Results of Proficiency Test
Gasoil B10 (10% FAME)
June 2016

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Authors: ing. R.J. Starink
Correctors: ing. C. Nijssen-Wester & ing. A.S. Noordman-de Neef
Report: iis16G03

August 2016

CONTENTS

1 INTRODUCTION

Since 2005, the Institute for Interlaboratory Studies organizes a proficiency test for the analysis of Gasoil B10, in accordance with the latest applicable version of the automotive diesel containing 7-10% FAME, based on the EN590 (0-7% FAME) and ASTM D7467 (6-20% FAME) specifications. During the annual proficiency testing program 2015/2016, it was decided to continue the round robin for the analysis of Gasoil B10.
In this interlaboratory study, a total of 76 laboratories in 32 different countries registered for participation. See appendix 3 for the number of participants per country. In this report, the results of the 2016 Gasoil B10 proficiency test 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 organiser of this proficiency test. The sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. In this proficiency test, the participants received, depending on their registration, a 1 litre and a 0.5 litre bottle Gasoil B10 (both labelled #16093) and/or a 1 litre bottle with Gasoil B10 (± 850 mL filled, labelled #16094) for Total Contamination only.
Participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

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

2.2 PROTOCOL

The protocol followed in the organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3). This protocol can be downloaded via the FAQ page of the iis website www.iisnl.com.

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

The necessary sample material of about 150 litres of regular Gasoil (with a FAME concentration of 3%V/V) was purchased at a local petrol station. To this batch 11 litre Biodiesel B100 was added to reach a final FAME concentration of approx. 10%V/V. From this batch, after homogenisation, 106 amber glass bottles of 1 litre and 106 amber glass bottles of 0.5 litre (both labelled #16093) were filled. The homogeneity of the subsamples #16093 was checked by determination of Density at 15°C in accordance with ASTM D4052 on 8 stratified randomly selected samples.

	Density at 15 °C in kg/m^3
sample #16093-1	829.63
sample #16093-2	829.63
sample #16093-3	829.64
sample #16093-4	829.64
sample #16093-5	829.64
sample #16093-6	829.64
sample #16093-7	829.63
sample #16093-8	829.64

table 1: homogeneity test results of subsamples #16093

From the above test results, the repeatability was calculated and compared with 0.3 times the corresponding reproducibility in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Density at 15 °C in kg/m^3
r (observed)	0.01
reference test method	ISO12185:96
0.3 x R(reference test method)	0.15

table 2: evaluation of repeatability of the subsamples #16093

The calculated repeatability was less than 0.3 times the reproducibility of the corresponding the target method. Therefore, homogeneity of the subsamples #16093 was assumed.

For Total Contamination, a different batch of approx. 100 litre regular Gasoil was used.
To each bottle (labelled #16094) a particulate quartz material BCR-067 (ø 2.4 – 32.0 µm) in oil suspension was added to give a total contamination of approx 17 mg/kg. To do this, a defined volume of the fresh prepared and well shaken quartz suspension was added to an empty bottle by means of a calibrated pipette. The addition was checked by weighing the bottle before and after addition.
In total 71 bottles were prepared and subsequently filled up to 850 mL with gasoil B10. After homogenization, a random sample was taken to verify the actual Total Contamination content.

To the participants, depending on their registration, a 1 litre and a 0.5 litre bottle of sample #16093 and/or a 1 litre (± 850 mL filled) of sample #16094 were sent on May 18, 2016.

2.5 STABILITY OF THE SAMPLES

The stability of Gasoil B10, packed in the brown glass bottles, was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were requested to determine on sample #16093: Acid number, Aromatics by FIA, Ash Content, Cetane Indices D976 and ISO4264, Cloud Point, Cold Filter Plugging Point, Carbon Residue on 10% distillation residue, Ramsbottom Carbon Residue on 10% distillation residue, Copper Corrosion, Density at 15°C, Distillation, FAME, Flash Point PMcc, Kinematic Viscosity at 40°C, Lubricity by HFRR at 60°C, Oxidation Stability EN 15751 and ISO12205, Polycyclic Aromatic Hydrocarbons, Pour Point (manual and automated), Sulphur Content and Water.
On sample #16094 the participants were requested to determine Total Contamination only.

To get comparable results a detailed report form, on which the units were prescribed as well as the reference test methods and a letter of instructions were prepared and made available on the data entry portal www.kpmd.co.uk/sgs-iis/. A SDS and a form to confirm receipt of the samples were added to the sample package.

