



Institute for
Interlaboratory Studies

Results of Proficiency Test Gasoil (premium) April 2023

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. C.M. Nijssen-Wester

Correctors: ing. G.A. Oosterlaken-Buijs & Mrs. E.R. Montenij-Bos

Approved by: ing. A.S. Noordman-de Neef

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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 or premium Gasoil. The demand for these premium diesel fuels is increasing. Since 2020 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Gasoil (premium) based on the latest version of EN590 every year. During the annual proficiency testing program 2022/2023 it was decided to continue the round robin for the analysis of Gasoil (premium).

In this interlaboratory study registered for participation:

- 31 laboratories in 24 countries for regular analyzes in Gasoil (premium) iis23G02
- 15 laboratories in 13 countries for Total Contamination in Gasoil (premium) iis23G02TC

In total 31 laboratories in 24 countries registered for participation in one or more proficiency tests, 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 up to two different samples of Gasoil (premium), see table below.

Sample ID	PT ID	Quantity	Purpose
#23050	iis23G02	1x 1 L + 1x 0.5 L	Regular analyzes
#23051	iis23G02TC	1x 1 L	Total Contamination

Table 1: Gasoil (premium) samples used in PT iis23G02

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

2.1 ACCREDITATION

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

2.2 PROTOCOL

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

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

For the preparation of the sample for the regular analyzes in Gasoil (premium) a batch of approximately 100 liters of Gasoil (premium) was obtained from the local market. After homogenisation 45 amber glass bottles of 1 L and 45 amber glass bottles of 0.5 L were filled and labelled #23050.

The homogeneity of the subsamples was checked by the determination of Density at 15 °C in accordance with ISO12185 on 8 stratified randomly selected subsamples.

	Density at 15 °C in kg/m ³
sample #23050-1	834.26
sample #23050-2	834.25
sample #23050-3	834.24
sample #23050-4	834.25
sample #23050-5	834.27
sample #23050-6	834.26
sample #23050-7	834.26
sample #23050-8	834.25

Table 2: homogeneity test results of subsamples #23050

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)	0.03
reference test method	ISO12185:96
0.3 x R (reference test method)	0.15

Table 3: evaluation of the repeatability of subsamples #23050

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

For the preparation of the sample for the determination of Total Contamination in Gasoil (premium) a batch of approximately 25 liters Gasoil (premium) was obtained from the local market. A defined volume of freshly prepared and well shaken dust suspension of Arizona Dust material in an oil was added to a 1 L 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 1 L with Gasoil (premium) and homogenized. Finally, the subsamples were labelled #23051.

Depending on the registration of the participant the appropriate set of PT samples was sent on March 15, 2023. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Gasoil (premium) 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 sample #23050: Total Acid Number, Ash content, Calculated Cetane Index (four variables), Cloud Point, Cold Filter Plugging Point (CFPP), Carbon Residue (micro method) on 10% distillation residue, Copper Corrosion 3 hrs 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, Flash Point PMcc, Kinematic Viscosity at 40 °C, Lubricity by HFRR at 60 °C, Manganese as Mn, Nitrogen, Aromatic Hydrocarbons (Polycyclic, Mono, Di, Tri+ and Total), Pour Point (Manual and Automated), Sulfur and Water. On sample #23051 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 reference test methods (when applicable) that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

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

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

3.1 STATISTICS

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5).

For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as '<...' or '>...' were not used in the statistical evaluation.

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

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

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

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

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

3.2 GRAPHICS

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

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

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements (derived from e.g. ISO or ASTM test methods), the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation 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, like Horwitz or an estimated reproducibility based on former iis proficiency tests.

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

The z-scores were calculated according to:

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

The $Z_{(\text{target})}$ 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. Therefore, the usual interpretation of z-scores is as follows:

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

4 EVALUATION

In this proficiency test some problems were encountered with the dispatch of the samples. For the regular Gasoil (premium) PT two participants reported test results after the final reporting date and five other participants did not report any test results. Not all participants were able to report all tests requested.

For the PT on Total Contamination in Gasoil (premium) none of the participants reported test results after the final reporting date and five participants did not report any test results.

In total 26 participants reported 443 numerical test results. Observed were 22 outlying test results, which is 5.0%. In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

Not all data sets proved to have a normal Gaussian distribution. These are referred to as “not OK” or “suspect”. The statistical evaluation of these data sets should be used with due care, see also paragraph 3.1.

4.1 EVALUATION PER SAMPLE AND PER TEST

In this section the reported test results are discussed per sample and per test. The test methods which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the original data in appendix 1. The abbreviations, used in these tables, are explained in appendix 3.

In the iis PT reports ASTM test methods are referred to with a number (e.g. D5950) and an added designation for the year that the test method was adopted or revised (e.g. D5950:14). When a method has been reapproved an “R” will be added and the year of approval (e.g. D5950:14R20).

sample #23050

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 D974:22.

Ash content: This determination was not problematic. Almost all reporting participants agreed on a concentration lower than 0.01%M/M. Therefore, no z-scores are calculated.

Calculated Cetane Index, four variables: Regretfully, no reproducibility is mentioned in procedure A of ASTM D4737 nor in the equivalent test methods ISO4264 and IP380. Therefore, iis has estimated a reproducibility for Calculated Cetane Index by Four Variable Equation based on previous iis PTs (see iis memo 1904).

This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the estimated target reproducibility based on iis memo 1904.

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

Cold Filter Plugging Point (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 (micro method) on 10% distillation 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 3 hrs at 50 °C: This determination was not problematic. All reporting laboratories agreed on a result of 1 (1a).

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

Distillation at 760 mmHg: This determination was not problematic. Nine statistical outliers were observed over eight parameters. All calculated reproducibilities after rejection of the statistical outliers are in agreement with the requirements of ISO3405:19 automated mode. When evaluated against the requirements of ISO3405:19 manual mode, only the calculated reproducibilities for IBP and 95% recovered are not in agreement.

FAME: This determination was problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of mode B of EN14078:14.

Flash Point PMcc: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ISO2719-A:16+A1:21.

Kinematic Viscosity at 40 °C: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ISO3104:20.

Lubricity by HFRR at 60 °C: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of modes A or B of ISO12156-1:18.

Manganese as Mn: This determination may be not problematic. Only four test results were reported of which only one numeric test result. Therefore, no z-scores are calculated.

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

Polycyclic Aromatic Hydrocarbons: This determination was not problematic. No statistical outliers were observed and one test results was excluded because of outliers in the Di Aromatic Hydrocarbons. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of EN12916:19+A1:22.

Mono Aromatic Hydrocarbons: 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 EN12916:19+A1:22.

Di Aromatic Hydrocarbons: 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 EN12916:19+A1:22.

Tri+ Aromatic Hydrocarbons: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN12916:19+A1:22.

Total Aromatic Hydrocarbons: This determination was not problematic. No statistical outliers were observed and one test results was excluded because of outliers in the Mono and Di Aromatic Hydrocarbons. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of EN12916:19+A1:22.

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.
Remarkably, two laboratories reported to have done ISO3016 automated. In the 2019 version of ISO3016 it is explicitly explained that this method does not support automated procedures for this test nor does the reproducibility of this test method apply to results obtained with automated equipment (see Foreword of ISO3016:19).

Pour Point Automated 3 °C interval: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements ASTM D5950:14R20.

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. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO12937:00.

sample #23051

Total Contamination: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN12662:14.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Acid Number	mg KOH/g	10	0.036	0.022	0.04
Ash content	%M/M	11	<0.01	n.e.	n.e.
Calc. Cetane Index four variables		19	53.49	0.92	0.91
Cloud Point	°C	15	-6.2	1.9	4
Cold Filter Plugging Point	°C	17	-24.6	9.2	4.5
Carbon Residue on 10% residue	%M/M	13	0.017	0.029	0.028
Copper Corrosion 3 hrs at 50 °C		15	1 (1a)	n.a.	n.a.
Density at 15 °C	kg/m ³	22	834.2	0.3	0.5
Initial Boiling Point	°C	21	167.8	9.8	9.2
Temp at 10% recovered	°C	22	203.8	3.9	4.5
Temp at 50% recovered	°C	21	274.0	2.3	3.0
Temp at 90% recovered	°C	21	344.8	3.8	5.2
Temp at 95% recovered	°C	20	358.6	8.2	9.0
Final Boiling Point	°C	17	366.7	3.4	7.1
Volume at 250 °C	%V/V	20	37.0	1.7	2.7
Volume at 350 °C	%V/V	17	92.1	1.6	2.7
FAME	%V/V	11	6.82	0.67	0.50
Flash Point PMcc	°C	21	53.6	6.2	3.8
Kinematic Viscosity at 40 °C	mm ² /s	18	2.844	0.050	0.032

Parameter	unit	n	average	2.8 * sd	R(lit)
Lubricity by HFRR at 60 °C	µm	10	180	39	80
Manganese as Mn	mg/L	2	<0.5	n.e.	n.e.
Nitrogen	mg/kg	5	12.3	5.6	2.9
Polycyclic AromaticHydrocarbons	%M/M	9	1.23	0.30	0.69
Mono Aromatic Hydrocarbons	%M/M	7	15.2	0.7	1.8
Di Aromatic Hydrocarbons	%M/M	7	1.14	0.24	0.33
Tri+ Aromatic Hydrocarbons	%M/M	7	0.10	0.14	0.52
Total Aromatic Hydrocarbons	%M/M	7	16.4	0.8	1.7
Pour Point Manual	°C	8	-29.9	4.6	9
Pour Point Automated Δ3 °C	°C	8	-30.4	3.3	6.1
Sulfur	mg/kg	21	6.8	1.4	1.9
Water	mg/kg	17	25.3	26.4	34.6

Table 4: reproducibilities of tests on sample #23050

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Contamination	mg/kg	8	34.2	3.5	9.7

Table 5: reproducibilities of tests on sample #23051

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF APRIL 2023 WITH PREVIOUS PTS

	April 2023	April 2022	April 2021	April 2020
Number of reporting laboratories	26	26	29	30
Number of test results	443	500	553	618
Number of statistical outliers	22	17	21	15
Percentage of statistical outliers	5.0%	3.4%	3.8%	2.4%

Table 6: comparison with previous proficiency tests

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

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

Parameter	April 2023	April 2022	April 2021	April 2020
Total Acid Number	+	+/-	+	+
Ash content	n.e.	n.e.	n.e.	++
Calc. Cetane Index four variables	+/-	+	+	+
Cloud Point	++	++	++	+
Cold Filter Plugging Point	--	+/-	-	-

Parameter	April 2023	April 2022	April 2021	April 2020
Carbon Residue on 10% residue	+/-	+/-	--	+/-
Density at 15 °C	+	+	++	++
Distillation at 760 mmHg	+	+	-	+
FAME	-	-	+	+/-
Flash Point PMcc	-	+/-	n.e.	+
Kinematic Viscosity at 40 °C	-	-	-	+/-
Lubricity by HFRR at 60 °C	++	++	+	+
Manganese as Mn	n.e.	n.e.	n.e.	n.e.
Nitrogen	-	--	+	-
Polycyclic AromaticHydrocarbons	++	++	+/-	+
Mono, Di and Tri ⁺ Aromatics	++	++	+	+
Total Aromatic Hydrocarbons	++	++	+	++
Pour Point	+	+	+	+
Sulfur	+	+	+/-	+
Water	+	++	+	++
Total Contamination	++	-	-	-

Table 7: comparison determinations to the reference test methods

The following performance categories were used:

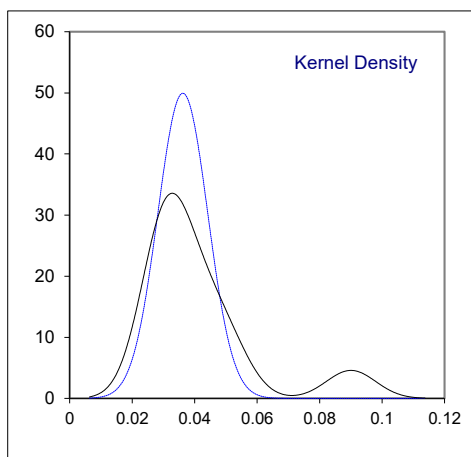
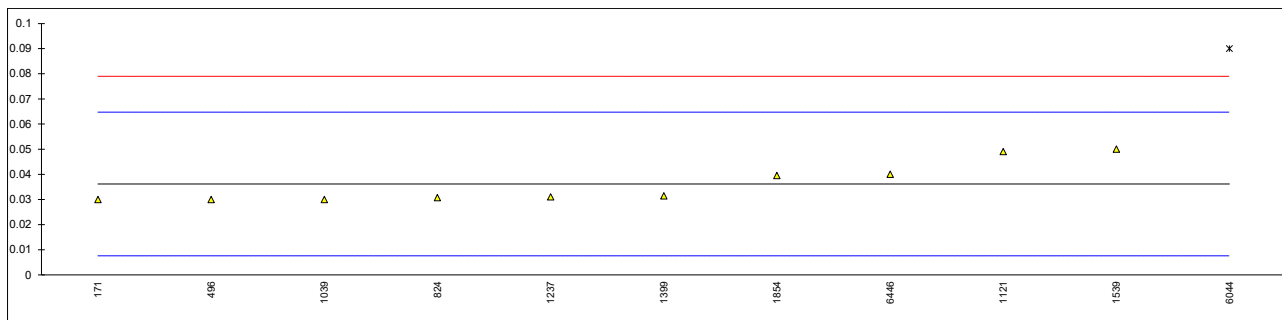
- ++ : group performed much better than the reference test method
- + : group performed better than the reference test method
- +/- : group performance equals to the reference test method
- : group performed worse than the reference test method
- : group performed much worse than the reference test method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

