Results of Proficiency Test
Gasoil (premium)
April 2020

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Over the past years, more and more diesel fuels are marketed with higher cetane numbers and additional cleaning agents and some synthetic content. These fuels are called premium diesel. The demand for these premium diesel fuels is increasing. Therefore, the Institute for Interlaboratory Studies (iis) decided during the annual proficiency testing program of 2019/2020 to organize a new proficiency scheme for Gasoil (premium) in accordance with EN590.

In this first interlaboratory study registered for participation:
- 34 laboratories in 21 countries on Gasoil (premium) PT (iis20G02),
- 12 laboratories in 12 countries for Cetane Number & DCN PT (iis20G02CN),
- 19 laboratories in 10 countries for Total Contamination PT (iis20G02TC).

In total 35 laboratories in 21 different countries registered for participation. See appendix 2 for the number of participants per country. In this report the results of this Gasoil (premium) 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 three different samples of Gasoil, see table below.

Samples	Purpose
#20045: 1x 1L + 1x 0.5L	Regular analyzes
#20046: 4x 1L	Cetane Number & DCN
#20047: 1x 1L	Total Contamination

Table 1: samples used in Gasoil (premium) proficiency tests

Participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

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

2.2 PROTOCOL

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

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

Preparation of subsamples for the regular PT and for the PT on Cetane Number
A batch of approximately 200 liters of Gasoil (premium) was purchased from the local market. After homogenisation 39 amber glass bottles of 1L and 38 amber glass bottles of 500 mL were filled and labelled #20045 for the regular Gasoil (premium) PT and 54 amber glass bottles of 1L were filled and labelled #20046 for the Cetane Number & DCN PT. The homogeneity of the subsamples #20045 and #20046 was checked by the determination of Density in accordance with ISO12185 on 8 stratified randomly selected subsamples.

	Density at 15°C in kg/m^3
sample 1	842.75
sample 2	842.76
sample 3	842.77
sample 4	842.77
sample 5	842.75
sample 6	842.76
sample 7	842.76
sample 8	842.76

Table 2: homogeneity test results of subsamples #20045 and #20046

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	ISO12185:96
0.3 * R (reference test method)	0.15

Table 3: evaluation of the repeatability of subsamples #20045

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

Preparation of subsamples for the PT on Total Contamination
For the PT on Total Contamination the remaining amount the same batch as used for the regular PT was selected. A defined volume of freshly prepared and well shaken dust suspension of Arizona Dust material in an oil was added to an 1L empty bottle by means of a calibrated pipette. The addition was checked by weighing the bottle before and after the addition. In total 22 bottles were prepared and subsequently filled up to 1L with Gasoil. Finally, the subsamples were labelled #20047.

Depending on the registration of the participant the appropriate set of PT samples was sent on March 18, 2020. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of 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 asked to determine on sample #20045: Total Acid Number (TAN), Ash content, Calculated Cetane Index (four variables), Cloud Point, Cold Filter Plugging Point (CFPP), Carbon Residue (Micro method) on 10% residue, Copper Corrosion 3hrs at 50°C, Density at 15°C, Distillation at 760 mmHg (IBP, 10%, 50%, 90%, 95% recovered, FBP and Volume at 250°C and 350°C), FAME content, Flash Point PMcc, Kinematic Viscosity at 40°C, Lubricity by HFRR at 60°C, Manganese as Mn, Nitrogen, Polycyclic-, Mono-, Di-, Tri+- and Total Aromatic Hydrocarbons, Pour Point (Manual and Automated), Sulfur and Water.
On sample #20046 was requested to determine: Cetane Number and Derived Cetane Number (EN15195 and EN16715).
On sample #20047 was requested to determine: Total Contamination.

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

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

3 RESULTS

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

Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline, the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results (no 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 and/or Grubbs' and/or Rosner’s outlier tests. Outliers are marked by D(0.01) for the Dixon’s test, by G(0.01) or DG(0.01) for the Grubbs’ test and by R(0.01) for the Rosner’s test. Stragglers are marked by D(0.05) for the Dixon’s test, by G(0.05) or DG(0.05) for the Grubbs’ test and by R(0.05) for the Rosner’s test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

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

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

3.2 GRAPHICS

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

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

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

3.3 Z-SCORES

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

This 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:

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

In this interlaboratory study serious problems were encountered with the dispatch of the samples due to the COVID-19 pandemic. Therefore, the reporting time on the data entry portal was extended with another three weeks.
Finally, for the regular Gasoil PT: four participants did not report any test results at all.
For the PT on Cetane Number: two participants did not report any test results at all.
For the PT on Total Contamination: two participants did not report any test results at all.

In total 30 participants reported 618 numerical test results. Observed were 15 outlying test results, which is 2.4% of the numerical test results. 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 where possible and applicable. These test methods are also in the tables together with the reported data. The abbreviations, used in these tables, are explained in appendix 3.

In the iis PT reports ASTM test methods are referred to with a number (e.g. D4737) and an added designation for the year that the test method was adopted or revised (e.g. D4737:10). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D4737:10(2016)). In the results tables of appendix 1 only the test method number and year of adoption or revision e.g. D4737:10 will be used.

Sample #20045

Total Acid Number: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D974:14e2.

Ash content: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO6245:01.

Calculated Cetane Index, four variables: 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. 16).
This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of iis memo 1904. No calculation errors were observed.

Cloud Point: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO3015:19.

CFPP: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of EN116:15.

Carbon Residue on 10% residue: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO10370:14.

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

Density at 15°C: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO12185:96.

Distillation: This determination was not problematic. In total eight statistical outliers were observed and four other test results were excluded over eight parameters. However, all calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of ISO3405:19 for automated mode as well as for manual mode.

FAME content: 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 mode B of EN14078:14.

Flash Point PMcc: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ISO2719-A:16.

Kinematic Viscosity at 40°C: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO3104:94.

Lubricity: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of modes A or B of ISO12156:18.

Manganese: The consensus value was below the application range of EN16576:14. Therefore, no z-scores were calculated.

Nitrogen: This determination was problematic. No statistical outlies were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D4629:17.

Polycyclic Aromatics: This determination was not problematic. No statistical outlies were observed. The calculated reproducibility is in agreement with the requirements of EN12916:16.

Mono-Aromatics: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN12916:16.

Di-Aromatics: 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 EN12916:16.

Tri+-Aromatics: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN12916:16.

Total Aromatics: 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 EN12916:16.

Pour Point, Manual: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO3016:19.

Pour Point, Automated: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements ASTM D5950:14 (3°C interval).

Sulfur: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO20846:19.

Water: 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 ISO12937:00.

Sample #20046

Cetane Number: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO5165:17.

DCN - EN15195: This determination was not problematic for Derived Cetane Number. No statistical outliers were observed. The calculated reproducibility of Derived Cetane Number is in agreement with the requirements of EN15195:14. For Ignition Delay Only one test result was reported, therefore no z-scores were calculated.

DCN - EN16715: This determination was problematic for Derived Cetane Number. No statistical outliers were observed. The calculated reproducibility of Derived Cetane Number is not in agreement with the requirements of EN16715:15. For Ignition Delay Only and Combustion Delay only two test result were reported for each parameter, therefore no z-scores were calculated.

Sample #20047

Total Contamination: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of EN12662:14.

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 test methods) or previous proficiency tests are presented in the next tables.

Parameters	unit	n	average	2.8 * sd	R (lit)
Total Acid Number (TAN)	mgKOH/g	9	0.034	0.033	0.04
Ash content	%M/M	12	0.0008	0.0013	0.005
Calc. Cetane Index, four variables		25	51.83	0.59	0.91
Cloud Point	°C	26	-9.6	2.1	4
Cold Filter Plugging Point	°C	23	-26.3	5.1	4.6
Carbon Residue on 10% residue	%M/M	13	0.022	0.020	0.019
Copper Corrosion, 3hrs at 50°C		23	1 (1a)	n.a.	n.a.
Density at 15°C	kg/m^3	30	842.7	0.2	0.5
Initial Boiling Point	°C	26	177.3	6.6	9.8
Temp at 10% recovery	°C	26	219.5	2.5	4.8
Temp at 50% recovery	°C	26	277.9	2.1	3.0
Temp at 90% recovery	°C	25	332.0	2.6	5.0
Temp at 95% recovery	°C	25	344.9	4.2	8.4
Final Boiling Point	°C	26	353.9	3.8	7.1

Parameters	unit	n	average	2.8 * sd	R (lit)
Volume at 250°C	%V/V	26	27.7	1.3	2.7
Volume at 350°C	%V/V	24	96.3	1.2	2.7
FAME content	%V/V	18	6.91	0.54	0.51
Flash Point PMcc	°C	28	67.5	3.1	4.8
Kinematic Viscosity at 40°C	mm^2/s	25	2.989	0.035	0.033
Lubricity by HFRR	µm	14	183	45	80
Manganese as Mn	mg/L	6	<0.5	n.e.	n.e.
Nitrogen	mg/kg	8	15.1	4.3	3.3
Polycyclic Aromatics	%M/M	12	2.60	0.60	0.95
Mono-Aromatics	%M/M	10	20.4	1.2	2.6
Di-Aromatics	%M/M	11	2.35	0.47	0.77
Tri^+-Aromatics	%M/M	12	0.30	0.50	0.61
Total Aromatics	%M/M	9	23.1	1.4	2.9
Pour Point, Manual	°C	12	-34.0	7.0	9
Pour Point, Automated	°C	11	-33.5	2.9	6.1
Sulfur	mg/kg	28	7.4	1.4	2.0
Water	mg/kg	23	46.0	12.6	46.6

Table 4: reproducibilities of tests on sample #20045

Parameters	unit	n	average	2.8 * sd	R (lit)
Cetane Number		7	51.7	2.9	4.3
DCN (EN15195)		3	52.1	2.7	2.4
Ignition Delay (EN15195)	ms	1	n.e	n.e.	n.e.
DCN (EN16715)		3	52.6	2.4	1.5
Ignition Delay (EN16715)	ms	2	3.1	n.e.	n.e.
Combustion Delay (EN16715)	ms	2	4.5	n.e.	n.e.
Total Contamination	mg/kg	17	36.6	11.9	10.1

Table 5: reproducibilities of tests on samples #20046 and #20047

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 standards. The problematic tests have been discussed in paragraph 4.1.

4.3 OVERVIEW OF THE PROFICIENCY TEST OF APRIL 2020

	April 2020
Number of reporting laboratories	30
Number of test results	618
Number of statistical outliers	15
Percentage of statistical outliers	2.4%

Table 6: overview of the proficiency test

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

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

	April 2020
Total Acid Number (TAN)	+
Ash content	++
Calc. Cetane Index, four variables	+
Cloud Point	+
Cold Filter Plugging Point	-
Carbon Residue on 10% residue	+/-
Density at 15°C	++
Distillation	+
FAME content	+/-
Flash Point PMcc	+
Kinematic Viscosity at 40°C	+/-
Lubricity by HFRR	+
Manganese as Mn	n.e.
Nitrogen	-
Polycyclic Aromatics	+
Mono-, Di- and Tri^{+}-Aromatics	+
Total Aromatics	++
Pour Point	+
Sulfur	+
Water	++
Cetane Number	+
DCN (EN15195)	-
DCN (EN16715)	-

Table 7: comparison determinations against the reference test method

The following performance categories were used:

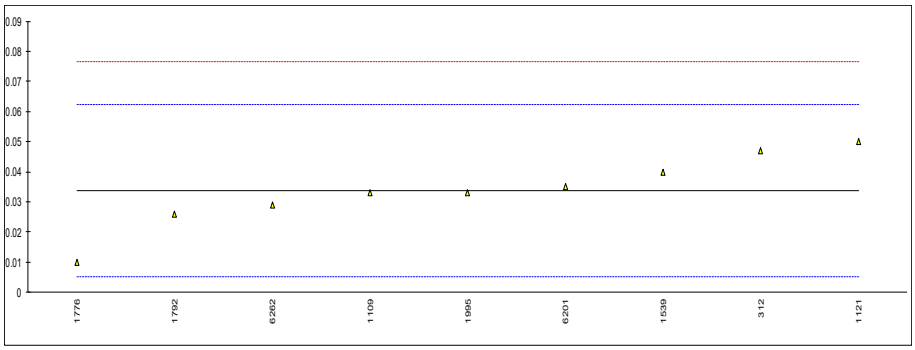
++: group performed much better than the reference test method
+ : group performed better than the s reference test method
+/-: group performance similar to the reference test method
- : group performed worse than the reference test method
-- : group performed much worse than the reference test method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

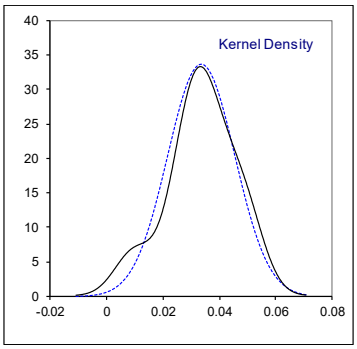
APPENDIX 1

Determination of Total Acid Number (TAN) on sample #20045; result in mgKOH/g

lab	method	value	mark	z(targ)	remarks
312	D974	0.047		0.93	
496		-----		-----	
541	D974	<0.05		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D974	0.033		-0.05	
1121	D664-A	0.05		1.14	
1126		-----		-----	
1266		-----		-----	
1320		-----		-----	
1539	ISO6618	0.04		0.44	
1611		-----		-----	
1618		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1710		-----		-----	
1713		-----		-----	
1725		-----		-----	
1776	D664-A	0.01		-1.66	
1792	D664-A	0.026		-0.54	
1881		-----		-----	
1995	D664-A	0.033		-0.05	
6005		-----		-----	
6018		-----		-----	
6028		-----		-----	
6075		-----		-----	
6142		-----		-----	
6201	D664-A	0.035		0.09	
6262	D664-A	0.0288		-0.34	
6279		-----		-----	
6317		-----		-----	

normality	suspect
n	9
outliers	0
mean (n)	0.03364
st.dev. (n)	0.011884
R(calc.)	0.03328
st.dev.(D974:14e2)	0.014286
R(D974:14e2)	0.04