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. Additional or corrected test results are used for data analysis and original 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

Statistical calculations were performed as described in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' (iis-protocol, April 2014 version 3.3). 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. Not all data sets proved to have a normal distribution, in which cases the statistical evaluation of the results should be used with due care.

In accordance to ISO 5725 the original test results per determination were submitted subsequently to Dixon's and/or Grubbs' and/or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of the averages and the 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. When the uncertainty passed the evaluation no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

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 standard. Outliers and other data, which were excluded from the calculations, are represented as a “x”. Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also a normal Gauss curve was projected over the Kernel Density Graph.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the spread of this interlaboratory study. This target standard deviation was calculated from the literature reproducibility by division with 2.8.

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:

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

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

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

	$\lvert z\rvert < 1$	good
$1 <$	$\lvert z\rvert < 2$	satisfactory
$2 <$	$\lvert z\rvert < 3$	questionable
$3 <$	$\lvert z\rvert$	unsatisfactory

4 EVALUATION

In this proficiency test, some problems were encountered during the dispatch of the samples to the participants in Brazil. Two laboratories reported test results after the final reporting date. Not all laboratories were able to perform all analyses requested. Finally, 76 laboratories did report 1522 numerical test results. Observed were 51 outlying test results, which is 3.4%. In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

4.1 EVALUATION PER TEST

In this section, the reported test results are discussed per sample and per test. The specified test methods and requirements were taken into account for explaining the observed differences when possible and applicable. These methods are also in the tables together with the reported test results. The abbreviations, used in these tables, are listed in appendix 3.

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

In the iis PT reports, ASTM methods are referred to with a number (e.g. D976) and an added designation for the year that the method was adopted or revised (e.g. D976:06). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D976:06 (2016)). In the results tables of Appendix 1 only the method number and year of adoption or revision will be used.

Acid number: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D664:11a.

Aromatics (FIA): No significant conclusions were drawn as the precision and bias of ASTM D1319 with biodiesel blends is not known and is currently under investigation, see paragraph X1.11.1 of ASTM D7467:15.

Ash: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO6245:01.

C.I. D976: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of ASTM D976:06(2016). In paragraph X1.12.1 of ASTM D7467-2015 is mentioned that use of ASTM D976:80 required in the USA by 40 CFR Part 80. However, the precision and bias of Test Method D976:80 with biodiesel blends is not known. Four participants made probably a calculation error.

C.I. ISO4264: Regretfully, no reproducibility limits are mentioned in ISO4264:07. One statistical outlier was observed.
It should be noted that the ASTM has repeatedly amended the calculations routines in ASTM D4737 to incorporate the various diesel oil specifications mentioned in ASTM D975. The last update of ISO4264 was in 2007, which is the current version (and technically equivalent to the 1996a version of ASTM D4737). In ISO4264 only one calculation routine is mentioned and in the latest ASTM D4737 (2010 version) two calculation routines are mentioned. The user should take care to use and report the correct method as required by clients. Four participants made probably a calculation error.

Cloud Point: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN23015:94.

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

CR 10% res.: The consensus value of the group was below the application range (0.1% - 30% M/M) of ISO10370:14. Therefore, no significant conclusions were drawn.

Ramsbottom: This determination was not problematic. No statistical outliers were observed. One test result was excluded as the reported test method is not equivalent to ASTM D524. However, the calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ASTM D524:15.

Copper Corr.: No problems were observed. All participants agreed on a test result of 1 or 1A/1B.

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

Distillation: This determination was somewhat problematic. In total eleven statistical outliers were observed. For one participant outliers were observed for temperature at 10% rec, 90% rec , 95% rec and volume at 250° and therefore all other test results were excluded.The calculated reproducibilities of temperature at 90% rec., 95% rec., FBP, vol at 250°C and vol at 350°C, after rejection of the statistical outliers are all in agreement with the requirements of ISO3405:11 (auto).

FAME: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of EN14078:14.

Flash 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 ISO2719:16.

Kin. Visc. 40°C: This determination was problematic for a number of laboratories. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN590:13, Annex A and with the requirements of ISO3104:94+corr.1997.

Lubricity by HFRR: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO12156-1:16 (for visual and digital camera).

Ox. Stab. ISO12205: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of ISO12205:95.

Ox. Stab. EN15751: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of EN15751:14.

PAH: 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 EN12916:16.