APPENDIX 1

Determination of Total Acid Number on sample #23050; result in mg KOH/g

lab	method	value	mark	z(targ)	remarks
171	D974	0.03		-0.43	
223		----		----	
300		----		----	
492		----		----	
496	D974	0.03		-0.43	
541	D664-A	<0.1		----	
824	D974	0.0307		-0.38	
1039	D664-A	0.03		-0.43	
1121	D664-A	0.049		0.90	
1126		----		----	
1237	D974	0.031		-0.36	
1266		----		----	
1272		----		----	
1310		----		----	
1399	D664	0.03145		-0.33	
1539	D664-A	0.05		0.97	
1715		----		----	
1720		----		----	
1854	D664-A	0.0395		0.23	
6028		----		----	
6044	D974	0.09	G(0.01)	3.77	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446	ISO6618	0.04		0.27	
6447		----		----	
6499		----		----	
6530		----		----	

normality suspect
n 10
outliers 1
mean (n) 0.0362
st.dev. (n) 0.00799
R(calc.) 0.0224
st.dev.(D974:22) 0.01429
R(D974:22) 0.04

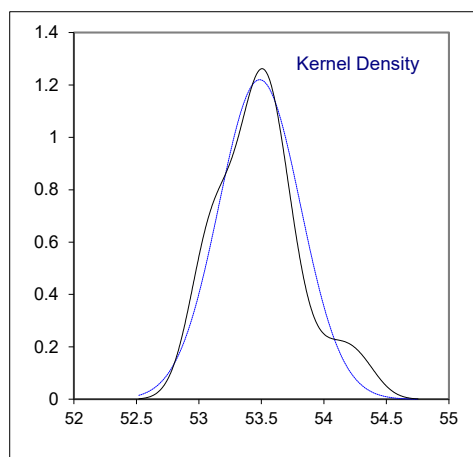
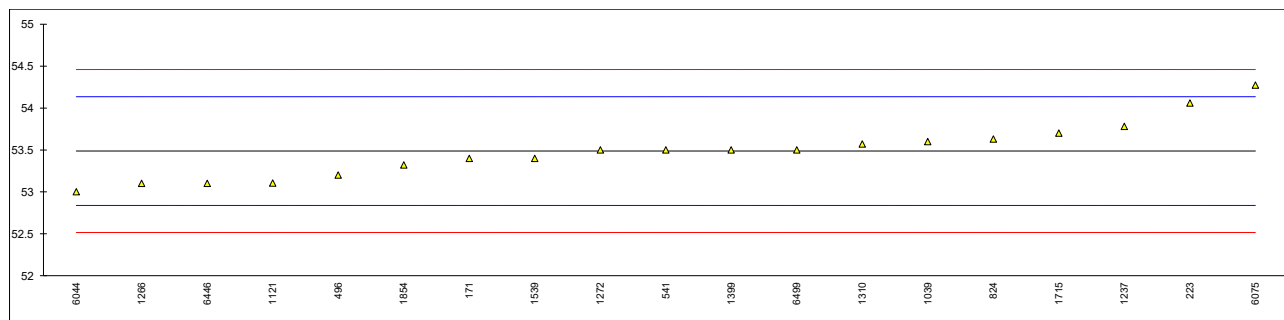


Determination of Ash content on sample #23050; result in %M/M

lab	method	value	mark	z(targ)	remarks
171	D482	<0.010		----	
223		----		----	
300		----		----	
492		----		----	
496	ISO6245	0		----	
541	D482	<0.001		----	
824	ISO6245	0.001		----	
1039	ISO6245	<0.001		----	
1121	IP4	0.0004		----	
1126		----		----	
1237		----		----	
1266		----		----	
1272	ISO6245	0.0031		----	
1310	ISO6245	<0.001		----	
1399	D482	<0.1		----	
1539	ISO6245	0.0004		----	
1715		----		----	
1720		----		----	
1854	ISO6245	0.001		----	
6028		----		----	
6044	ISO6245	0		----	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446		----		----	
6447		----		----	
6499		----		----	
6530		----		----	
	n	11			
	mean (n)	<0.01			

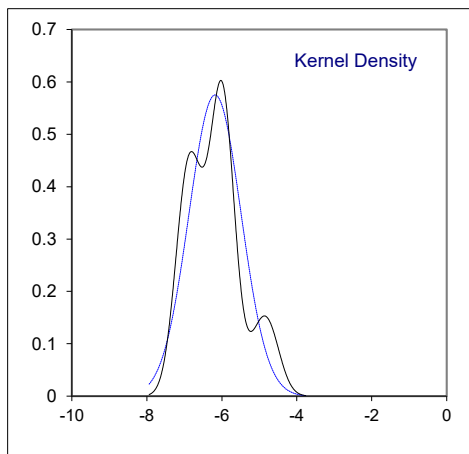
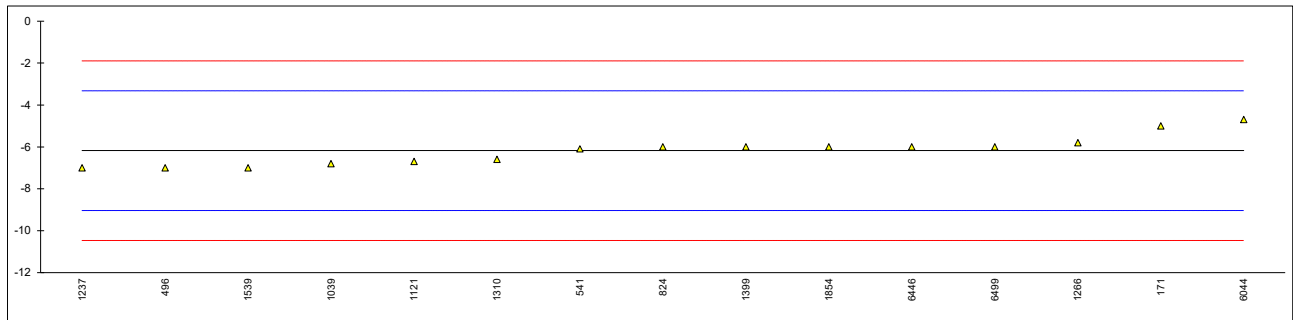
Determination of Calculated Cetane Index, four variables acc. to ISO4264 on sample #23050

lab	method	value	mark	z(targ)	remarks
171	D4737-A	53.4		-0.27	
223	D4737-A	54.06		1.77	
300		----		----	
492		----		----	
496	ISO4264	53.20		-0.88	
541	ISO4264	53.5		0.04	
824	ISO4264	53.63		0.44	
1039	ISO4264	53.6		0.35	
1121	ISO4264	53.105		-1.18	
1126		----		----	
1237	ISO4264	53.78		0.91	
1266	ISO4264	53.1		-1.19	
1272	ISO4264	53.5		0.04	
1310	ISO4264	53.57		0.26	
1399	D4373	53.5		0.04	
1539	ISO4264	53.4		-0.27	
1715	ISO4264	53.7		0.66	
1720		----		----	
1854	D4737-A	53.32		-0.51	
6028		----		----	
6044	ISO4264	53		-1.50	
6047		----		----	
6075	ISO4264	54.2730		2.43	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446	ISO4264	53.1		-1.19	
6447		----		----	
6499	D4737-A	53.5		0.04	
6530		----		----	
normality		OK			
n		19			
outliers		0			
mean (n)		53.486			
st.dev. (n)		0.3271			
R(calc.)		0.916			
st.dev. (iis memo 1904)		0.3239			
R(iis memo 1904)		0.907			



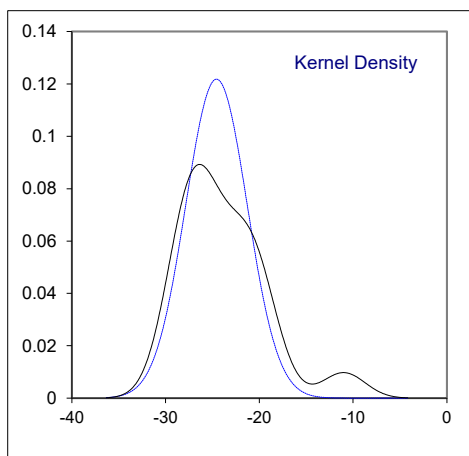
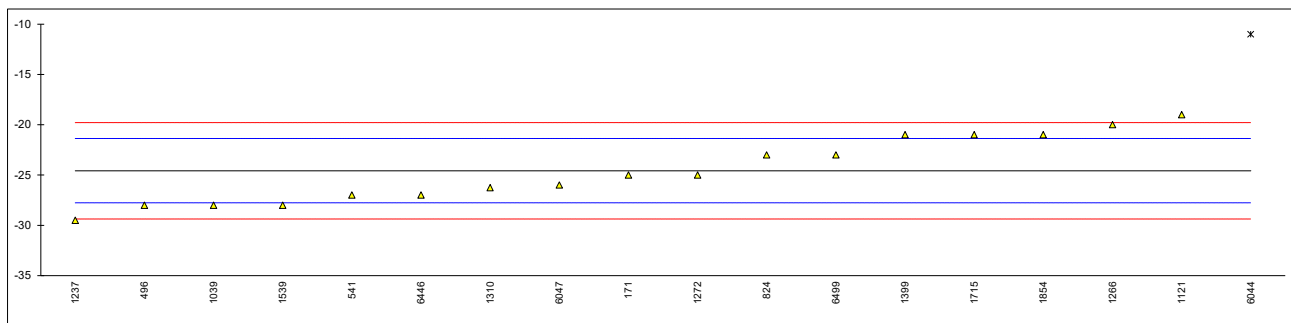
Determination of Cloud Point on sample #23050; result in °C

lab	method	value	mark	z(targ)	remarks
171	D2500	-5		0.83	
223		----		----	
300		----		----	
492		----		----	
496	ISO3015	-7		-0.57	
541	D5771	-6.1		0.06	
824	ISO3015	-6		0.13	
1039	ISO3015	-6.8		-0.43	
1121	IP219	-6.7		-0.36	
1126		----		----	
1237	ISO3015	-7		-0.57	
1266		-5.8		0.27	
1272		----		----	
1310	ISO3015	-6.6		-0.29	
1399	D5773	-6.0		0.13	
1539	ISO3015	-7		-0.57	
1715		----		----	
1720		----		----	
1854	D2500	-6		0.13	
6028		----		----	
6044	ISO3015	-4.7		1.04	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446	D2500	-6		0.13	
6447		----		----	
6499	D7683	-6		0.13	
6530		----		----	
normality		OK			
n		15			
outliers		0			
mean (n)		-6.18			
st.dev. (n)		0.694			
R(calc.)		1.94			
st.dev.(ISO3015:19)		1.429			
R(ISO3015:19)		4			



Determination of Cold Filter Plugging Point (CFPP) on sample #23050; result in °C