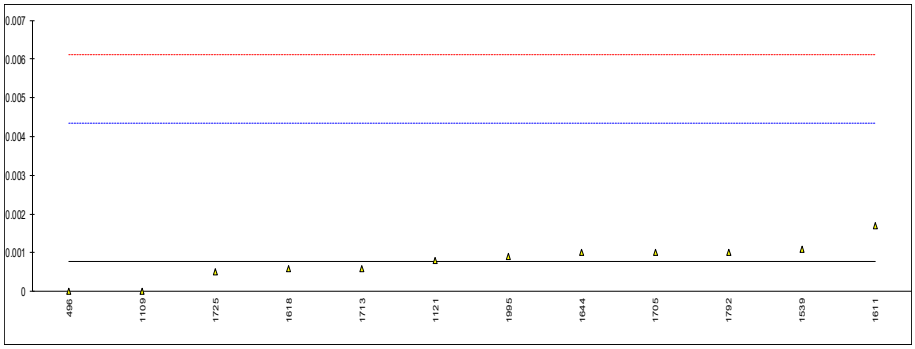


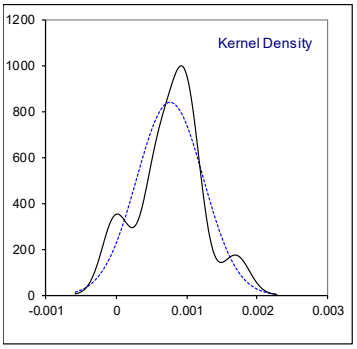
Determination of Ash content on sample #20045; result in %M/M

lab	method	value	mark	z(targ)	remarks
312		-----		-----	
496	ISO6245	0		-0.43	
541	ISO6245	<0.001		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D482	0.000		-0.43	
1121	IP4	0.0008		0.02	
1126		-----		-----	
1266		-----		-----	
1320		-----		-----	
1539	ISO6245	0.0011		0.19	
1611	ISO6245	0.0017		0.52	
1618	ISO6245	0.0006		-0.09	
1644	ISO6245	0.001		0.13	
1697		-----		-----	
1698		-----		-----	
1705	ISO6245	0.001		0.13	
1710		-----		-----	
1713	ISO6245	0.0006		-0.09	
1725	ISO6245	0.0005		-0.15	
1776		-----		-----	
1792	ISO6245	0.001		0.13	
1881		-----		-----	
1995	D482	0.0009		0.07	
6005		-----		-----	
6018		-----		-----	
6028		-----		-----	
6075	ISO6245	<0.001		-----	
6142		-----		-----	
6201		-----		-----	
6262	ISO6245	<0.001		-----	
6279		-----		-----	
6317		-----		-----	

normality	OK
n	12
outliers	0
mean (n)	0.00077
st.dev. (n)	0.000474
R(calc.)	0.00133
st.dev.(ISO6245:01)	0.001786
R(ISO6245:01)	0.005

application range: 0.001 – 0.079 %M/M

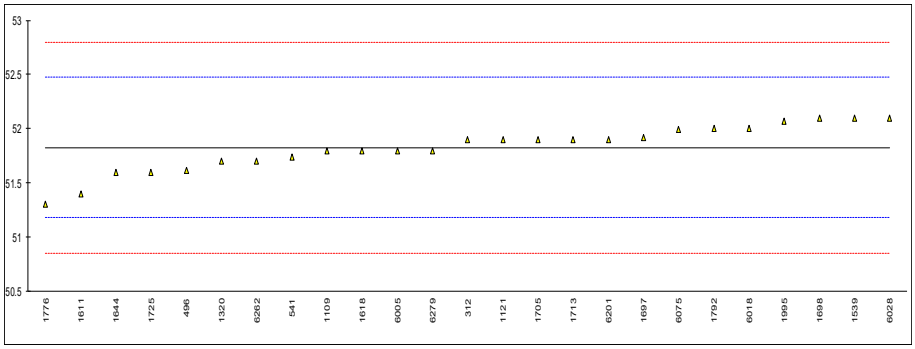


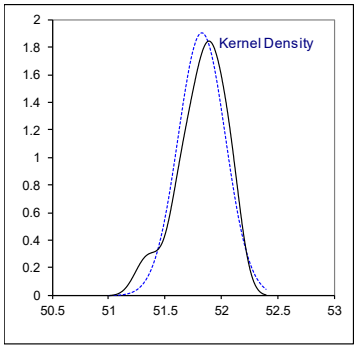


Determination of Calculated Cetane Index, four variables on sample #20045

lab	method	value	mark	z(targ)	remarks
312	D4737-A	51.9		0.23	
496	ISO4264	51.62		-0.63	
541	D4737-A	51.74		-0.26	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D4737-A	51.8		-0.08	
1121	ISO4264	51.9		0.23	
1126		-----		-----	
1266		-----		-----	
1320	ISO4264	51.7		-0.39	
1539	ISO4264	52.1		0.85	
1611	ISO4264	51.4		-1.31	
1618	ISO4264	51.8		-0.08	
1644	ISO4264	51.6		-0.70	
1697	ISO4264	51.92		0.29	
1698	ISO4264	52.1		0.85	
1705	ISO4264	51.9		0.23	
1710		-----		-----	
1713	ISO4264	51.9		0.23	
1725	ISO4264	51.6		-0.70	
1776	ISO4264	51.3		-1.62	
1792	ISO4264	52.0		0.54	
1881		-----		-----	
1995	D4737-A	52.07		0.75	
6005	ISO4264	51.8		-0.08	
6018	ISO4264	52.0		0.54	
6028	ISO4264	52.1		0.85	
6075	ISO4264	51.99		0.51	
6142		-----		-----	
6201	ISO4264	51.9		0.23	
6262	ISO4264	51.7		-0.39	
6279	ISO4264	51.8	C	-0.08	first reported 50.9
6317		-----		-----	

normality	OK
n	25
outliers	0
mean (n)	51.826
st.dev. (n)	0.2095
R(calc.)	0.587
st.dev.(iis memo 1904)	0.3239
R(iis memo 1904)	0.907



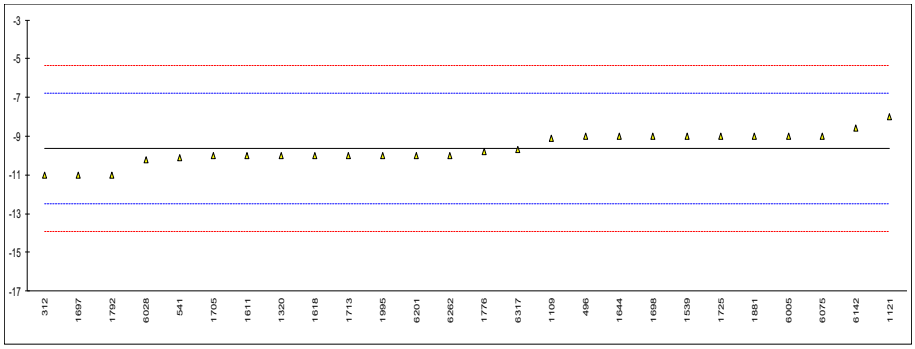


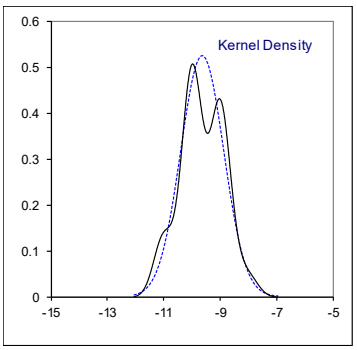
Determination of Cloud Point on sample #20045; result in °C

lab	method	value	mark	z(targ)	remarks
312	D2500	-11		-0.96	
496	ISO3015	-9.0		0.44	
541	D5771	-10.1		-0.33	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D5773	-9.1		0.37	
1121	IP219	-8		1.14	
1126		-----		-----	
1266		-----		-----	
1320	ISO3015	-10		-0.26	
1539	ISO3015	-9		0.44	
1611	ISO3015	-10.0		-0.26	
1618	ISO3015	-10		-0.26	
1644	ISO3015	-9		0.44	
1697	ISO3015	-11		-0.96	
1698	ISO3015	-9		0.44	
1705	ISO3015	-10		-0.26	
1710		-----		-----	
1713	ISO3015	-10		-0.26	
1725	ISO3015	-9		0.44	
1776	ISO3015	-9.8		-0.12	
1792	D2500	-11		-0.96	
1881	EN23015	-9		0.44	
1995	D5771	-10		-0.26	
6005	ISO3015	-9		0.44	
6018		-----		-----	
6028	D2500	-10.2		-0.40	
6075	EN23015	-9		0.44	
6142	ISO3015	-8.6		0.72	
6201	D5771	-10		-0.26	
6262	EN23015	-10		-0.26	
6279		-----		-----	
6317	D2500	-9.7		-0.05	

normality	OK
n	26
outliers	0
mean (n)	-9.63
st.dev. (n)	0.761
R(calc.)	2.13
st.dev.(ISO3015:19)	1.429
R(ISO3015:19)	4
compare	
R(EN23015:94)	4
R(ISO2295:19)	2.5

EN23015:94 is withdrawn

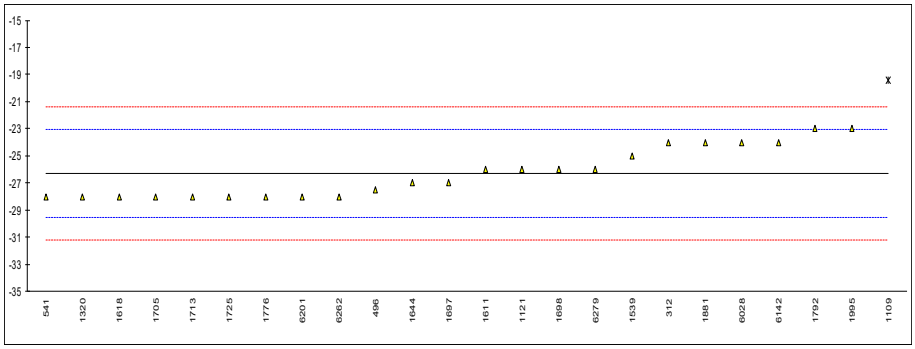


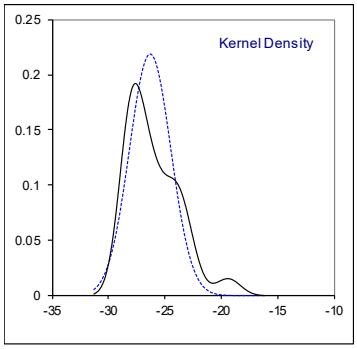


Determination of Cold Filter Plugging Point (CFPP) on sample #20045; result in °C

lab	method	value	mark	z(targ)	remarks
312	EN116	-24		1.40	
496	EN116	-27.5		-0.74	
541	EN116	-28		-1.05	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	IP309	-19.4	R(0.05)	4.21	
1121	IP309	-26	C	0.17	first reported -18
1126		-----		-----	
1266		-----		-----	
1320	EN116	-28		-1.05	
1539	EN116	-25		0.78	
1611	EN116	-26.0		0.17	
1618	EN116	-28		-1.05	
1644	EN116	-27		-0.44	
1697	EN116	-27		-0.44	
1698	EN116	-26		0.17	
1705	EN116	-28		-1.05	
1710		-----		-----	
1713	EN116	-28		-1.05	
1725	EN116	-28		-1.05	
1776	EN116	-28		-1.05	
1792	EN116	-23		2.01	
1881	EN116	-24		1.40	
1995	D6371	-23		2.01	
6005		-----		-----	
6018		-----		-----	
6028	EN116	-24		1.40	
6075		-----		-----	
6142	EN116	-24		1.40	
6201	EN116	-28		-1.05	
6262	EN116	-28		-1.05	
6279	EN116	-26.0		0.17	
6317		-----		-----	

normality	OK
n	23
outliers	1
mean (n)	-26.28
st.dev. (n)	1.827
R(calc.)	5.11
st.dev.(EN116:15)	1.635
R(EN116:15)	4.58