Pour Point (M): This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO3016:94.

Pour Point (A): This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D5950:14.

Sulphur: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO20846:11 and ASTM D5453:16e1.

Water: This determination was problematic for a number of laboratories. Seven statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of EN12937:00.

Total Contamination: The samples were spiked with a freshly prepared and well shaken suspension of particulate quartz material (ø 2.4-32 µm) in oil. Therefore, the minimum Total Contamination to be found was known. The laboratories should be able to find at least 10.1 mg/kg [17.0 $mg/kg_{(added\ amount)}$ – 6.9 $mg/kg_{(R\ EN12662)}$]. None of the laboratories reported a test result below this minimum concentration of 10.1 mg/kg.
This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of EN12662:14.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameters	*unit*	*n*	*average*	*2.8 * sd*	*R (lit)*
Acid Number	mgKOH/g	34	0.030	0.029	0.044
Aromatics by FIA	%V/V	12	19.8	8.9	n.a.
Ash content	%M/M	25	0.0005	0.0017	0.0050
Cetane Index D976		32	57.5	1.2	2.0
Cetane Index ISO4264		48	58.9	1.3	n.a.
Cloud Point	°C	57	-4.5	2.5	4.0
Cold Filter Plugging Point	°C	53	-17.2	2.8	4.0
CR on 10% residue	%M/M	27	0.020	0.030	(0.018)
Ramsbottom CR on 10% residue	%M/M	9	0.056	0.021	0.029
Copper Corrosion 3hrs at 50˚C		52	1	n.a.	n.a.
Density at 15°C	kg/m^3	68	829.6	0.2	0.5
Initial Boiling Point	°C	65	179.4	11.0	9.9
10% recovery	°C	65	221.7	5.7	4.9
50% recovery	°C	66	283.5	3.7	3.0
90% recovery	°C	64	337.3	3.6	5.1
95% recovery	°C	65	349.6	6.6	8.9
Final Boiling Point	°C	64	358.3	5.4	7.1
Volume at 250°C	%V/V	61	25.7	2.7	2.7
Volume at 350°C	%V/V	59	95.1	1.8	2.7
Fatty Acid Methyl Ester	%V/V	51	8.7	0.7	0.7
Flash Point PMcc	°C	66	71.1	4.1	5.1
Kinematic Viscosity at 40°C	mm^2/s	57	3.053	0.029	0.033
Lubricity by HFRR	µm	41	197	73	90
Oxidation Stability ISO12205	g/m^3	19	4.16	8.95	8.51
Oxidation Stability EN15751	hrs	34	33.5	6.4	6.8
Polycyclic Aromatic Hydrocarbons	%M/M	28	1.7	1.0	0.8
Pour Point (manual)	°C	33	-22.1	5.9	6.6
Pour Point (automated)	°C	33	-20.8	3.2	6.1
Sulphur	mg/kg	56	8.1	1.6	2.0
Water content	mg/kg	59	66.4	19.1	56.0
Total Contamination (#16094)	mg/kg	39	20.3	7.2	7.5

table 3: summary of test results samples #16093 and #16094

Between brackets: evaluation with care as consensus value was below application range of the reference test method

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

4.3 COMPARISON OF THE INTERLABORATORY STUDY OF JUNE 2016 WITH PREVIOUS PTS.

	June 2016	*May 2015*	*May 2014*	*April 2013*
Number of reporting labs	76	73	67	61
Number of results reported	1522	1371	1317	1257
Statistical outliers	51	32	33	29
Percentage outliers	3.4%	2.3%	2.5%	2.4%

table 4: comparison with previous proficiency tests.

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

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

	June 2016	*May 2015*	*May 2014*	*April 2013*
Acid number	++	+	+	+
Aromatics by FIA	n.e.	n.e.	n.e.	n.e.
Ash content	++	+	++	+
Cetane Index D976	++	++	++	++
Cetane Index ISO4264	n.e.	n.e.	n.e.	n.e.
Cloud Point	++	+	++	++
Cold Filter Plugging Point	++	+	+	--
CR micro method on 10% res.	(--)	(-)	(-)	(-)
Ramsbottom CR on 10% res.	+	+/-	n.e.	(--)
Density at 15 °C	++	+	+	+
Distillation	-	+	+	+
Fatty Acid Methyl Ester	+/-	-	-	-
Flash Point PMcc	+	+	+	+
Kinematic Viscosity at 40 °C	+	+/-	+	+/-
Lubricity by HFRR	+	-	++	++
Oxidation Stability ISO12205	-	+	+	+/-
Oxidation Stability EN15751	+	-	+/-	--
Polycyclic Aromatic Hydrocar.	-	+	-	+
Pour Point (manual)	+	+	--	+/-
Pour Point (automated)	++	-	+	+
Sulphur	+	+	+/-	++
Water content	++	++	++	++
Total Contamination	+	--	--	--

table 5: comparison determinations against the reference test method

Between brackets: consensus value is below application range of the reference test method

