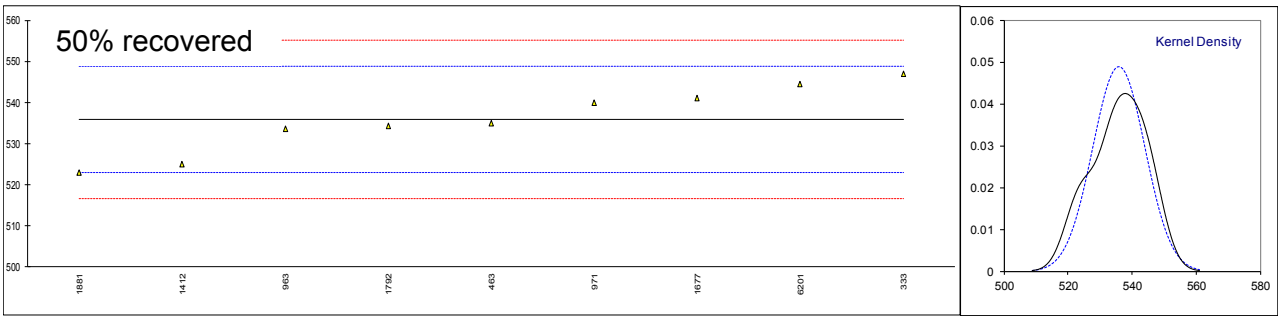

5% recovered
Kernel Density

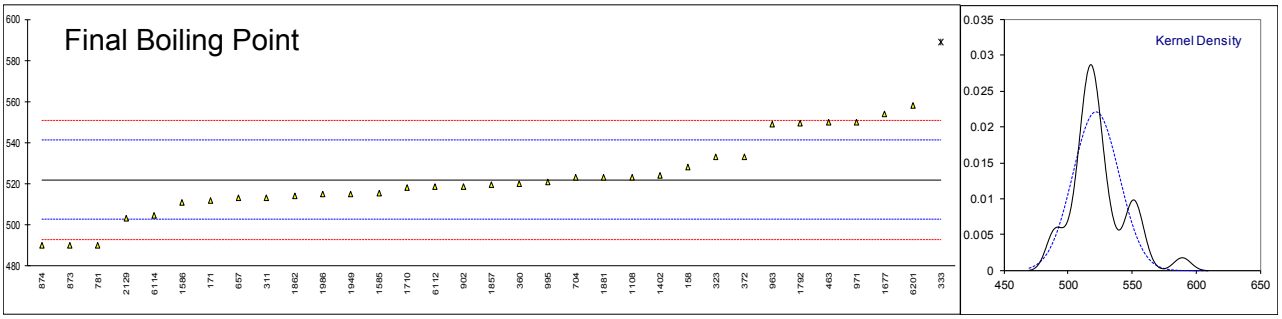

10% recovered
Kernel Density


20% recovered
Kernel Density


30% recovered
Kernel Density


40% recovered
Kernel Density


50% recovered
Kernel Density


Final Boiling Point
Kernel Density

z-scores of Vacuum Distillation according to ASTM D1160 on sample #18265

lab	method	IBP	5%rec	10%rec	20%rec	30%rec	40%rec	50%rec	FBP
52		-----	-----	-----	-----	-----	-----	-----	-----
120		-----	-----	-----	-----	-----	-----	-----	-----
131		-----	-----	-----	-----	-----	-----	-----	-----
132		-----	-----	-----	-----	-----	-----	-----	-----
133		-----	-----	-----	-----	-----	-----	-----	-----
140		-----	-----	-----	-----	-----	-----	-----	-----
150		-----	-----	-----	-----	-----	-----	-----	-----
158	D1160	-0.48	-0.88	-0.90	-0.67	-0.49	-0.39	-----	0.63
159		-----	-----	-----	-----	-----	-----	-----	-----
168		-----	-----	-----	-----	-----	-----	-----	-----
169		-----	-----	-----	-----	-----	-----	-----	-----
170		-----	-----	-----	-----	-----	-----	-----	-----
171	D1160	-1.91	-1.13	-0.10	1.70	2.01	2.05	-----	-1.03
175		-----	-----	-----	-----	-----	-----	-----	-----
194		-----	-----	-----	-----	-----	-----	-----	-----
212		-----	-----	-----	-----	-----	-----	-----	-----
225		-----	-----	-----	-----	-----	-----	-----	-----
230		-----	-----	-----	-----	-----	-----	-----	-----
237		-----	-----	-----	-----	-----	-----	-----	-----
238		-----	-----	-----	-----	-----	-----	-----	-----
253		-----	-----	-----	-----	-----	-----	-----	-----
256		-----	-----	-----	-----	-----	-----	-----	-----
273		-----	-----	-----	-----	-----	-----	-----	-----
311	D1160	-0.08	0.12	0.04	-0.25	-0.05	0.07	-----	-0.92
313		-----	-----	-----	-----	-----	-----	-----	-----
323	D1160	0.55	1.12	0.58	0.59	0.68	0.52	-----	1.15
333	D1160	0.37	1.22	1.23	1.15	0.51	0.48	1.72	6.96
334		-----	-----	-----	-----	-----	-----	-----	-----
336		-----	-----	-----	-----	-----	-----	-----	-----
337		-----	-----	-----	-----	-----	-----	-----	-----
339		-----	-----	-----	-----	-----	-----	-----	-----
342		-----	-----	-----	-----	-----	-----	-----	-----
349		-----	-----	-----	-----	-----	-----	-----	-----
351		-----	-----	-----	-----	-----	-----	-----	-----
356		-----	-----	-----	-----	-----	-----	-----	-----
360	D1160	0.49	0.25	0.31	0.17	0.24	0.07	-----	-0.20
370		-----	-----	-----	-----	-----	-----	-----	-----
372	D1160	0.21	0.87	-0.50	-0.25	-0.20	0.22	-----	1.15
444		-----	-----	-----	-----	-----	-----	-----	-----
445		-----	-----	-----	-----	-----	-----	-----	-----
447		-----	-----	-----	-----	-----	-----	-----	-----
463	D1160	-0.94	-1.38	-1.98	-1.37	-1.38	-1.16	-0.14	2.91
507		-----	-----	-----	-----	-----	-----	-----	-----
541		-----	-----	-----	-----	-----	-----	-----	-----
558		-----	-----	-----	-----	-----	-----	-----	-----
575		-----	-----	-----	-----	-----	-----	-----	-----
605		-----	-----	-----	-----	-----	-----	-----	-----
610		-----	-----	-----	-----	-----	-----	-----	-----
631		-----	-----	-----	-----	-----	-----	-----	-----
633		-----	-----	-----	-----	-----	-----	-----	-----
634		-----	-----	-----	-----	-----	-----	-----	-----
657	D1160	-0.25	0.12	0.31	0.17	0.09	0.07	-----	-0.92
671		-----	-----	-----	-----	-----	-----	-----	-----
704	D1160	-0.25	-0.13	0.04	-0.11	-0.20	-0.09	-----	0.11
732		-----	-----	-----	-----	-----	-----	-----	-----
753		-----	-----	-----	-----	-----	-----	-----	-----
781	D1160	-0.48	-2.26	-1.84	-1.51	-0.79	-0.85	-----	-3.31
798		-----	-----	-----	-----	-----	-----	-----	-----
823		-----	-----	-----	-----	-----	-----	-----	-----
824		-----	-----	-----	-----	-----	-----	-----	-----
825		-----	-----	-----	-----	-----	-----	-----	-----
840		-----	-----	-----	-----	-----	-----	-----	-----
842		-----	-----	-----	-----	-----	-----	-----	-----
873	D1160	-0.19	-1.00	-1.84	-1.65	-1.38	-1.16	-----	-3.31
874	D1160	-0.54	-2.38	-0.90	-1.51	-1.08	-0.85	-----	-3.31
887		-----	-----	-----	-----	-----	-----	-----	-----
902	D1160	-0.11	0.25	0.15	0.39	-0.20	0.23	-----	-0.32
904		-----	-----	-----	-----	-----	-----	-----	-----
913		-----	-----	-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----	-----	-----
963	D1160	-0.25	0.31	-0.27	0.21	-0.92	-1.16	-0.35	2.82
971	D1160	0.26	0.87	0.58	0.73	0.68	0.68	0.63	2.91
974		-----	-----	-----	-----	-----	-----	-----	-----
994		-----	-----	-----	-----	-----	-----	-----	-----
995		-0.88	-0.25	0.17	0.31	0.98	-0.09	-----	-0.09
996		-----	-----	-----	-----	-----	-----	-----	-----