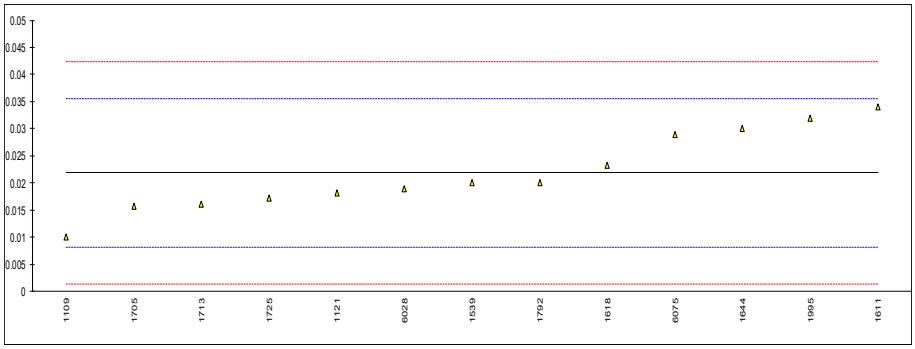


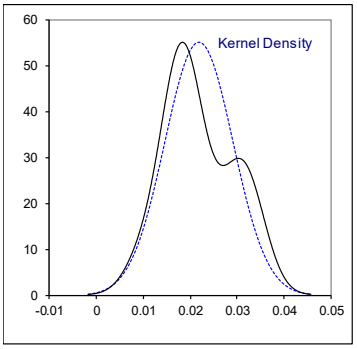


Determination of Carbon Residue (Micro method) on 10% residue on sample #20045; result in %M/M

lab	method	value	mark	z(targ)	remarks
312		-----		-----	
496		-----		-----	
541	ISO10370	<0.10		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D4530	0.01		-1.73	
1121	IP398	0.0181		-0.55	
1126		-----		-----	
1266		-----		-----	
1320		-----		-----	
1539	ISO10370	0.020		-0.27	
1611	ISO10370	0.034		1.77	
1618	ISO10370	0.0233		0.21	
1644	ISO10370	0.03		1.19	
1697		-----		-----	
1698		-----		-----	
1705	ISO10370	0.0158		-0.89	
1710		-----		-----	
1713	ISO10370	0.016		-0.86	
1725	ISO10370	0.0172		-0.68	
1776		-----		-----	
1792	ISO10370	0.02		-0.27	
1881		-----		-----	
1995	D4530	0.032		1.48	
6005		-----		-----	
6018		-----		-----	
6028	ISO10370	0.019		-0.42	
6075	ISO10370	0.029	C	1.04	first reported 0.043
6142		-----		-----	
6201	ISO10370	<0.1		-----	
6262	ISO10370	<0.1		-----	
6279		-----		-----	
6317		-----		-----	

normality	OK
n	13
outliers	0
mean (n)	0.02188
st.dev. (n)	0.007258
R(calc.)	0.02032
st.dev.(ISO10370:14)	0.006847
R(ISO10370:14)	0.01917





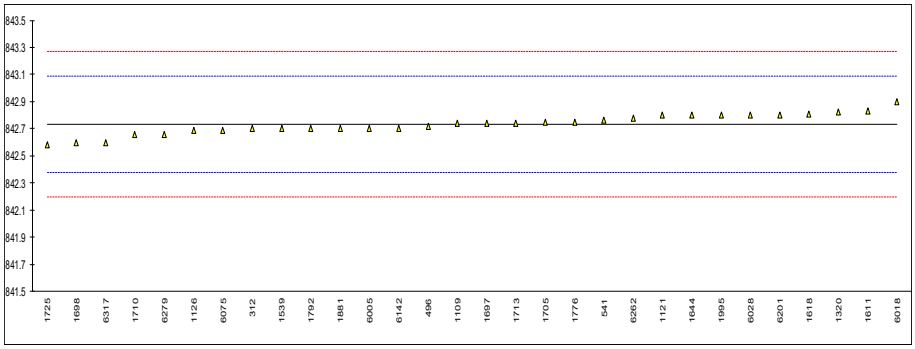
Determination of Copper Corrosion, 3hrs at 50°C on sample #20045

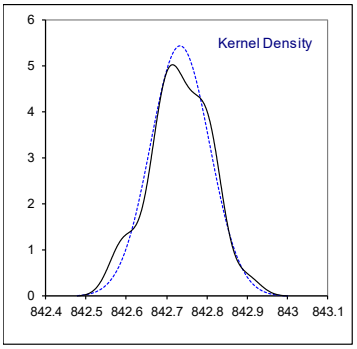
lab	method	value	mark	z(targ)	remarks
312	D130	1a		-----	
496	D130	1a		-----	
541	D130	1a		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D130	1a		-----	
1121	IP154	1a		-----	
1126		-----		-----	
1266		-----		-----	
1320	D130	1a		-----	
1539	ISO2160	1A		-----	
1611	ISO2160	klasa 1		-----	
1618	ISO2160	class 1a		-----	
1644	ISO2160	klasa 1A		-----	
1697	ISO2160	1		-----	
1698		-----		-----	
1705	ISO2160	1		-----	
1710		-----		-----	
1713	ISO2160	1		-----	
1725	ISO2160	class 1a		-----	
1776		-----		-----	
1792	ISO2160	1A		-----	
1881		-----		-----	
1995	D130	1A		-----	
6005	ISO2160	1a		-----	
6018	ISO2160	1a		-----	
6028	ISO2160	1a		-----	
6075	ISO2160	1a		-----	
6142		-----		-----	
6201	D130	1a		-----	
6262	D130	1A		-----	
6279		-----		-----	
6317	D130	1a		-----	
	n	23			
	mean (n)	1 (1a)			

Determination of Density at 15°C on sample #20045; result in kg/m^3

lab	method	value	mark	z(targ)	remarks
312	ISO12185	842.7		-0.19	
496	ISO12185	842.72		-0.08	
541	ISO12185	842.76		0.15	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D4052	842.74		0.03	
1121	ISO12185	842.8		0.37	
1126	ISO12185	842.69		-0.25	
1266		-----		-----	
1320	ISO12185	842.82		0.48	
1539	ISO12185	842.7		-0.19	
1611	ISO12185	842.83		0.54	
1618	ISO12185	842.81		0.43	
1644	ISO12185	842.8		0.37	
1697	ISO12185	842.74		0.03	
1698	ISO12185	842.6		-0.75	
1705	ISO12185	842.75		0.09	
1710	ISO12185	842.66		-0.41	
1713	ISO12185	842.74		0.03	
1725	ISO12185	842.58		-0.86	
1776	ISO12185	842.75		0.09	
1792	ISO12185	842.7		-0.19	
1881	ISO12185	842.7		-0.19	
1995	D4052	842.8		0.37	
6005	ISO12185	842.7		-0.19	
6018	ISO12185	842.9		0.93	
6028	ISO12185	842.8		0.37	
6075	ISO12185	842.69		-0.25	
6142	ISO12185	842.7		-0.19	
6201	ISO12185	842.8		0.37	
6262	ISO12185	842.78		0.26	
6279	ISO12185	842.66		-0.41	
6317	D7042	842.6		-0.75	

normality	OK
n	30
outliers	0
mean (n)	842.734
st.dev. (n)	0.0735
R(calc.)	0.206
st.dev.(ISO12185:96)	0.1786
R(ISO12185:96)	0.5

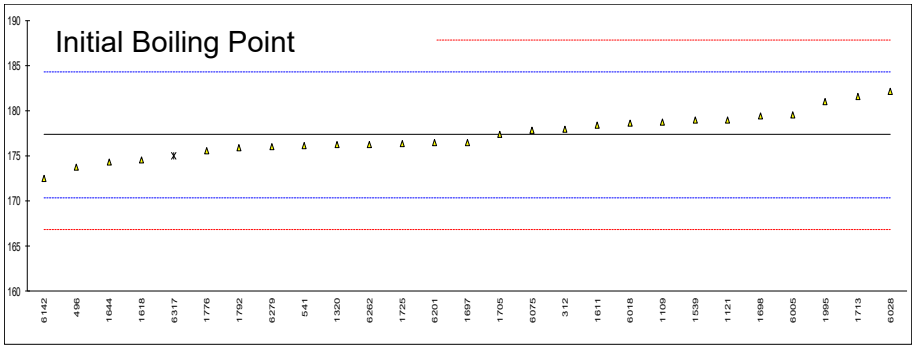


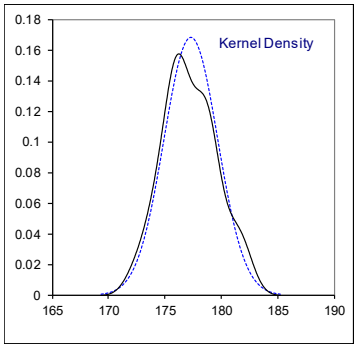


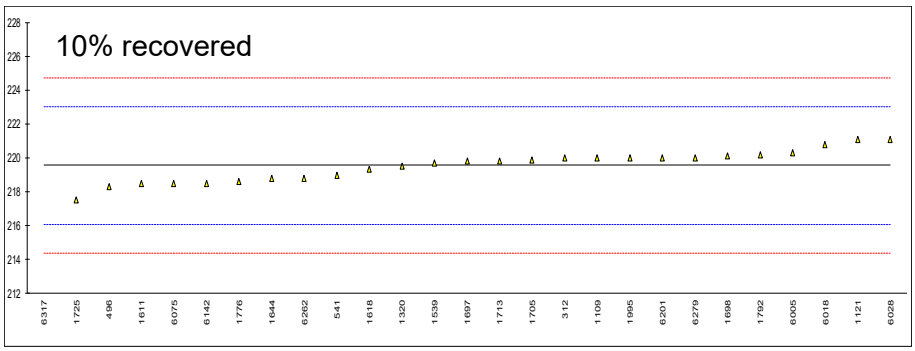
Determination of Distillation at 760 mmHg on sample #20045; result in °C

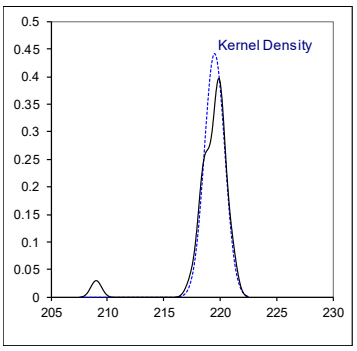
lab	method	IBP	10%rec	50%rec	90%rec	95%rec	FBP
312	D86-automated	177.9	220.0	278.2	331.2	344.2	351.9
496	D86-automated	173.7	218.3	277.3	331.0	344.0	353.1
541	ISO3405-automated	176.15	218.95	277.60	332.05	345.95	353.85
914		-----	-----	-----	-----	-----	-----
962		-----	-----	-----	-----	-----	-----
963		-----	-----	-----	-----	-----	-----
1109	D86-automated	178.7	220.0	277.7	331.6	344.2	354.5
1121	ISO3405-automated	179.0	221.1	277.6	332.8	346.4	355.7
1126		-----	-----	-----	-----	-----	-----
1266		-----	-----	-----	-----	-----	-----
1320	ISO3405-automated	176.2	219.5	277.5	331.1	344.1	352.0
1539	ISO3405-automated	178.9	219.7	278.6	333.1	346.7	353.7
1611		178.4 C	218.5	276.9	330.7	342.4	354.6
1618	ISO3405-automated	174.5	219.3	277.6	331.9	345.0	354.0
1644	ISO3405-automated	174.3	218.8	277.4	332.1	344.2	352.2
1697	ISO3405-automated	176.5	219.8	278.1	332.4	345.8	355.0
1698	ISO3405-automated	179.4	220.1	278.6	332.0	345.2	353.1
1705	ISO3405-automated	177.4	219.9	278.4	332.1	344.7	356.2
1710		-----	-----	-----	-----	-----	-----
1713	ISO3405-automated	181.5	219.8	278.5	332.6	345.9	354.4
1725	ISO3405-automated	176.3	217.5	277.1	332.0	346.1	353.1
1776	ISO3405-automated	175.5	218.6	276.0	327.8 R1	338.6 R5	350.8
1792	D86-automated	175.9	220.2	278.1	332.6	345.5	353.3
1881		-----	-----	-----	-----	-----	-----
1995	D86-automated	181	220	279	334	346	353
6005	ISO3405-automated	179.5	220.3	277.5	330.8	343.1	355.7
6018	ISO3405-automated	178.6	220.8	278.6	331.7	343.8	355.2
6028	ISO3405-automated	182.1	221.1	278.6	330.9	342.3	355.7
6075	ISO3405-automated	177.8	218.5	278.9	333.0 C	346.5 C	354.8
6142	ISO3405-automated	172.5	218.5	276.7	330.8	343.7	353.2
6201	D86-automated	176.4	220.0	278.0	333.1	347.1	354.5
6262	D86-automated	176.2	218.8	278.3	333.1	347.1	353.2
6279	ISO3405-automated	176.0	220.0	277.3	330.9	342.0	355.4 C
6317	D86-manual	175 ex	209 R1	265 R1	332 ex	350 ex	364 R1
	normality	OK	OK	OK	OK	OK	OK
	n	26	26	26	25	25	26
	outliers	0 (+1 ex)	1	1	1 (+1 ex)	1 (+1 ex)	1
	mean (n)	177.32	219.54	277.85	331.98	344.88	353.93
	st.dev. (n)	2.370	0.905	0.731	0.910	1.500	1.366
	R(calc.)	6.64	2.53	2.05	2.55	4.20	3.82
	st.dev.(ISO3405-A:19)	3.483	1.725	1.071	1.778	3.004	2.536
	R(ISO3405-A:19)	9.75	4.83	3.0	4.98	8.41	7.1
	compare						
	R(ISO3405-M:19)	6.73	4.47	3.67	3.78	4.72	3.86

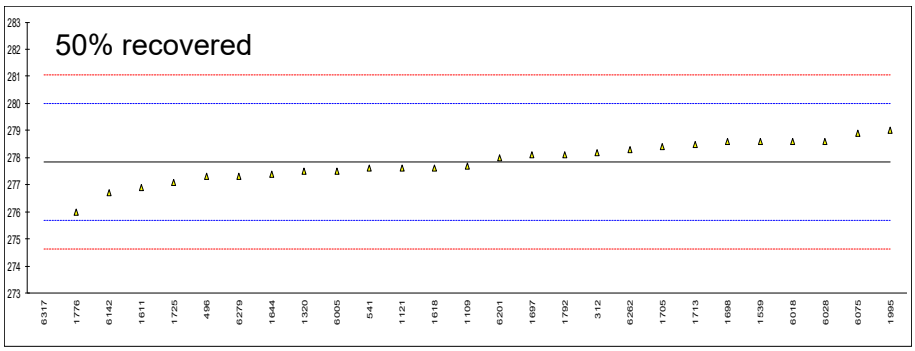
Lab 1611 first reported 168.4
Lab 6075 first reported 335.9 and 354.8 respectively
Lab 6279 first reported 348.7
Lab 6317 three test results excluded as four other related test results are statistical outliers