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

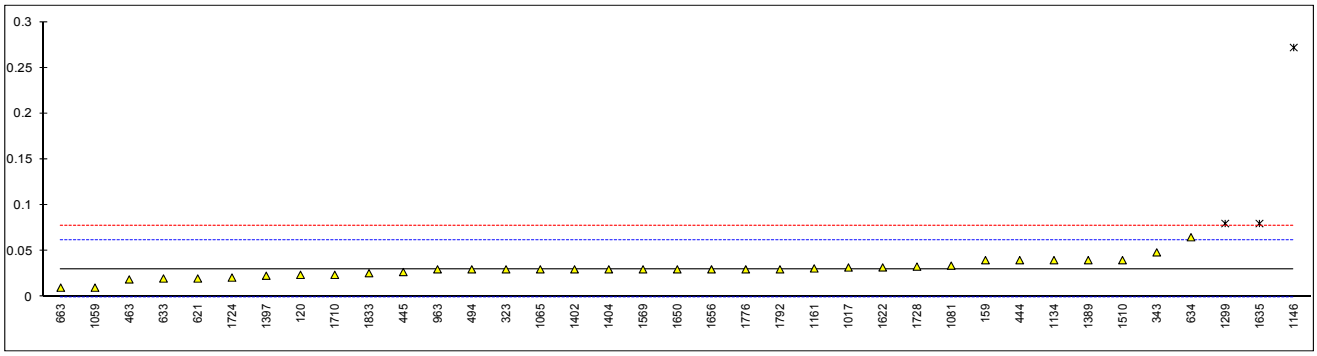
- ++: group performed much better than the reference test method
- + : group performed better than the reference test method
- +/-: group performance equals the reference test method
- - : group performed worse than the reference test method
- -- : group performed much worse than the reference test method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

