Results of Proficiency Test
Gasoil - ASTM (winter)
September 2020

SUMMARY OF CHANGES

This revised report replaces the original report iis20G06ASTM of December 2020.

It was discovered that there was a copy error in the second double table of the parameter Lubricity. The results of the first part of the table were copied to the second part of the table. This resulted in not correctly showing the results of seven participants for this test in the report.
The statistical evaluation for this parameter was done on all reported results and has remained the same.

The following page in this report has been revised:

- Appendix 1: page 63 (page 62 in the original report)

CONTENTS

Appendices:

1   INTRODUCTION

Since 1994 the Institute for Interlaboratory Studies (iis) organizes proficiency scheme for Gasoil twice a year. One round according to EN590 specification and one round according to ASTM D975 (amongst others). During the annual proficiency testing program of 2020/2021, it was decided to continue the proficiency test for the testing of Gasoil winter quality in accordance with the latest applicable version of ASTM D975 and Colonial Pipeline specification.

In this interlaboratory study registered for participation:
-       174 laboratories in 73 different countries for Gasoil ASTM (summer) iis20G06ASTM
-       35 laboratories in 25 different countries for Cetane Number iis20G06CN
-       55 laboratories in 35 different countries for Total Contamination iis20G06TC
-       49 laboratories in 28 different countries registered for Oxidation Stability iis20G06OX.

In this interlaboratory study a total of 181 participants in 75 different countries registered for participation. See appendix 2 for the number of participants per country.
In this report the results of this Gasoil ASTM proficiency tests are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2   SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory. In this proficiency test the participants received depending on the registration from one to four different samples of Gasoil, see table below for an overview.

Samples	Purpose
#20170: 1x 1L + 1x 0.5L	Regular analyzes
#20171: 4x 1L	Cetane Number & DCN
#20172: 1x 1L	Total Contamination
#20173: 1x 1L	Oxidation Stability

Table 1: Gasoil samples used in PT iis20G06

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

2.2   PROTOCOL

The protocol followed in the 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 the preparation of the sample for the regular Gasoil PT a batch of approximately 400 liters of Gasoil was purchased from the local market and spiked with Thiophene especially for the Sulphur determination. After homogenisation 225 amber glass bottles of 1L and 225 amber glass bottles of 0.5L were filled and both were labelled #20170.
The homogeneity of the subsamples was checked by the determination of Density in accordance with ASTM D4052 on 10 stratified randomly selected subsamples (5 from the 1L and 5 from the 0.5L subsamples).

	Density at 15°C in kg/m^3		Density at 15°C in kg/m^3
sample #20170-1	837.35	sample #20170-6	837.35
sample #20170-2	837.35	sample #20170-7	837.35
sample #20170-3	837.35	sample #20170-8	837.35
sample #20170-4	837.35	sample #20170-9	837.35
sample #20170-5	837.35	sample #20170-10	837.35

Table 2: homogeneity test results of subsamples #20170

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

	Density at 15°C in kg/m^3
r (observed)	0.00
reference test method	ASTM D4052:18a
0.3 x R (reference test method)	0.15

Table 3: evaluation of the repeatability of subsamples #20170

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

For the PT on Cetane Number approximately 400 liters was purchased from the local market. After homogenisation 240 amber glass bottles of 1L were filled and labelled #20171.
The homogeneity of the subsamples was checked by the determination of Density in accordance with ASTM D4052 on 10 stratified randomly selected subsamples.

	Density at 15°C in kg/m^3		Density at 15°C in kg/m^3
sample #20171-1	837.37	sample #20171-6	837.38
sample #20171-2	837.40	sample #20171-7	837.38
sample #20171-3	837.38	sample #20171-8	837.37
sample #20171-4	837.38	sample #20171-9	837.38
sample #20171-5	837.37	sample #20171-10	837.38

Table 4: homogeneity test results of subsamples #20171

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

	Density at 15°C in kg/m^3
r (observed)	0.02
reference test method	ASTM D4052:18a
0.3 x R (reference test method)	0.15

Table 5: evaluation of the repeatability of subsamples #20171

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

For the PT on Total Contamination in Gasoil approximately 100 liters from the same batch as used for the PT on Cetane Number was selected. A defined volume of fresh prepared and well shaken dust suspension of Arizona Dust material in an oil suspension was added to an empty bottle by means of a calibrated pipette. The addition was checked by weighing the bottle before and after addition. In total 82 bottles were prepared and subsequently filled up with 1L from this batch of Gasoil and subsequently homogenized. The subsamples are labelled #20172. The addition of Arizona Dust material was to give a Total Contamination of at least 15 mg/kg.

Approximately 90 liters of Gasoil was purchased from the local market. The batch Gasoil was made positive for Oxidation Stability by adding a copper rod for a while to enhance the oxidation of Gasoil. After homogenisation 84 amber glass bottles of 1 liter were filled and labelled #20173. The homogeneity of the subsamples was checked by the determination of Density in accordance with ASTM D4052 on 8 stratified randomly selected subsamples.

	Density at 15°C in kg/m³		Density at 15°C in kg/m³
sample #20173-1	840.73	sample #20173-5	840.73
sample #20173-2	840.73	sample #20173-6	840.73
sample #20173-3	840.73	sample #20173-7	840.73
sample #20173-4	840.73	sample #20173-8	840.73

Table 6: homogeneity test results of subsamples #20173

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

	Density at 15°C in kg/m³
r (observed)	0.00
reference test method	ASTM D4052:18a
0.3 x R (reference test method)	0.15

Table 7: evaluation of the repeatability of subsamples #20173

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

Depending on the registration of the participant the appropriate set of PT samples was sent on September 2, 2020. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

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

2.6 ANALYZES

The participants were requested to determine on the samples of #20170: Total Acid number, API Gravity, Aromatics by FIA, Ash content, Calculated Cetane Index (D976 and D4737), Cloud Point, Cold Filter Plugging Point (CFPP), Color ASTM, Conradson Carbon Residue (micro method), Ramsbottom Carbon Residue, Copper Corrosion 3hrs at 50°C , Density at 15°C, Distillation at 760 mmHg (IBP, 10%, 50%, 90%, 95% recovered, FBP, volume at 250°C and 350°C), FAME content, Flash Point PMcc, Kinematic Viscosity at 40°C, Lubricity by HFRR, Nitrogen, Pour Point (manual and/or automated), Total Sulfur, Water and Water & Sediment (D2709 and D1796).
On the samples of #20171 was requested to determine: Cetane Number and Derived Cetane number (D6890 and D7668).
On sample #20172 was requested to determine: Particulate Contamination (D6217) and Total Contamination (EN12662).
On sample #20173 was requested to determine: Oxidation Stability (Filterable Insolubles, Adherent Insolubles and Total Insolubles).

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 calculations.

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

3   RESULTS

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

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

3.1   STATISTICS

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5).
For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as '<…' or '>…' were not used in the statistical evaluation.
First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test, a variant of the Kolmogorov-Smirnov test and by the calculation of skewness and kurtosis. Evaluation of the three normality indicators in combination with the visual evaluation of the graphic Kernel density plot, lead to judgement of the normality being either 'unknown', 'OK', 'suspect' or 'not OK'. After removal of outliers, this check was repeated. If a data set does not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

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

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

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

3.2   GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis.

The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.

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

3.3   Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ISO or ASTM reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation in this interlaboratory study.
The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used. 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:

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

The $z_{(target)}$ scores are listed in the result tables of 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

Some problems were encountered with the dispatch of the samples due to COVID-19 pandemic. Therefore, the reporting time on the data entry portal was extended with one week.
For the PT with the regular analyzes: thirty participants did not report any test results at all and eight participants reported the test results after the extended final reporting date.
For the PT on Cetane Number: seven participants did not report any test results at all and one participant reported the test results after the extended final reporting date.
For the PT on Total Contamination: fourteen participants did not report any test results at all and one participant reported the test results after the extended final reporting date.
For the Oxidation Stability PT: sixteen participants did not report any test results at all and two participants reported the test results after the extended final reporting date.

Finally, in total 151 participants reported in total 2691 numerical test results. Observed were 67 outlying test results, which is 2.5%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

Not all original data sets proved to have a normal Gaussian distribution. These are referred to as "not OK" or "suspect". The statistical evaluation of these data sets should be used with due care.

4.1 EVALUATION PER SAMPLE AND PER TEST

In this section the reported test results are discussed per sample and per test. The test methods which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the reported test results. The abbreviations, used in these tables, are explained in appendix 4.

In the iis PT reports ASTM test methods are referred to with a number (e.g. D976) and an added designation for the year that the test method was adopted or revised (e.g. D976:06).

If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D976:06 (2016)). In the test results tables of appendix 1 only the test method number and year of adoption (e.g. D976:06) will be used.

Sample #20170

Total Acid Number: 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 D974:14e2.

API Gravity: 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 ASTM D1298:12b(2017).

Aromatics by FIA: This determination was not problematic. No statistical outliers were observed, but one test result was excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ASTM D1319:20a.
One should be aware that this Gasoil does not meet the scope of ASTM D1319 with regards to the boiling range.

Ash content: This determination was not problematic. All reporting paricipants except one agreed the concentration was near or below the application range of the test method. In ASTM D482:19 the minimum value of the application rate was raised to 0.010%M/M, whereas it was 0.001%M/M in earlier versions of the method.

CCI D976:   This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D976:06(2016) and ASTM D976:80(1990)e1. The specification for Gasoil ASTM D975:20a table 1 refers to the version from 1980.
Differences in calculation were found for six laboratories. The calculation of iis is done according to ASTM D976:06(2016), paragraph 4.1 Formula 2 (based on Density at 15°C and Mid-boiling Temperature in °C).

CCI D4737:   Regretfully, no reproducibility is mentioned in procedure A of ASTM D4737:10(2016) nor in the equivalent test methods ISO4262:2007(E) and IP380. Therefore, iis has estimated a reproducibility for Calculated Cetane Index by Four Variable Equation based from previous iis PTs (see iis memo 1904, lit. 17). This reproducibility has been used for the evaluation.
This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is full in agreement with the reproducibility of iis memo 1904.

Cloud Point: This determination was problematic for some laboratories. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D2500:17a.

CFPP: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D6371:17a or EN116:15.
Also, when the test results from ASTM D6371 and IP309/EN116 were evaluated separately, both the calculated reproducibilities are still not in agreement with the requirements of the corresponding reference test methods.

Color ASTM: 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 D1500:12(2017). Please note: The test values reported as "text", e.g. L1.5, were converted to a numerical value (L1.5 to 1.25, see also appendix 1) before calculating the z-scores.

Conradson CR: This determination was not problematic. No statistical outliers were observed. However, the calculated reproducibility is in full agreement with the requirements of ASTM D189:06(2019).

Ramsbottom CR: This determination may not be problematic. Ten participants reported a test result and all except one agreed on a result of <0.1%M/M.

Copper Corrosion: This determination was not problematic. All reporting participants agreed on a result of 1 (1a/1b).

Density at 15°C: This determination was problematic for a number of laboratories. Nine statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D4052:18a.

Distillation at 760 mmHg: This determination was problematic depending on the parameter and the mode used. In total fifteen statistical outliers were observed over eight parameters and two other test result were excluded. However, all calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of ASTM D86:20b automated mode, except the Temperature at 10% recovered. When evaluated against the ASTM D86:20b manual mode the calculated reproducibilities of IBP, Temperature at 10% recovered, 90% recovered, 95% recovered and FBP after rejection of the suspect data are not in agreement.

FAME content: This determination was problematic depending on the test method used. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D7371:14 but not with the requirements of EN14078:14 (A or B mode).
A possible explanation for the lesser performance of EN14078 may be found in the cells used for the determination. The cell length has to be exactly determined and preferably the same cells should be used for both calibration and determination. More information can be found in clause 7.1 Selection and treatment of the cell of EN14078.

Flash Point PMcc: 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 D93-A:20.

Kinematic Viscosity at 40°C: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ASTM D445:19a.

Lubricity: 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 D6079:18 and ISO12156-1:16 (method A or B).
When the test results from ASTM D6079 and ISO12156/IP450 were evaluated separately, the calculated reproducibility is also in agreement with the requirements of the respective test methods.

Nitrogen: This determination was very problematic. No statistical outliers were observed. However, the calculated reproducibility is not at all in agreement with the requirements of ASTM D4629:17.
A common source for deviations is that the standard density at 15°C is used and not the actual sample temperature with volumetric sampling.

Pour Point: The determination was not problematic for the manual mode. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D97:17b.
Also for the automated mode the determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of ASTM D5950:14(2020).

Total Sulfur: This determination was problematic for some laboratories. Six statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5453:19a.

Water: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of the ASTM D6304-A:16e1.

Water and Sediment (D2709): This determination was not problematic. All reporting laboratories agreed on a test result of <0.05%V/V. Therefore, no z-scores were calculated.

Water and Sediment (D1796): This determination was not problematic. All reporting laboratories agreed on a test result of <0.1%V/V. Therefore, no z-scores were calculated.

Sample #20171

CN - D613:   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 D613:18a.

DCN - D6890:   This determination was problematic. One statistical outlier was observed. The calculated reproducibility for Derived Cetane Number (DCN) and for Ignition Delay (ID) after rejection of the statistical outlier is not in agreement with the requirements of ASTM D6890:18.

DCN - D7668:   This determination was problematic depending on the parameter. Two statistical outliers were observed and one other test result was excluded. The calculated reproducibility for DCN and for Combustion Delay (CD) is in agreement with the requirements of ASTM D7668:17. The calculated reproducibility for Ignition Delay (ID) is not in agreement with the requirements of ASTM D7668:17.

Sample #20172

Particulate Contamination: This determination was very problematic. Only six participants reported test results. As the calculated reproducibility is not at all in agreement with the requirements of ASTM D6217:18, no z-scores were calculated.

Total Contamination: This determination was problematic. No statistical outliers were observed and one other test result was excluded. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of EN12662:14.

Sample #20173

Filterable Insolubles (A): This determination was problematic for a number of laboratories at this low level of 0.20 mg/100mL.Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with ASTM D2274:14(2019).

Adherent Insolubles Insolubles (B): This determination was problematic for a number of labortoeies at this low level of 0.17 mg/100mL. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with ASTM D2274:14(2019).

Total Insolubles (A+B): This determination was not problematic at this low level of 0.31 mg/100mL. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with ASTM D2274:14(2019).

4.2   PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Acid Number	mgKOH/g	74	0.03	0.03	0.04
API Gravity		73	37.39	0.14	0.3
Aromatics by FIA	%V/V	21	22.0	4.1	3.7
Ash content	%M/M	88	<0.01	n.e.	n.e.
Calc. Cetane Index ASTM D976		77	51.1	0.7	2
Calc. Cetane Index ASTM D4737		92	50.9	0.9	0.9
Cloud Point	°C	111	-7.2	2.8	4
Cold Filter Plugging Point	°C	89	-22.1	5.7	4.8
Color ASTM scale		109	1.1	0.6	1
Conradson Carbon Residue	%M/M	48	0.02	0.03	0.03
Ramsbottom Carbon Residue	%M/M	9	<0.1	n.e.	n.e.
Copper Corrosion 3hrs at 50°C		101	1 (1a/1b)	n.a.	n.a.
Density at 15°C	kg/m^3	126	837.3	0.2	0.5
Initial Boiling Point	°C	119	165.9	9.5	9.1
Temp at 10% recovery	°C	121	206.5	5.5	4.5
Temp at 50% recovery	°C	119	265.6	3.1	3
Temp at 90% recovery	°C	122	335.7	4.8	5.0
Temp at 95% recovery	°C	119	350.5	7.0	8.6
Final Boiling Point	°C	120	358.7	5.8	7.1
Volume at 250°C	%V/V	107	39.1	2.5	2.7
Volume at 350°C	%V/V	107	94.9	1.8	2.7
FAME content	%V/V	49	3.2	0.5	0.9
Flash Point PMcc	°C	132	58.7	4.0	4.2

Parameter	unit	n	average	2.8 * sd	R(lit)
Kinematic Viscosity at 40°C	mm²/s	113	2.688	0.030	0.030
Lubricity by HFRR at 60°C	µm	48	188	38	80
Nitrogen	mg/kg	33	26.8	9.0	4.4
Pour Point, Manual	°C	57	-32.9	4.0	9
Pour Point, Automated	°C	36	-32.5	5.9	6.1
Total Sulfur	mg/kg	94	18.8	5.3	5.2
Water	mg/kg	101	60.8	40.5	198.5
Water and Sediment (D2709)	%V/V	46	<0.05	n.e.	n.e.
Water and Sediment (D1796)	%V/V	26	<0.1	n.e.	n.e.

Table 8: reproducibilities of tests on sample #20170

Parameter	unit	n	average	2.8 * sd	R(lit)
Cetane Number		16	52.7	3.0	4.4
DCN (D6890)		5	52.6	2.7	2.4
Ignition Delay (D6890)		3	3.9	0.4	0.2
DCN (D7668)		8	53.2	1.1	1.5
Ignition Delay (D7668)		8	2.9	0.3	0.2
Combustion Delay (D7668)		8	4.5	0.1	0.1

Table 9: reproducibilities of tests on sample #20171

Parameter	unit	n	average	2.8 * sd	R(lit)
Particulate Contamination	mg/L	6	(9.5)	(13.5)	(3.5)
Total Contamination	mg/kg	32	20.4	13.3	7.5

Table 10: reproducibilities of tests on sample #20172

Parameter	unit	n	average	2.8 * sd	R(lit)
Oxidation Stab. Filt. Insol. A	mg/100mL	24	0.2	0.6	0.6
Oxidation Stab. Adher. Insol B	mg/100mL	24	0.2	0.6	0.6
Oxidation Stab. Tot. Insol. (A+B)	mg/100mL	28	0.3	0.8	0.8

Table 11: reproducibilities of tests on sample #20173

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

4.3 COMPARISON OF THE INTERLABORATORY STUDY OF SEPTEMBER 2020 WITH PREVIOUS PTS

	September 2020	September 2019	September 2018	September 2017	September 2016
Number of reporting laboratories	151	165	170	181	199
Number of test results	2691	3201	3027	3341	3721
Number of statistical outliers	67	62	84	83	61
Percentage of statistical outliers	2.5%	1.9%	2.8%	2.5%	1.6%

Table 12: 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.

Parameter	September 2020	September 2019	September 2018	September 2017	September 2016
Total Acid Number	+	+	++	++	++
API Gravity	++	++	n.e	n.e	n.e
Aromatics by FIA	+/-	+/-	-	-	-
Ash content	n.e.	++	++	(++)	(++)
Calc. Cetane Index ASTM D976	++	++	++	++	++
Calc. Cetane Index ASTM D4737	+/-	+	n.e	n.e	n.e
Cloud Point	+	+	+	++	++
Cold Filter Plugging Point	-	-	--	--	-
Color ASTM scale	+	+	++	++	++
Conradson Carbon Residue	+/-	+/-	+/-	+	+
Ramsbottom Carbon Residue	n.e.	+/-	--	+/-	-
Density at 15°C	++	+	+	++	+
Distillation at 760 mmHg	+	+	+	+	+
FAME content	+	+	+	++	++
Flash Point PMcc	+/-	+/-	+/-	+	+/-
Kinematic Viscosity at 40°C	+/-	+/-	+/-	+/-	-
Lubricity by HFRR at 60°C	++	+	-	++	-
Nitrogen	--	-	--	-	-
Pour Point (Manual and Auto)	+	+	+	++	++
Total Sulfur	+/-	+	+/-	+	+
Water	++	++	++	++	++
Cetane Number	+	+	+	+/-	+
DCN (D6890)	-	+	+	(--)	+/-
DCN (D7668)	+/-	--	+	+	-

Parameter	September 2020	September 2019	September 2018	September 2017	September 2016
Particulate Contamination mg/L	(--)	(--)	-	--	-
Total Contamination mg/kg	-	-	-	-	+/-
Oxidation Stability	+/-	+	+	+	+/-

Table 13: comparison determinations against the reference test method

No z-scores were calculated for determinations reported between brackets

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 similar to the reference test method
- -   :   group performed worse than the reference test method
- --   :   group performed much worse than the reference test method
- n.e.   :   not evaluated

APPENDIX 1

Determination of Total Acid Number on sample #20170; results in mgKOH/g

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D974	0.03		-0.05	781		-----		-----
53		-----		-----	785		-----		-----
62	D974	0.02		-0.75	798		-----		-----
90		-----		-----	825	D974	0.028		-0.19
92	D974	0.014		-1.17	851	D664-A	0.04		0.65
120	D664-A	0.016		-1.03	854	D664-A	<0.1		-----
140		-----		-----	856	D974	0.04		0.65
150		-----		-----	862	D974	0.030		-0.05
158	D664-A	0.10	R(0.01)	4.85	863	D974	0.038		0.51
159		-----		-----	864	D974	0.04		0.65
169		-----		-----	872		-----		-----
171	D974	0.03		-0.05	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904	D664-A	0.035		0.30
217	D974	0.044		0.93	912		-----		-----
221		-----		-----	913		-----		-----
224		-----		-----	914		-----		-----
225	D974	0.02		-0.75	922	D664-A	0.035		0.30
228	D974	0.0139		-1.18	962		-----		-----
230	D664-A	0.0255		-0.37	963		-----		-----
237	D974	0.047		1.14	970	D664-A	0.029		-0.12
238	D974	0.021		-0.68	971	D664-A	0.028		-0.19
253	D974	0.03		-0.05	974	D974	0.031		0.02
254	D974	0.03		-0.05	988		-----		-----
256	D974	0.03		-0.05	994	D974	0.03		-0.05
258		-----		-----	995	D974	0.031		0.02
273	D974	0.032		0.09	996		-----		-----
312	D974	0.035		0.30	997	D974	0.032		0.09
317	D974	0.03		-0.05	998		-----		-----
323	D974	0.02		-0.75	1006		-----		-----
333		-----		-----	1011		-----		-----
334	D974	0.026		-0.33	1016	ISO6618	0.03397		0.23
335		-----		-----	1026	D664-A	0.033		0.16
336		-----		-----	1059		-----		-----
337		-----		-----	1105	D974	0.0313		0.04
339		-----		-----	1109	D974	0.032		0.09
342	D664-A	0.03		-0.05	1121		-----		-----
343	D664-A	<0.1		-----	1126		-----		-----
344		-----		-----	1134		-----		-----
349	D664-A	0.01		-1.45	1135	D664-A	0.02		-0.75
353		-----		-----	1140	IP139	0.025		-0.40
355		-----		-----	1146		-----		-----
356	D974	0.03		-0.05	1162	D974	0.025		-0.40
381		-----		-----	1171		-----		-----
433		-----		-----	1182		-----		-----
463	D974	0.035		0.30	1213	D974	0.0275		-0.23
485		-----		-----	1227	D664-A	0.03		-0.05
495	D664-A	0.051		1.42	1277		-----		-----
498		-----		-----	1284		-----		-----
507		-----		-----	1297	D664-A	0.01		-1.45
511		-----		-----	1299	D664-A	0.02		-0.75
529	D664-A	0.02325		-0.52	1356	D664-A	<0.05		-----
541	D974	<0.05		-----	1357		-----		-----
551		-----		-----	1389		-----		-----
554		-----		-----	1412	D664-A	0.03		-0.05
555		-----		-----	1417	D664-A	0.033		0.16
558		-----		-----	1430		0.02		-0.75
562	D664-A	<0.1		-----	1431	D664-A	0.0219		-0.62
575	D664-A	0.035		0.30	1433		-----		-----
603		-----		-----	1441		-----		-----
604		-----		-----	1498		-----		-----
608	D664-A	0.045		1.00	1575		-----		-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616	D974	0.022		-0.61
631	D974	0.041		0.72	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D974	0.04		0.65	1643	D664-A	0.019		-0.82
732		-----		-----	1720	D974	0.035		0.30
733		-----		-----	1724	D664-A	0.02		-0.75
750		-----		-----	1740	D664-A	0.04		0.65

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807	D664-A	0.03		-0.05	6201	D664-A	0.02		-0.75
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944		-----		-----	6258	D974	0.02		-0.75
1967	D664-A	0.0407		0.70	6262	D664-A	0.0354		0.33
6026	D664	0.0315		0.05	6266		-----		-----
6034		-----		-----	6272	D974	0.050		1.35
6049	D664-A	0.05		1.35	6291	D974	0.05		1.35
6054	D974	0.055		1.70	6317		-----		-----
6057	D664-A	<0,05		-----	6319		-----		-----
6103		-----		-----	6341		-----		-----
6142	ISO6618	0.04		0.65	6346		-----		-----

normality	OK
n	74
outliers	1
mean (n)	0.0307
st.dev. (n)	0.00976
R(calc.)	0.0273
st.dev.(D974:14e2)	0.01429
R(D974:14e2)	0.04
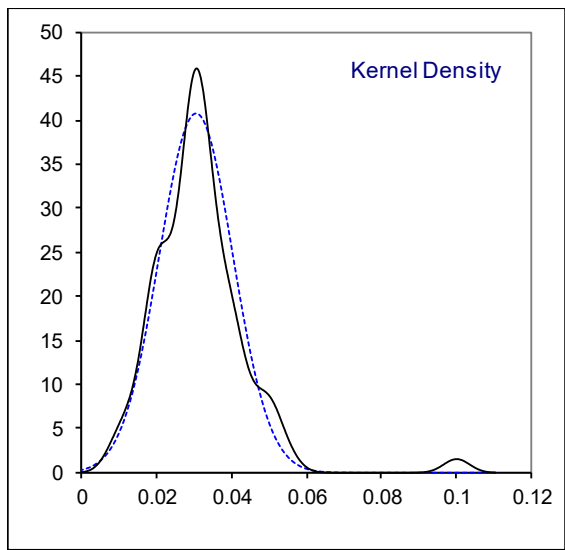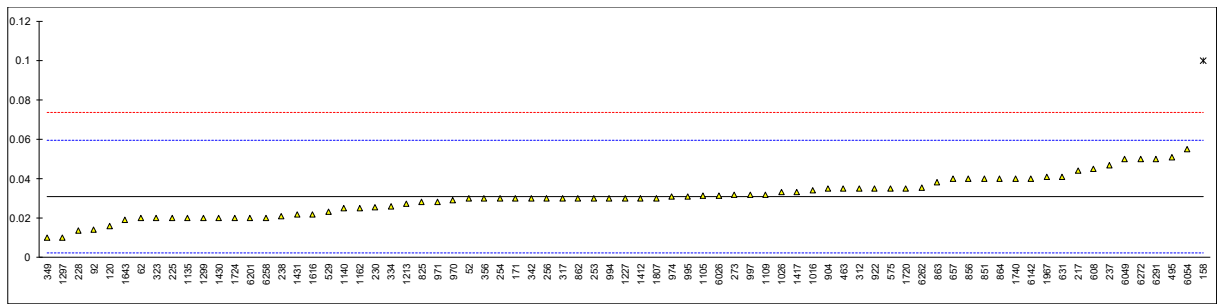
Determination of API Gravity on sample #20170;

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4052	37.4		0.08	781		-----		-----
53		-----		-----	785		-----		-----
62	D4052	37.4		0.08	798		-----		-----
90	D4052	37.40		0.08	825	D1298	37.41		0.17
92	D4052	37.5		1.01	851		-----		-----
120	D4052	37.36		-0.30	854	D4052	37.4		0.08
140	D4052	37.4		0.08	856	D1298	37.4		0.08
150		-----		-----	862	D1298	37.31		-0.76
158	D4052	37.4		0.08	863	D4052	37.39		-0.02
159		-----		-----	864	D4052	37.4		0.08
169	D4052	37.4		0.08	872		-----		-----
171	D1298	37.4		0.08	873		-----		-----
175	D4052	37.40		0.08	874		-----		-----
186		-----		-----	886		-----		-----
203	Calculated	37.54		1.38	887		-----		-----
215		-----		-----	904	D1298	37.28		-1.04
217	D4052	37.41		0.17	912	D1298	37.39		-0.02
221		-----		-----	913	D1298	37.4		0.08
224	D1298	37.39		-0.02	914		-----		-----
225	D4052	37.4		0.08	922	D4052	37.4		0.08
228	D4052	37.32		-0.67	962		-----		-----
230		-----		-----	963		-----		-----
237	D4052	37.32		-0.67	970	D4052	37.41		0.17
238	D4052	37.48		0.82	971	D4052	37.41		0.17
253	D4052	37.41		0.17	974	Calculation	37.41		0.17
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995	D1298	37.39		-0.02
273	D4052	37.4	C	0.08	996		-----		-----
312	D4052	37.43	C	0.36	997	D1298	37.39		-0.02
317	D1298	37.6	R(0.01)	1.94	998	D1298	37.34		-0.48
323	D1298	37.41		0.17	1006		-----		-----
333		-----		-----	1011		-----		-----
334		-----		-----	1016		-----		-----
335		-----		-----	1026		-----		-----
336		-----		-----	1059		-----		-----
337		-----		-----	1105	D4052	37.39		-0.02
339		-----		-----	1109		-----		-----
342		-----		-----	1121	D4052	37.31		-0.76
343		-----		-----	1126		-----		-----
344		-----		-----	1134		-----		-----
349		-----		-----	1135	D4052	37.38		-0.11
353		-----		-----	1140		-----		-----
355	D4052	37.39		-0.02	1146		-----		-----
356	D4052	37.39		-0.02	1162	D4052	37.41		0.17
381	ISO12185	37.5		1.01	1171		-----		-----
433		-----		-----	1182		-----		-----
463	ISO12185	37.398		0.06	1213		-----		-----
485		-----		-----	1227	D1298	37.3		-0.86
495	D1298	37.4		0.08	1277		-----		-----
498		-----		-----	1284		-----		-----
507	D1298	37.5		1.01	1297	D4052	37.31		-0.76
511		-----		-----	1299		-----		-----
529	D4052	37.40		0.08	1356		-----		-----
541	D4052	37.39		-0.02	1357	D1298	37.4		0.08
551		-----		-----	1389		-----		-----
554		-----		-----	1412	D4052	37.40		0.08
555		-----		-----	1417		-----		-----
558		-----		-----	1430		-----		-----
562	D1298	37.4		0.08	1431	D4052	37.33		-0.58
575	D1298	37.7	R(0.01)	2.88	1433		-----		-----
603		-----		-----	1441	D1298	37.37		-0.20
604	D4052	37.33		-0.58	1498	D4052	37.4		0.08
608	D4052	37.48		0.82	1575		-----		-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616	Calculated	37.39		-0.02
631	D1298	37.4		0.08	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D4052	37.4		0.08	1643		-----		-----
732	ISO12185	37.31		-0.76	1720		-----		-----
733	ISO12185	37.31		-0.76	1724	D4052	37.38		-0.11
750		-----		-----	1740	D1298	37.395		0.03

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807		-----		-----	6201	D1298	37.31		-0.76
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944		-----		-----	6258		-----		-----
1967	D1298	37.39		-0.02	6262	D4052	37.40		0.08
6026	D1298	37.49		0.92	6266		-----		-----
6034		-----		-----	6272	D1298	37.80	R(0.01)	3.81
6049	D4052	37.415		0.22	6291	D1298	37.41		0.17
6054		-----		-----	6317	D4052	37.33		-0.58
6057		-----		-----	6319		-----		-----
6103		-----		-----	6341		-----		-----
6142		-----		-----	6346		-----		-----

normality	suspect	
n	73	
outliers	3	
mean (n)	37.392	
st.dev. (n)	0.0495	
R(calc.)	0.139	
st.dev.(D1298:12b)	0.1071	
R(D1298:12b)	0.3	