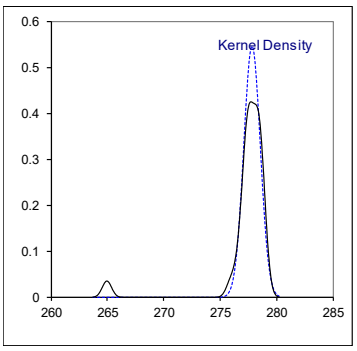


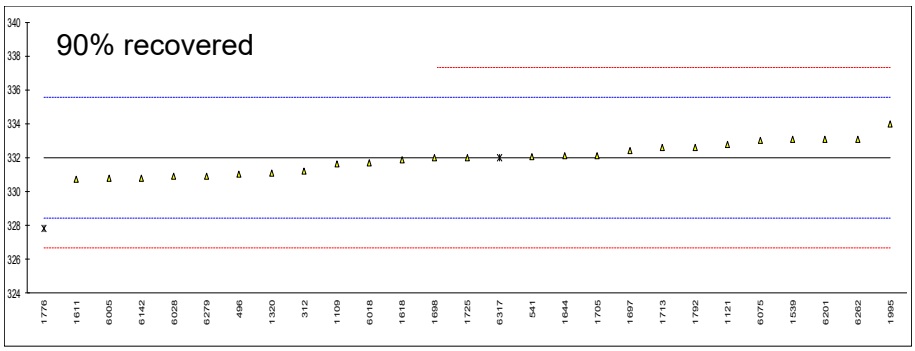


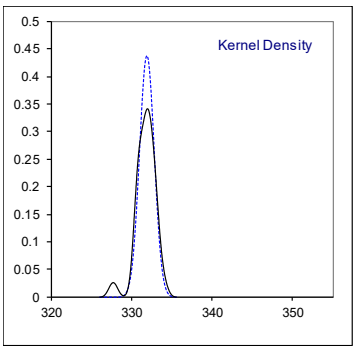

10% recovered

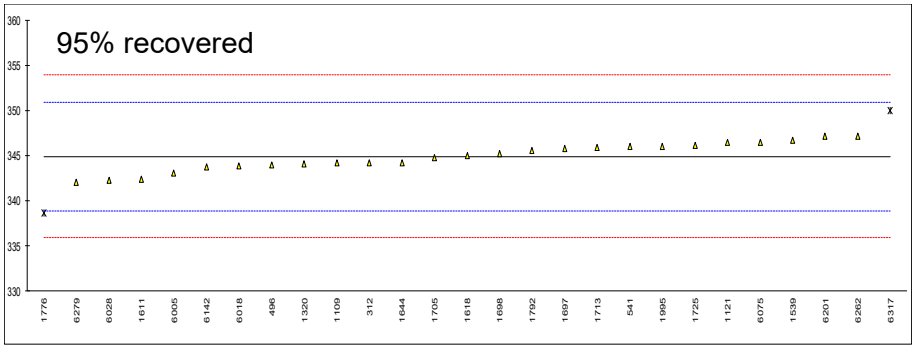

Kernel Density

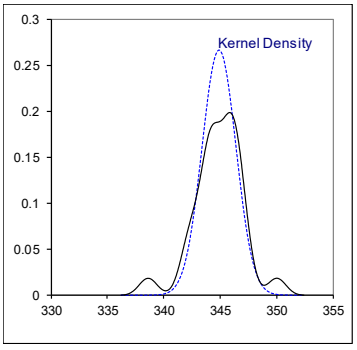

50% recovered

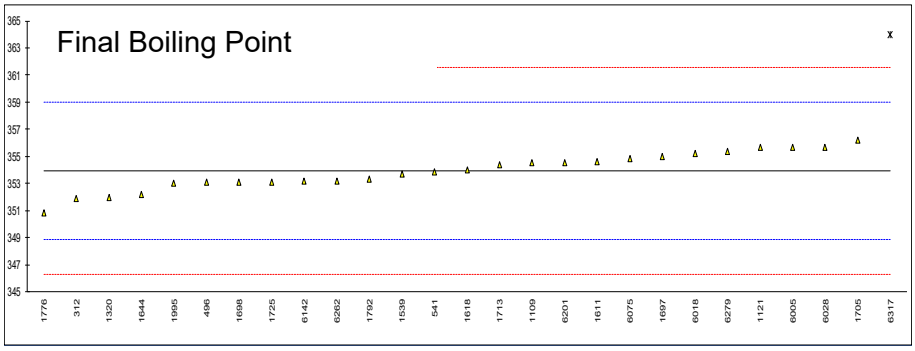

Kernel Density

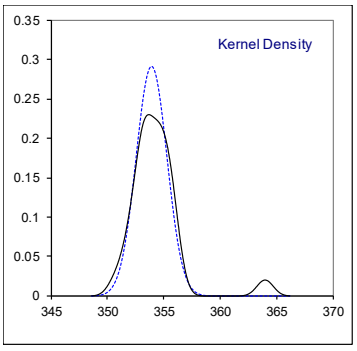

90% recovered


Kernel Density


95% recovered


Kernel Density


Final Boiling Point


Kernel Density

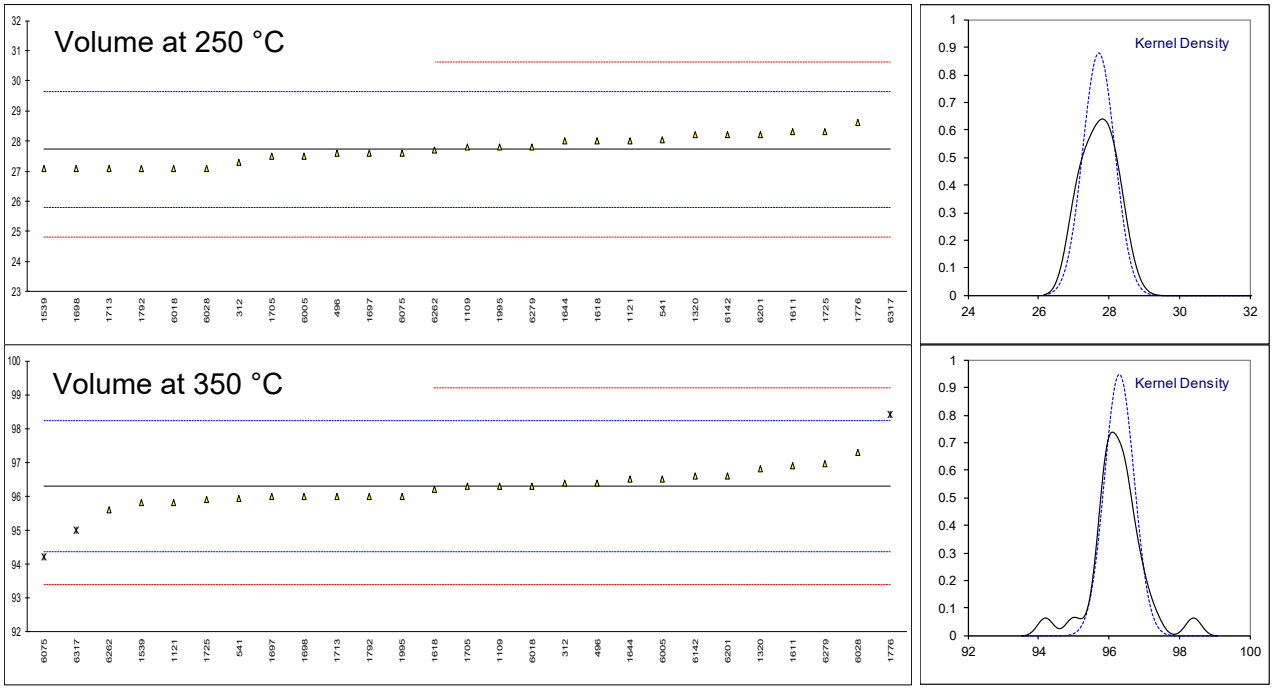
z-scores Distillation on sample #20045

lab	IBP	10%rec	50%rec	90%rec	95%rec	FBP
312	0.17	0.27	0.33	-0.44	-0.23	-0.80
496	-1.04	-0.72	-0.51	-0.55	-0.29	-0.33
541	-0.34	-0.34	-0.23	0.04	0.36	-0.03
914	-----	-----	-----	-----	-----	-----
962	-----	-----	-----	-----	-----	-----
963	-----	-----	-----	-----	-----	-----
1109	0.40	0.27	-0.14	-0.21	-0.23	0.23
1121	0.48	0.90	-0.23	0.46	0.51	0.70
1126	-----	-----	-----	-----	-----	-----
1266	-----	-----	-----	-----	-----	-----
1320	-0.32	-0.02	-0.33	-0.50	-0.26	-0.76
1539	0.45	0.09	0.70	0.63	0.61	-0.09
1611	0.31	-0.60	-0.89	-0.72	-0.83	0.26
1618	-0.81	-0.14	-0.23	-0.05	0.04	0.03
1644	-0.87	-0.43	-0.42	0.07	-0.23	-0.68
1697	-0.24	0.15	0.23	0.24	0.31	0.42
1698	0.60	0.32	0.70	0.01	0.11	-0.33
1705	0.02	0.21	0.51	0.07	-0.06	0.90
1710	-----	-----	-----	-----	-----	-----
1713	1.20	0.15	0.61	0.35	0.34	0.19
1725	-0.29	-1.18	-0.70	0.01	0.41	-0.33
1776	-0.52	-0.55	-1.73	-2.35	-2.09	-1.23
1792	-0.41	0.38	0.23	0.35	0.21	-0.25
1881	-----	-----	-----	-----	-----	-----
1995	1.06	0.27	1.07	1.13	0.37	-0.37
6005	0.63	0.44	-0.33	-0.66	-0.59	0.70
6018	0.37	0.73	0.70	-0.16	-0.36	0.50
6028	1.37	0.90	0.70	-0.61	-0.86	0.70
6075	0.14	-0.60	0.98	0.57	0.54	0.34
6142	-1.38	-0.60	-1.07	-0.66	-0.39	-0.29
6201	-0.26	0.27	0.14	0.63	0.74	0.23
6262	-0.32	-0.43	0.42	0.63	0.74	-0.29
6279	-0.38	0.27	-0.51	-0.61	-0.96	0.58
6317	-0.67	-6.11	-11.99	0.01	1.71	3.97

Determination of Distillation on sample #20045; result in %V/V

lab	method	Vol.250°C	mark	z(targ)	Vol.350°C	mark	z(targ)
312	D86-automated	27.3		-0.43	96.4		0.11
496	D86-automated	27.6		-0.12	96.4		0.11
541	ISO3405-automated	28.05		0.35	95.95		-0.36
914		-----		-----	-----		-----
962		-----		-----	-----		-----
963		-----		-----	-----		-----
1109	D86-automated	27.8		0.09	96.3		0.00
1121	ISO3405-automated	28.0		0.29	95.8		-0.52
1126		-----		-----	-----		-----
1266		-----		-----	-----		-----
1320	ISO3405-automated	28.2		0.50	96.8		0.52
1539	ISO3405-automated	27.1		-0.64	95.8		-0.52
1611		28.3		0.60	96.9		0.63
1618	ISO3405-automated	28.0		0.29	96.2		-0.10
1644	ISO3405-automated	28.0		0.29	96.5		0.21
1697	ISO3405-automated	27.6		-0.12	96.0		-0.31
1698	ISO3405-automated	27.1		-0.64	96.0		-0.31
1705	ISO3405-automated	27.5		-0.23	96.3		0.00
1710		-----		-----	-----		-----
1713	ISO3405-automated	27.1		-0.64	96.0		-0.31
1725	ISO3405-automated	28.3		0.60	95.9		-0.41
1776	ISO3405-automated	28.6		0.92	98.4	R(0.05)	2.18
1792	D86-automated	27.1		-0.64	96.0		-0.31
1881		-----		-----	-----		-----
1995	D86-automated	27.8		0.09	96		-0.31
6005	ISO3405-automated	27.5		-0.23	96.5		0.21
6018	ISO3405-automated	27.1		-0.64	96.3		0.00
6028	ISO3405-automated	27.1		-0.64	97.3		1.04
6075	ISO3405-automated	27.6		-0.12	94.2	R(0.05)	-2.17
6142	ISO3405-automated	28.2		0.50	96.6		0.31
6201	D86-automated	28.2		0.50	96.6		0.31
6262	D86-automated	27.7		-0.02	95.6		-0.72
6279	ISO3405-automated	27.8		0.09	96.97		0.70
6317	D86-manual	38	R(0.01)	10.66	95	ex	-1.34
	normality	OK			OK		
	n	26			24		
	outliers	1			2 (+1 ex)		
	mean (n)	27.72			96.30		
	st.dev. (n)	0.453			0.421		
	R(calc.)	1.27			1.18		
	st.dev.(ISO3405-A:19)	0.964			0.964		
	R(ISO3405-A:19)	2.7			2.7		
compare	R(ISO3405-M:19)	2.72			2.19		

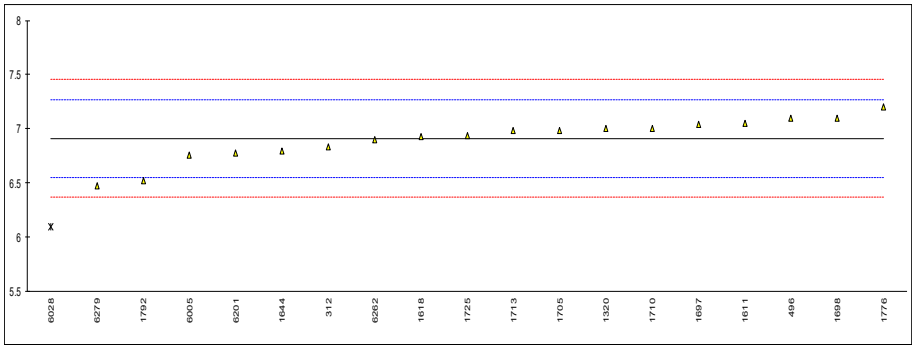
Lab 6317 test result excluded as four other related test results are statistical outliers