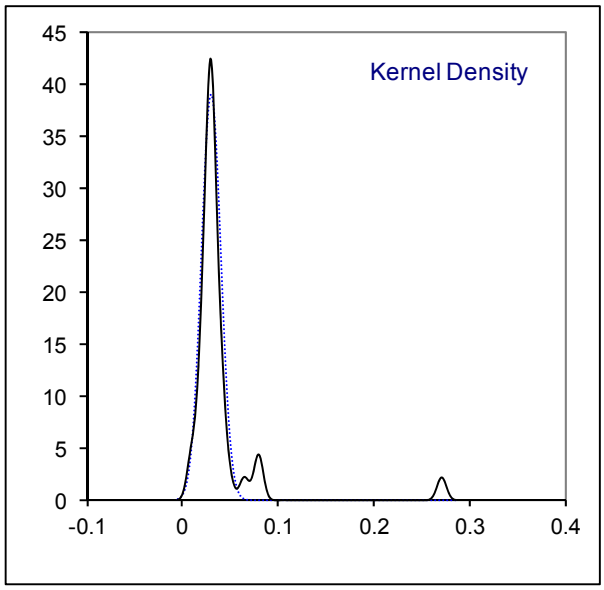
APPENDIX 1

Determination of Acid Number on sample #16093; result in mgKOH/g

lab	method	value	mark	z(targ)	remarks
120	D664	0.024		-0.40	
132	D664	<0.10		-----	
150	D664	<0.10		-----	
159	D974	0.040		0.62	
171	D664	<0.10		-----	
175		-----		-----	
311	D664	<0.10		-----	
312		-----		-----	
323	D974	0.03		-0.02	
334		-----		-----	
335		-----		-----	
336		-----		-----	
338		-----		-----	
340	D664	<0.1		-----	
343	D664	0.0485		1.17	
353		-----		-----	
381		-----		-----	
444	D664	0.04		0.62	
445	D664	0.027		-0.21	
463	D664	0.019		-0.72	
494	D664	0.03		-0.02	
496		-----		-----	
511		-----		-----	
541	D664	<0.1		-----	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621	D664	0.02		-0.66	
633	D664	0.02		-0.66	
634	D664	0.065		2.23	
663	D664	0.01		-1.30	
963	D664	0.03		-0.02	
1017	D974	0.032		0.11	
1033		-----		-----	
1059	ISO6619	0.01		-1.30	
1065	D664	0.030		-0.02	
1080		-----		-----	
1081	D664	0.034		0.24	
1134	D664	0.04		0.62	
1146	D664	0.272	R(0.01)	15.49	
1161	D664	0.031		0.05	
1194		-----		-----	
1237		-----		-----	
1299	D664	0.08	C,R(0.01)	3.19	First reported 0.1
1389	D664	0.04		0.62	
1397	D974	0.023		-0.47	
1402	IP177	0.03		-0.02	
1404	D974	0.03		-0.02	
1455	D974	<0.02		-----	
1459		-----		-----	
1510	D974	0.04		0.62	
1569	D664	0.03		-0.02	
1622	D664	0.0321		0.12	
1631		-----		-----	
1634		-----		-----	
1635	D664	0.08	R(0.01)	3.19	
1650	D664	0.030		-0.02	
1656	D974	0.03		-0.02	
1659		-----		-----	
1706		-----		-----	
1710	D664	0.024		-0.40	
1724	D664	0.021		-0.59	
1728	D974	0.0330		0.17	
1776	D664	0.03		-0.02	
1792	D664	0.030		-0.02	
1807		-----		-----	
1810		-----		-----	
1811		-----		-----	
1833	D664	0.0258		-0.29	
1948		-----		-----	
1984		-----		-----	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	not OK
n	34
outliers	3
mean (n)	0.0303
st.dev. (n)	0.01022
R(calc.)	0.0286
R(D664:11a)	0.0437



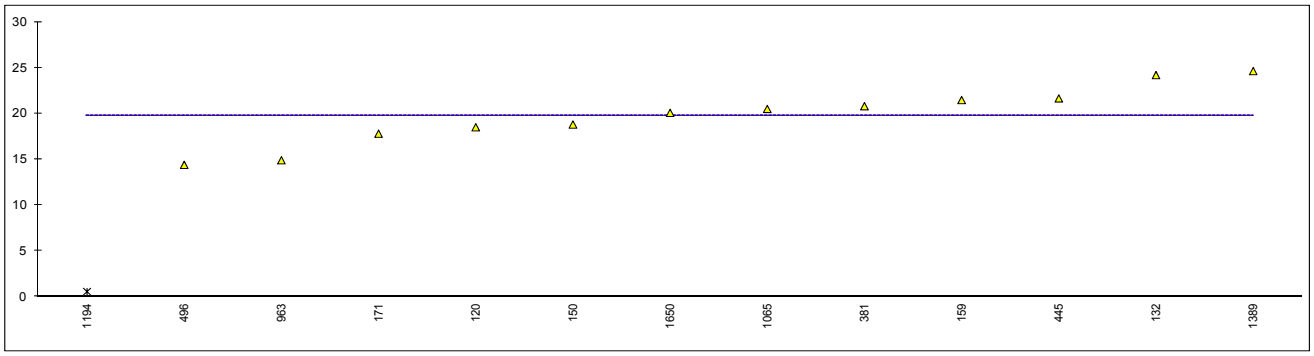


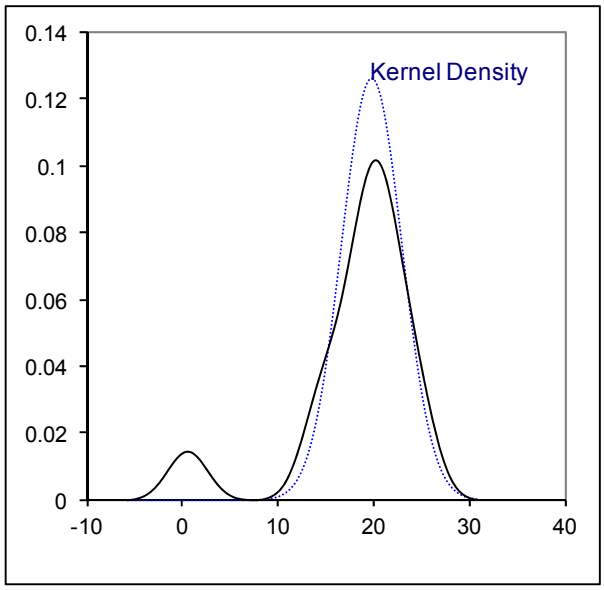
Determination of Aromatics by FIA on sample #16093; result in %V/V