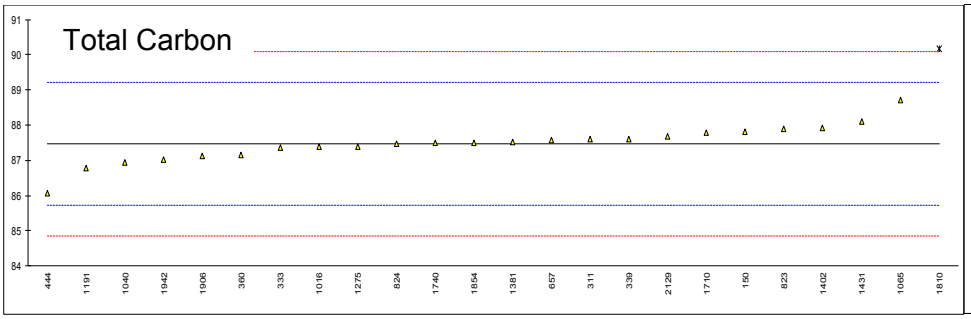
lab	method	IBP	5%rec	10%rec	20%rec	30%rec	40%rec	50%rec	FBP
997		-----	-----	-----	-----	-----	-----	-----	-----
1016		-----	-----	-----	-----	-----	-----	-----	-----
1040		-----	-----	-----	-----	-----	-----	-----	-----
1065		-----	-----	-----	-----	-----	-----	-----	-----
1082		-----	-----	-----	-----	-----	-----	-----	-----
1090		-----	-----	-----	-----	-----	-----	-----	-----
1107		-----	-----	-----	-----	-----	-----	-----	-----
1108	D1160	0.92	-0.32	-0.57	0.04	-0.42	-0.21	-----	0.12
1109		-----	-----	-----	-----	-----	-----	-----	-----
1121		-----	-----	-----	-----	-----	-----	-----	-----
1126		-----	-----	-----	-----	-----	-----	-----	-----
1134		-----	-----	-----	-----	-----	-----	-----	-----
1191		-----	-----	-----	-----	-----	-----	-----	-----
1205		-----	-----	-----	-----	-----	-----	-----	-----
1229		-----	-----	-----	-----	-----	-----	-----	-----
1275		-----	-----	-----	-----	-----	-----	-----	-----
1299		-----	-----	-----	-----	-----	-----	-----	-----
1356		-----	-----	-----	-----	-----	-----	-----	-----
1367		-----	-----	-----	-----	-----	-----	-----	-----
1381		-----	-----	-----	-----	-----	-----	-----	-----
1402	D1160	0.15	-1.38	-1.44	-2.35	-1.97	-1.46	-----	0.22
1412	D1160	-0.25	-0.63	-0.77	-0.95	-0.79	-0.55	-1.70	-----
1431		-----	-----	-----	-----	-----	-----	-----	-----
1543		-----	-----	-----	-----	-----	-----	-----	-----
1585		0.01	0.18	0.11	0.04	0.26	-0.06	-----	-0.65
1586	D1160	0.21	0.62	0.71	0.87	1.27	0.83	-----	-1.13
1648		-----	-----	-----	-----	-----	-----	-----	-----
1677	D1160	0.32	1.62	0.98	0.59	0.54	0.83	0.79	3.33
1681		-----	-----	-----	-----	-----	-----	-----	-----
1710	D1160	0.37	0.85	0.37	-0.03	-0.01	-0.27	-----	-0.40
1720		-----	-----	-----	-----	-----	-----	-----	-----
1724		-----	-----	-----	-----	-----	-----	-----	-----
1740		-----	-----	-----	-----	-----	-----	-----	-----
1792		0.53	0.37	0.54	-0.06	0.43	0.28	-0.27	2.87
1810		-----	-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----	-----
1849		-----	-----	-----	-----	-----	-----	-----	-----
1854		-----	-----	-----	-----	-----	-----	-----	-----
1857	D1160	-0.34	-0.04	0.17	0.11	0.23	0.16	-----	-0.23
1862		0.06	-0.15	0.15	-0.19	-0.26	-0.35	-----	-0.80
1881	D1160	-0.08	0.25	0.44	0.17	-0.35	-0.39	-2.01	0.11
1906		-----	-----	-----	-----	-----	-----	-----	-----
1942		-----	-----	-----	-----	-----	-----	-----	-----
1949	D1160	-0.06	-0.22	-0.03	-0.19	-0.33	-0.24	-----	-0.70
1986	D1160	-0.19	0.25	-0.10	0.03	-0.20	-0.39	-----	-0.72
2129	D1160	0.09	0.87	1.52	1.01	1.57	1.44	-----	-1.96
6051		-----	-----	-----	-----	-----	-----	-----	-----
6075		-----	-----	-----	-----	-----	-----	-----	-----
6092		-----	-----	-----	-----	-----	-----	-----	-----
6112		0.19	0.59	0.63	0.45	0.09	-0.10	-----	-0.33
6114	D1160	-0.21	0.05	0.90	1.08	0.80	0.51	-----	-1.78
6142		-----	-----	-----	-----	-----	-----	-----	-----
6154		-----	-----	-----	-----	-----	-----	-----	-----
6201	D1160	0.86	1.36	1.31	1.29	0.62	1.35	1.32	3.76
6203		-----	-----	-----	-----	-----	-----	-----	-----

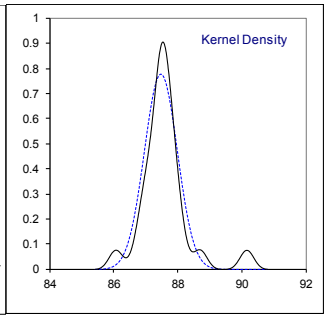
Determination of Total Carbon, Hydrogen and Nitrogen on sample #18265; results in %M/M

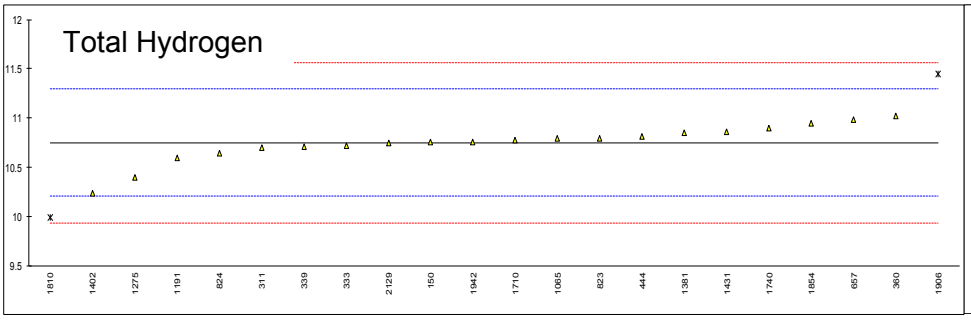
lab	method	Total C	mark	z(targ)	Total H	mark	z(targ)	Total N	mark	z(targ)
52		-----		-----	-----		-----	-----		-----
120		-----		-----	-----		-----	-----		-----
131		-----		-----	-----		-----	-----		-----
132		-----		-----	-----		-----	-----		-----
133		-----		-----	-----		-----	-----		-----
140		-----		-----	-----		-----	-----		-----
150	D5291-C	87.82		0.40	10.76		0.03	<0.75		-----
158		-----		-----	-----		-----	-----		-----
159		-----		-----	-----		-----	-----		-----
168		-----		-----	-----		-----	-----		-----
169		-----		-----	-----		-----	-----		-----
170		-----		-----	-----		-----	-----		-----
171		-----		-----	-----		-----	-----		-----
175		-----		-----	-----		-----	-----		-----
194		-----		-----	-----		-----	-----		-----
212		-----		-----	-----		-----	-----		-----
225		-----		-----	-----		-----	-----		-----
230		-----		-----	-----		-----	-----		-----
237		-----		-----	-----		-----	-----		-----
238		-----		-----	-----		-----	-----		-----
253		-----		-----	-----		-----	-----		-----
256		-----		-----	-----		-----	-----		-----
273		-----		-----	-----		-----	-----		-----
311	D5291-A	87.6		0.14	10.7		-0.19	0.4		0.61
313		-----		-----	-----		-----	-----		-----
323		-----		-----	-----		-----	-----		-----
333	D5291-D	87.36		-0.13	10.72		-0.12	0.37		-0.23
334		-----		-----	-----		-----	-----		-----
336		-----		-----	-----		-----	-----		-----
337		-----		-----	-----		-----	-----		-----
339	D5291-D	87.6		0.14	10.71		-0.15	0.38		0.05
342		-----		-----	-----		-----	-----		-----
349		-----		-----	-----		-----	-----		-----
351		-----		-----	-----		-----	-----		-----
356		-----		-----	-----		-----	-----		-----
360	D5291-A	87.15		-0.37	11.02		0.99	0.32		-1.62
370		-----		-----	-----		-----	-----		-----
372		-----		-----	-----		-----	-----		-----
444	D5291-C	86.07		-1.61	10.81		0.21	0.44		1.73
445		-----		-----	-----		-----	-----		-----
447		-----		-----	-----		-----	-----		-----
463		-----		-----	-----		-----	-----		-----
507		-----		-----	-----		-----	-----		-----
541		-----		-----	-----		-----	-----		-----
558		-----		-----	-----		-----	-----		-----
575		-----		-----	-----		-----	-----		-----
605		-----		-----	-----		-----	-----		-----
610		-----		-----	-----		-----	-----		-----
631		-----		-----	-----		-----	-----		-----
633		-----		-----	-----		-----	-----		-----
634		-----		-----	-----		-----	-----		-----
657	D5291-D	87.58		0.12	10.98		0.84	0.44	C	1.73
671		-----		-----	-----		-----	-----		-----
704		-----		-----	-----		-----	-----		-----
732		-----		-----	-----		-----	-----		-----
753		-----		-----	-----		-----	-----		-----
781		-----		-----	-----		-----	-----		-----
798		-----		-----	-----		-----	-----		-----
823	D5291-D	87.9		0.49	10.8		0.18	-----		-----
824	D5291-D	87.47	C	0.00	10.64	C	-0.41	-----		-----
825		-----		-----	-----		-----	-----		-----
840		-----		-----	-----		-----	-----		-----
842		-----		-----	-----		-----	-----		-----
873		-----		-----	-----		-----	-----		-----
874		-----		-----	-----		-----	-----		-----
887		-----		-----	-----		-----	-----		-----
902		-----		-----	-----		-----	-----		-----
904		-----		-----	-----		-----	-----		-----
913		-----		-----	-----		-----	-----		-----
962		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
971		-----		-----	-----		-----	-----		-----
974		-----		-----	-----		-----	-----		-----
994		-----		-----	-----		-----	-----		-----
995		-----		-----	-----		-----	0.34		-1.06