Lab 273 first reported: 36.8
Lab 312 first reported: 36.71

Kernel Density
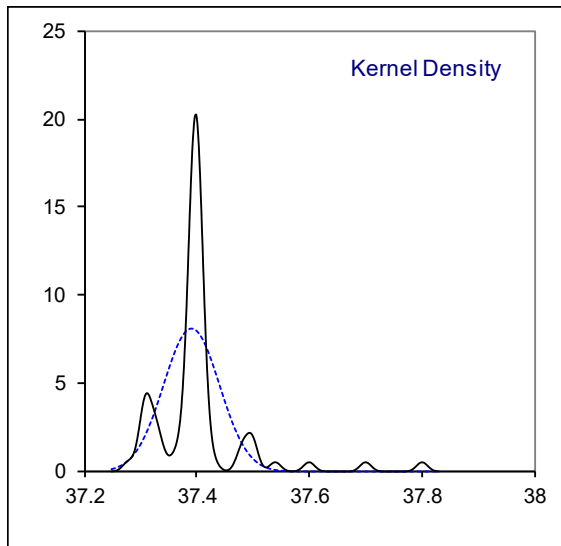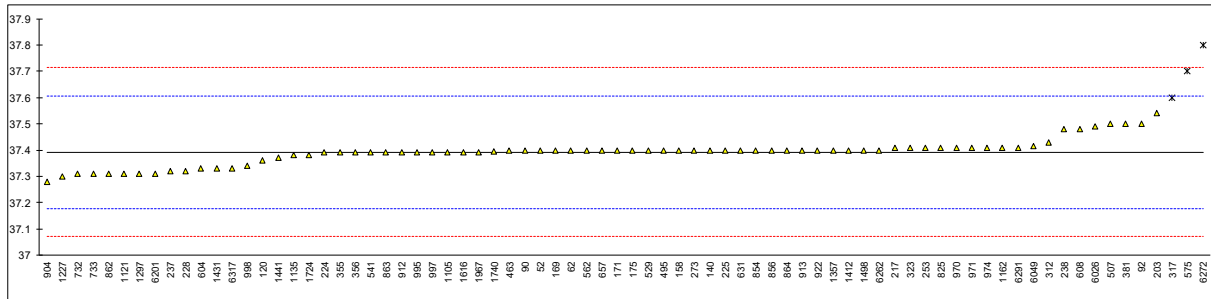
Determination of Aromatics by FIA (without oxygenates correction) on sample #20170; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	781		-----		-----
53		-----		-----	785		-----		-----
62	D1319	25.0		2.27	798		-----		-----
90		-----		-----	825		-----		-----
92		-----		-----	851		-----		-----
120		-----		-----	854	D6591	22.3		0.23
140		-----		-----	856	D6591	21.7		-0.22
150		-----		-----	862	D1319	21.6		-0.30
158		-----		-----	863	IP391	22.48	ex	0.37
159		-----		-----	864	D1319	21.7		-0.22
169		-----		-----	872		-----		-----
171		-----		-----	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904		-----		-----
217		-----		-----	912		-----		-----
221		-----		-----	913		-----		-----
224		-----		-----	914		-----		-----
225		-----		-----	922	D1319	21.3		-0.53
228		-----		-----	962		-----		-----
230	D1319	22.71		0.54	963		-----		-----
237	D1319	23.2		0.91	970		-----		-----
238		-----		-----	971	D1319	22.5		0.38
253	D1319	22.50		0.38	974		-----		-----
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995	D1319	20.9		-0.83
273		-----		-----	996		-----		-----
312		-----		-----	997		-----		-----
317		-----		-----	998		-----		-----
323	D1319	20.8		-0.90	1006		-----		-----
333		-----		-----	1011		-----		-----
334		-----		-----	1016		-----		-----
335		-----		-----	1026		-----		-----
336		-----		-----	1059		-----		-----
337		-----		-----	1105		-----		-----
339		-----		-----	1109	D1319	23.82		1.38
342		-----		-----	1121		-----		-----
343	D1319	23.3		0.99	1126		-----		-----
344		-----		-----	1134		-----		-----
349		-----		-----	1135		-----		-----
353		-----		-----	1140		-----		-----
355		-----		-----	1146		-----		-----
356		-----		-----	1162		-----		-----
381		-----		-----	1171	D1319Mod.	23.35		1.02
433		-----		-----	1182		-----		-----
463		-----		-----	1213		-----		-----
485		-----		-----	1227		-----		-----
495		-----		-----	1277		-----		-----
498		-----		-----	1284		-----		-----
507		-----		-----	1297		-----		-----
511		-----		-----	1299		-----		-----
529		-----		-----	1356		-----		-----
541		-----		-----	1357	D1319	19.0		-2.27
551		-----		-----	1389		-----		-----
554		-----		-----	1412		-----		-----
555		-----		-----	1417		-----		-----
558		-----		-----	1430		-----		-----
562		-----		-----	1431		-----		-----
575		-----		-----	1433		-----		-----
603		-----		-----	1441		-----		-----
604		-----		-----	1498		-----		-----
608	D1319	22.0		0.00	1575		-----	W	-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616		-----		-----
631		-----		-----	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		20.6		-1.06
657	D1319	20.6		-1.06	1643		-----		-----
732		-----		-----	1720		-----		-----
733		-----		-----	1724		-----		-----
750		-----		-----	1740		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807		-----		-----	6201	D1319	23.35		1.02
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D1319	19.68		-1.75	6258		-----		-----
1967		-----		-----	6262		-----		-----
6026		-----		-----	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049		-----		-----	6291		-----		-----
6054		-----		-----	6317		-----		-----
6057		-----		-----	6319		-----		-----
6103		-----		-----	6341		-----		-----
6142		-----		-----	6346		-----		-----

normality	OK
n	21
outliers	0 (+1ex)
mean (n)	21.996
st.dev. (n)	1.4485
R(calc.)	4.056
st.dev.(D1319:20a)	1.3214
R(D1319:20a)	3.7

Lab 863 is excluded because the result was reported in %M/M
Lab 1575 test result withdrawn, first reported: 27.4

Kernel Density
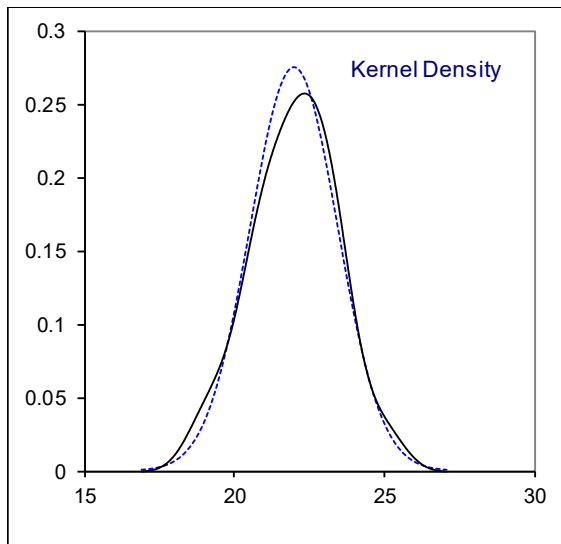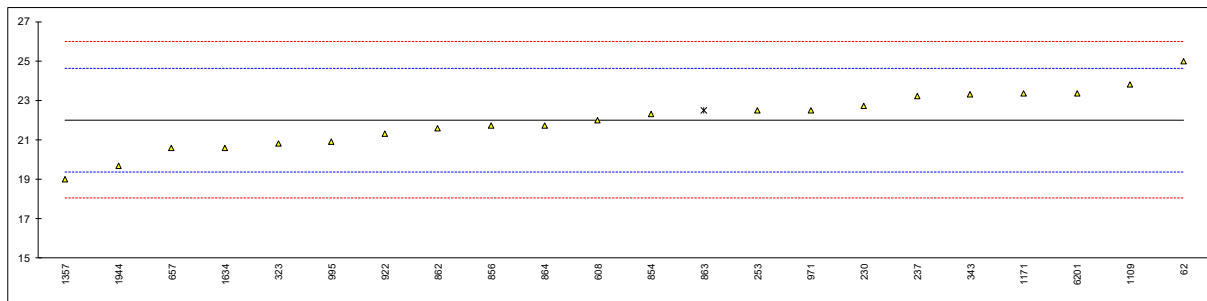
Determination of Ash content on sample #20170; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D482	<0.010		-----	781		-----		-----
53		-----		-----	785		-----		-----
62	D482	<0.001		-----	798		-----		-----
90	D482	0		-----	825	D482	L0.001		-----
92	D482	<0.001		-----	851	ISO6245	0.004		-----
120	D482	<0.010		-----	854	D482	<0.010		-----
140	D482	<0.010		-----	856	ISO6245	<0.001		-----
150		-----		-----	862	D482	<0.001		-----
158	D482	<0.001		-----	863	D482	<0.01		-----
159		-----		-----	864	D482	<0.001		-----
169	D482	0.0		-----	872		-----		-----
171	D482	<0.010		-----	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904	D482	0.001		-----
217	D482	0.00079		-----	912		-----		-----
221	D482	<0,01		-----	913	D482	<0.01		-----
224	D482	0.000035		-----	914		-----		-----
225	D482	0.001		-----	922	D482	<0.01		-----
228	D482	0.0006		-----	962		-----		-----
230	D482	0.0004		-----	963		-----		-----
237	D482	<0.01		-----	970	D482	0.0008		-----
238		-----		-----	971	D482	0.0005		-----
253		-----		-----	974	D482	0.0008		-----
254	D482	0.0009		-----	988		-----		-----
256	D482	0.0007		-----	994		-----		-----
258		-----		-----	995	D482	0.0008		-----
273	D482	<0.01		-----	996		-----		-----
312		-----		-----	997	D482	0.008		-----
317	D482	<0.001		-----	998	D482	0.0006		-----
323	D482	< 0.001		-----	1006		-----		-----
333		-----		-----	1011		-----		-----
334	D482	0.0003		-----	1016	D482	0.000		-----
335		-----		-----	1026	D482	<0.01		-----
336		-----		-----	1059	ISO6245	<0,001		-----
337		-----		-----	1105	D482	<0.01		-----
339		-----		-----	1109	D482	0.0000		-----
342	ISO6245	0.0001		-----	1121	D482	<0.001		-----
343	D482	<0.010		-----	1126		-----		-----
344	D482	0.00095		-----	1134		-----		-----
349		-----		-----	1135	ISO6245	< 0,001		-----
353	IP4	0.0002		-----	1140	IP4	<0.001		-----
355		-----		-----	1146	D482	0.0000		-----
356	D482	Below 0.010		-----	1162	D482	0.0022		-----
381		-----		-----	1171	ISO6245	0.0017		-----
433		-----		-----	1182		-----		-----
463	D482	<0,001		-----	1213	D482	< 0.005		-----
485		-----		-----	1227		-----		-----
495		-----		-----	1277		-----		-----
498		-----		-----	1284	D482	0.0007		-----
507	D482	0.00015		-----	1297		-----		-----
511		-----		-----	1299	D482	<0.010		-----
529	D482	0.000645		-----	1356	D482	<0.01		-----
541	D482	<0.001		-----	1357	D482	<0.01		-----
551		-----		-----	1389	D482	<0.001		-----
554		-----		-----	1412	D482	0.0008		-----
555		-----		-----	1417		-----		-----
558		-----		-----	1430	D482	0.0207	f+?	-----
562	D482	<0.010		-----	1431	D482	0.0015		-----
575	D482	<0.0001		-----	1433	D482	0.00188		-----
603		-----		-----	1441	D482	<0.001		-----
604		-----		-----	1498		-----		-----
608	D482	<0.001		-----	1575	D482	0.0005		-----
614	D482	<0.005		-----	1588		-----		-----
621		-----		-----	1616	D482	0.00078		-----
631	D482	0.0008		-----	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D482	<0.010		-----	1643	D482	0.0004		-----
732		-----		-----	1720		-----		-----
733		-----		-----	1724	D482	0.0002		-----
750		-----		-----	1740	D482	0.001		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807		-----		-----	6201	D482	0.002		-----
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D482	0.00076		-----	6258	D482	0.000		-----
1967	D482	0.0011		-----	6262	D482	0		-----
6026	D482	0.0009		-----	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049	D482	0.001		-----	6291	D482	<0.001		-----
6054		-----		-----	6317		-----		-----
6057	D482	<0,001		-----	6319		-----		-----
6103		-----		-----	6341		-----		-----
6142		-----		-----	6346		-----		-----

n	88	
mean (n)	<0.01	Application range: 0.010 – 0.180 %M/M

Lab 1430: possibly a false positive test result?

Determination of Calculated Cetane Index, two variables ASTM D976 on sample #20170

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D976	50.9		-0.34	781		-----		-----
53		-----		-----	785		-----		-----
62	D976	51.5		0.50	798		-----		-----
90	D976	51.05		-0.13	825	D976	51.0		-0.20
92	D976	51.27		0.17	851	D976	51.0	E	-0.20
120	D976	51.3		0.22	854	D976	51.1		-0.06
140	D976	50.9		-0.34	856	D976	50.9		-0.34
150		-----		-----	862	D976	50.9		-0.34
158	D976	50.9		-0.34	863	D976	51.2		0.08
159		-----		-----	864	D976	51.0		-0.20
169		-----		-----	872		-----		-----
171	D976	53.5	R(0.01)	3.30	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886	D976	51.3		0.22
203		-----		-----	887	D976	51.4		0.36
215		-----		-----	904	D976	50.9		-0.34
217	D976	51.29		0.20	912	D976	51.20	E	0.08
221	D976	51.26		0.16	913		-----		-----
224	D976	50.56		-0.82	914		-----		-----
225		-----		-----	922	D976	51.3		0.22
228	D976	51.0		-0.20	962		-----		-----
230	D976	51.1		-0.06	963		-----		-----
237	D976	50.8		-0.48	970	D976	51.5		0.50
238		-----		-----	971	D976	51.3		0.22
253	D976	51.3		0.22	974	D976	51.6		0.64
254	D976	51.0		-0.20	988		-----		-----
256		-----		-----	994		-----		-----
258	D976	51.4		0.36	995	D976	51.5		0.50
273	D976	51	E	-0.20	996		-----		-----
312	D976	51.2		0.08	997	D976	51.4		0.36
317	D976	51.5		0.50	998	D976	51.47		0.45
323	D976	51.5		0.50	1006	D976	51.2		0.08
333		-----		-----	1011		-----		-----
334		-----		-----	1016		-----		-----
335		-----		-----	1026		-----		-----
336	D976	50.8		-0.48	1059		-----		-----
337		-----		-----	1105	D976	51.0		-0.20
339		-----		-----	1109		-----		-----
342	D976	51.2		0.08	1121		-----		-----
343		-----		-----	1126		-----		-----
344		-----		-----	1134	D976	50.9747		-0.24
349		-----		-----	1135	D976	51.3		0.22
353		-----		-----	1140		-----		-----
355	D976	51.0		-0.20	1146		-----		-----
356	D976	51.0		-0.20	1162	D976	50.8	E	-0.48
381		-----		-----	1171		-----		-----
433		-----		-----	1182		-----		-----
463	D976	51.0		-0.20	1213		-----		-----
485		-----		-----	1227		-----		-----
495	D976	51.28		0.19	1277		-----		-----
498		-----		-----	1284		-----		-----
507	D976	50.28	R(0.05)	-1.21	1297	D976	51.0859		-0.08
511		-----		-----	1299		-----		-----
529	D976	51.26764		0.17	1356		-----		-----
541	D976	51.2		0.08	1357	D976	n.a		-----
551		-----		-----	1389	D976	51.2		0.08
554		-----		-----	1412	D976	51.3		0.22
555		-----		-----	1417		-----		-----
558		-----		-----	1430		-----		-----
562	D976	51.3		0.22	1431	D976	50.8		-0.48
575		-----		-----	1433		-----		-----
603		-----		-----	1441		-----		-----
604	D976	51.297		0.21	1498	D976	51.2		0.08
608	D976	51.47		0.45	1575	D976	51.0		-0.20
614	D976	49.8	R(0.01)	-1.88	1588		-----		-----
621		-----		-----	1616		-----		-----
631	D976	51.40		0.36	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D976	51.5		0.50	1643		-----		-----
732	D976	51.44		0.41	1720		-----		-----
733		-----		-----	1724	D976	51.29		0.20
750		-----		-----	1740		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807	D976	50.7		-0.62	6201	D976	50.91		-0.33
1810		-----		-----	6238		-----		-----
1811	D976	50.9	E	-0.34	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D976	51		-0.20	6258	D976	51.0	E	-0.20
1967	D976	50.9		-0.34	6262	D976	51.2		0.08
6026	D976	50.7		-0.62	6266		-----		-----
6034		-----		-----	6272	D976	51.5		0.50
6049	D976	51.1		-0.06	6291	D976	51.2		0.08
6054	D976	50.8		-0.48	6317		-----		-----
6057	D976	51.3		0.22	6319		-----		-----
6103		-----		-----	6341		-----		-----
6142		-----		-----	6346		-----		-----

normality	OK
n	77
outliers	3
mean (n)	51.146
st.dev. (n)	0.2354
R(calc.)	0.659
st.dev.(D976:06)	0.7143
R(D976:06)	2

Compare R(D976:80) = 2

The CCI calculated by iis for labs marked with an E:
Lab 273 calculation difference: iis calculated 51.29 (lab reported 51, rounding?)
Lab 851 calculation difference: iis calculated 51.25 (lab reported 51.0)
Lab 912 calculation difference: iis calculated 51.44 (lab reported 51.2)
Lab 1162 calculation difference: iis calculated 51.03 (lab reported 50.8)
Lab 1811 calculation difference: iis calculated 51.14 (lab reported 50.9)
Lab 6258 calculation difference: iis calculated 51.43 (lab reported 51.0)

Kernel Density
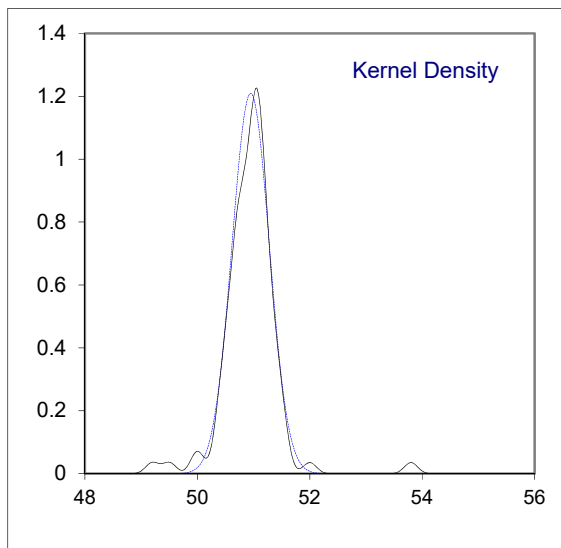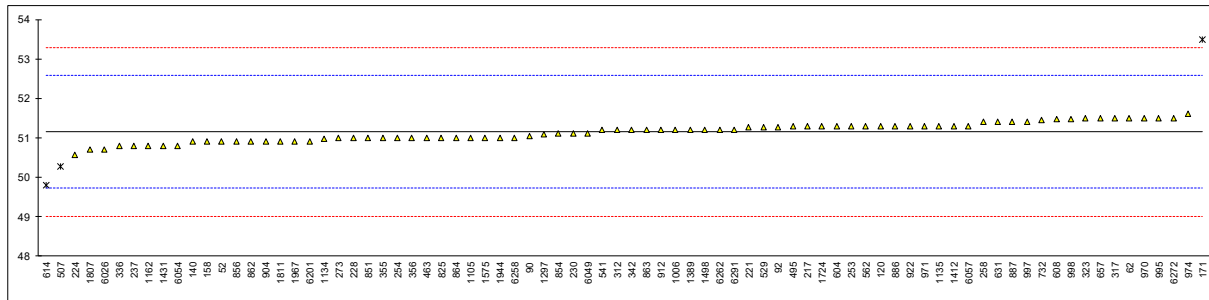
Determination of Calculated Cetane Index, four variables ASTM D4737 on sample #20170

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4737-A	50.7		-0.77	781		-----		-----
53		-----		-----	785		-----		-----
62	D4737-A	51.5		1.70	798		-----		-----
90	D4737-A	50.775		-0.54	825	D4737-A	50.8		-0.46
92	D4737-B	50.94	E	-0.03	851	D4737-A	50.9		-0.15
120	D4737-A	51.2		0.78	854	D4737-B	50.7		-0.77
140	D4737-A	50.7		-0.77	856	D4737-A	50.7		-0.77
150		-----		-----	862	D4737-A	50.8		-0.46
158	D4737-A	50.6		-1.07	863	D4737-A	51.0		0.16
159		-----		-----	864	D4737-A	50.8		-0.46
169	D4737-A	51.1		0.47	872		-----		-----
171	D4737-A	53.8	R(0.01)	8.80	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887	D4737-A	51.34		1.21
215		-----		-----	904	D4737-A	50.6		-1.07
217	D4737-A	51.13		0.56	912	D4737	50.70	E	-0.77
221	D4737-A	51.13		0.56	913	D4737	51		0.16
224		-----		-----	914		-----		-----
225		-----		-----	922		-----		-----
228	D4737-A	51.0		0.16	962		-----		-----
230	ISO4264	50.9		-0.15	963		-----		-----
237	D4737-A	50.5		-1.38	970	D4737-A	51.3		1.08
238		-----		-----	971	D4737-A	51.2		0.78
253		-----		-----	974	D4737-A	51.5		1.70
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995	D4737-A	51.3		1.08
273	D4737-A	51.4		1.39	996		-----		-----
312	D4737-A	51.0		0.16	997	D4737-A	51.1		0.47
317	ISO4264	51.5		1.70	998	D4737-A	51.11		0.50
323	D4737-A	51.4		1.39	1006	D4737-B	50.8		-0.46
333		-----		-----	1011	ISO4264	51.2	C	0.78
334	D4737-A	50.8		-0.46	1016		-----		-----
335	D4737-A	51.2		0.78	1026	ISO4264	51.1		0.47
336	D4737-A	50.5		-1.38	1059	ISO4264	50.9		-0.15
337		-----		-----	1105	D4737-A	50.8		-0.46
339		-----		-----	1109	D4737-A	50.9		-0.15
342	ISO4264	51.0		0.16	1121		-----		-----
343	D4737-A	50.5		-1.38	1126		-----		-----
344	D4737-A	51.53		1.79	1134	IP380	50.6725		-0.85
349		-----		-----	1135	ISO4264	51.2		0.78
353	IP380	50.62		-1.01	1140	IP380	50.7813		-0.52
355	D4737-A	50.65		-0.92	1146	ISO4264	50.78		-0.52
356	D4737-A	50.8		-0.46	1162	D4737-A	50.6		-1.07
381	ISO4264	51.0		0.16	1171	ISO4264	51.02		0.22
433		-----		-----	1182		-----		-----
463	D4737-A	50.9		-0.15	1213		-----		-----
485	D4737-A	51.3		1.08	1227		-----		-----
495	D4737-B	50.93		-0.06	1277		-----		-----
498		-----		-----	1284		-----		-----
507	D4737	50.00	E	-2.93	1297		-----		-----
511		-----		-----	1299	D4737-A	51.1		0.47
529	D4737-A	51.053		0.32	1356	ISO4264	52	E	3.24
541	D4737-A	51.04		0.28	1357	D4737-A	51.4		1.39
551		-----		-----	1389	D4737	51.2		0.78
554		-----		-----	1412	D4737-A	51.1		0.47
555		-----		-----	1417		-----		-----
558		-----		-----	1430	D4737-A	50.0		-2.93
562	D4737	51.0	E	0.16	1431	ISO4264	50.4		-1.69
575		-----		-----	1433		-----		-----
603		-----		-----	1441	D4737-A	51.1		0.47
604		-----		-----	1498	D4737-A	51.0		0.16
608		-----		-----	1575	D4737-A	50.4		-1.69
614	D4737-A	49.5	R(0.01)	-4.47	1588		-----		-----
621		-----		-----	1616	D4737-A	51.0		0.16
631	D4737-A	51.06		0.34	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634	ISO4264	51.14		0.59
657	D4737-A	51.3		1.08	1643		-----		-----
732	D4737-A	51.14		0.59	1720	D4737-A	50.7		-0.77
733		-----		-----	1724	D4737-A	51.25		0.93
750		-----		-----	1740		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807	D4737-A	50.4		-1.69	6201	D4737-A	50.7		-0.77
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D4737-A	50.86		-0.27	6258	D4737-A	51.3		1.08
1967	D4737-A	50.5		-1.38	6262	ISO4264	51.1		0.47
6026	D4737-A	50.4		-1.69	6266		-----		-----
6034	D4737-A	49.2	C,R(0.01),E	-5.39	6272		-----		-----
6049	D4737-A	51.0		0.16	6291	D4737-A	51.1		0.47
6054	D4737-A	50.6		-1.07	6317		-----		-----
6057	ISO4264	51.1		0.47	6319		-----		-----
6103	ISO4264	51		0.16	6341		-----		-----
6142		-----		-----	6346		-----		-----

normality	suspect	
n	92	
outliers	3	
mean (n)	50.948	
st.dev. (n)	0.3299	
R(calc.)	0.924	
st.dev.(iis memo1904)	0.3241	
R(iis memo1904)	0.907	

Lab 1011 first reported: 49.92
Lab 6034 first reported: 49.7

The CCI calculated by iis (D4737 formula 2) for labs marked with an E:
Lab 92 calculation difference: iis calculated 50.94 for A and 50.62 for B (lab reported 50.94 with D4737-B, possibly method A used for calculation)
Lab 507 calculation difference: iis calculated 49.86 for A and 49.36 for B (lab reported 50.00 with D4737)
Lab 562 calculation difference depending on procedure used: iis calc. 50.99 for A and 50.73 for B (lab reported 51.0 with D4737)
Lab 912 calculation difference depending on procedure used: iis calc. 50.97 for A and 50.65 for B (lab reported 50.7 with D4737)
Lab 1356 calculation difference: iis calc. 52.54 for A and 52.36 for B (lab reported 52 with ISO4264 (equivalent to D4737-A))
Lab 6034 calculation difference: iis calc. 49.64 for A and 49.27 for B (lab reported 49.2 with D4737-A)

Kernel Density
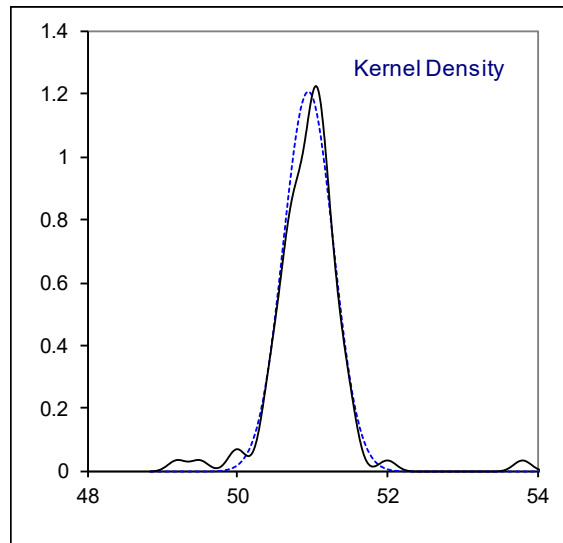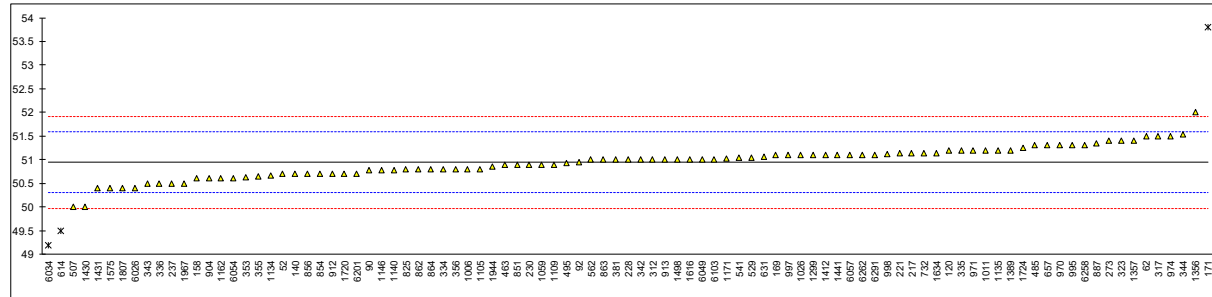
Determination of Cloud Point on sample #20170; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D2500	-8		-0.55	781		-----		-----
53	D2500	-7		0.15	785		-----		-----
62	D2500	-6.0		0.85	798		-----		-----
90	D2500	-12	R(0.01)	-3.35	825	D2500	-7		0.15
92		-----		-----	851	D2500	-7		0.15
120	D5773	-7.3		-0.06	854	D2500	-8		-0.55
140	D5773	-6.9		0.22	856	D2500	-8		-0.55
150		-----		-----	862	D2500	-7		0.15
158	D5773	-6.8		0.29	863	D2500	-8.5		-0.90
159	D2500	-8		-0.55	864	D2500	-8		-0.55
169	D2500	-8		-0.55	872		-----		-----
171	D2500	-4		2.25	873		-----		-----
175	D5771	-7		0.15	874		-----		-----
186		-----		-----	886		-----		-----
203	D2500	-8		-0.55	887	D2500	-8		-0.55
215		-----		-----	904	D2500	-7		0.15
217	D2500	-8		-0.55	912		-9		-1.25
221		-----		-----	913	D2500	-6		0.85
224	D2500	-7.0		0.15	914		-----		-----
225	D2500	-1	R(0.01)	4.35	922	D2500	-7		0.15
228	D2500	-8		-0.55	962		-----		-----
230	D2500	-6.66		0.39	963		-----		-----
237	D2500	-8		-0.55	970	D2500	-6		0.85
238	D2500	-7		0.15	971	D2500	-7		0.15
253	D2500	-7		0.15	974	D2500	-6		0.85
254	D2500	-5		1.55	988		-----		-----
256	D2500	-5.0		1.55	994		-----		-----
258		-----		-----	995	D2500	-7		0.15
273	D2500	-3.5		2.60	996		-----		-----
312	D2500	-8		-0.55	997	D2500	-7		0.15
317	D5771	-8		-0.55	998	D2500	-7		0.15
323	D2500	-8		-0.55	1006		-----		-----
333	D2500	-8		-0.55	1011	D2500	-6		0.85
334	D2500	-7		0.15	1016	ISO3015	-7.0		0.15
335	ISO3015	-8		-0.55	1026	D5773	-8		-0.55
336	D2500	-8		-0.55	1059	ISO3015	-8		-0.55
337	EN23015	-7		0.15	1105	D5773	-6.7		0.36
339		-----		-----	1109	D5773	-6.5		0.50
342	ISO3015	-7		0.15	1121	D2500	-7		0.15
343	D5771	-8		-0.55	1126		-----		-----
344	D2500	-7.0		0.15	1134	IP219	-7		0.15
349		-----		-----	1135	EN23015	-9		-1.25
353	IP219	-8		-0.55	1140	D5773	-7.0		0.15
355		-----		-----	1146	D2500	-8		-0.55
356	D2500	-7		0.15	1162	D2500	-7		0.15
381	ISO3015	-7		0.15	1171	ISO3015	-7.5		-0.20
433		-----		-----	1182	D5773	-7.2		0.01
463	D2500	-8.0		-0.55	1213	D2500	-3	R(0.01)	2.95
485		-----		-----	1227	D2500	-8		-0.55
495	EN23015	-7.2		0.01	1277		-----		-----
498		-----		-----	1284	D5771	-7.2		0.01
507	D2500	-5		1.55	1297	D5773	-7.1	C	0.08
511		-----		-----	1299	D2500	-6		0.85
529	D2500	-7		0.15	1356	EN23015	-2	R(0.01)	3.65
541	D5771	-7.6		-0.27	1357	D2500	-7.0		0.15
551		-----		-----	1389	D2500	-8		-0.55
554		-----		-----	1412	D2500	-8		-0.55
555		-----		-----	1417	IP444	-6.4		0.57
558		-----		-----	1430	D5771	-6		0.85
562	D2500	-6		0.85	1431	D2500	-9.49		-1.59
575		-----		-----	1433	D2500	-8		-0.55
603		-----		-----	1441		-----		-----
604	D2500	-8		-0.55	1498	D2500	-8		-0.55
608	D2500	-7		0.15	1575		-----		-----
614	D2500	-9		-1.25	1588		-----		-----
621		-----		-----	1616	D2500	-7		0.15
631	D5773	-7.6		-0.27	1629		-----		-----
633		-----		-----	1631	D5771	-5.3		1.34
634		-----		-----	1634		-----		-----
657	D2500	-3	R(0.01)	2.95	1643	D2500	-7		0.15
732	EN23015	-7		0.15	1720	D5773	-7.3		-0.06
733	EN23015	-7		0.15	1724	D2500	-8		-0.55
750		-----		-----	1740	D2500	-8		-0.55

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807	D2500	-5		1.55	6201	D2500	-9		-1.25
1810	EN23015	-8.5		-0.90	6238		-----		-----
1811	D2500	-7		0.15	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D2500	-8		-0.55	6258	D2500	-8		-0.55
1967	D2500	-7		0.15	6262	ISO3015	-7		0.15
6026	D2500	-5		1.55	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049	D2500	-8		-0.55	6291	D2500	-8		-0.55
6054	D5771	-8.0		-0.55	6317		-----		-----
6057	D2500	-8		-0.55	6319		-----		-----
6103		-----		-----	6341		-----		-----
6142	ISO3015	-6.25		0.68	6346		-----		-----

normality	suspect
n	111
outliers	5
mean (n)	-7.22
st.dev. (n)	1.014
R(calc.)	2.84
st.dev.(D2500:17a)	1.429
R(D2500:17a)	4