lab	method	value	mark	z(targ)	remarks
120	D1319	18.5		-----	
132	D1319	24.19		-----	
150	D1319	18.8		-----	
159	D1319	21.47		-----	
171	D1319	17.8		-----	
175		-----		-----	
311		-----		-----	
312		-----		-----	
323		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
338		-----		-----	
340		-----		-----	
343		-----		-----	
353		-----		-----	
381	D1319	20.8		-----	
444		-----		-----	
445	D1319	21.65		-----	
463		-----		-----	
494		-----		-----	
496	D1319	14.40		-----	
511		-----		-----	
541		-----		-----	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
963	D1319	14.9		-----	
1017		-----		-----	
1033		-----		-----	
1059		-----		-----	
1065	D1319	20.5		-----	
1080		-----		-----	
1081		-----		-----	
1134		-----		-----	
1146		-----		-----	
1161		-----		-----	
1194		0.566	G(0.01)	-----	False negative test result?
1237		-----		-----	
1299		-----		-----	
1389	D1319	24.63		-----	
1397		-----		-----	
1402		-----		-----	
1404		-----		-----	
1455		-----		-----	
1459		-----		-----	
1510		-----		-----	
1569		-----		-----	
1622		-----		-----	
1631		-----		-----	
1634		-----		-----	
1635		-----		-----	
1650	D1319	20.07		-----	
1656		-----		-----	
1659		-----		-----	
1706		-----		-----	
1710		-----		-----	
1724		-----		-----	
1728		-----		-----	
1776		-----		-----	
1792		-----		-----	
1807		-----		-----	
1810		-----		-----	
1811		-----		-----	
1833		-----		-----	
1948		-----		-----	
1984		-----		-----	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	OK
n	12
outliers	1
mean (n)	19.809
st.dev. (n)	3.1656
R(calc.)	8.864
R(D1319:15)	n.a.

Compare R(D1319:15 for Diesel without FAME) = 3.7



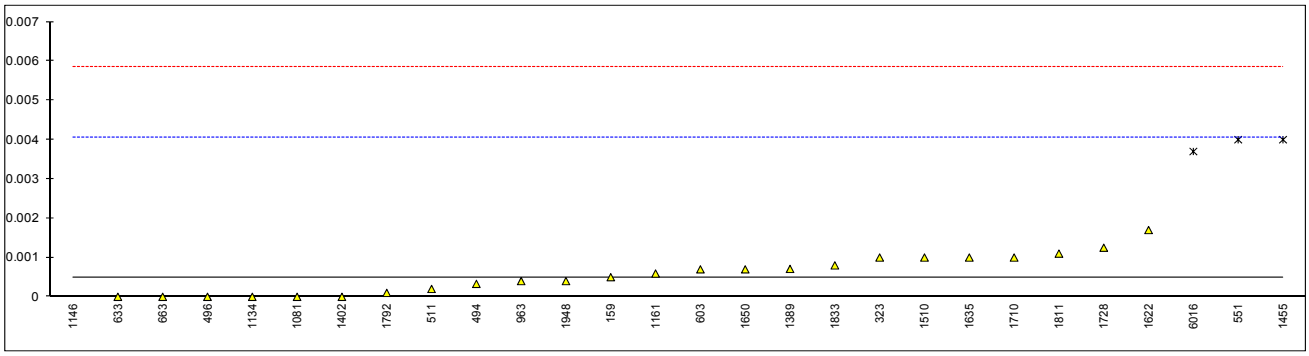


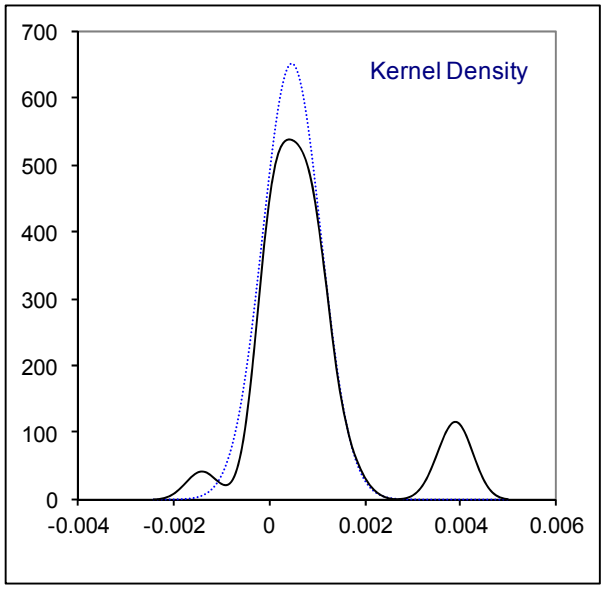
Determination of Ash Content on sample #16093; result in %M/M