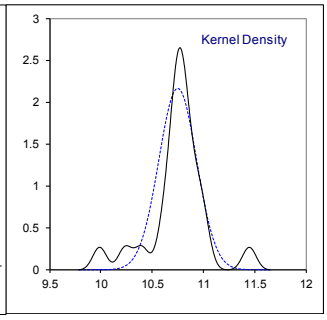
lab	method	Total C	mark	z(targ)	Total H	mark	z(targ)	Total N	mark	z(targ)
996		-----		-----	-----		-----	-----		-----
997		-----		-----	-----		-----	-----		-----
1016	D5291-C	87.38		-0.11	-----		-----	0.402		0.67
1040	D7662	86.94		-0.61	-----		-----	-----		-----
1065		88.7		1.40	10.8		0.18	0.36		-0.50
1082		-----		-----	-----		-----	-----		-----
1090		-----		-----	-----		-----	-----		-----
1107		-----		-----	-----		-----	-----		-----
1108		-----		-----	-----		-----	-----		-----
1109		-----		-----	-----		-----	-----		-----
1121		-----		-----	-----		-----	-----		-----
1126		-----		-----	-----		-----	-----		-----
1134		-----		-----	-----		-----	-----		-----
1191		86.77		-0.81	10.60		-0.56	0.260		-3.30
1205		-----		-----	-----		-----	-----		-----
1229		-----		-----	-----		-----	-----		-----
1275	D5291-D	87.4		-0.08	10.4		-1.30	0.39		0.33
1299		-----		-----	-----		-----	-----		-----
1356		-----		-----	-----		-----	-----		-----
1367		-----		-----	-----		-----	-----		-----
1381	In house	87.52		0.05	10.856		0.38	-----		-----
1402	D5291-A	87.93		0.52	10.24		-1.89	-----		-----
1412		-----		-----	-----		-----	-----		-----
1431	D5291-C	88.11		0.73	10.86		0.40	0.427		1.37
1543		-----		-----	-----		-----	-----		-----
1585		-----		-----	-----		-----	-----		-----
1586		-----		-----	-----		-----	-----		-----
1648		-----		-----	-----		-----	-----		-----
1677		-----		-----	-----		-----	-----		-----
1681		-----		-----	-----		-----	-----		-----
1710	D5291-B	87.79		0.36	10.78		0.10	-----		-----
1720		-----		-----	-----		-----	-----		-----
1724		-----		-----	-----		-----	-----		-----
1740		87.5		0.03	10.9		0.55	0.37		-0.23
1792		-----		-----	-----		-----	-----		-----
1810	D5291-A	90.16	R(0.01)	3.07	9.99	R(0.05)	-2.81	-----		-----
1811		-----		-----	-----		-----	-----		-----
1849		-----		-----	-----		-----	-----		-----
1854		87.50		0.03	10.95		0.73	-----		-----
1857		-----		-----	-----		-----	-----		-----
1862		-----		-----	-----		-----	-----		-----
1881		-----		-----	-----		-----	-----		-----
1906		87.13		-0.39	11.45	R(0.05)	2.58	0.43		1.45
1942	D5291-D	87.01		-0.53	10.76		0.03	0.34		-1.06
1949		-----		-----	-----		-----	-----		-----
1986		-----		-----	-----		-----	-----		-----
2129	D5291-A	87.67		0.22	10.75		-0.01	0.38		0.05
6051		-----		-----	-----		-----	-----		-----
6075		-----		-----	-----		-----	-----		-----
6092		-----		-----	-----		-----	-----		-----
6112		-----		-----	-----		-----	-----		-----
6114		-----		-----	-----		-----	-----		-----
6142		-----		-----	-----		-----	-----		-----
6154		-----		-----	-----		-----	-----		-----
6201		-----		-----	-----		-----	-----		-----
6203		-----		-----	-----		-----	-----		-----
normality		not OK			not OK			suspect		
n		23			20			16		
outliers		1			2			0		
mean (n)		87.4739			10.7518			0.3781		
st.dev. (n)		0.51431			0.18403			0.04805		
R(calc.)		1.4401			0.5153			0.1345		
st.dev.(D5291-ABC:16)		0.87399			0.27099			0.03580		
R(D5291-ABC:16)		2.4472			0.7588			0.1002		

Lab 657 first reported 0.53
Lab 824 first reported 89.99 and 5.26


Total Carbon
91
90
89
88
87
86
85
84
444 1191 1040 1942 1906 360 333 1016 1275 824 1740 1854 1381 657 311 339 2129 1710 150 823 1402 1431 1065 1810


Kernel Density
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
84 86 88 90 92


Total Hydrogen
12
11.5
11
10.5
10
9.5
1810 1402 1275 1191 824 311 339 333 2129 150 1942 1710 1065 823 444 1381 1431 1740 1854 657 360 1906


Kernel Density
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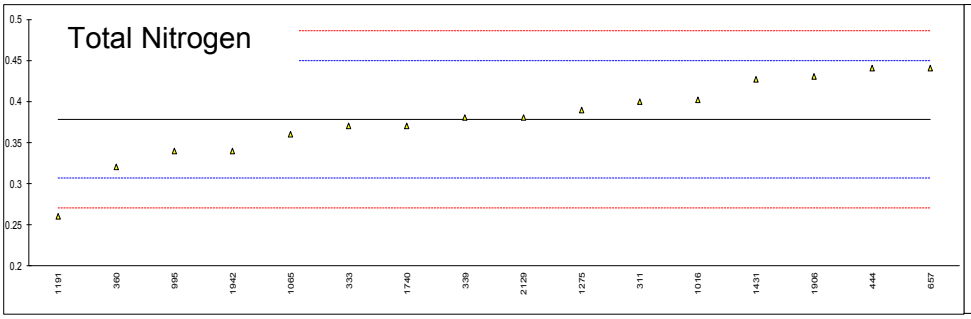
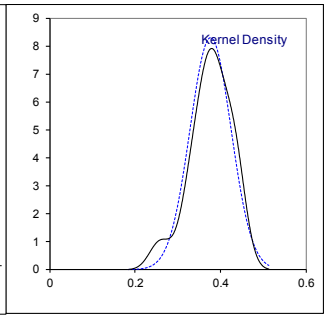
2.5
2
1.5
1
0.5
0
9.5 10 10.5 11 11.5 12


Total Nitrogen
0.5
0.45
0.4
0.35
0.3
0.25
0.2
1191 360 995 1942 1065 333 1740 339 2129 1275 311 1016 1431 1906 444 657


Kernel Density
9
8
7
6
5
4
3
2
1
0
0 0.2 0.4 0.6

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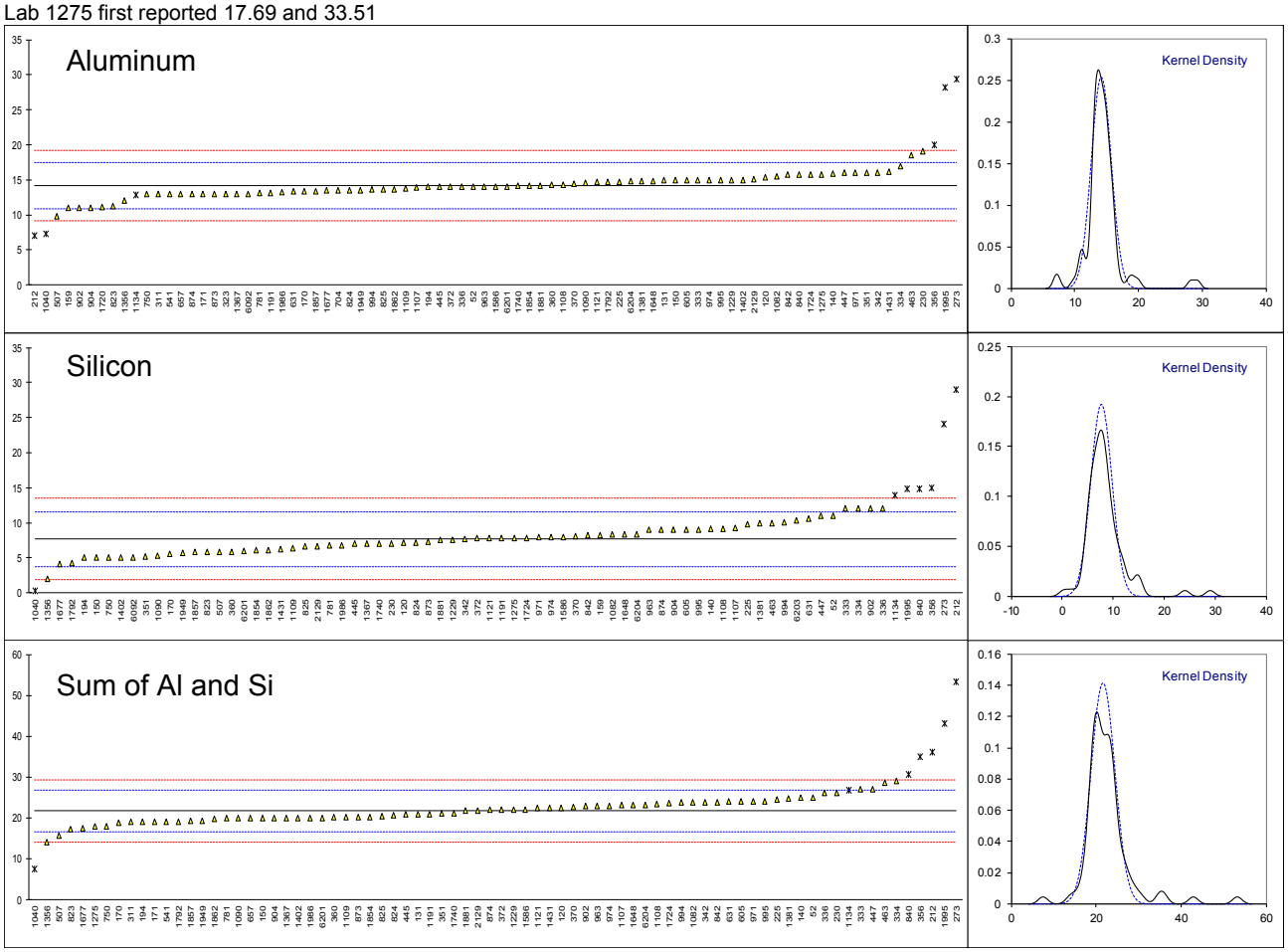
Determination of Aluminum as Al, Silicon as Si and total Al+Si on sample #18266; results in mg/kg