Lab 1297 first reported: 7.1

Kernel Density
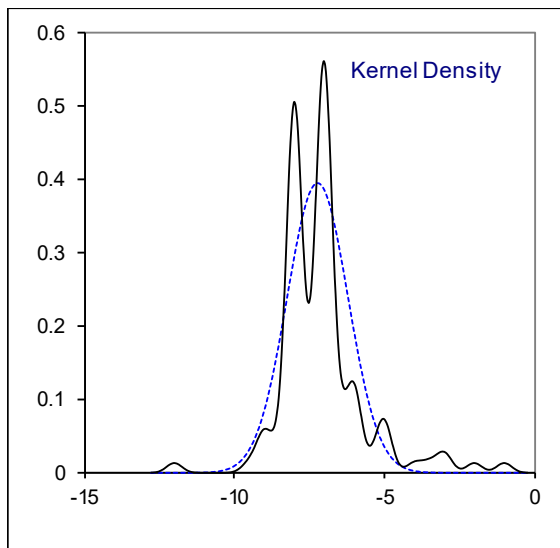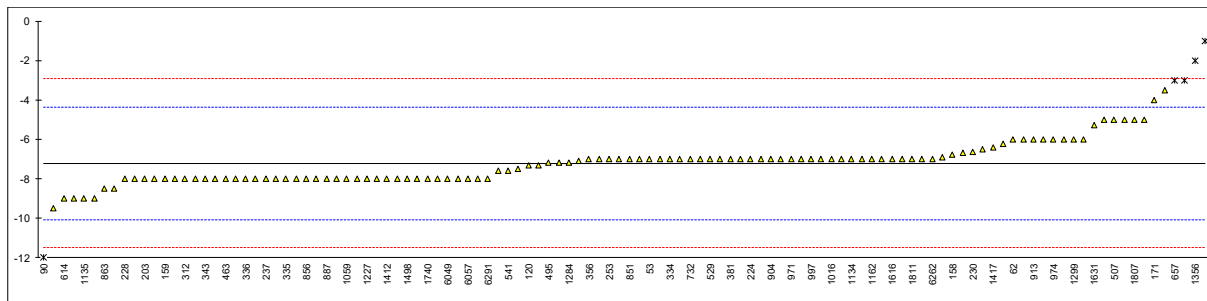
Determination of Cold Filter Plugging Point (CFPP) on sample #20170; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D6371	-20		1.21	781		-----		-----
53		-----		-----	785		-----		-----
62		-----		-----	798		-----		-----
90		-----		-----	825		-----		-----
92		-----		-----	851		-----		-----
120		-----		-----	854	IP309	-20		1.21
140	D6371	-21		0.62	856	D6371	-21		0.62
150		-----		-----	862	D6371	-23		-0.54
158		-----		-----	863	D6371	-20		1.21
159	D6371	-23		-0.54	864	D6371	-20		1.21
169		-----		-----	872		-----		-----
171	D6371	-19		1.79	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904	D6371	-23		-0.54
217	D6371	-26	C	-2.29	912		-----		-----
221		-----		-----	913		-----		-----
224		-----		-----	914		-----		-----
225		-----		-----	922	D6371	-24		-1.13
228		-----		-----	962		-----		-----
230	IP309	-19.99		1.21	963		-----		-----
237	D6371	-23		-0.54	970	D6371	-23		-0.54
238		-----		-----	971	D6371	-22		0.04
253		-----		-----	974	IP309	-22		0.04
254		-----		-----	988		-----		-----
256	IP309	-23.0		-0.54	994		-----		-----
258	IP309	-22		0.04	995		-----		-----
273	IP309	-17		2.96	996		-----		-----
312	D6371	-22		0.04	997	D6371	-17		2.96
317	EN116	-23		-0.54	998	D6371	-20		1.21
323	D6371	-23		-0.54	1006	D6371	-26		-2.29
333	D6371	-23		-0.54	1011	EN116	-20		1.21
334	D6371	-21		0.62	1016	EN116	-22		0.04
335	EN116	-23		-0.54	1026	EN16329	-24		-1.13
336	EN116	-20		1.21	1059	EN116	-21		0.62
337	EN116	-20		1.21	1105	D6371	-20		1.21
339		-----		-----	1109	IP309	-18		2.37
342	IP309	-21		0.62	1121	D6371	-27		-2.88
343	EN116	-22		0.04	1126		-----		-----
344	EN116	-25		-1.71	1134	EN116	-24		-1.13
349		-----		-----	1135	EN116	-23		-0.54
353	IP309	-21		0.62	1140	IP309	-23		-0.54
355		-----		-----	1146		-----		-----
356	EN116	-21		0.62	1162	D6371	-20.5		0.91
381	EN116	-24		-1.13	1171	EN116	-21.5		0.33
433		-----		-----	1182	EN116	-21		0.62
463	EN116	-22.0		0.04	1213		-----		-----
485		-----		-----	1227	EN116	-21		0.62
495	EN116	-21		0.62	1277		-----		-----
498		-----		-----	1284	D6371	-22		0.04
507	D6371	-18		2.37	1297	D6371	-24		-1.13
511		-----		-----	1299	EN116	-24		-1.13
529		-----		-----	1356	EN116	-23.5		-0.84
541	D6371	-21		0.62	1357	D6371	-21.0		0.62
551		-----		-----	1389	IP309	-27		-2.88
554		-----		-----	1412		-----		-----
555		-----		-----	1417	IP309	-23		-0.54
558		-----		-----	1430	EN116	-21		0.62
562	D6371	-20		1.21	1431	D6371	-22		0.04
575		-----		-----	1433	EN116	-21		0.62
603		-----		-----	1441	D6371	-21		0.62
604		-----		-----	1498	D6371	-22		0.04
608		-----		-----	1575		-----		-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616	D6371	-23		-0.54
631		-----		-----	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634	EN116	-24		-1.13
657	IP309	-22		0.04	1643		-----		-----
732	EN116	-20		1.21	1720		-----		-----
733		-----		-----	1724	IP309	-21		0.62
750		-----		-----	1740	D6371	-22		0.04

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807	D6371	-21		0.62	6201	D6371	-26		-2.29
1810	EN116	-24		-1.13	6238		-----		-----
1811	D6371	-24		-1.13	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	EN116	-21		0.62	6258	EN116	-25		-1.71
1967	IP309	-25		-1.71	6262	EN116	-24		-1.13
6026	D6371	-24		-1.13	6266		-----		-----
6034	D6371	-24		-1.13	6272		-----		-----
6049	IP309	-21		0.62	6291	EN116	-23		-0.54
6054		-----		-----	6317		-----		-----
6057	EN116	-22		0.04	6319		-----		-----
6103	EN116	-20		1.21	6341		-----		-----
6142	EN116	-24.5		-1.42	6346		-----		-----

				D6371 only	EN116 only
normality	OK			OK	OK
n	89			41	48
outliers	0			0	0
mean (n)	-22.07			-22.01	-22.03
st.dev. (n)	2.024			2.169	1.917
R(calc.)	5.67			6.07	5.37
st.dev.(D6371:17a)	1.715			1.713	-----
R(D6371:17a)	4.80			4.80	-----
Compare					
R(EN116:15)	4.32			-----	4.32

Lab 217 first reported: -28

Kernel Density
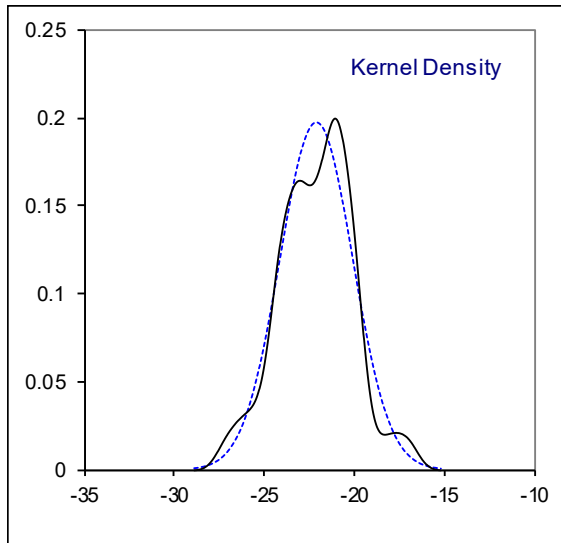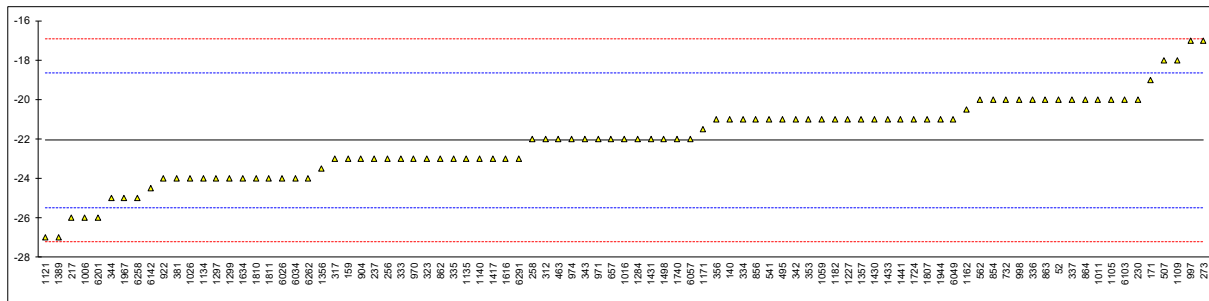
Determination of Color ASTM scale on sample #20170;

lab	method	reported test value	lis conversion*	mark	z(targ)	remarks
52	D6045	<1.5	1.25		0.37	
53		-----	-----		-----	
62	D1500	1	1		-0.33	
90		-----	-----		-----	
92	D1500	1.0	1.0		-0.33	
120	D6045	<1	0.75		-1.03	
140	D1500	1.0	1.0		-0.33	
150		-----	-----		-----	
158	D1500	<1.5	1.25		0.37	
159	D1500	1.5	1.5		1.07	
169	D1500	<1.5	1.25		0.37	
171	D1500	1.5	1.5		1.07	
175		-----	-----		-----	
186		-----	-----		-----	
203	D1500	1	1		-0.33	
215		-----	-----		-----	
217	D1500	<1,0	0.75		-1.03	
221	D1500	1.5	1.5		1.07	
224	D1500	1.0	1.0		-0.33	
225		-----	-----		-----	
228	D1500	1.5	1.5		1.07	
230	D1500	L2.0	1.75		1.77	
237	D1500	L1.5	1.25		0.37	
238	D1500	1.0	1.0		-0.33	
253	D1500	1.0	1.0		-0.33	
254	D1500	1.0	1.0		-0.33	
256	D1500	1.0	1.0		-0.33	
258	D1500	1	1		-0.33	
273	D1500	L1.5	1.25		0.37	
312	D1500	<1,5	1.25		0.37	
317	D1500	1.0	1.0		-0.33	
323	D1500	0.9	0.9		-0.61	
333		-----	-----		-----	
334	D1500	L1.5	1.25		0.37	
335	D1500	1.0	1.0		-0.33	
336	D1500	1.0	1.0		-0.33	
337		-----	-----		-----	
339		-----	-----		-----	
342	D1500	L1.0	0.75		-1.03	
343	D1500	1.0	1.0		-0.33	
344	D1500	<1.5	1.25		0.37	
349	D6045	L1,0	0.75		-1.03	
353	D6045	1.3	1.3		0.51	
355	D1500	L1.5	1.25		0.37	
356	D1500	1.5	1.5		1.07	
381		-----	-----		-----	
433		-----	-----		-----	
463	D1500	1.5	1.5		1.07	
485	D1500	1.0	1.0		-0.33	
495	D1500	1.0	1.0		-0.33	
498		-----	-----		-----	
507	D1500	1.0	1.0		-0.33	
511		-----	-----		-----	
529	D1500	1.4	1.4		0.79	
541	D1500	L0.5	0.25	R(0.05)	-2.43	
551		-----	-----		-----	
554		-----	-----		-----	
555		-----	-----		-----	
558		-----	-----		-----	
562	D1500	L1.5	1.25		0.37	
575	D1500	1.0	1.0		-0.33	
603	D1500	1.0	1.0		-0.33	
604	D1500	L1.5	1.25		0.37	
608	D1500	1.0	1.0		-0.33	
614	D1500	L1.5	1.25		0.37	
621		-----	-----		-----	
631	D6045	1.3	1.3		0.51	
633		-----	-----		-----	
634		-----	-----		-----	
657	D1500	<1.0	0.75		-1.03	
732	D1500	1	1		-0.33	
733		-----	-----		-----	
750		-----	-----		-----	
781		-----	-----		-----	
785		-----	-----		-----	

lab	method	reported test value	lis conversion*	mark	z(targ)	remarks
798		-----	-----		-----	
825	D1500	1.0	1.0		-0.33	
851	D1500	L1.5	1.25		0.37	
854	D1500	L1.0	0.75		-1.03	
856	D1500	1	1		-0.33	
862	D1500	1.0	1.0		-0.33	
863	D1500	1.0	1.0		-0.33	
864	D6045	1.0	1.0		-0.33	
872		-----	-----		-----	
873		-----	-----		-----	
874		-----	-----		-----	
886		-----	-----		-----	
887	D1500	L1.5	1.25		0.37	
904	D1500	L 1,0	0.75		-1.03	
912		1.3	1.3		0.51	
913	D6045	1.3	1.3		0.51	
914		-----	-----		-----	
922	D1500	L1.5	1.25		0.37	
962		-----	-----		-----	
963		-----	-----		-----	
970	D1500	1.0	1.0		-0.33	
971	D1500	1.0	1.0		-0.33	
974	D1500	1.0	1.0		-0.33	
988		-----	-----		-----	
994		-----	-----		-----	
995	D1500	1.0	1.0		-0.33	
996		-----	-----		-----	
997	D1500	1.0	1.0		-0.33	
998	D1500	1.0	1.0		-0.33	
1006		-----	-----		-----	
1011		-----	-----		-----	
1016	D1500	1.3	1.3		0.51	
1026	D1500	L1.5	1.25		0.37	
1059	D1500	L1,5	1.25		0.37	
1105	D6045	L1.5	1.25		0.37	
1109	D1500	L1.5	1.25		0.37	
1121	D1500	<1.5	1.25		0.37	
1126		-----	-----		-----	
1134	D1500	1.0	1.0		-0.33	
1135	ISO2049	L1.5	1.25		0.37	
1140	D6045	1.1	1.1		-0.05	
1146		-----	-----		-----	
1162	D1500	1.3	1.3		0.51	
1171	D1500	1.47	1.47		0.99	
1182		-----	-----		-----	
1213		-----	-----		-----	
1227	D1500	1	1		-0.33	
1277		-----	-----		-----	
1284	D6045	L1.5	1.25		0.37	
1297	D1500	1.0	1.0		-0.33	
1299	D6045	L1.5	1.25		0.37	
1356		-----	-----		-----	
1357	D1500	L1.5	1.25		0.37	
1389	D1500	L1.5	1.25		0.37	
1412	D1500	1	1		-0.33	
1417	D6045	<1.5	1.25		0.37	
1430	D1500	L1	0.75		-1.03	
1431	D1500	1	1		-0.33	
1433	D6045	1.2	1.2		0.23	
1441	D1500	<1.5	1.25		0.37	
1498		-----	-----		-----	
1575	D1500	1.0	1.0		-0.33	
1588		-----	-----		-----	
1616	D6045	1.3	1.3		0.51	
1629		-----	-----		-----	
1631		-----	-----		-----	
1634		-----	-----		-----	
1643		-----	-----		-----	
1720	D6045	1.3	1.3		0.51	
1724		-----	-----		-----	
1740	D1500	L1.5	1.25		0.37	
1783	D1500	1.3	1.3		0.51	
1807	D1500	1.0	1.0		-0.33	
1810		-----	-----		-----	
1811		-----	-----		-----	
1906		-----	-----		-----	
1944	D1500	L1.5	1.25		0.37	
1967	D1500	1.0	1.0		-0.33	

lab	method	reported test value	lis conversion*	mark	z(targ)	remarks
6026	D1500	1.0	1.0		-0.33	
6034	D1500	1	1		-0.33	
6049	D1500	1.5	1.5		1.07	
6054	D6045	L 1.3	1.25		0.37	
6057	D1500	1.0	1.0		-0.33	
6103	D6045	L 1.5	1.25		0.37	
6142		-----	-----		-----	
6172		-----	-----		-----	
6201	D1500	<1	0.75		-1.03	
6238		-----	-----		-----	
6249		-----	-----		-----	
6253		-----	-----		-----	
6258	D1500	1.3	1.3		0.51	
6262	D1500	L1.0	0.75		-1.03	
6266		-----	-----		-----	
6272		-----	-----		-----	
6291	D1500	<1.0	0.75		-1.03	
6317	D1500	0.5	0.5		-1.73	
6319		-----	-----		-----	
6341		-----	-----		-----	
6346		-----	-----		-----	

normality		OK
n		109
outliers		1
mean (n)		1.12
st.dev. (n)		0.216
R(calc.)		0.60
st.dev.(D1500:12)		0.357
R(D1500:12)		1

*In the calculation of the mean, standard deviation and the reproducibility, areported value of 'L y' or '<y' is changed into y-0.25
 (for example, L1.5 is changed into 1.25)

Kernel Density
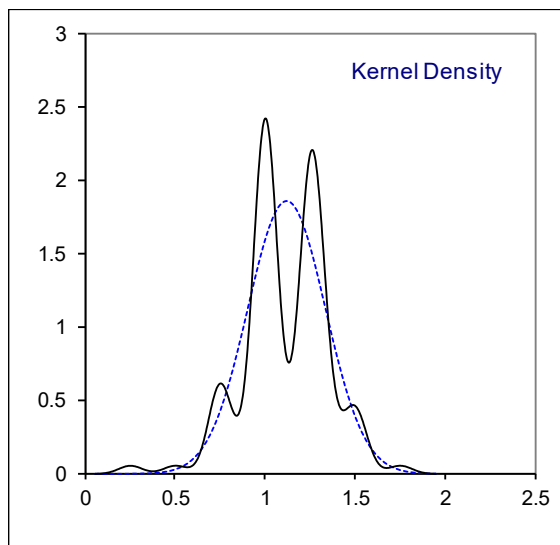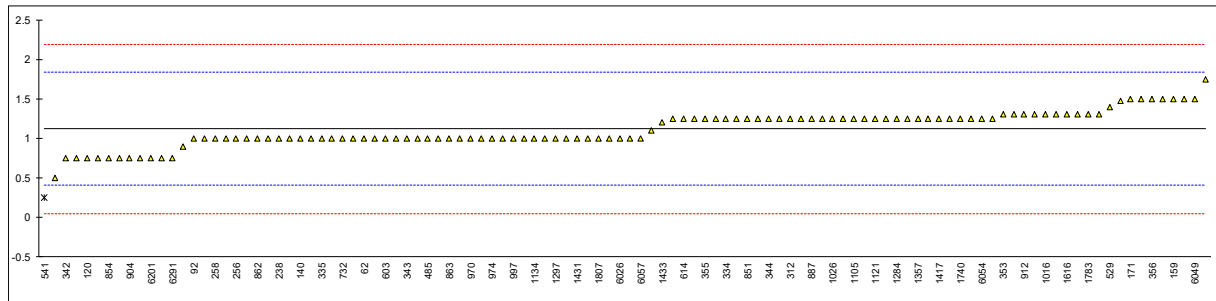
Determination of Conradson Carbon Residue (micro method) on 10% residue on sample #20170; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4530	<0.1		-----	781		-----		-----
53		-----		-----	785		-----		-----
62	D4530	<0.1		-----	798		-----		-----
90		-----		-----	825		-----		-----
92		-----		-----	851	ISO10370	0.04		1.91
120	D4530	<0.10		-----	854	D4530	<0.1		-----
140	D4530	<0.1		-----	856	ISO10370	<0.1		-----
150		-----		-----	862	D4530	<0.1		-----
158	D4530	<0.10		-----	863	D4530	<0.1		-----
159		-----		-----	864	D4530	<0.1		-----
169		-----		-----	872		-----		-----
171		-----		-----	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904	D4530	0.0066		-1.36
217	D189	0.029		0.84	912		-----		-----
221	D4530	0.03		0.93	913		-----		-----
224	D189	0.013		-0.73	914		-----		-----
225	D4530	0.02		-0.05	922	D189	0.028		0.74
228	D189	0.0158		-0.46	962		-----		-----
230	ISO10370	0.0066		-1.36	963		-----		-----
237	D4530	<0.10		-----	970	D189	0.02		-0.05
238		-----		-----	971	D4530	0.02		-0.05
253		-----		-----	974	D189	0.02		-0.05
254	D189	0.03		0.93	988		-----		-----
256	D189	0.03		0.93	994		-----		-----
258		-----		-----	995	D189	0.019		-0.14
273	D4530	0.045		2.40	996		-----		-----
312		-----		-----	997		-----		-----
317	D4530	<0.10		-----	998		-----		-----
323	D189	< 0.10		-----	1006		-----		-----
333		-----		-----	1011		-----		-----
334	D189	0.01		-1.02	1016	ISO10370	0.017		-0.34
335		-----		-----	1026	ISO10370	<0.10		-----
336		-----		-----	1059	ISO10370	0.02		-0.05
337		-----		-----	1105	D189	0.013		-0.73
339		-----		-----	1109	D4530	<0.1		-----
342	ISO10370	<0.10		-----	1121		-----		-----
343	D4530	<0.1		-----	1126		-----		-----
344	D4530	0.0238		0.33	1134		-----		-----
349		-----		-----	1135	ISO10370	<0,10		-----
353	IP13	0.0203		-0.02	1140	IP398	<0.010		-----
355		-----		-----	1146		-----		-----
356	ISO10370	Below 0.01		-----	1162	D4530	0.030		0.93
381		-----		-----	1171	ISO6615	0.048		2.69
433		-----		-----	1182	ISO10370	0.038	C	1.72
463	D4530	<0,03		-----	1213		-----		-----
485		-----		-----	1227	D4530	0.01		-1.02
495		-----		-----	1277		-----		-----
498		-----		-----	1284		-----		-----
507	D4530	0.0033		-1.68	1297	D4530	0.01069		-0.96
511		-----		-----	1299	D4530	0.020		-0.05
529		-----		-----	1356	ISO10370	<0.01		-----
541	D189	<0.01		-----	1357	D4530	<0.1		-----
551		-----		-----	1389	D4530	<0.10		-----
554		-----		-----	1412	D189	0.02		-0.05
555		-----		-----	1417		-----		-----
558		-----		-----	1430	D4530	<0.1		-----
562	D4530	<0.1		-----	1431	D4530	0.02168		0.12
575		-----		-----	1433	ISO10370	0.02280		0.23
603	D4530	0.0158		-0.46	1441	D4530	<0.10		-----
604		-----		-----	1498		-----		-----
608	D4530	<0.01		-----	1575	D4530	0.02		-0.05
614		-----		-----	1588		-----		-----
621		-----		-----	1616	D4530	0.02		-0.05
631	D4530	0.016		-0.44	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D4530	<0.10		-----	1643		-----		-----
732	ISO10370	0.01		-1.02	1720		-----		-----
733		-----		-----	1724	D4530	0.02		-0.05
750		-----		-----	1740	D4530	0.02		-0.05

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807		-----		-----	6201	D189	0.01		-1.02
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	ISO10370	0.0194		-0.10	6258	D4530	0.01		-1.02
1967	D189	0.0229		0.24	6262	ISO10370	0		-2.00
6026	D4530	0.0217		0.12	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049	D4530	0.02		-0.05	6291	D189	<0.01		-----
6054	D4530	0.012		-0.83	6317		-----		-----
6057	ISO10370	<0,01		-----	6319		-----		-----
6103	ISO10370	0.043		2.21	6341		-----		-----
6142		-----		-----	6346		-----		-----

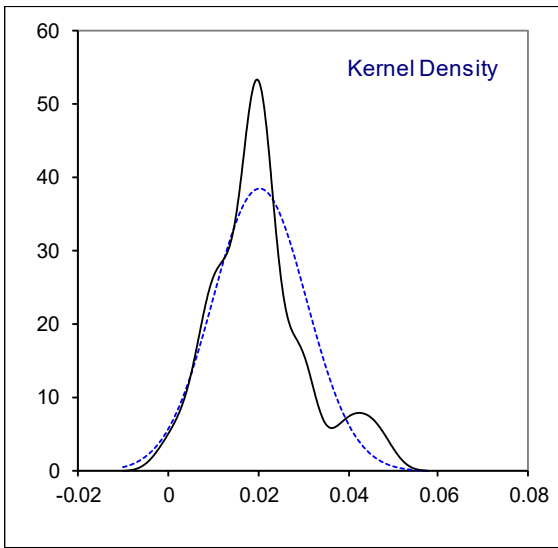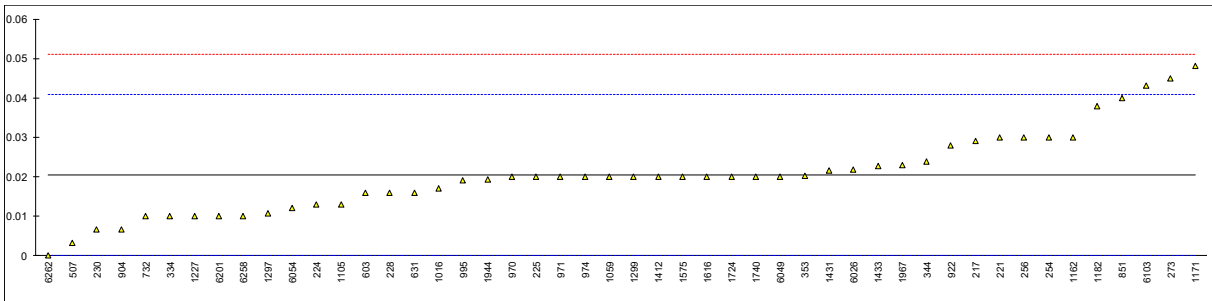|		
normality	OK
n	48
outliers	0
mean (n)	0.0205
st.dev. (n)	0.01040
R(calc.)	0.0291
st.dev.(D189:06)	0.01022
R(D189:06)	0.0286

Lab 1182 first reported: 0.22

Determination of Ramsbottom Carbon Residue on 10% residue on sample #20170; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	781		-----		-----
53		-----		-----	785		-----		-----
62		-----		-----	798		-----		-----
90		-----		-----	825		-----		-----
92	D524	<0.1	C	-----	851		-----		-----
120	D524	<0.10		-----	854		-----		-----
140		-----		-----	856		-----		-----
150		-----		-----	862		-----		-----
158	D524	0.08		-----	863		-----		-----
159		-----		-----	864		-----		-----
169	D524	0.11	C	-----	872		-----		-----
171	D524	0.08		-----	873		-----		-----
175	D524	0.079		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904		-----		-----
217		-----		-----	912		-----		-----
221		-----		-----	913		-----		-----
224		-----		-----	914		-----		-----
225		-----		-----	922		-----		-----
228		-----		-----	962		-----		-----
230		-----		-----	963		-----		-----
237		-----		-----	970		-----		-----
238		-----		-----	971		-----		-----
253		-----		-----	974	D524	0.06		-----
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995		-----		-----
273		-----		-----	996		-----		-----
312		-----		-----	997		-----		-----
317		-----		-----	998		-----		-----
323		-----		-----	1006		-----		-----
333		-----		-----	1011		-----		-----
334		-----		-----	1016		-----		-----
335		-----		-----	1026		-----		-----
336		-----		-----	1059		-----		-----
337		-----		-----	1105	D524	0.079		-----
339		-----		-----	1109		-----		-----
342		-----		-----	1121		-----		-----
343		-----		-----	1126		-----		-----
344		-----		-----	1134		-----		-----
349		-----		-----	1135		-----		-----
353		-----		-----	1140		-----		-----
355		-----		-----	1146		-----		-----
356		-----		-----	1162		-----		-----
381		-----		-----	1171		-----		-----
433		-----		-----	1182		-----		-----
463		-----		-----	1213		-----		-----
485		-----		-----	1227		-----		-----
495		-----		-----	1277		-----		-----
498		-----		-----	1284		-----		-----
507		-----		-----	1297		-----		-----
511		-----		-----	1299		-----		-----
529		-----		-----	1356		-----		-----
541		-----		-----	1357	D524	n.a		-----
551		-----		-----	1389		-----		-----
554		-----		-----	1412		-----		-----
555		-----		-----	1417		-----		-----
558		-----		-----	1430		-----		-----
562	D524	<0.01		-----	1431		-----		-----
575		-----		-----	1433		-----		-----
603		-----		-----	1441		-----		-----
604		-----		-----	1498		-----		-----
608		-----		-----	1575		-----		-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616		-----		-----
631		-----		-----	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D524	0.09		-----	1643		-----		-----
732		-----		-----	1720		-----		-----
733		-----		-----	1724		-----		-----
750		-----		-----	1740		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807		-----		-----	6201		-----		-----
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944		-----		-----	6258		-----		-----
1967		-----		-----	6262		-----		-----
6026		-----		-----	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049		-----		-----	6291		-----		-----
6054		-----		-----	6317		-----		-----
6057		-----		-----	6319		-----		-----
6103		-----		-----	6341		-----		-----
6142		-----		-----	6346		-----		-----

n	9
mean (n)	<0.1

Lab 92 first reported 0
Lab 169 first reported 0.14

Determination of Copper Corrosion, 3 hrs at 50°C on sample #20170;

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D130	1a		-----	781		-----		-----
53		-----		-----	785		-----		-----
62	D130	1a		-----	798		-----		-----
90	D130	1a		-----	825	D130	1a		-----
92	D130	1a		-----	851		-----		-----
120	D130	1A		-----	854	D130	1A		-----
140	D130	1a		-----	856	D130	1a		-----
150		-----		-----	862	D130	1a		-----
158	D130	1a		-----	863	D130	1a		-----
159		-----		-----	864	D130	1a		-----
169	D130	1a		-----	872		-----		-----
171	D130	1a		-----	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203	D130	1a		-----	887		-----		-----
215		-----		-----	904	D130	1a		-----
217	D130	1a		-----	912		1a		-----
221		-----		-----	913	D130	1a		-----
224	D130	1a		-----	914		-----		-----
225	D130	1a		-----	922	D130	1a		-----
228	D130	1A		-----	962		-----		-----
230	D130	1a		-----	963		-----		-----
237	D130	1A		-----	970	D130	1a		-----
238	D130	1a		-----	971	D130	1a		-----
253	D130	1A		-----	974	D130	1a		-----
254	D130	1a		-----	988		-----		-----
256	D130	1A		-----	994		-----		-----
258	D130	1a		-----	995	D130	1A		-----
273	D130	1a		-----	996		-----		-----
312	D130	1a		-----	997		-----		-----
317	D130	1a		-----	998	D130	1A		-----
323	D130	1A		-----	1006	D130	1a		-----
333		-----		-----	1011	ISO2160	1a		-----
334	D130	1A		-----	1016	ISO2160	1A		-----
335	D130	1b		-----	1026	ISO2160	1A		-----
336	D130	1a		-----	1059	ISO2160	1a		-----
337		-----		-----	1105	D130	1a		-----
339		-----		-----	1109	D130	1a		-----
342	D130	1A		-----	1121	IP154	1		-----
343	D130	1a		-----	1126		-----		-----
344	D130	1a		-----	1134		-----		-----
349		-----		-----	1135	ISO2160	1A		-----
353	IP154	1a		-----	1140	IP154	1A		-----
355		-----		-----	1146		-----		-----
356	D130	1B		-----	1162	D130	1a		-----
381	ISO2160	1		-----	1171	ISO2160	1A		-----
433		-----		-----	1182		-----		-----
463	ISO2160	1A		-----	1213		-----		-----
485		-----		-----	1227	D130	1A		-----
495		-----		-----	1277		-----		-----
498		-----		-----	1284		-----		-----
507	D130	1A		-----	1297	D130	1A		-----
511		-----		-----	1299	D130	1A		-----
529	D130	1A		-----	1356		-----		-----
541	D130	1a		-----	1357	D130	1a		-----
551		-----		-----	1389	D130	1A		-----
554		-----		-----	1412	D130	1a		-----
555		-----		-----	1417	IP154	1B		-----
558		-----		-----	1430	D130	1a		-----
562	D130	1a		-----	1431	D130	1a		-----
575	D130	1a		-----	1433	D130	1a		-----
603		-----		-----	1441	D130	1A		-----
604		-----		-----	1498		-----		-----
608	D130	1a		-----	1575	D130	1A		-----
614	D130	1a		-----	1588		-----		-----
621		-----		-----	1616	D130	1a		-----
631		-----		-----	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634	ISO2160	1a		-----
657	D130	1a		-----	1643		-----		-----
732		-----		-----	1720	D130	1a		-----
733		-----		-----	1724	D130	No.1a		-----
750		-----		-----	1740		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807	D130	1a		-----	6201	D130	1a		-----
1810	ISO2160	1a		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D130	1a		-----	6258	D130	1a		-----
1967	D130	1A		-----	6262	D130	1a		-----
6026	D130	1a		-----	6266		-----		-----
6034		-----		-----	6272	D130	1b		-----
6049	D130	1a		-----	6291	D130	1a		-----
6054	D130	1a		-----	6317	D130	1a		-----
6057	D130	1A		-----	6319		-----		-----
6103	D130	1a		-----	6341		-----		-----
6142		-----		-----	6346		-----		-----

n	101
mean (n)	1 (1a/1b)