lab	method	value	mark	z(targ)	remarks
120	D482	<0.001		-----	
132	D482	<0.001		-----	
150	D482	<0.001		-----	
159	D482	0.0005		0.01	
171		-----		-----	
175		-----		-----	
311	ISO6245	<0.001		-----	
312		-----		-----	
323	ISO6245	0.001		0.29	
334		-----		-----	
335		-----		-----	
336		-----		-----	
338		-----		-----	
340	ISO6245	<0.001		-----	
343		-----		-----	
353		-----		-----	
381		-----		-----	
444		-----		-----	
445	IP4	<0.001		-----	
463	ISO6245	<0.001		-----	
494	ISO6245	0.00033		-0.09	
496	ISO6245	0.000		-0.27	
511	D482	0.0002		-0.16	
541	ISO6245	<0.001		-----	
551	D482	0.004	R(0.01)	1.97	
556		-----		-----	
603	D482	0.0007		0.12	
621	D482	< 0.001		-----	
633	D482	0		-0.27	
634		-----		-----	
663	D482	0.000		-0.27	
963	ISO6245	0.0004		-0.05	
1017		-----		-----	
1033		-----		-----	
1059	ISO6245	<0.001		-----	
1065		-----		-----	
1080		-----		-----	
1081	D482	0		-0.27	
1134	IP4	0		-0.27	
1146	D482	-0.0014		-1.05	
1161	ISO6245	0.000593		0.06	
1194		-----		-----	
1237		-----		-----	
1299	D482	<0.001		-----	
1389	D482	0.00071		0.13	
1397	ISO6245	<0.001		-----	
1402	ISO6245	0.000		-0.27	
1404	ISO6245	<0.001		-----	
1455	ISO6245	0.004	R(0.01)	1.97	
1459		-----		-----	
1510	IP4	0.001		0.29	
1569	ISO6245	<0.001		-----	
1622	D482	0.0017		0.68	
1631		-----		-----	
1634		-----		-----	
1635	ISO6245	0.001		0.29	
1650	ISO6245	0.0007		0.12	
1656	IP4	<0.01		-----	
1659	ISO6245	<0.001		-----	
1706		-----		-----	
1710	ISO6245	0.001		0.29	
1724	D482	<0.001		-----	
1728	D482	0.00125		0.43	
1776		-----		-----	
1792	ISO6245	0.0001		-0.21	
1807		-----		-----	
1810		-----		-----	
1811	ISO6245	0.0011		0.35	
1833	ISO6245	0.0008		0.18	
1948	ISO6245	0.0004		-0.05	
1984		-----		-----	
1987		-----		-----	
2146		-----		-----	
6016	D482	0.0037	R(0.01)	1.80	

normality	not OK
n	25
outliers	3
mean (n)	0.00048
st.dev. (n)	0.000612
R(calc.)	0.00171
R(ISO6245:01)	0.00500

