**Institute for
Interlaboratory Studies**

Results of Proficiency Test
Diesel B10 (10% FAME)
May 2023

Organized by:	**Institute for Interlaboratory Studies** **Spijkenisse, the Netherlands**
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1   INTRODUCTION

Since 2005 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Diesel B10 containing approximately 10% FAME based on the latest version of EN16734 (0-10% FAME) and ASTM D7467 (6-20% FAME) every year. During the annual proficiency testing program of 2022/2023 it was decided to continue the round robin for the analysis of Diesel B10 (10% FAME).

In this interlaboratory study registered for participation:
-   61 laboratories in 32 countries for regular analyzes in Diesel B10 iis23G04
-   32 laboratories in 21 countries on the Total Contamination analyzes iis23G04TC

In total 62 laboratories in 32 countries registered for participation in one or two proficiency tests, see appendix 3 for the number of participants per country. In this report the results of the Diesel B10 (10% FAME) 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, one or two different samples of Diesel B10 (10% FAME), see table below.

Sample ID	PT ID	Quantity	Purpose
#23075	iis23G04	1 x 1 L + 1 x 0.5 L	Regular analyzes
#23076	iis23G04TC	1 x 1 L	Total Contamination

Table 1: Diesel B10 (10% FAME) samples used in PTs iis23G04 and iis23G04TC

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

2.1   ACCREDITATION

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

2.2 PROTOCOL

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

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

A batch of approximately 170 liters of Diesel was obtained from the local market. Biodiesel B100 was added to the Diesel batch to reach a final FAME concentration of approximately 10% V/V. After homogenization 85 amber glass bottles of 1 L and 85 amber glass bottles of 0.5 L were filled and labelled #23075.
The homogeneity of the subsamples was checked by determination of Density at 15 °C in accordance with ISO12185 on 8 stratified randomly selected subsamples.

	Density at 15 °C in kg/m^3
sample #23075-1	836.01
sample #23075-2	836.02
sample #23075-3	836.02
sample #23075-4	836.02
sample #23075-5	836.05
sample #23075-6	836.02
sample #23075-7	836.02
sample #23075-8	836.02

Table 2: homogeneity test results of subsamples #23075

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 #23075

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 Diesel B10 Total Contamination a batch of approximately 55 liters Diesel was obtained from the local market. Biodiesel B100 was added to the Diesel batch to reach a final FAME concentration of approximately 10% V/V.
A defined volume of freshly prepared and well shaken dust suspension of Arizona Dust material in an oil suspension 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 addition. In total 50 bottles were prepared and subsequently filled up to 1 L with the prepared Diesel B10. Finally, the subsamples were labelled #23076.

Depending on the registration of the participant the appropriate set of PT samples was sent on May 3, 2023. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Diesel B10 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 #23075: Total Acid Number, Aromatics by FIA, Ash content, Calculated Cetane Index (two and four variables), Cloud Point, Cold Filter Plugging Point (CFPP), Carbon Residue (micro method) on 10% distillation residue, Ramsbottom Carbon Residue 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, Oxidation Stability (stability and induction period), Polycyclic, Mono, Di, Tri+ and Total Aromatic Hydrocarbons, Pour Point (Manual and Automated 3 °C interval), Sulfur and Water.
On sample #23076 it 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:

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

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

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

$$|z| < 1 \quad \text{good}$$
$$1 < |z| < 2 \quad \text{satisfactory}$$
$$2 < |z| < 3 \quad \text{questionable}$$
$$3 < |z| \quad \text{unsatisfactory}$$

4 EVALUATION

In this proficiency test some problems were encountered with the dispatch of the samples. For the regular Diesel B10 PT three participants reported test results after the final reporting date and four other participants did not report any test results. Not all participants were able to report all tests requested.

For the Total Contamination PT two participants reported test results after the final reporting date and eight other participants did not report any test results.

In total 58 participants reported 1032 numerical test results. Observed were 45 outlying test results, which is 4.4%. 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 4.

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 #23075

Total Acid Number: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D664-B:18e2.

Aromatics by FIA: This determination was problematic. No statistical evaluation has been performed due to the large variation and the limited number of test results.

Ash content: This determination was not problematic. All reporting participants agreed on a consensus value <0.01. Therefore, no z-scores are calculated.

Calc. Cetane Index, two variables: 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 D976:21e1.

Calc. Cetane Index, four variables: Regretfully, no reproducibility is mentioned in procedure A of ASTM D4737:21 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. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the estimated target reproducibility over previous PTs, see iis memo 1904.

Cloud Point: 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 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.
Please note that attention should be given to anomalous aspiration behavior as mentioned in §10.8 from EN116:15.

Carbon Residue (micro method) on 10% residue: This determination may not be problematic. The consensus value of the group was below the application range of ISO10370:14. Therefore, no z-scores are calculated.

Ramsbottom Carbon Residue on 10% residue: Only three test results were reported. Therefore, no z-scores are calculated.

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

Density at 15 °C: This determination was not problematic. Five 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. In total eight statistical outliers were observed over eight parameters. All calculated reproducibilities after rejection of the statistical outliers are in agreement with the requirements of the automated mode of ISO3405:19. When evaluated against the requirements of the manual mode of ISO3405:19, most calculated reproducibilities after rejection of the statistical outliers are also in agreement, except for IBP, 95% recovery and FBP.

FAME: 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 EN14078-B:14.

Flash Point PMcc: 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 ISO2719-A:16+A1:21.

Kinematic Viscosity at 40 °C: 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 ISO3104:20.

Lubricity by HFRR at 60 °C: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO12156-1:18 mode A (Digital Camera) and mode B (Visual).

Oxidation Stability: This determination was not problematic. All reporting participants agreed on a consensus value <4. Therefore, no z-scores are calculated.

Oxidation Stability Induction period: This determination was problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of EN15751:14.

Polycyclic Aromatics: This determination was problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of EN12916:19.

Mono Aromatics: 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 EN12916:19.

Di Aromatics: 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 EN12916:19.

Tri+ Aromatics: 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 EN12916:19.

Total Aromatics: This determination may be problematic for a number of laboratories. Three statistical outliers were observed and three other test results were excluded. The calculated reproducibility after rejection of the suspect data is in agreement with the requirements of EN12916:19.

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. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5950:14R20.

Sulfur: 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 ISO20846:19.

Water: This determination was not problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO12937:00.

sample #23076

Total Contamination: 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 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 table.

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Acid Number	mg KOH/g	23	0.05	0.03	0.05
Aromatics by FIA	%V/V	7	18.8	n.e.	n.e.
Ash content	%M/M	28	<0.01	n.e.	n.e.
Calc. Cetane Index two variables		21	54.29	0.93	2
Calc. Cetane Index four variables		35	53.70	0.86	0.91
Cloud Point	°C	43	-6.3	2.9	4
Cold Filter Plugging Point	°C	40	-25.1	7.2	4.5
Carbon Residue (micro method)	%M/M	30	<0.1	n.e.	n.e.
Ramsbottom Carbon Residue	%M/M	3	n.e.	n.e.	n.e.
Copper Corrosion 3 hrs at 50 °C		30	1(1a/b)	n.a.	n.a.
Density at 15 °C	kg/m^3	49	836.1	0.2	0.5
Initial Boiling Point	°C	46	168.1	7.0	9.2
10% recovery	°C	48	205.1	4.3	4.5
50% recovery	°C	48	279.3	3.0	3
90% recovery	°C	46	344.7	3.1	5.2
95% recovery	°C	47	357.7	6.0	8.9
Final Boiling Point	°C	47	364.6	6.4	7.1
Volume at 250 °C	%V/V	41	35.0	1.5	2.7

Parameter	unit	n	average	2.8 * sd	R(lit)
Volume at 350 °C	%V/V	42	92.5	1.9	2.7
Fatty Acid Methyl Esters (FAME)	%V/V	37	10.0	0.9	0.8
Flash Point PMcc	°C	45	54.4	5.2	3.9
Kinematic Viscosity at 40 °C	mm^2/s	39	2.876	0.028	0.032
Lubricity by HFRR at 60 °C	µm	22	180	49	80
Oxidation Stability	g/m^3	7	<4	n.e.	n.e.
Oxidation Stability Induct. period	hours	12	41.8	18.4	8.3
Polycyclic Aromatic Hydrocarb.	%M/M	21	1.33	1.19	0.71
Mono Aromatic Hydrocarbons	%M/M	17	14.9	3.4	1.8
Di Aromatic Hydrocarbons	%M/M	18	1.15	0.40	0.33
Tri+ Aromatic Hydrocarbons	%M/M	13	0.11	0.33	0.52
Total Aromatic Hydrocarbons	%M/M	11	16.1	1.6	1.7
Pour Point Manual	°C	22	-29.1	6.1	6.6
Pour Point Automated 3 °C int.	°C	11	-28.6	5.5	6.1
Sulfur	mg/kg	39	6.8	1.2	1.9
Water	mg/kg	35	39.6	22.3	43.3
Total Contamination	mg/kg	22	28.2	14.6	8.8

Table 4: reproducibilities of tests on samples #23075 and #23076

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 INTERLABORATORY STUDY OF MAY 2023 WITH PREVIOUS PTS

	May 2023	May 2022	May 2021	May 2020	June 2019
Number of reporting laboratories	58	54	71	63	68
Number of test results	1032	985	1351	1261	1349
Number of statistical outliers	45	20	40	37	41
Percentage of statistical outliers	4.4%	2.0%	3.0%	2.9%	3.0%

Table 5: comparison with previous proficiency tests

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

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

Parameter	May 2023	May 2022	May 2021	May 2020	June 2019
Total Acid Number	+	+	+	+	+/-
Aromatics by FIA	n.e.	n.e.	(--)	n.e.	n.e.
Ash content	n.e.	n.e.	n.e.	+	++
Calc. Cetane Index two variables	++	++	++	++	++
Calc. Cetane Index four variables	+/-	-	+/-	+	++
Cloud Point	+	+	+	+	+
Cold Filter Plugging Point	-	+	-	+/-	+/-
Carbon Residue (micro method)	n.e.	n.e.	(-)	(-)	(--)
Ramsbottom Carbon Residue	n.e.	n.e.	--	-	--
Density at 15 °C	++	++	+	++	++
Distillation at 760 mmHg	+	+	+	+	+
Fatty Acid Methyl Esters (FAME)	-	-	+/-	+/-	+
Flash Point PMcc	-	+	+	+	+/-
Kinematic Viscosity at 40 °C	+	-	+/-	-	-
Lubricity by HFRR at 60 °C	+	+	+	+	++
Oxidation Stability	n.e.	n.e.	+	+	+
Oxidation Stability Induct. period	--	-	-	-	-
Aromatic Hydrocarbons	+	+	+/-	+	+
Pour Point Manual	+/-	+	+	-	+
Pour Point Automated 3 °C int.	+/-	+	+	+	+
Sulfur	+	+/-	+	+/-	-
Water	+	++	++	++	++
Total Contamination	-	-	+	-	--

Table 6: comparison of determinations to the reference test methods

For results between brackets no z-scores are calculated.

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

APPENDIX 1

Determination of Total Acid Number on sample #23075; result in mg KOH/g

lab	method	value	mark	z(targ)	remarks
62	D664-B	<0.1		-----	
120		-----		-----	
140	D664-B	0.10	R(0.05)	2.45	
150		-----		-----	
171	D664-B	0.61	R(0.01)	28.70	
235	D664-B	0.01	R(0.05)	-2.18	
237	D664-B	<0.1		-----	
238	D974	0.043		-0.48	
300	D664-B	0.06		0.39	
323	D664-B	0.05		-0.12	
328		-----		-----	
334	D664-B	0.0397		-0.65	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447	D974	0.06		0.39	
460		-----		-----	
467	D664-B	0.064		0.60	
496	D664-B	0.049		-0.17	
529		-----		-----	
541		-----		-----	
603	D664-B	0.04		-0.64	
663	D664-B	<0.10		-----	
1006		0.047		-0.28	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059		-----		-----	
1065	D664-B	0.050		-0.12	
1066	D974	0.06		0.39	
1126		-----		-----	
1134	D664-B	0.03		-1.15	
1140	D974	0.047		-0.28	
1194		-----		-----	
1227	D664-B	0.038		-0.74	
1233	D644-A	0.065		0.65	
1259		-----		-----	
1389	D664-B	0.05		-0.12	
1402	D664-B	0.053		0.03	
1459		-----		-----	
1521		-----		-----	
1544	D974	0.0733		1.08	
1554		-----		-----	
1631		-----		-----	
1635	D664-B	0.07		0.91	
1706		-----		-----	
1724	D664-B	0.051		-0.07	
1728		-----		-----	
1807	D664-B	0.06		0.39	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168		-----		-----	
6180	D664-B	0.046		-0.33	
6370		-----		-----	
6371		-----		-----	
6373	D974	0.059		0.34	
6496		-----		-----	
6499		-----		-----	
6502		-----		-----	

normality	OK	
n	23	
outliers	3	
mean (n)	0.0524	
st.dev. (n)	0.01078	
R(calc.)	0.0302	
st.dev.(D664-B:18e2)	0.01943	
R(D664-B:18e2)	0.0544	
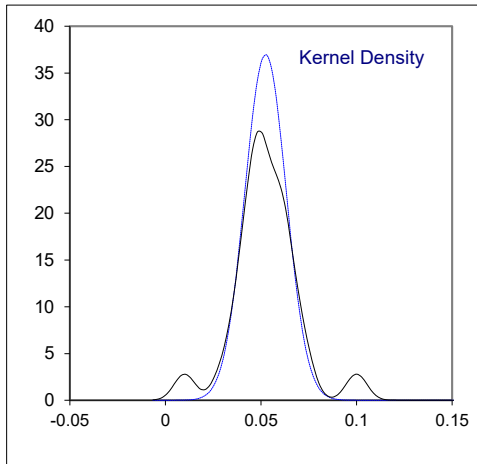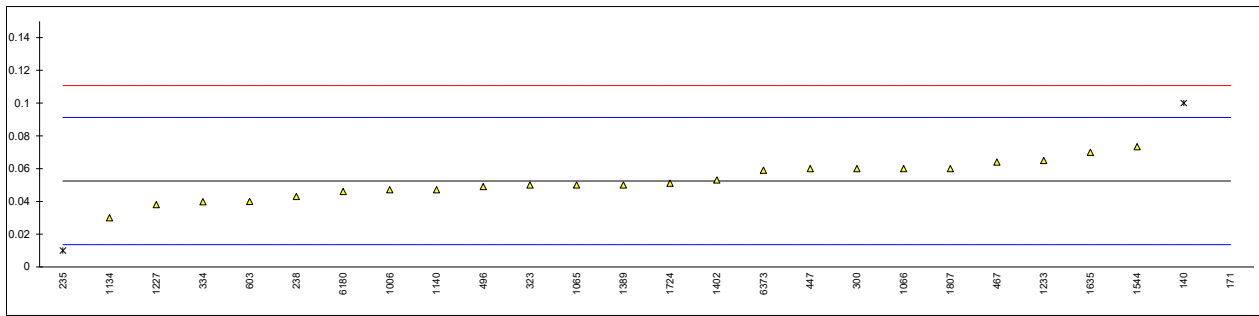
Determination of Aromatics by FIA (without Oxygenates correction) on sample #23075; result in %V/V

lab	method	value	mark	z(targ)	remarks
62	D1319	25.3		-----	
120		-----		-----	
140		-----		-----	
150		-----		-----	
171		-----		-----	
235		-----		-----	
237	D1319	23.6		-----	
238		-----		-----	
300		-----		-----	
323		-----		-----	
328		-----		-----	
334		-----		-----	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447	D1319	14.03	C	-----	first reported 51.1
460		-----		-----	
467	D1319	12.5		-----	
496		-----		-----	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663		-----		-----	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059		-----		-----	
1065		-----		-----	
1066	D1319	16.9		-----	
1126		-----		-----	
1134	D1319	19.05		-----	
1140		-----		-----	
1194		-----		-----	
1227		-----		-----	
1233		-----		-----	
1259	D1319	19.9		-----	
1389		-----		-----	
1402		-----		-----	
1459		-----		-----	
1521		-----		-----	
1544		-----		-----	
1554		-----		-----	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724		-----		-----	
1728		-----		-----	
1807		-----		-----	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168		-----		-----	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373		-----		-----	
6496		-----		-----	
6499		-----		-----	
6502		-----		-----	
	n	7			
	mean (n)	18.75			