Determination of Density at 15°C on sample #20170; results in kg/m³

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4052	837.3		-0.24	781		-----		-----
53	D4052	837.3		-0.24	785		-----		-----
62	D4052	837.4		0.32	798		-----		-----
90	D4052	837.3		-0.24	825	D4052	837.32		-0.13
92	D4052	836.8	R(0.01)	-3.04	851	D4052	837.3		-0.24
120	D4052	837.6		1.44	854	D4052	837.34		-0.01
140	D4052	837.4		0.32	856	D4052	837.4		0.32
150		-----		-----	862	D4052	837.4		0.32
158	D4052	837.4		0.32	863	D4052	837.44		0.55
159	D4052	838.2	C,R(0.01)	4.80	864	D4052	837.4		0.32
169	D4052	837.4		0.32	872		-----		-----
171	D4052	837.4		0.32	873		-----		-----
175	D4052	837.2		-0.80	874		-----		-----
186		-----		-----	886	D4052	837.3		-0.24
203	D4052	836.70	R(0.01)	-3.60	887	D4052	837.3		-0.24
215	ISO3675	837.5		0.88	904	D4052	837.5		0.88
217	D4052	837.3		-0.24	912	D4052	837.4		0.32
221	D4052	837.4		0.32	913	D4052	837.4		0.32
224	D1298	837.40		0.32	914		-----		-----
225	D4052	837.3		-0.24	922	D4052	837.3		-0.24
228	D4052	837.4		0.32	962		-----		-----
230	D4052	837.35		0.04	963		-----		-----
237	D4052	837.3		-0.24	970	D4052	837.3		-0.24
238	D4052	837.0	R(0.01)	-1.92	971	D4052	837.3		-0.24
253	D4052	837.3		-0.24	974	D4052	837.3		-0.24
254	D4052	837.3		-0.24	988		-----		-----
256	D4052	837.4		0.32	994		-----		-----
258	D4052	837.4		0.32	995	D4052	837.4		0.32
273	D4052	837.2		-0.80	996		-----		-----
312	D4052	837.2		-0.80	997	D4052	837.4		0.32
317	D4052	837.3		-0.24	998	D4052	837.3		-0.24
323	D4052	837.3		-0.24	1006	D4052	837.4		0.32
333	D4052	837.2		-0.80	1011	ISO12185	837.3		-0.24
334	ISO12185	837.3		-0.24	1016		-----		-----
335	D4052	837.4		0.32	1026	D4052	837.3		-0.24
336	D4052	837.3		-0.24	1059	ISO12185	837.3		-0.24
337	D4052	837.3		-0.24	1105	D4052	837.4		0.32
339		-----		-----	1109	D4052	837.3	C	-0.24
342	D4052	837.3		-0.24	1121	D4052	837.4		0.32
343	D4052	837.3		-0.24	1126		-----		-----
344	D4052	837.3		-0.24	1134	IP365	837.4		0.32
349	D4052	837.21		-0.74	1135	D4052	837.5		0.88
353	D4052	837.3		-0.24	1140	IP365	837.4		0.32
355	D4052	837.4		0.32	1146	D4052	837.4		0.32
356	D4052	837.4		0.32	1162	D4052	837.30		-0.24
381	ISO12185	837.25		-0.52	1171	D4052	837.15		-1.08
433	ISO12185	837.3		-0.24	1182	ISO12185	837.201		-0.79
463	ISO12185	837.36		0.10	1213	D4052	837.275		-0.38
485	D4052	837.2		-0.80	1227	D4052	837.3		-0.24
495	ISO12185	837.27		-0.41	1277		-----		-----
498		-----		-----	1284	D4052	837.35		0.04
507	D4052	837.46		0.66	1297	D4052	837.4	C	0.32
511		-----		-----	1299	D4052	837.3		-0.24
529	D4052	837.42		0.43	1356	ISO12185	837.4		0.32
541	D4052	837.38		0.21	1357	D4052	837.4		0.32
551		-----		-----	1389	D4052	837.3		-0.24
554		-----		-----	1412	D4052	837.3		-0.24
555		-----		-----	1417	IP365	837.3		-0.24
558		-----		-----	1430	D4052	837.4		0.32
562	D4052	837.3		-0.24	1431	D4052	837.38		0.21
575	D1298	834.8	C,R(0.01)	-14.24	1433	D4052	837.3		-0.24
603	D4052	837.3		-0.24	1441	D4052	837.54		1.11
604	D4052	837.28		-0.35	1498	D4052	837.3		-0.24
608	D4052	837.0	R(0.01)	-1.92	1575		-----	W	-----
614	D4052	837.5		0.88	1588	ISO12185	837.80	R(0.01)	2.56
621		-----		-----	1616	D4052	837.38		0.21
631	D4052	837.48		0.77	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634	ISO12185	837.3		-0.24
657	D4052	837.4		0.32	1643	D4052	837.2		-0.80
732	ISO12185	837.37		0.15	1720	D4052	837.2		-0.80
733	ISO12185	837.4		0.32	1724	D4052	837.5		0.88
750		-----		-----	1740	D1298	837.4		0.32

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783	D4052	837.3		-0.24	6172	D4052	837.5		0.88
1807	D4052	837.4		0.32	6201	D4052	837.4		0.32
1810	D4052	837.3		-0.24	6238		-----		-----
1811	D4052	837.3		-0.24	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D1298	837.4		0.32	6258	D4052	837.3		-0.24
1967	D1298	837.3		-0.24	6262	D4052	837.35		0.04
6026	D1298	836.9	R(0.01)	-2.48	6266		-----		-----
6034	D4052	837.3		-0.24	6272	D4052	835.5	R(0.01)	-10.32
6049	D4052	837.3		-0.24	6291	D4052	837.3		-0.24
6054	D4052	837.36		0.10	6317	D4052	837.25		-0.52
6057	D4052	837.4		0.32	6319		-----		-----
6103	ISO12185	837.3		-0.24	6341		-----		-----
6142	ISO12185	837.2		-0.80	6346		-----		-----

normality	OK
n	126
outliers	9
mean (n)	837.34
st.dev. (n)	0.0795
R(calc.)	0.22
st.dev.(D4052:18a)	0.179
R(D4052:18a)	0.5

Lab 159 reported: 0.8382 kg/m^3
Lab 575 first reported: 835.6
Lab 1109 reported: 0.83730 kg/m^3
Lab 1297 first reported: 834.0
Lab 1575 test result withdrawn, first reported: 836.5

Kernel Density
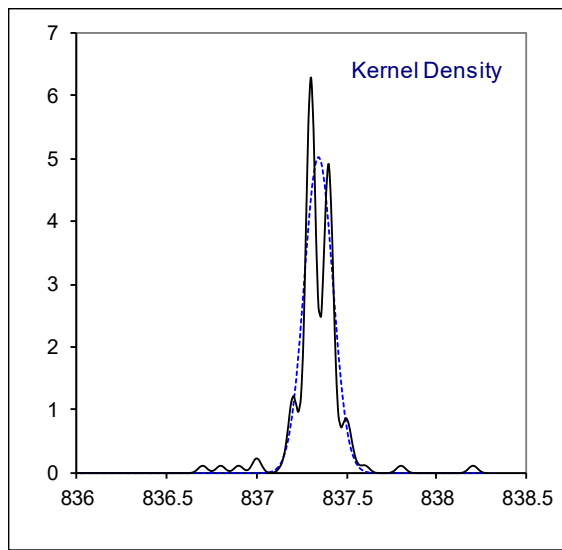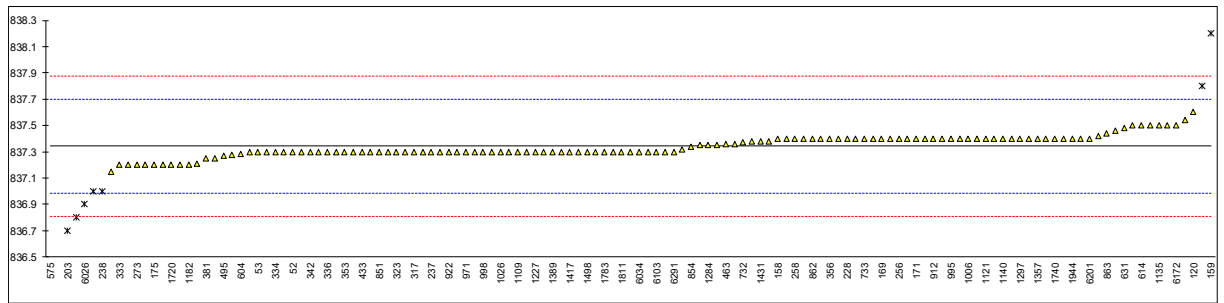
Determination of Distillation at 760 mmHg on sample #20170; results in °C

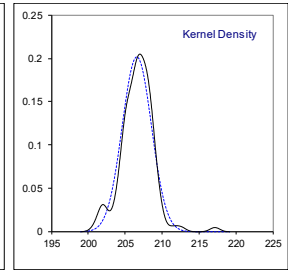| lab	method	IBP		10% rec		50% rec		90% rec		95% rec		FBP	
52	D86-automated	166.3		206.3		264.4		335.0		350.5		359.0	
53		-----		-----		-----		-----		-----		-----	
62	D86-automated	169.9		209.5		267.2		337.3		353.1		359.9	
90	D86-automated	166.1		205.1		265.1		338.1		353.1		360.1	
92	D86-automated	169.3		204.5		265.3		335.1		349.7		361.0	
120	D86-automated	169.2		208.2		266.8		337.7		-----		360.3	
140	D86-automated	161.8		206.2	C	264.4		335.3		350.0		359.0	
150		-----		-----		-----		-----		-----		-----	
158	D86-automated	164.4		204.4		264.5		336.8		351.5		355.3	
159	D86	163.4		205.1		265.2		332.4		349.2		356.6	
169	D86-automated	169.5		206.7		266.4		337.1		353.6		360.3	
171	D86-automated	171.9		217.1	R1	276.9	R1	336.8		348.9		357.5	
175	D86-automated	167.9		205.6		266.8		338.4		355.0		359.5	
186		-----		-----		-----		-----		-----		-----	
203		-----		-----		-----		-----		-----		-----	
215		-----		-----		-----		-----		-----		-----	
217	D86-automated	168.2		207.4		266.2		335.1		349.2		359.4	
221	D86-manual	157.0		207.8		266.2		336.7		352.0		358.5	
224	D86-manual	166.53		203.29		263.04		334.30		348.05		355.55	
225	D86-manual	168.0		205.0		264.0		335.0		348.0		353.0	
228	D86-manual	170.0		209.0		265.0		331.0		343.0		358.0	
230	D86-automated	166.4		206.3		265.6		335.6		349.4		359.8	
237	D86-manual	169.0		205.0		264.0		331.5	C	342.0		357.0	
238		-----		-----		-----		-----		-----		-----	
253	D86-manual	165.0		206.5		266.0		336.0		350.0		360.0	
254	D86-manual	167.0		207.0		265.0		336.0		351.0		359.0	
256	D86	166.0		206.0		265.0		335.0		351.0		357.0	
258	D86-automated	168.8		209.9		266.6		336.2		349.4		356.5	
273	D86-automated	167.5		208.5		266.0		336.5		351.5		359.0	
312	D86-automated	168.3		206.2		265.7		334.5		348.3		357.5	
317	D86-automated	173.1		209.4		267.1		337.8		352.6		357.4	
323	D86-automated	170.4		208.1		267.1		337.7		354.0		360.6	
333		-----		-----		-----		-----		-----		-----	
334	D86-automated	162.1		205.4		265.3		336.1		352.4		357.7	
335	D86-automated	168.2		208.6		266.1		337.6		352.8		360.9	
336	D86-automated	162.5		204.0		264.1		333.0		347.7		357.3	
337	D86-automated	163.1	C	204.9		264.8		333.8		346.8		353.0	
339		-----		-----		-----		-----		-----		-----	
342	D86-automated	167.3		206.5		265.7		336.1		352.0		358.3	
343	D86-automated	162.8		204.8		264		333.7		347.7		360.6	
344	D86-automated	174.0		211.4		266.6		338.0		354.3		360.0	
349	D86-automated	162.2		206.6		264.1		334.6		348.9		356.4	
353	D86-automated	157.6		205.3		264.2		335.3		350.6		356.8	
355	D86-manual	164.15		204.61		265.12		335.39		350.0		357.75	
356	D86-automated	163.5		205.6		265.2		336.3		352.4		358.4	
381	D86-automated	157.5		205.4		266.3		336.8		350.7		358.5	
433		-----		-----		-----		-----		-----		-----	
463	D86-automated	168.9		207.1		265.0		334.0		348.7		356.2	
485		168.65		207.75		266.65		336.25		350.70		359.70	
495	D86-automated	164.1		207.1		266.1		337.0		353.2		360.2	
498		-----		-----		-----		-----		-----		-----	
507	D86-manual	163		202		262		330		345		353	
511		-----		-----		-----		-----		-----		-----	
529	D86-automated	163.2		206.8		266.2		336.7		352.0		359.0	
541	D86-automated	166.45		206.60		266.25		335.42		349.98		358.97	
551		-----		-----		-----		-----		-----		-----	
554		-----		-----		-----		-----		-----		-----	
555		-----		-----		-----		-----		-----		-----	
558		-----		-----		-----		-----		-----		-----	
562	D86	166.5		206.0		266.0		336.0		-----		-----	
575		-----		-----		-----		-----		-----		-----	
603		-----		-----		-----		-----		-----		-----	
604	D86-automated	167.5		209.1		266.2		336.2		350.5		353.9	
608	D86-automated	167.6		206.9		266.5		337.1		352.5		360.6	
614	D86-manual	78	R1	205	ex	260	R1	327	R1	340	R1	349	R1
621		-----		-----		-----		-----		-----		-----	
631	D86-manual	173.5		206.5		267.0		337.5		350.0		360.0	
633		-----		-----		-----		-----		-----		-----	
634		-----		-----		-----		-----		-----		-----	
657	D86-automated	166.8		207.9		267.0		336.9		352.9		359.0	
732		168		206		267		339		353		362	
733		-----		-----		-----		-----		-----		-----	
750		-----		-----		-----		-----		-----		-----	
781		-----		-----		-----		-----		-----		-----	

lab	method	IBP	10% rec	50% rec	90% rec	95% rec	FBP
785		-----	-----	-----	-----	-----	-----
798		-----	-----	-----	-----	-----	-----
825		167.5	206.3	264.7	334.3	348.6	359.2
851	D86-manual	164.0	205.0	266.0	338.0	350.0	359.0
854	D86-automated	163.0	206.9	265.4	335.4	350.5	358.8
856	D86-automated	162.3	206.6	264.5	335.3	349.8	356.0
862	D86-automated	163.9	207.1	264.6	334.7	349.2	355.5
863	D86-automated	163.3	206.9	265.9	336.4	351.8	358.6
864	D86-automated	163.0	206.2	265.2	335.0	350.9	357.5
872		-----	-----	-----	-----	-----	-----
873		-----	-----	-----	-----	-----	-----
874		-----	-----	-----	-----	-----	-----
886		-----	-----	-----	-----	-----	-----
887	D86-automated	159.0	208.5	266.8	338.1	353.6	360.9
904	D86-automated	167.2	204.8	264.8	333.5	347.7	359.2
912	D86	166.0	204.0	267.0	337.0	350.0	362.0
913	D86	166	204	267	340	356	360
914		-----	-----	-----	-----	-----	-----
922	D86-automated	168.1	207.8	266.2	336.4	351.3	359.2
962		-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----
970	D86-automated	167.9	207.5	266.9	337.4	353.4	359.5
971	D86-automated	166.2	208.2	266.3	337.1	352.0	359.7
974	D86-automated	166.2	208.5	267.5	337.3	352.3	359.9
988		-----	-----	-----	-----	-----	-----
994	D86-manual	-----	-----	-----	-----	-----	-----
995	D86-manual	167.0	206.0	267.5	337.5 C	355.0	363.5
996		-----	-----	-----	-----	-----	-----
997	D86-manual	165.0	205.5	267.0	337.0 C	354.0	362.5
998	D86-manual	167.0	205.0	267.0	337.0 C	355.5	363.0
1006	D86-automated	164.9	207.5	266.1	335.2	349.4	359.5
1011	ISO3405-autom.	168.8	208.6	266	335.3	350.1	359.6
1016		-----	-----	-----	-----	-----	-----
1026	ISO3405-autom.	165.9	208.2	266.0	335.1	350	359.3
1059	ISO3405-autom.	169.0	207.6	264.9	335.3	349.4	356.6
1105	D86-automated	164.1	207.2	264.9	334.5	348.2	358.1
1109	D86-automated	165.3	206.9	264.9	334.5	349.2	358.9
1121	D86-automated	171.9	207.4	264.2	335.4	349.9	359.7
1126		170.4	208.6	266.6	336.9	350.3	359.3
1134	IP123-automated	159.4	204.9	264.9	336.0	351.8	358.6
1135	D86-automated	168.1	208.4	266.7	336.5	351.7	360.2
1140	IP123-automated	158.6	206.0	265.0	336.5	353.1	358.6
1146	D86-automated	169.2	206.2	265.0	334.1	347.6	359.4
1162	D86-manual	159.5	203.5	265.0	333.5	346.5	357.0
1171	ISO3405-manual	171.43	207.75	265.12	333.76	347.79	363.08
1182	D86-automated	166.5	205.6	266.1	337.1	353.6	359.4
1213		-----	-----	-----	-----	-----	-----
1227	D86-automated	168	207.8	265.1	333.6	347.5	359.9
1277		-----	-----	-----	-----	-----	-----
1284	D86-automated	163.5	206.8	266.4	335.8	351.2	359.8
1297	D86-automated	165.3	206.4	265.3	335.4	350.7	357.8
1299	D86-automated	168.3	208.4	265.8	335.8	350.2	360.3
1356		-----	212.5	272 R1	339.5	-----	-----
1357	D86-automated	167.3	209.6	267.0	336.6	349.9	357.7
1389	D86-automated	161.0	208.7	266.1	335.5	348.9	358.5
1412	D86-manual	168.5	207.0	266.0	337.0	353.5	360.5
1417	D86-automated	167.5	208.9	268.3	338.7	357.3	359.2
1430	D86-automated	152.8 R5	201.7	262.7	333.8	348.1	355.1
1431		159.3	204.0	263.9	334.0	348.3	359.3
1433	D86-automated	167.1	207.3	266.6	336.5	351.7	357.0 C
1441	D86-automated	167.5	207.9	266.0	335.2	348.6	360.0
1498	D86-automated	163.2	205.6	265.9	337.1	352.0	359.7
1575	D7345	162.7	201.9	266.3	334.4	349.1	353.7
1588		-----	-----	-----	-----	-----	-----
1616	D86-automated	165.5	208.2	265.3	334.5	348.3	358.1
1629		-----	-----	-----	-----	-----	-----
1631		-----	-----	-----	-----	-----	-----
1634	D86-automated	167.6	207.8	265.9	335.2	349.7	359.8
1643		-----	-----	-----	-----	-----	-----
1720	D86-automated	162.4	205.3	264.8	333.2	346.8	358.0
1724	D86-automated	165.2	209.2	266.5	334.9	349.7	358.6
1740	D86-automated	168.1	207.1	265.8	335.1	349.3	358.6
1783	D86-automated	166.5	208.1	265.9	335.3	350.0	359.0
1807	D86-automated	163.7	205.1	263.5	333.1	346.6	358
1810	D86-automated	165.3	207.8	265.1	335.4	349.6	357.9
1811	D86-automated	163.7	206.6	265.5	335.3	349.0	358.8
1906		-----	-----	-----	-----	-----	-----

Gasoil - ASTM (winter): iis20G06ASTM == Revised ==

lab	method	IBP		10% rec		50% rec		90% rec	95% rec	FBP
1944	D86-manual	167.7		206.9		265.0		336.1	351.7	360.1
1967	D86-manual	165.5		202.0		265.0		335.0	350.0	360.0
6026	D86-manual	165.5		202.0		263.0		334.0	348.0	357.5
6034	D86-automated	153.8	C,R5	200.9	C	260.7	C,R1	332.1	345.8	353.2
6049	D86-automated	163.9		207.9		265.4		336.2	351.8	359.0
6054	D86-automated	161.7		205.8		264.1		334.1	349.2	356.5
6057	D86-automated	162.2		207.6		266.2		336.4	351.6	360.1
6103		169.45		206.8		265.4		336.1	352.3	358.3
6142	ISO3405-autom.	160.65		204.9		264.05		333.95	348.55	357.55
6172	D86	165.5		204.8		265.7		339.3	355.8	364.3
6201	D86-automated	166.7		206.5		264.6		334.7	349.0	358.5
6238		-----		-----		-----		-----	-----	-----
6249		-----		-----		-----		-----	-----	-----
6253		-----		-----		-----		-----	-----	-----
6258	D86-automated	168.0		208.6		266.8		336.6	351.2	355.9
6262	D86-automated	166.0		207.6		265.8		335.1	349.2	359.8
6266		-----		-----		-----		-----	-----	-----
6272	D86	170.3		202		264.3		339.6	354.4	356.7
6291	D86-automated	170.3		208.2		265.7		335.4	350.4	359.0
6317		-----		-----		-----		-----	-----	-----
6319		-----		-----		-----		-----	-----	-----
6341		-----		-----		-----		-----	-----	-----
6346		-----		-----		-----		-----	-----	-----
	normality	OK		OK		OK		OK	OK	suspect
	n	119		121		119		122	119	120
	outliers	3		1 (+1ex)		4		1	1	1
	mean (n)	165.94		206.54		265.58		335.74	350.45	358.65
	st.dev. (n)	3.379		1.980		1.100		1.725	2.516	2.067
	R(calc.)	9.46		5.54		3.08		4.83	7.04	5.79
	st.dev.(D86-A:20b)	3.259		1.62		1.071		1.799	3.085	2.536
	R(D86-A:20b)	9.13		4.54		3		5.04	8.64	7.1
Compare										
	R(D86-M:20b)	6.57		4.45		3.95		4.31	4.85	3.79

Lab 140   first reported for temp. at 10% rec.: 192.6
Lab 237   first reported for temp. at 90% rec.: 330.0
Lab 337   first reported for Initial Boiling Point: 150.1
Lab 614   test resul for temp. at 10% rec. was excluded as related test results are statistical outliers
Lab 995   first reported for temp. at 90% rec.: 342.5
Lab 997   first reported for temp. at 90% rec.: 342.0
Lab 998 first reported for temp. at 90% rec.: 342.0
Lab 1433 first reported for Final Boiling Point: 367
Lab 6034 first reported for Initial Boiling Point: 155.7, for temp. at 10% rec.: 200.3 and for temp. at 50% rec.: 261.3
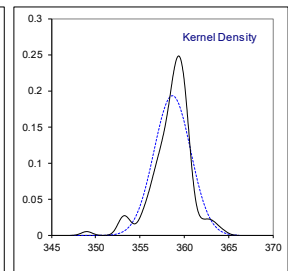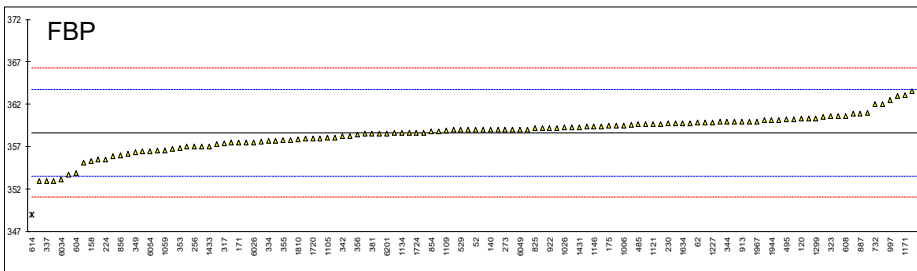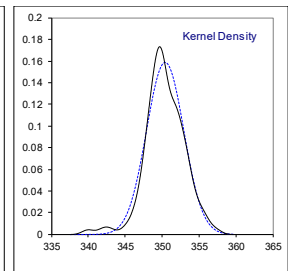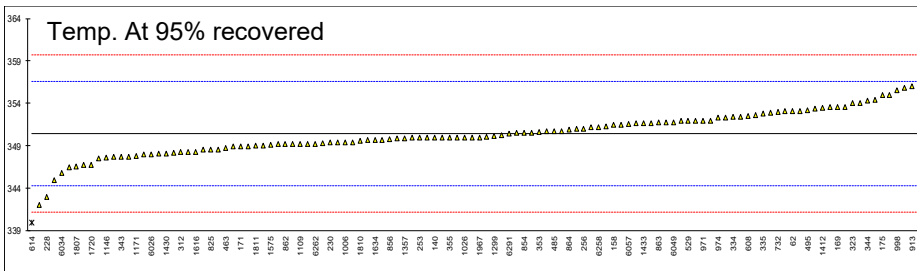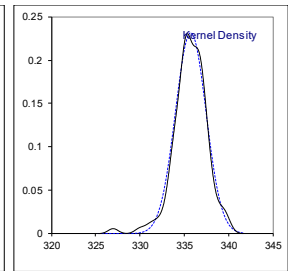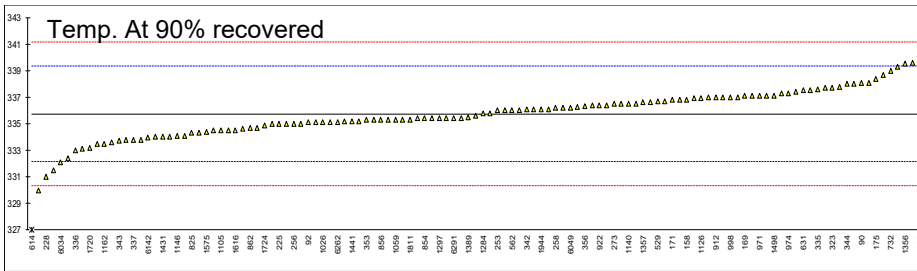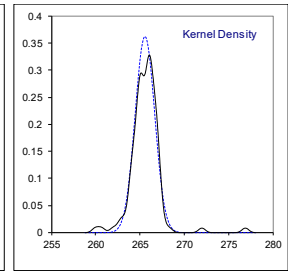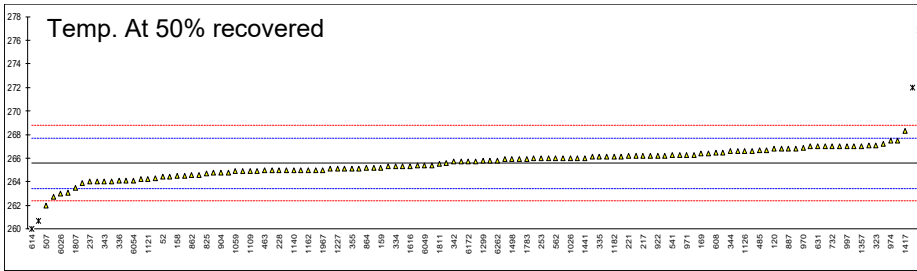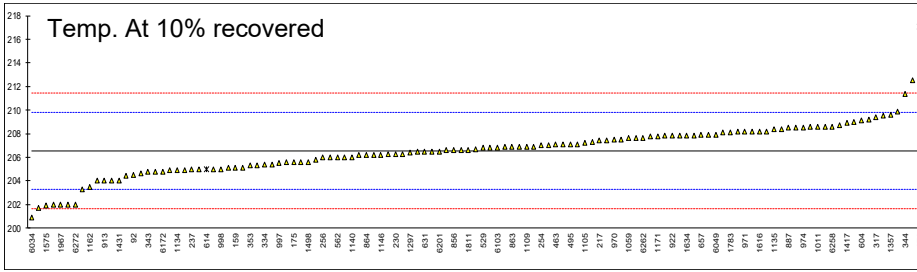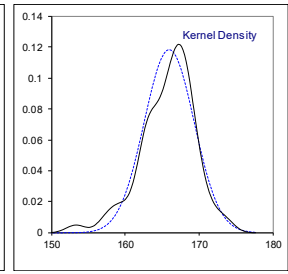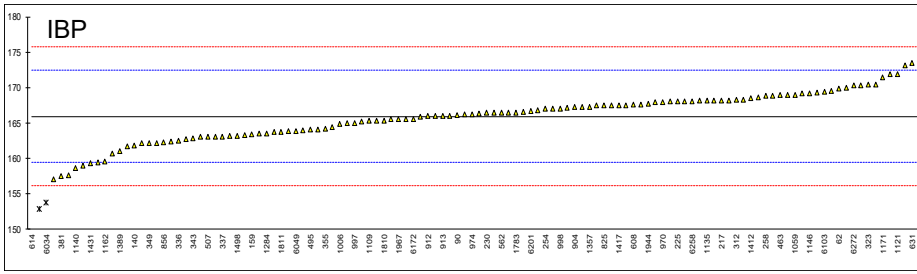
z-scores Distillation at 760 mmHg on sample #20170