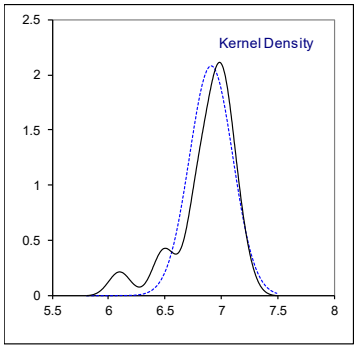


Determination of FAME content on sample #20045; result in %V/V

lab	method	value	mark	z(targ)	remarks
312	EN14078-B	6.83		-0.44	
496	EN14078-A	7.1		1.05	
541		-----		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109		-----		-----	
1121		-----		-----	
1126		-----		-----	
1266		-----		-----	
1320	EN14078-B	7.00		0.50	
1539		-----		-----	
1611	EN14078-B	7.05		0.77	
1618	EN14078-B	6.93		0.11	
1644	EN14078-B	6.80		-0.61	
1697	EN14078-B	7.04		0.72	
1698	EN14078-B	7.1		1.05	
1705	EN14078-B	6.9828		0.40	
1710	EN14078-B	7.0		0.50	
1713	EN14078-B	6.98		0.39	
1725	EN14078-B	6.94		0.16	
1776	EN14078-A	7.2		1.60	
1792	EN14078-B	6.52		-2.16	
1881		-----		-----	
1995		-----		-----	
6005	EN14078-B	6.76		-0.83	
6018		-----		-----	
6028	EN14078-B	6.1	C,G(0.05)	-4.48	first reported 5.1
6075		-----		-----	
6142		-----		-----	
6201	EN14078-B	6.78		-0.72	
6262	EN14078-A	6.9		-0.06	
6279	EN14078-B	6.47		-2.43	
6317		-----		-----	

normality	OK		
n	18		
outliers	1		
mean (n)	6.910		
st.dev. (n)	0.1916		
R(calc.)	0.537		
st.dev.(EN14078-B:14)	0.1810		
R(EN14078-B:14)	0.507	application range: 3 - 20 %V/V	
compare			
R(EN14078-A:14)	0.368	application range: 0.05 - 3 %V/V	

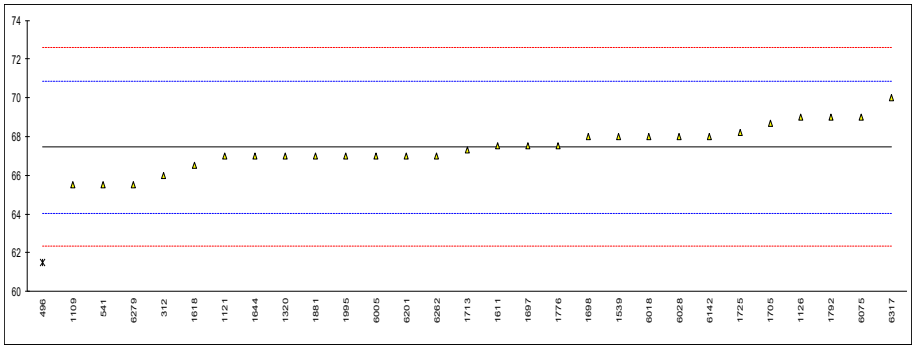


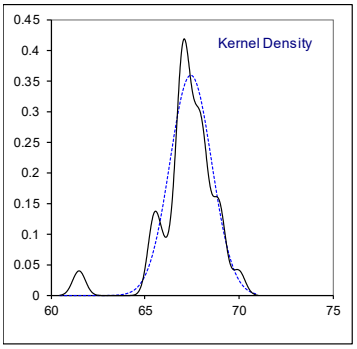


Determination of Flash Point PMcc on sample #20045; result in °C

lab	method	value	mark	z(targ)	remarks
312	D93-A	66.0		-0.85	
496	ISO2719-A	61.5	R(0.01)	-3.48	
541	ISO2719-A	65.50		-1.14	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D93-A	65.5		-1.14	
1121	ISO2719-A	67.0		-0.26	
1126	ISO2719	69.0		0.90	
1266		-----		-----	
1320	ISO2719-A	67.0		-0.26	
1539	ISO2719-A	68.0		0.32	
1611	ISO2719-A	67.5		0.03	
1618	ISO2719-A	66.5		-0.56	
1644	ISO2719-A	67.0		-0.26	
1697	ISO2719-A	67.5		0.03	
1698	ISO2719-A	68.0		0.32	
1705	ISO2719-A	68.675		0.71	
1710		-----		-----	
1713	ISO2719-A	67.3		-0.09	
1725	ISO2719-A	68.2		0.44	
1776	ISO2719-A	67.5		0.03	
1792	ISO2719-A	69.0		0.90	
1881	ISO2719-A	67.0		-0.26	
1995	D93-A	67		-0.26	
6005	ISO2719-A	67.0		-0.26	
6018	ISO2719-A	68.0		0.32	
6028	ISO2719-A	68		0.32	
6075	ISO2719-A	69.0		0.90	
6142	ISO2719-A	68.0		0.32	
6201	D93-A	67.0		-0.26	
6262	ISO2719-A	67.0		-0.26	
6279	ISO2719-A	65.5		-1.14	
6317	D93-A	70		1.49	

normality	OK
n	28
outliers	1
mean (n)	67.453
st.dev. (n)	1.1114
R(calc.)	3.112
st.dev.(ISO2719-A:16)	1.7104
R(ISO2719-A:16)	4.789

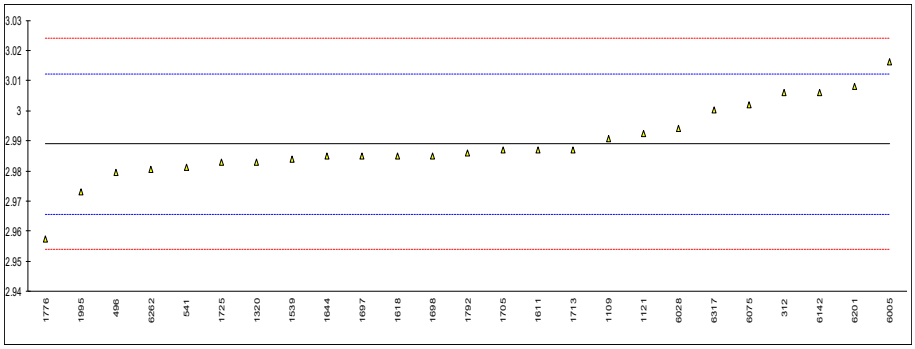


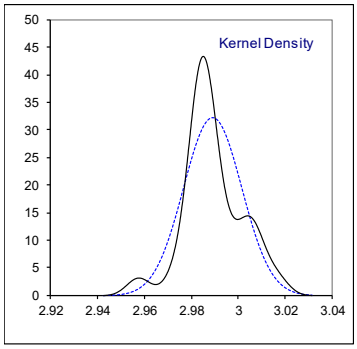


Determination of Kinematic Viscosity at 40°C on sample #20045; result in mm^2/s

lab	method	value	mark	z(targ)	remarks
312	D445	3.006		1.46	
496	ISO3104	2.9795		-0.81	
541	ISO3104	2.9811		-0.67	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D445	2.9906		0.14	
1121	ISO3104	2.9925		0.30	
1126		-----		-----	
1266		-----		-----	
1320	ISO3104	2.983		-0.51	
1539	ISO3104	2.984		-0.42	
1611	ISO3104	2.987		-0.17	
1618	ISO3104	2.985		-0.34	
1644	ISO3104	2.985		-0.34	
1697	ISO3104	2.985		-0.34	
1698	ISO3104	2.985		-0.34	
1705	ISO3104	2.987		-0.17	
1710		-----		-----	
1713	ISO3104	2.9870		-0.17	
1725	ISO3104	2.9828		-0.53	
1776	ISO3104	2.9575		-2.69	
1792	ISO3104	2.986		-0.25	
1881		-----		-----	
1995	D7042	2.973		-1.37	
6005	ISO3104	3.0162		2.33	
6018		-----		-----	
6028	ISO3104	2.994		0.43	
6075	ISO3104	3.002		1.12	
6142	ISO3104	3.006		1.46	
6201	D445	3.008		1.63	
6262	D445	2.9804		-0.73	
6279		-----		-----	
6317	D7042	3.0002		0.96	

normality	suspect
n	25
outliers	0
mean (n)	2.9890
st.dev. (n)	0.01237
R(calc.)	0.0346
st.dev.(ISO3104:94)	0.01168
R(ISO3104:94)	0.0327

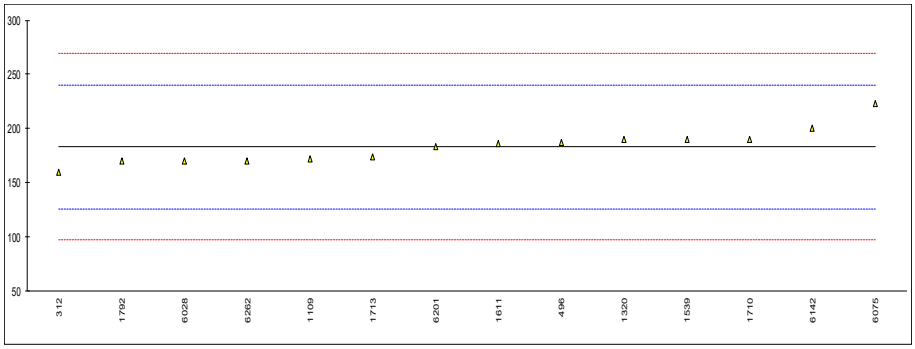


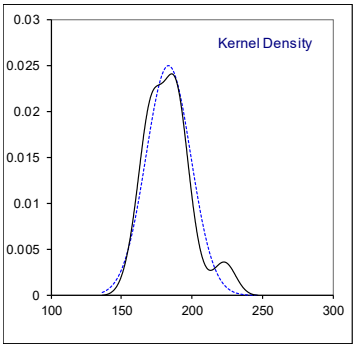


Determination of Lubricity by HFRR at 60°C on sample #20045; result in µm

lab	method	value	mark	z(targ)	Corrected	remarks
312	ISO12156-1 method A	160		-0.81	NO	
496	ISO12156-1 method A	187.5		0.15	NO	
541		-----		-----		
914		-----		-----		
962		-----		-----		
963		-----		-----		
1109	IP450	172		-0.39	YES	
1121		-----		-----		
1126		-----		-----		
1266		-----		-----		
1320	ISO12156-1 method A	190		0.24	NO	
1539	ISO12156-1 method A	190		0.24	NO	
1611	ISO12156-1 method A	186		0.10		
1618		-----		-----		
1644		-----		-----		
1697		-----		-----		
1698		-----		-----		
1705		-----		-----		
1710	ISO12156-1 method A	190		0.24	NO	
1713	ISO12156-1 method B	174		-0.32	NO	
1725		-----		-----		
1776		-----		-----		
1792	ISO12156-1 method B	170		-0.46	NO	
1881		-----		-----		
1995		-----		-----		
6005		-----		-----		
6018		-----		-----		
6028	ISO12156-1 method A	170		-0.46	NO	
6075	ISO12156-1 method A	223		1.39	NO	
6142	ISO12156-1 method A	200		0.59		
6201	ISO12156-1 method A	183.0		-0.01	NO	
6262	ISO12156-1 method A	170		-0.46	NO	
6279		-----		-----		
6317		-----		-----		

normality	not OK	
n	14	
outliers	0	
mean (n)	183.250	
st.dev. (n)	15.9383	
R(calc.)	44.627	
st.dev.(ISO12156-A:18)	28.5714	
R(ISO12156-A:18)	80	(digital camera)
compare		
R(ISO12156-B:18)	90	(visual)
R(D6079:18)	80	





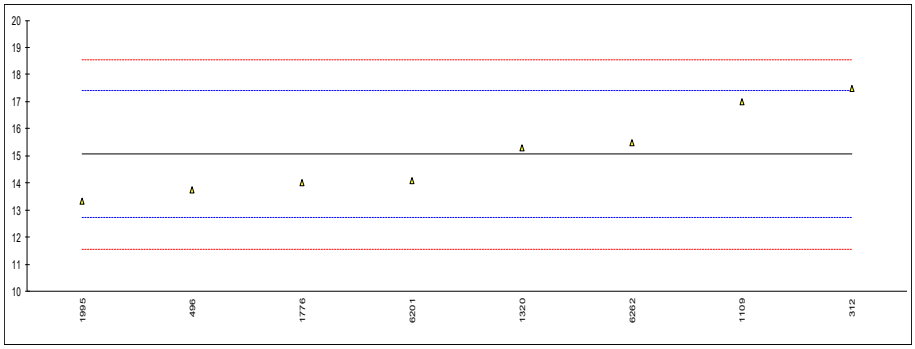
Determination of Manganese as Mn on sample #20045; result in mg/L