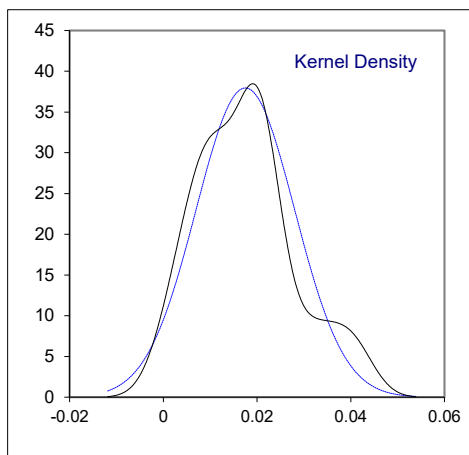
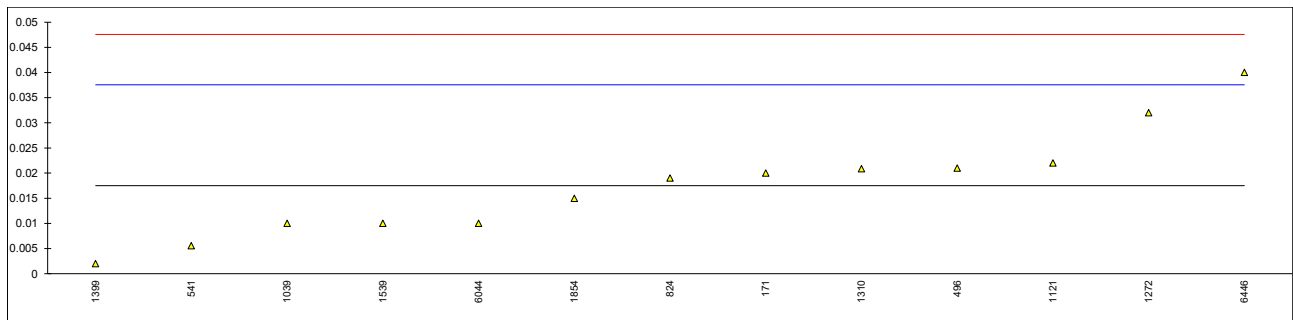
lab	method	value	mark	z(targ)	remarks
171	D6371	-25		-0.27	
223		----		----	
300		----		----	
492		----		----	
496	EN116	-28		-2.14	
541	D6371	-27		-1.52	
824	EN116	-23		0.98	
1039	EN116	-28		-2.14	
1121	IP309	-19.0		3.49	
1126		----		----	
1237	EN116	-29.5		-3.08	
1266	EN116	-20.0		2.86	
1272	EN116	-25		-0.27	
1310	EN116	-26.25		-1.05	
1399	IP309	-21		2.24	
1539	EN116	-28		-2.14	
1715	EN116	-21		2.24	
1720		----		----	
1854	IP309	-21		2.24	
6028		----		----	
6044	EN116	-11	G(0.05)	8.49	
6047	EN116	-26.0		-0.89	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446	EN116	-27		-1.52	
6447		----		----	
6499	D6371	-23		0.98	
6530		----		----	
normality		OK			
n		17			
outliers		1			
mean (n)		-24.57			
st.dev. (n)		3.276			
R(calc.)		9.17			
st.dev.(EN116:15)		1.598			
R(EN116:15)		4.47			



Determination of Carbon Residue (micro method) on 10% distillation residue on sample #23050; result in %M/M

lab	method	value	mark	z(targ)	remarks
171	D189	0.02		0.25	
223		----		----	
300		----		----	
492		----		----	
496	ISO10370	0.021		0.35	
541	D189	0.005549		-1.19	
824	ISO10370	0.019		0.15	
1039	ISO10370	0.01		-0.75	
1121	IP398	0.022		0.45	
1126		----		----	
1237		----		----	
1266		----		----	
1272	ISO10370	0.032		1.45	
1310	ISO10370	0.020854		0.33	
1399	D4530	0.0020		-1.54	
1539	ISO6615	0.01		-0.75	
1715		----		----	
1720		----		----	
1854	ISO10370	0.015		-0.25	
6028		----		----	
6044	ISO10370	0.01		-0.75	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446	ISO10370	0.04		2.24	
6447		----		----	
6499		----		----	
6530		----		----	

normality OK
n 13
outliers 0
mean (n) 0.01749
st.dev. (n) 0.010515
R(calc.) 0.02944
st.dev.(ISO10370:14) 0.010038
R(ISO10370:14) 0.02811

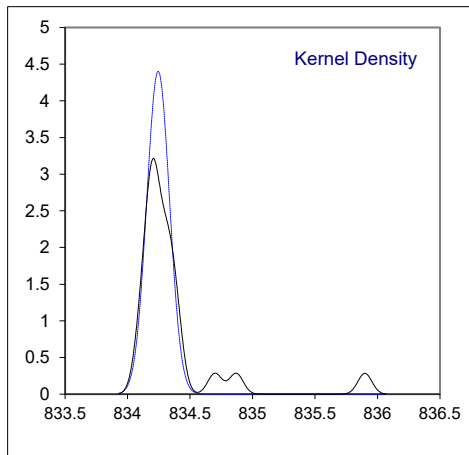
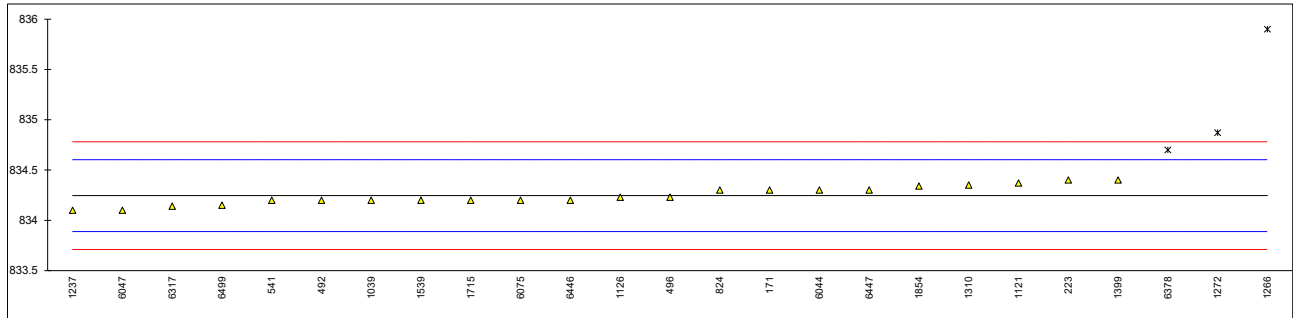


Determination of Copper Corrosion 3 hrs at 50 °C on sample #23050

lab	method	value	mark	z(targ)	remarks
171	D130	1a		----	
223		----		----	
300		----		----	
492		----		----	
496	D130	1a		----	
541	D130	1a		----	
824	D130	1a		----	
1039	ISO2160	1A		----	
1121	IP154	1a		----	
1126		----		----	
1237		----		----	
1266	ISO2160	1a		----	
1272	ISO2160	1A		----	
1310	ISO2160	1A		----	
1399		----		----	
1539	ISO2160	1a		----	
1715		----		----	
1720		----		----	
1854	D130	1A		----	
6028		----		----	
6044		----		----	
6047		----		----	
6075	ISO2160	1A		----	
6317	D130	1a		----	
6373		----		----	
6378	D130	1a		----	
6379		----		----	
6446	ISO2160	1A		----	
6447		----		----	
6499		----		----	
6530		----		----	
	n	15			
	mean (n)	1 (1a)			

Determination of Density at 15 °C on sample #23050; result in kg/m³

lab	method	value	mark	z(targ)	remarks
171	D4052	834.3		0.30	
223	D4052	834.4	C	0.86	first reported: 833.8
300		-----		-----	
492	D4052	834.2		-0.26	
496	ISO12185	834.23		-0.09	
541	D4052	834.2		-0.26	
824	ISO12185	834.3		0.30	
1039	ISO12185	834.2		-0.26	
1121	IP365	834.37	C	0.69	first reported: 0.83437 kg.m ³
1126	ISO12185	834.23		-0.09	
1237	ISO12185	834.1		-0.82	
1266	ISO3675	835.9	C,R(0.01)	9.26	first reported: 834.7
1272	ISO12185	834.87	C,R(0.01)	3.49	first reported: 835.02
1310	ISO12185	834.35		0.58	
1399	D4052	834.4		0.86	
1539	ISO3675	834.2		-0.26	
1715	ISO12185	834.2		-0.26	
1720		-----		-----	
1854	ISO12185	834.34		0.53	
6028		-----		-----	
6044	ISO12185	834.3		0.30	
6047	ISO12185	834.1		-0.82	
6075	ISO12185	834.20		-0.26	
6317	D4052	834.14		-0.59	
6373		-----		-----	
6378	D1298	834.7	R(0.01)	2.54	
6379		-----		-----	
6446	D4052	834.2		-0.26	
6447	D4052	834.3		0.30	
6499	D4052	834.15		-0.54	
6530		-----		-----	
normality		OK			
n		22			
outliers		3			
mean (n)		834.246			
st.dev. (n)		0.0906			
R(calc.)		0.259			
st.dev.(ISO12185:96)		0.1786			
R(ISO12185:96)		0.5			

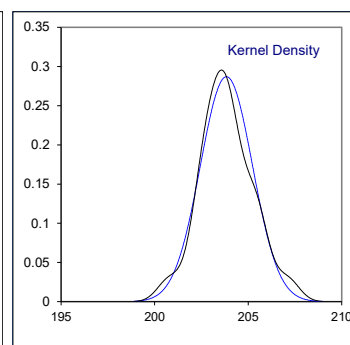
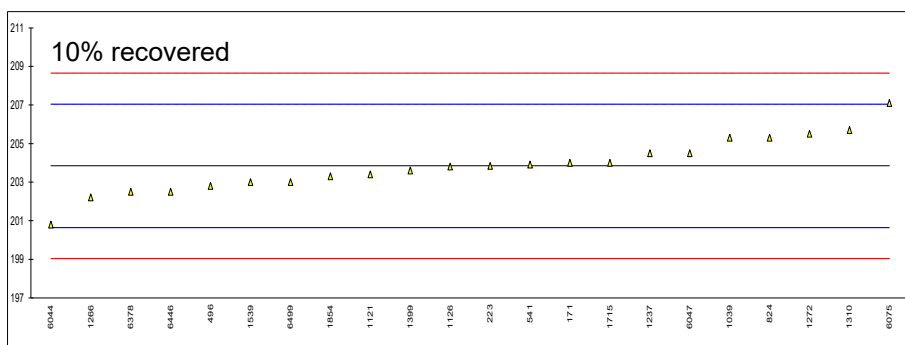
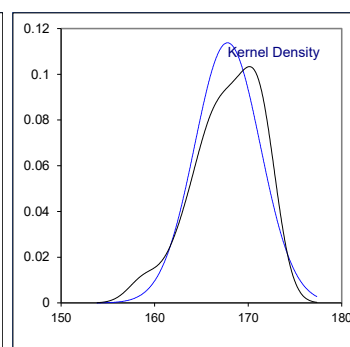
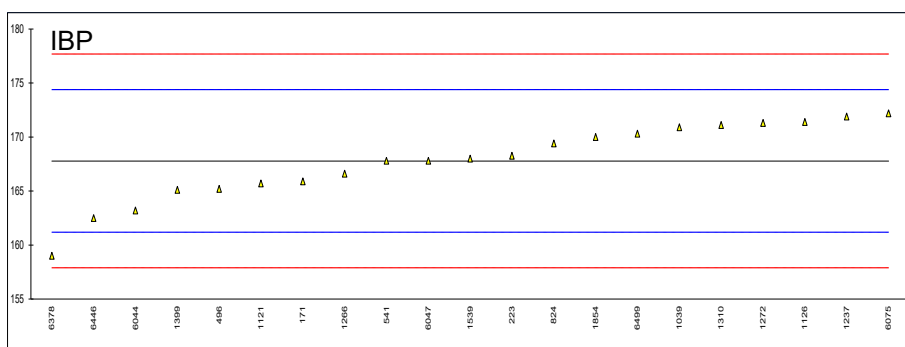