lab	IBP	10% rec	50% rec	90% rec	95% rec	FBP
52	0.11	-0.15	-1.11	-0.41	0.02	0.14
53	-----	-----	-----	-----	-----	-----
62	1.22	1.82	1.51	0.87	0.86	0.49
90	0.05	-0.89	-0.45	1.31	0.86	0.57
92	1.03	-1.26	-0.27	-0.36	-0.24	0.93
120	1.00	1.02	1.13	1.09	-----	0.65
140	-1.27	-0.21	-1.11	-0.24	-0.15	0.14
150	-----	-----	-----	-----	-----	-----
158	-0.47	-1.32	-1.01	0.59	0.34	-1.32
159	-0.78	-0.89	-0.36	-1.86	-0.41	-0.81
169	1.09	0.10	0.76	0.76	1.02	0.65
171	1.83	6.51	10.56	0.59	-0.50	-0.45
175	0.60	-0.58	1.13	1.48	1.47	0.34
186	-----	-----	-----	-----	-----	-----
203	-----	-----	-----	-----	-----	-----
215	-----	-----	-----	-----	-----	-----
217	0.69	0.53	0.57	-0.36	-0.41	0.30
221	-2.74	0.78	0.57	0.53	0.50	-0.06
224	0.18	-2.00	-2.37	-0.80	-0.78	-1.22
225	0.63	-0.95	-1.48	-0.41	-0.80	-2.23
228	1.25	1.52	-0.55	-2.64	-2.42	-0.26
230	0.14	-0.15	0.01	-0.08	-0.34	0.45
237	0.94	-0.95	-1.48	-2.36	-2.74	-0.65
238	-----	-----	-----	-----	-----	-----
253	-0.29	-0.02	0.39	0.14	-0.15	0.53
254	0.33	0.28	-0.55	0.14	0.18	0.14
256	0.02	-0.33	-0.55	-0.41	0.18	-0.65
258	0.88	2.07	0.95	0.26	-0.34	-0.85
273	0.48	1.21	0.39	0.42	0.34	0.14
312	0.73	-0.21	0.11	-0.69	-0.70	-0.45
317	2.20	1.76	1.41	1.15	0.70	-0.49
323	1.37	0.96	1.41	1.09	1.15	0.77
333	-----	-----	-----	-----	-----	-----
334	-1.18	-0.70	-0.27	0.20	0.63	-0.37
335	0.69	1.27	0.48	1.03	0.76	0.89
336	-1.05	-1.56	-1.39	-1.52	-0.89	-0.53
337	-0.87	-1.01	-0.73	-1.08	-1.18	-2.23
339	-----	-----	-----	-----	-----	-----
342	0.42	-0.02	0.11	0.20	0.50	-0.14
343	-0.96	-1.07	-1.48	-1.13	-0.89	0.77
344	2.47	3.00	0.95	1.26	1.25	0.53
349	-1.15	0.04	-1.39	-0.63	-0.50	-0.89
353	-2.56	-0.76	-1.29	-0.24	0.05	-0.73
355	-0.55	-1.19	-0.43	-0.19	-0.15	-0.35
356	-0.75	-0.58	-0.36	0.31	0.63	-0.10
381	-2.59	-0.70	0.67	0.59	0.08	-0.06
433	-----	-----	-----	-----	-----	-----
463	0.91	0.35	-0.55	-0.97	-0.57	-0.97
485	0.83	0.75	0.99	0.28	0.08	0.41
495	-0.56	0.35	0.48	0.70	0.89	0.61
498	-----	-----	-----	-----	-----	-----
507	-0.90	-2.80	-3.35	-3.19	-1.77	-2.23
511	-----	-----	-----	-----	-----	-----
529	-0.84	0.16	0.57	0.53	0.50	0.14
541	0.16	0.04	0.62	-0.18	-0.15	0.13
551	-----	-----	-----	-----	-----	-----
554	-----	-----	-----	-----	-----	-----
555	-----	-----	-----	-----	-----	-----
558	-----	-----	-----	-----	-----	-----
562	0.17	-0.33	0.39	0.14	-----	-----
575	-----	-----	-----	-----	-----	-----
603	-----	-----	-----	-----	-----	-----
604	0.48	1.58	0.57	0.26	0.02	-1.87
608	0.51	0.22	0.85	0.76	0.66	0.77
614	-26.98	-0.95	-5.21	-4.86	-3.39	-3.81
621	-----	-----	-----	-----	-----	-----
631	2.32	-0.02	1.32	0.98	-0.15	0.53
633	-----	-----	-----	-----	-----	-----
634	-----	-----	-----	-----	-----	-----
657	0.27	0.84	1.32	0.64	0.79	0.14
732	0.63	-0.33	1.32	1.81	0.83	1.32
733	-----	-----	-----	-----	-----	-----
750	-----	-----	-----	-----	-----	-----
781	-----	-----	-----	-----	-----	-----
785	-----	-----	-----	-----	-----	-----

lab	IBP	10% rec	50% rec	90% rec	95% rec	FBP
798	-----	-----	-----	-----	-----	-----
825	0.48	-0.15	-0.83	-0.80	-0.60	0.22
851	-0.59	-0.95	0.39	1.26	-0.15	0.14
854	-0.90	0.22	-0.17	-0.19	0.02	0.06
856	-1.12	0.04	-1.01	-0.24	-0.21	-1.05
862	-0.62	0.35	-0.92	-0.58	-0.41	-1.24
863	-0.81	0.22	0.29	0.37	0.44	-0.02
864	-0.90	-0.21	-0.36	-0.41	0.14	-0.45
872	-----	-----	-----	-----	-----	-----
873	-----	-----	-----	-----	-----	-----
874	-----	-----	-----	-----	-----	-----
886	-----	-----	-----	-----	-----	-----
887	-2.13	1.21	1.13	1.31	1.02	0.89
904	0.39	-1.07	-0.73	-1.25	-0.89	0.22
912	0.02	-1.56	1.32	0.70	-0.15	1.32
913	0.02	-1.56	1.32	2.37	1.80	0.53
914	-----	-----	-----	-----	-----	-----
922	0.66	0.78	0.57	0.37	0.27	0.22
962	-----	-----	-----	-----	-----	-----
963	-----	-----	-----	-----	-----	-----
970	0.60	0.59	1.23	0.92	0.95	0.34
971	0.08	1.02	0.67	0.76	0.50	0.41
974	0.08	1.21	1.79	0.87	0.60	0.49
988	-----	-----	-----	-----	-----	-----
994	-----	-----	-----	-----	-----	-----
995	0.33	-0.33	1.79	0.98	1.47	1.91
996	-----	-----	-----	-----	-----	-----
997	-0.29	-0.64	1.32	0.70	1.15	1.52
998	0.33	-0.95	1.32	0.70	1.64	1.72
1006	-0.32	0.59	0.48	-0.30	-0.34	0.34
1011	0.88	1.27	0.39	-0.24	-0.11	0.37
1016	-----	-----	-----	-----	-----	-----
1026	-0.01	1.02	0.39	-0.36	-0.15	0.26
1059	0.94	0.65	-0.64	-0.24	-0.34	-0.81
1105	-0.56	0.41	-0.64	-0.69	-0.73	-0.22
1109	-0.19	0.22	-0.64	-0.69	-0.41	0.10
1121	1.83	0.53	-1.29	-0.19	-0.18	0.41
1126	1.37	1.27	0.95	0.64	-0.05	0.26
1134	-2.01	-1.01	-0.64	0.14	0.44	-0.02
1135	0.66	1.15	1.04	0.42	0.40	0.61
1140	-2.25	-0.33	-0.55	0.42	0.86	-0.02
1146	1.00	-0.21	-0.55	-0.91	-0.92	0.30
1162	-1.97	-1.87	-0.55	-1.25	-1.28	-0.65
1171	1.69	0.75	-0.43	-1.10	-0.86	1.75
1182	0.17	-0.58	0.48	0.76	1.02	0.30
1213	-----	-----	-----	-----	-----	-----
1227	0.63	0.78	-0.45	-1.19	-0.96	0.49
1277	-----	-----	-----	-----	-----	-----
1284	-0.75	0.16	0.76	0.03	0.24	0.45
1297	-0.19	-0.09	-0.27	-0.19	0.08	-0.34
1299	0.73	1.15	0.20	0.03	-0.08	0.65
1356	-----	3.67	5.99	2.09	-----	-----
1357	0.42	1.89	1.32	0.48	-0.18	-0.37
1389	-1.51	1.33	0.48	-0.13	-0.50	-0.06
1412	0.79	0.28	0.39	0.70	0.99	0.73
1417	0.48	1.46	2.53	1.65	2.22	0.22
1430	-4.03	-2.98	-2.69	-1.08	-0.76	-1.40
1431	-2.04	-1.56	-1.57	-0.97	-0.70	0.26
1433	0.36	0.47	0.95	0.42	0.40	-0.65
1441	0.48	0.84	0.39	-0.30	-0.60	0.53
1498	-0.84	-0.58	0.29	0.76	0.50	0.41
1575	-0.99	-2.86	0.67	-0.75	-0.44	-1.95
1588	-----	-----	-----	-----	-----	-----
1616	-0.13	1.02	-0.27	-0.69	-0.70	-0.22
1629	-----	-----	-----	-----	-----	-----
1631	-----	-----	-----	-----	-----	-----
1634	0.51	0.78	0.29	-0.30	-0.24	0.45
1643	-----	-----	-----	-----	-----	-----
1720	-1.08	-0.76	-0.73	-1.41	-1.18	-0.26
1724	-0.23	1.64	0.85	-0.47	-0.24	-0.02
1740	0.66	0.35	0.20	-0.36	-0.37	-0.02
1783	0.17	0.96	0.29	-0.24	-0.15	0.14
1807	-0.69	-0.89	-1.95	-1.47	-1.25	-0.26
1810	-0.19	0.78	-0.45	-0.19	-0.28	-0.30
1811	-0.69	0.04	-0.08	-0.24	-0.47	0.06
1906	-----	-----	-----	-----	-----	-----
1944	0.54	0.22	-0.55	0.20	0.40	0.57
1967	-0.13	-2.80	-0.55	-0.41	-0.15	0.53

| lab	IBP	10% rec	50% rec	90% rec	95% rec	FBP
6026	-0.13	-2.79	-2.41	-0.97	-0.80	-0.45
6034	-3.72	-3.47	-4.56	-2.02	-1.51	-2.15
6049	-0.62	0.85	-0.17	0.26	0.44	0.14
6054	-1.30	-0.45	-1.39	-0.91	-0.41	-0.85
6057	-1.15	0.66	0.57	0.37	0.37	0.57
6103	1.08	0.17	-0.17	0.20	0.60	-0.14
6142	-1.62	-1.00	-1.43	-1.00	-0.62	-0.43
6172	-0.13	-1.06	0.11	1.98	1.73	2.23
6201	0.23	-0.02	-0.92	-0.58	-0.47	-0.06
6238	-----	-----	-----	-----	-----	-----
6249	-----	-----	-----	-----	-----	-----
6253	-----	-----	-----	-----	-----	-----
6258	0.63	1.28	1.13	0.48	0.24	-1.08
6262	0.02	0.66	0.20	-0.36	-0.41	0.45
6266	-----	-----	-----	-----	-----	-----
6272	1.34	-2.79	-1.20	2.15	1.28	-0.77
6291	1.34	1.03	0.11	-0.19	-0.02	0.14
6317	-----	-----	-----	-----	-----	-----
6319	-----	-----	-----	-----	-----	-----
6341	-----	-----	-----	-----	-----	-----
6346	-----	-----	-----	-----	-----	-----

Determination of Distillation at 760 mmHg on sample #20170; results in %V/V

lab	method	Vol.250°C	mark	z(targ)	Vol.350°C	mark	z(targ)	%residue
52	D86-automated	40.0		0.93	94.8		-0.08	1.4
53		-----		-----	-----		-----	-----
62	D86-automated	38.4		-0.75	94.4		-0.50	1.3
90	D86-automated	40		0.93	94		-0.92	1.5
92	D86-automated	40.3		1.25	95.1		0.24	1.4
120		-----		-----	-----		-----	-----
140		-----		-----	-----		-----	1.4
150		-----		-----	-----		-----	-----
158		-----		-----	-----		-----	1.7
159		-----		-----	-----		-----	1.5
169		-----		-----	-----		-----	1.5
171	D86-automated	31.4	R(0.01)	-8.12	96.6		1.82	-----
175		-----		-----	-----		-----	1.3
186		-----		-----	-----		-----	-----
203		-----		-----	-----		-----	-----
215		-----		-----	-----		-----	-----
217	D86-automated	38.4		-0.75	95.2		0.34	1.4
221	D86-manual	39.9		0.82	94.9		0.03	1.4
224	D86-manual	40.9		1.88	95.5		0.66	1.7
225	D86-manual	39.5		0.40	94.5		-0.39	1.8
228	D86-manual	39.5		0.40	97.5	R(0.01)	2.76	0.6
230	D86-automated	38.8		-0.33	95.2		0.34	1.4
237	D86-manual	40.0		0.93	97.5	R(0.01)	2.76	1.0
238		-----		-----	-----		-----	-----
253	D86-manual	39.0		-0.12	95.0		0.13	1.2
254	D86-manual	39.0		-0.12	94.0		-0.92	-----
256	D86	40.0		0.93	94.0		-0.92	-----
258	D86-automated	37.8		-1.39	95.1		0.24	1.2
273		-----		-----	-----		-----	-----
312	D86-automated	39.3		0.19	95.5		0.66	2.0
317	D86-automated	37.8		-1.39	94.2		-0.71	1.5
323	D86-automated	38.4		-0.75	94.1		-0.81	1.5
333		-----		-----	-----		-----	-----
334	D86-automated	39.3		0.19	94.5		-0.39	1.3
335	D86-automated	39.5		0.40	94.4		-0.50	1.2
336	D86-automated	40.3		1.25	95.5		0.66	0.5
337	D86-automated	39.2		0.09	95.9		1.08	2.0
339		-----		-----	-----		-----	-----
342	D86-automated	39.3		0.19	94.5		-0.39	-----
343	D86-automated	40.4		1.35	95.7		0.87	1.4
344	D86-automated	37.6		-1.60	94.1		-0.81	1.0
349		-----		-----	-----		-----	-----
353	D86-automated	40.3		1.25	94.9		0.03	1.4
355	D86-manual	39.75		0.67	95.0		0.13	1.75
356	D86-automated	39.4		0.30	94.5		-0.39	1.2
381	D86-automated	39.1		-0.02	94.9		0.03	1.0
433		-----		-----	-----		-----	-----
463	D86-automated	39.0		-0.12	95.3		0.45	1.6
485		38.55		-0.60	94.80		-0.08	1.3
495	D86-automated	38.7		-0.44	94.2		-0.71	1.4
498		-----		-----	-----		-----	-----
507	D86-manual	40		0.93	96		1.19	1.5
511		-----		-----	-----		-----	-----
529	D86-automated	38.4		-0.75	94.5		-0.39	2.1
541	D86-automated	38.79		-0.34	95.00		0.13	1.4
551		-----		-----	-----		-----	-----
554		-----		-----	-----		-----	-----
555		-----		-----	-----		-----	-----
558		-----		-----	-----		-----	-----
562		-----		-----	-----		-----	-----
575		-----		-----	-----		-----	-----
603		-----		-----	-----		-----	-----
604	D86-automated	38.6		-0.54	94.8		-0.08	1.4
608		-----		-----	-----		-----	1.4
614	D86-manual	42	ex	3.03	Did not reach 350		-----	-----
621		-----		-----	-----		-----	-----
631	D86-manual	39		-0.12	95		0.13	1.1
633		-----		-----	-----		-----	-----
634		-----		-----	-----		-----	-----
657	D86-automated	38.0		-1.18	94.3		-0.60	1.4
732		37.5		-1.70	94		-0.92	1.8
733		-----		-----	-----		-----	-----
750		-----		-----	-----		-----	-----
781		-----		-----	-----		-----	-----
785		-----		-----	-----		-----	-----

lab	method	Vol.250°C	mark	z(targ)	Vol.350°C	mark	z(targ)	%residue
798		-----		-----	-----		-----	-----
825		39.5		0.40	95.3		0.45	0.6
851	D86-manual	39.0		-0.12	95.0		0.13	-----
854	D86-automated	39.0		-0.12	94.9		0.03	1.4
856	D86-automated	39.9		0.82	95.1		0.24	1.4
862	D86-automated	39.6		0.51	95.3		0.45	1.4
863	D86-automated	38.9		-0.23	94.6		-0.29	1.4
864	D86-automated	39.3		0.19	94.8		-0.08	1.4
872		-----		-----	-----		-----	-----
873		-----		-----	-----		-----	-----
874		-----		-----	-----		-----	-----
886		-----		-----	-----		-----	-----
887	D86-automated	38.62		-0.52	94.11		-0.80	2.5
904	D86-automated	39.3		0.19	95.5		0.66	1.4
912	D86	38		-1.18	95		0.13	1.5
913	D86	39		-0.12	93		-1.97	1.0
914		-----		-----	-----		-----	-----
922	D86-automated	38.5		-0.65	94.5		-0.39	1.4
962		-----		-----	-----		-----	-----
963		-----		-----	-----		-----	-----
970	D86-automated	38.9		-0.23	93.9		-1.02	1.0
971	D86-automated	38.0		-1.18	94.4		-0.50	1.3
974	D86-automated	37.7		-1.49	94.4		-0.50	1.0
988		-----		-----	-----		-----	-----
994		-----		-----	-----		-----	-----
995	D86-manual	37.0		-2.23	94.0		-0.92	1.8
996		-----		-----	-----		-----	-----
997	D86-manual	38.0		-1.18	94.0		-0.92	1.6
998	D86-manual	37.5		-1.70	94.0		-0.92	1.6
1006	D86-automated	38.7		-0.44	95.1		0.24	1.4
1011	ISO3405-autom.	39.0		-0.12	95		0.13	-----
1016		-----		-----	-----		-----	-----
1026	ISO3405-autom.	38.7		-0.44	95.0		0.13	1.7
1059	ISO3405-autom.	39.4		0.30	95.1		0.24	1.4
1105	D86-automated	39.7		0.61	95.5		0.66	1.4
1109	D86-automated	39.1		-0.02	95.1		0.24	1.3
1121	D86-automated	40.5		1.46	95.0		0.13	0.6
1126		38.3		-0.86	94.9		0.03	1.5
1134	IP123-automated	39.6		0.51	94.5		-0.39	1.4
1135	D86-automated	38.0		-1.18	94.6		-0.29	1.7
1140	IP123-automated	40.9		1.88	95.5		0.66	1.4
1146	D86-automated	39		-0.12	96		1.19	0.9
1162	D86-manual	39.5		0.40	95.5		0.66	1.8
1171	ISO3405-manual	38.85		-0.28	95.56		0.72	1.00
1182	D86-automated	39.2		0.09	94.2		-0.71	1.3
1213		-----		-----	-----		-----	-----
1227	D86-automated	39.57		0.48	95.69		0.86	0.99
1277		-----		-----	-----		-----	-----
1284	D86-automated	39.1		-0.02	94.7		-0.18	-----
1297	D86-automated	39.047		-0.07	94.8	C	-0.08	1.4
1299	D86-automated	39.0		-0.12	94.9		0.03	1.3
1356		-----		-----	-----		-----	-----
1357	D86-automated	38.0		-1.18	95.0		0.13	1.3
1389	D86-automated	38.6		-0.54	95.4		0.55	1.5
1412	D86-manual	37.5		-1.70	94.5		-0.39	1.6
1417	D86-automated	37.3		-1.91	93.6		-1.34	-----
1430		-----		-----	-----		-----	-----
1431		40.6		1.56	95.5		0.66	1.4
1433	D86-automated	38.2		-0.97	94.5		-0.39	1.4
1441		-----		-----	-----		-----	1.4
1498	D86-automated	40		0.93	95		0.13	1.4
1575	D7345	39.6		0.51	95.2		0.34	1.7
1588		-----		-----	-----		-----	-----
1616	D86-automated	39.0		-0.12	95.5		0.66	1.5
1629		-----		-----	-----		-----	-----
1631		-----		-----	-----		-----	-----
1634	D86-automated	38.9		-0.23	95.1		0.24	1.2
1643		-----		-----	-----		-----	-----
1720	D86-automated	39.4		0.30	95.9		1.08	-----
1724	D86-automated	38.3		-0.86	95.1		0.24	1.5
1740	D86-automated	39.0		-0.12	95.1		0.24	1.6
1783	D86-automated	39.14		0.02	95.00		0.13	1.7
1807	D86-automated	40.7		1.67	95.8		0.98	1.0
1810	D86-automated	39.2		0.09	95.1		0.24	1.5
1811	D86-automated	38.9		-0.23	95.3		0.45	1.0
1906		-----		-----	-----		-----	-----
1944	D86-manual	39.5		0.40	94.5		-0.39	1.4
1967	D86-manual	39.5		0.40	95.0		0.13	1.0

lab	method	Vol.250°C	mark	z(targ)	Vol.350°C	mark	z(targ)	%residue
6026	D86-manual	40.5		1.46	95.5		0.66	1.0
6034	D86-automated	42.4	C,R(0.05)	3.46	96.1		1.29	1.4
6049	D86-automated	40.7		1.67	94.6		-0.29	1.6
6054	D86-automated	40.1		1.03	95.2		0.34	1.4
6057	D86-automated	39.1		-0.02	94.6		-0.29	-----
6103		40		0.93	95		0.13	1.4
6142	ISO3405-autom.	40.25		1.19	95.45		0.61	1.4
6172	D86	38		-1.18	93		-1.97	1.4
6201	D86-automated	39.8		0.72	95.3		0.45	1.3
6238		-----		-----	-----		-----	-----
6249		-----		-----	-----		-----	-----
6253		-----		-----	-----		-----	-----
6258	D86-automated	37.8		-1.39	94.7		-0.18	1.4
6262	D86-automated	38.8		-0.33	95.3		0.45	1.4
6266		-----		-----	-----		-----	-----
6272	D86	41.36		2.36	93.36		-1.59	2.75
6291	D86-automated	39.2		0.09	94.9		0.03	1.4
6317		-----		-----	-----		-----	-----
6319		-----		-----	-----		-----	-----
6341		-----		-----	-----		-----	-----
6346		-----		-----	-----		-----	-----

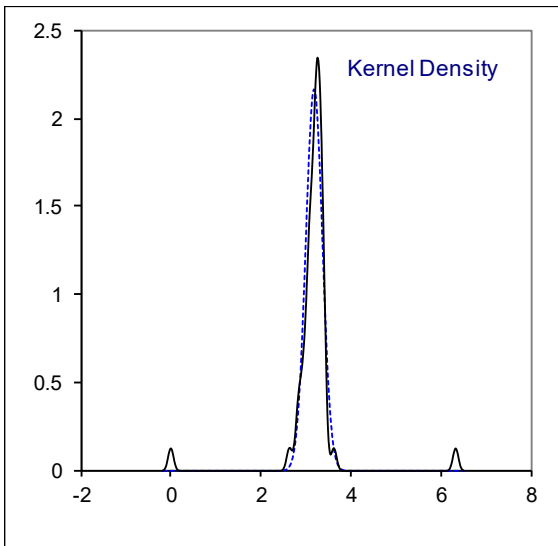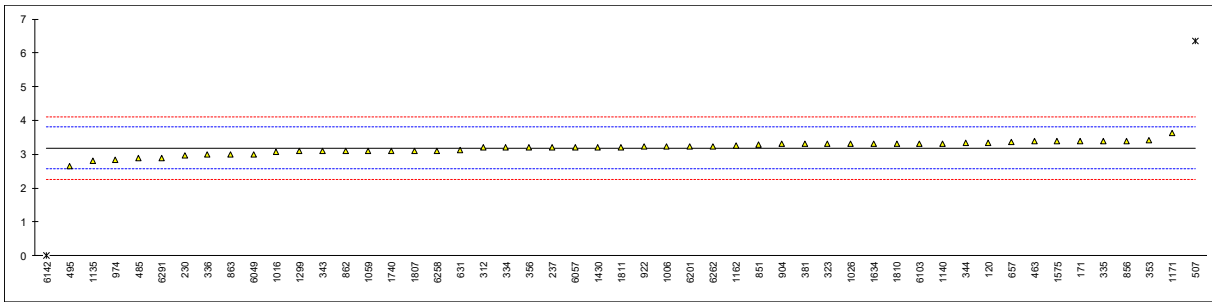|				
	normality	OK		OK
	n	107		107
	outliers	2 (+1ex)		2
	mean (n)	39.12		94.87
	st.dev. (n)	0.878		0.629
	R(calc.)	2.46		1.76
	st.dev.(D86-A:20b)	0.950		0.95
	R(D86-A:20b)	2.66		2.66
Compare				
	R(D86-M:20b)	2.71		2.59

Lab 1297 first reported for Volume at 350°C: 34.81
Lab 6034 first reported for Volume at 250°C: 42.8
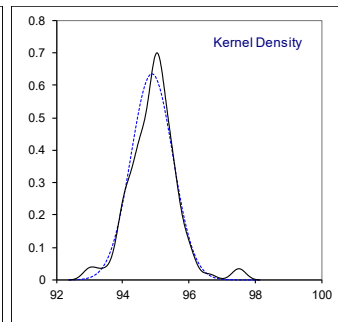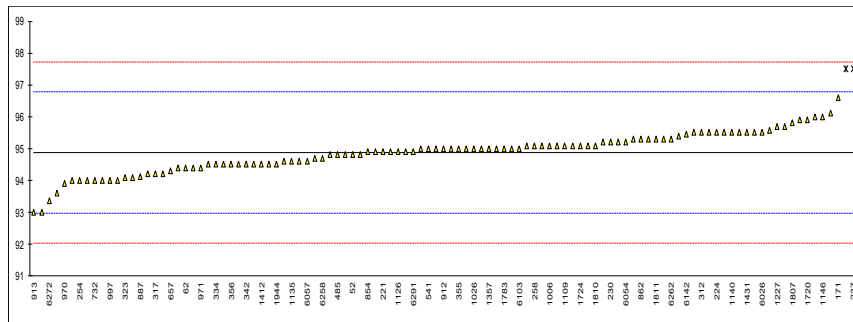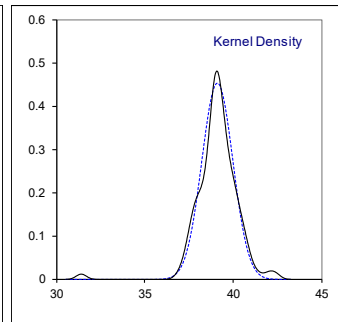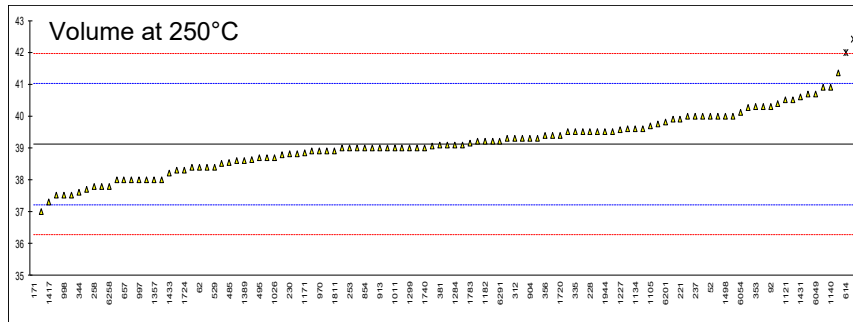
Determination of FAME content on sample #20170; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	781		-----		-----
53		-----		-----	785		-----		-----
62		-----		-----	798		-----		-----
90		-----		-----	825		-----		-----
92		-----		-----	851	EN14078-A	3.28		0.29
120	D7371	3.34		0.49	854		-----		-----
140		-----		-----	856	EN14078-A	3.4		0.68
150		-----		-----	862	D7371	3.1		-0.29
158		-----		-----	863	EN14078-A	3.0		-0.62
159		-----		-----	864		-----		-----
169		-----		-----	872		-----		-----
171	D7371	3.40		0.68	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904	D7371	3.3		0.36
217		-----		-----	912		-----		-----
221		-----		-----	913		-----		-----
224		-----		-----	914		-----		-----
225		-----		-----	922	EN14078-B	3.23		0.13
228		-----		-----	962		-----		-----
230	EN14078-A	2.977		-0.69	963		-----		-----
237	D7371	3.2		0.03	970		-----		-----
238		-----		-----	971		-----		-----
253		-----		-----	974	EN14078-B	2.84		-1.14
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995		-----		-----
273		-----		-----	996		-----		-----
312	EN14078-A	3.2		0.03	997		-----		-----
317		-----		-----	998		-----		-----
323	D7371	3.3		0.36	1006	D7371	3.23		0.13
333		-----		-----	1011		-----		-----
334	EN14078-A	3.2		0.03	1016	EN14078-A	3.072		-0.38
335	EN14078-B	3.4		0.68	1026	EN14078-A	3.3		0.36
336	EN14078-A	2.99		-0.65	1059	EN14078-B	3.1		-0.29
337		-----		-----	1105		-----		-----
339		-----		-----	1109		-----		-----
342		-----		-----	1121		-----		-----
343	EN14078-A	3.1		-0.29	1126		-----		-----
344	EN14078-A	3.33		0.45	1134		-----		-----
349		-----		-----	1135	EN14078-A	2.81		-1.23
353	EN14078-A	3.415		0.73	1140	EN14078-A	3.32		0.42
355		-----		-----	1146		-----		-----
356	EN14078-A	3.2		0.03	1162	D7371	3.26		0.23
381	EN14078-A	3.3		0.36	1171	EN14078-A	3.63		1.43
433		-----		-----	1182		-----		-----
463	EN14078-A	3.39		0.65	1213		-----		-----
485	EN14078-A	2.89		-0.97	1227		-----		-----
495	EN14078-A	2.64		-1.78	1277		-----		-----
498		-----		-----	1284		-----		-----
507	D7371	6.341	R(0.01)	10.22	1297		-----		-----
511		-----		-----	1299	EN14078-A	3.09		-0.32
529		-----		-----	1356		-----		-----
541		-----		-----	1357	D7371	n.a		-----
551		-----		-----	1389		-----		-----
554		-----		-----	1412		-----		-----
555		-----		-----	1417		-----		-----
558		-----		-----	1430		3.21		0.07
562		-----		-----	1431		-----		-----
575		-----		-----	1433		-----		-----
603		-----		-----	1441		-----		-----
604		-----		-----	1498		-----		-----
608		-----		-----	1575	D7371	3.39		0.65
614		-----		-----	1588		-----		-----
621		-----		-----	1616		-----		-----
631	EN14078-A	3.13		-0.19	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634	EN14078-A	3.3		0.36
657	EN14078-A	3.36		0.55	1643		-----		-----
732		-----		-----	1720		-----		-----
733		-----		-----	1724		-----		-----
750		-----		-----	1740	EN14078-A	3.1		-0.29

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807	EN14078-A	3.1		-0.29	6201	D7371	3.23		0.13
1810	EN14078-A	3.3		0.36	6238		-----		-----
1811	D7371	3.21		0.07	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944		-----		-----	6258	EN14078-A	3.1		-0.29
1967		-----		-----	6262	EN14078-A	3.24		0.16
6026		-----		-----	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049	EN14078-A	3.00		-0.62	6291	D7371	2.90		-0.94
6054		-----		-----	6317		-----		-----
6057	EN14078-A	3.2		0.03	6319		-----		-----
6103	EN14078-A	3.30		0.36	6341		-----		-----
6142	EN14078-A	0	R(0.01)	-10.35	6346		-----		-----

normality	OK	
n	49	
outliers	2	
mean (n)	3.190	
st.dev. (n)	0.1842	
R(calc.)	0.516	
st.dev.(D7371:14)	0.3083	
R(D7371:14)	0.863	Range: 1-20%V/V

| compare			
	R(EN14078-A:14)	0.182	Range: 0.05-3%V/V
	R(EN14078-B:14)	0.212	Range: 3-20%V/V

Kernel Density

Determination of Flash Point PMcc on sample #20170; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D93-A	58.0		-0.47	781		-----		-----
53	D93-A	58.5		-0.14	785		-----		-----
62	D93-A	58.0		-0.47	798		-----		-----
90	D93-A	56.8		-1.28	825	D93-A	60.5		1.20
92	D93-A	58.0		-0.47	851	D93-A	61.0		1.54
120	D93-A	58.0		-0.47	854	D93-A	58.5		-0.14
140	D93-A	58.0		-0.47	856	D93-A	59		0.20
150		-----		-----	862	D93-A	58.5		-0.14
158	D93-A	58.0		-0.47	863	D93-A	59.0		0.20
159	D93-A	58.3		-0.27	864	D93-A	60.0		0.87
169	D93-A	58.5		-0.14	872		-----		-----
171	D93-A	60.0		0.87	873		-----		-----
175	D93-A	59		0.20	874		-----		-----
186		-----		-----	886		-----		-----
203	D93-A	62		2.21	887	D93-A	59.6		0.60
215	ISO2719-A	58.0		-0.47	904	D93-A	60.5		1.20
217	D93-A	58.0		-0.47	912		-----		-----
221		-----		-----	913	D93-A	61		1.54
224	D93-A	57.04		-1.12	914		-----		-----
225	D93-A	56.0		-1.82	922	D93-A	59.0		0.20
228	D93-A	60.0		0.87	962		-----		-----
230	ISO2719-A	57.0		-1.15	963		-----		-----
237	D93-A	59.0		0.20	970	D93-A	58.5		-0.14
238	D93-A	58		-0.47	971	D93-A	58.0		-0.47
253	D93-A	58.5		-0.14	974	D93-A	58.0		-0.47
254	D93-A	59.0		0.20	988		-----		-----
256	D93-A	59.0		0.20	994		-----		-----
258	D93-A	58.1858		-0.35	995	D93-A	58.0		-0.47
273	D93-A	61.0		1.54	996		-----		-----
312	D93-A	59.0		0.20	997	D93-A	58.0		-0.47
317	D93-A	59.0		0.20	998	D93-A	59.0		0.20
323	D93-A	57.5		-0.81	1006	D93-A	57.5		-0.81
333	D93-A	57.5		-0.81	1011	ISO2719-A	59		0.20
334	D93-A	59.0		0.20	1016		-----		-----
335	ISO2719-A	59.0		0.20	1026	D93-A	60.0		0.87
336	D93-A	62.0		2.21	1059	ISO2719-A	59.0		0.20
337	D93-A	60.5		1.20	1105	D93-A	58		-0.47
339	D93-A	61.4		1.81	1109	D93-A	57.0		-1.15
342	ISO2719-A	57.5		-0.81	1121	D93-A	57.0		-1.15
343	D93-A	60.5		1.20	1126		-----		-----
344	D93-A	59.0		0.20	1134	D93-A	59.0		0.20
349	D93-A	56		-1.82	1135	D93-A	57.0		-1.15
353	IP34-A	58.525		-0.12	1140	IP34-A	59.5		0.53
355	D93-A	57.0		-1.15	1146	D93-A	58.0		-0.47
356	D93-A	57.0		-1.15	1162	D93-A	60.0		0.87
381	ISO2719-A	56.0		-1.82	1171	ISO2719-A	58.39		-0.21
433	ISO2719-A	58.5		-0.14	1182	D93-A	59		0.20
463	D93-A	59.0		0.20	1213	D93-A	59		0.20
485	D93-A	58.0		-0.47	1227	D93-A	59		0.20
495	D93-A	60.0		0.87	1277		-----		-----
498	ISO2719-B	54.7		-2.69	1284	D93-A	58.5		-0.14
507	D93-A	63.0		2.88	1297	D93-A	57.5		-0.81
511		-----		-----	1299	D93-A	60.5		1.20
529	D93-A	58.5		-0.14	1356	ISO2719-A	59.5		0.53
541	D93-A	57.00		-1.15	1357	D93-A	57.3		-0.95
551		-----		-----	1389	D93-A	59.0		0.20
554		-----		-----	1412	D93-A	57.0		-1.15
555		-----		-----	1417	D93-A	59		0.20
558		-----		-----	1430	D93-A	57		-1.15
562	D93	58.5		-0.14	1431	D93-A	58.5		-0.14
575	D93-A	60		0.87	1433	D93-A	57.8		-0.61
603	D93-A	57.0		-1.15	1441	D93-A	58.0		-0.47
604	D93-A	62.0		2.21	1498	D93-A	58.5		-0.14
608	D93-A	57	C	-1.15	1575		-----		-----
614	D93-A	65	R(0.01)	4.23	1588		-----		-----
621		-----		-----	1616	D93-A	57.5		-0.81
631	D93-A	55.5		-2.15	1629	D93-A	59.3		0.40
633		-----		-----	1631		-----		-----
634		-----		-----	1634	D93-A	59.5		0.53
657	D93-A	61.0		1.54	1643	D93-A	58.775		0.05
732	ISO2719-A	57.4		-0.88	1720	D93-A	60.5		1.20
733	ISO2719-A	58.57		-0.09	1724	D93-A	60.0		0.87
750		-----		-----	1740	D93-A	59		0.20