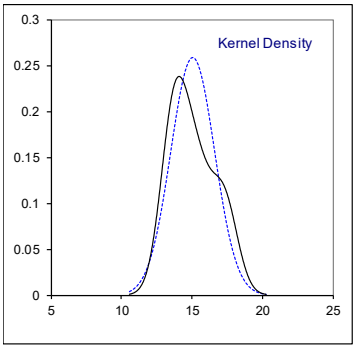
lab	method	value	mark	z(targ)	remarks
312	EN16576	<0.5		-----	
496	EN16576	<0.5		-----	
541		-----		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109		-----		-----	
1121		-----		-----	
1126		-----		-----	
1266		-----		-----	
1320	EN16576	<0,5		-----	
1539	EN16576	< 0,5		-----	
1611	EN16576	<0,5		-----	
1618		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1710	EN16576	<0.2		-----	
1713		-----		-----	
1725		-----		-----	
1776		-----		-----	
1792		-----		-----	
1881		-----		-----	
1995		-----		-----	
6005		-----		-----	
6018		-----		-----	
6028		-----		-----	
6075		-----		-----	
6142		-----		-----	
6201	EN16576	<1		-----	
6262	EN16576	<1.0		-----	
6279		-----		-----	
6317		-----		-----	
	n	6			
	mean (n)	<0.5			
	R(calc.)	n.e.			
	R(EN16576:14)	n.e.		application range: 0.5 – 7 mg/L	

Determination of Nitrogen on sample #20045; result in mg/kg

lab	method	value	mark	z(targ)	remarks
312	D4629	17.49		2.08	
496	D4629	13.75		-1.12	
541		-----		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D4629	17		1.66	
1121		-----		-----	
1126		-----		-----	
1266		-----		-----	
1320	D4629	15.3		0.21	
1539		-----		-----	
1611		-----		-----	
1618		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1710		-----		-----	
1713		-----		-----	
1725		-----		-----	
1776	D4629	14		-0.91	
1792		-----		-----	
1881		-----		-----	
1995	D4629	13.34		-1.47	
6005		-----		-----	
6018		-----		-----	
6028		-----		-----	
6075		-----		-----	
6142		-----		-----	
6201	D4629	14.1		-0.82	
6262	D4629	15.5		0.38	
6279		-----		-----	
6317		-----		-----	

normality	unknown
n	8
outliers	0
mean (n)	15.06
st.dev. (n)	1.542
R(calc.)	4.32
st.dev.(D4629:17)	1.168
R(D4629:17)	3.27

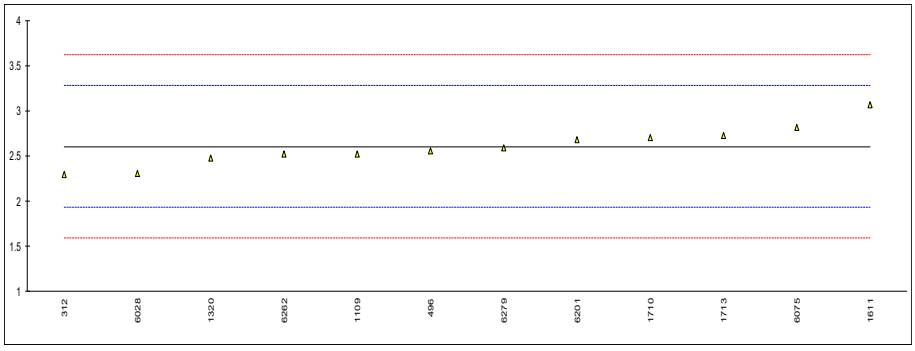


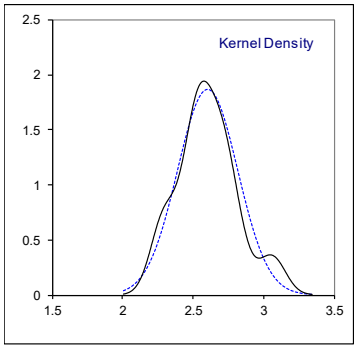


Determination of Polycyclic Aromatic Hydrocarbons on sample #20045; result in %M/M

lab	method	value	mark	z(targ)	remarks
312	EN12916	2.29		-0.93	
496	EN12916	2.56		-0.13	
541		-----		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	IP391	2.52		-0.25	
1121		-----		-----	
1126		-----		-----	
1266		-----		-----	
1320		2.48		-0.36	
1539		-----		-----	
1611	EN12916	3.06		1.35	
1618		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1710	EN12916	2.7		0.29	
1713	EN12916	2.73		0.38	
1725		-----		-----	
1776		-----		-----	
1792		-----		-----	
1881		-----		-----	
1995		-----		-----	
6005		-----		-----	
6018		-----		-----	
6028	EN12916	2.30		-0.90	
6075		2.81	C	0.61	first reported 4.11
6142		-----		-----	
6201	IP391	2.68		0.23	
6262	EN12916	2.517		-0.25	
6279	EN12916	2.59		-0.04	
6317		-----		-----	

normality	OK
n	12
outliers	0
mean (n)	2.603
st.dev. (n)	0.2141
R(calc.)	0.600
st.dev.(EN12916:16)	0.3381
R(EN12916:16)	0.947

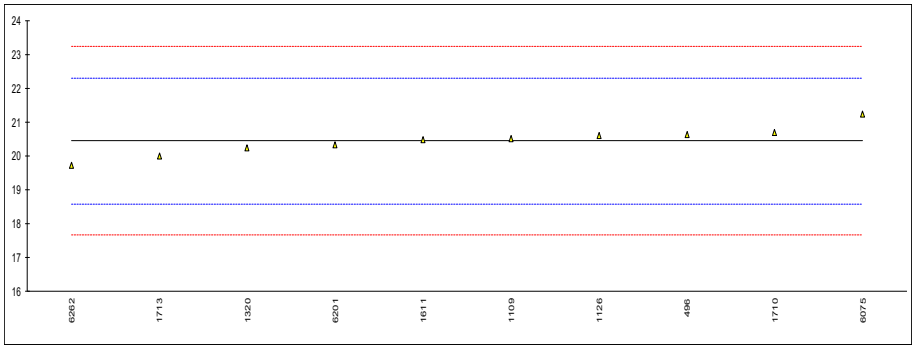


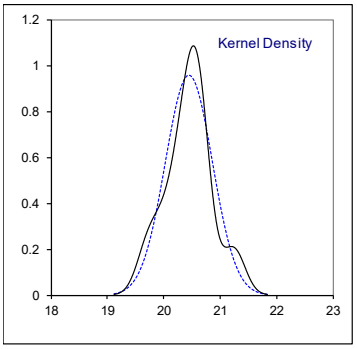


Determination of Mono-Aromatic Hydrocarbons on sample #20045; result in %M/M

lab	method	value	mark	z(targ)	remarks
312		-----		-----	
496	EN12916	20.63		0.20	
541		-----		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	IP391	20.52		0.08	
1121		-----		-----	
1126	EN12916	20.6		0.17	
1266		-----		-----	
1320		20.24		-0.22	
1539		-----		-----	
1611	EN12916	20.48		0.04	
1618		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1710	EN12916	20.7		0.28	
1713	EN12916	19.99		-0.49	
1725		-----		-----	
1776		-----		-----	
1792		-----		-----	
1881		-----		-----	
1995		-----		-----	
6005		-----		-----	
6018		-----		-----	
6028		-----		-----	
6075		21.24		0.86	
6142		-----		-----	
6201	IP391	20.32		-0.13	
6262	EN12916	19.709		-0.79	
6279		-----		-----	
6317		-----		-----	

normality	suspect
n	10
outliers	0
mean (n)	20.443
st.dev. (n)	0.4175
R(calc.)	1.169
st.dev.(EN12916:16)	0.9285
R(EN12916:16)	2.600

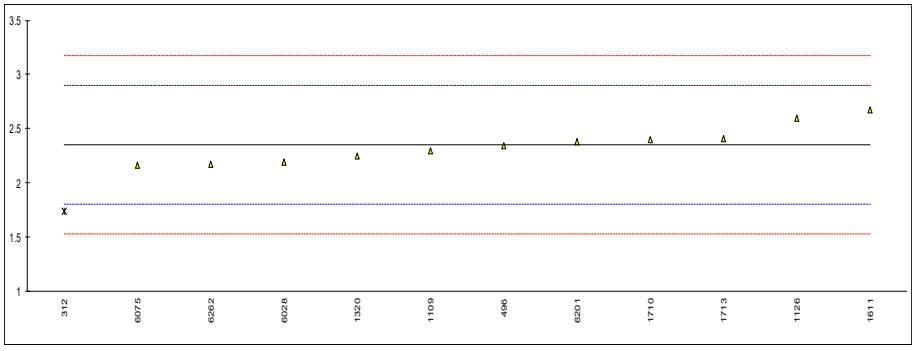


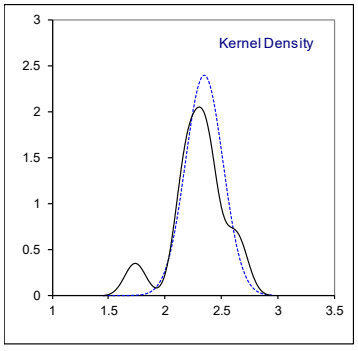


Determination of Di-Aromatic Hydrocarbons on sample #20045; result in %M/M

lab	method	value	mark	z(targ)	remarks
312	EN12916	1.74	D(0.05)	-2.23	
496	EN12916	2.34		-0.04	
541		-----		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	IP391	2.30		-0.19	
1121		-----		-----	
1126	EN12916	2.6		0.91	
1266		-----		-----	
1320		2.25		-0.37	
1539		-----		-----	
1611	EN12916	2.67		1.16	
1618		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1710	EN12916	2.4		0.18	
1713	EN12916	2.41		0.21	
1725		-----		-----	
1776		-----		-----	
1792		-----		-----	
1881		-----		-----	
1995		-----		-----	
6005		-----		-----	
6018		-----		-----	
6028	EN12916	2.19		-0.59	
6075		2.16	C	-0.70	first reported 3.46
6142		-----		-----	
6201	IP391	2.38		0.10	
6262	EN12916	2.172		-0.66	
6279		-----		-----	
6317		-----		-----	

normality	OK
n	11
outliers	1
mean (n)	2.352
st.dev. (n)	0.1667
R(calc.)	0.467
st.dev.(EN12916:16)	0.2738
R(EN12916:16)	0.767

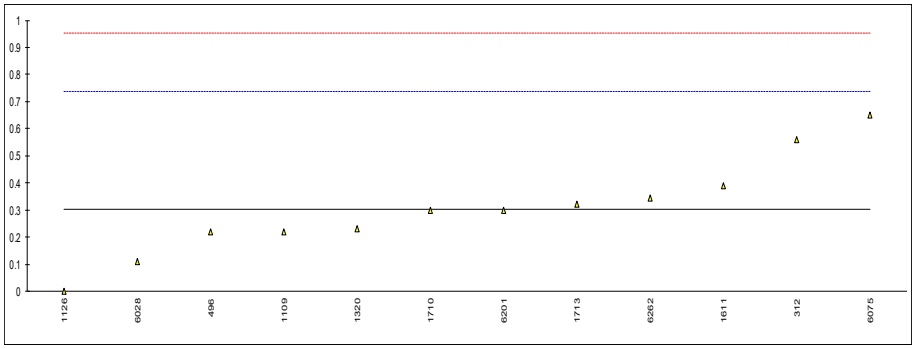


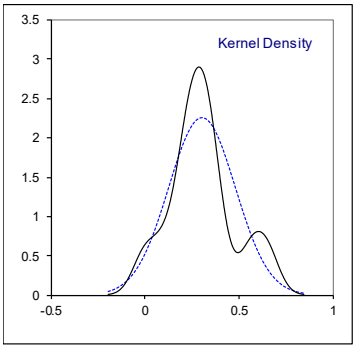


Determination of Tri+-Aromatic Hydrocarbons on sample #20045; result in %M/M

lab	method	value	mark	z(targ)	remarks
312	EN12916	0.56		1.19	
496	EN12916	0.22		-0.39	
541		-----		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	IP391	0.22		-0.39	
1121		-----		-----	
1126	EN12916	0		-1.41	
1266		-----		-----	
1320		0.23		-0.34	
1539		-----		-----	
1611	EN12916	0.39		0.40	
1618		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1710	EN12916	0.3		-0.02	
1713	EN12916	0.32		0.08	
1725		-----		-----	
1776		-----		-----	
1792		-----		-----	
1881		-----		-----	
1995		-----		-----	
6005		-----		-----	
6018		-----		-----	
6028	EN12916	0.11		-0.90	
6075		0.65		1.60	
6142		-----		-----	
6201	IP391	0.30		-0.02	
6262	EN12916	0.345		0.19	
6279		-----		-----	
6317		-----		-----	

normality	OK
n	12
outliers	0
mean (n)	0.304
st.dev. (n)	0.1769
R(calc.)	0.495
st.dev.(EN12916:16)	0.2162
R(EN12916:16)	0.605