Determination of Ash content on sample #23075; result in %M/M

lab	method	value	mark	z(targ)	remarks
62	D482	<0.01		-----	
120		-----		-----	
140	ISO6245	<0.001		-----	
150	D482	<0.005		-----	
171	D482	<0.010		-----	
235	ISO6245	0.0006		-----	
237	D482	<0.01		-----	
238		-----		-----	
300		-----		-----	
323	ISO6245	<0.001		-----	
328		-----		-----	
334	ISO6245	<0.001		-----	
335		-----		-----	
338		-----		-----	
365	IP4	<0.001		-----	
445		-----		-----	
447	IP4	0.001		-----	
460		-----		-----	
467	ISO6245	<0,001		-----	
496	ISO6245	0.000		-----	
529		-----		-----	
541	D482	0.001		-----	
603	D482	< 0.010		-----	
663	D482	<0.010		-----	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	ISO6245	<0.001		-----	
1065		-----		-----	
1066	D482	0.005		-----	
1126		-----		-----	
1134	IP4	<0.001		-----	
1140		-----		-----	
1194		-----		-----	
1227		-----		-----	
1233	ISO6245	0.003		-----	
1259		-----		-----	
1389	D482	<0.001		-----	
1402	IP4	<0.001		-----	
1459	ISO6245	0.001		-----	
1521	ISO6245	0.0004		-----	
1544	ISO6245	0.00055		-----	
1554	ISO6245	0.00068		-----	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724	D482	0.0005		-----	
1728		-----		-----	
1807		-----		-----	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168		-----		-----	
6180	ISO6245	0.001		-----	
6370		-----		-----	
6371		-----		-----	
6373	D482	0.00		-----	
6496		-----		-----	
6499		-----		-----	
6502		-----		-----	
	n	28			
	mean (n)	<0.01			

Determination of Calculated Cetane Index, two variables D976 on sample #23075

lab	method	value	mark	z(targ)	remarks
62	D976	54.5		0.29	
120		-----		-----	
140	D976	54.6		0.43	
150		-----		-----	
171	D976	54.3		0.01	
235	D976	54.6		0.43	
237	D976	55.5	R(0.05)	1.69	
238	D976	54.1		-0.27	
300		-----		-----	
323	D976	54.5		0.29	
328	D976	54.3		0.01	
334		-----		-----	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447		-----		-----	
460		-----		-----	
467	D976	53.8	E	-0.69	calculation difference, iis calculated 54.4
496		-----		-----	
529		-----		-----	
541	D976	54	E	-0.41	calculation difference, iis calculated 54.3
603	D976	54.7		0.57	
663	D976	54.2		-0.13	
1006	D976	54.4		0.15	
1016		-----		-----	
1017		-----		-----	
1040	D976	53.45	E	-1.18	calculation difference, iis calculated 54.24
1059		-----		-----	
1065		-----		-----	
1066	D976	54.5		0.29	
1126		-----		-----	
1134	D976	54.4		0.15	
1140		-----		-----	
1194		-----		-----	
1227		-----		-----	
1233		-----		-----	
1259		-----		-----	
1389		-----		-----	
1402	D976	54.4		0.15	
1459		-----		-----	
1521		-----		-----	
1544	D976	53.90	E	-0.55	calculation difference, iis calculated 54.39
1554		-----		-----	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724	D976	53.9		-0.55	
1728		-----		-----	
1807	D976	54.4		0.15	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168	D976	54.8		0.71	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373	D976	54.4		0.15	
6496		-----		-----	
6499		-----		-----	
6502		-----		-----	

normality	OK	
n	21	
outliers	1	
mean (n)	54.293	
st.dev. (n)	0.3310	
R(calc.)	0.927	
st.dev.(D976:21e1)	0.7143	
R(D976:21e1)	2	
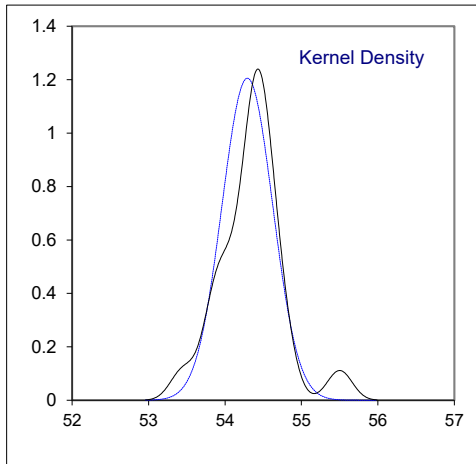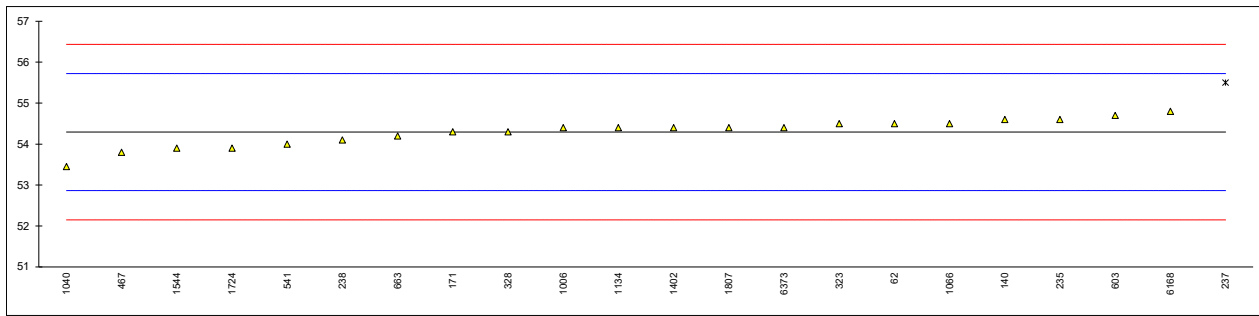
Determination of Calculated Cetane Index, four variables ISO4264 on sample #23075

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140	D4737-A	54.1		1.23	
150		-----		-----	
171	D4737-B	53.2		-1.54	
235	ISO4264	54.0		0.93	
237	D4737-A	54.8	R(0.05)	3.39	
238	D4737	53.1		-1.85	
300		-----		-----	
323	ISO4264	53.9		0.62	
328	ISO4264	53.6		-0.31	
334	ISO4264	53.6		-0.31	
335	ISO4264	53.5		-0.62	
338	ISO4264	53.4		-0.93	
365	IP380	53.6		-0.31	
445		-----		-----	
447	IP380	53.8		0.31	
460		-----		-----	
467	ISO4264	54.4	E	2.16	calculation difference, iis calculated 53.8 for procedure A
496	ISO4264	53.73		0.09	
529		-----		-----	
541	ISO4264	53.7		0.00	
603		-----		-----	
663		-----		-----	
1006	D4737-A	53.8		0.31	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	ISO4264	54.0		0.93	
1065		-----		-----	
1066		-----		-----	
1126		-----		-----	
1134	IP380	53.8		0.31	
1140	IP380	53.6		-0.31	
1194	D4737-A	58.3	R(0.01)	14.20	
1227	D4737-A	53.68		-0.06	
1233	ISO4264	53.4		-0.93	
1259	ISO4264	53.0	E	-2.16	calculation difference, iis calculated 53.5 for procedure A
1389		-----		-----	
1402	IP380	53.8		0.31	
1459	ISO4264	53.5		-0.62	
1521	ISO4264	53.9		0.62	
1544		-----		-----	
1554	ISO4264	53.9		0.62	
1631		-----		-----	
1635	D4737-A	53.9		0.62	
1706		-----		-----	
1724	D4737-A	53.2		-1.54	
1728		-----		-----	
1807	ISO4264	53.7		0.00	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168	D4737-A	54.3		1.85	
6180	D4737-A	53.4		-0.93	
6370	ISO4264	53.7		0.00	
6371	ISO4264	53.9		0.62	
6373	ISO4264	53.8		0.31	
6496	ISO4264	53.8		0.31	
6499	D4737-A	53.8	E	0.31	calculation difference, iis calculated 49.5
6502		-----		-----	

normality	OK
n	35
outliers	2
mean (n)	53.700
st.dev. (n)	0.3068
R(calc.)	0.859
st.dev.(iis memo 1904)	0.3239
R(iis memo 1904)	0.907

Kernel Density
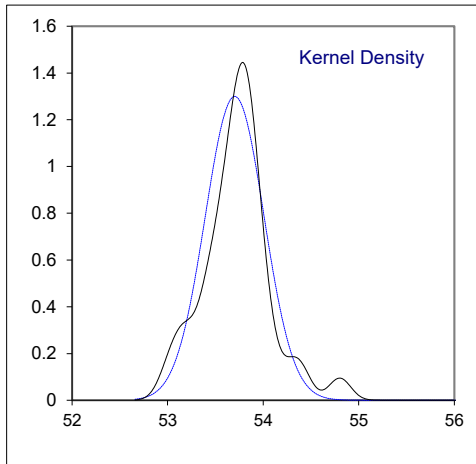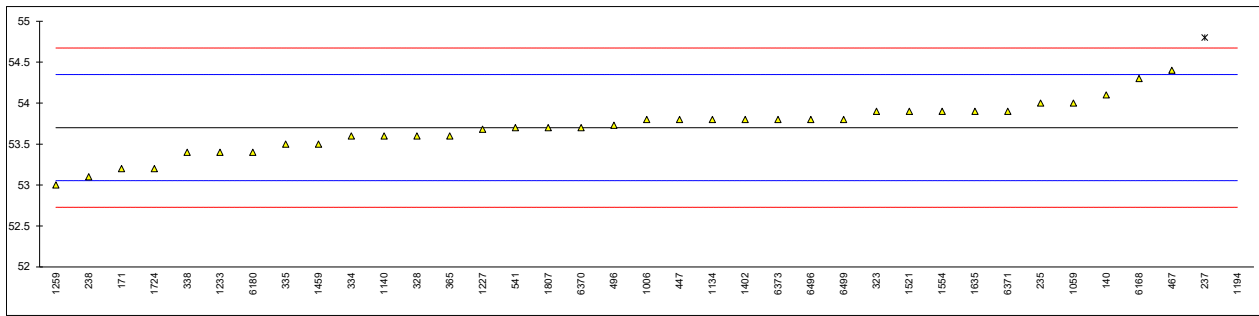
Determination of Cloud Point on sample #23075; result in °C

lab	method	value	mark	z(targ)	remarks
62	D5773	-5.1		0.81	
120	D5773	-5.8		0.32	
140	D2500	-8		-1.22	
150	EN23015	-6		0.18	
171	D2500	-6		0.18	
235	D2500	-7		-0.52	
237	D2500	-4		1.58	
238		-----		-----	
300		-----		-----	
323	ISO3015	-8		-1.22	
328	ISO3015	-5		0.88	
334	ISO3015	-6		0.18	
335	ISO3015	-6.9		-0.45	
338	ISO3015	-5		0.88	
365	IP219	-7		-0.52	
445		-----		-----	
447	IP219	-6		0.18	
460		-----		-----	
467	ISO3015	-7		-0.52	
496	D2500	-6.8		-0.38	
529		-----		-----	
541	D5771	-5.6		0.46	
603	D2500	-2	C,R(0.05)	2.98	first reported 0
663	D2500	-6		0.18	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040	D5771	-6.65		-0.27	
1059	ISO3015	-7		-0.52	
1065	D2500	-7		-0.52	
1066	D2500	-8		-1.22	
1126		-----		-----	
1134	IP219	-6		0.18	
1140	D5773	-6.6		-0.24	
1194		-----		-----	
1227	D2500	-6		0.18	
1233	ISO3015	-8		-1.22	
1259	EN23015	-6		0.18	
1389	D2500	-8		-1.22	
1402	EN23015	-6		0.18	
1459	ISO3015	-6.0		0.18	
1521	ISO3015	-4		1.58	
1544	ISO3015	-6.0		0.18	
1554		-----		-----	
1631		-----		-----	
1635	D7689	-7		-0.52	
1706		-----		-----	
1724	D2500	-6		0.18	
1728	D2500	-7		-0.52	
1807	EN23015	-7		-0.52	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168	D2500	-4		1.58	
6180	ISO3015	-5		0.88	
6370	D5771	-6.9		-0.45	
6371	D5771	-7		-0.52	
6373	ISO3015	-5		0.88	
6496	ISO3015	-6		0.18	
6499	D2500	-6.0		0.18	
6502		-----		-----	

normality	OK	
n	43	
outliers	1	
mean (n)	-6.264	
st.dev. (n)	1.0472	
R(calc.)	2.932	
st.dev.(ISO3015:19)	1.4286	
R(ISO3015:19)	4	

Kernel Density
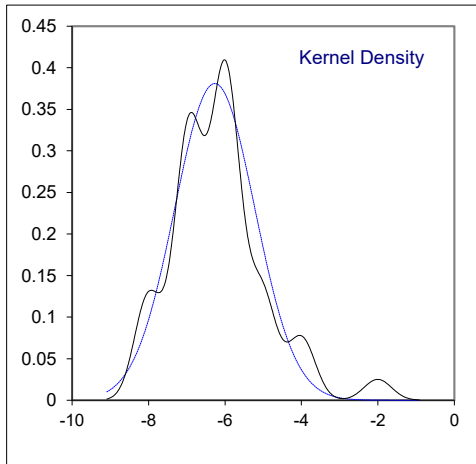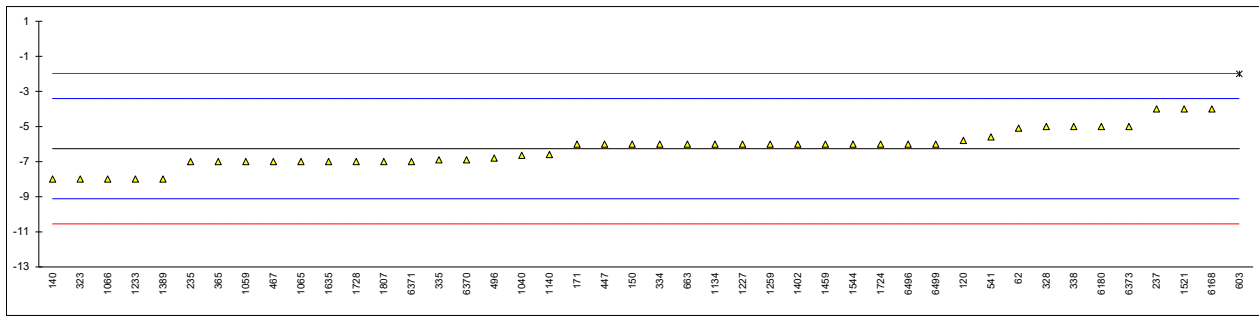
Determination of Cold Filter Plugging Point (CFPP) on sample #23075; result in °C

lab	method	value	mark	z(targ)	remarks
62	D6371	-20		3.17	
120	IP309	-20.0		3.17	
140		-----		-----	
150		-----		-----	
171	D6371	-24		0.68	
235	IP309	-23		1.30	
237	D6371	-21		2.54	
238		-----		-----	
300	EN116	-26		-0.56	
323	EN116	-22		1.92	
328	EN116	-27		-1.18	
334	EN116	-25		0.06	
335	EN116	-26		-0.56	
338	EN116	-28		-1.81	
365	IP309	-10	R(0.01)	9.38	
445		-----		-----	
447	IP309	-24		0.68	
460		-----		-----	
467	EN116	-26		-0.56	
496	EN116	-29		-2.43	
529		-----		-----	
541	D6371	-27		-1.18	
603		-----		-----	
663	EN116	-22		1.92	
1006	D6371	-21		2.54	
1016		-----		-----	
1017	EN116	-22		1.92	
1040	EN16329	-23.5		0.99	
1059	EN116	-27		-1.18	
1065	D6371	-28		-1.81	
1066	EN116	-24		0.68	
1126		-----		-----	
1134	EN116	-29		-2.43	
1140		-----		-----	
1194	EN116	-25.3	C	-0.13	first reported 25.3
1227	EN116	-26		-0.56	
1233	D6371	-23		1.30	
1259	EN116	-24		0.68	
1389	IP309	-28		-1.81	
1402	EN116	-27		-1.18	
1459	EN116	-28.0		-1.81	
1521		-----		-----	
1544	EN116	-28.0		-1.81	
1554	EN116	-23		1.30	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724		-----	W	-----	test result withdrawn, reported -8
1728	D6371	-24		0.68	
1807	EN116	-26		-0.56	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168	D6371	-25		0.06	
6180	IP309	-23		1.30	
6370	EN116	-28.0		-1.81	
6371	EN116	-28		-1.81	
6373		-----		-----	
6496	EN116	-28		-1.81	
6499	D6371	-25.0		0.06	
6502		-----		-----	

normality	OK	
n	40	
outliers	1	
mean (n)	-25.095	
st.dev. (n)	2.5669	
R(calc.)	7.187	
st.dev.(EN116:15)	1.6092	
R(EN116:15)	4.506	
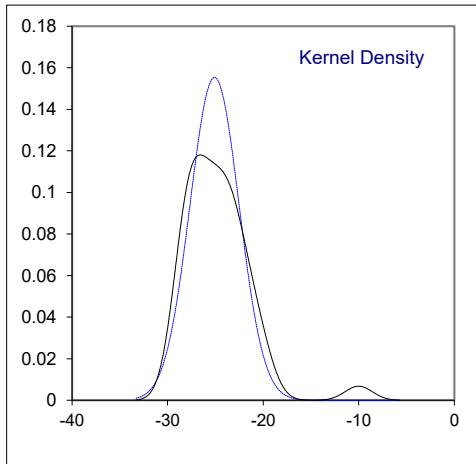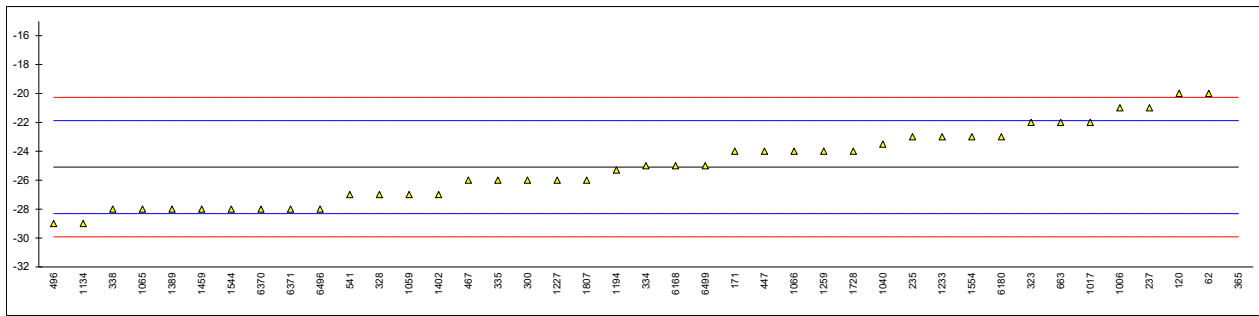
Determination of Carbon Residue (micro method) on 10% distillation residue on sample #23075; result in %M/M