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783	D93-A	58.0		-0.47	6172	D93	58.5		-0.14
1807	D93-A	59.5		0.53	6201	D93-A	58.0		-0.47
1810	D93-A	58		-0.47	6238		-----		-----
1811	D93-A	58.5		-0.14	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D93-A	58.5		-0.14	6258	D93-A	61.0		1.54
1967	D93-A	57.5		-0.81	6262	D93-A	59.0		0.20
6026		57.0		-1.15	6266		-----		-----
6034	D93-A	61		1.54	6272	D93	69.8	R(0.01)	7.45
6049	D93-A	60.0		0.87	6291	ISO2719-A	60.0		0.87
6054	D93-A	58.0		-0.47	6317	D93-A	60.5		1.20
6057	D93-A	62.0		2.21	6319		-----		-----
6103	ISO2719-A	59.0		0.20	6341		-----		-----
6142	ISO2719-A	58.25		-0.31	6346		-----		-----

normality	OK
n	132
outliers	2
mean (n)	58.707
st.dev. (n)	1.4142
R(calc.)	3.960
st.dev.(D93-A:20)	1.4886
R(D93-A:20)	4.168

Lab 608 first reported: 64.0

Kernel Density
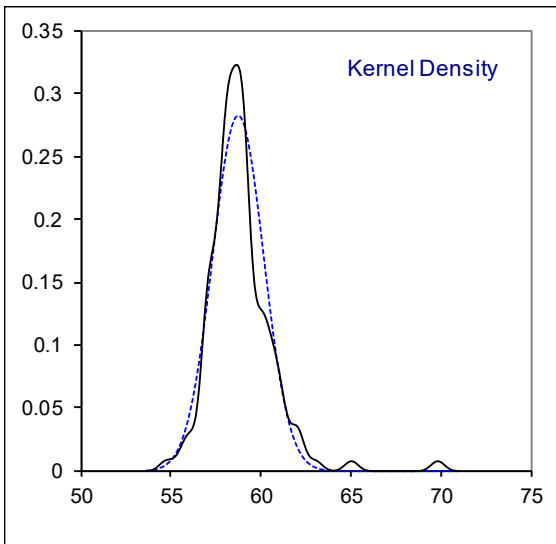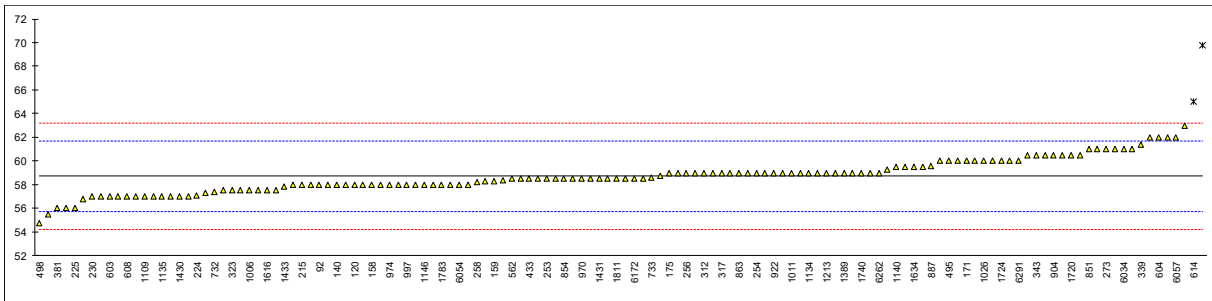
Determination of Kinematic Viscosity at 40°C, on sample #20170; results in mm^2/s

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D445	2.688		-0.04	781		-----		-----
53		-----		-----	785		-----		-----
62	D445	2.687		-0.13	798		-----		-----
90		-----		-----	825	D445	2.682		-0.59
92	D445	2.711		2.09	851	D445	2.703		1.35
120	D445	2.679	C	-0.87	854	D445	2.695		0.61
140	D445	2.703	C	1.35	856	ISO3104	2.681		-0.68
150		-----		-----	862	D445	2.693		0.43
158	D445	2.695		0.61	863	D445	2.690		0.15
159	D445	2.678		-0.96	864	D445	2.671		-1.61
169	D445	2.7805	C,R(0.01)	8.53	872		-----		-----
171	D445	2.673		-1.43	873		-----		-----
175	D445	2.678		-0.96	874		-----		-----
186		-----		-----	886	D445	2.718		2.74
203		-----		-----	887		-----		-----
215		-----		-----	904	D445	2.684		-0.41
217	D445	2.6881		-0.03	912	D445	2.702		1.26
221	D445	2.706		1.63	913	D445	2.642	R(0.01)	-4.30
224	D445	2.665	C	-2.17	914		-----		-----
225	D445	2.685		-0.31	922	D445	2.676		-1.15
228	D445	2.698		0.89	962		-----		-----
230	D445	2.7045		1.49	963		-----		-----
237	D445	2.700		1.07	970	D445	2.690		0.15
238		-----		-----	971	D445	2.687		-0.13
253	D445	2.6844		-0.37	974	D445	2.692		0.33
254	D445	2.690		0.15	988		-----		-----
256	D445	2.676		-1.15	994		-----		-----
258	D445	2.686684		-0.16	995	D445	2.691	C	0.24
273	D445	2.684		-0.41	996		-----		-----
312	D445	2.690		0.15	997	D445	2.688	C	-0.04
317	D445	2.681		-0.68	998	D445	2.688	C	-0.04
323	D445	2.686		-0.22	1006	D445	2.6883		-0.01
333	D445	2.685		-0.31	1011	ISO3104	2.667		-1.98
334	D445	2.686		-0.22	1016		-----		-----
335	D445	2.701	C	1.17	1026	D445	2.674		-1.33
336	D445	2.689		0.06	1059	ISO3104	2.683		-0.50
337		-----		-----	1105	D445	2.684		-0.41
339		-----		-----	1109	D445	2.6910		0.24
342	ISO3104	2.6870		-0.13	1121	D445	2.709		1.91
343	D445	2.681		-0.68	1126		-----		-----
344		-----		-----	1134	D445	2.6678		-1.91
349	D445	2.679		-0.87	1135	D445	2.695		0.61
353	IP71	2.6709		-1.62	1140	IP71	2.682		-0.59
355	D445	2.683		-0.50	1146	D445	2.680		-0.78
356	D445	2.676		-1.15	1162	D445	2.6820		-0.59
381	D445	2.687		-0.13	1171	ISO3104	2.6891		0.06
433		-----		-----	1182	D7042	2.6761		-1.14
463	D7042	2.6953		0.64	1213	D445	2.687		-0.13
485		-----		-----	1227	D445	2.6813		-0.66
495	ISO3104	2.6793		-0.84	1277		-----		-----
498		-----		-----	1284	D445	2.703		1.35
507	D445	2.6892		0.07	1297	D7042	2.686		-0.22
511		-----		-----	1299	D445	2.687		-0.13
529		-----		-----	1356	ISO3104	2.6878		-0.06
541		-----		-----	1357	D445	2.687		-0.13
551		-----		-----	1389	D445	2.6829		-0.51
554		-----		-----	1412	D445	2.688		-0.04
555		-----		-----	1417	D445	2.691		0.24
558		-----		-----	1430	D445	2.673		-1.43
562		-----		-----	1431	D7042	2.6907		0.21
575	D445	2.691		0.24	1433	D445	2.68634		-0.19
603	D445	2.701		1.17	1441		-----		-----
604	D445	2.7101		2.01	1498	D445	2.683		-0.50
608	D445	2.677		-1.06	1575		-----		-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616	D445	2.689		0.06
631	D445	2.6864		-0.19	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634	ISO3104	2.685		-0.31
657	D445	2.686		-0.22	1643	D445	2.6805		-0.73
732	D445	2.6981		0.90	1720	D7042	2.6922		0.35
733		-----		-----	1724	D445	2.6823		-0.56
750		-----		-----	1740	D445	2.683		-0.50

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172	D445	2.6942		0.54
1807	D445	2.612	C,R(0.01)	-7.07	6201	D445	2.683		-0.50
1810	D445	2.682		-0.59	6238		-----		-----
1811	D445	2.687		-0.13	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D445	2.7207	C	2.99	6258	D445	2.682		-0.59
1967	D445	2.693	C	0.43	6262	D445	2.6994		1.02
6026	D445	2.679		-0.87	6266		-----		-----
6034		-----		-----	6272	D445	2.72		2.93
6049	D445	2.685		-0.31	6291	D445	2.7094		1.94
6054	D445	2.699	C	0.98	6317	D7042	2.6925		0.38
6057	D445	2.697		0.80	6319		-----		-----
6103	ISO3104	2.677		-1.06	6341		-----		-----
6142	ISO3104	2.7085		1.86	6346		-----		-----

normality	OK
n	113
outliers	3
mean (n)	2.6884
st.dev. (n)	0.01075
R(calc.)	0.0301
st.dev.(D445:19a)	0.01080
R(D445:19a)	0.0302

Lab 120 first reported: 2.721　　　　　　　　　　Lab 997 first reported: 2.732
Lab 140 first reported: 2.735　　　　　　　　　　Lab 998 first reported: 2.720
Lab 169 first reported: 3.036　　　　　　　　　　Lab 1807 first reported: 2.914
Lab 224 first reported: 2.747　　　　　　　　　　Lab 1944 first reported: 2.7255
Lab 335 first reported: 2.640　　　　　　　　　　Lab 1967 first reported: 2.493
Lab 995 first reported: 2.721　　　　　　　　　　Lab 6054 first reported: 2.721


Kernel Density
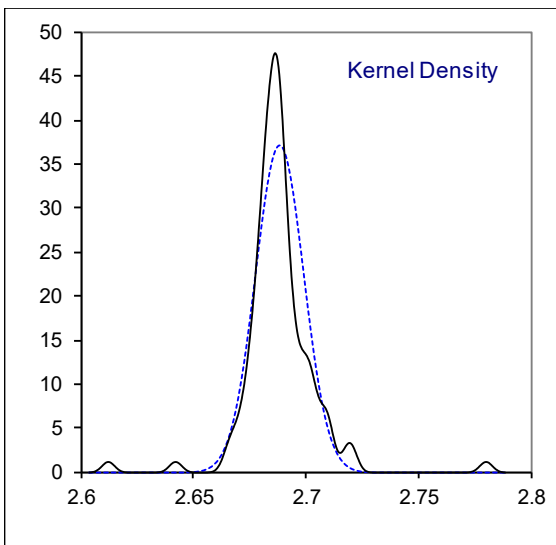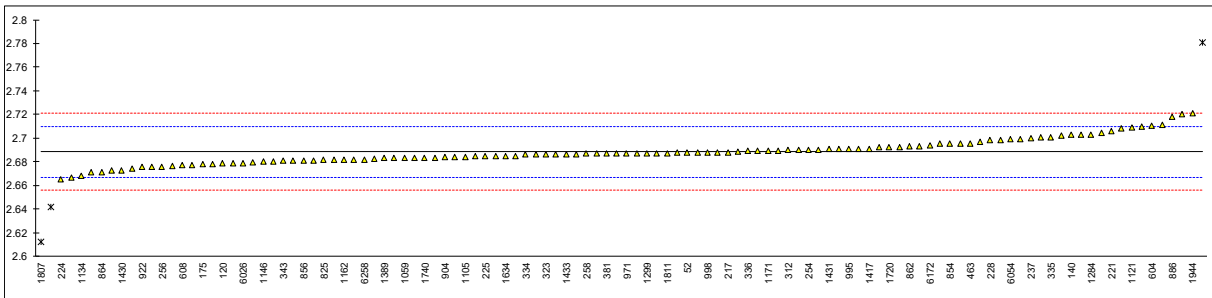
Determination of Lubricity by HFRR at 60°C, rel. humidity 30-85% on sample #20170; results in µm

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D6079	200		0.41	781		-----		-----
53		-----		-----	785		-----		-----
62		-----		-----	798		-----		-----
90		-----		-----	825		-----		-----
92		-----		-----	851		-----		-----
120	D6079	175		-0.47	854	D6079	200		0.41
140	D6079	177.5		-0.38	856	D6079	200		0.41
150		-----		-----	862	D6079	189		0.02
158		-----		-----	863	D6079	189		0.02
159		-----		-----	864	D6079	189		0.02
169		-----		-----	872		-----		-----
171	D6079	220		1.11	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904	D6079	198		0.34
217		-----		-----	912		-----		-----
221		-----		-----	913		-----		-----
224		-----		-----	914		-----		-----
225		-----		-----	922		-----		-----
228		-----		-----	962		-----		-----
230		-----		-----	963		-----		-----
237	D6079	190		0.06	970	D6079	173		-0.54
238		-----		-----	971		-----		-----
253		-----		-----	974	IP450	166		-0.78
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995	D6079	189		0.02
273		-----		-----	996		-----		-----
312	ISO12156-1 meth A	190		0.06	997		-----		-----
317		-----		-----	998		-----		-----
323	ISO12156-1 meth A	280	R(0.01)	3.21	1006	D6079	190.5		0.08
333		-----		-----	1011		-----		-----
334	D6079	189		0.02	1016	ISO12156-1 meth A	194		0.20
335		-----		-----	1026		183		-0.19
336		-----		-----	1059	ISO12156-1 meth B	180		-0.29
337		-----		-----	1105	D6079	168		-0.71
339		-----		-----	1109	IP450	170		-0.64
342	ISO12156-1 (2006)	172		-0.57	1121		-----		-----
343	ISO12156-1 (2006)	191		0.09	1126		-----		-----
344		-----		-----	1134		-----		-----
349		-----		-----	1135	ISO12156-1 meth A	185		-0.12
353		-----		-----	1140	D6079	180		-0.29
355		-----		-----	1146		-----		-----
356	ISO12156-1 (2006)	220		1.11	1162	D6079	212.5		0.85
381		-----		-----	1171		-----		-----
433		-----		-----	1182		-----		-----
463	ISO12156-1 (2006)	201		0.44	1213		-----		-----
485		-----		-----	1227		-----		-----
495		-----		-----	1277		-----		-----
498		-----		-----	1284		-----		-----
507	D6079	200.0		0.41	1297		-----		-----
511		-----		-----	1299	ISO12156-1 (2006)	247	R(0.01)	2.05
529		-----		-----	1356	ISO12156-1 meth A	202		0.48
541		-----		-----	1357	D6079	190		0.06
551		-----		-----	1389	ISO12156-1 meth A	185		-0.12
554		-----		-----	1412		-----		-----
555		-----		-----	1417		-----		-----
558		-----		-----	1430		-----		-----
562	D6079	180.0		-0.29	1431		-----		-----
575		-----		-----	1433		-----		-----
603		-----		-----	1441	D6079	188		-0.01
604		-----		-----	1498		-----		-----
608		-----		-----	1575		-----		-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616	D6079	200		0.41
631	D7688	200		0.41	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D6079	185.5		-0.10	1643		-----		-----
732		-----		-----	1720		-----		-----
733		-----		-----	1724		-----		-----
750		-----		-----	1740	ISO12156-1 meth A	190		0.06

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807	ISO12156-1 (2006)	160		-0.99	6201	D6079	180		-0.29
1810	ISO12156-1 meth A	170		-0.64	6238		-----		-----
1811	D6079	170		-0.64	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944		-----		-----	6258		-----		-----
1967	D6079	208		0.69	6262	ISO12156-2	192		0.13
6026		-----		-----	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049		-----		-----	6291	ISO12156-1 (2006)	173		-0.54
6054		-----		-----	6317		-----		-----
6057		-----		-----	6319		-----		-----
6103	ISO12156-1A	199		0.37	6341		-----		-----
6142	ISO12156-1A	185		-0.12	6346		-----		-----

					Only D6079	Only ISO12156/IP450
	normality	OK			OK	OK
	n	48			27	19
	outliers	2			0	2
	mean (n)	188.3			190.0	185.5
	st.dev. (n)	13.46			12.68	14.82
	R(calc.)	37.7			35.5	41.5
	st.dev.(D6079:18)	28.57			28.57	-----
	R(D6079:18)	80			80	-----
compare						
	R(ISO12156-1-A:16)	80	(digital camera)		-----	80
	R(ISO12156-1-B:16)	90	(visual		-----	90

Kernel Density
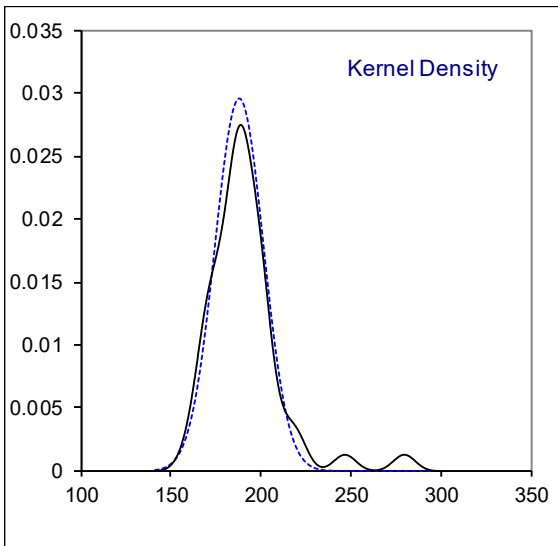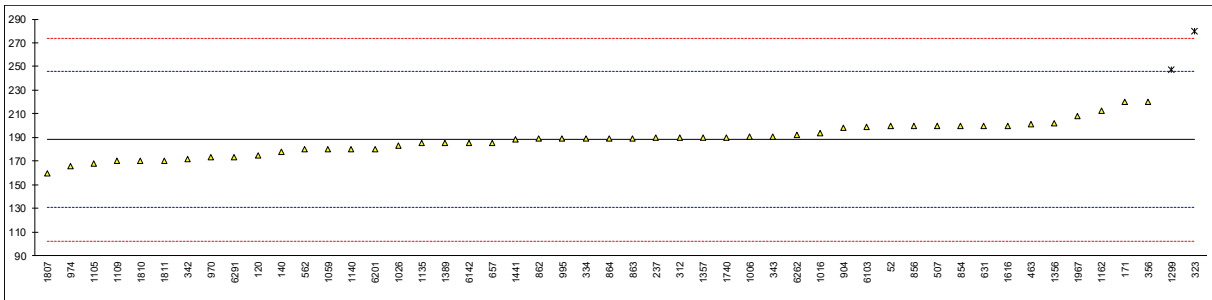
Determination of Nitrogen on sample #20170; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4629	30		2.04	781		-----		-----
53		-----		-----	785		-----		-----
62		-----		-----	798		-----		-----
90		-----		-----	825		-----		-----
92		-----		-----	851		-----		-----
120	D4629	28.68	C	1.20	854		-----		-----
140		-----		-----	856		-----		-----
150		-----		-----	862	D4629	30		2.04
158	D4629	24.8		-1.27	863		-----		-----
159	D4629	18.8		-5.09	864		-----		-----
169		-----		-----	872		-----		-----
171	D4629	20		-4.32	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904		-----		-----
217		-----		-----	912		-----		-----
221		-----		-----	913		-----		-----
224		-----		-----	914		-----		-----
225		-----		-----	922	D4629	24.4	C	-1.52
228		-----		-----	962		-----		-----
230		-----		-----	963		-----		-----
237	D4629	27.8		0.64	970		-----		-----
238		-----		-----	971	D4629	29.0		1.40
253		-----		-----	974		-----		-----
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995		-----		-----
273		-----		-----	996		-----		-----
312	D4629	30		2.04	997		-----		-----
317		-----		-----	998		-----		-----
323		-----		-----	1006		-----		-----
333	D4629	22		-3.05	1011		-----		-----
334	D4629	27.3		0.32	1016	D4629	30.55		2.39
335		-----		-----	1026	D4629	30.5		2.36
336	D4629	23		-2.41	1059		-----		-----
337		-----		-----	1105	D4629	33.3		4.14
339		-----		-----	1109	D4629	27		0.13
342		-----		-----	1121		-----		-----
343		-----		-----	1126		-----		-----
344		-----		-----	1134		-----		-----
349		-----		-----	1135	D4629	25		-1.14
353		-----		-----	1140	D5762	24.57		-1.41
355		-----		-----	1146		-----		-----
356		-----		-----	1162	D4629	27.9		0.70
381		-----		-----	1171		-----		-----
433		-----		-----	1182		-----		-----
463		-----		-----	1213		-----		-----
485		-----		-----	1227	D4629	27.3		0.32
495	D4629	27.42		0.40	1277		-----		-----
498		-----		-----	1284		-----		-----
507		-----		-----	1297	D4629	24.5		-1.46
511		-----		-----	1299		-----		-----
529		-----		-----	1356		-----		-----
541		-----		-----	1357	D4629	27.5		0.45
551		-----		-----	1389		-----		-----
554		-----		-----	1412	D4629	27		0.13
555		-----		-----	1417		-----		-----
558		-----		-----	1430		-----		-----
562		-----		-----	1431		-----		-----
575		-----		-----	1433		-----		-----
603		-----		-----	1441		-----		-----
604		-----		-----	1498		-----		-----
608		-----		-----	1575		-----		-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616	D4629	29.12		1.48
631		-----		-----	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D4629	25.4		-0.89	1643		-----		-----
732		-----		-----	1720		-----		-----
733		-----		-----	1724		-----		-----
750		-----		-----	1740		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807		-----		-----	6201	D4629	27.6		0.51
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944		-----		-----	6258		-----		-----
1967	D4629	24.1		-1.71	6262	D4629	29.5		1.72
6026	D4629	23.13		-2.33	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049		-----		-----	6291	D4629	29.91		1.98
6054		-----		-----	6317		-----		-----
6057	D4629	27.1		0.20	6319		-----		-----
6103		-----		-----	6341		-----		-----
6142		-----		-----	6346		-----		-----

normality	OK
n	33
outliers	0
mean (n)	26.79
st.dev. (n)	3.209
R(calc.)	8.99
st.dev.(D4629:17)	1.571
R(D4629:17)	4.40

Lab 120 first reported: 20.43
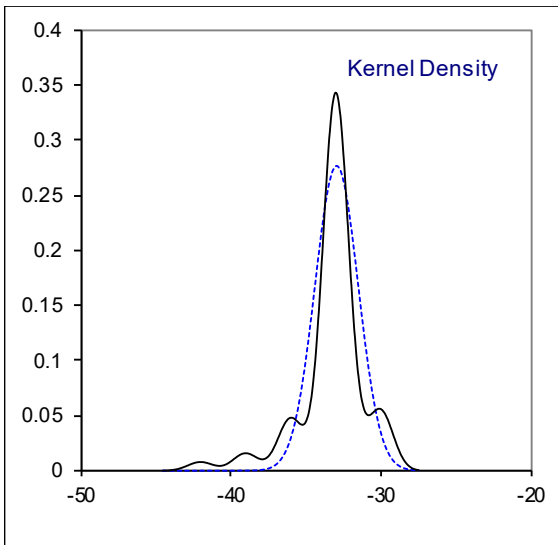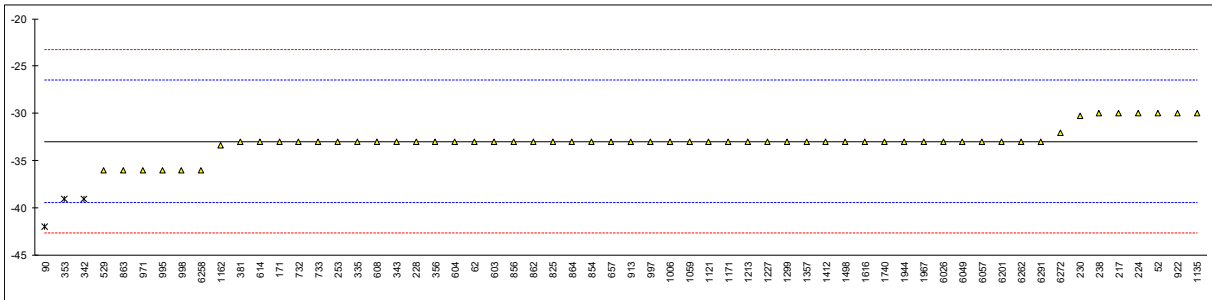Lab 922 first reported: 19.6

Kernel Density
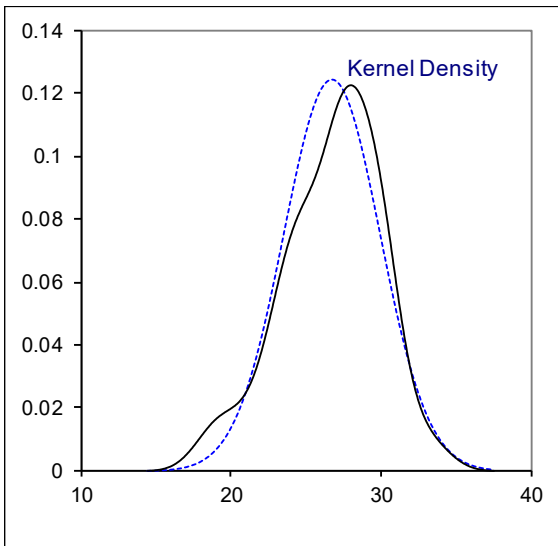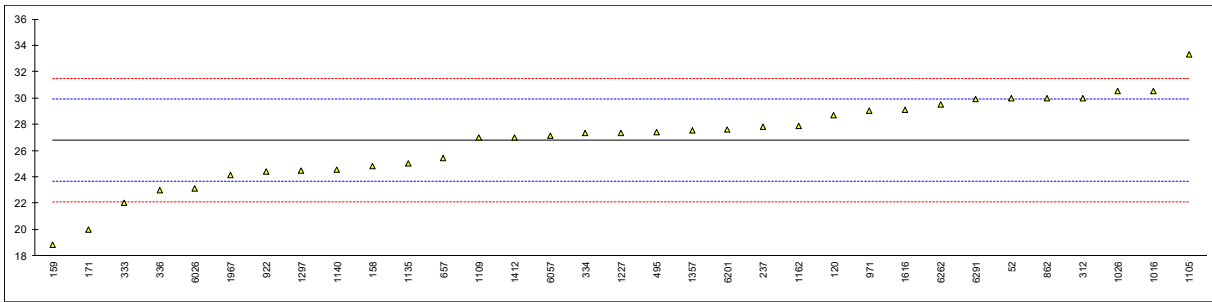
Determination of Pour Point, Manual on sample #20170; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D97	-30		0.92	781		-----		-----
53		-----		-----	785		-----		-----
62	D97	-33		-0.02	798		-----		-----
90	D97	-42	R(0.01)	-2.82	825	D97	-33		-0.02
92		-----		-----	851	D97	<-24		-----
120		-----		-----	854	D97	-33		-0.02
140		-----		-----	856	ISO3016	-33		-0.02
150		-----		-----	862	D97	-33		-0.02
158		-----		-----	863	D97	-36		-0.95
159		-----		-----	864	D97	-33		-0.02
169	D97	<-31		-----	872		-----		-----
171	D97	-33		-0.02	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904	D97	<-36		-----
217	D97	-30		0.92	912		-----		-----
221		-----		-----	913	D97	-33		-0.02
224	D97	-30.0		0.92	914		-----		-----
225	D97	<-33		-----	922	D97	-30		0.92
228	D97	-33		-0.02	962		-----		-----
230	D97	-30.28		0.83	963		-----		-----
237		-----		-----	970	D97	<-36		-----
238	D97	-30		0.92	971	D97	-36		-0.95
253	D97	-33		-0.02	974	D97	<-36		-----
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995	D97	-36		-0.95
273		-----		-----	996		-----		-----
312		-----		-----	997	D97	-33		-0.02
317		-----		-----	998	D97	-36		-0.95
323		-----		-----	1006	D97	-33		-0.02
333		-----		-----	1011		-----		-----
334		-----		-----	1016		-----		-----
335	D97	-33		-0.02	1026		-----		-----
336		-----		-----	1059	ISO3016	-33		-0.02
337		-----		-----	1105		-----		-----
339		-----		-----	1109		-----		-----
342	ISO3016	-39	R(0.01)	-1.88	1121	D97	-33		-0.02
343	D97	-33		-0.02	1126		-----		-----
344		-----		-----	1134		-----		-----
349		-----		-----	1135	ISO3016	-30		0.92
353	IP15	-39	R(0.01)	-1.88	1140		-----		-----
355		-----		-----	1146		-----		-----
356	D97	-33		-0.02	1162	D97	-33.4		-0.14
381	ISO3016	-33		-0.02	1171	ISO3016	-33.0		-0.02
433		-----		-----	1182		-----		-----
463		-----		-----	1213	D97	-33		-0.02
485		-----		-----	1227	D97	-33		-0.02
495		-----		-----	1277		-----		-----
498		-----		-----	1284		-----		-----
507		-----		-----	1297		-----		-----
511		-----		-----	1299	D97	-33		-0.02
529	D97	-36		-0.95	1356	ISO3016	<-35		-----
541		-----		-----	1357	D97	-33.0		-0.02
551		-----		-----	1389	D97	<-21		-----
554		-----		-----	1412	D97	-33		-0.02
555		-----		-----	1417		-----		-----
558		-----		-----	1430		-----		-----
562	D97	<-39		-----	1431		-----		-----
575		-----		-----	1433		-----		-----
603	D97	-33		-0.02	1441		-----		-----
604	D97	-33		-0.02	1498	D97	-33		-0.02
608	D97	-33		-0.02	1575		-----		-----
614	D97	-33		-0.02	1588		-----		-----
621		-----		-----	1616	D97	-33		-0.02
631		-----		-----	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D97	-33		-0.02	1643		-----		-----
732	D97	-33		-0.02	1720		-----		-----
733	D97	-33		-0.02	1724		-----		-----
750		-----		-----	1740	D97	-33		-0.02

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807		-----		-----	6201	D97	-33		-0.02
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D97	-33		-0.02	6258	D97	-36		-0.95
1967	D97	-33		-0.02	6262	D97	-33		-0.02
6026	D97	-33		-0.02	6266		-----		-----
6034		-----		-----	6272	D97	-32		0.29
6049	D97	-33		-0.02	6291	D97	-33		-0.02
6054		-----		-----	6317		-----		-----
6057	D97	-33		-0.02	6319		-----		-----
6103		-----		-----	6341		-----		-----
6142		-----		-----	6346		-----		-----

|	
normality	suspect
n	57
outliers	3
mean (n)	-32.94
st.dev. (n)	1.442
R(calc.)	4.04
st.dev.(D97:17b)	3.214
R(D97:17b)	9