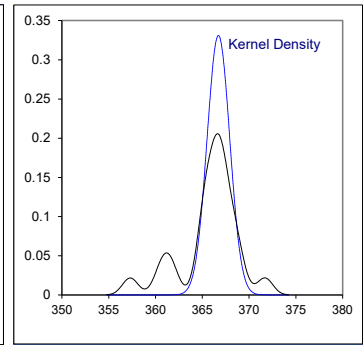
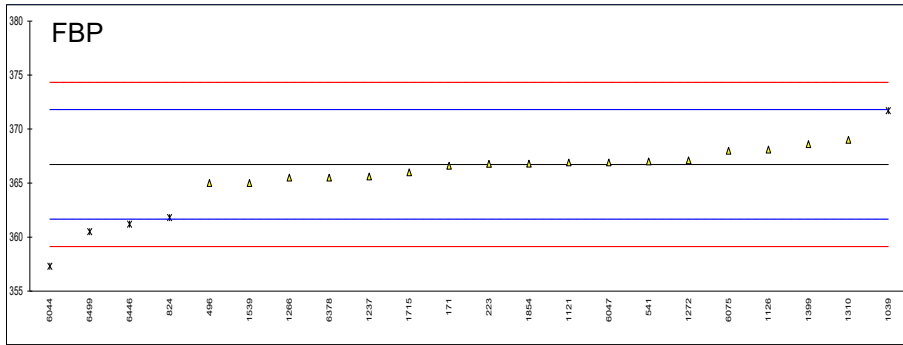
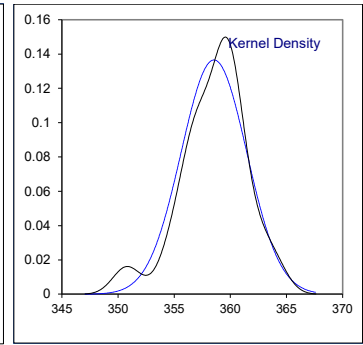
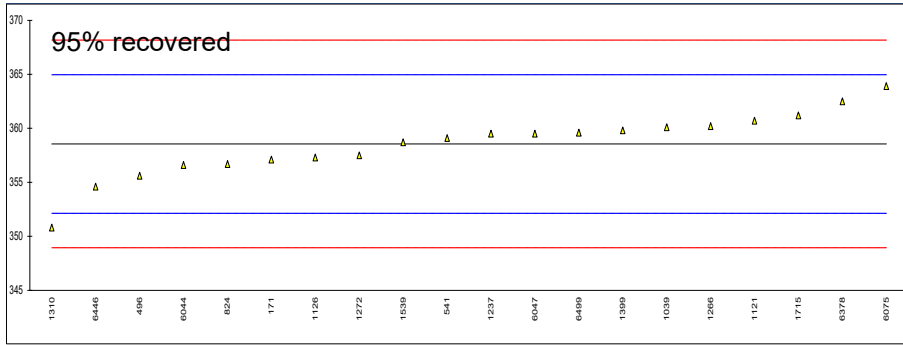
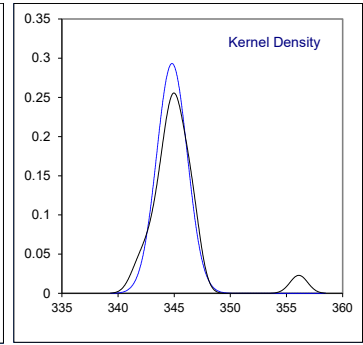
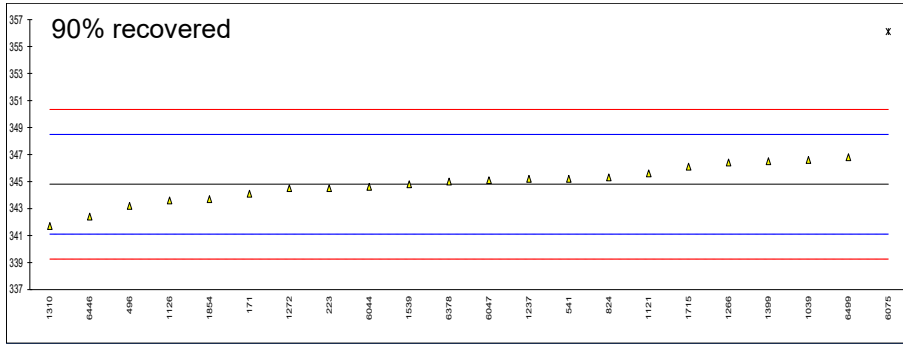
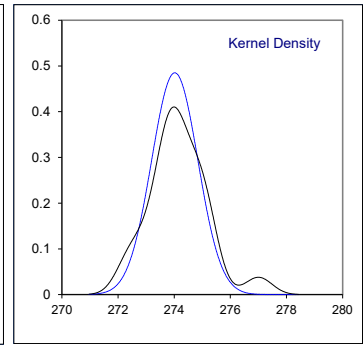
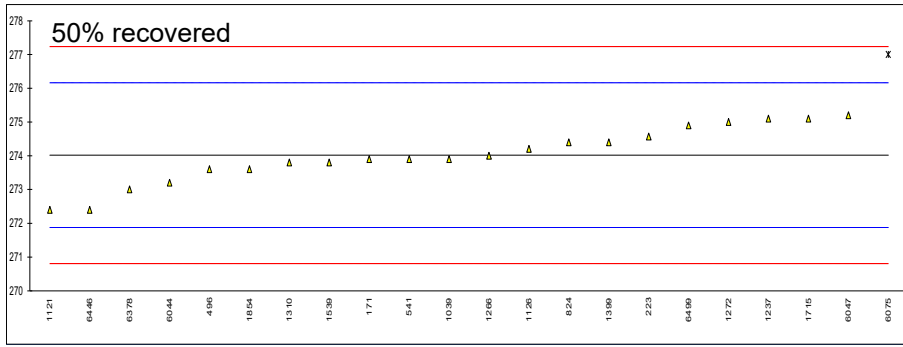
Determination of Distillation at 760 mmHg on sample #23050; result in °C

lab	method	IBP	10%rec	50%rec	90%rec	95%rec	FBP
171	D86-automated	165.9	204.0	273.9	344.1	357.1	366.6
223		168.26	203.84	274.57	344.51	---	366.79
300		---	---	---	---	---	---
492		---	---	---	---	---	---
496	ISO3405-automated	165.2	202.8	273.6	343.2	355.6	365.0
541	D86-automated	167.8	203.9	273.9	345.2	359.1	367
824	D86-automated	169.4	205.3	274.4	345.3	356.7	361.8 R5
1039	D2887a	170.9	205.3	273.9	346.6	360.1	371.7 R5
1121	IP123-automated	165.7	203.4	272.4	345.6	360.7	366.9
1126		171.4	203.8	274.2	343.6	357.3	368.1
1237	ISO3405-automated	171.9	204.5	275.1	345.2	359.5	365.6
1266	ISO3405-automated	166.6	202.2	274.0	346.4	360.2	365.5
1272	ISO3405	171.3	205.5	275.0	344.5	357.5	367.1
1310	ISO3405-automated	171.1	205.7	273.8	341.7	350.8	369.0 C
1399	D86-automated	165.1	203.6	274.4	346.5	359.8	368.6
1539	ISO3405-automated	168.0	203.0	273.8	344.8	358.7	365.0
1715	ISO3405-automated	---	204.0	275.1	346.1	361.2	366.0
1720		---	---	---	---	---	---
1854	ISO3405-automated	170.0	203.3	273.6	343.7	---	366.8
6028		---	---	---	---	---	---
6044	D86-automated	163.2	200.8	273.2	344.6	356.6	357.3 R5
6047	ISO3405-automated	167.8	204.5	275.2 R5	345.1	359.5	366.9
6075		172.2	207.1	277.0	356.1 R1	363.9	368.0
6317		---	---	---	---	---	---
6373		---	---	---	---	---	---
6378	D86-automated	159.0 C	202.5 C	273.0	345.0	362.5	365.5
6379		---	---	---	---	---	---
6446	ISO3405-automated	162.5	202.5	272.4	342.4	354.6	361.2 R5
6447		---	---	---	---	---	---
6499	D86-automated	170.3	203.0	274.9	346.8	359.6	360.5 R5
6530		---	---	---	---	---	---
	normality	OK	OK	OK	OK	suspect	OK
	n	21	22	21	21	20	17
	outliers	0	0	1	1	0	5
	mean (n)	167.79	203.84	274.02	344.81	358.55	366.73
	st.dev. (n)	3.507	1.390	0.823	1.360	2.921	1.206
	R(cal.)	9.82	3.89	2.30	3.81	8.18	3.38
	st.dev.(ISO3405-A:19)	3.296	1.602	1.071	1.847	3.204	2.536
	R(ISO3405-A:19)	9.23	4.48	3.0	5.17	8.97	7.1
Compare	R(ISO3405-M:19)	6.15	4.63	4.14	4.30	4.72	3.79

Lab 1310 first reported for FBP: 356.9 °C

Lab 6378 first reported for IBP: 155 °C and for Temp. at 10 % recovered: 200.0 °C



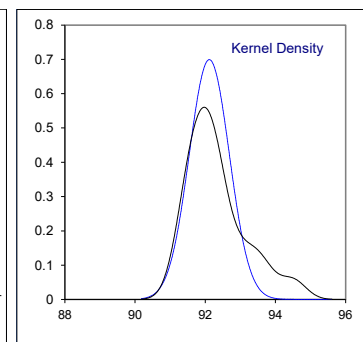
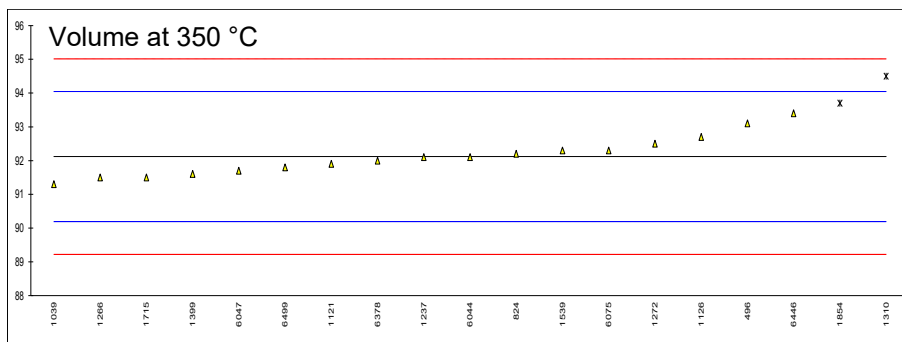
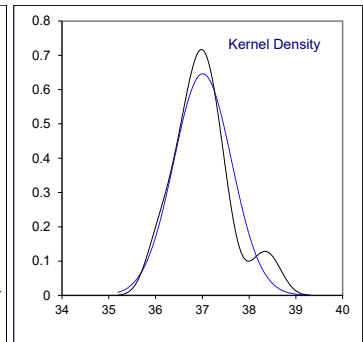
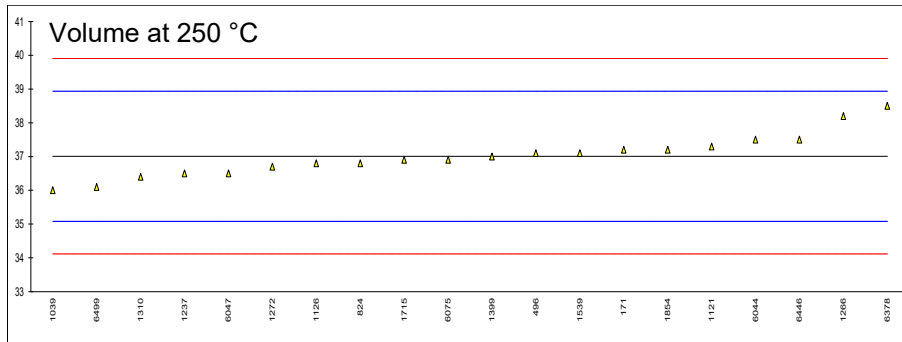


z-scores Distillation on sample #23050

lab	IBP	10%rec	50%rec	90%rec	95%rec	FBP
171	-0.57	0.10	-0.11	-0.38	-0.45	-0.05
223	0.14	0.00	0.52	-0.16	----	0.02
300	----	----	----	----	----	----
492	----	----	----	----	----	----
496	-0.79	-0.65	-0.39	-0.87	-0.92	-0.68
541	0.00	0.04	-0.11	0.21	0.17	0.11
824	0.49	0.91	0.36	0.27	-0.58	-1.94
1039	0.94	0.91	-0.11	0.97	0.48	1.96
1121	-0.63	-0.28	-1.51	0.43	0.67	0.07
1126	1.10	-0.03	0.17	-0.65	-0.39	0.54
1237	1.25	0.41	1.01	0.21	0.30	-0.45
1266	-0.36	-1.03	-0.02	0.86	0.51	-0.48
1272	1.07	1.03	0.92	-0.17	-0.33	0.15
1310	1.00	1.16	-0.20	-1.68	-2.42	0.90
1399	-0.82	-0.15	0.36	0.92	0.39	0.74
1539	0.06	-0.53	-0.20	0.00	0.05	-0.68
1715	----	0.10	1.01	0.70	0.83	-0.29
1720	----	----	----	----	----	----
1854	0.67	-0.34	-0.39	-0.60	----	0.03
6028	----	----	----	----	----	----
6044	-1.39	-1.90	-0.76	-0.11	-0.61	-3.72
6047	0.00	0.41	1.10	0.16	0.30	0.07
6075	1.34	2.03	2.78	6.11	1.67	0.50
6317	----	----	----	----	----	----
6373	----	----	----	----	----	----
6378	-2.67	-0.84	-0.95	0.11	1.23	-0.48
6379	----	----	----	----	----	----
6446	-1.60	-0.84	-1.51	-1.30	-1.23	-2.18
6447	----	----	----	----	----	----
6499	0.76	-0.53	0.82	1.08	0.33	-2.46
6530	----	----	----	----	----	----