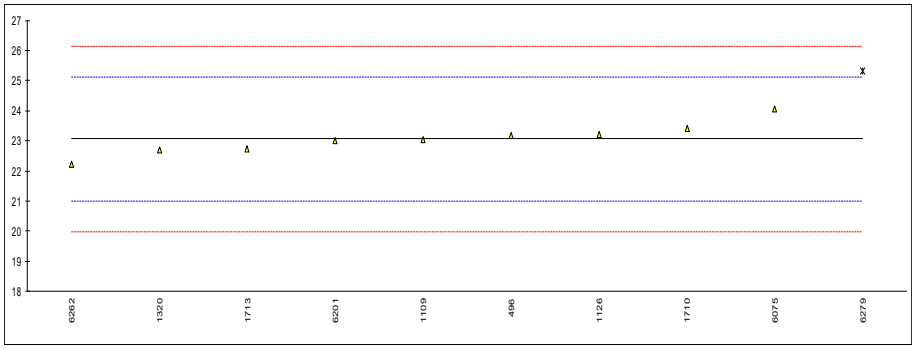


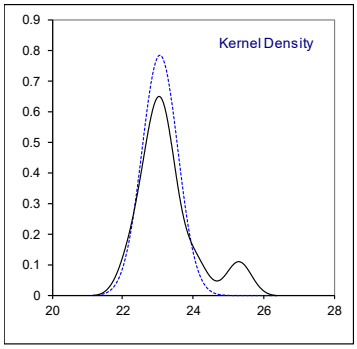


Determination of Total Aromatic Hydrocarbons on sample #20045; result in %M/M

lab	method	value	mark	z(targ)	remarks
312		-----		-----	
496	EN12916	23.19		0.13	
541		-----		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	IP391	23.04		-0.02	
1121		-----		-----	
1126	EN12916	23.2		0.14	
1266		-----		-----	
1320		22.71		-0.34	
1539		-----		-----	
1611		-----		-----	
1618		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1710	EN12916	23.4		0.33	
1713	EN12916	22.72		-0.33	
1725		-----		-----	
1776		-----		-----	
1792		-----		-----	
1881		-----		-----	
1995		-----		-----	
6005		-----		-----	
6018		-----		-----	
6028		-----		-----	
6075		24.05	C	0.97	first reported 29.35
6142		-----		-----	
6201	IP391	23.00		-0.06	
6262	EN12916	22.225		-0.81	
6279	EN12916	25.3	C,G(0.05)	2.18	first reported 30.04
6317		-----		-----	

normality	suspect
n	9
outliers	1
mean (n)	23.059
st.dev. (n)	0.5089
R(calc.)	1.425
st.dev.(EN12916:16)	1.0258
R(EN12916:16)	2.872

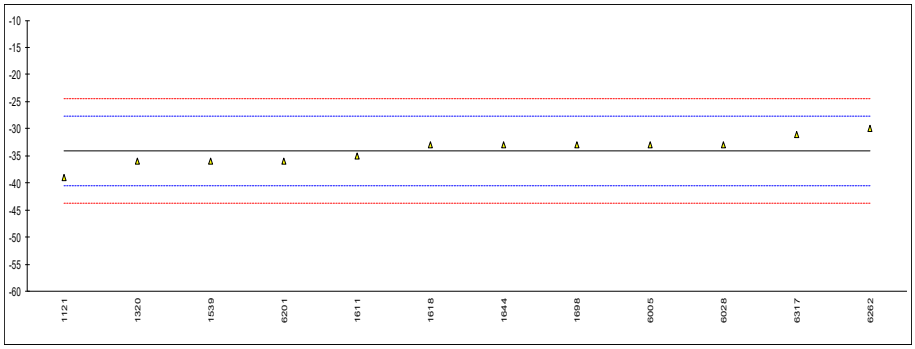


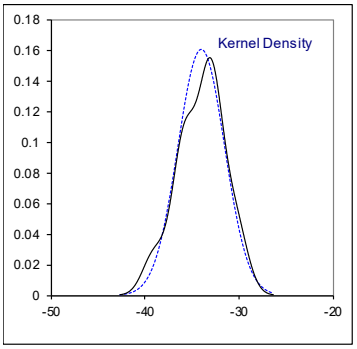


Determination of Pour Point, Manual on sample #20045; result in °C

lab	method	value	mark	z(targ)	remarks
312		-----		-----	
496		-----		-----	
541		-----		-----	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109		-----		-----	
1121	ISO3016	-39		-1.56	
1126		-----		-----	
1266		-----		-----	
1320	ISO3016	-36	C	-0.62	first reported as Pour Point, Automated, 3 °C interval
1539	ISO3016	-36		-0.62	
1611	ISO3016	-35.0		-0.31	
1618	ISO3016	-33		0.31	
1644	ISO3016	-33.0		0.31	
1697		-----		-----	
1698	ISO3016	-33		0.31	
1705		-----		-----	
1710		-----		-----	
1713		-----		-----	
1725		-----		-----	
1776		-----		-----	
1792	ISO3016	<-24		-----	
1881		-----		-----	
1995		-----		-----	
6005	ISO3016	-33		0.31	
6018		-----		-----	
6028	D97	-33.0		0.31	
6075		-----		-----	
6142		-----		-----	
6201	ISO3016	-36		-0.62	
6262	D97	-30		1.24	
6279		-----		-----	
6317	D97	-31		0.93	

normality	OK
n	12
outliers	0
mean (n)	-34.00
st.dev. (n)	2.486
R(calc.)	6.96
st.dev.(ISO3016:19)	3.214
R(ISO3016:19)	9

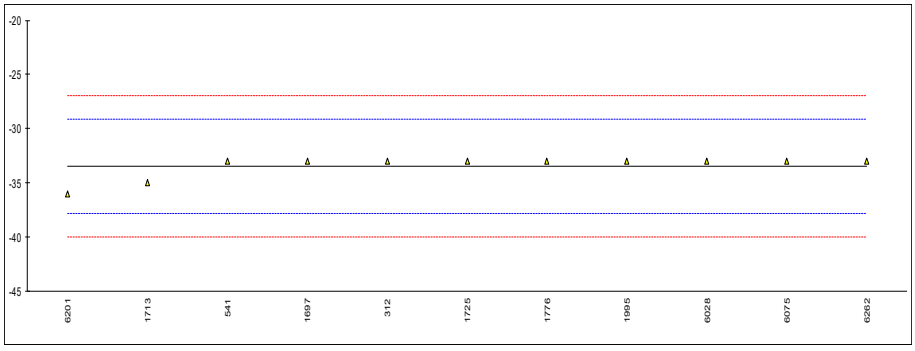


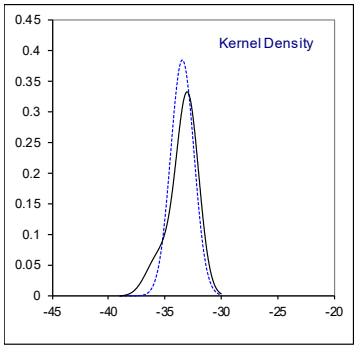


Determination of Pour Point, Automated, 3°C interval on sample #20045; result in °C

lab	method	value	mark	z(targ)	remarks
312	D5950	-33		0.21	
496		-----		-----	
541	D5950	-33		0.21	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109		-----		-----	
1121		-----		-----	
1126		-----		-----	
1266		-----		-----	
1320		-----		-----	
1539		-----		-----	
1611		-----		-----	
1618		-----		-----	
1644		-----		-----	
1697	ISO3016	-33		0.21	according to ISO3016 using automated equipment
1698		-----		-----	
1705		-----		-----	
1710		-----		-----	
1713	ISO3016	-35		-0.71	automated – ISO3016
1725	ISO3016	-33		0.21	according to ISO3016 using automated equipment
1776	D5950	-33		0.21	
1792		-----		-----	
1881		-----		-----	
1995	D5950	-33		0.21	
6005		-----		-----	
6018		-----		-----	
6028	D5950	-33.0		0.21	
6075	NFT60-105	-33		0.21	
6142		-----		-----	
6201	D5950	-36		-1.17	
6262	D5950	-33		0.21	
6279		-----		-----	
6317		-----		-----	

normality	not OK	
n	11	
outliers	0	
mean (n)	-33.45	
st.dev. (n)	1.036	
R(calc.)	2.90	
st.dev.(D5950:14)	2.179	
R(D5950:14)	6.1	3°C interval

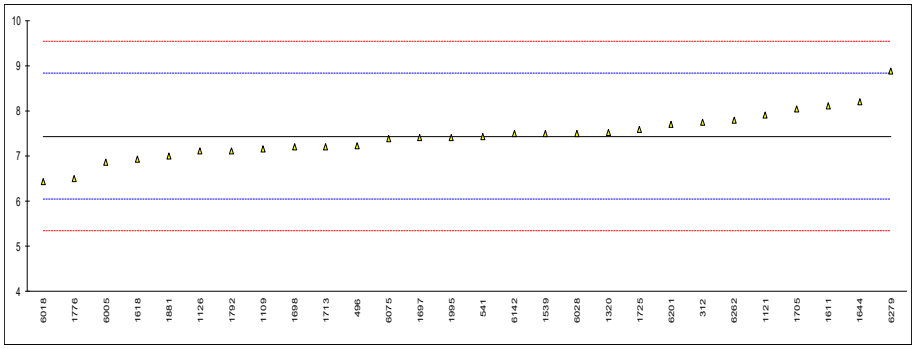


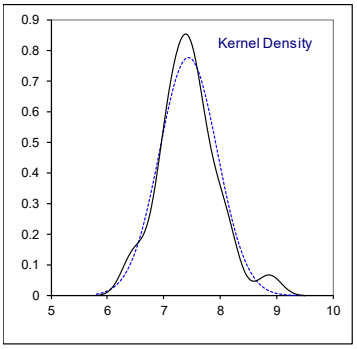


Determination of Sulfur on sample #20045; result in mg/kg

lab	method	value	mark	z(targ)	remarks
312	ISO20846	7.74		0.43	
496	ISO20846	7.22		-0.31	
541	ISO20846	7.43		-0.01	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D7039	7.15		-0.41	
1121	ISO20846	7.90		0.66	
1126	ISO20846	7.1		-0.49	
1266		-----		-----	
1320	ISO20846	7.52		0.12	
1539	ISO20846	7.5		0.09	
1611	ISO20846	8.10		0.95	
1618	ISO20846	6.93		-0.73	
1644	ISO20846	8.2		1.09	
1697	ISO20846	7.40		-0.05	
1698	ISO20846	7.2		-0.34	
1705	ISO20846	8.04		0.86	
1710		-----		-----	
1713	ISO20846	7.21		-0.33	
1725	ISO20846	7.59		0.22	
1776	ISO20846	6.5		-1.35	
1792	ISO13032	7.1		-0.49	
1881	ISO20846	7.0		-0.63	
1995	D5453	7.4		-0.05	
6005	ISO20846	6.87		-0.81	
6018	ISO20846	6.44		-1.43	
6028	ISO20846	7.5		0.09	
6075	ISO20846	7.38		-0.08	
6142	ISO20846	7.49		0.07	
6201	ISO20846	7.69		0.36	
6262	ISO20846	7.8		0.52	
6279	ISO20884	8.873		2.06	
6317		-----		-----	

normality	suspect
n	28
outliers	0
mean (n)	7.438
st.dev. (n)	0.5129
R(calc.)	1.436
st.dev.(ISO20846:19)	0.6975
R(ISO20846:19)	1.953

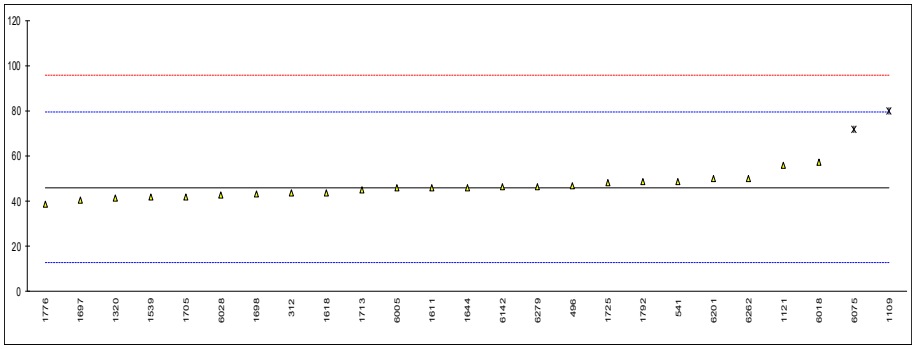


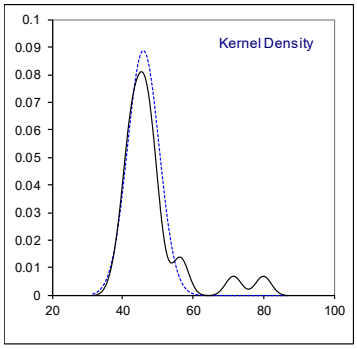


Determination of Water on sample #20045; result in mg/kg

lab	method	value	mark	z(targ)	remarks
312	ISO12937	43.4		-0.15	
496	D6304-A	47.0		0.06	
541	ISO12937	48.5		0.15	
914		-----		-----	
962		-----		-----	
963		-----		-----	
1109	D6304-C	80	R(0.01)	2.04	
1121	ISO12937	55.9		0.60	
1126		-----		-----	
1266		-----		-----	
1320	ISO12937	41.4		-0.27	
1539	ISO12937	42		-0.24	
1611	ISO12937	46		0.00	
1618	ISO12937	43.6		-0.14	
1644	ISO12937	46.0		0.00	
1697	ISO12937	40.5		-0.33	
1698	ISO12937	43		-0.18	
1705	ISO12937	42		-0.24	
1710		-----		-----	
1713	ISO12937	45		-0.06	
1725	ISO12937	48.1		0.13	
1776	ISO12937	38.4		-0.45	
1792	ISO12937	48.4		0.15	
1881		-----		-----	
1995		-----		-----	
6005	ISO12937	45.9		0.00	
6018	ISO12937	57		0.66	
6028	ISO12937	42.7		-0.20	
6075	ISO12937	71.5	R(0.01)	1.53	
6142	ISO12937	46.2		0.01	
6201	ISO12937	50		0.24	
6262	ISO12937	50		0.24	
6279	ISO12937	46.25		0.02	
6317	D95	<0.1	C	-----	first reported 0.1 mg/kg, possibly reported in %V/V?

normality	suspect
n	23
outliers	2
mean (n)	45.97
st.dev. (n)	4.488
R(calc.)	12.57
st.dev.(ISO12937:00)	16.652
R(ISO12937:00)	46.63