lab	method	Al	mark	z(targ)	Si	mark	z(targ)	Sum Al+Si	mark	z(targ)
52	IP470	14		-0.10	11		1.73	25		1.29
120	IP501	15.33		0.70	7.189		-0.23	22.519		0.32
131	IP501	15		0.50	<10		-----	21		-0.28
132		-----		-----	-----		-----	-----		-----
133		-----		-----	-----		-----	-----		-----
140	IP501	15.9		1.05	9.1		0.75	25.0		1.29
150	IP501	15		0.50	5		-1.36	20		-0.67
159	IP501	11		-1.90	8.2		0.29	-----		-----
169		-----		-----	-----		-----	-----		-----
170	IP501	13.38		-0.47	5.56		-1.08	18.94		-1.08
171	IP501	13		-0.70	<10		-----	19		-1.06
175		-----		-----	-----		-----	-----		-----
194	IP501	14		-0.10	5		-1.36	19		-1.06
212	IP470	7	R(0.01)	-4.30	29	R(0.01)	11.03	36	R(0.01)	5.60
225	IP501	14.75		0.35	9.80		1.11	24.55		1.11
230	IP501	19.11		2.98	7.07		-0.30	26.18		1.75
237		-----		-----	-----		-----	-----		-----
273	IP470	29.32	R(0.01)	9.11	24.03	R(0.01)	8.46	53.35	R(0.01)	12.39
311	IP501	13		-0.70	<10		-----	19		-1.06
323	IP501	13		-0.70	<10		-----	-----		-----
333	IP501	15		0.50	12		2.25	27		2.07
334	IP501	17		1.71	12		2.25	29		2.86
336	IP501	14		-0.10	12		2.25	26		1.68
342	IP501	16.077		1.15	7.747		0.05	23.824		0.83
351	IP501	16.01		1.11	5.16		-1.28	21.17		-0.21
356	IP501	20	R(0.05)	3.51	15	C,ex	3.80	35	C,R(0.01)	5.21
360	IP501	14.3		0.08	5.9		-0.90	20.2		-0.59
370	IP470	14.5		0.20	8.1		0.24	22.6		0.35
372	IP470	14		-0.10	7.8		0.08	22		0.11
444		-----		-----	-----		-----	-----		-----
445	IP501	14		-0.10	7		-0.33	21		-0.28
447	IP470	16		1.11	11		1.73	27		2.07
463	IP470	18.5		2.61	10.0		1.22	28.5		2.66
507	IP501	9.8		-2.62	5.9		-0.90	15.7		-2.35
541	IP501	13		-0.70	<10		-----	19		-1.06
605	IP501	15		0.50	9		0.70	24		0.90
631	IP470	13.35		-0.49	10.6		1.53	24		0.90
657	ISO10478	13		-0.70	<10		-----	20		-0.67
704	IP470	13.5		-0.40	<10		-----	-----		-----
750	IP501	13		-0.70	5		-1.36	18		-1.45
781	IP501	13.1		-0.64	6.8		-0.43	19.9		-0.71
798		-----		-----	-----		-----	-----		-----
823	IP470	11.3		-1.72	5.9		-0.90	17.2		-1.77
824	IP501	13.5		-0.40	7.2		-0.23	20.6		-0.43
825	IP501	13.7		-0.28	6.7		-0.49	20.4		-0.51
840	IP501	15.8		0.99	14.9	R(0.01)	3.75	30.7	ex	3.52
842	IP501	15.7		0.93	8.2		0.29	23.9		0.86
873	IP470	13.0		-0.70	7.3		-0.18	20.3		-0.55
874	IP470	13		-0.70	9		0.70	22		0.11
902	IP501	11		-1.90	12		2.25	23		0.51
904	IP470	11		-1.90	9		0.70	20		-0.67
913		-----		-----	-----		-----	-----		-----
963	IP501	14		-0.10	9		0.70	23		0.51
971	IP501	16		1.11	8		0.19	24		0.90
974	IP501	15		0.50	8		0.19	23		0.51
994	IP501	13.65		-0.31	10.12		1.28	23.77		0.81
995	IP470	15		0.50	9		0.70	24		0.90
1016		-----		-----	-----		-----	-----		-----
1040	IP501	7.34	R(0.01)	-4.10	0.24	ex	-3.82	7.58	R(0.01)	-5.53
1082	ISO10478	15.5		0.81	8.3		0.34	23.8		0.82
1090	IP501	14.6		0.26	5.31		-1.20	19.9		-0.71
1107	IP501	13.9		-0.16	9.3		0.86	23.2		0.58
1108	IP470	14.3		0.08	9.1		0.75	23.4		0.66
1109	IP470	13.8		-0.22	6.4		-0.64	20.2		-0.59
1121	IP501	14.7		0.32	7.8		0.08	22.5		0.31
1134	IP501	12.882	ex	-0.77	13.966	ex	3.27	26.848	ex	2.01
1191	ISO10478	13.18		-0.59	7.82		0.09	21		-0.28
1229	ISO10478	15		0.50	7.6		-0.02	22		0.11
1275	IP501	15.82		1.00	7.85	C	0.11	17.93	C	-1.48
1299		-----		-----	-----		-----	-----		-----
1356	IP501	12		-1.30	2		-2.91	14		-3.02
1367	IP501	13		-0.70	7		-0.33	20		-0.67
1381	ISO10478	14.81		0.39	9.97		1.20	24.78		1.20
1402	IP501	15		0.50	5		-1.36	20		-0.67
1412		-----		-----	-----		-----	-----		-----
1431	In house	16.2		1.23	6.3		-0.69	22.5		0.31

lab	method	Al	mark	z(targ)	Si	mark	z(targ)	Sum Al+Si	mark	z(targ)
1586	IP501	14		-0.10	8		0.19	22		0.11
1648	IP501	14.9		0.44	8.4		0.39	23.2		0.58
1677	IP501	13.46		-0.42	4.10		-1.83	17.56		-1.63
1720	D5708Mod.	11.076		-1.85	-----		-----	-----		-----
1724	IP501	15.8		0.99	7.88		0.12	23.7		0.78
1740	IP501	14.2		0.02	7		-0.33	21.2		-0.20
1792	IP501	14.7		0.32	4.3		-1.73	19.0		-1.06
1810		-----		-----	-----		-----	-----		-----
1854	IP501	14.2		0.02	6.1		-0.80	20.3		-0.55
1857	IP501	13.4		-0.46	5.8		-0.95	19.2		-0.98
1862	IP501	13.7		-0.28	6.1		-0.80	19.8		-0.75
1881	IP470	14.2		0.02	7.5		-0.07	21.7		0.00
1949	IP501	13.5		-0.40	5.7		-1.00	19.2		-0.98
1986	IP470	13.2		-0.58	6.8		-0.43	20.0		-0.67
1995	IP501	28.2	R(0.01)	8.44	14.8	ex	3.70	43	R(0.01)	8.34
2129	IP470	15.1		0.57	6.7		-0.49	21.8		0.04
6075		-----		-----	-----		-----	-----		-----
6092	IP501	13		-0.70	5		-1.36	-----		-----
6201	IP501	14		-0.10	6		-0.85	20		-0.67
6203		-----		-----	10.4		1.42	-----		-----
6204	IP501	14.8		0.38	8.4		0.39	23.2		0.58
normality		suspect			OK			OK		
n		77			69			71		
outliers		5 (+1ex)			3 (+4ex)			5 (+2ex)		
mean (n)		14.16	Spike 14.2 <100%		7.64	Spike 15.6 <49%		21.71		
st.dev. (n)		1.572			2.081			2.817		
R(calc.)		4.40			5.83			7.89		
st.dev.(IP470:05)		1.664			1.936			2.553		
R(IP470:05)		4.66			5.42			7.15		
Compare										
R(IP501:05)		4.77			2.54			5.40		

Lab 356 first reported 22 and 42
Labs: 356,1040 and 1995 test results are excluded because of the statistical outliers in the Al and Al+Si determination
Lab 840 test results are excluded because of the statistical outliers in the Si determination
Lab 1134 test results are excluded as 6 of 10 related test values are outliers
Lab 1275 first reported 17.69 and 33.51

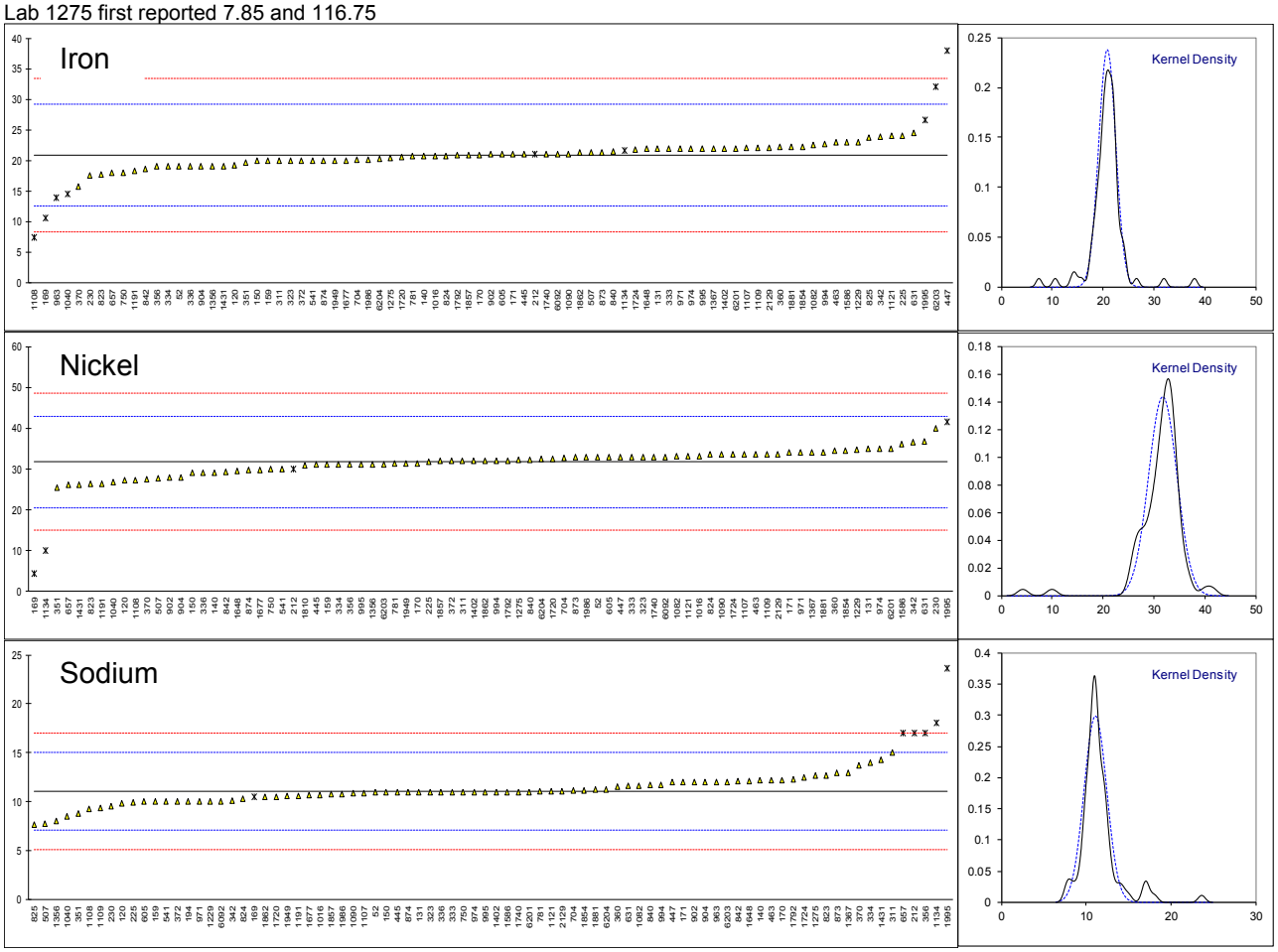


Determination of Iron as Fe, Nickel as Ni, Sodium as Na on sample #18266; results in mg/kg