Determination of Distillation on sample #23050; result in %V/V

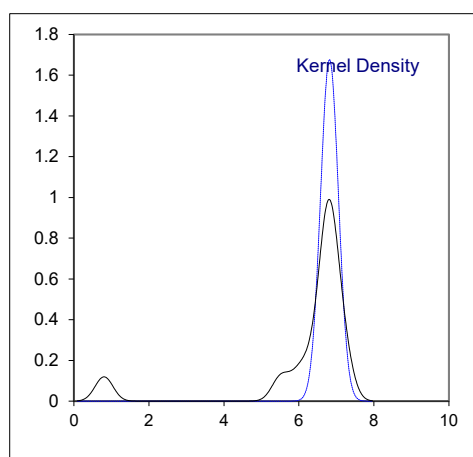
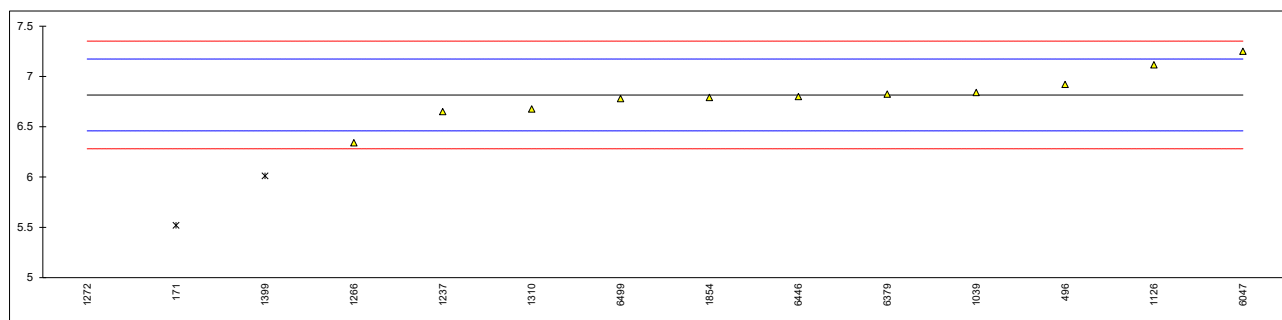
lab	method	Vol.250 °C	mark	z(targ)	Vol.350 °C	mark	z(targ)	remarks
171	D86-automated	37.2	C	0.20	-----		-----	first reported: 47.5
223		-----		-----	-----		-----	
300		-----		-----	-----		-----	
492		-----		-----	-----		-----	
496	ISO3405-automated	37.1		0.09	93.1		1.02	
541	D86-automated	-----		-----	-----		-----	
824	D86-automated	36.8		-0.22	92.2		0.09	
1039	D2887a	36.0		-1.05	91.3		-0.85	
1121	IP123-automated	37.3		0.30	91.9		-0.23	
1126		36.8		-0.22	92.7		0.60	
1237	ISO3405-automated	36.5		-0.53	92.1		-0.02	
1266	ISO3405-automated	38.2		1.23	91.5		-0.64	
1272	ISO3405	36.7		-0.32	92.5		0.40	
1310	ISO3405-automated	36.4		-0.63	94.5	DG(0.05)	2.47	
1399	D86-automated	37.0		-0.01	91.6		-0.54	
1539	ISO3405-automated	37.1		0.09	92.3		0.19	
1715	ISO3405-automated	36.9		-0.11	91.5		-0.64	
1720		-----		-----	-----		-----	
1854	ISO3405-automated	37.2		0.20	93.7	DG(0.05)	1.64	
6028		-----		-----	-----		-----	
6044	D86-automated	37.5		0.51	92.1		-0.02	
6047	ISO3405-automated	36.5		-0.53	91.7		-0.43	
6075		36.9		-0.11	92.3		0.19	
6317		-----		-----	-----		-----	
6373		-----		-----	-----		-----	
6378	D86-automated	38.5		1.55	92.0		-0.12	
6379		-----		-----	-----		-----	
6446	ISO3405-automated	37.5		0.51	93.4		1.33	
6447		-----		-----	-----		-----	
6499	D86-automated	36.1		-0.94	91.8		-0.33	
6530		-----		-----	-----		-----	
	normality	OK			OK			
	n	20			17			
	outliers	0			2			
	mean (n)	37.01			92.12			
	st.dev. (n)	0.617			0.570			
	R(calc.)	1.73			1.60			
	st.dev.(ISO3405-A:19)	0.964			0.964			
	R(ISO3405-A:19)	2.7			2.7			
Compare								
	R(ISO3405-M:19)	2.51			2.15			



Determination of FAME on sample #23050; result in %V/V

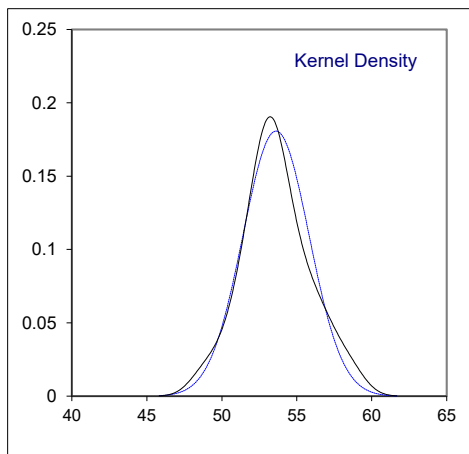
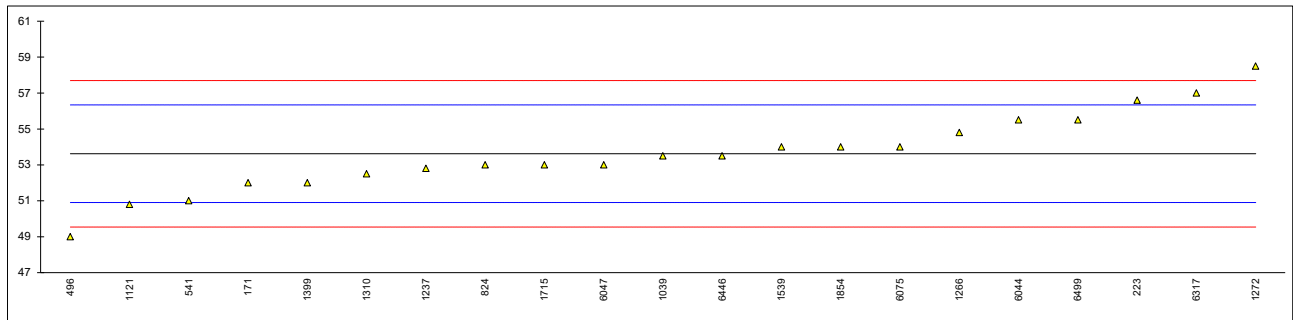
lab	method	value	mark	z(targ)	remarks
171	D7371	5.52	DG(0.05)	-7.27	
223		----	----	----	
300		----	----	----	
492		----	----	----	
496	EN14078-B	6.92		0.58	
541		----	----	----	
824		----	----	----	
1039	EN14078-B	6.84		0.13	
1121		----	----	----	
1126	EN14078-A	7.116		1.68	
1237	EN14078-B	6.65		-0.94	
1266	EN14078-A	6.34		-2.67	
1272	EN14078	0.8	C,G(0.01)	-33.74	first reported: 0.0
1310	EN14078-B	6.675		-0.80	
1399	EN14078	6.01	DG(0.05)	-4.52	
1539		----	----	----	
1715		----	----	----	
1720		----	----	----	
1854	EN14078-C	6.79		-0.15	
6028		----	----	----	
6044		----	----	----	
6047	EN14078-B	7.25		2.43	
6075		----	----	----	
6317		----	----	----	
6373		----	----	----	
6378		----	----	----	
6379	EN14078-B	6.8245		0.04	
6446	EN14078-B	6.8		-0.09	
6447		----	----	----	
6499	EN14078-B	6.78		-0.21	
6530		----	----	----	

normality suspect
n 11
outliers 3
mean (n) 6.817
st.dev. (n) 0.2379
R(calc.) 0.666
st.dev.(EN14078-B:14) 0.1783
R(EN14078-B:14) 0.499



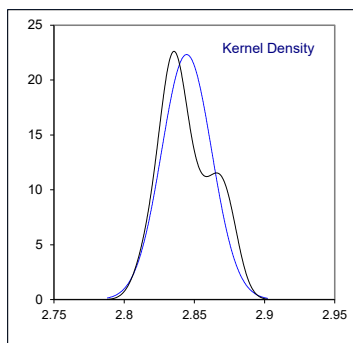
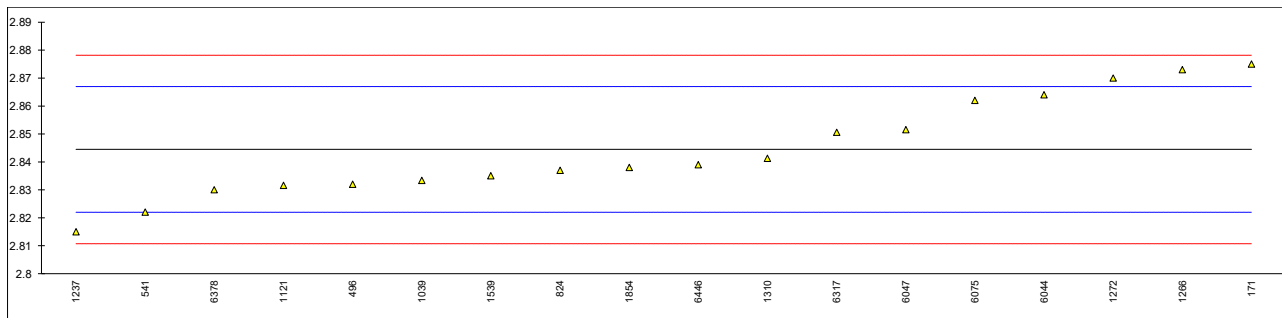
Determination of Flash Point PMcc on sample #23050; result in °C

lab	method	value	mark	z(targ)	remarks
171	D93-A	52.0		-1.19	
223	D93-A	56.6		2.19	
300		----		----	
492		----		----	
496	ISO2719-A	49.0		-3.40	
541	D93-A	51		-1.93	
824	ISO2719-A	53.0		-0.46	
1039	ISO2719-A	53.5		-0.09	
1121	IP34-A	50.8		-2.07	
1126		----		----	
1237	ISO2719-A	52.8		-0.60	
1266	ISO2719-A	54.8		0.87	
1272	ISO2719	58.5		3.59	
1310	ISO2719-A	52.5		-0.82	
1399	D93-A	52		-1.19	
1539	ISO2719-A	54.0		0.28	
1715	ISO2719-A	53.0		-0.46	
1720		----		----	
1854	D93-A	54.0		0.28	
6028		----		----	
6044	D93-A	55.5		1.38	
6047	ISO2719-A	53.0		-0.46	
6075	ISO2719-A	54		0.28	
6317	D93-A	57		2.49	
6373		----		----	
6378		----		----	
6379		----		----	
6446	ISO2719-A	53.5		-0.09	
6447		----		----	
6499	ISO2719-A	55.5		1.38	
6530		----		----	
normality		OK			
n		21			
outliers		0			
mean (n)		53.619			
st.dev. (n)		2.2083			
R(calc.)		6.183			
st.dev.(ISO2719-A:16+A1:21)		1.3596			
R(ISO2719-A:16+A1:21)		3.807			



Determination of Kinematic Viscosity at 40 °C on sample #23050; result in mm²/s

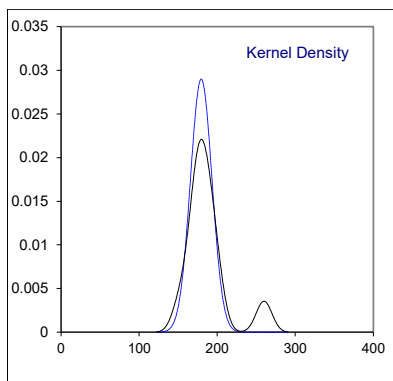
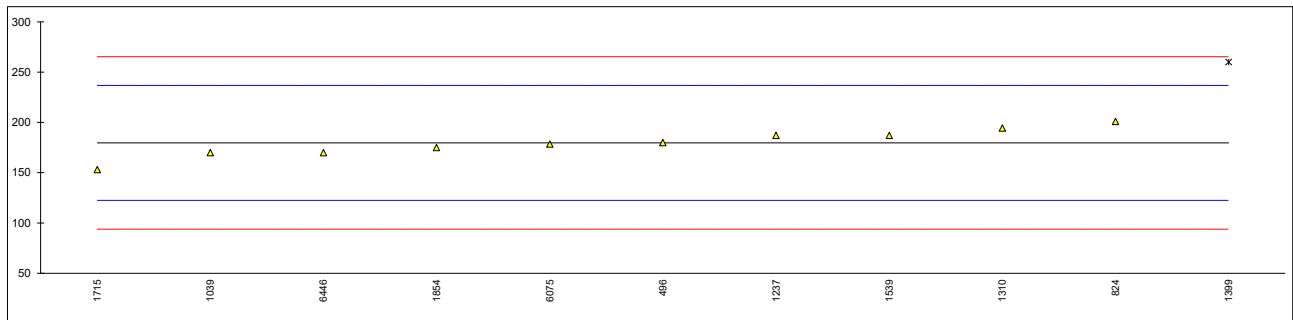
lab	method	value	mark	z(targ)	remarks
171	D445	2.875		2.71	
223		----		----	
300		----		----	
492		----		----	
496	ISO3104-B	2.832		-1.11	
541	D445	2.822		-2.00	
824	ISO3104-A	2.837		-0.66	
1039	ISO3104-B	2.8334		-0.98	
1121	IP71	2.8316		-1.14	
1126		----		----	
1237	ISO3104-A	2.815		-2.62	
1266	ISO3104-A	2.873		2.53	
1272	ISO3104	2.870	C	2.27	first reported: 2.96475
1310	ISO23581	2.8413		-0.28	
1399		----		----	
1539	ISO3104-A	2.835		-0.84	
1715		----		----	
1720		----		----	
1854	ISO3104-A	2.838		-0.57	
6028		----		----	
6044	ISO3104-A	2.864		1.73	
6047	ISO3104-A	2.8515	C	0.62	first reported: 3.2634
6075	ISO3104-B	2.862		1.56	
6317	D7042	2.8506		0.54	
6373		----		----	
6378	D445	2.83	C	-1.28	first reported: 3.0
6379		----		----	
6446	ISO3104-A	2.839		-0.49	
6447		----		----	
6499		----		----	
6530		----		----	
normality		OK			
n		18			
outliers		0			
mean (n)		2.8445			
st.dev. (n)		0.01787			
R(calc.)		0.0500			
st.dev.(ISO3104-A:20)		0.01126			
R(ISO3104-A:20)		0.0315			