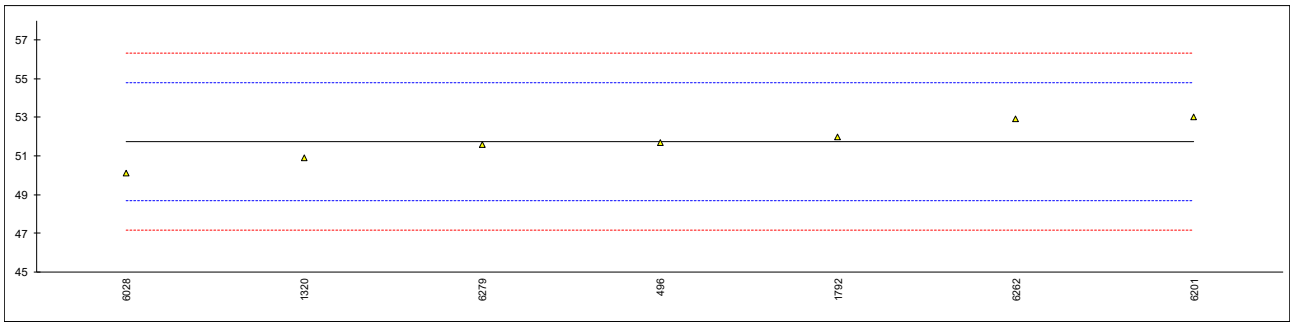


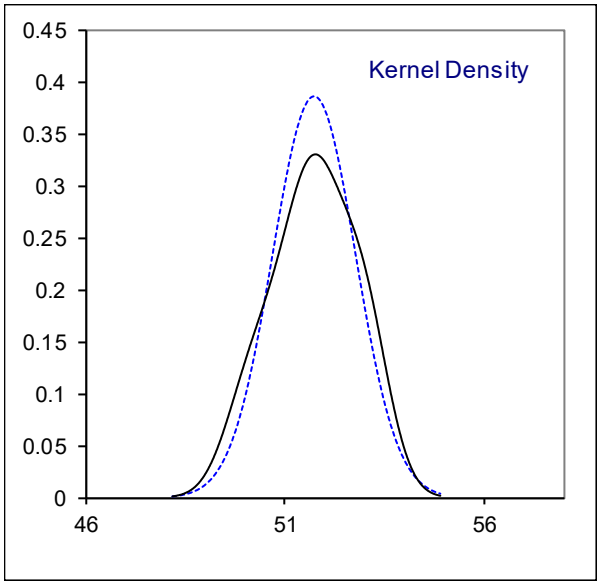


Determination of Cetane Number on sample #20046;

lab	method	value	mark	z(targ)	remarks
496	ISO5165	51.7		-0.03	
963		-----		-----	
1320	ISO5165	50.9		-0.55	
1610		-----		-----	
1776		-----		-----	
1792	ISO5165	52.0		0.17	
6028	ISO5165	50.1		-1.08	
6075		-----		-----	
6142		-----		-----	
6201	ISO5165	53.0		0.82	
6262	ISO5165	52.9		0.76	
6279	ISO5165	51.6		-0.09	

normality	unknown
n	7
outliers	0
mean (n)	51.74
st.dev. (n)	1.034
R(calc.)	2.90
st.dev.(ISO5165:17)	1.524
R(ISO5165:17)	4.27

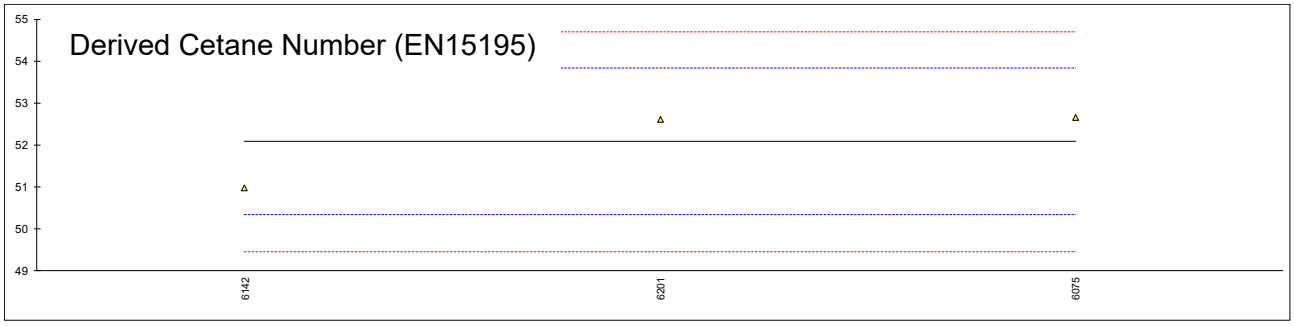




Determination of Derived Cetane Number (EN15195) on sample #20046;

lab	method	DCN	mark	z(targ)	ID (ms)	mark	z(targ)	Air Temp. (°C)	mark
496		-----		-----	-----		-----	-----	
963		-----		-----	-----		-----	-----	
1320		-----		-----	-----		-----	-----	
1610		-----		-----	-----		-----	-----	
1776		-----		-----	-----		-----	-----	
1792		-----		-----	-----		-----	-----	
6028		-----		-----	-----		-----	-----	
6075	EN17155	52.66		0.67	2.2925		-----	579.56	
6142	EN15195	50.98		-1.26	-----		-----	-----	
6201	EN15195	52.6		0.60	-----		-----	-----	
6262		-----		-----	-----		-----	-----	
6279		-----		-----	-----		-----	-----	

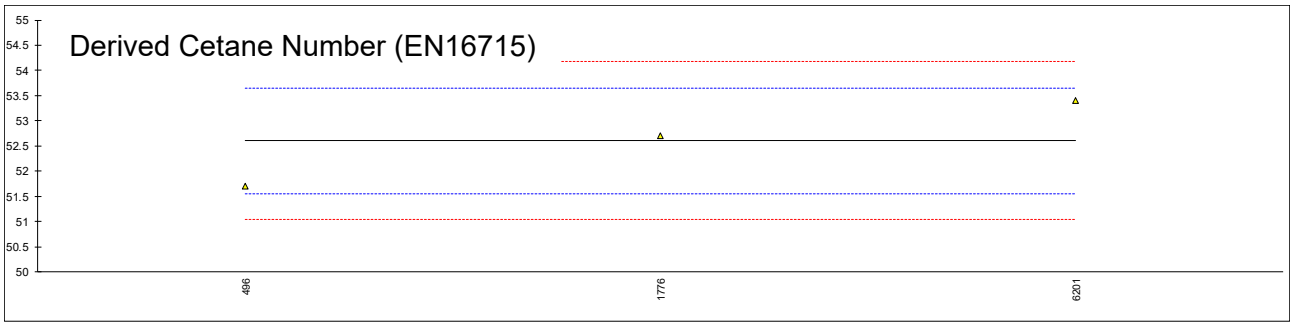
normality	unknown	unknown
n	3	1
outliers	0	0
mean (n)	52.08	n.e.
st.dev. (n)	0.953	n.e.
R(calc.)	2.67	n.e.
st.dev.(EN15195:14)	0.871	n.e
R(EN15195:14)	2.44	n.e



Determination of Derived Cetane Number (EN16715) on sample #20046;

Lab	method	DCN	mark	z(targ)	ID (ms)	mark	z(targ)	CD (ms)	mark	z(targ)	W. T. (°C)	mark
496	EN16715	51.7		-1.73	3.08		-----	4.60		-----	-----	
963		-----		-----	-----		-----	-----		-----	-----	
1320		-----		-----	-----		-----	-----		-----	-----	
1610		-----		-----	-----		-----	-----		-----	-----	
1776	EN16715	52.71	E	0.20	3.09		-----	4.48		-----	589.26	
1792		-----		-----	-----		-----	-----		-----	-----	
6028		-----		-----	-----		-----	-----		-----	-----	
6075		-----		-----	-----		-----	-----		-----	-----	
6142		-----		-----	-----		-----	-----		-----	-----	
6201	EN17155	53.4		1.52	-----		-----	-----		-----	-----	
6262		-----		-----	-----		-----	-----		-----	-----	
6279		-----		-----	-----		-----	-----		-----	-----	
	normality	unknown			unknown			unknown				
	n	3			2			2				
	outliers	0			0			0				
	mean (n)	52.60			3.09			4.54				
	st.dev. (n)	0.855			n.e.			n.e.				
	R(calc.)	2.39			n.e.			n.e.				
	st.dev.(EN16715:15)	0.523			n.e			n.e				
	R(EN16715:15)	1.46			n.e			n.e				

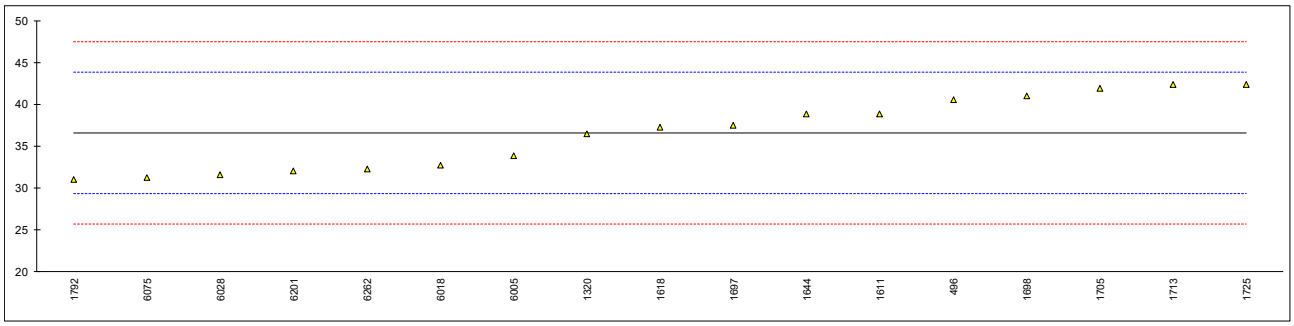
Lab 1776 iis calculated for DCN 53.12

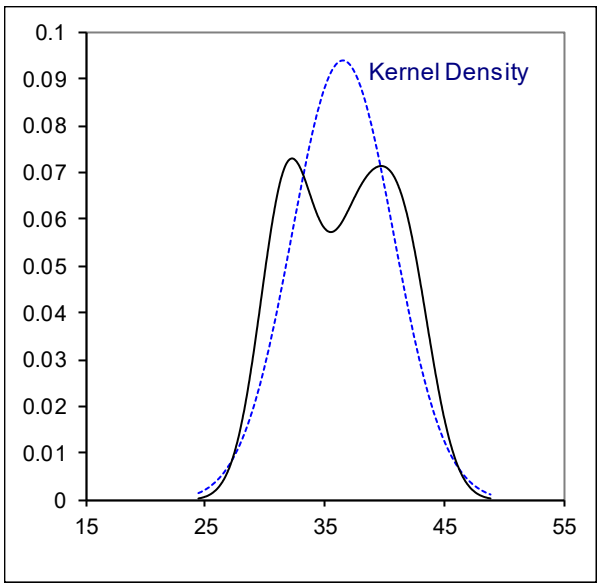


Determination of Total Contamination on sample #20047; result in mg/kg

lab	method	Total C.	mark	z(targ)	incomplete	vol. filtered (mL)	stopped (min)	remarks
496	EN12662:2014	40.5		1.09	NO	-----	-----	
963		-----		-----		-----	-----	
1266		-----		-----		-----	-----	
1320	EN12662:2014	36.5		-0.02		-----	-----	
1611	EN12662:2014	38.8		0.62		-----	-----	
1618	EN12662:2014	37.2		0.18		-----	-----	
1644	EN12662:2014	38.8		0.62	NO	-----	-----	
1697	EN12662:2014	37.45		0.25		-----	-----	
1698	EN12662:2014	41		1.23	NO	-----	-----	
1705	EN12662:2014	41.95		1.49		-----	-----	
1713	EN12662:2014	42.3		1.59		-----	-----	
1725	EN12662:2014	42.4		1.61		-----	-----	
1792	EN12662:2014	31.0		-1.54		-----	-----	
6005	EN12662:2014	33.8		-0.76	YES	300	-----	
6018	EN12662:2014	32.7		-1.07	YES	300	-----	
6028	EN12662:2014	31.6		-1.37		-----	-----	
6075	EN12662:2014	31.27	C	-1.46		-----	-----	first reported 73.56
6201	EN12662:2014	32		-1.26	YES	300	-----	
6262	EN12662:2014	32.3		-1.18	NO	-----	-----	

normality	OK
n	17
outliers	0
mean (n)	36.563
st.dev. (n)	4.2393
R(calc.)	11.870
st.dev.(EN12662:14)	3.6150
R(EN12662:14)	10.122





APPENDIX 2

Number of participants per country

1 lab in	ARGENTINA
1 lab in	AUSTRALIA
1 lab in	BELGIUM
1 lab in	EGYPT
1 lab in	GERMANY
1 lab in	HUNGARY
1 lab in	INDIA
1 lab in	IRELAND
1 lab in	LITHUANIA
1 lab in	MARTINIQUE
3 labs in	NETHERLANDS
1 lab in	NORTH MACEDONIA
9 labs in	POLAND
2 labs in	PORTUGAL
2 labs in	SAUDI ARABIA
1 lab in	SLOVAKIA
2 labs in	SPAIN
1 lab in	SWEDEN
1 lab in	TANZANIA
1 lab in	TUNISIA
2 labs in	UNITED KINGDOM

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)/R(1)	= outlier in Rosner's outlier test
R(0.05)/R(5)	= straggler in Rosner's outlier test
E	= possibly an error in calculations
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

Literature

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13 Analytical Methods Committee, Technical Brief, No 4 January 2001
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16 iis memo 1904 Precision data of Calculated Cetane Index Four Variables in Gasoil