lab	method	Fe	mark	z(targ)	Ni	mark	z(targ)	Na	mark	z(targ)
52	IP470	19		-0.44	33		0.23	11		-0.04
120	IP501	19.25		-0.38	27.135		-0.82	9.839		-0.63
131	IP501	22		0.28	35		0.59	11		-0.04
132		-----		-----	-----		-----	-----		-----
133		-----		-----	-----		-----	-----		-----
140	IP501	20.7		-0.04	29.1		-0.47	12.2		0.57
150	IP501	20		-0.20	29		-0.49	11		-0.04
159	IP501	20		-0.20	31		-0.13	10		-0.55
169	D5863-B	10.61	R(0.01)	-2.46	4.27	R(0.01)	-4.92	10.46	ex	-0.31
170	IP501	20.94		0.02	31.38		-0.06	12.24		0.59
171	IP501	21		0.04	34		0.41	12		0.47
175		-----		-----	-----		-----	-----		-----
194		-----		-----	-----		-----	10		-0.55
212	IP470	21	ex	0.04	30	ex	-0.31	17	R(0.01)	3.01
225	IP501	24.01		0.76	31.78		0.01	9.95		-0.57
230	IP501	17.62		-0.78	39.95		1.48	9.57		-0.76
237		-----		-----	-----		-----	-----		-----
273		-----		-----	-----		-----	-----		-----
311	IP501	20		-0.20	32		0.05	15		1.99
323	IP501	20		-0.20	33		0.23	11		-0.04
333	IP501	22		0.28	33		0.23	11		-0.04
334	IP501	19		-0.44	31		-0.13	14		1.49
336	IP501	19		-0.44	29		-0.49	11		-0.04
342	IP501	23.9401		0.74	36.5222		0.86	10.1670		-0.46
351	IP501	19.75		-0.26	25.52		-1.11	8.80		-1.15
356	IP501	19		-0.44	31		-0.13	17	R(0.01)	3.01
360	IP501	22.2		0.32	34.4		0.48	11.5		0.22
370	IP470	15.8		-1.21	27.5		-0.75	13.7		1.33
372	IP470	20		-0.20	32		0.05	10		-0.55
444		-----		-----	-----		-----	-----		-----
445	IP501	21		0.04	31		-0.13	11		-0.04
447	IP470	38	R(0.01)	4.11	33		0.23	12		0.47
463	IP470	23.0		0.52	33.7		0.36	12.2		0.57
507	IP501	21.4		0.13	27.8		-0.70	7.8		-1.66
541	IP501	20		-0.20	30		-0.31	10		-0.55
605	IP501	21		0.04	33		0.23	10		-0.55
631	IP470	24.5		0.87	36.7		0.89	11.6		0.27
657	IP501	18		-0.68	26		-1.02	17	R(0.01)	3.01
704	IP470	20.1		-0.18	32.6		0.16	11.2		0.06
750	IP501	18		-0.68	30		-0.31	11		-0.04
781	IP501	20.7		-0.04	31.3		-0.07	11.1		0.01
798		-----		-----	-----		-----	-----		-----
823	IP470	17.7		-0.76	26.4		-0.95	12.7	C	0.83
824	IP501	20.8		-0.01	33.5		0.32	10.3		-0.39
825	IP501	23.7		0.68	-----		-----	7.7		-1.71
840	IP501	21.5		0.16	32.3		0.11	11.7		0.32
842	IP501	18.6		-0.54	29.3		-0.43	12.1		0.52
873	IP470	21.4		0.13	32.9		0.21	13.0		0.98
874	IP470	20		-0.20	29.7		-0.36	11		-0.04
902	IP501	21		0.04	28		-0.67	12		0.47
904	IP470	19		-0.44	28		-0.67	12		0.47
913		-----		-----	-----		-----	-----		-----
963	IP501	14	R(0.05)	-1.64	-----		-----	12		0.47
971	IP501	22		0.28	34		0.41	10		-0.55
974	IP501	22		0.28	35		0.59	11		-0.04
994	IP501	22.67		0.44	32.01		0.05	11.75		0.34
995	IP470	22		0.28	31		-0.13	11		-0.04
1016	In house	20.7		-0.04	33.2		0.27	10.704		-0.19
1040	IP501	14.57	R(0.05)	-1.51	26.85		-0.87	8.5		-1.31
1082	In house	22.6		0.42	33.1		0.25	11.6		0.27
1090	IP501	21.1		0.06	33.5		0.32	10.9		-0.09
1107	IP501	22.1		0.30	33.6		0.34	10.9		-0.09
1108	D5863-B	7.4	R(0.01)	-3.23	27.3		-0.79	9.3		-0.90
1109	IP470	22.1		0.30	33.7		0.36	9.4		-0.85
1121	IP501	24.0		0.75	33.1		0.25	11.1		0.01
1134	IP501	21.581	ex	0.17	10.003	R(0.01)	-3.89	18.030	R(0.01)	3.53
1191	ISO10478Mod.	18.27		-0.62	26.45		-0.94	10.62		-0.23
1229	In house	23.06		0.53	34.66		0.53	10		-0.55
1275	IP501	20.36		-0.12	32.27	C	0.10	12.65	C	0.80
1299		-----		-----	-----		-----	-----		-----
1356	IP501	19		-0.44	31		-0.13	8		-1.56
1367	IP501	22		0.28	34		0.41	13		0.98
1381		-----		-----	-----		-----	-----		-----
1402	IP501	22		0.28	32		0.05	11		-0.04
1412		-----		-----	-----		-----	-----		-----
1431	In house	19.1		-0.42	26.1		-1.01	14.3		1.64

lab	method	Fe	mark	z(targ)	Ni	mark	z(targ)	Na	mark	z(targ)
1586	IP501	23		0.52	36		0.77	11		-0.04
1648	IP501	21.9		0.25	29.4		-0.41	12.1		0.52
1677	IP501	20.03		-0.20	29.83		-0.34	10.66		-0.21
1720	D5708	20.547		-0.07	32.549		0.15	10.523		-0.28
1724	IP501	21.8		0.23	33.5		0.32	12.5		0.72
1740	IP501	21		0.04	33		0.23	11		-0.04
1792	IP501	20.9		0.01	32.1		0.07	12.3		0.62
1810		-----		-----	30.8		-0.16	-----		-----
1854	IP501	22.3		0.35	34.5		0.50	11.2		0.06
1857	IP501	20.9		0.01	31.9		0.03	10.8		-0.14
1862	IP501	21.3		0.11	32.0		0.05	10.5		-0.29
1881	IP470	22.2		0.32	34.1		0.43	11.3		0.11
1949	IP501	20.0		-0.20	31.3		-0.07	10.6		-0.24
1986	IP470	20.1		-0.18	32.9		0.21	10.8		-0.14
1995	IP501	26.6	ex	1.38	41.5	ex	1.76	23.6	R(0.01)	6.36
2129	IP470	22.1		0.30	33.7		0.36	11.1		0.01
6075		-----		-----	-----		-----	-----		-----
6092	IP501	21		0.04	33		0.23	10		-0.55
6201	IP501	22		0.28	35		0.59	11		-0.04
6203	IP470	32.0	R(0.01)	2.67	31.0		-0.13	12.0		0.47
6204	IP501	20.3		-0.13	32.5		0.14	11.3		0.11
normality		OK			OK			suspect		
n		74			78			78		
outliers		6 (+3ex)			2 (+2ex)			5 (+1ex)		
mean (n)		20.85			31.71			11.07		
st.dev. (n)		1.677			2.779			1.333		
R(calc.)		4.70			7.78			3.73		
st.dev.(IP470:05)		4.170			5.577			1.970		
R(IP470:05)		11.68			15.62			5.51		
Compare										
R(IP501:05)		4.98			11.25			4.00		

Lab 169 test results are excluded as 2 of 3 related test values are outliers
Lab 212 test results are excluded as 5 of 9 related test values are outliers
Lab 823 first reported 21.1
Labs: 1134 and 1995 test results are excluded as 6 of 10 related test values are outliers
Lab 1275 first reported 7.85 and 116.75