Determination of Lubricity by HFRR at 60 °C on sample #23050; result in μm

lab	method	value	mark	z(targ)	Corrected	remarks
171		----		----	----	
223		----		----	----	
300		----		----	----	
492		----		----	----	
496	ISO12156-1-A	180		0.01	No	
541		----		----	----	
824	ISO12156-1-A	201		0.75	No	
1039	ISO12156-1-B	170		-0.34	No	
1121		----		----	----	
1126		----		----	----	
1237	ISO12156-1-A	187		0.26	No	
1266		----		----	----	
1272		----		----	----	
1310	ISO12156-1-A	194.5		0.52	No	
1399	ISO12156-1	260	G(0.01)	2.81	----	
1539	ISO12156-1-A	187		0.26	No	
1715	ISO12156-1-A	153		-0.93	No	
1720		----		----	----	
1854	ISO12156-1-A	175		-0.16	Yes	
6028		----		----	----	
6044		----		----	----	
6047		----		----	----	
6075	ISO12156-1-A	178.5		-0.04	No	
6317		----		----	----	
6373		----		----	----	
6378		----		----	----	
6379		----		----	----	
6446	ISO12156-1-A	170		-0.34	----	
6447		----		----	----	
6499		----		----	----	
6530		----		----	----	

normality OK
 n 10
 outliers 1
 mean (n) 179.600
 st.dev. (n) 13.7594
 R(calc.) 38.526
 st.dev.(ISO12156-1-A:18) 28.5714
 R(ISO12156-1-A:18) 80 (digital camera)
 Compare
 R(ISO12156-1-B:18) 90 (visual)
 R(D7069:22) 80



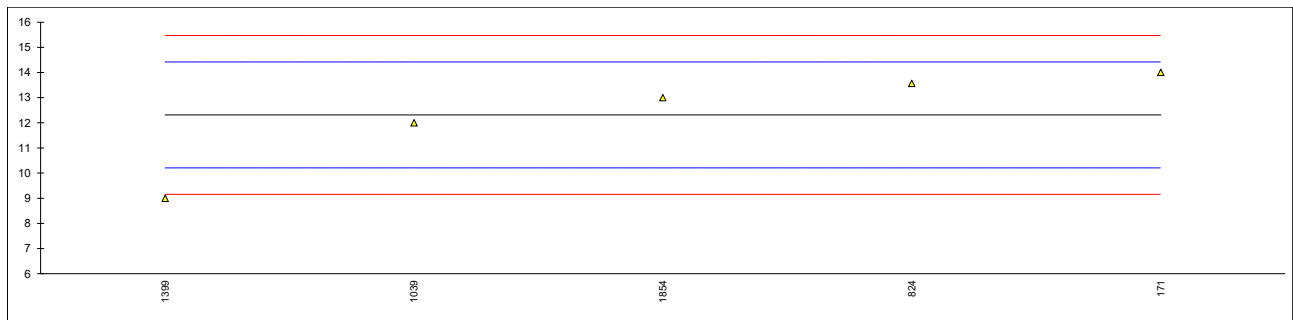
Determination of Manganese as Mn on sample #23050; result in mg/L

lab	method	value	mark	z(targ)	remarks
171	D3831	<2.5		----	
223		----		----	
300		----		----	
492		----		----	
496	EN16576	<0,50		----	
541		----		----	
824		----		----	
1039		----		----	
1121		----		----	
1126		----		----	
1237		----		----	
1266		----		----	
1272	EN16576	0.9		----	
1310	EN16576	<0.5		----	
1399		----		----	
1539		----		----	
1715		----		----	
1720		----		----	
1854		----		----	
6028		----		----	
6044		----		----	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446		----		----	
6447		----		----	
6499		----		----	
6530		----		----	
n		2			
Mean(n)		<0.5			application range EN16576:14: 0.5 – 7 mg/L

Determination of Nitrogen on sample #23050; result in mg/kg

lab	method	value	mark	z(targ)	remarks
171	D4629	14		1.60	
223		----		----	
300		----		----	
492		----		----	
496		----		----	
541		----		----	
824	D4629	13.57		1.19	
1039	D4629	12.0		-0.30	
1121		----		----	
1126		----		----	
1237		----		----	
1266		----		----	
1272		----		----	
1310		----		----	
1399	D4629	9		-3.15	
1539		----		----	
1715		----		----	
1720		----		----	
1854	D4629	13.0		0.65	
6028		----		----	
6044		----		----	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446		----		----	
6447		----		----	
6499		----		----	
6530		----		----	

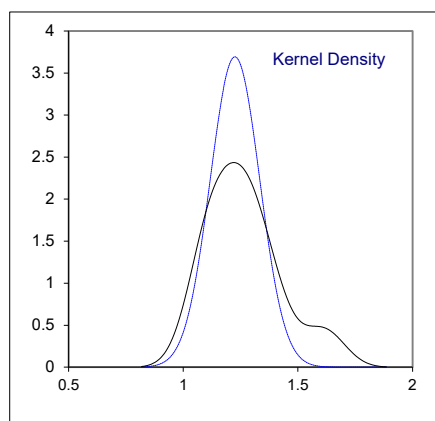
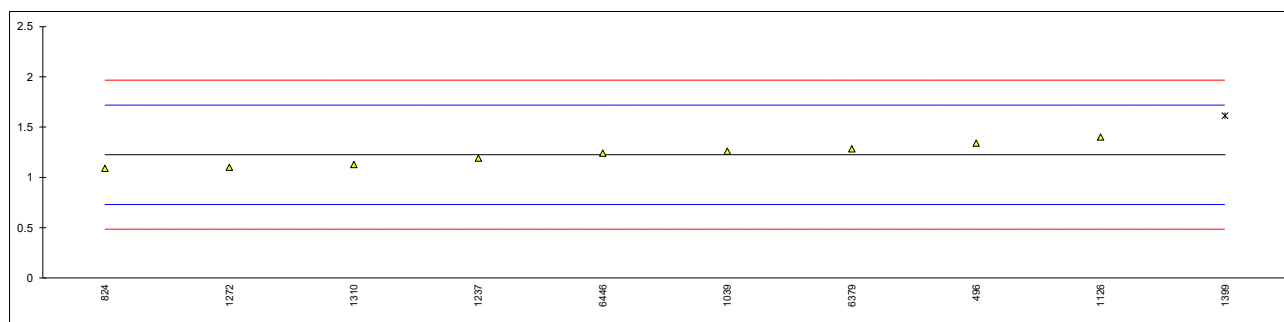
normality unknown
n 5
outliers 0
mean (n) 12.31
st.dev. (n) 1.998
R(calc.) 5.60
st.dev.(D4629:17) 1.053
R(D4629:17) 2.95



Determination of Polycyclic Aromatic Hydrocarbons ¹⁾ on sample #23050; result in %M/M

lab	method	value	mark	z(targ)	remarks
171		----		----	
223		----		----	
300		----		----	
492		----		----	
496	EN12916	1.34		0.46	
541		----		----	
824	EN12916	1.09		-0.55	
1039	D6379	1.26		0.14	
1121		----		----	
1126		1.4		0.71	
1237	EN12916	1.19		-0.14	
1266		----		----	
1272	EN12916	1.1		-0.51	
1310	EN12916	1.127		-0.40	
1399	IP391	1.614	ex	1.57	see paragraph 4.1
1539		----		----	
1715		----		----	
1720		----		----	
1854		----		----	
6028		----		----	
6044		----		----	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		1.28375		0.24	
6446		1.24		0.06	
6447		----		----	
6499		----		----	
6530		----		----	
normality		OK			
n		9			
outliers		0 (+1ex)			
mean (n)		1.226			
st.dev. (n)		0.1081			
R(calc.)		0.303			
st.dev.(EN12916:19+A1:22)		0.2471			
R(EN12916:19+A1:22)		0.692			

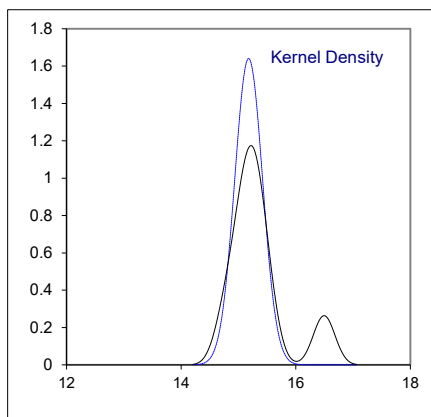
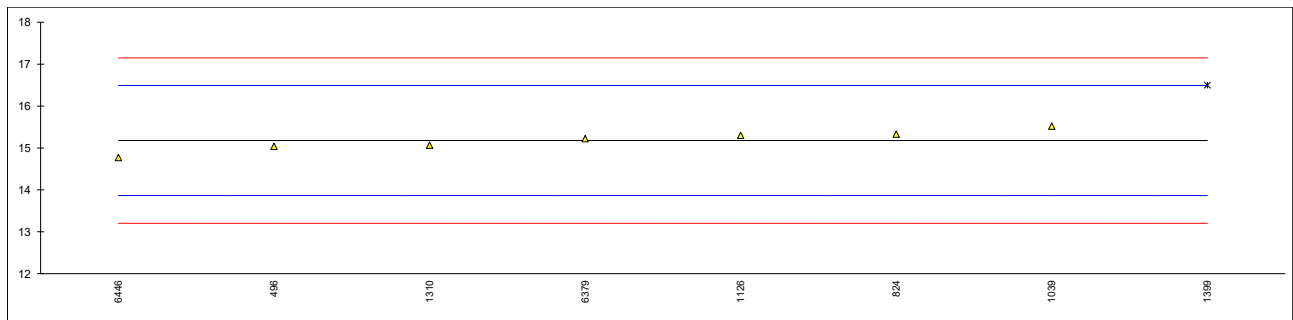
¹⁾Definition from EN12916: %Polycyclic Aromatic Hydrocarbons = sum of %di and %tri+ Aromatic Hydrocarbons



Determination of Mono Aromatic Hydrocarbons on sample #23050; result in %M/M

lab	method	value	mark	z(targ)	remarks
171		----		----	
223		----		----	
300		----		----	
492		----		----	
496	EN12916	15.04		-0.21	
541		----		----	
824	EN12916	15.33		0.23	
1039	D6379	15.52		0.52	
1121		----		----	
1126		15.3		0.19	
1237		----		----	
1266		----		----	
1272		----		----	
1310	EN12916	15.065		-0.17	
1399	IP391	16.496	G(0.05)	2.00	
1539		----		----	
1715		----		----	
1720		----		----	
1854		----		----	
6028		----		----	
6044		----		----	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		15.2184		0.06	
6446		14.77		-0.62	
6447		----		----	
6499		----		----	
6530		----		----	

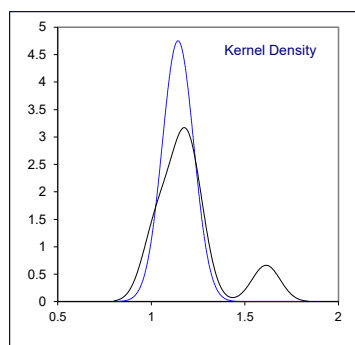
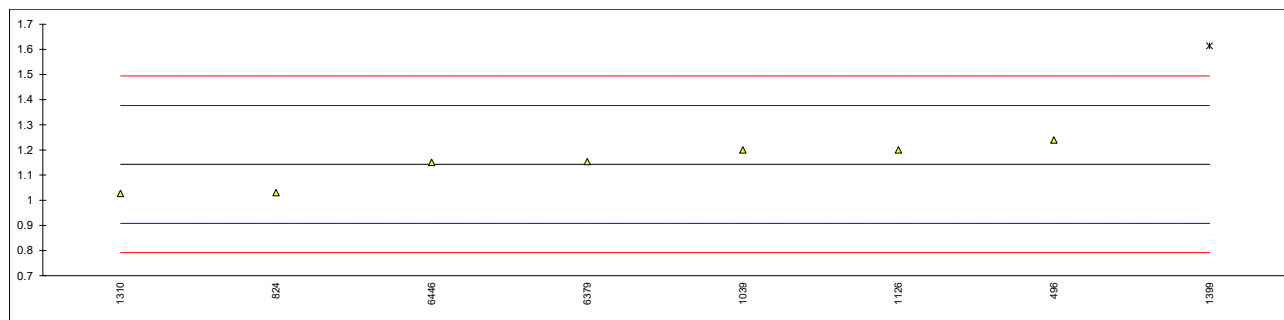
normality unknown
n 7
outliers 1
mean (n) 15.178
st.dev. (n) 0.2432
R(calc.) 0.681
st.dev.(EN12916:19+A1:22) 0.6577
R(EN12916:19+A1:22) 1.842