Kernel Density

Determination of Pour Point, Automated, 3°C interval on sample #20170; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5949	-30		1.13	781		-----		-----
53		-----		-----	785		-----		-----
62		-----		-----	798		-----		-----
90		-----		-----	825		-----		-----
92		-----		-----	851		-----		-----
120		-----		-----	854		-----		-----
140		-----		-----	856		-----		-----
150		-----		-----	862	D5950	-33		-0.24
158	D5949	-36		-1.62	863		-----		-----
159		-----		-----	864		-----		-----
169		-----		-----	872		-----		-----
171	D5950	-33		-0.24	873		-----		-----
175	D5950	-33		-0.24	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887	D6749	-30		1.13
215		-----		-----	904		-----		-----
217		-----		-----	912		-----		-----
221		-----		-----	913	D6749	-33		-0.24
224		-----		-----	914		-----		-----
225		-----		-----	922		-----		-----
228		-----		-----	962		-----		-----
230		-----		-----	963		-----		-----
237		-----		-----	970		-----		-----
238		-----		-----	971		-----		-----
253		-----		-----	974		-----		-----
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995		-----		-----
273		-----		-----	996		-----		-----
312	D5950	-30		1.13	997		-----		-----
317	D6749	-33		-0.24	998		-----		-----
323	D5950	-33		-0.24	1006		-----		-----
333		-----		-----	1011		-----		-----
334	D5950	-33		-0.24	1016		-----		-----
335		-----		-----	1026	D5950	-33		-0.24
336	D5950	-30		1.13	1059		-----		-----
337		-----		-----	1105	D5949	-27		2.51
339		-----		-----	1109		-----		-----
342		-----		-----	1121		-----		-----
343		-----		-----	1126		-----		-----
344		-----		-----	1134		-----		-----
349		-----		-----	1135	D5950	-30		1.13
353		-----		-----	1140	D5950	-33		-0.24
355		-----		-----	1146	D5950	-36		-1.62
356		-----		-----	1162		-----		-----
381		-----		-----	1171		-----		-----
433		-----		-----	1182	D5949	-27		2.51
463	D6892	-33		-0.24	1213		-----		-----
485		-----		-----	1227		-----		-----
495	D6892	-36		-1.62	1277		-----		-----
498		-----		-----	1284	D5950	-32		0.22
507		-----		-----	1297	D5949	-31		0.68
511		-----		-----	1299		-----		-----
529		-----		-----	1356		-----		-----
541	D5950	-33		-0.24	1357	D5949	-33.0		-0.24
551		-----		-----	1389		-----		-----
554		-----		-----	1412		-----		-----
555		-----		-----	1417	D5950	-31		0.68
558		-----		-----	1430	D5950	-33		-0.24
562		-----		-----	1431	D5950	-33		-0.24
575		-----		-----	1433		-----		-----
603		-----		-----	1441		-----		-----
604		-----		-----	1498		-----		-----
608		-----		-----	1575		-----		-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616		-----		-----
631	D5950	-36		-1.62	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D5950	-33		-0.24	1643		-----		-----
732		-----		-----	1720		-----		-----
733		-----		-----	1724		-----		-----
750		-----		-----	1740		-----		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807		-----		-----	6201	D5950	<-33		-----
1810	D5950	-33		-0.24	6238		-----		-----
1811	D5950	-33		-0.24	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944		-----		-----	6258		-----		-----
1967		-----		-----	6262	D5950	-33		-0.24
6026		-----		-----	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049		-----		-----	6291	D5950	-33		-0.24
6054	D5950	-33.0		-0.24	6317		-----		-----
6057		-----		-----	6319		-----		-----
6103	D5950	-34		-0.70	6341		-----		-----
6142	D5950	-33		-0.24	6346		-----		-----

|	
normality	suspect
n	36
outliers	0
mean (n)	-32.47
st.dev. (n)	2.091
R(calc.)	5.85
st.dev.(D5950:14)	2.179
R(D5950:14)	6.1

Kernel Density
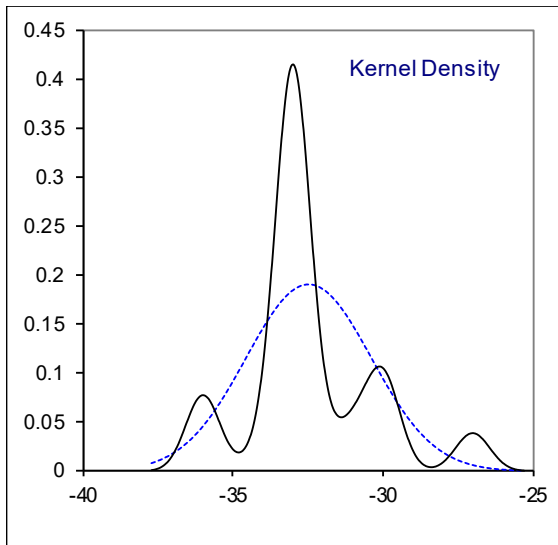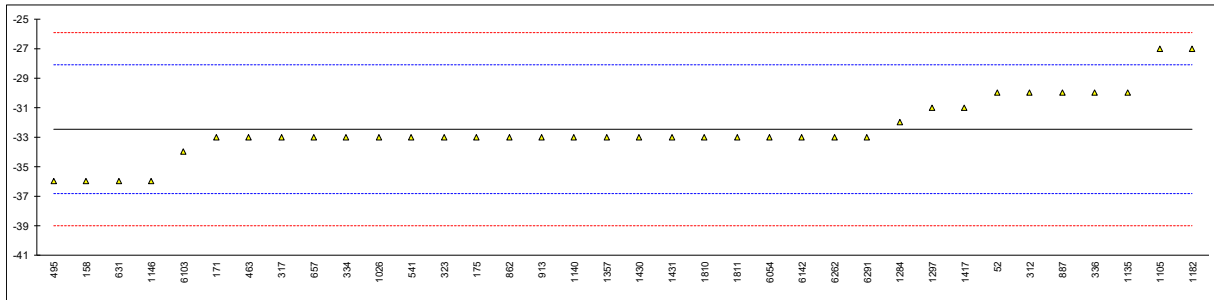
Determination of Total Sulfur on sample #20170; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5453	19		0.09	781		-----		-----
53		-----		-----	785		-----		-----
62	D5453	19.5		0.36	798		-----		-----
90		-----		-----	825	D5453	17.46		-0.73
92	D5453	22.8		2.12	851	ISO20884	17.27		-0.84
120	D2622	19.455		0.33	854	D5453	18		-0.45
140	D2622	17.7		-0.61	856	D5453	19.4		0.30
150		-----		-----	862	D5453	20		0.62
158	D2622	19.9		0.57	863	D5453	18.7		-0.07
159	D5453	20.9		1.10	864	D5453	21		1.16
169	D5453	20.23		0.75	872		-----		-----
171	D5453	18		-0.45	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904	D5453	19.3		0.25
217		-----		-----	912		-----		-----
221		-----		-----	913	D5453	19.9		0.57
224	D4294	7.04	C,R(0.01)	-6.30	914		-----		-----
225	D4294	43.8	R(0.01)	13.34	922	D5453	17.1		-0.93
228	D2622	14.0		-2.58	962		-----		-----
230	D4294	24.9		3.24	963		-----		-----
237	D5453	20.5		0.89	970	D5453	19.2		0.20
238		-----		-----	971	D5453	19.1		0.14
253		-----		-----	974		-----		-----
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258	D5453	18		-0.45	995	D5453	17		-0.98
273	D5453	15		-2.05	996		-----		-----
312	D5453	19		0.09	997		-----		-----
317	D5453	20		0.62	998		-----		-----
323	D5453	13.4		-2.90	1006	D5453	19.8		0.52
333	D5453	22		1.69	1011		-----		-----
334	ISO20846	17.4		-0.77	1016	ISO20846	19.692		0.46
335	ISO20846	20.2		0.73	1026	ISO20846	19.4		0.30
336	D5453	19		0.09	1059	ISO20884	15.3		-1.89
337	D5453	20		0.62	1105	D7039	19.24		0.22
339		-----		-----	1109	D7039	18.65		-0.10
342		-----		-----	1121		-----		-----
343	ISO20846	18.2		-0.34	1126		-----		-----
344	D5453	16.84		-1.06	1134	ISO20846	19.600		0.41
349		-----		-----	1135	D5453	17.1		-0.93
353	ISO20846	17.5		-0.71	1140	D5453	18.01		-0.44
355	D2622	18.783		-0.03	1146	D4294	10	C,R(0.01)	-4.72
356	ISO20846	18.5		-0.18	1162	D5453	19.2		0.20
381	ISO20846	20.4		0.84	1171	ISO20846	19.41		0.31
433		-----		-----	1182	ISO20846	20.6		0.94
463	D5453	18.1		-0.39	1213	D5453	21.25		1.29
485	D5453	20.63		0.96	1227	D5453	20.1		0.68
495	ISO20846	16.38		-1.31	1277		-----		-----
498		-----		-----	1284	D2622	18.13		-0.38
507		-----		-----	1297	D5453	17.9		-0.50
511		-----		-----	1299	ISO20884	16.7		-1.14
529	D4294	20.35		0.81	1356	ISO8754	<300		-----
541		-----		-----	1357	D5453	18.3		-0.28
551		-----		-----	1389	ISO20846	19.6		0.41
554		-----		-----	1412	D5453	17		-0.98
555		-----		-----	1417	In house	140	R(0.01)	64.74
558		-----		-----	1430	ISO8754	14.9		-2.10
562		-----		-----	1431	D7220	17.6		-0.66
575		-----		-----	1433	ISO20846	19.283		0.24
603		-----		-----	1441	D5453	19.8		0.52
604		-----		-----	1498	D5453	22.4		1.91
608		-----		-----	1575		-----		-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616	D5453	18.25		-0.31
631	D4294	17.3		-0.82	1629		-----		-----
633		-----		-----	1631	ISO13032	22.8		2.12
634		-----		-----	1634	ISO20846	18.8		-0.02
657	D5453	15.815		-1.61	1643		-----		-----
732	D4294	17		-0.98	1720		-----		-----
733	ISO20884	17.57		-0.67	1724	D5453	18.26		-0.31
750		-----		-----	1740	D5453	20.6		0.94

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172	D5453	14.82		-2.14
1807	D5453	18.2		-0.34	6201	D5453	18.3		-0.28
1810	D5453	20.7		1.00	6238		-----		-----
1811	D5453	20.5		0.89	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D5453	18.5	C	-0.18	6258	ISO20846	19.5		0.36
1967	ISO20884	18.7		-0.07	6262	ISO20884	19.456		0.33
6026	D4294	17.95		-0.47	6266		-----		-----
6034	D5453	8.0	C,R(0.01)	-5.79	6272		-----		-----
6049	D5453	21.0		1.16	6291	D5453	19.85		0.54
6054	D4294	19.7		0.46	6317		-----		-----
6057	ISO20846	21.0		1.16	6319		-----		-----
6103	D4294	16.8		-1.09	6341		-----		-----
6142	ISO20846	979.42	R(0.01)	513.21	6346		-----		-----

normality	suspect
n	94
outliers	6
mean (n)	18.833
st.dev. (n)	1.9055
R(calc.)	5.336
st.dev.(D5453:19a)	1.872
R(D5453:19a)	5.24

Lab 224   first reported: 70.8
Lab 1146 first reported: 0.001
Lab 1944 first reported: 8.5
Lab 6034 first reported: 7.5

Kernel Density
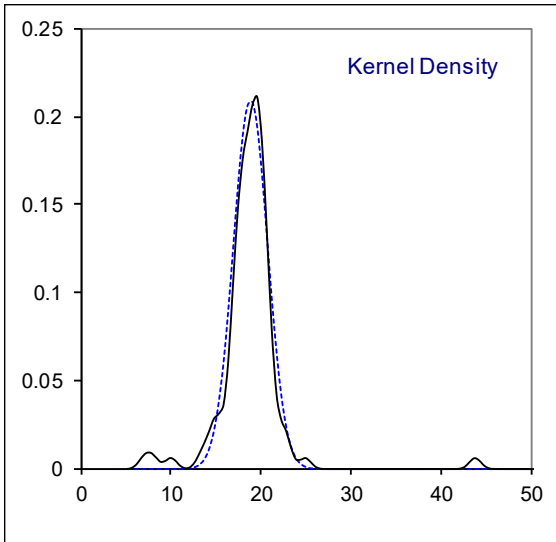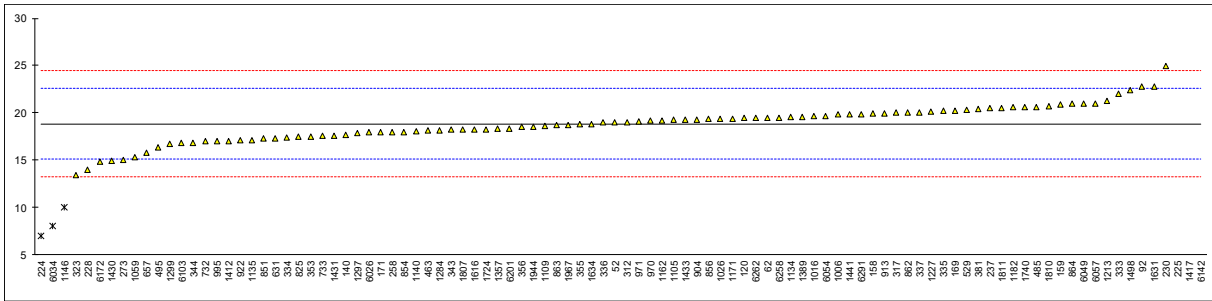
Determination of Water on sample #20170; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D6304-A	57		-0.05	781		-----		-----
53		-----		-----	785		-----		-----
62	D6304-A	<100		-----	798		-----		-----
90	D6304-A	82		0.30	825		-----		-----
92	E203	110		0.69	851	D6304-A	61.65		0.01
120		-----		-----	854	D6304-A	63		0.03
140	D6304-A	105		0.62	856		-----		-----
150		-----		-----	862	D6304-A	55		-0.08
158		-----		-----	863	D6304-A	58		-0.04
159		-----		-----	864	D6304-A	65		0.06
169	D6304-A	72		0.16	872		-----		-----
171	D6304-A	76		0.22	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203	D6304-A	75.0639		0.20	887		-----		-----
215		-----		-----	904	D6304-A	43		-0.25
217	D6304-A	65.8		0.07	912		-----		-----
221		-----		-----	913	D6304	68		0.10
224	ISO12937	40.0		-0.29	914		-----		-----
225		-----		-----	922	D6304-A	51		-0.14
228		-----		-----	962		-----		-----
230		-----		-----	963		-----		-----
237	D6304-C	49.8		-0.15	970	D6304-A	66		0.07
238		-----		-----	971	D6304-A	60.54		0.00
253	D6304-A	66		0.07	974	D6304-A	64		0.05
254	D6304-B	60.75		0.00	988		-----		-----
256	D6304	43.0		-0.25	994		-----		-----
258	D6304-A	47.46		-0.19	995	D6304-A	62		0.02
273	D6304-A	62		0.02	996		-----		-----
312	ISO12937	66		0.07	997	D6304-A	58		-0.04
317	D6304-A	50	C	-0.15	998		-----		-----
323	D6304-A	54		-0.10	1006	D6304-A	61		0.00
333	D6304-A	60		-0.01	1011	ISO12937	53		-0.11
334	E203	54.7		-0.09	1016	ISO12937	46.42		-0.20
335	ISO12937	61.1		0.00	1026	D6304-B	64		0.05
336	ISO12937	70		0.13	1059	ISO12937	60		-0.01
337	ISO12937	50		-0.15	1105	D6304-C	63		0.03
339		-----		-----	1109	D6304	53		-0.11
342	ISO12937	55.4		-0.08	1121	D6304	122		0.86
343	ISO12937	45		-0.22	1126		-----		-----
344	ISO12937	47.75		-0.18	1134	IP438	58		-0.04
349	D6304-A	53		-0.11	1135	ISO12937	59		-0.02
353	IP438	90.0		0.41	1140	IP438	102		0.58
355		-----		-----	1146	D6304-C	<100		-----
356	D6304-A	60		-0.01	1162	D6304-A	55.8		-0.07
381	ISO12937	61		0.00	1171	ISO12937	53.7		-0.10
433		-----		-----	1182		-----		-----
463	D6304-A	70.65		0.14	1213	D6304-A	43		-0.25
485	D6304-A	55.0		-0.08	1227		52		-0.12
495	ISO12937	35.4		-0.36	1277		-----		-----
498	ISO12937	63.3		0.04	1284		-----		-----
507		-----		-----	1297	D6304-A	53.2		-0.11
511		-----		-----	1299	ISO12937	60		-0.01
529	D6304-A	54.285		-0.09	1356	D6304-A	<200		-----
541	D6304-A	54.0		-0.10	1357	D6304-A	58.0		-0.04
551		-----		-----	1389	ISO12937	50		-0.15
554		-----		-----	1412	D6304-A	57		-0.05
555		-----		-----	1417	D6304-A	60		-0.01
558		-----		-----	1430	D6304-A	54		-0.10
562		-----		-----	1431	D6304-A	37.39		-0.33
575		-----		-----	1433	ISO12937	63.37		0.04
603		-----		-----	1441	D6304-A	61.4		0.01
604		-----		-----	1498		-----		-----
608	D6304-A	55		-0.08	1575		-----		-----
614	D6304-C	70		0.13	1588		-----		-----
621		-----		-----	1616	UOP481	48.80		-0.17
631	D6304-B	62.6		0.03	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634	D6304-A	47		-0.19
657	D6304-A	63.0		0.03	1643	ISO6296	109		0.68
732	ISO12937	49.9		-0.15	1720		-----		-----
733	ISO12937	47.85		-0.18	1724	D6304-A	65		0.06
750		-----		-----	1740	D6304-A	55		-0.08

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172	D6304	57.96		-0.04
1807	D6304-A	60		-0.01	6201	D6304-A	58		-0.04
1810	D6304-A	60		-0.01	6238		-----		-----
1811	D6304-A	66		0.07	6249		-----		-----
1906	D6304-C	64.19		0.05	6253		-----		-----
1944	D6304-A	56.755		-0.06	6258	ISO12937	58.4		-0.03
1967	D6304-A	54		-0.10	6262	ISO12937	50		-0.15
6026		-----		-----	6266		-----		-----
6034	D6304-A	63		0.03	6272		-----		-----
6049	D6304-A	54		-0.10	6291	D6304-A	65		0.06
6054		-----		-----	6317	D95	<2		-----
6057	ISO12937	85		0.34	6319		-----		-----
6103	ISO12937	53.9		-0.10	6341		-----		-----
6142	ISO12937	58.25		-0.04	6346		-----		-----

normality	not OK
n	101
outliers	0
mean (n)	60.75
st.dev. (n)	14.449
R(calc.)	40.46
st.dev.(D6304-A:16e1)	70.898
R(D6304-A:16e1)	198.51

Lab 317 first reported: 50% M/M
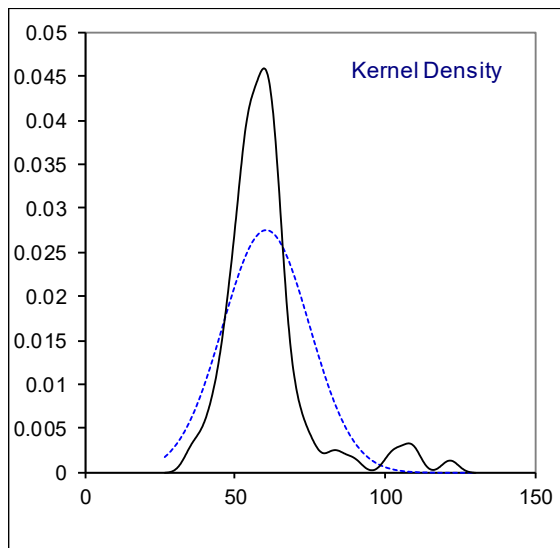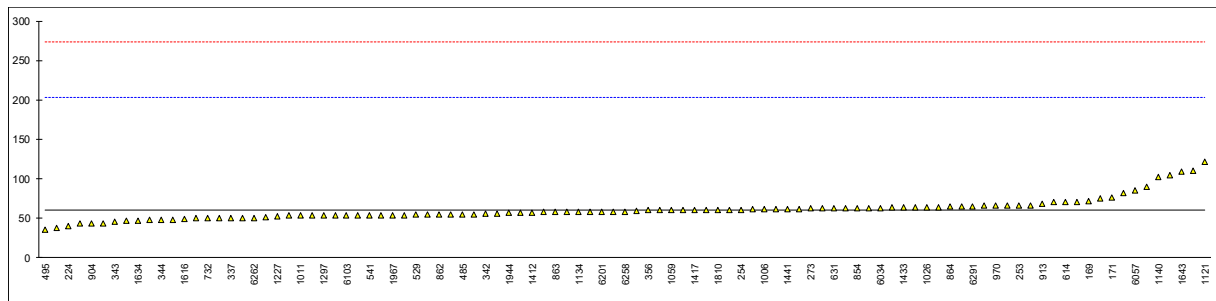
Determination of Water and Sediment (D2709) on sample #20170; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D2709	<0.010		-----	781		-----		-----
53		-----		-----	785		-----		-----
62	D2709	<0.01		-----	798		-----		-----
90		-----		-----	825	D2709	L0.01		-----
92	D2709	0		-----	851		-----		-----
120		-----		-----	854	D2709	<0.01		-----
140	D2709	<0.01		-----	856		-----		-----
150		-----		-----	862	D2709	<0.01		-----
158	D2709	<0.01		-----	863	D2709	<0.01		-----
159		-----		-----	864	D2709	<0.01		-----
169		-----		-----	872		-----		-----
171	D2709	<0.01		-----	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904		-----		-----
217	D2709	0		-----	912		-----		-----
221		-----		-----	913		-----		-----
224		-----		-----	914		-----		-----
225		-----		-----	922		-----		-----
228		-----		-----	962		-----		-----
230		-----		-----	963		-----		-----
237	D2709	<0.05		-----	970	D2709	0		-----
238		-----		-----	971	D2709	<0.01		-----
253		-----		-----	974	D2709	0.00		-----
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995		-----		-----
273		-----		-----	996		-----		-----
312		-----		-----	997		-----		-----
317		-----		-----	998		-----		-----
323		-----		-----	1006	D2709	0		-----
333		-----		-----	1011		-----		-----
334		-----		-----	1016		-----		-----
335		-----		-----	1026		-----		-----
336		-----		-----	1059	D2709	<0,05		-----
337		-----		-----	1105	D2709	<0.01		-----
339		-----		-----	1109	D2709	0.000		-----
342	D2709	0.00		-----	1121		-----		-----
343	D2709	<0.01		-----	1126		-----		-----
344	D2709	<0.05		-----	1134		-----		-----
349		-----		-----	1135		-----		-----
353		-----		-----	1140		-----		-----
355		-----		-----	1146		-----		-----
356	D2709	Below 0.05		-----	1162		-----		-----
381		-----		-----	1171		-----		-----
433		-----		-----	1182		-----		-----
463		-----		-----	1213	D2709	<0.05		-----
485		-----		-----	1227		-----		-----
495		-----		-----	1277		-----		-----
498		-----		-----	1284		-----		-----
507	D2709	0.000		-----	1297		-----		-----
511		-----		-----	1299	D2709	<0.01		-----
529	D2709	0.00		-----	1356		-----		-----
541	D2709	<0.05		-----	1357	D2709	<0.01		-----
551		-----		-----	1389	D2709	<0.0025		-----
554		-----		-----	1412		-----		-----
555		-----		-----	1417		-----		-----
558		-----		-----	1430		-----		-----
562	D2709	<0.01		-----	1431		-----		-----
575	D2709	<0.005		-----	1433	D2709	0.005		-----
603		-----		-----	1441	D2709	<0.025		-----
604		-----		-----	1498	D2709	0.005		-----
608		-----		-----	1575	D2709	<0.01		-----
614		-----		-----	1588		-----		-----
621		-----		-----	1616		-----		-----
631	D2709	<0.01		-----	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657	D2709	<0.01		-----	1643		-----		-----
732		-----		-----	1720		-----		-----
733		-----		-----	1724		-----		-----
750		-----		-----	1740	D2709	0		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807		-----		-----	6201		-----		-----
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944	D2709	<0.05		-----	6258	D2709	0.00		-----
1967	D2709	Less 0.01		-----	6262	D2709	<0.05		-----
6026		-----		-----	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049		-----		-----	6291	D2709	<0.05		-----
6054	D2709	0		-----	6317		-----		-----
6057		-----		-----	6319		-----		-----
6103		-----		-----	6341		-----		-----
6142		-----		-----	6346		-----		-----

|		
n	46
mean (n)	<0.05

Determination of Water and Sediment (D1796) on sample #20170; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		-----		-----	781		-----		-----
53		-----		-----	785		-----		-----
62	D1796	0		-----	798		-----		-----
90		-----		-----	825	D1796	0		-----
92		-----		-----	851		-----		-----
120	D1796	0.00		-----	854		-----		-----
140		-----		-----	856		-----		-----
150		-----		-----	862		-----		-----
158		-----		-----	863		-----		-----
159		-----		-----	864		-----		-----
169	D1796	0.0		-----	872		-----		-----
171	D1796	0.00		-----	873		-----		-----
175		-----		-----	874		-----		-----
186		-----		-----	886		-----		-----
203		-----		-----	887		-----		-----
215		-----		-----	904		-----		-----
217	D1796	0		-----	912		-----		-----
221		-----		-----	913		-----		-----
224		-----		-----	914		-----		-----
225		-----		-----	922	D1796	<0.025		-----
228		-----		-----	962		-----		-----
230		-----		-----	963		-----		-----
237	D1796	<0.05		-----	970	D1796	0		-----
238		-----		-----	971	D1796	0.00		-----
253		-----		-----	974	D1796	0.00		-----
254		-----		-----	988		-----		-----
256		-----		-----	994		-----		-----
258		-----		-----	995		-----		-----
273		-----		-----	996		-----		-----
312		-----		-----	997		-----		-----
317		-----		-----	998		-----		-----
323		-----		-----	1006		-----		-----
333		-----		-----	1011		-----		-----
334	D1796	0		-----	1016		-----		-----
335		-----		-----	1026		-----		-----
336		-----		-----	1059		-----		-----
337		-----		-----	1105		-----		-----
339		-----		-----	1109	D1796	0.00		-----
342		-----		-----	1121		-----		-----
343	D1796	0.00		-----	1126		-----		-----
344		-----		-----	1134		-----		-----
349		-----		-----	1135	D1796	<0,01		-----
353		-----		-----	1140		-----		-----
355		-----		-----	1146		-----		-----
356		-----		-----	1162	D1796	0.00		-----
381		-----		-----	1171		-----		-----
433		-----		-----	1182		-----		-----
463		-----		-----	1213		-----		-----
485		-----		-----	1227		-----		-----
495		-----		-----	1277		-----		-----
498		-----		-----	1284		-----		-----
507	D1796	0.0000		-----	1297		-----		-----
511		-----		-----	1299		-----		-----
529	D1796	0.000		-----	1356		-----		-----
541	D1796	<0.1		-----	1357	D1796	n.a		-----
551		-----		-----	1389		-----		-----
554		-----		-----	1412		-----		-----
555		-----		-----	1417		-----		-----
558		-----		-----	1430		-----		-----
562	D1796	0.00		-----	1431		-----		-----
575		-----		-----	1433		-----		-----
603		-----		-----	1441		-----		-----
604		-----		-----	1498		-----		-----
608		-----		-----	1575		-----		-----
614	D1796	<0.025		-----	1588		-----		-----
621		-----		-----	1616		-----		-----
631	D1796	<0.01		-----	1629		-----		-----
633		-----		-----	1631		-----		-----
634		-----		-----	1634		-----		-----
657		-----		-----	1643		-----		-----
732		-----		-----	1720		-----		-----
733		-----		-----	1724		-----		-----
750		-----		-----	1740	D1796	0		-----

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
1783		-----		-----	6172		-----		-----
1807		-----		-----	6201		-----		-----
1810		-----		-----	6238		-----		-----
1811		-----		-----	6249		-----		-----
1906		-----		-----	6253		-----		-----
1944		-----		-----	6258		-----		-----
1967		-----		-----	6262	D1796	<0.05		-----
6026		-----		-----	6266		-----		-----
6034		-----		-----	6272		-----		-----
6049		-----		-----	6291	D1796	<0.05		-----
6054		-----		-----	6317		-----		-----
6057		-----		-----	6319		-----		-----
6103	D1796	<0.05		-----	6341		-----		-----
6142		-----		-----	6346		-----		-----

n	26
mean (n)	<0.1

Determination of Cetane Number (ASTM D613) of sample #20171

lab	method	value	mark	z(targ)	remarks
120	D613	51.49		-0.75	
140		-----		-----	
150	D613	51.4		-0.81	
171	D613	54.8		1.36	
312	D613	53.5		0.53	
323	D613	54.6		1.24	
336		-----		-----	
343		-----		-----	
356		-----		-----	
381	D613	52.7		0.02	
551		-----		-----	
657	D613	52.7		0.02	
754		-----		-----	
862	D613	51.2		-0.93	
904		-----		-----	
963		-----		-----	
1011		-----		-----	
1059		-----		-----	
1065	D613	51.8		-0.55	
1162	D613	52.2		-0.30	
1299	D613	52.2		-0.30	
1356	ISO4264	41	G(0.01)	-7.45	
1357	D613	52.2		-0.30	
1610		-----		-----	
1709	D613	53.76		0.70	
1807		-----		-----	
1992	D613	51.966		-0.45	
6057		-----		-----	
6103	In house	53.3		0.41	
6142		-----		-----	
6201	D613	52.8		0.09	
6238		-----		-----	
6253		-----		-----	
6262		-----		-----	
6291		-----		-----	

normality	OK
n	16
outliers	1
mean (n)	52.66
st.dev. (n)	1.084
R(calc.)	3.04
st.dev.(D613:18a)	1.565
R(D613:18a)	4.38
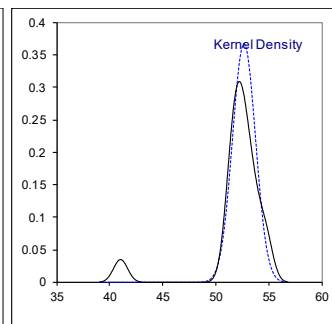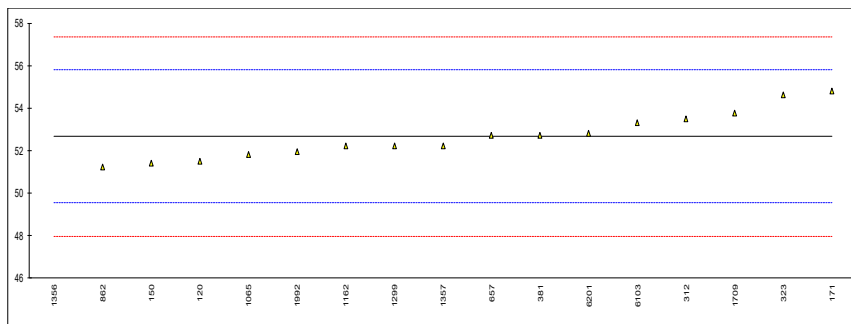
Determination of Derived Cetane Number (D6890) of sample #20171

lab	method	DCN	mark	z(targ)	ID (ms)	mark	z(targ)	Air Temp. (°C)
120		-----		-----	-----		-----	-----
140		-----		-----	-----		-----	-----
150		-----		-----	-----		-----	-----
171		-----		-----	-----		-----	-----
312		-----		-----	-----		-----	-----
323		-----		-----	-----		-----	-----
336		-----		-----	-----		-----	-----
343		-----		-----	-----		-----	-----
356		-----		-----	-----		-----	-----
381		-----		-----	-----		-----	-----
551		-----		-----	-----		-----	-----
657		-----		-----	-----		-----	-----
754		-----		-----	-----		-----	-----
862		-----		-----	-----		-----	-----
904	D6890	53.63		1.27	3.795		-1.86	595.2
963		-----		-----	-----		-----	-----
1011		-----		-----	-----		-----	-----
1059		-----		-----	-----		-----	-----
1065		-----		-----	-----		-----	-----
1162		-----		-----	-----		-----	-----
1299		-----		-----	-----		-----	-----
1356		-----		-----	-----		-----	-----
1357	D6890	n.a		-----	n.a		-----	n.a
1610	IP498	51.03		-1.75	4.102		2.53	-----
1709		-----		-----	-----		-----	-----
1807	EN17155	53.0		0.54	2.16	G(0.05)	-25.21	-----
1992		-----		-----	-----		-----	-----
6057		-----		-----	-----		-----	-----
6103		-----		-----	-----		-----	-----
6142	IP498	52.57		0.04	3.8785		-0.67	-----
6201	EN17155	52.45		-0.10	-----		-----	-----
6238		-----		-----	-----		-----	-----
6253		-----		-----	-----		-----	-----
6262		-----		-----	-----		-----	-----
6291		-----		-----	-----		-----	-----
	normality	unknown			unknown			
	n	5			3			
	outliers	0			1			
	mean (n)	52.56			3.93			
	st.dev. (n)	0.960			0.159			
	R(calc.)	2.69			0.44			
	st.dev.(D6890:18)	0.860			0.070			
	R(D6890:18)	2.41			0.20			