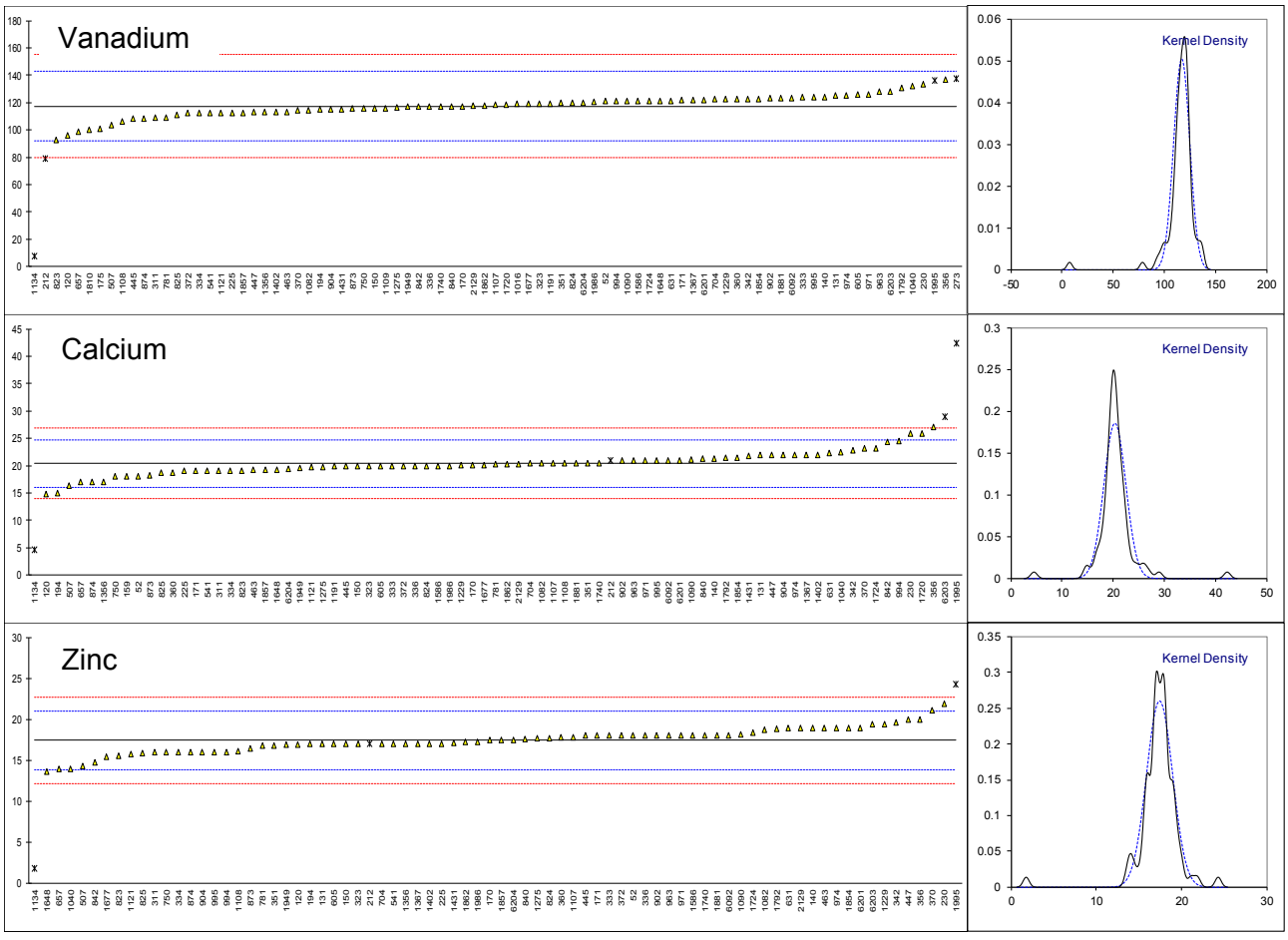


Determination of Vanadium as V, Calcium as Ca and Zinc as Zn on sample #18266; results in mg/kg

lab	method	V	mark	z(targ)	Ca	mark	z(targ)	Zn	mark	z(targ)
52	IP470	121		0.28	18		-1.10	18		0.32
120	IP501	95.92		-1.70	14.745		-2.61	16.925		-0.29
131	IP501	125		0.60	22		0.75	17		-0.24
132		-----		-----	-----		-----	-----		-----
133		-----		-----	-----		-----	-----		-----
140	IP501	124.2		0.54	21.3		0.43	19.0		0.89
150	IP501	116		-0.11	20		-0.17	17		-0.24
159		-----		-----	18		-1.10	-----		-----
169		-----		-----	-----		-----	-----		-----
170	IP501	117.35		-0.01	20.07		-0.14	17.49		0.03
171	IP501	122		0.36	19		-0.64	18		0.32
175	D5863-B	101		-1.30	-----		-----	-----		-----
194	IP501	115		-0.19	15		-2.49	17		-0.24
212	IP470	79	R(0.01)	-3.05	21	ex	0.29	17	ex	-0.24
225	IP501	112.03		-0.43	18.99		-0.64	17.04		-0.22
230	IP501	133.27		1.26	25.83		2.52	21.86		2.51
237		-----		-----	-----		-----	-----		-----
273	IP470	137.6	ex	1.60	-----		-----	-----		-----
311	IP501	109		-0.67	19		-0.64	16		-0.81
323	IP501	119		0.12	20		-0.17	17		-0.24
333	IP501	124		0.52	20		-0.17	18		0.32
334	IP501	112		-0.43	19		-0.64	16		-0.81
336	IP501	117		-0.03	20		-0.17	18		0.32
342	IP501	122.7543		0.42	22.8394		1.14	19.6400		1.25
351	IP501	119.50		0.16	20.41		0.02	16.84		-0.33
356	IP501	137		1.55	27		3.07	20		1.45
360	IP501	122.6		0.41	18.7		-0.78	17.8		0.21
370	IP470	114.3		-0.25	23.1		1.26	21.1		2.08
372	IP470	112		-0.43	20		-0.17	18		0.32
444		-----		-----	-----		-----	-----		-----
445	IP501	108		-0.75	20		-0.17	18		0.32
447	IP470	113		-0.35	22		0.75	20		1.45
463	IP470	113.1		-0.34	19.2		-0.55	19.0		0.89
507	IP501	103.7		-1.09	16.4		-1.84	14.3		-1.77
541	IP501	112		-0.43	19		-0.64	17		-0.24
605	IP501	126		0.68	20		-0.17	17		-0.24
631	D5863-A	121.4		0.31	22.3		0.89	18.9		0.83
657	IP501	99		-1.46	17		-1.56	14		-1.94
704	IP470	122.3		0.39	20.4		0.01	17.0		-0.24
750	IP501	116		-0.11	18		-1.10	16		-0.81
781	IP501	109.1		-0.66	20.3		-0.04	16.8		-0.36
798		-----		-----	-----		-----	-----		-----
823	IP470	92.8		-1.95	19.1		-0.59	15.5		-1.09
824	IP501	119.5		0.16	20.0		-0.17	17.7		0.15
825	IP501	111.2		-0.49	18.7		-0.78	15.9		-0.87
840	IP501	117.3		-0.01	21.2	C	0.38	17.6		0.10
842	IP501	117.0		-0.03	24.4	C	1.86	14.8		-1.49
873	IP470	115.4		-0.16	18.2		-1.01	16.5		-0.53
874	IP470	108		-0.75	17		-1.56	16		-0.81
902	IP501	123		0.44	21		0.29	18		0.32
904	IP470	115		-0.19	22		0.75	16		-0.81
913		-----		-----	-----		-----	-----		-----
963	IP501	128		0.84	21		0.29	18		0.32
971	IP501	126		0.68	21		0.29	18		0.32
974	IP501	125		0.60	22		0.75	19		0.89
994	IP501	121		0.28	24.54		1.93	16.04		-0.79
995	IP470	124		0.52	21		0.29	16		-0.81
1016	In house	118.8		0.11	-----		-----	-----		-----
1040	IP501	132.18		1.17	22.47		0.97	14.00		-1.94
1082	In house	114.4		-0.24	20.4		0.01	18.7		0.72
1090	IP501	121.0		0.28	21.1		0.33	18.1		0.38
1107	IP501	118.4		0.08	20.4		0.01	17.8		0.21
1108	D5863-B	106		-0.91	20.4		0.01	16.1		-0.75
1109	IP470	116.0		-0.11	-----		-----	-----		-----
1121	IP501	112		-0.43	19.8		-0.27	15.8		-0.92
1134	IP501	7.466	R(0.01)	-8.72	4.588	R(0.01)	-7.31	1.789	R(0.01)	-8.85
1191	ISO10478Mod.	119.11		0.13	19.87		-0.23	-----		-----
1229	In house	122.3		0.39	20.06		-0.15	19.43		1.13
1275	IP501	116.75	C	-0.05	19.82	C	-0.26	17.69	C	0.15
1299		-----		-----	-----		-----	-----		-----
1356	IP501	113		-0.35	17		-1.56	17		-0.24
1367	IP501	122		0.36	22		0.75	17		-0.24
1381		-----		-----	-----		-----	-----		-----
1402	IP501	113		-0.35	22		0.75	17		-0.24
1412		-----		-----	-----		-----	-----		-----
1431	In house	115		-0.19	21.8		0.66	17.1		-0.19

lab	method	V	mark	z(targ)	Ca	mark	z(targ)	Zn	mark	z(targ)
1586	IP501	121		0.28	20		-0.17	18		0.32
1648	IP501	121.3		0.31	19.3		-0.50	13.6		-2.17
1677	IP501	118.88		0.12	20.07		-0.14	15.41		-1.14
1720	D5708	118.582		0.09	25.951		2.58	-----		-----
1724	IP501	121.2		0.30	23.2		1.31	18.4		0.55
1740	IP501	117		-0.03	20.5		0.06	18		0.32
1792	IP501	130.5		1.04	21.5		0.52	18.8		0.77
1810		100.2		-1.37	-----		-----	-----		-----
1854	IP501	122.8		0.43	21.5		0.52	19		0.89
1857	IP501	112.3		-0.41	19.2		-0.55	17.5		0.04
1862	IP501	118.0		0.05	20.3		-0.04	17.2		-0.13
1881	IP470	123.0		0.44	20.4		0.01	18.0		0.32
1949	IP501	116.8		-0.05	19.6		-0.36	16.9		-0.30
1986	IP470	120.6		0.25	20.0		-0.17	17.3		-0.07
1995	IP501	136.3	ex	1.50	42.3	R(0.01)	10.15	24.3	R(0.01)	3.89
2129	IP470	117.8		0.03	20.3		-0.04	18.9		0.83
6075		-----		-----	-----		-----	-----		-----
6092	IP501	123		0.44	21		0.29	18		0.32
6201	IP501	122		0.36	21		0.29	19		0.89
6203	IP470	128.0		0.84	29.0	R(0.05)	3.99	19.4		1.11
6204	IP501	120.1		0.21	19.4		-0.45	17.5		0.04
normality		suspect			suspect			OK		
n		81			77			75		
outliers		2 (+2ex)			3 (+1ex)			2 (+1ex)		
mean (n)		117.43			20.38			17.43		
st.dev. (n)		7.915			2.145			1.530		
R(calc.)		22.16			6.01			4.28		
st.dev.(IP470:05)		12.617			2.160			1.767		
R(IP470:05)		35.33			6.05			4.95		
Compare										
R(IP501:05)		29.32			4.57			3.76		

Lab 212 test results are excluded as 5 of 9 related test values are outliers
Lab 273 test results are excluded as 3 of 4 related test values are outliers
Lab 840 first reported 35.7
Lab 842 first reported 43.7
Lab 1275 first reported 19.82, 32.27 and 10.08
Lab 1995 test results are excluded as 6 of 10 related test values are outliers