lab	method	value	mark	z(targ)	remarks
62	D4530	<0.1	C	-----	first reported 0.3
120		-----		-----	
140	ISO10370	<0.10		-----	
150	D4530	<0.003		-----	
171	D4530	<0.1		-----	
235	ISO10370	0.05		-----	
237	D4530	0.028		-----	
238		-----		-----	
300		-----		-----	
323	ISO10370	<0.10		-----	
328	ISO10370	<0.10		-----	
334	ISO10370	<0.10		-----	
335		-----		-----	
338		-----		-----	
365	IP13	0.017		-----	
445		-----		-----	
447	IP398	<0.10		-----	
460		-----		-----	
467	ISO10370	<0,10		-----	
496	ISO10370	0.0481		-----	
529		-----		-----	
541	D189	0.03		-----	
603	D4530	< 0.10		-----	
663	D4530	0.06		-----	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	ISO10370	0.02		-----	
1065		-----		-----	
1066	D4530	0.07		-----	
1126		-----		-----	
1134		-----		-----	
1140	IP398	<0.01		-----	
1194		-----		-----	
1227	D4530	0.02		-----	
1233	ISO10370	0.04		-----	
1259		-----		-----	
1389	D4530	<0.10		-----	
1402	ISO10370	<0.10		-----	
1459		-----		-----	
1521	ISO10370	0.039		-----	
1544	ISO10370	0.0288		-----	
1554		0.0304		-----	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724	D4530	0.02		-----	
1728		-----		-----	
1807		-----		-----	
1833	ISO10370	<0.1		-----	
2146		-----		-----	
6075		-----		-----	
6168		-----		-----	
6180	ISO10370	0.040		-----	
6370		-----		-----	
6371		-----		-----	
6373	ISO10370	0.02		-----	
6496		-----		-----	
6499		-----		-----	
6502		-----		-----	
	n	30			
	mean (n)	<0.1			application range ISO10370:14: 0.10 – 30.0 %M/M

Determination of Ramsbottom Carbon Residue on 10% distillation residue on sample #23075; result in %M/M

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140	D524	0.08		-----	
150		-----		-----	
171	D524	0.07		-----	
235		-----		-----	
237		-----		-----	
238		-----		-----	
300		-----		-----	
323		-----		-----	
328		-----		-----	
334		-----		-----	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447		-----		-----	
460		-----		-----	
467		-----		-----	
496		-----		-----	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663		-----		-----	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059		-----		-----	
1065		-----		-----	
1066		-----		-----	
1126		-----		-----	
1134		-----		-----	
1140		-----		-----	
1194		-----		-----	
1227		-----		-----	
1233		-----		-----	
1259		-----		-----	
1389		-----		-----	
1402	D524	0.07		-----	
1459		-----		-----	
1521		-----		-----	
1544		-----		-----	
1554		-----		-----	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724		-----		-----	
1728		-----		-----	
1807		-----		-----	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168		-----		-----	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373		-----		-----	
6496		-----		-----	
6499		-----		-----	
6502		-----		-----	
	n	3			

Determination of Copper Corrosion 3 hrs at 50 °C on sample #23075: rating

lab	method	value	mark	z(targ)	remarks
62	D130	1a		-----	
120	D130	1A		-----	
140		-----		-----	
150	D130	1A		-----	
171	D130	1a		-----	
235	D130	1a		-----	
237	D130	1		-----	
238	D130	1A		-----	
300		-----		-----	
323	ISO2160	1A		-----	
328	D130	1		-----	
334	D130	1a		-----	
335	D130	1a		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447	IP154	1a		-----	
460		-----		-----	
467	ISO2160	1a		-----	
496	ISO2160	1a		-----	
529		-----		-----	
541	D130	1a		-----	
603	D130	1A		-----	
663	D130	1a		-----	
1006	D130	1a		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	ISO2160	1a		-----	
1065		-----		-----	
1066		-----		-----	
1126		-----		-----	
1134	IP154	1a		-----	
1140	IP154	1B		-----	
1194		-----		-----	
1227	D130	1A		-----	
1233		-----		-----	
1259		-----		-----	
1389	D130	1A		-----	
1402	D130	1A		-----	
1459		-----		-----	
1521	ISO2160	1		-----	
1544		-----		-----	
1554	ISO2160	1a		-----	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724	D130	1a		-----	
1728		-----		-----	
1807	D130	1A		-----	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168	D130	1a		-----	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373	D130	1A		-----	
6496		-----		-----	
6499		-----		-----	
6502		-----		-----	
	n	30			
	mean (n)	1(1a/b)			

Determination of Density at 15 °C on sample #23075; result in kg/m^3
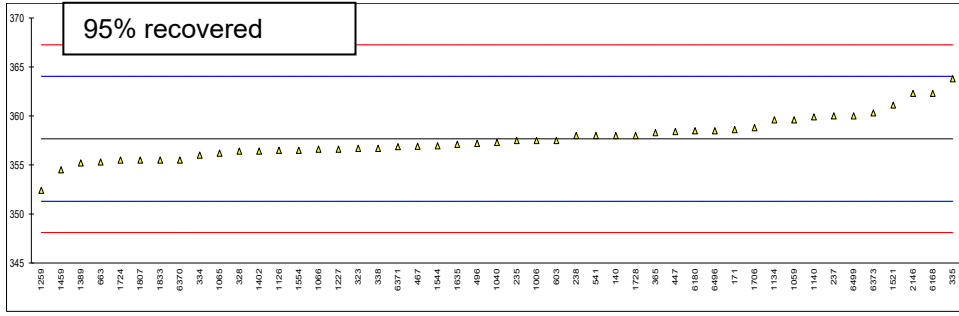
lab	method	value	mark	z(targ)	remarks
62	D4052	836		-0.36	
120	D4052	836.1		0.20	
140	D4052	836.1	C	0.20	first reported 0.8361
150	D4052	836.1		0.20	
171	D4052	836.1		0.20	
235	ISO12185	836.03		-0.19	
237	D4052	836.0		-0.36	
238	D4052	835.9		-0.92	
300	ISO12185	836.1		0.20	
323	ISO12185	836.1		0.20	
328	ISO12185	836.1		0.20	
334	ISO12185	836.0		-0.36	
335	ISO12185	836.1		0.20	
338	ISO12185	836.1		0.20	
365	IP365	836.0		-0.36	
445		-----		-----	
447	IP365	836.0		-0.36	
460	D4052	836.0		-0.36	
467	ISO12185	836.10		0.20	
496	ISO12185	836.0		-0.36	
529		-----		-----	
541	D4052	836.1		0.20	
603	D4052	836.0		-0.36	
663	D4052	836.0		-0.36	
1006	D4052	836.1		0.20	
1016		-----		-----	
1017	D4052	836.0		-0.36	
1040	ISO12185	836.17		0.59	
1059	ISO12185	836.1		0.20	
1065	D4052	836.4	R(0.01)	1.88	
1066	D4052	836.0		-0.36	
1126	D4052	835.97		-0.53	
1134	IP365	836.0		-0.36	
1140	IP365	836.5	R(0.01)	2.44	
1194	In house	781.9	C,R(0.01)	-303.32	first reported 0.7819
1227	D4052	836.1		0.20	
1233	ISO12185	836.1		0.20	
1259	ISO12185	836.0		-0.36	
1389	D4052	836.1		0.20	
1402	ISO12185	836.0		-0.36	
1459	ISO12185	836.03		-0.19	
1521	ISO12185	836.1		0.20	
1544	ISO12185	836.10		0.20	
1554	ISO12185	836.10		0.20	
1631		-----		-----	
1635		-----		-----	
1706	ISO12185	836.3		1.32	
1724	D4052	836.1		0.20	
1728	D4052	836.05		-0.08	
1807	ISO12185	836.1		0.20	
1833		836.1		0.20	
2146	ISO12185	836.0		-0.36	
6075		-----		-----	
6168	D4052	836.3		1.32	
6180	ISO12185	836.1		0.20	
6370	ISO12185	836.43	R(0.01)	2.05	
6371	D7042	836.40	R(0.01)	1.88	
6373	D1298	836.1		0.20	
6496	D7042	836.08		0.09	
6499	D4052	835.92		-0.81	
6502		-----		-----	

normality	not OK	
n	49	
outliers	5	
mean (n)	836.064	
st.dev. (n)	0.0756	
R(calc.)	0.212	
st.dev.(ISO12185:96)	0.1786	
R(ISO12185:96)	0.5	
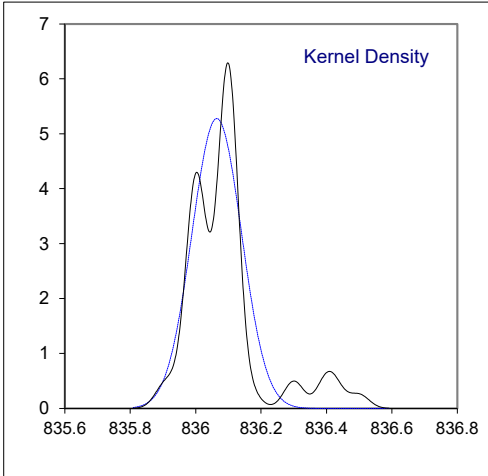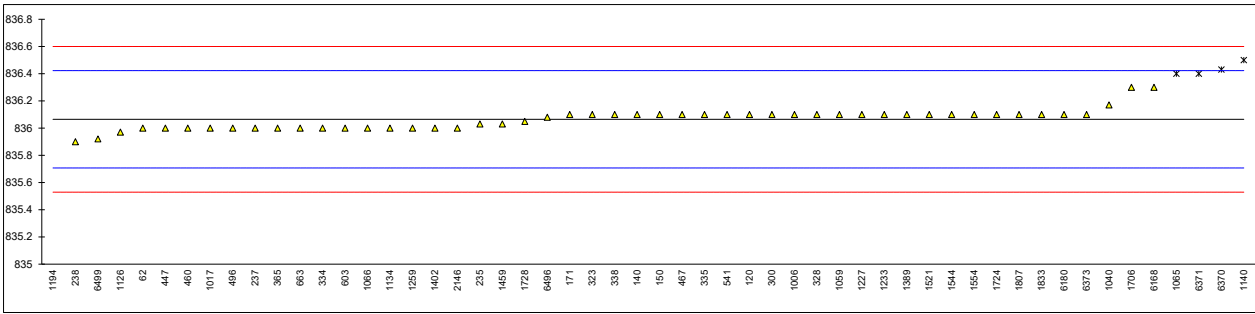
Determination of Distillation at 760 mmHg on sample #23075; result in °C

lab	method	IBP	mark	10%rec	mark	50%rec	mark	90%rec	mark	95%rec	mark	FBP	mark
62	D86-automated	169.8		207.3		279.9		344.0		-----		364.3	
120		-----		203.6		278.1		344.4		-----		364.6	
140	ISO3405-automated	168.9		207.4		280.5		345.7		358.0		367.2	
150		-----		-----		-----		-----		-----		-----	
171	D86-automated	164.8		204.7		278.9		345.4		358.6		366.0	
235	D86-automated	172.7		207.2		280.2		345.6		357.5		367.5	
237	D86-manual	166.0		205.0		285.0	R(1)	349.0	R(5)	360.0		371.0	
238	D86-manual	164.0		201.0		277.0		345.0		358.0		364.0	
300		-----		-----		-----		-----		-----		-----	
323	ISO3405-automated	169.0		206.6		279.7		344.4		356.7		364.0	
328	ISO3405-automated	165.4		204.4		278.9		343.7		356.4		363.4	
334	ISO3405-automated	167.5		204.2		278.6		343.0		356.0		362.5	
335	D86-automated	167.8		201.5		279.3		347.1		363.8		366.5	
338	ISO3405-automated	165.1		203.1		278.0		344.0		356.7		364.4	
365	D86-automated	165.2		204.3		278.5		344.8		358.3		363.6	
445		-----		-----		-----		-----		-----		-----	
447	IP123-automated	169.2		205.3		279.1		345.0		358.4		365.4	
460		-----		-----		-----		-----		-----		-----	
467	ISO3405-automated	170.2		205.9		279.5		343.4		356.9		363.7	
496	ISO3405-automated	168.4		205.2		279.0		344.3		357.2		365.5	
529		-----		-----		-----		-----		-----		-----	
541	D86-automated	167.8		205.4		279.0		344.6		358.0		365.2	
603	D86-automated	169.9		206.9		280.6		344.4		357.5		362.4	
663	D86-automated	164.3		206.7		278.0		343.6		355.3		363.6	
1006	D86-automated	168.0		206.3		279.2		345.0		357.5		363.7	
1016		-----		-----		-----		-----		-----		-----	
1017		-----		-----		-----		-----		-----		-----	
1040		163.75		-----		278.60		344.75		357.3		367.1	
1059	ISO3405-automated	171.6		206.5		280.0		345.6		359.6		367.2	
1065		165.6		203.0		278.1		345.0		356.2		359.6	
1066	D86-automated	167.1		205.6		279.7		344.8		356.6		265.6	R(1)
1126	D86-automated	171.6		206.6		278.7		343.4		356.5		367.3	
1134	IP123-automated	165.4		205.2		279.3		345.5		359.6		366.5	
1140	IP123-automated	165.5		205.5		279.2		345.0		359.9		365.1	
1194		-----		-----		-----		-----		-----		-----	
1227		169.5		207		278.1		344.2		356.6		366	
1233		-----		-----		-----		-----		-----		-----	
1259	ISO3405-automated	168.6	C	202.0		278.8	C	342.1		352.4		360.6	
1389	D86-automated	162.9	C	205.8		278.2		343.6		355.2		360.8	
1402	ISO3405-automated	169.8		205.8		279.4		344.3		356.4		365.7	
1459	ISO3405-automated	168.3		205.1		278.1		343.0		354.5		361.9	
1521	ISO3405-automated	169.6		206.0		280.0		346.5		361.1		365.5	
1544	ISO3405-automated	170.70		207.05		279.30		343.90		356.95		363.50	
1554		-----		205.1		280.1		343.6		356.5		-----	
1631		-----		-----		-----		-----		-----		-----	
1635		168.2		205.8		279.7		344.4		357.1		365.8	
1706	ISO3405-automated	169.8		206.3		279.8		345.6		358.8		365.6	
1724	D86-automated	165.0		204.1		276.9		342.8		355.5		362.4	
1728	ISO3405-manual	169		204		279.5		345		358		364	
1807	ISO3405-automated	169.8		205.2		279.3		344.7		355.5		366.1	
1833		-----		205.3		278.3		343.1		355.5		364.8	
2146	ISO3405-automated	168.9		205.3		280.7		346.3		362.3		366.5	
6075		-----		-----		-----		-----		-----		-----	
6168	D86-automated	169.0		206.8		282.1		348.7	R(5)	362.3		369.1	
6180	D86-automated	168.3		203.1		278.3		346.1		358.5		364.9	
6370	ISO3405-automated	172.3		203.4		281.5		346.2		355.5		362.4	
6371	ISO3405-automated	167.96		203.53		281.80		346.76		356.86		360.53	
6373		170.0		206.1		280.0		345.7		360.3		365.3	
6496	ISO3405-automated	173.5		204.8		279.7		345.0		358.5		364.5	
6499	D86-automated	169.0		203.6		280.4		246.8	R(1)	360.0		360.8	
6502		-----		-----		-----		-----		-----		-----	
	normality	OK		OK		OK		OK		suspect		OK	
	n	46		48		48		46		47		47	
	outliers	0		0		1		3		0		1	
	mean (n)	168.15		205.12		279.28		344.66		357.68		364.64	
	st.dev. (n)	2.499		1.534		1.088		1.110		2.153		2.288	
	R(calc.)	7.00		4.30		3.05		3.11		6.03		6.41	
	st.dev.(ISO3405-A:19)	3.303		1.612		1.071		1.846		3.191		2.536	
	R(ISO3405-A:19)	9.25		4.51		3		5.17		8.94		7.1	
Compare:													
	R(ISO3405-M:19)	6.24		4.76		4.12		4.12		4.46		3.68	

Lab 1259 first reported 157.5 for IBP and 276.1 for 50% recovered
Lab 1389 first reported 142.9