Determination of Di Aromatic Hydrocarbons on sample #23050; result in %M/M

lab	method	value	mark	z(targ)	remarks
171		----		----	
223		----		----	
300		----		----	
492		----		----	
496	EN12916	1.24		0.83	
541		----		----	
824	EN12916	1.03		-0.96	
1039	D6379	1.20		0.49	
1121		----		----	
1126		1.2		0.49	
1237		----		----	
1266		----		----	
1272		----		----	
1310	EN12916	1.027		-0.99	
1399	IP391	1.614	G(0.05)	4.02	
1539		----		----	
1715		----		----	
1720		----		----	
1854		----		----	
6028		----		----	
6044		----		----	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		1.1531		0.09	
6446		1.15		0.06	
6447		----		----	
6499		----		----	
6530		----		----	

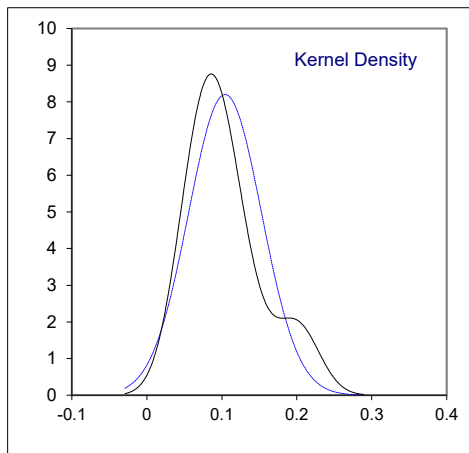
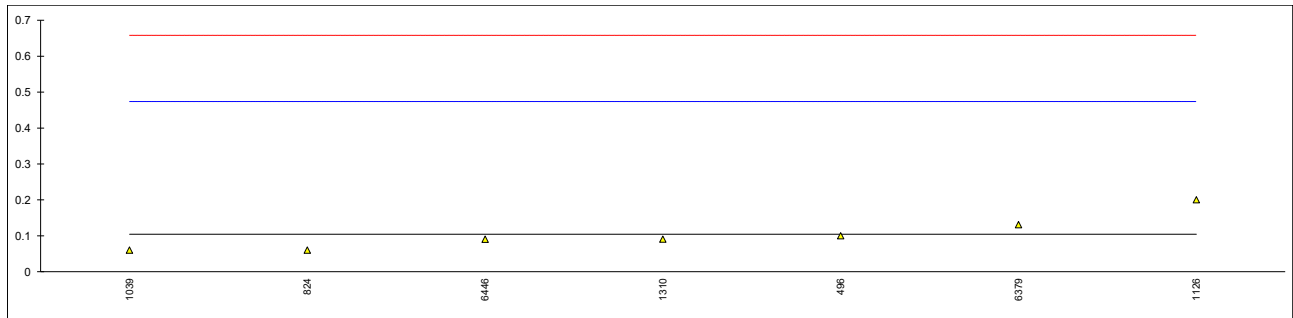
normality unknown
n 7
outliers 1
mean (n) 1.143
st.dev. (n) 0.0839
R(calc.) 0.235
st.dev.(EN12916:19+A1:22) 0.1171
R(EN12916:19+A1:22) 0.328



Determination of Tri⁺ Aromatic Hydrocarbons on sample #23050; result in %M/M

lab	method	value	mark	z(targ)	remarks
171		----		----	
223		----		----	
300		----		----	
492		----		----	
496	EN12916	0.1		-0.02	
541		----		----	
824	EN12916	0.06		-0.24	
1039	D6379	0.06		-0.24	
1121		----		----	
1126		0.2		0.52	
1237		----		----	
1266		----		----	
1272		----		----	
1310	EN12916	0.0904	C	-0.08	first reported: 0.954
1399	IP391	<LOQ		----	
1539		----		----	
1715		----		----	
1720		----		----	
1854		----		----	
6028		----		----	
6044		----		----	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		0.1306		0.14	
6446		0.09		-0.08	
6447		----		----	
6499		----		----	
6530		----		----	

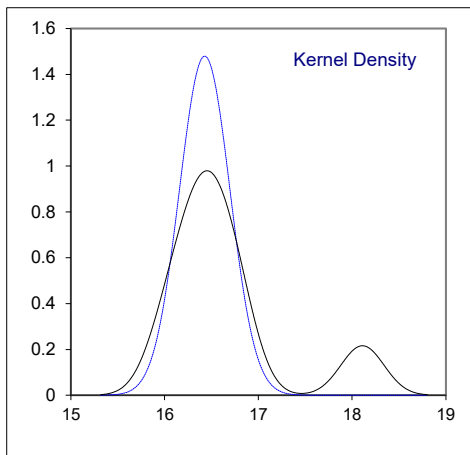
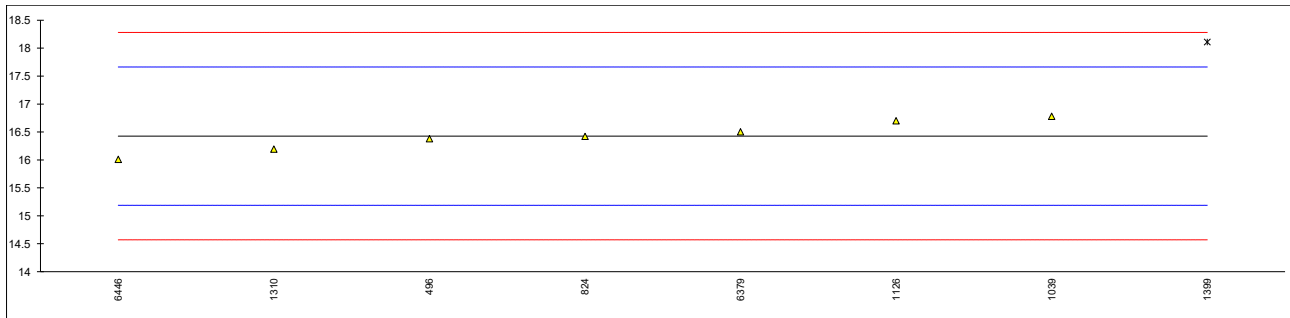
normality unknown
n 7
outliers 0
mean (n) 0.104
st.dev. (n) 0.0486
R(calc.) 0.136
st.dev.(EN12916:19+A1:22) 0.1847
R(EN12916:19+A1:22) 0.517



Determination of Total Aromatic Hydrocarbons on sample #23050; result in %M/M

lab	method	value	mark	z(targ)	remarks
171		----		----	
223		----		----	
300		----		----	
492		----		----	
496	EN12916	16.38		-0.07	
541		----		----	
824	EN12916	16.42		-0.01	
1039	D6379	16.78		0.57	
1121		----		----	
1126		16.7		0.44	
1237		----		----	
1266		----		----	
1272		----		----	
1310	EN12916	16.192		-0.38	
1399	IP391	18.110	ex	2.72	see paragraph 4.1
1539		----		----	
1715		----		----	
1720		----		----	
1854		----		----	
6028		----		----	
6044		----		----	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		16.50215		0.12	
6446		16.01		-0.67	
6447		----		----	
6499		----		----	
6530		----		----	

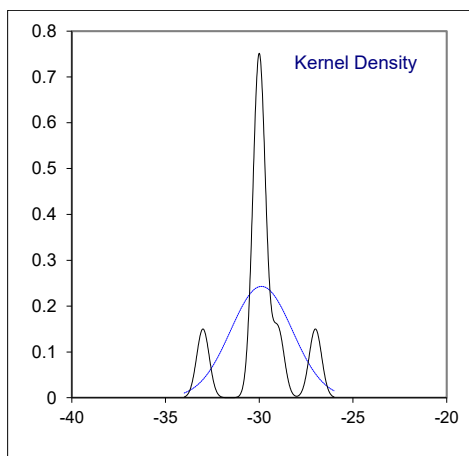
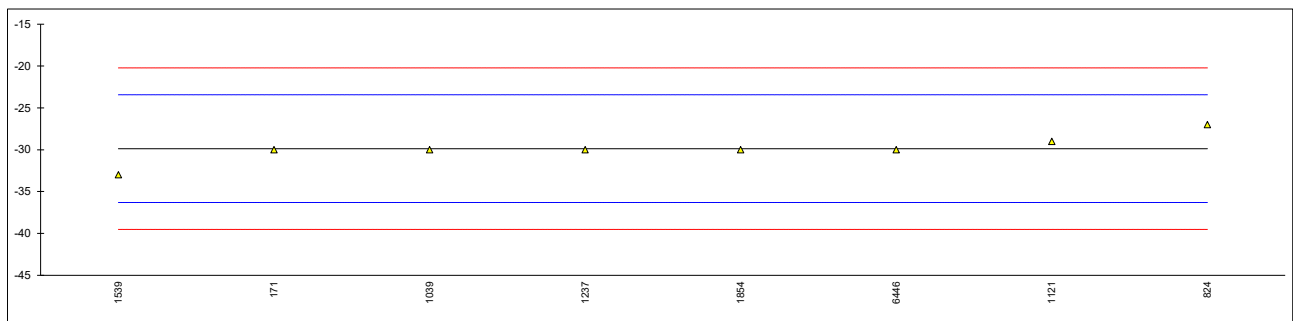
normality unknown
n 7
outliers 0 (+1ex)
mean (n) 16.426
st.dev. (n) 0.2696
R(calc.) 0.755
st.dev.(EN12916:19+A1:22) 0.6183
R(EN12916:19+A1:22) 1.731



Determination of Pour Point Manual on sample #23050; result in °C

lab	method	value	mark	z(targ)	remarks
171	D97	-30		-0.04	
223		----		----	
300		----		----	
492		----		----	
496		----		----	
541		----		----	
824	ISO3016-manual	-27		0.89	
1039	ISO3016-automated	-30		-0.04	
1121	IP15	-29.0		0.27	
1126		----		----	
1237	ISO3016-manual	-30		-0.04	
1266		----		----	
1272		----		----	
1310		----		----	
1399		----		----	
1539	ISO3016-manual	-33		-0.97	
1715		----		----	
1720		----		----	
1854	ISO3016-manual	-30		-0.04	
6028		----		----	
6044		----		----	
6047		----		----	
6075		----		----	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446	ISO3016-automated	-30		-0.04	
6447		----		----	
6499		----		----	
6530		----		----	

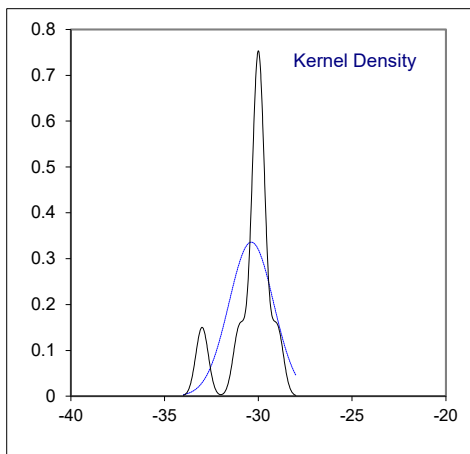
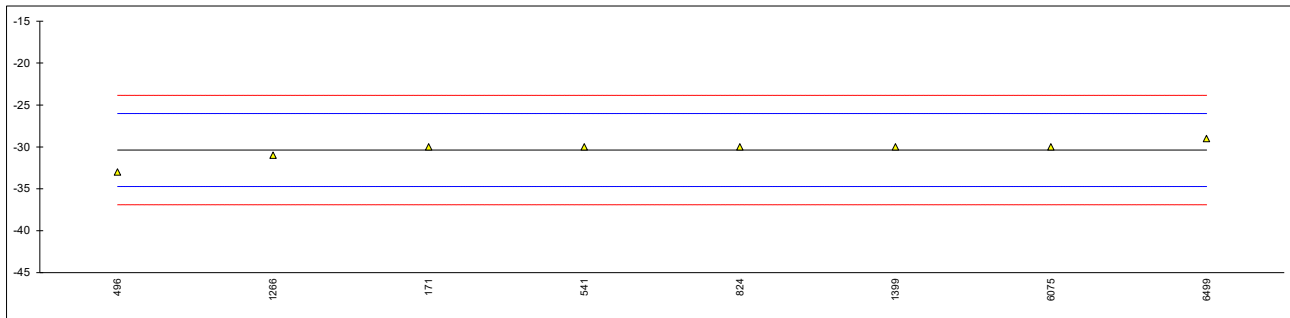
normality unknown
n 8
outliers 0
mean (n) -29.88
st.dev. (n) 1.642
R(calc.) 4.60
st.dev.(ISO3016:19) 3.214
R(ISO3016:19) 9