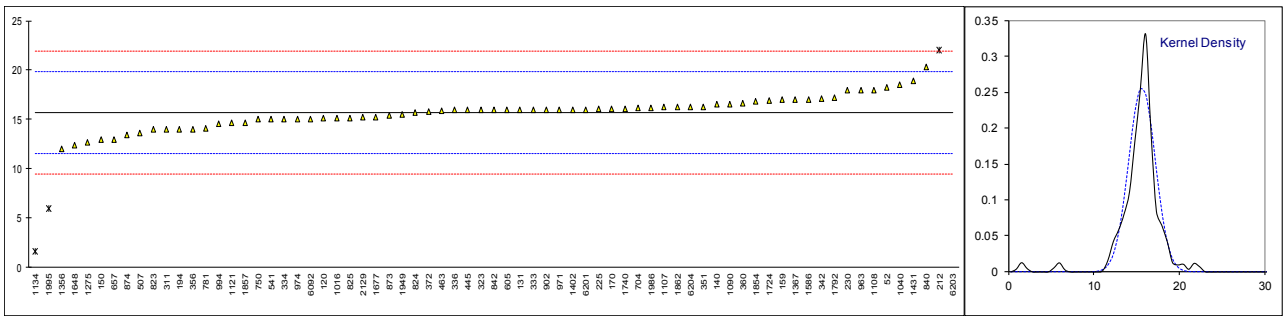


Determination of Phosphorus as P on sample #18266; results in mg/kg

lab	method	value	mark	z(targ)	remarks
52	IP500	18.2		1.19	
120	IP501	15.085		-0.31	
131	IP501	16		0.13	
132		-----		-----	
133		-----		-----	
140	IP501	16.5		0.37	
150	IP501	13		-1.31	
159	IP501	17		0.62	
169		-----		-----	
170	IP501	16.06		0.16	
171	IP501	<1		-----	
175		-----		-----	
194	IP501	14		-0.83	
212	IP500	22	ex	3.03	test results are excluded as 5 of 9 related test values are outliers
225	IP501	16.03		0.15	
230	IP501	17.97		1.08	
237		-----		-----	
273		-----		-----	
311	IP501	14		-0.83	
323	IP501	16		0.13	
333	IP501	16		0.13	
334	IP501	15		-0.35	
336	IP501	16		0.13	
342	IP501	17.0755		0.65	
351	IP501	16.31		0.28	
356	IP501	14		-0.83	
360	IP501	16.6		0.42	
370		-----		-----	
372	IP500	15.8		0.04	
444		-----		-----	
445	IP501	16		0.13	
447		-----		-----	
463	IP500	15.92		0.09	
507	IP501	13.6		-1.02	
541	IP501	15		-0.35	
605	IP501	16		0.13	
631		-----		-----	
657	IP501	13		-1.31	
704	IP500	16.2		0.23	
750	IP501	15		-0.35	
781	IP501	14.1		-0.78	
798		-----		-----	
823	IP501	14.0		-0.83	
824	IP501	15.7		-0.01	
825	IP501	15.1		-0.30	
840	IP501	20.3		2.21	
842	IP501	16.0		0.13	
873	IP501	15.4		-0.16	
874	IP501	13.4		-1.12	
902	IP501	16		0.13	
904		-----		-----	
913		-----		-----	
963	IP501	18		1.10	
971	IP501	16		0.13	
974	IP501	15		-0.35	
994	IP501	14.53		-0.58	
995		-----		-----	
1016	NEN6966	15.085		-0.31	
1040	IP501	18.56		1.37	
1082		-----		-----	
1090	IP501	16.5		0.37	
1107	IP501	16.3		0.28	
1108	IP501	18		1.10	
1109		-----		-----	
1121	IP501	14.7		-0.49	
1134	IP501	1.662	R(0.01)	-6.78	
1191		-----		-----	
1229		-----		-----	
1275	IP501	12.65		-1.48	
1299		-----		-----	
1356	IP501	12		-1.79	
1367	IP501	17		0.62	
1381		-----		-----	
1402	IP501	16		0.13	
1412		-----		-----	
1431	In house	18.9		1.53	

lab	method	value	mark	z(targ)	remarks
1586	IP501	17		0.62	
1648	IP501	12.4		-1.60	
1677	IP501	15.26		-0.22	
1720		-----		-----	
1724	IP501	16.92		0.58	
1740	IP501	16.1		0.18	
1792	IP501	17.2		0.71	
1810		-----		-----	
1854	IP501	16.8		0.52	
1857	IP501	14.7		-0.49	
1862	IP501	16.3		0.28	
1881		-----		-----	
1949	IP501	15.5		-0.11	
1986	IP500	16.2		0.23	
1995	IP501	5.96	R(0.01)	-4.71	
2129	IP500	15.19		-0.26	
6075		-----		-----	
6092	IP501	15		-0.35	
6201	IP501	16		0.13	
6203	IP500	160.0	R(0.01)	69.54	
6204	IP501	16.3		0.28	

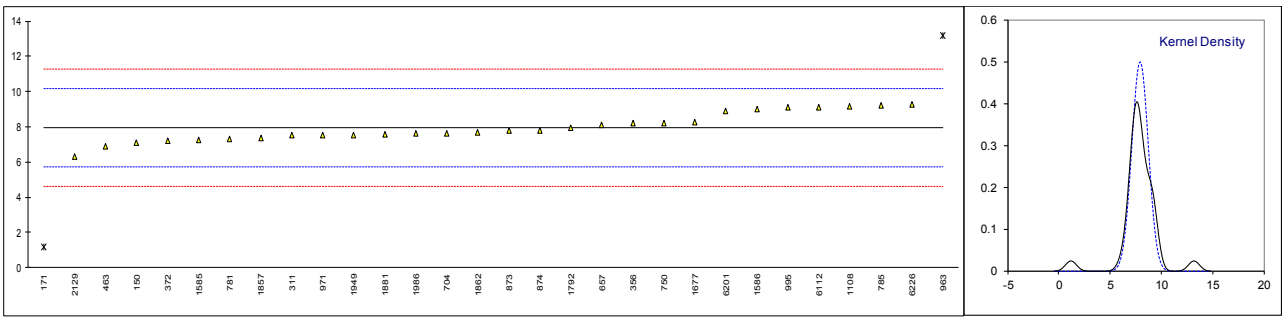
	normality	OK
	n	67
	outliers	3 (+1ex)
	mean (n)	15.72
	st.dev. (n)	1.551
	R(calc.)	4.34
	st.dev.(IP501:05)	2.075
	R(IP501:05)	5.81
Compare		
	R(IP500:03)	3.64



Determination of Bromine Number on distillate <360°C AET on sample #18267; results in g Br_2/100g

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D1159	7.1		-0.76	
170		-----		-----	
171	D1159	1.2	R(0.01)	-6.04	
311	D1159	7.5		-0.40	
323		-----		-----	
356	D1159	8.2		0.23	
372	D1159	7.2		-0.67	
445		-----		-----	
463	D1159	6.87		-0.96	
657	D1159	8.1		0.14	
704	D1159	7.65		-0.27	
750	D1159	8.2		0.23	
753		-----		-----	
781	D1159	7.3		-0.58	
785	D1159	9.2		1.12	
798		-----		-----	
823		-----		-----	
873	D1159	7.8		-0.13	
874	D1159	7.8		-0.13	
963	D1159	13.20	R(0.01)	4.70	
971	D1159	7.50		-0.40	
994		-----		-----	
995	D1159	9.1		1.03	
1016		-----		-----	
1065		-----		-----	
1108	D1159	9.15		1.08	
1134		-----		-----	
1585	D1159	7.27		-0.61	
1586	D1159	9.0		0.94	
1677	D1159	8.235		0.26	
1740		-----		-----	
1792	D1159	7.95		0.00	
1857	D1159	7.35		-0.53	
1862	D1159	7.69		-0.23	
1881	D1159	7.58		-0.33	
1949	D1159	7.54		-0.36	
1986	D1159	7.62		-0.29	
2129	D1159	6.3		-1.47	
6112	D1159	9.10		1.03	
6201	D1159	8.92		0.87	
6203		-----		-----	
6226	D1159	9.289		1.20	

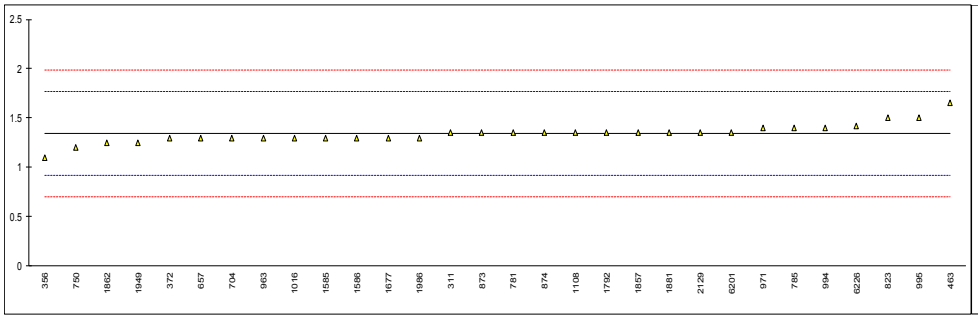
normality	OK
n	28
outliers	2
mean (n)	7.947
st.dev. (n)	0.7970
R(calc.)	2.232
st.dev.(D1159:07)	1.1170
R(D1159:07)	3.128