Initial Boiling Point

Kernel Density

10% recovered

Kernel Density

50% recovered

Kernel Density

90% recovered

Kernel Density

95% recovered

Kernel Density

Final Boiling Point

Kernel Density
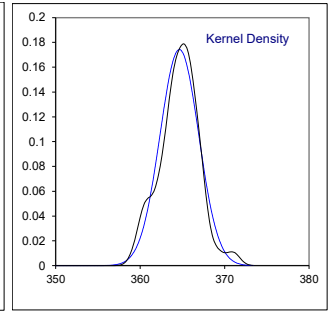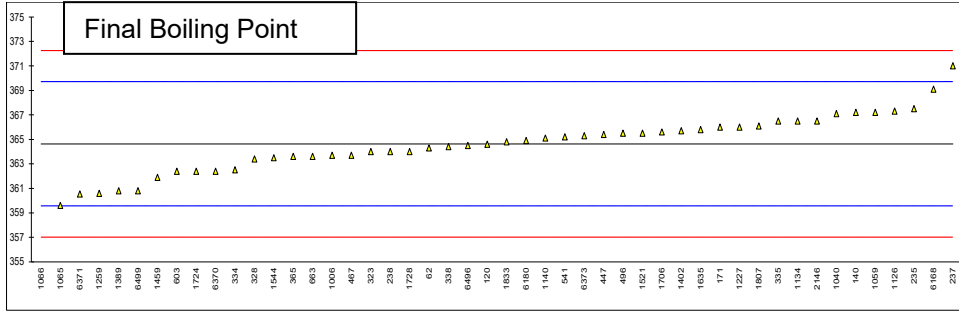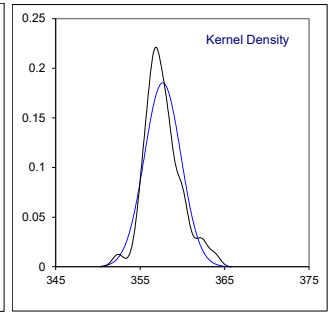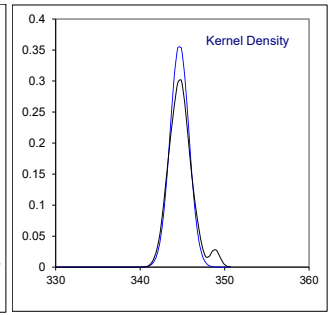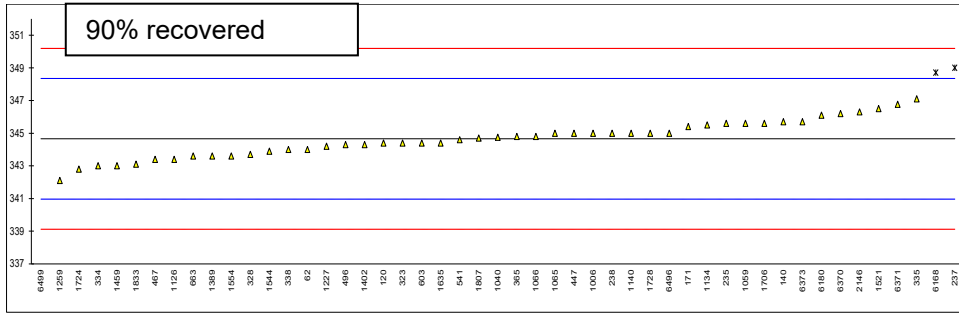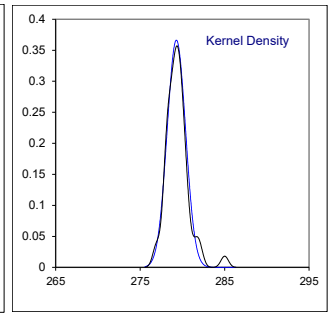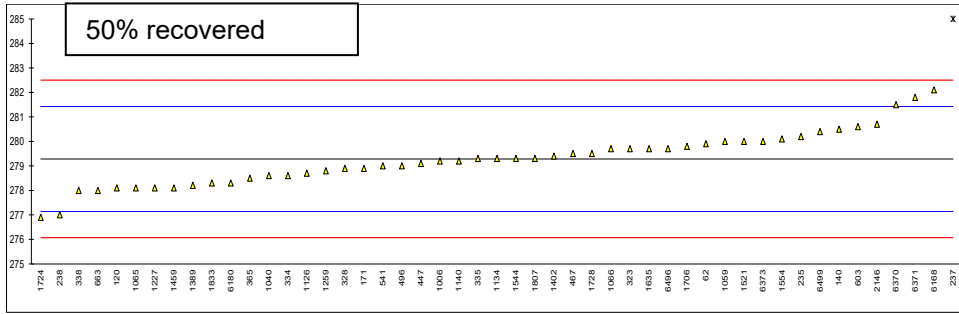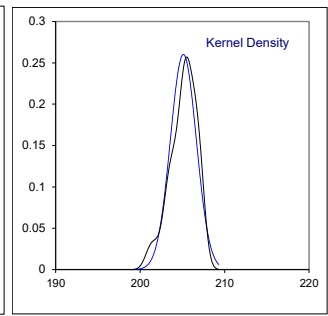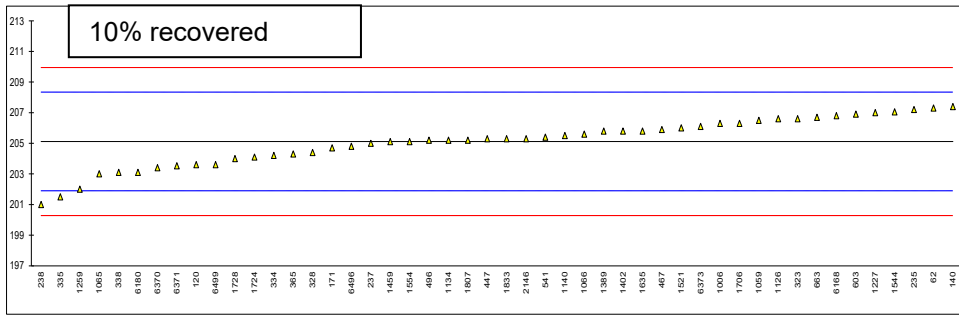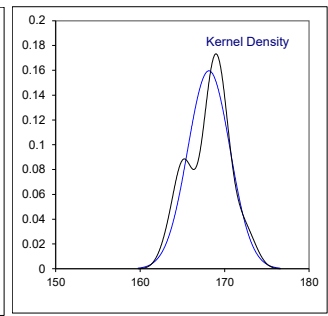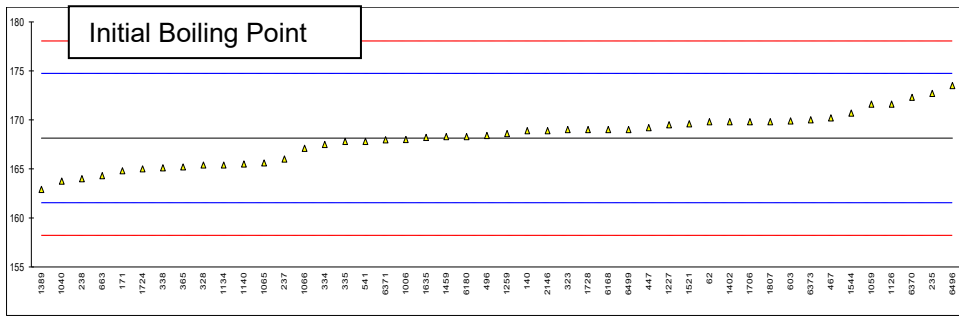
## Determination of Distillation at 760 mmHg on sample #23075; result in %V/V

lab	method	Vol at 250°C	mark	z(targ)	Vol at 350°C	mark	z(targ)	% residue	remark
62		-----		-----	-----		-----	1.3	
120		-----		-----	-----		-----	-----	
140	ISO3405-automated	34.1		-0.89	92.0		-0.51	1.4	
150		-----		-----	-----		-----	-----	
171	D86-automated	34.9		-0.06	91.7		-0.82	1.1	
235	D86-automated	34.0		-0.99	92.1		-0.41	1.2	
237	D86-manual	33.0	R(0.05)	-2.03	90.0	R(0.05)	-2.58	1.0	
238	D86-manual	35.0		0.05	91.0		-1.55	1.0	
300		-----		-----	-----		-----	-----	
323	ISO3405-automated	34.9		-0.06	92.8		0.32	1.2	
328	ISO3405-automated	35.0		0.05	93.0		0.53	1.3	
334	ISO3405-automated	35.1		0.15	93.1		0.63	1.4	
335	D86-automated	35.1		0.15	91.2		-1.34	0.3	
338	ISO3405-automated	35.6		0.67	92.8		0.32	1.4	
365	D86-automated	35.3		0.36	92.4		-0.10	1.5	
445		-----		-----	-----		-----	-----	
447	IP123-automated	34.5		-0.47	92.2		-0.30	1.4	
460		-----		-----	-----		-----	-----	
467	ISO3405-automated	34.5		-0.47	92.9		0.42	1.5	
496	ISO3405-automated	35.3		0.36	92.7		0.22	1.0	
529		-----		-----	-----		-----	-----	
541		-----		-----	-----		-----	-----	
603		-----		-----	-----		-----	1.4	
663	D86-automated	34.8		-0.16	93.1		0.63	1.7	
1006	D86-automated	34.9		-0.06	92.5		0.01	0.5	
1016		-----		-----	-----		-----	-----	
1017		-----		-----	-----		-----	-----	
1040		35.65		0.72	92.65		0.16	1.7	
1059	ISO3405-automated	34.5		-0.47	92.0		-0.51	1.4	
1065		-----		-----	-----		-----	-----	
1066	D86-automated	35.0		0.05	92.6		0.11	1.4	
1126	D86-automated	34.7		-0.26	93.0		0.53	1.5	
1134	IP123-automated	35.2		0.26	92.1		-0.41	1.4	
1140	IP123-automated	36.4		1.50	93.4		0.94	-----	
1194		-----		-----	-----		-----	-----	
1227		35.4		0.46	92.9		0.42	1.16	
1233		-----		-----	-----		-----	-----	
1259	ISO3405-automated	37.2	R(0.05)	2.33	94.3		1.87	1.4	
1389	D86-automated	35.0		0.05	93.1		0.63	1.0	
1402	ISO3405-automated	34.5		-0.47	92.8		0.32	1.2	
1459	ISO3405-automated	35.2		0.26	93.5		1.04	1.4	
1521	ISO3405-automated	34.6		-0.37	91.7		-0.82	1.3	
1544	ISO3405-automated	34.50		-0.47	92.30		-0.20	1.80	
1554	ISO3405-automated	35.1		0.15	92.5		0.01	-----	
1631		-----		-----	-----		-----	-----	
1635		34.8		-0.16	92.7		0.22	1.4	
1706	ISO3405-automated	34.5		-0.47	92.1		-0.41	1.6	
1724	D86-automated	36.3		1.40	93.2		0.73	1.4	
1728	ISO3405-manual	35		0.05	93		0.53	1.5	
1807	ISO3405-automated	34.8		-0.16	92.9		0.42	1.2	
1833		35.4		0.46	93.3		0.84	-----	
2146	ISO3405-automated	34.8		-0.16	91.6		-0.93	1.4	
6075		-----		-----	-----		-----	-----	
6168		-----		-----	-----		-----	1.4	
6180	D86-automated	35.9		0.98	91.9		-0.61	1.6	
6370	ISO3405-automated	34.9		-0.06	92.1		-0.41	1.8	
6371	ISO3405-automated	34.06		-0.93	91.63		-0.89	1.8	
6373		34.6		-0.37	91.9		-0.61	1.4	
6496	ISO3405-automated	34.6		-0.37	92.4		-0.10	1.4	
6499	D86-automated	34.7		-0.26	91.6		-0.93	1.5	
6502		-----		-----	-----		-----	-----	
	normality	suspect			OK				
	n	41			42				
	outliers	2			1				
	mean (n)	34.95			92.49				
	st.dev. (n)	0.520			0.671				
	R(calc.)	1.46			1.88				
	st.dev.(ISO3405-A:19)	0.964			0.964				
	R(ISO3405-A:19)	2.7			2.7				
Compare:									
	R(ISO3405-M:19)	5.46			5.06				

Volume at 250 °C

Volume at 350 °C
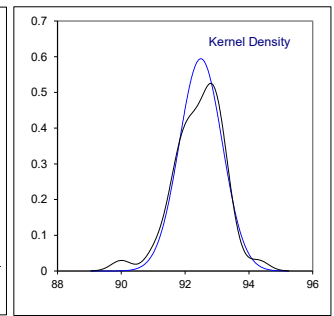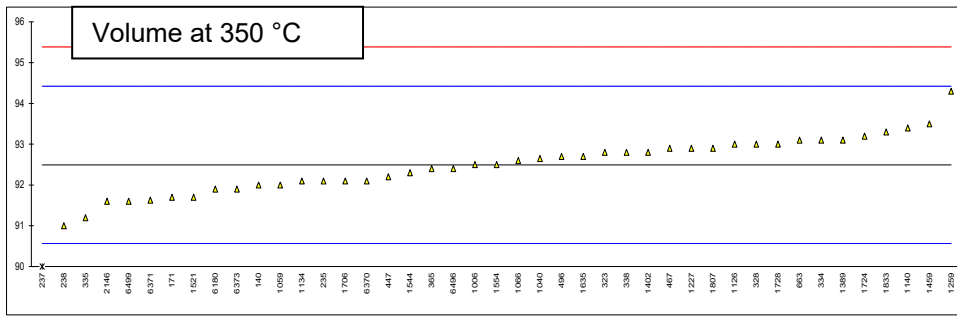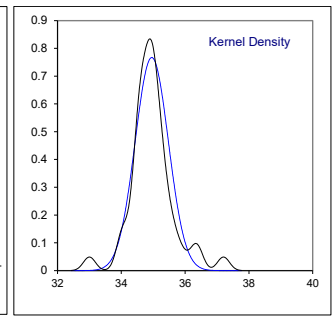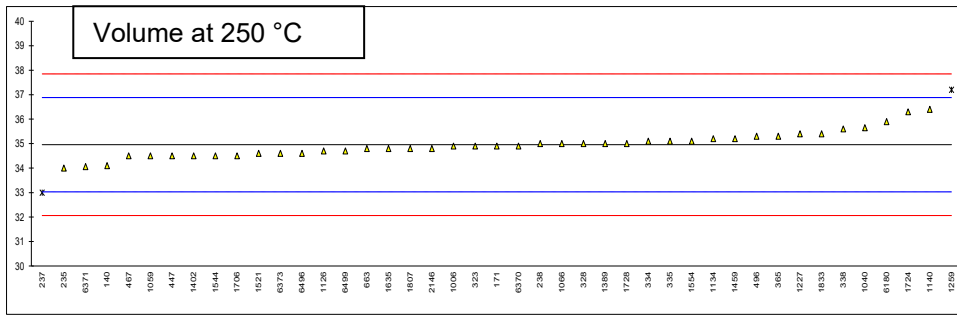
Determination of Fatty Acid Methyl Esters (FAME) on sample #23075; result in %V/V