Determination of Pour Point Automated 3 °C interval on sample #23050; result in °C

lab	method	value	mark	z(targ)	remarks
171	D5950	-30		0.17	
223		----		----	
300		----		----	
492		----		----	
496	D5950	-33		-1.20	
541	D5950	-30		0.17	
824	D6892	-30		0.17	
1039		----		----	
1121		----		----	
1126		----		----	
1237		----		----	
1266	D5950	-31.0		-0.29	
1272		----		----	
1310		----		----	
1399	D5950	-30		0.17	
1539		----		----	
1715		----		----	
1720		----		----	
1854		----		----	
6028		----		----	
6044		----		----	
6047		----		----	
6075	NF T60-105	-30		0.17	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446		----		----	
6447		----		----	
6499	D6749	-29		0.63	
6530		----		----	

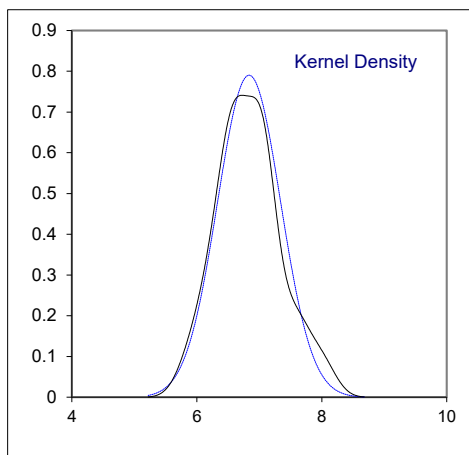
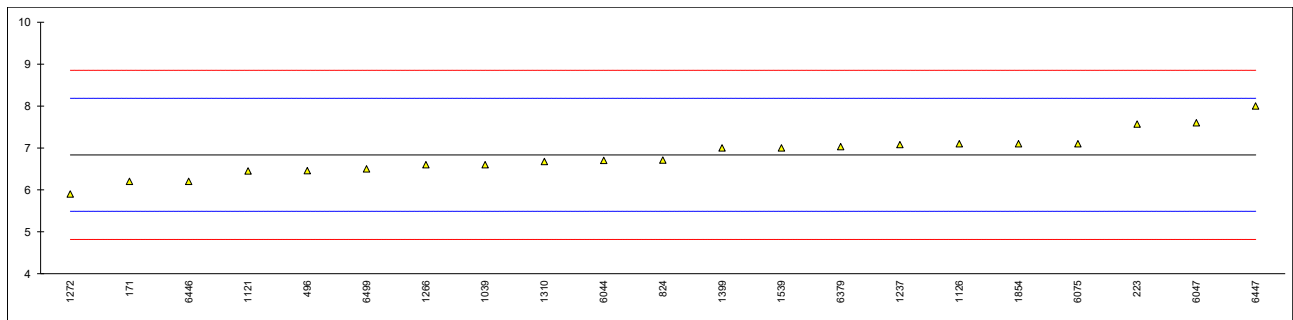
normality unknown
n 8
outliers 0
mean (n) -30.38
st.dev. (n) 1.188
R(calc.) 3.33
st.dev.(D5950:14R20) 2.179
R(D5950:14R20) 6.1



Determination of Sulfur on sample #23050; result in mg/kg

lab	method	value	mark	z(targ)	remarks
171	D5453	6.2		-0.95	
223	D4294	7.57		1.09	
300		----		----	
492		----		----	
496	ISO20884	6.46		-0.56	
541		----		----	
824	ISO20846	6.71		-0.19	
1039	ISO20884	6.6		-0.35	
1121	IP490	6.45		-0.57	
1126	ISO20846	7.1		0.39	
1237	ISO20846	7.08		0.36	
1266		6.6		-0.35	
1272	ISO20846	5.9		-1.39	
1310	ISO20846	6.675		-0.24	
1399	D5453	7		0.24	
1539	ISO20846	7.0		0.24	
1715		----		----	
1720		----		----	
1854	ISO20846	7.1		0.39	
6028		----		----	
6044	ISO13032	6.7		-0.20	
6047	ISO20846	7.6		1.13	
6075	ISO20846	7.1		0.39	
6317		----		----	
6373		----		----	
6378		----		----	
6379	ISO20846	7.03		0.29	
6446	ISO20884	6.2		-0.95	
6447	D2622	8		1.73	
6499	D7220	6.5		-0.50	
6530		----		----	

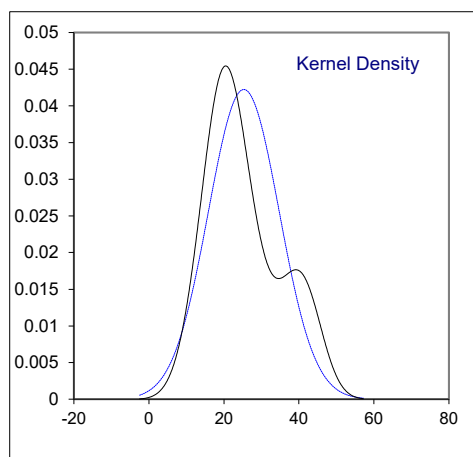
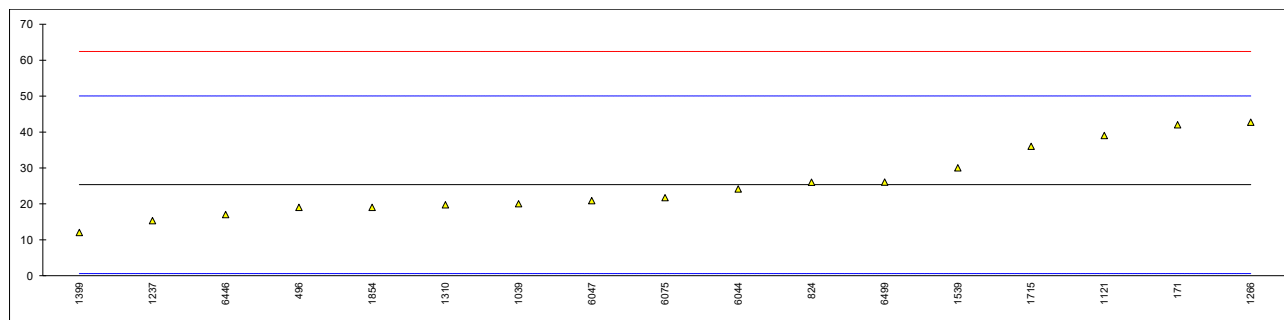
normality OK
n 21
outliers 0
mean (n) 6.837
st.dev. (n) 0.5048
R(calc.) 1.414
st.dev.(ISO20846:19) 0.6735
R(ISO20846:19) 1.886



Determination of Water on sample #23050; result in mg/kg

lab	method	value	mark	z(targ)	remarks
171	D6304-A:20	42		1.35	
223		----		----	
300		----		----	
492		----		----	
496	ISO12937	19		-0.51	
541		----		----	
824	ISO12937	26		0.05	
1039	ISO12937	20		-0.43	
1121	IP438	39		1.11	
1126		----		----	
1237	ISO12937	15.3		-0.81	
1266	ISO12937	42.75		1.41	
1272		----		----	
1310	ISO12937	19.6996		-0.46	
1399	IP438	12		-1.08	
1539	ISO6296	30		0.38	
1715	ISO12937	36		0.86	
1720		----		----	
1854	D6304-C:16e1	19.0		-0.51	
6028		----		----	
6044	D6304-A:16e1	24.1		-0.10	
6047	ISO12937	20.9		-0.36	
6075	ISO12937	21.7		-0.29	
6317		----		----	
6373		----		----	
6378		----		----	
6379		----		----	
6446	ISO12937	17		-0.67	
6447		----		----	
6499	D6304-A:20	26.05		0.06	
6530		----		----	

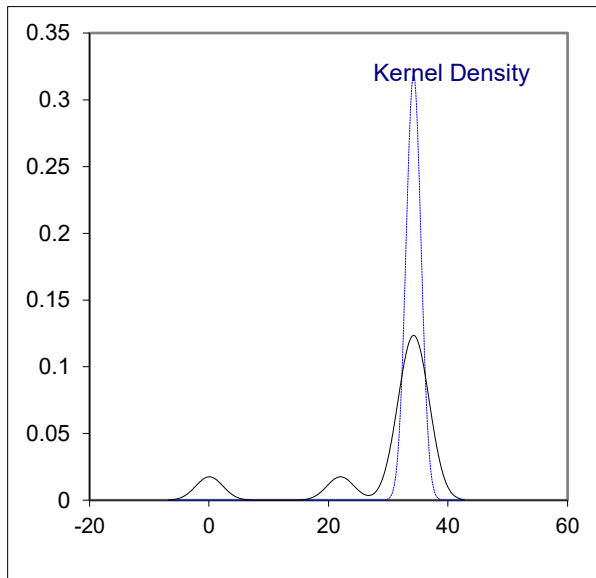
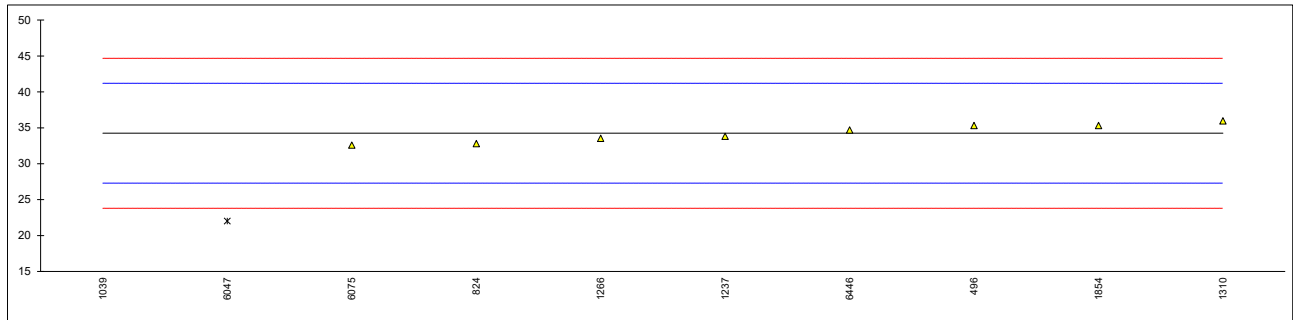
normality OK
n 17
outliers 0
mean (n) 25.32
st.dev. (n) 9.444
R(calc.) 26.44
st.dev.(ISO12937:00) 12.360
R(ISO12937:00) 34.61



Determination of Total Contamination on sample #23051; result in mg/kg

lab	method	Total C.	mark	z(targ)	complete	vol. filtered (mL)	stopped (min)	remarks
300		----		----	----	----	----	
496	EN12662:2014	35.3		0.30	Yes	----	----	
824	EN12662:2014	32.79		-0.42	Yes	----	----	
1039	EN12662:2014	0.03	G(0.01)	-9.84	No	525.1	2	
1237	EN12662:2014	33.8		-0.13	Yes	----	----	
1266	EN12662:2014	33.53		-0.21	Yes	----	----	
1310	EN12662:2014	35.96		0.49	Yes	300	8	
1399		----		----	----	----	----	
1854	EN12662:2014	35.3		0.30	Yes	300	12.3	
6028		----		----	----	----	----	
6047	EN12662:2014	22.0	C,G(0.01)	-3.52	No	141	30	first reported: 16.3
6075	EN12662:2014	32.5774		-0.48	Yes	----	15	
6373		----		----	----	----	----	
6446	EN12662:2014	34.7		0.13	Yes	300	----	
6530		----		----	----	----	----	

normality OK
 n 8
 outliers 2
 mean (n) 34.245
 st.dev. (n) 1.2525
 R(calc.) 3.507
 st.dev.(EN12662:14) 3.4789
 R(EN12662:14) 9.74



APPENDIX 2

Number of participants per country

1 lab in ARGENTINA
1 lab in BELGIUM
1 lab in BULGARIA
1 lab in ESTONIA
1 lab in FINLAND
3 labs in GERMANY
3 labs in GREECE
1 lab in HUNGARY
1 lab in KINGDOM OF BAHRAIN
1 lab in KOREA, Republic of
1 lab in MALI
1 lab in MARTINIQUE
4 labs in NETHERLANDS
1 lab in POLAND
1 lab in SERBIA
1 lab in SLOVENIA
1 lab in SOUTH AFRICA
1 lab in SPAIN
1 lab in SUDAN
1 lab in TANZANIA
1 lab in TUNISIA
1 lab in UGANDA
1 lab in UNITED KINGDOM
1 lab in UNITED STATES OF AMERICA

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	= calculation difference between reported test result and result calculated by iis
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

Literature

- 1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018
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- 3 ISO5725 parts 1-6:94
- 4 ISO13528:05
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- 7 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
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- 9 Analytical Methods Committee, Technical Brief, No 4, January 2001
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- 12 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)
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