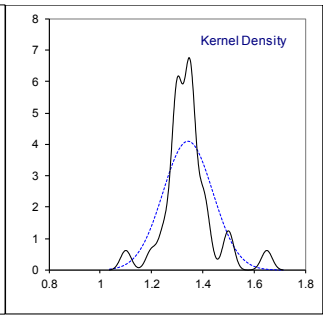


Determination of P-Value on sample #18267;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150		-----		-----	
170		-----		-----	
171		-----		-----	
311	SMS1600	1.35		0.04	
323		-----		-----	
356	SMS1600	1.10		-1.13	
372	SMS1600	1.30		-0.20	
445		-----		-----	
463	In house	1.65	C	1.44	first reported 2.131
657	SMS1600	1.30		-0.20	
704	SMS1600	1.30		-0.20	
750	SMS1600	1.20		-0.66	
753		-----		-----	
781	SMS1600	1.35		0.04	
785	SMS1600	1.40		0.27	
798		-----		-----	
823	SMS1600	1.5		0.74	
873	SMS1600	1.35		0.04	
874	SMS1600	1.35		0.04	
963	SMS1600	1.3		-0.20	
971	SMS1600	1.40		0.27	
994	SMS1600	1.4		0.27	
995	SMS1600	1.5		0.74	
1016	In house	1.30		-0.20	
1065		-----		-----	
1108	SMS1600	1.35		0.04	
1134		-----		-----	
1585	SMS1600	1.30		-0.20	
1586	SMS1600	1.3		-0.20	
1677	SMS1600	1.3		-0.20	
1740		-----		-----	
1792	SMS1600	1.35		0.04	
1857	SMS1600	1.35		0.04	
1862	SMS1600	1.25		-0.43	
1881	SMS1600	1.35		0.04	
1949	SMS1600	1.25		-0.43	
1986	SMS1600	1.30		-0.20	
2129	SMS1600	1.35		0.04	
6112		-----		-----	
6201	SMS1600	1.35		0.04	
6203		-----		-----	
6226	SMS2715	1.42		0.36	

normality	not OK
n	30
outliers	0
mean (n)	1.342
st.dev. (n)	0.0970
R(calc.)	0.272
st.dev.(target)	0.2143
R(target)	0.600



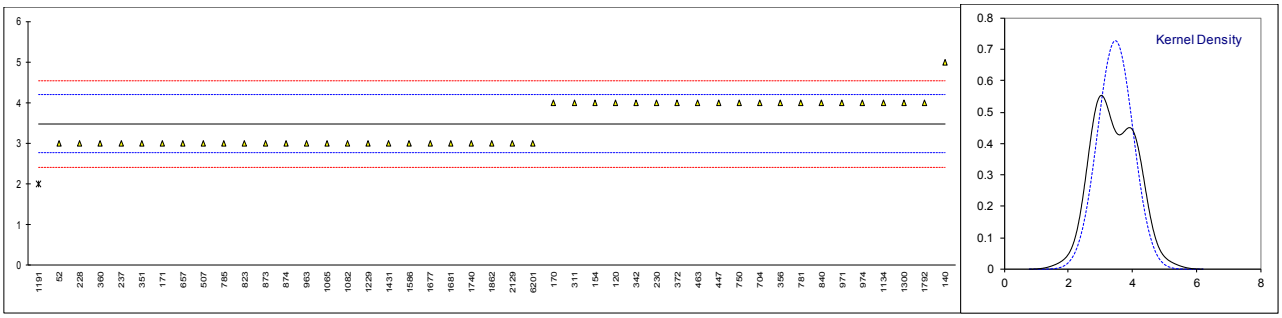


Determination of Compatibility rating on sample #18268;

lab	method	value	mark	z(targ)	remarks
52	D4740	3		-1.34	
120	D4740	4		1.46	
132		-----		-----	
140	D4740	5		4.26	
154	D4740	4		1.46	
170	D4740	4		1.46	
171	D4740	3		-1.34	
225		-----		-----	
228	D4740	3.0		-1.34	
230	D4740	4		1.46	
237	D4740	3		-1.34	
311	D4740	4		1.46	
323		-----		-----	
342	D4740	4		1.46	
351	D4740	3		-1.34	
356	D4740	4		1.46	
360	D4740	3		-1.34	
372	D4740	4		1.46	
445		-----		-----	
447	D4740	4		1.46	
463	D4740	4		1.46	
507	D4740	3		-1.34	
657	D4740	3		-1.34	
704	D4740	4		1.46	
750	D4740	4		1.46	
781	D4740	4		1.46	
785	D4740	3		-1.34	
798		-----		-----	
823	D4740	3		-1.34	
840	D4740	4		1.46	
873	D4740	3		-1.34	
874	D4740	3		-1.34	
963	D4740	3		-1.34	
971	D4740	4		1.46	
974	D4740	4		1.46	
1016		-----		-----	
1065	D4740	3		-1.34	
1082	D4740	3		-1.34	
1134	D4740	4		1.46	
1191	D4740	2	ex	-4.14	excluded as test value is out of range
1229	D4740	3		-1.34	
1300	D4740	4		1.46	
1431	D4740	3		-1.34	
1586	D4740	3		-1.34	
1677	D4740	3		-1.34	
1681	D4740	3		-1.34	
1740	D4740	3		-1.34	
1792	D4740	4		1.46	
1862	D4740	3		-1.34	
1995		-----		-----	
2129	D4740	3		-1.34	
6092		-----		-----	
6201	D4740	3		-1.34	

	normality	OK
	n	44
	outliers	0 + 1ex
	mean (n)	3.5
	st.dev. (n)	0.55
	R(calc.)	1.5
	st.dev.(D4740:04)	0.36
	R(D4740:04)	1

Range rating: 4 ± 1



APPENDIX 2 Analytical details of the determination: Acid Number

lab	End point determination	Volume of the titration solvent
52	---	---
120	---	---
131	---	---
132	---	---
133	---	---
140	Inflection Point	125 mL
150	---	---
158	Inflection Point	60 mL
159	---	---
168	---	---
169	---	---
170	Inflection Point	60 mL
171	---	---
175	---	---
194	---	---
212	Inflection Point	125 mL
225	---	---
230	Inflection Point	125 mL
237	Inflection Point	125 mL
238	---	---
253	---	---
256	Inflection Point	60 mL
273	Inflection Point	60 mL
311	Inflection Point	125 mL
313	---	---
323	---	---
333	Buffer End Point (pH 11)	125 mL
334	Inflection Point	125 mL
336	---	---
337	---	---
339	---	---
342	---	---
349	---	---
351	---	---
356	Inflection Point	125 mL
360	Inflection Point	60 mL
370	---	---
372	Inflection Point	60 mL
444	---	---
445	---	---
447	Inflection Point	125 mL
463	Buffer End Point (pH 11)	125 mL
507	Inflection Point	60 mL
541	---	---
558	---	---
575	Buffer End Point (pH 11)	60 mL
605	---	---
610	---	---
631	---	---
633	Inflection Point	125 mL
634	---	---
657	Inflection Point	125 mL
671	---	---
704	Inflection Point	125 mL
732	---	---
753	---	---
781	Inflection Point	125 mL
798	---	---
823	Inflection Point	125 mL
824	Inflection Point	125 mL
825	---	---
840	Inflection Point	60 mL
842	---	---
873	---	---
874	Buffer End Point (pH 11)	125 mL
887	Buffer End Point (pH 11)	60 mL
902	Inflection Point	125 mL
904	Inflection Point	125 mL
913	---	---
962	---	---
963	Buffer End Point (pH 11)	125 mL
971	Inflection Point	125 mL
974	Inflection Point	125 mL
994	Inflection Point	125 mL
995	Inflection Point	125 mL
996	---	---

lab	End point determination	Volume of the titration solvent
997	---	---
1016	---	---
1040	Inflection Point	60 mL
1065	---	---
1082	---	---
1090	Inflection Point	125 mL
1107	Inflection Point	125 mL
1108	Inflection Point	125 mL
1109	Inflection Point	125 mL
1121	Inflection Point	125 mL
1126	---	---
1134	Inflection Point	125 mL
1191	---	---
1205	---	---
1229	---	---
1275	Inflection Point	125 mL
1299	---	---
1356	Buffer End Point (pH 11)	60 mL
1367	---	---
1381	---	---
1402	Inflection Point	60 mL
1412	---	---
1431	Inflection Point	60 mL
1543	---	---
1585	Inflection Point	125 mL
1586	---	---
1648	---	---
1677	Inflection Point	---
1681	---	---
1710	Inflection Point	125 mL
1720	---	---
1724	---	---
1740	Inflection Point	60 mL
1792	Inflection Point	60 mL
1810	---	---
1811	---	---
1849	---	---
1854	---	---
1857	---	---
1862	Inflection Point	125 mL
1881	---	---
1906	---	---
1942	---	---
1949	Inflection Point	---
1986	Inflection Point	60 mL
2129	Inflection Point	125 mL
6051	---	---
6075	---	---
6092	---	---
6112	---	---
6114	Inflection Point	125 mL
6142	---	---
6154	---	---
6201	Inflection Point	125 mL
6203	---	---

APPENDIX 3

Number of participants per country

Main round

1 lab in ARGENTINA
1 lab in AUSTRALIA
2 labs in AZERBAIJAN
3 labs in BELGIUM
1 lab in BRAZIL
1 lab in BULGARIA
1 lab in CANADA
1 lab in COLOMBIA
1 lab in COTE D'IVOIRE
2 labs in CZECH REPUBLIC
1 lab in DENMARK
1 lab in DJIBOUTI
3 labs in ESTONIA
3 labs in FINLAND
5 labs in FRANCE
2 labs in GEORGIA
1 lab in GERMANY
8 labs in GREECE
1 lab in GUAM
1 lab in HUNGARY
2 labs in INDIA
1 lab in IRELAND
1 lab in ISRAEL
1 lab in KAZAKHSTAN
2 labs in LITHUANIA
2 labs in MALAYSIA
2 labs in MALTA
1 lab in MARTINIQUE
1 lab in MAURITIUS
1 lab in MOROCCO
5 labs in NETHERLANDS
2 labs in NIGERIA
1 lab in NORWAY
1 lab in PANAMA
3 labs in PHILIPPINES
2 labs in PORTUGAL
1 lab in ROMANIA
10 labs in RUSSIAN FEDERATION
2 labs in SAUDI ARABIA
1 lab in SINGAPORE
1 lab in SOUTH AFRICA
3 labs in SOUTH KOREA
5 labs in SPAIN
2 labs in SUDAN
1 lab in SWEDEN
1 lab in TAIWAN
1 lab in TANZANIA
4 labs in TURKEY
1 lab in TURKMENISTAN
2 labs in UKRAINE
2 labs in UNITED ARAB EMIRATES
10 labs in UNITED KINGDOM
14 labs in UNITED STATES OF AMERICA
2 labs in VIETNAM

APPENDIX 4

Abbreviations:

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
E	= possibly an error in calculations
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
SDS	= Safety Data Sheet

Literature:

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018
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3 ASTM E1301:03
4 ISO 5725:86
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7 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
8 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
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11 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
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