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D7371	9.76		-0.93	
140		-----		-----	
150		-----		-----	
171	EN14078-B	8.5	R(0.01)	-5.62	
235		-----		-----	
237	D7371	10.1		0.33	
238		-----		-----	
300	EN14078-B	9.9		-0.41	
323	EN14078-B	10.3		1.07	
328	EN14078-B	10.0		-0.04	
334	EN14078-B	9.6		-1.53	
335	EN14078-B	9.756		-0.95	
338		-----		-----	
365	EN14078-B	10.412		1.49	
445		-----		-----	
447	EN14078-B	10.0		-0.04	
460	EN14078-B	9.847		-0.61	
467		-----		-----	
496	EN14078-B	10.495		1.80	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663	EN14078-B	9.88		-0.49	
1006	EN14078-A	10.24		0.85	
1016		-----		-----	
1017	EN14078-A	9.7097		-1.12	
1040	EN14078-A	9.96		-0.19	
1059	EN14078-B	9.1		-3.39	
1065		-----		-----	
1066	EN14078-A	10.1		0.33	
1126		-----		-----	
1134		-----		-----	
1140	EN14078-B	10.55		2.00	
1194	In house	9.4		-2.27	
1227		-----		-----	
1233	EN14078-B	10.35		1.26	
1259	EN14078-A	9.93		-0.30	
1389	EN14078-B	9.5		-1.90	
1402	EN14078-B	10.012		0.00	
1459	EN14078-B	10.28		1.00	
1521		-----		-----	
1544	EN14078-B	10.08		0.26	
1554	EN14078-B	10.0		-0.04	
1631		-----		-----	
1635		-----		-----	
1706	EN14078-B	9.9		-0.41	
1724	EN14078-A	10.616		2.25	
1728		-----		-----	
1807	EN14078-B	10.0		-0.04	
1833	EN14078	9.98		-0.12	
2146	In house	9.85		-0.60	
6075		-----		-----	
6168	EN14078-B	10.3		1.07	
6180		-----		-----	
6370	EN14078-B	9.95		-0.23	
6371	EN14078-B	10.0		-0.04	
6373	EN14078-B	10.2		0.70	
6496	EN14078-B	10.66		2.41	
6499	EN14078-B	9.70		-1.16	
6502		-----		-----	
	normality	OK			
	n	37			
	outliers	1			
	mean (n)	10.011			
	st.dev. (n)	0.3331			
	R(calc.)	0.933			
	st.dev.(EN14078-B:14)	0.2688			
	R(EN14078-B:14)	0.753			
Compare:					
	R(D7371:14R22)	1.189			
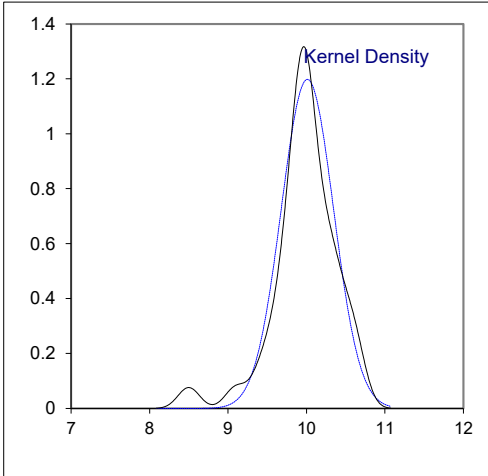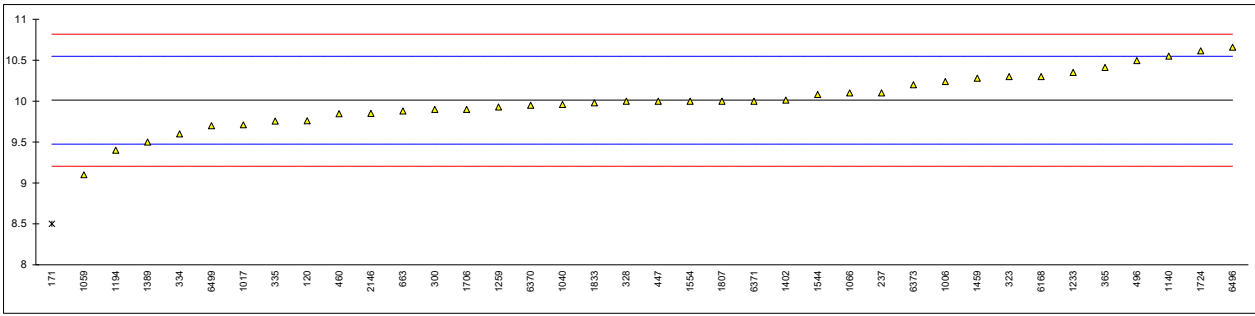
Determination of Flash Point PMcc on sample #23075; result in °C

lab	method	value	mark	z(targ)	remarks
62	D93-A	53.0		-1.04	
120		-----		-----	
140	ISO2719-A	56.0		1.14	
150	D93-A	55		0.41	
171	ISO2719-A	52.0		-1.76	
235	ISO2719-A	51.0		-2.49	
237	D93-A	54.0		-0.31	
238	D93-A	58.0		2.59	
300	ISO2719-C	52.5		-1.40	
323	ISO2719-B	54.5		0.05	
328	ISO2719-A	58.0		2.59	
334	D93-A	57.0		1.86	
335	ISO2719-A	56.0		1.14	
338		-----		-----	
365	IP34-A	55.425		0.72	
445		-----		-----	
447	IP34-A	55.0		0.41	
460		-----		-----	
467	ISO2719-A	53.5		-0.68	
496	ISO2719-A	10.495	R(0.01)	-31.83	
529		-----		-----	
541	D93-A	51.0		-2.49	
603	D93-A	53.5		-0.68	
663	D93-A	53.0		-1.04	
1006	D93-A	54.0		-0.31	
1016		-----		-----	
1017	D93-A	54.0		-0.31	
1040	ISO2719-A	53.0		-1.04	
1059	ISO2719-A	52.5		-1.40	
1065		-----		-----	
1066	D93-A	56.0		1.14	
1126		-----		-----	
1134	IP34-A	54.5		0.05	
1140	IP34-A	52.5		-1.40	
1194		-----		-----	
1227	D93-A	53		-1.04	
1233	ISO2719-B	53.0		-1.04	
1259	D93-A	55.0		0.41	
1389	D93-A	58.0		2.59	
1402	ISO2719-B	54.5		0.05	
1459	ISO2719-A	53.5		-0.68	
1521	ISO2719-A	55.0		0.41	
1544	ISO2719-A	52.50		-1.40	
1554	ISO2719-A	53.5		-0.68	
1631		-----		-----	
1635	D93-A	53		-1.04	
1706		-----		-----	
1724		54		-0.31	
1728	D93-A	57		1.86	
1807	ISO2719-A	57.5		2.22	
1833	ISO2719-A	55		0.41	
2146		-----		-----	
6075		-----		-----	
6168	D93-A	54.0		-0.31	
6180	D93-A	53.0		-1.04	
6370	ISO2719-A	55.5		0.77	
6371	ISO2719-A	56.0		1.14	
6373	ISO2719-A	58.0		2.59	
6496		-----		-----	
6499	D93-A	53.5		-0.68	
6502		-----		-----	

normality	OK	
n	45	
outliers	1	
mean (n)	54.432	
st.dev. (n)	1.8534	
R(calc.)	5.190	
st.dev.(ISO2719-A:16+A1:21)	1.3802	
R(ISO2719-A:16+A1:21)	3.865	
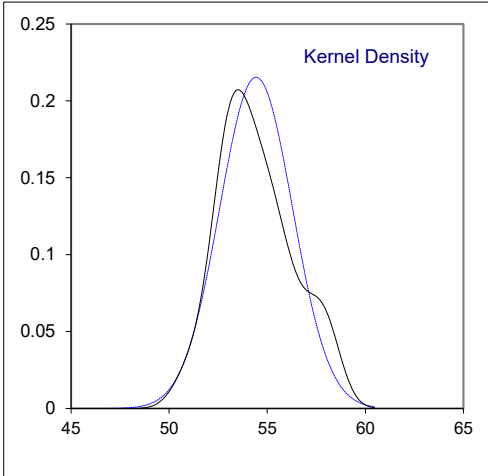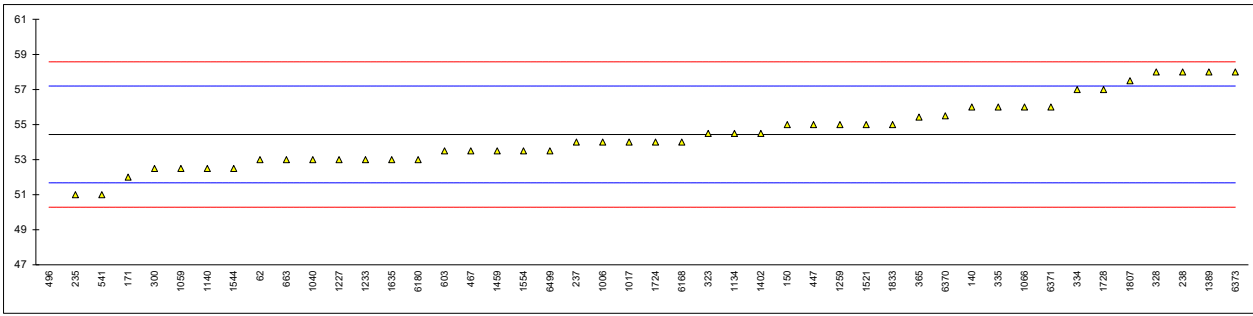
Determination of Kinematic Viscosity at 40 °C on sample #23075; result in mm^2/s

lab	method	value	mark	z(targ)	remarks
62	D445	2.877		0.07	
120	D445	2.869		-0.63	
140		-----		-----	
150		-----		-----	
171	ISO3104-A	2.866		-0.90	
235	D445	2.882		0.51	
237	D445	2.894		1.57	
238		-----		-----	
300	ISO3104-A	2.876		-0.02	
323	ISO3104-B	2.876		-0.02	
328		-----		-----	
334	ISO3104-A	2.871		-0.46	
335	ISO3104-A	2.895		1.66	
338		-----		-----	
365	IP71	2.873		-0.28	
445		-----		-----	
447	D445	2.883		0.60	
460		-----		-----	
467	ISO3104-A	2.8752		-0.09	
496	ISO3104-B	2.872		-0.37	
529		-----		-----	
541	D445	2.867		-0.81	
603	D445	2.897		1.83	
663	D445	2.876		-0.02	
1006	D445	2.887		0.95	
1016		-----		-----	
1017		-----		-----	
1040	D7042	2.870		-0.54	
1059	ISO3104-B	2.882		0.51	
1065	D445	2.891		1.31	
1066	D445	2.876		-0.02	
1126		-----		-----	
1134	IP71	2.8578		-1.62	
1140	IP71	2.870		-0.54	
1194		-----		-----	
1227	D445	2.8748		-0.12	
1233	ISO3104-B	2.863		-1.16	
1259	D7042	2.866		-0.90	
1389	D445	2.879		0.25	
1402	ISO3104-A	2.871		-0.46	
1459	D7042	2.8787		0.22	
1521	ISO3104-A	2.8534		-2.01	
1544	ISO3104-A	2.8772		0.09	
1554	ISO3104-A	2.882		0.51	
1631		-----		-----	
1635	D7042	2.880		0.34	
1706	ISO3104-B	2.874		-0.19	
1724	D445	2.872		-0.37	
1728		-----		-----	
1807	ISO3104-A	2.826	C,R(0.01)	-4.42	first reported 2.933
1833	D445	2.875		-0.10	
2146		-----		-----	
6075		-----		-----	
6168		-----		-----	
6180	D445	2.875		-0.10	
6370	D7042	2.9141	R(0.05)	3.34	
6371	D7042	2.9008		2.17	
6373	D445	2.866		-0.90	
6496		-----	W	-----	test result withdrawn, reported 2.918
6499		-----		-----	
6502		-----		-----	

normality	OK	
n	39	
outliers	2	
mean (n)	2.87618	
st.dev. (n)	0.010117	
R(calc.)	0.02833	
st.dev.(ISO3104:20)	0.011352	
R(ISO3104:20)	0.03178	
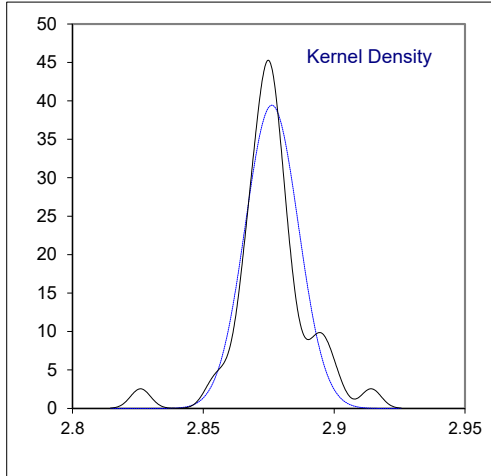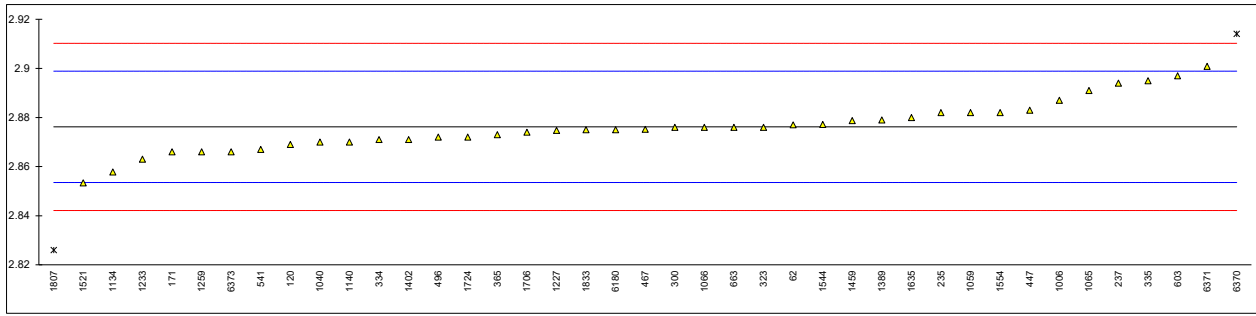
Determination of Lubricity by HFRR at 60 °C on sample #23075; result in µm

lab	method	value	mark	z(targ)	corrected	remarks
62	D6079	220		1.39	No	
120	D6079	187.0	C	0.23	No	first reported 280.5
140		-----		-----		
150		-----		-----		
171	ISO12156-1-A	160		-0.71	Yes	
235		-----		-----		
237	D6079	200		0.69		
238		-----		-----		
300		-----		-----		
323	ISO12156-1-B	175		-0.19		
328		-----		-----		
334	ISO12156-1-B	180		-0.01		
335		-----		-----		
338		-----		-----		
365		-----		-----		
445		-----		-----		
447	ISO12156-1-B	176		-0.15	No	
460		-----		-----		
467	ISO12156-1-A	187		0.23	Yes	
496	ISO12156-1-B	169		-0.40	Yes	
529		-----		-----		
541		-----		-----		
603		-----		-----		
663		-----		-----		
1006	D6079	194		0.48		
1016		-----		-----		
1017		-----		-----		
1040		-----		-----		
1059	ISO12156-1-A	170		-0.36	No	
1065		-----		-----		
1066		-----		-----		
1126		-----		-----		
1134	ISO12156-1-A	136		-1.55	Yes	
1140	IP450	162		-0.64		
1194		-----		-----		
1227		-----		-----		
1233	ISO12156-1-A	201		0.72		
1259	ISO12156-1-B	160		-0.71	No	
1389	ISO12156-1-B	176		-0.15	No	
1402	ISO12156-1-B	190		0.34	No	
1459		-----		-----		
1521		-----		-----		
1544	ISO12156-1-A	194.0		0.48	No	
1554		-----		-----		
1631		-----		-----		
1635		-----		-----		
1706		-----		-----		
1724	IP450	180		-0.01	No	
1728		-----		-----		
1807	ISO12156-1-A	180		-0.01		
1833		-----		-----		
2146		-----		-----		
6075		-----		-----		
6168		-----		-----		
6180		-----		-----		
6370		-----		-----		
6371		-----		-----		
6373	ISO12156-1-A	190		0.34	Yes	
6496	ISO12156-1-A	180		-0.01		
6499		-----		-----		
6502		-----		-----		

	normality	suspect	
	n	22	
	outliers	0	
	mean (n)	180.32	
	st.dev. (n)	17.548	
	R(calc.)	49.14	
	st.dev.(ISO12156-1-A:18 (Digital Camera))	28.571	
	R(ISO12156-1-A:18 (Digital Camera))	80	
Compare:			
	R(ISO12156-1-B:18 (Visual))	90	

Kernel Density
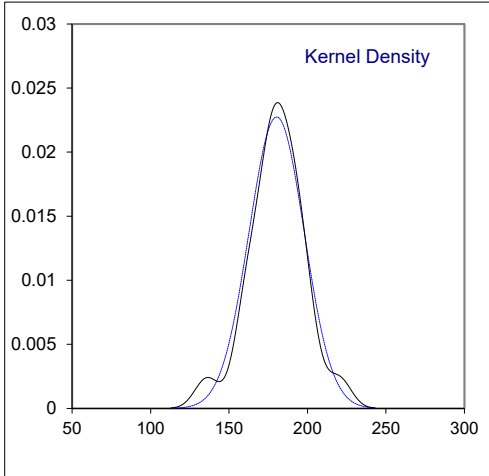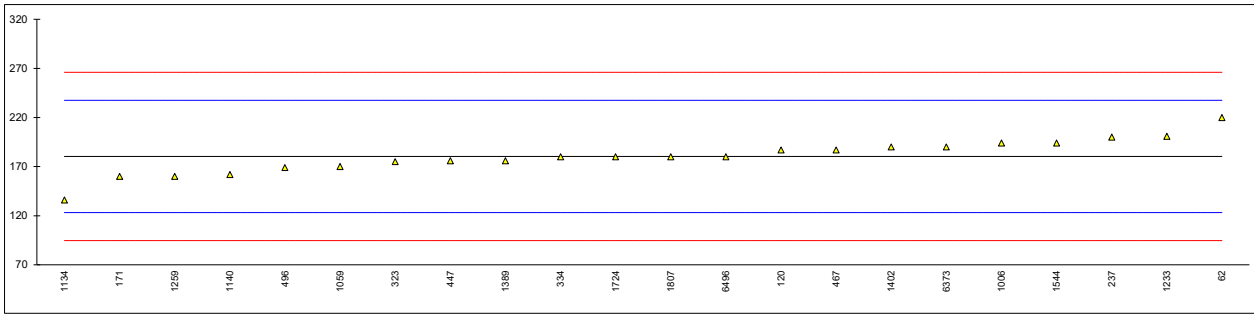
Determination of Oxidation Stability on sample #23075; result in g/m^3