Derived Cetane Number (D6890)


Ignition Delay (D6890)
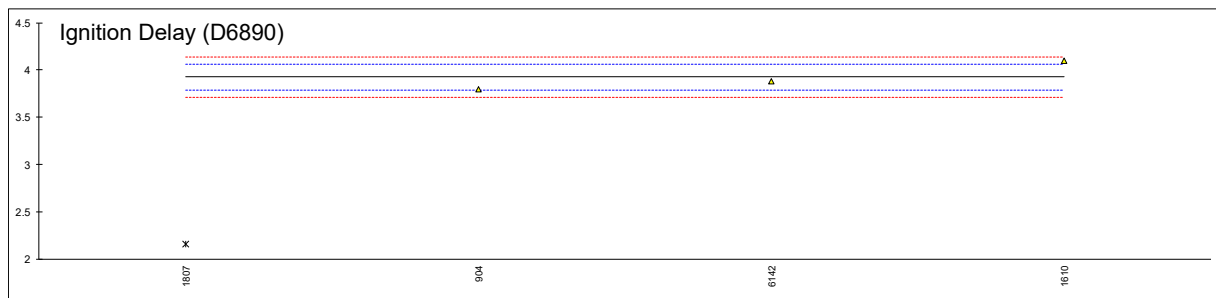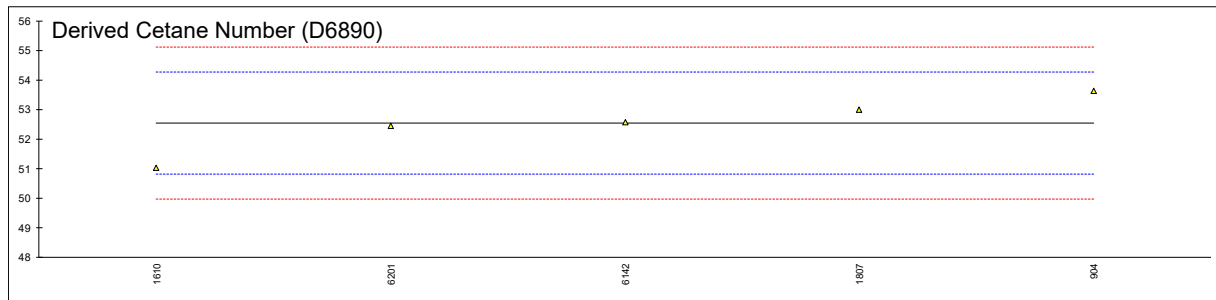
Determination of Derived Cetane Number (D7668) of sample #20171

lab	method	DCN	mark	z(targ)	ID (ms)	mark	z(targ)	CD (ms)	mark	z(targ)	W. T. (°C)
120		-----		-----	-----		-----	-----		-----	-----
140		-----		-----	-----		-----	-----		-----	-----
150		-----		-----	-----		-----	-----		-----	-----
171		-----		-----	-----		-----	-----		-----	-----
312		-----		-----	-----		-----	-----		-----	-----
323		-----		-----	-----		-----	-----		-----	-----
336	D7668	53.4		0.46	2.98		0.71	4.46		-0.23	593.3
343	D7668	52.7		-0.85	3.1		3.00	4.51		0.86	590.2
356	D7668	53.5		0.65	2.89		-1.01	4.44		-0.67	610
381		-----		-----	-----		-----	-----		-----	-----
551		-----		-----	-----		-----	-----		-----	-----
657		-----		-----	-----		-----	-----		-----	-----
754		-----		-----	-----		-----	-----		-----	-----
862		-----		-----	-----		-----	-----		-----	-----
904		-----		-----	-----		-----	-----		-----	-----
963		-----		-----	-----		-----	-----		-----	-----
1011		-----		-----	-----		-----	-----		-----	-----
1059	EN16715	53.6		0.84	2.8829		-1.15	4.4289		-0.91	599.20
1065		-----		-----	-----		-----	-----		-----	-----
1162	D7668	52.50		-1.23	2.948		0.10	4.525		1.18	594.60
1299	D7668	51.3	G(0.05)	-3.49	3.20	ex	4.91	4.65	G(0.05)	3.90	584.6
1356		-----		-----	-----		-----	-----		-----	-----
1357	D7668	n.a		-----	n.a		-----	n.a		-----	n.a
1610		-----		-----	-----		-----	-----		-----	-----
1709		-----		-----	-----		-----	-----		-----	-----
1807		-----		-----	-----		-----	-----		-----	-----
1992		-----		-----	-----		-----	-----		-----	-----
6057	D7668	53.1		-0.10	3.02		1.47	4.48		0.20	591.92
6103		-----		-----	-----		-----	-----		-----	-----
6142		-----		-----	-----		-----	-----		-----	-----
6201		-----		-----	-----		-----	-----		-----	-----
6238		-----		-----	-----		-----	-----		-----	-----
6253		-----		-----	-----		-----	-----		-----	-----
6262	D7668	52.97		-0.35	2.8151		-2.44	4.4779		0.16	612.64
6291	D7668	53.46		0.58	2.9078		-0.67	4.4433		-0.59	598.50
	normality	OK			OK			OK			
	n	8			8			8			
	outliers	1			0 (+1ex)			1			
	mean (n)	53.15			2.94			4.47			
	st.dev. (n)	0.404			0.089			0.034			
	R(calc.)	1.13			0.25			0.10			
	st.dev.(D7668:17)	0.532			0.052			0.046			
	R(D7668:17)	1.49			0.15			0.13			

W.T. = Chamber Wall Temperature

Lab 1299 test result was excluded as related test results are statistical outliers.

Derived Cetane Number (D7668)

Ignition Delay (D7668)


Combustion Delay (D7668)
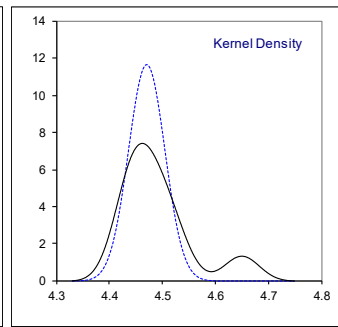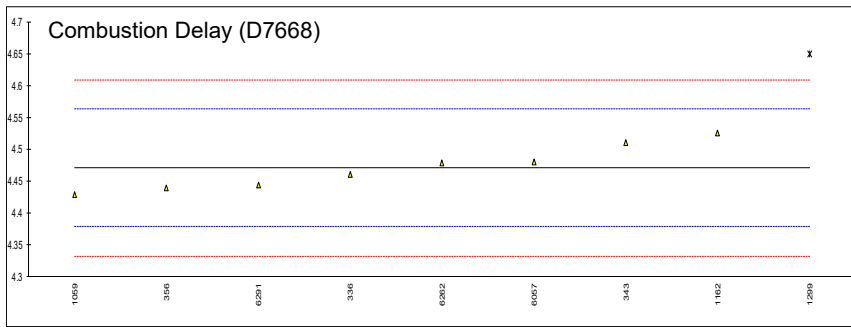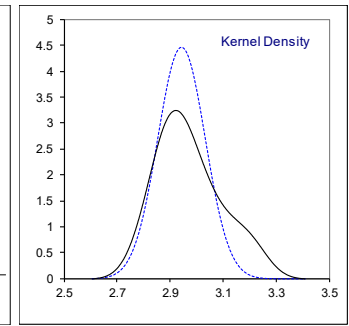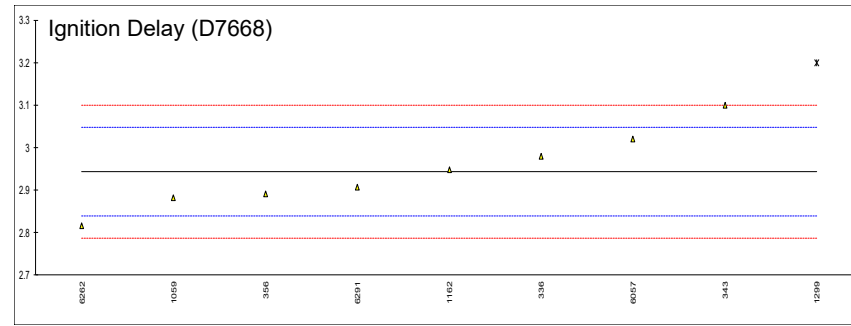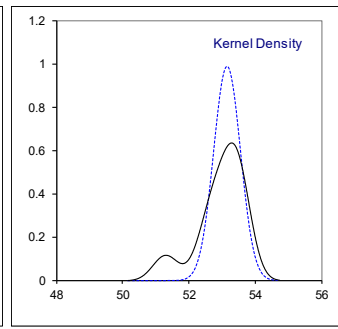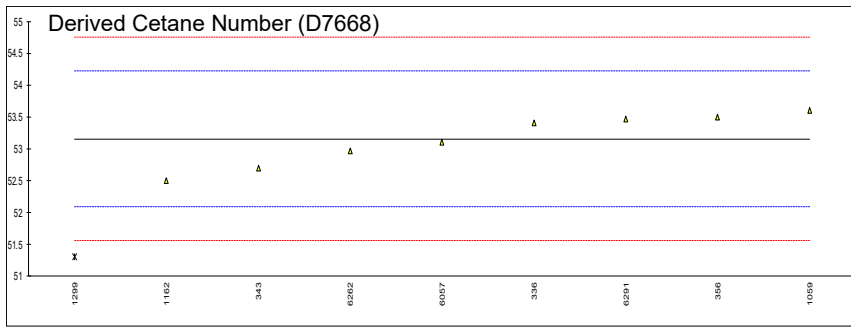
Determination of Particulate Contamination on sample #20172; results in mg/L

lab	method	Part.Cont.	mark	z(targ)	Vol. filtered	No. of filtrations	remarks
120	D6217	1.9		-----	720	1	
140		-----		-----	-----	-----	
150		-----		-----	-----	-----	
171		-----		-----	-----	-----	
230	D6217	8.4		-----	1000	1	
237		-----		-----	-----	-----	
273		-----		-----	-----	-----	
317		-----		-----	-----	-----	
323		-----		-----	-----	-----	
333		-----		-----	-----	-----	
334		-----		-----	-----	-----	
335		-----		-----	-----	-----	
336		-----		-----	-----	-----	
349		-----		-----	-----	-----	
353		-----		-----	-----	-----	
356		-----		-----	-----	-----	
463		-----		-----	-----	-----	
507	D6217	9.30		-----	1000	2	
551		-----		-----	-----	-----	
603		-----		-----	-----	-----	
621		-----		-----	-----	-----	
657	D6217	13.2		-----	1000	2	
750		-----		-----	-----	-----	
798		-----		-----	-----	-----	
825		-----		-----	-----	-----	
862		-----		-----	-----	-----	
874		-----		-----	-----	-----	
912		-----		-----	-----	-----	
922	D6217	16.0		-----	1000	3	
963		-----		-----	-----	-----	
970		-----		-----	-----	-----	
974		-----		-----	-----	-----	
994	D6217	8.34		-----	500	13	
1006		-----		-----	-----	-----	
1011		-----		-----	-----	-----	
1016		-----		-----	-----	-----	
1059		-----		-----	-----	-----	
1134		-----		-----	-----	-----	
1135		-----		-----	-----	-----	
1162		-----		-----	-----	-----	
1171		-----		-----	-----	-----	
1299		-----		-----	-----	-----	
1357	D6217	n.a		-----	n.a	n.a	
1431		-----		-----	-----	-----	
1433		-----		-----	-----	-----	
1631		-----		-----	-----	-----	
1634		-----		-----	-----	-----	
1724		-----		-----	-----	-----	
1807		-----		-----	-----	-----	
6034		-----		-----	-----	-----	
6057		-----		-----	-----	-----	
6103		-----		-----	-----	-----	
6201		-----		-----	-----	-----	
6262		-----		-----	-----	-----	
6291		-----		-----	-----	-----	
	normality	unknown					
	n	6					
	outliers	0					
	mean (n)	(9.52)					
	st.dev. (n)	(4.823)					
	R(calc.)	(13.50)					
	st.dev.(D6217:18)	(1.245)					
	R(D6217:18)	(3.49)					

Determination of Total Contamination on sample #20172; results in mg/kg

| lab	method	Total C.	mark	z(targ)	incomplete	vol. filtered (mL)	stopped (min)	remarks
120		-----		-----	-----	-----	-----	
140		-----		-----	-----	-----	-----	
150	EN12662:2014	27.1	C	2.53	Yes	300	-----	first reported: <12.0
171	EN12662:2014	26.5		2.31	Yes	300	-----	
230	D6217	10.0	ex	-3.89	Yes	1000	24.49	test result excluded *)
237		-----		-----	-----	-----	-----	
273	IP440	22		0.62	Yes	-----	-----	
317	EN12662:2014	16.0		-1.64	Yes	-----	-----	
323	EN12662:2014	24.5		1.56	Yes	300	-----	
333	EN12662:2014	21		0.24	Yes	300	-----	
334	EN12662:2014	25.0		1.74	Yes	-----	-----	
335	EN12662:2014	24.5		1.56	Yes	-----	-----	
336	EN12662:2014	21.5		0.43	Yes	300	-----	
349	EN12662:2014	24		1.37	-----	-----	-----	
353	IP440	21.09		0.28	No	600	9:54	vol. not acc. to test method
356	EN12662:2014	22.0		0.62	-----	300	-----	
463	EN12662:2014	25.99		2.12	Yes	300	1.20	
507		-----		-----	-----	-----	-----	
551		-----		-----	-----	-----	-----	
603		-----		-----	-----	-----	-----	
621		-----		-----	-----	-----	-----	
657		-----		-----	-----	-----	-----	
750		-----		-----	-----	-----	-----	
798		-----		-----	-----	-----	-----	
825		-----		-----	-----	-----	-----	
862		-----		-----	-----	-----	-----	
874		-----		-----	-----	-----	-----	
912		-----		-----	-----	-----	-----	
922		-----		-----	-----	-----	-----	
963		-----		-----	-----	-----	-----	
970	IP440	15.2		-1.94	Yes	300	5	
974	IP440	15.4		-1.86	Yes	300	5	
994		-----		-----	-----	-----	-----	
1006	EN12662:2014	16.84		-1.32	Yes	307	2	vol. not acc. to test method
1011	EN12662:2014	23		0.99	-----	-----	-----	
1016	EN12662:2014	17.1		-1.22	Yes	300	-----	
1059	EN12662:2014	19.3		-0.40	Yes	370	-----	vol. not acc. to test method
1134		-----		-----	-----	-----	-----	
1135	EN12662:2014	14		-2.39	Yes	300	<1	
1162	EN12662:2014	15.43		-1.85	Yes	-----	-----	
1171	EN12662:2014	27.43		2.66	Yes	269.9	1.35	vol. not acc. to test method
1299	EN12662:2014	18.5		-0.70	Yes	300	-----	
1357	IP440	18.8		-0.58	Yes	800	30	vol. not acc. to test method
1431	EN12662:2008	29.744		3.53	-----	467.66	-----	vol. not acc. to test method
1433	EN12662:2014	18.7765		-0.59	Yes	300	-----	
1631		-----		-----	-----	-----	-----	
1634	EN12662:2014	16.65		-1.39	Yes	299.4	-----	
1724		-----	W	-----	-----	-----	-----	test result withdrawn, fr. 9.9
1807	EN12662:2014	<12	f-?	<-3.14	-----	-----	-----	
6034	EN12662:2014	20.0		-0.13	Yes	300	15	
6057	EN12662:2014	<12	f-?	<-3.14	Yes	-----	-----	
6103	EN12662:2014	11.1		-3.48	Yes	300	28	
6201	EN12662:2014	24.2		1.44	Yes	345	-----	vol. not acc. to test method
6262	EN12662:2014	12		-3.14	Yes	-----	-----	
6291	EN12662:2014	16.72		-1.36	-----	-----	-----	
	normality	OK						
	n	32						
	outliers	0 (+1ex)						
	mean (n)	20.36						
	st.dev. (n)	4.757						
	R(calc.)	13.32						
	st.dev.(EN12662:14)	2.663						
	R(EN12662:14)	7.46						

*) Lab 230 reported a test result according to ASTM D6217 in mg/L
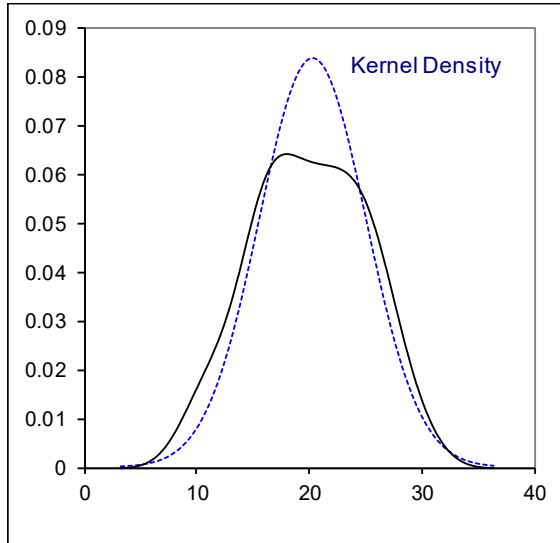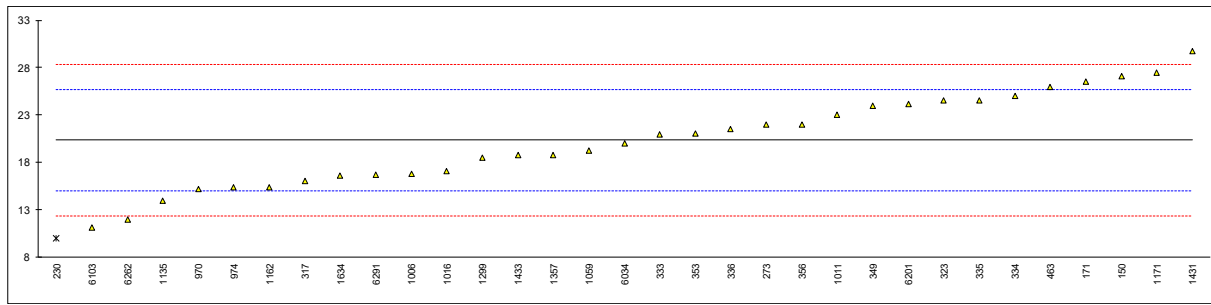
Determination of Oxidation Stability Filterable Insolubles (A) on sample #20173; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
52	D2274	0		-0.99	
120	D2274	0.5		1.50	
140		-----		-----	
150	D2274	0.9	C	3.50	first reported: 0.0
158		-----		-----	
171	D2274	0.7		2.50	
230	ISO12205	0.17		-0.14	
237		-----		-----	
312	D2274	0.2		0.01	
323	D2274	0.1		-0.49	
334	ISO12205	0.2		0.01	
342	ISO12205	0.1		-0.49	
344		-----		-----	
356		-----		-----	
369	D2274	0.086		-0.56	
463		-----		-----	
507	D2274	0.09		-0.54	
551		-----		-----	
657	D2274	0.11		-0.44	
750		-----		-----	
781		-----		-----	
862	D2274	<0.1		-----	
864	D2274	<0.1		-----	
874		-----		-----	
963		-----		-----	
970	D2274	0.256		0.29	
974	D2274	0.260		0.31	
1006	D2274	0		-0.99	
1011		-----		-----	
1016	ISO12205	1.3	R(0.01)	5.50	
1059	ISO12205	0.1714		-0.14	
1105	D2274	0.1		-0.49	
1109	D2274	0.05		-0.74	
1134		-----		-----	
1135	ISO12205	0.3		0.51	
1299		-----		-----	
1357	D2274	n.a		-----	
1631		-----		-----	
1709	D2274	0.06		-0.69	
1724		-----		-----	
1807	ISO12205	0.085		-0.57	
1944	ISO12205	0.18		-0.09	
6034	D2274	0.012		-0.93	
6057		-----		-----	
6195	D2274	0.14		-0.29	
6201	D2274	1.4	R(0.01)	6.00	
6262		-----		-----	
6291		-----	W	-----	test result withdrawn, first reported: 0.2
6341		-----		-----	

normality	not OK
n	24
outliers	2
mean (n)	0.199
st.dev. (n)	0.2173
R(calc.)	0.609
st.dev.(D2274:14)	0.2002
R(D2274:14)	0.561
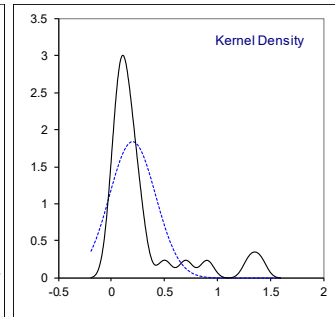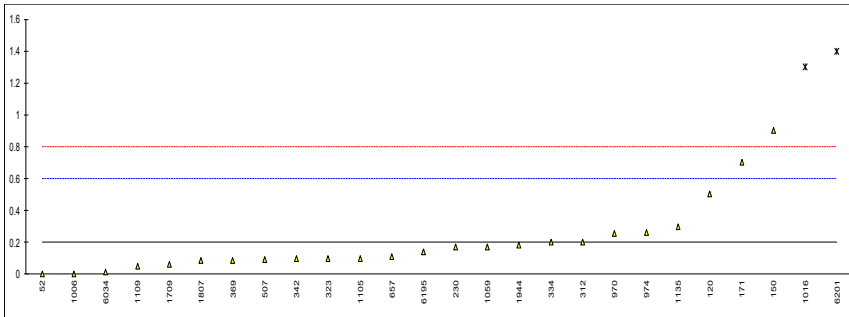
Determination of Oxidation Stability Adherent Insolubles (B) on sample #20173; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
52	D2274	0.1		-0.33	
120	D2274	0.2		0.17	
140		-----		-----	
150	D2274	0.2	C	0.17	first reported: 1.8
158		-----		-----	
171	D2274	0.3		0.66	
230	ISO12205	0.34		0.86	
237		-----		-----	
312	D2274	<0,1		-----	
323	D2274	0.9		3.66	
334	ISO12205	0		-0.83	
342	ISO12205	0		-0.83	
344		-----		-----	
356		-----		-----	
369	D2274	0.043		-0.62	
463		-----		-----	
507	D2274	0.14		-0.13	
551		-----		-----	
657	D2274	0.057		-0.55	
750		-----		-----	
781		-----		-----	
862	D2274	<0.1		-----	
864	D2274	0.1		-0.33	
874		-----		-----	
963		-----		-----	
970	D2274	0.118		-0.24	
974	D2274	0.123		-0.22	
1006	D2274	0.06		-0.53	
1011		-----		-----	
1016	ISO12205	0.7		2.66	
1059	ISO12205	0.0857		-0.41	
1105	D2274	0.0		-0.83	
1109	D2274	0.16		-0.03	
1134		-----		-----	
1135	ISO12205	<1		-----	
1299		-----		-----	
1357	D2274	n.a		-----	
1631		-----		-----	
1709	D2274	0.09		-0.38	
1724		-----		-----	
1807	ISO12205	0.057		-0.55	
1944	ISO12205	0.08		-0.43	
6034	D2274	0.013		-0.77	
6057		-----		-----	
6195	D2274	0.14		-0.13	
6201	D2274	16	R(0.01)	79.08	
6262		-----		-----	
6291		-----	W	-----	test result withdrawn, first reported: 0.9
6341		-----		-----	

normality	not OK	
n	24	
outliers	1	
mean (n)	0.167	
st.dev. (n)	0.2151	
R(calc.)	0.602	
st.dev.(D2274:14)	0.2002	
R(D2274:14)	0.561	
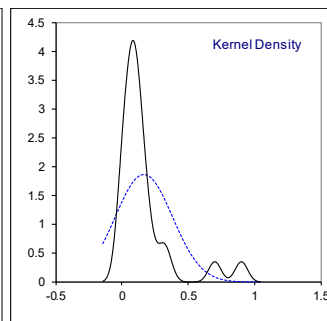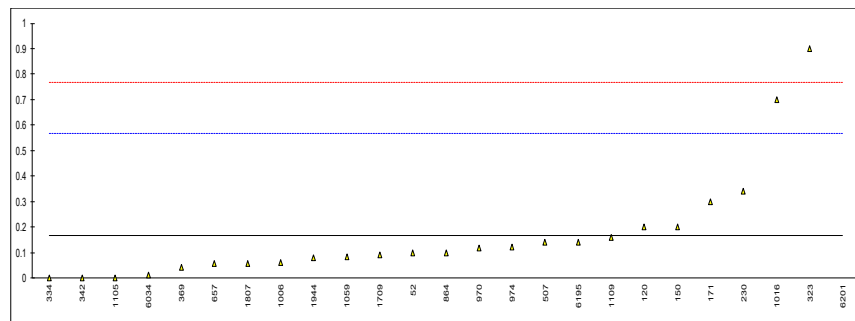
Determination of Oxidation Stability Total Insolubles (A+B) on sample #20173; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
52	D2274	0.1		-0.75	
120	D2274	0.7		1.37	
140		-----		-----	
150	D2274	1.1	C	2.78	first reported: 1.8
158		-----		-----	
171	D2274	0.9	E	2.07	calculation difference: iis calculated 1.0
230	ISO12205	0.51		0.70	
237		-----		-----	
312	D2274	0.2		-0.40	
323	D2274	1.0		2.43	
334	ISO12205	0.2		-0.40	
342	ISO12205	0.1		-0.75	
344		-----		-----	
356		-----		-----	
369	D2274	0.129		-0.65	
463		-----		-----	
507	D2274	0.23		-0.29	
551		-----		-----	
657	D2274	0.167		-0.52	
750		-----		-----	
781		-----		-----	
862	D2274	<0.1		-----	
864	D2274	0.1		-0.75	
874		-----		-----	
963		-----		-----	
970	D2274	0.374		0.22	
974	D2274	0.383		0.25	
1006	D2274	0.06		-0.89	
1011		-----	W	-----	test result withdrawn, first reported: 1.6 (16 g/cm^3)
1016	ISO12205	2.0	R(0.01)	5.96	
1059	ISO12205	0.2571		-0.20	
1105	D2274	0.1		-0.75	
1109	D2274	0.21		-0.36	
1134		-----		-----	
1135	ISO12205	0.3		-0.05	
1299	D2274	0.2		-0.40	
1357	D2274	n.a		-----	
1631		-----		-----	
1709	D2274	0.15		-0.58	
1724	D2274	0.286		-0.09	
1807	ISO12205	0.14		-0.61	
1944	ISO12205	0.26		-0.19	
6034	D2274	0.025		-1.02	
6057	ISO12205	0.3		-0.05	
6195	D2274	0.28		-0.12	
6201	D2274	16.4	R(0.01), E	56.82	calculation difference: iis calculated: 17.4
6262		-----		-----	
6291		-----	W	-----	test result withdrawn, first reported: 1.1
6341		-----		-----	

normality	not OK
n	28
outliers	2
mean (n)	0.313
st.dev. (n)	0.2813
R(calc.)	0.788
st.dev.(D2274:14)	0.2831
R(D2274:14)	0.793
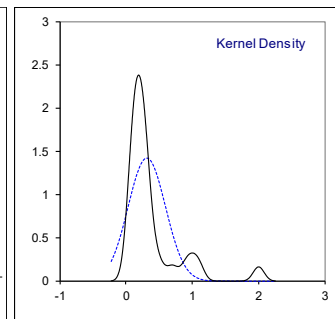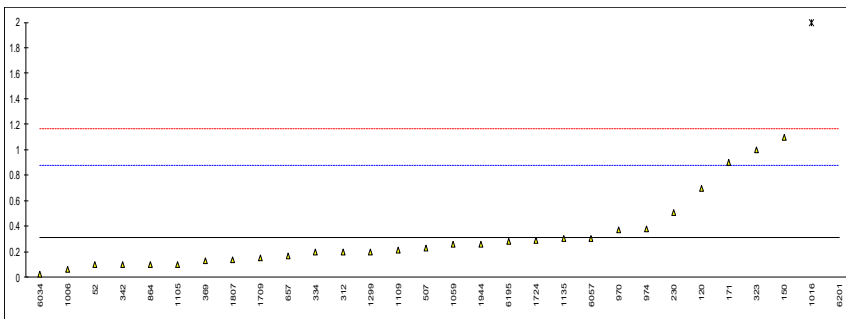
APPENDIX 2

Participants per country

1 lab in	AFGHANISTAN	2 labs in	MOROCCO
1 lab in	ALBANIA	1 lab in	MOZAMBIQUE
1 lab in	ARGENTINA	8 labs in	NETHERLANDS
3 labs in	AUSTRALIA	2 labs in	NIGERIA
1 lab in	AUSTRIA	1 lab in	NORWAY
2 labs in	AZERBAIJAN	2 labs in	OMAN
3 labs in	BELGIUM	1 lab in	PAKISTAN
2 labs in	BOSNIA and HERZEGOVINA	1 lab in	PANAMA
4 labs in	BRAZIL	1 lab in	PERU
5 labs in	CANADA	3 labs in	PHILIPPINES
2 labs in	CHILE	2 labs in	POLAND
7 labs in	CHINA, People's Republic	2 labs in	PORTUGAL
2 labs in	COLOMBIA	2 labs in	QATAR
1 lab in	CONGO Brazzaville	1 lab in	ROMANIA
1 lab in	CONGO, Republic Democrate	11 labs in	RUSSIAN FEDERATION
1 lab in	COSTA RICA	2 labs in	SAUDI ARABIA
2 labs in	COTE D'IVOIRE	1 lab in	SENEGAL
1 lab in	CYPRUS	1 lab in	SERBIA
2 labs in	CZECH REPUBLIC	1 lab in	SINGAPORE
1 lab in	DJIBOUTI	1 lab in	SLOVENIA
1 lab in	EGYPT	1 lab in	SOUTH AFRICA
6 labs in	FRANCE	1 lab in	SOUTH KOREA
4 labs in	GEORGIA	9 labs in	SPAIN
3 labs in	GERMANY	1 lab in	ST. LUCIA - WEST INDIES
6 labs in	GREECE	1 lab in	SUDAN
1 lab in	GUINEA REPUBLIC	2 labs in	SWEDEN
2 labs in	HONG KONG	4 labs in	TAIWAN
3 labs in	INDIA	4 labs in	TANZANIA
1 lab in	INDONESIA	1 lab in	TOGO
2 labs in	IRELAND	2 labs in	TUNISIA
1 lab in	ISRAEL	4 labs in	TURKEY
2 labs in	KAZAKHSTAN	2 labs in	TURKMENISTAN
1 lab in	KENYA	4 labs in	UNITED ARAB EMIRATES
1 lab in	LATVIA	6 labs in	UNITED KINGDOM
3 labs in	MALAYSIA	8 labs in	UNITED STATES OF AMERICA
1 lab in	MALTA	1 lab in	VIETNAM
1 lab in	MAURITIUS	1 lab in	ZAMBIA
1 lab in	MEXICO		

APPENDIX 3

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) = R1	= outlier in Rosner's outlier test
R(0.05) = R5	= 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
fr.	= first reported
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
SDS	= Safety Data Sheet

Literature

1   iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018
2   ASTM E178:16
3   ASTM E1301:95(2003)
4   ISO5725:86 (1994)
5   ISO5725:94, parts 1-6
6   ISO13528:05
7   M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
8   W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
9   IP367:84
10   DIN38402 T41/42
11   P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
12   J.N. Miller, Analyst, 118, 455, (1993)
13   Analytical Methods Committee, Technical Brief, No 4, January 2001
14   P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364, (2002)
15   Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)
16   Horwitz, W and Albert, R, J. AOAC Int, 79, 3, 589, (1996)
17   iis memo 1904 Precision data of Calculated Cetane Index Four Variables in Gasoil