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140		-----		-----	
150		-----		-----	
171		-----		-----	
235		-----		-----	
237		-----		-----	
238		-----		-----	
300		-----		-----	
323		-----		-----	
328		-----		-----	
334	ISO12205	1		-----	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447	ISO12205	0		-----	
460		-----		-----	
467		-----		-----	
496		-----		-----	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663		-----		-----	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	ISO12205	0.571		-----	
1065		-----		-----	
1066		-----		-----	
1126		-----		-----	
1134		-----		-----	
1140		-----	W	-----	test result withdrawn, reported 27.58
1194		-----		-----	
1227		-----		-----	
1233		-----		-----	
1259		-----		-----	
1389		-----		-----	
1402	ISO12205	<0.1		-----	
1459		-----		-----	
1521	ISO12205	2.0		-----	
1544		-----		-----	
1554		-----		-----	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724		-----	W	-----	test result withdrawn, reported 11.14
1728		-----		-----	
1807	ISO12205	<1		-----	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168		-----		-----	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373		-----		-----	
6496	ISO12205	3.14		-----	
6499		-----		-----	
6502		-----		-----	
	n	7			
	mean (n)	<4			

Determination of Oxidation Stability Induction period on sample #23075; result in hours

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140		-----		-----	
150		-----		-----	
171	EN15751	41.2		-0.20	
235		-----		-----	
237		-----		-----	
238		-----		-----	
300		-----		-----	
323	EN15751	42.2		0.13	
328	EN15751	>48		-----	
334	EN15751	46.4		1.55	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447	EN15751	>20		-----	
460		-----		-----	
467		-----		-----	
496	EN15751	33.13		-2.91	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663		-----		-----	
1006	EN15751	50.2		2.82	
1016	EN15751	7.595	G(0.01)	-11.50	
1017		-----		-----	
1040		-----		-----	
1059		-----		-----	
1065		-----		-----	
1066		-----		-----	
1126		-----		-----	
1134		-----		-----	
1140	EN15751	27.58		-4.78	
1194		-----		-----	
1227	EN15751	43.9		0.71	
1233		-----		-----	
1259	EN15751	40		-0.61	
1389		-----		-----	
1402	EN15751	45.85		1.36	
1459	EN15751	49.575		2.61	
1521	EN15751	43.82		0.68	
1544	EN15751	37.77		-1.36	
1554		-----		-----	
1631	EN15751	>48		-----	
1635		-----		-----	
1706		-----		-----	
1724	EN15751	>48		-----	
1728		-----		-----	
1807	EN15751	>40		-----	
1833	EN15751	>48		-----	
2146		-----		-----	
6075		-----		-----	
6168		-----		-----	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373		-----		-----	
6496		-----		-----	
6499	EN15751	108.78	G(0.01)	22.51	
6502		-----		-----	

	normality	OK	
	n	12	
	outliers	2	
	mean (n)	41.802	
	st.dev. (n)	6.5674	
	R(calc.)	18.389	
	st.dev.(EN15751:14)	2.9753	
	R(EN15751:14)	8.331	
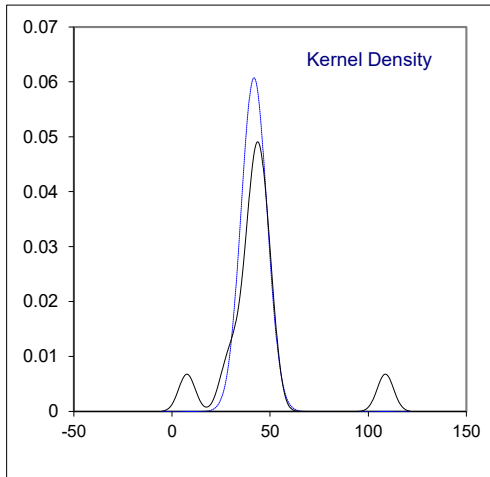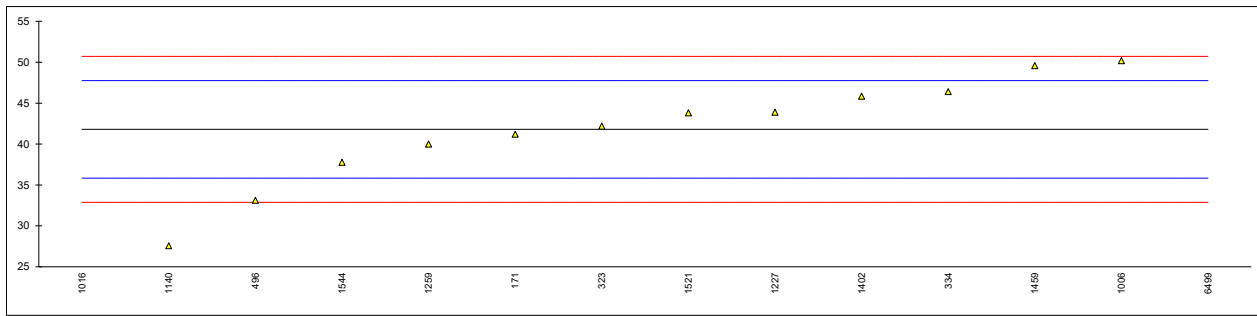
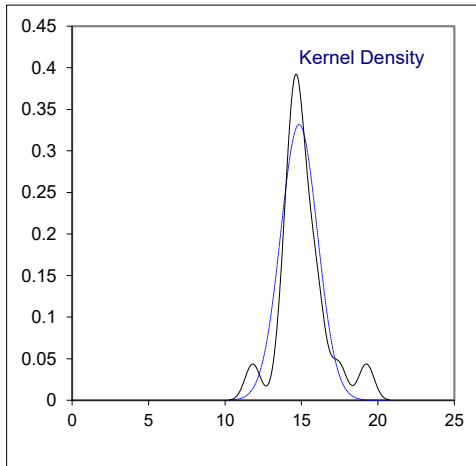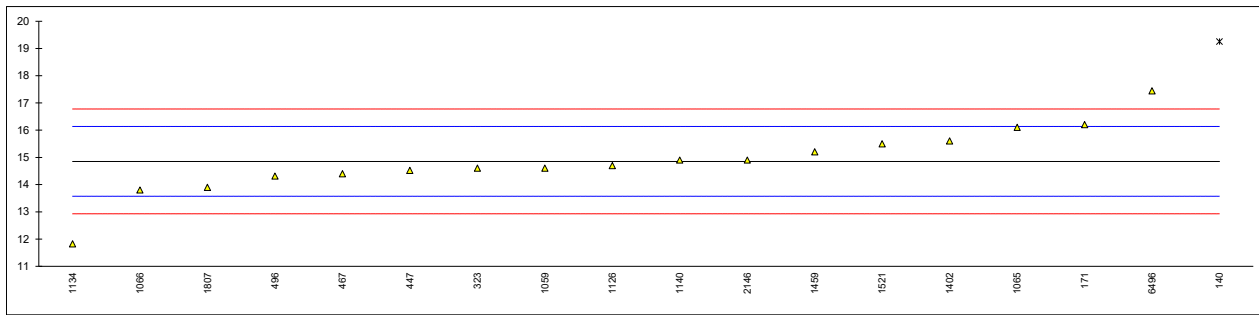Determination of Polycyclic Aromatic Hydrocarbons *) on sample #23075; result in %M/M

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140	EN12916	1.9	E	2.23	calculation difference, iis calculated 1.0
150		-----		-----	
171		5.1	G(0.01)	14.83	
235		-----		-----	
237		-----		-----	
238		-----		-----	
300		-----		-----	
323	EN12916	1.2		-0.52	
328		-----		-----	
334		-----		-----	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447	IP391	1.13		-0.80	
460		-----		-----	
467	EN12916	1.18		-0.60	
496		1.22		-0.44	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663		-----		-----	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	EN12916	1.0		-1.31	
1065		-----		-----	
1066	EN12916	4.3	G(0.01)	11.68	
1126		1.5		0.66	
1134		0.900	C	-1.70	first reported 0.164
1140	IP391	1.3		-0.13	
1194	EN12916	0.3		-4.06	
1227		-----		-----	
1233		-----		-----	
1259		-----		-----	
1389		-----		-----	
1402	EN12916	1.5		0.66	
1459	EN12916	1.17		-0.64	
1521	EN12916	1.2		-0.52	
1544	EN12916	1.290		-0.17	
1554	EN12916	1.071		-1.03	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724	IP391	1.038		-1.16	
1728		-----		-----	
1807	EN12916	1.3		-0.13	
1833		-----		-----	
2146	EN12916	1.7		1.45	
6075		-----		-----	
6168		-----		-----	
6180		-----		-----	
6370		2.1		3.02	
6371		2.0		2.63	
6373		-----		-----	
6496		1.98		2.55	
6499		-----		-----	
6502		-----		-----	
	normality	OK			
	n	21			
	outliers	2			
	mean (n)	1.332			
	st.dev. (n)	0.4259			
	R(calc.)	1.193			
	st.dev.(EN12916:19)	0.2541			
	R(EN12916:19)	0.711			

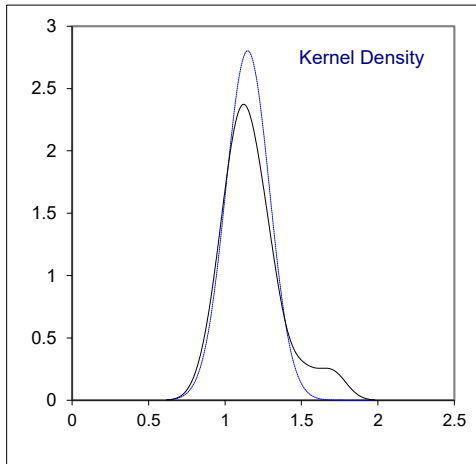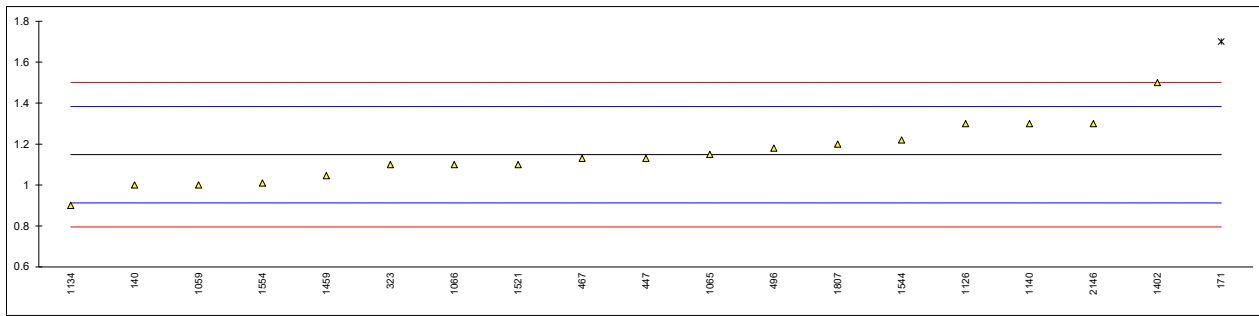*) %Polycyclic Aromatic Hydrocarbons = sum of the di-aromatic hydrocarbons and tri+-aromatic hydrocarbons
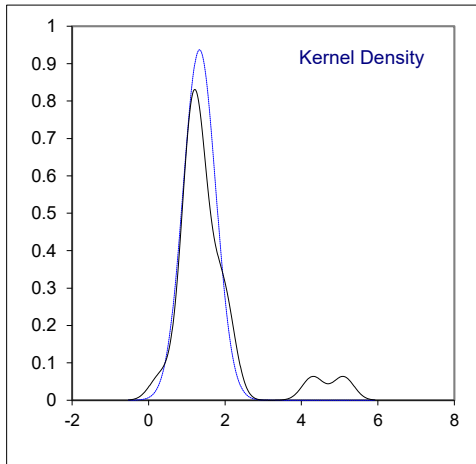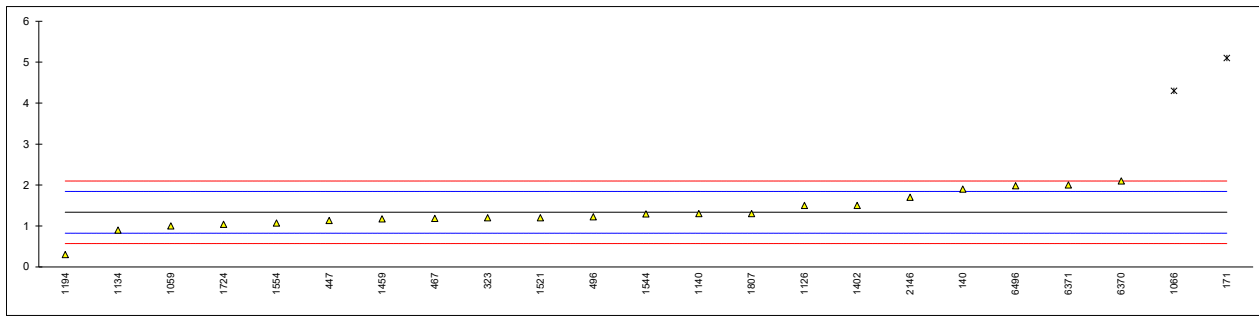
Determination of Mono Aromatic Hydrocarbons on sample #23075; result in %M/M

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140	EN12916	19.25	C,G(0.05)	6.86	first reported 18.3
150		-----		-----	
171		16.2		2.10	
235		-----		-----	
237		-----		-----	
238		-----		-----	
300		-----		-----	
323	EN12916	14.6		-0.39	
328		-----		-----	
334		-----		-----	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447	IP391	14.52	C	-0.52	first reported 11.58
460		-----		-----	
467	EN12916	14.40		-0.71	
496		14.31		-0.85	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663		-----		-----	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	EN12916	14.6		-0.39	
1065		16.1		1.95	
1066	EN12916	13.8		-1.64	
1126		14.7		-0.24	
1134		11.823	C	-4.73	first reported 11.274
1140	IP391	14.9		0.07	
1194		-----		-----	
1227		-----		-----	
1233		-----		-----	
1259		-----		-----	
1389		-----		-----	
1402	EN12916	15.6		1.17	
1459	EN12916	15.205		0.55	
1521	EN12916	15.5		1.01	
1544		-----		-----	
1554		-----		-----	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724		-----		-----	
1728		-----		-----	
1807	EN12916	13.9		-1.49	
1833		-----		-----	
2146	EN12916	14.9		0.07	
6075		-----		-----	
6168		-----		-----	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373		-----		-----	
6496		17.44		4.04	
6499		-----		-----	
6502		-----		-----	
	normality	not OK			
	n	17			
	outliers	1			
	mean (n)	14.853			
	st.dev. (n)	1.2023			
	R(calc.)	3.366			
	st.dev.(EN12916:19)	0.6410			
	R(EN12916:19)	1.795			

Kernel Density

Determination of Di Aromatic Hydrocarbons on sample #23075; result in %M/M

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140	EN12916	1.0	C	-1.26	first reported 1.9
150		-----		-----	
171		1.7	G(0.05)	4.69	
235		-----		-----	
237		-----		-----	
238		-----		-----	
300		-----		-----	
323	EN12916	1.1		-0.41	
328		-----		-----	
334		-----		-----	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447	IP391	1.13		-0.15	
460		-----		-----	
467	EN12916	1.13		-0.15	
496		1.18		0.27	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663		-----		-----	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	EN12916	1.0		-1.26	
1065		1.15		0.02	
1066	EN12916	1.1		-0.41	
1126		1.3		1.29	
1134		0.900	C	-2.11	first reported 0.164
1140	IP391	1.3		1.29	
1194		-----		-----	
1227		-----		-----	
1233		-----		-----	
1259		-----		-----	
1389		-----		-----	
1402	EN12916	1.5		2.99	
1459	EN12916	1.045		-0.88	
1521	EN12916	1.1		-0.41	
1544	EN12916	1.220		0.61	
1554	EN12916	1.010		-1.17	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724		-----		-----	
1728		-----		-----	
1807	EN12916	1.2		0.44	
1833		-----		-----	
2146	EN12916	1.3		1.29	
6075		-----		-----	
6168		-----		-----	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373		-----		-----	
6496		-----	W	-----	test result withdrawn, reported 1.66
6499		-----		-----	
6502		-----		-----	

|			
normality	OK		
n	18		
outliers	1		
mean (n)	1.148		
st.dev. (n)	0.1424		
R(calc.)	0.399		
st.dev.(EN12916:19)	0.1178		
R(EN12916:19)	0.330		

Determination of Tri+ Aromatic Hydrocarbons on sample #23075; result in %M/M

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140	EN12916	0		-0.62	
150		-----		-----	
171		3.4	DG(0.01)	17.63	
235		-----		-----	
237		-----		-----	
238		-----		-----	
300		-----		-----	
323	EN12916	<0.1		-----	
328		-----		-----	
334		-----		-----	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447	IP391	0		-0.62	
460		-----		-----	
467	EN12916	<0,1		-----	
496		0.04		-0.40	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663		-----		-----	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	EN12916	<0,1		-----	
1065		0.1		-0.08	
1066	EN12916	3.2	DG(0.01)	16.56	
1126		0.2		0.46	
1134		<0.1		-----	
1140	IP391	0.0		-0.62	
1194		-----		-----	
1227		-----		-----	
1233		-----		-----	
1259		-----		-----	
1389		-----		-----	
1402	EN12916	<0.1		-----	
1459	EN12916	0.13		0.08	
1521	EN12916	0.1		-0.08	
1544	EN12916	0.070		-0.24	
1554	EN12916	0.061		-0.29	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724		-----		-----	
1728		-----		-----	
1807	EN12916	0.1		-0.08	
1833		-----		-----	
2146	EN12916	0.37		1.37	
6075		-----		-----	
6168		-----		-----	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373		-----		-----	
6496		0.32		1.10	
6499		-----		-----	
6502		-----		-----	

normality	suspect	
n	13	
outliers	2	
mean (n)	0.115	
st.dev. (n)	0.1174	
R(calc.)	0.329	
st.dev.(EN12916:19)	0.1863	
R(EN12916:19)	0.522	
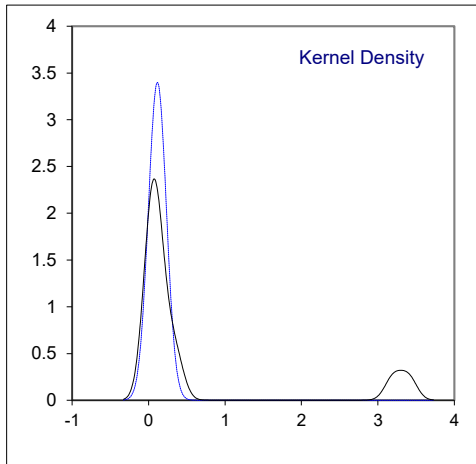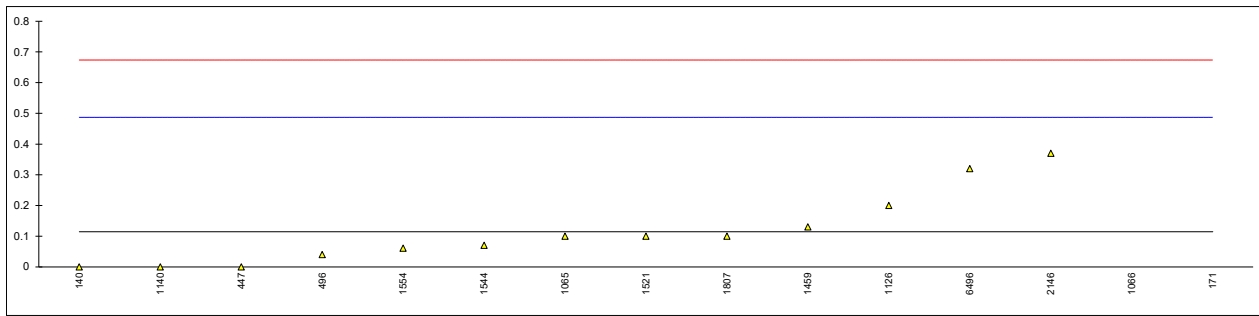
Determination of Total Aromatic Hydrocarbons on sample #23075; result in %M/M

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120		-----		-----	
140	EN12916	20.25	ex,C	6.98	first reported 20.2
150		-----		-----	
171		21.3	ex	8.74	
235		-----		-----	
237		-----		-----	
238		-----		-----	
300		-----		-----	
323	EN12916	15.8		-0.47	
328		-----		-----	
334		-----		-----	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447	IP391	12.71	DG(0.01)	-5.65	calculation difference, iis calculated 15.65
460		-----		-----	
467	EN12916	15.58		-0.84	
496		15.53		-0.93	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663		-----		-----	
1006		-----		-----	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	EN12916	15.6		-0.81	
1065		-----		-----	
1066	EN12916	18.1	ex	3.38	
1126		16.2		0.20	
1134		12.723	C,DG(0.01)	-5.63	first reported 11.438
1140	IP391	16.2		0.20	
1194	EN12916	8.5	G(0.01)	-12.70	
1227		-----		-----	
1233		-----		-----	
1259		-----		-----	
1389		-----		-----	
1402	EN12916	17.1		1.70	
1459	EN12916	16.4		0.53	
1521	EN12916	16.7		1.03	
1544		-----		-----	
1554		-----		-----	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724		-----		-----	
1728		-----		-----	
1807	EN12916	15.2		-1.48	
1833		-----		-----	
2146	EN12916	16.6		0.87	
6075		-----		-----	
6168		-----		-----	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373		-----		-----	
6496		-----	W	-----	test result withdrawn, reported 19.42
6499		-----		-----	
6502		-----		-----	

normality	OK	
n	11	
outliers	3 +3ex	
mean (n)	16.083	
st.dev. (n)	0.5884	
R(calc.)	1.647	
st.dev.(EN12916:19)	0.5972	
R(EN12916:19)	1.672	

Labs 140, 171 and 1066 test result excluded as statistical outlier in Mono-, Di- and/or Tri+ Aromatic Hydrocarbons
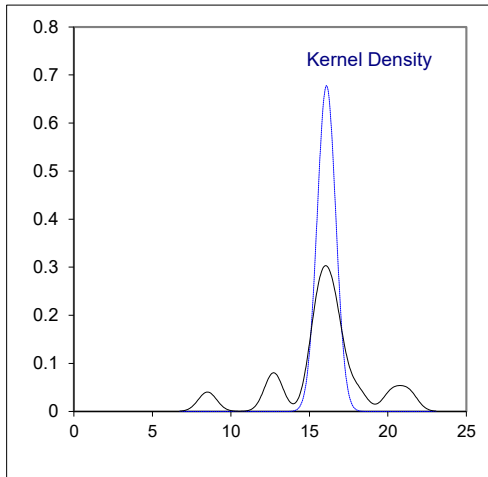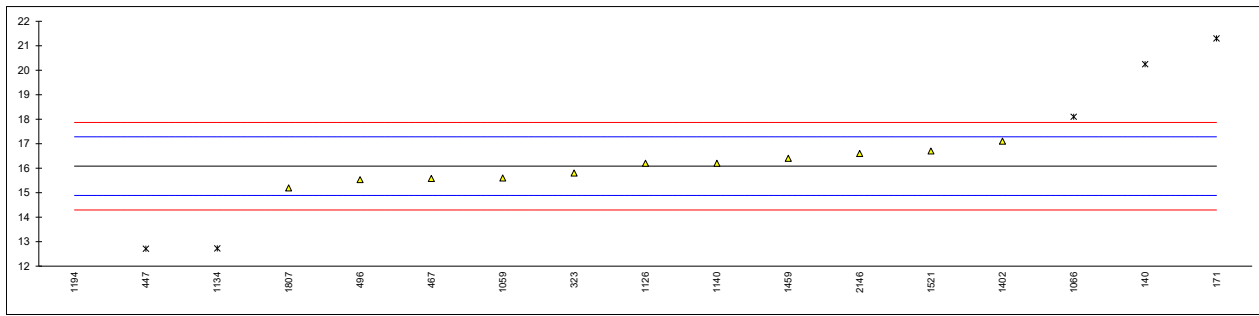
Determination of Pour Point Manual on sample #23075; results in °C

lab	method	value	mark	z(targ)	remarks
62	D97	-33		-1.66	
120	D97	-30	C	-0.39	first reported -21.0
140		-----		-----	
150		-----		-----	
171	D97	-27		0.89	
235	ISO3016-manual	-24		2.16	
237	D97	<-21		-----	
238		-----		-----	
300		-----		-----	
323		-----		-----	
328		-----		-----	
334	ISO3016-automated	-30		-0.39	
335	ISO3016-automated	-27		0.89	
338		-----		-----	
365	IP15	-30		-0.39	
445		-----		-----	
447	IP15	-30		-0.39	
460		-----		-----	
467	ISO3016-manual	-30		-0.39	
496		-----		-----	
529		-----		-----	
541		-----		-----	
603	D97	-30		-0.39	
663	D97	-30		-0.39	
1006	D97	-27		0.89	
1016		-----		-----	
1017		-----		-----	
1040		-----		-----	
1059	ISO3016-automated	-30		-0.39	
1065		-----		-----	
1066	D97	-27		0.89	
1126		-----		-----	
1134	IP15	-27		0.89	
1140		-----		-----	
1194		-----		-----	
1227	D97	-30		-0.39	
1233	ISO3016-manual	<-12		-----	
1259	ISO3016-manual	<-21	C	-----	first reported -21
1389	D97	<-21		-----	
1402	ISO3016-manual	-33		-1.66	
1459		-----		-----	
1521	ISO3016-manual	-31		-0.81	
1544		-----		-----	
1554		-----		-----	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724	D97	<-36		-----	
1728	D97	-30		-0.39	
1807		-----		-----	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168	D97	-27		0.89	
6180	ISO3016-manual	-27		0.89	
6370		-----		-----	
6371		-----		-----	
6373		-----		-----	
6496	D97	-30		-0.39	
6499		-----		-----	
6502		-----		-----	

|		
normality	OK	
n	22	
outliers	0	
mean (n)	-29.091	
st.dev. (n)	2.1802	
R(calc.)	6.105	
st.dev.(ISO3016:19)	2.3571	
R(ISO3016:19)	6.6	
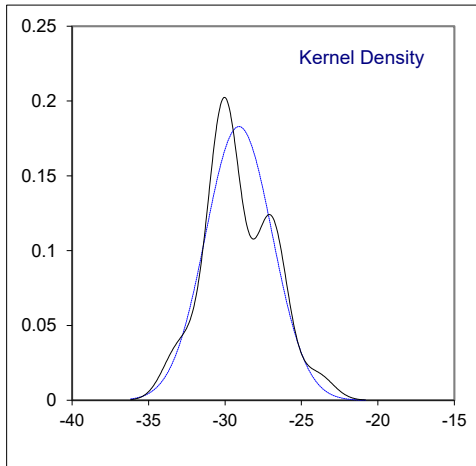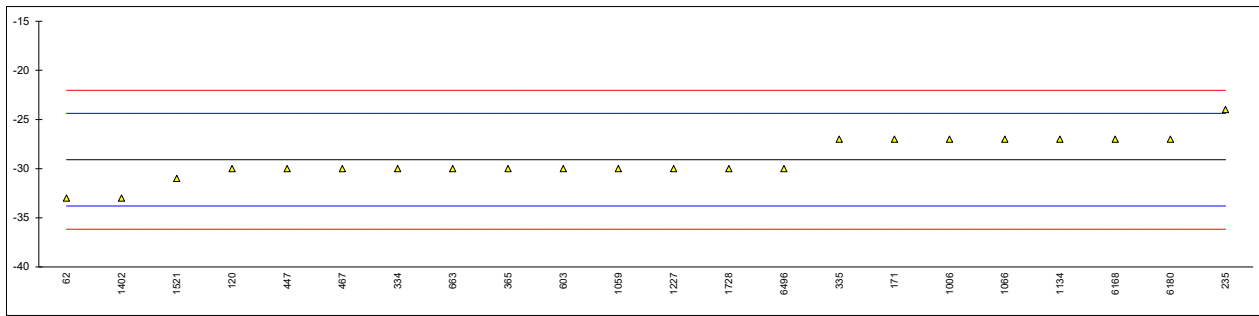
Determination of Pour Point Automated 3 °C interval on sample #23075; results in °C

lab	method	value	mark	z(targ)	remarks
62		-----		-----	
120	D5950	-24.0		2.13	
140		-----		-----	
150	D5950	-27		0.75	
171		-----		-----	
235		-----		-----	
237		-----		-----	
238		-----		-----	
300		-----		-----	
323	D5950	-30		-0.63	
328		-----		-----	
334		-----		-----	
335		-----		-----	
338		-----		-----	
365		-----		-----	
445		-----		-----	
447		-----		-----	
460		-----		-----	
467	D6892	-27		0.75	
496		-----		-----	
529		-----		-----	
541	D5950	-30		-0.63	
603		-----		-----	
663		-----		-----	
1006		-----		-----	
1016		-----		-----	
1017	D5950	-30		-0.63	
1040		-----		-----	
1059		-----		-----	
1065	D5950	-36	D(0.01)	-3.38	
1066		-----		-----	
1126		-----		-----	
1134		-----		-----	
1140	D5950	-30		-0.63	
1194		-----		-----	
1227		-----		-----	
1233		-----		-----	
1259		-----		-----	
1389		-----		-----	
1402		-----		-----	
1459	In house	-30.0		-0.63	
1521		-----		-----	
1544		-----		-----	
1554		-----		-----	
1631		-----		-----	
1635	D7346	-30		-0.63	
1706	ISO3016	-29.0		-0.17	
1724		-----		-----	
1728		-----		-----	
1807		-----		-----	
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168		-----		-----	
6180		-----		-----	
6370		-----		-----	
6371		-----		-----	
6373		-----		-----	
6496		-----		-----	
6499	D6749	-28.0		0.29	
6502		-----		-----	

	normality	not OK	
	n	11	
	outliers	1	
	mean (n)	-28.636	
	st.dev. (n)	1.9633	
	R(calc.)	5.497	
	st.dev.(D5950:14R20)	2.1786	
	R(D5950:14R20)	6.1	
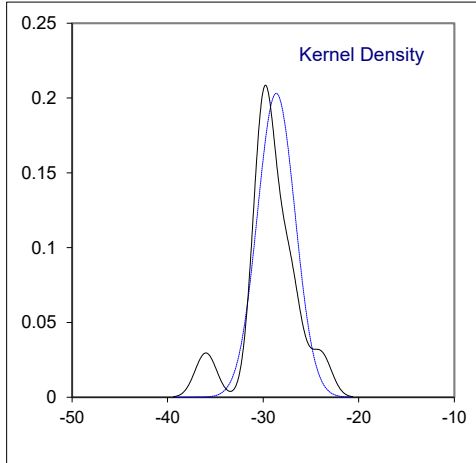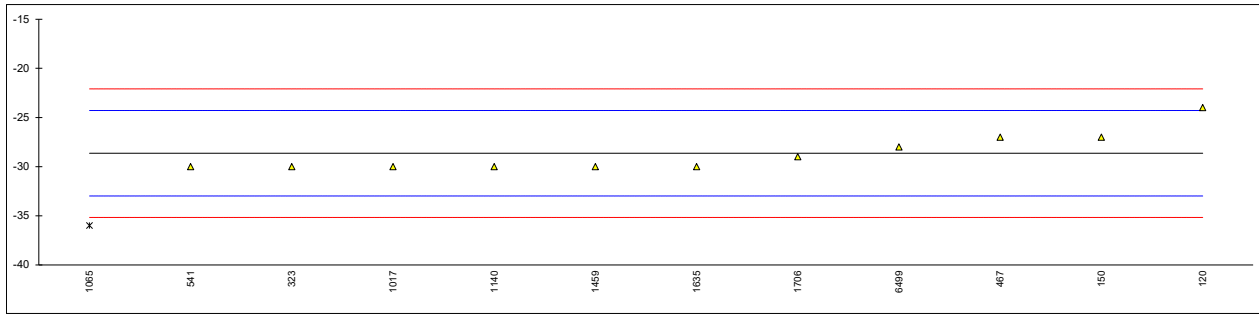
Determination of Sulfur on sample #23075; result in mg/kg

lab	method	value	mark	z(targ)	remarks
62	D5453	6.8		0.00	
120	D7039	6.98		0.27	
140	ISO20846	7.3		0.75	
150	ISO20846	6.97		0.26	
171	D2622	7.2		0.60	
235	ISO8754	6.7	C	-0.14	first reported 70
237	D5453	7.0		0.30	
238		-----		-----	
300		-----		-----	
323	ISO20846	6.6		-0.29	
328	ISO20846	7.4		0.90	
334	ISO20846	6.5		-0.44	
335	ISO20846	7.313		0.77	
338	ISO20846	6.54		-0.38	
365	IP490	7.787		1.47	
445		-----		-----	
447	IP490	6.7		-0.14	
460		-----		-----	
467		-----		-----	
496	ISO20846	6.6355		-0.24	
529		-----		-----	
541		-----		-----	
603		-----		-----	
663	D5453	6.9		0.15	
1006	D5453	6.8		0.00	
1016		-----		-----	
1017		-----		-----	
1040	ISO20884	6.6		-0.29	
1059	ISO20846	6.6		-0.29	
1065		-----		-----	
1066	D2622	6.1		-1.04	
1126		-----		-----	
1134	IP490	5.67		-1.68	
1140	D5453	6.5		-0.44	
1194	D7221	8.4	R(0.05)	2.39	
1227	D5453	6.2		-0.89	
1233		-----		-----	
1259	ISO20846	6.3		-0.74	
1389	ISO20846	6.9		0.15	
1402	ISO20846	7.67		1.30	
1459	ISO20884	6.7		-0.14	
1521	ISO20846	6.56		-0.35	
1544		-----		-----	
1554	ISO20846	6.57		-0.34	
1631		-----		-----	
1635	ISO20846	6.51		-0.43	
1706	ISO20846	7.2		0.60	
1724	D5453	6.8		0.00	
1728		-----		-----	
1807	ISO20846	4.8	R(0.05)	-2.97	
1833		-----		-----	
2146	ISO20846	7.1		0.45	
6075		-----		-----	
6168		-----		-----	
6180	ISO20846	6.3		-0.74	
6370	ISO20884	7.12		0.48	
6371	ISO20884	6.96		0.24	
6373	ISO20846	7.2		0.60	
6496	ISO20884	7.31		0.76	
6499	D7220	6.1		-1.04	
6502		-----		-----	

normality	OK	
n	39	
outliers	2	
mean (n)	6.797	
st.dev. (n)	0.4419	
R(calc.)	1.237	
st.dev.(ISO20846:19)	0.6719	
R(ISO20846:19)	1.881	
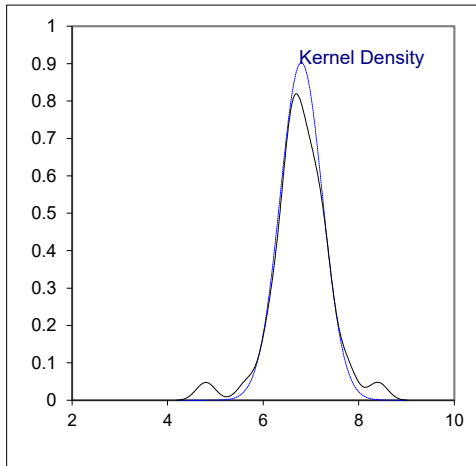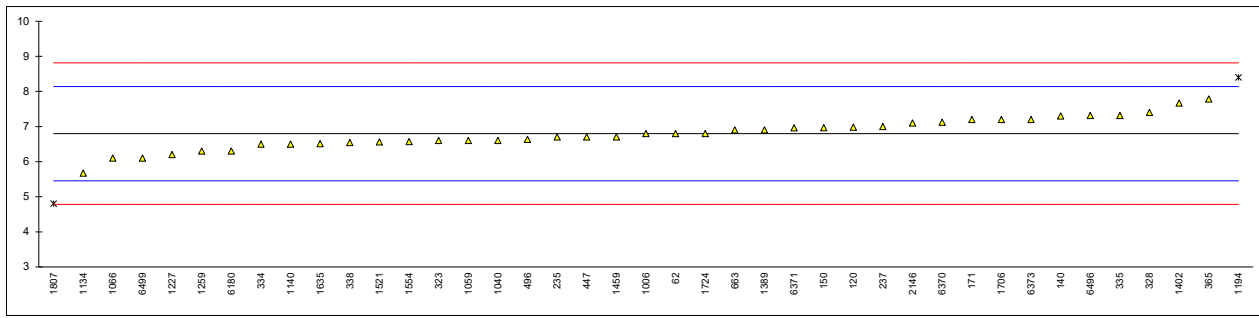
Determination of Water on sample #23075; result in mg/kg

lab	method	value	mark	z(targ)	remarks
62	D6304-A:20	34		-0.36	
120		-----		-----	
140	ISO12937	82	C,R(0.05)	2.74	first reported 80
150		-----		-----	
171	D6304-A:20	52		0.80	
235	D6304-A:20	38.97		-0.04	
237	D6304-C:16e1	60		1.32	
238		-----		-----	
300		-----		-----	
323	ISO12937	33		-0.43	
328	ISO12937	40		0.02	
334	ISO12937	51.3		0.75	
335	ISO12937	43.3		0.24	
338	ISO12937	36.1		-0.23	
365	IP439	42.5		0.19	
445		-----		-----	
447	IP438	41.1		0.10	
460		-----		-----	
467	ISO12937	36.4		-0.21	
496	D6304-A:20	43		0.22	
529		-----		-----	
541		-----		-----	
603	D6304-A:20	37		-0.17	
663	D6304-A:20	55		0.99	
1006	D6304-A:20	51.9		0.79	
1016		-----		-----	
1017		-----		-----	
1040	ISO12937	34.75		-0.32	
1059	ISO12937	30		-0.62	
1065	D6304-A:20	90	R(0.05)	3.26	
1066	D6304-B:20	32.2		-0.48	
1126		-----		-----	
1134	IP438	43		0.22	
1140	IP438	70	R(0.05)	1.96	
1194	ISO12937	31.8		-0.51	
1227	D6304-A:20	36.2		-0.22	
1233		-----	W	-----	test result withdrawn, reported 0.02
1259	ISO12937	40		0.02	
1389	ISO12937	36		-0.23	
1402		33		-0.43	
1459	ISO12937	21		-1.20	
1521	ISO12937	37		-0.17	
1544		-----		-----	
1554	ISO12937	34		-0.36	
1631		-----		-----	
1635		-----		-----	
1706		-----		-----	
1724	D6304-A:20	33.4		-0.40	
1728	E203	70	R(0.05)	1.96	
1807	ISO12937	80.3	C,R(0.05)	2.63	first reported 110
1833		-----		-----	
2146		-----		-----	
6075		-----		-----	
6168	D6304-A:16e1	45.3		0.37	
6180		-----		-----	
6370	ISO12937	47.5		0.51	
6371	ISO12937	43.2		0.23	
6373	ISO12937	40		0.02	
6496	ISO12937	42.4		0.18	
6499	D6304-A:20	30.67		-0.58	
6502		-----		-----	
	normality	OK			
	n	35			
	outliers	5			
	mean (n)	39.628			
	st.dev. (n)	7.9799			
	R(calc.)	22.344			
	st.dev.(ISO12937:00)	15.4612			
	R(ISO12937:00)	43.291			
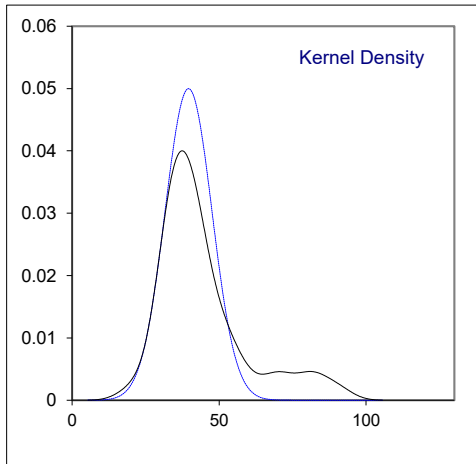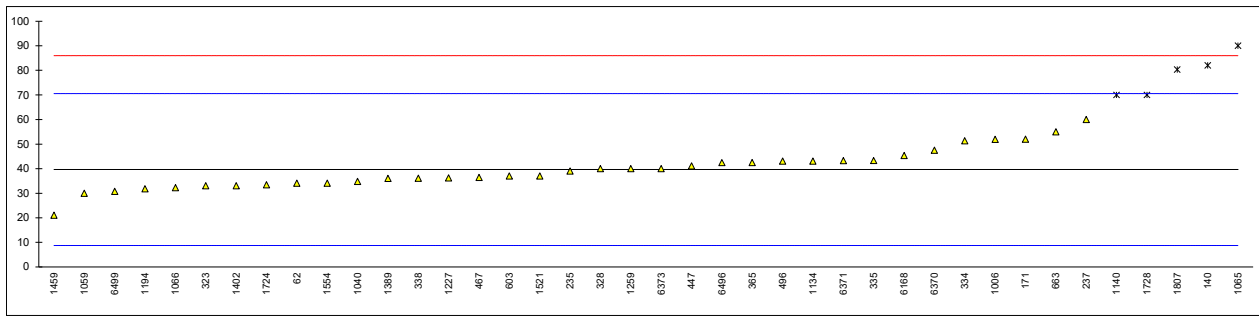
Determination of Total Contamination on sample #23076; result in mg/kg

lab	method	value	mark	z(targ)	Complete filtration	Volume filtered (mL)	filtration stopped after minutes
120		-----		-----		-----	-----
140	EN12662:2014	22.3		-1.90	Yes	300	-----
150		-----		-----		-----	-----
171	EN12662:2014	18.5		-3.11	Yes	300	11.73
235		-----		-----		-----	-----
300		-----		-----		-----	-----
323	EN12662:2014	37.1		2.84		300	-----
328	EN12662:2014	30.0		0.57	Yes	-----	-----
334	EN12662:2014	31.0		0.89	Yes	300	-----
335	EN12662:2014	34.5		2.01	Yes	-----	-----
365	IP440	26.91		-0.42		340	-----
445		-----		-----		-----	-----
447	IP440	25.5		-0.87	Yes	300	-----
467	EN12662:2014	26.80		-0.46	Yes	350	8:56:20
496	EN12662:2014	33.2		1.59	Yes	-----	-----
663	EN12662:2014	34.0		1.85	Yes	250	-----
1006	EN12662:2014	30.0		0.57		300	5
1016	EN12662:2014	21.2		-2.25	Yes	-----	-----
1059	EN12662:2014	34.0		1.85	Yes	-----	-----
1134	EN12662:2014	22.1		-1.96	Yes	-----	-----
1402	IP440	26.2		-0.65	Yes	300	-----
1521	EN12662:2014	27.47		-0.24	Yes	-----	-----
1544	EN12662:2014	27.75		-0.15	Yes	350	15
1554	EN12662:2014	>30.0		-----	Yes	300	12
1724	IP440	23.17		-1.62	Yes	-----	-----
1807	EN12662:2014	36.96		2.79		-----	-----
1972	EN12662:2014	25.45		-0.89	Yes	330	3
6075		-----		-----		-----	-----
6168	D6371	64.7	C,R(0.01)	11.68	Yes	1000	-----
6370	EN12662	26.99		-0.40	Yes	300	9'45"
6371		-----		-----		-----	-----
6373		-----		-----		-----	-----

normality	OK
n	22
outliers	1
mean (n)	28.232
st.dev. (n)	5.1975
R(calc.)	14.553
st.dev.(EN12662:14)	3.1258
R(EN12662:14)	8.752

Lab 6168 first reported 203.5
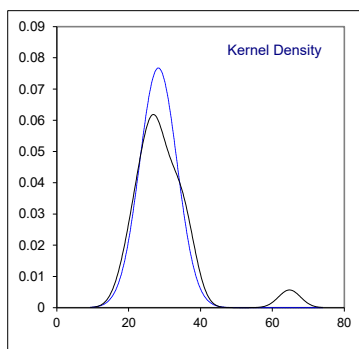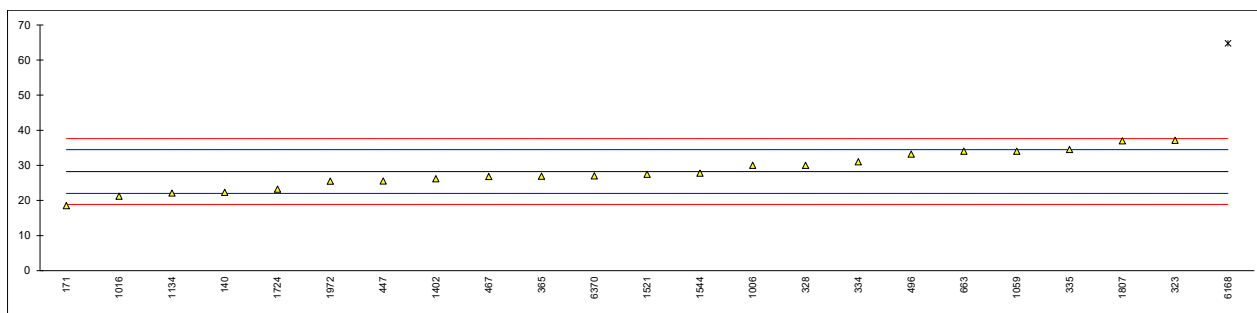
APPENDIX 2

z-scores Distillation

lab	IBP	10% rec	50% rec	90% rec	95% rec	FBP
62	0.50	1.35	0.58	-0.36	-----	-0.13
120	-----	-0.94	-1.10	-0.14	-----	-0.02
140	0.23	1.42	1.14	0.56	0.10	1.01
150	-----	-----	-----	-----	-----	-----
171	-1.01	-0.26	-0.36	0.40	0.29	0.54
235	1.38	1.29	0.86	0.51	-0.06	1.13
237	-0.65	-0.07	5.34	2.35	0.73	2.51
238	-1.26	-2.55	-2.13	0.18	0.10	-0.25
300	-----	-----	-----	-----	-----	-----
323	0.26	0.92	0.39	-0.14	-0.31	-0.25
328	-0.83	-0.44	-0.36	-0.52	-0.40	-0.49
334	-0.20	-0.57	-0.64	-0.90	-0.53	-0.84
335	-0.10	-2.24	0.02	1.32	1.92	0.73
338	-0.92	-1.25	-1.20	-0.36	-0.31	-0.09
365	-0.89	-0.51	-0.73	0.08	0.20	-0.41
445	-----	-----	-----	-----	-----	-----
447	0.32	0.11	-0.17	0.18	0.23	0.30
460	-----	-----	-----	-----	-----	-----
467	0.62	0.49	0.20	-0.68	-0.24	-0.37
496	0.08	0.05	-0.26	-0.19	-0.15	0.34
529	-----	-----	-----	-----	-----	-----
541	-0.10	0.18	-0.26	-0.03	0.10	0.22
603	0.53	1.11	1.23	-0.14	-0.06	-0.88
663	-1.16	0.98	-1.20	-0.57	-0.74	-0.41
1006	-0.04	0.73	-0.08	0.18	-0.06	-0.37
1016	-----	-----	-----	-----	-----	-----
1017	-----	-----	-----	-----	-----	-----
1040	-1.33	-----	-0.64	0.05	-0.12	0.97
1059	1.05	0.86	0.67	0.51	0.60	1.01
1065	-0.77	-1.31	-1.10	0.18	-0.46	-1.99
1066	-0.32	0.30	0.39	0.08	-0.34	-39.06
1126	1.05	0.92	-0.54	-0.68	-0.37	1.05
1134	-0.83	0.05	0.02	0.46	0.60	0.73
1140	-0.80	0.24	-0.08	0.18	0.70	0.18
1194	-----	-----	-----	-----	-----	-----
1227	0.41	1.17	-1.10	-0.25	-0.34	0.54
1233	-----	-----	-----	-----	-----	-----
1259	0.14	-1.93	-0.45	-1.39	-1.65	-1.59
1389	-1.59	0.42	-1.01	-0.57	-0.78	-1.51
1402	0.50	0.42	0.11	-0.19	-0.40	0.42
1459	0.05	-0.01	-1.10	-0.90	-1.00	-1.08
1521	0.44	0.55	0.67	1.00	1.07	0.34
1544	0.77	1.20	0.02	-0.41	-0.23	-0.45
1554	-----	-0.01	0.76	-0.57	-0.37	-----
1631	-----	-----	-----	-----	-----	-----
1635	0.02	0.42	0.39	-0.14	-0.18	0.46
1706	0.50	0.73	0.48	0.51	0.35	0.38
1724	-0.95	-0.63	-2.22	-1.01	-0.68	-0.88
1728	0.26	-0.69	0.20	0.18	0.10	-0.25
1807	0.50	0.05	0.02	0.02	-0.68	0.58
1833	-----	0.11	-0.92	-0.84	-0.68	0.06
2146	0.23	0.11	1.32	0.89	1.45	0.73
6075	-----	-----	-----	-----	-----	-----
6168	0.26	1.04	2.63	2.19	1.45	1.76
6180	0.05	-1.25	-0.92	0.78	0.26	0.10
6370	1.26	-1.06	2.07	0.83	-0.68	-0.88
6371	-0.06	-0.98	2.35	1.14	-0.26	-1.62
6373	0.56	0.61	0.67	0.56	0.82	0.26
6496	1.62	-0.20	0.39	0.18	0.26	-0.05
6499	0.26	-0.94	1.04	-53.00	0.73	-1.51
6502	-----	-----	-----	-----	-----	-----

APPENDIX 3

Number of participants per country

1 lab in ARGENTINA

2 labs in AUSTRIA

3 labs in BELGIUM

2 labs in BULGARIA

1 lab in CANADA

2 labs in CROATIA

1 lab in CYPRUS

1 lab in ESTONIA

1 lab in FINLAND

5 labs in FRANCE

2 labs in GERMANY

2 labs in GREECE

1 lab in IRELAND

1 lab in ISRAEL

1 lab in MALAYSIA

1 lab in MARTINIQUE

1 lab in MAURITIUS

1 lab in MEXICO

4 labs in NETHERLANDS

2 labs in NIGERIA

1 lab in PERU

1 lab in POLAND

4 labs in ROMANIA

1 lab in SLOVENIA

1 lab in SOUTH AFRICA

2 labs in SPAIN

1 lab in SWEDEN

1 lab in TAIWAN

1 lab in THAILAND

3 labs in TURKEY

7 labs in UNITED KINGDOM

4 labs in UNITED STATES OF AMERICA

APPENDIX 4

Abbreviations

C   = final test result after checking of first reported suspect test result
D(0.01)/D(1)   = outlier in Dixon's outlier test
D(0.05)/D(5)   = straggler in Dixon's outlier test
G(0.01)/G(1)   = outlier in Grubbs' outlier test
G(0.05)/G(5)   = straggler in Grubbs' outlier test
DG(0.01)/DG(1)   = outlier in Double Grubbs' outlier test
DG(0.05)/DG(5)   = 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   = 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
2   ISO5725:86
3   ISO5725 parts 1-6:94
4   ISO13528:05
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6   W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
7   P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
8   J.N. Miller, Analyst, 118, 455, (1993)
9   Analytical Methods Committee, Technical Brief, No 4, January 2001
10   P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364, (2002)
11   W. Horwitz and R. Albert, J. AOAC Int, 79.3, 589-621, (1996)
12   Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)
13   iis Memo 1904 Precision data of Calculated Cetane Index Four Variables in Gasoil, (2019)