Compare R(D482) = 0.005
Application range: 0.001 – 0.180%

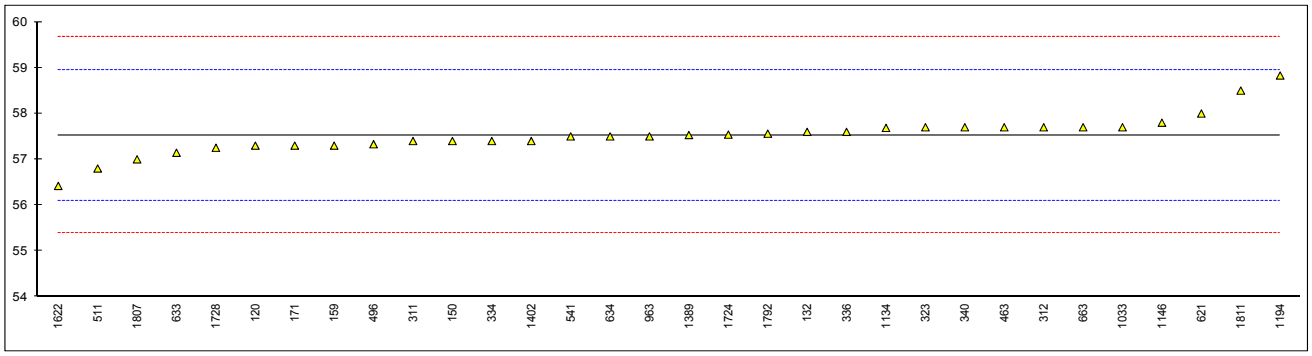


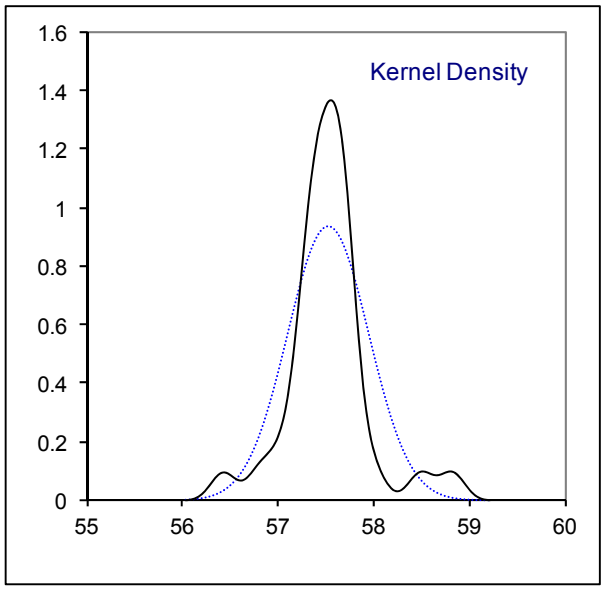


Determination of Cetane Index, two variables D976 on sample #16093

lab	method	value	mark	z(targ)	Remarks
120	D976	57.3	E	-0.31	iis calculated 57.51
132	D976	57.6		0.11	
150	D976	57.4		-0.17	
159	D976	57.3		-0.31	
171	D976	57.3	E	-0.31	iis calculated 57.61
175		-----		-----	
311	D976	57.4		-0.17	
312	D976	57.7		0.25	
323	D976	57.7		0.25	
334	D976	57.4		-0.17	
335		-----		-----	
336	D976	57.6		0.11	
338		-----		-----	
340	D976	57.7		0.25	
343		-----		-----	
353		-----		-----	
381		-----		-----	
444		-----		-----	
445		-----		-----	
463	D976	57.7		0.25	
494		-----		-----	
496	D976	57.33		-0.27	
511	D976	56.8		-1.01	
541	D976	57.5		-0.03	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621	D976	58.0		0.67	
633	D976	57.1437	E	-0.53	iis calculated 56.77
634	D976	57.5		-0.03	
663	D976	57.7		0.25	
963	D976	57.5		-0.03	
1017		-----		-----	
1033	D976	57.7		0.25	
1059		-----		-----	
1065		-----		-----	
1080		-----		-----	
1081		-----		-----	
1134	D976	57.6862		0.23	
1146	D976	57.8		0.39	
1161		-----		-----	
1194	INH-4737	58.83		1.83	
1237		-----		-----	
1299		-----		-----	
1389	D976	57.53		0.01	
1397		-----		-----	
1402	D976	57.4		-0.17	
1404		-----		-----	
1455		-----		-----	
1459		-----		-----	
1510		-----		-----	
1569		-----		-----	
1622	D976	56.4206		-1.55	
1631		-----		-----	
1634		-----		-----	
1635		-----		-----	
1650		-----		-----	
1656		-----		-----	
1659		-----		-----	
1706		-----		-----	
1710		-----		-----	
1724	D976	57.54		0.02	
1728	D976	57.2527		-0.38	
1776		-----		-----	
1792	D976	57.56		0.05	
1807	D976	57.0		-0.73	
1810		-----		-----	
1811	D976	58.5	E	1.37	iis calculated 57.27
1833		-----		-----	
1948		-----		-----	
1984		-----		-----	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	not OK
n	32
outliers	0
mean (n)	57.525
st.dev. (n)	0.4278
R(calc.)	1.198
R(D976:06)	2.000



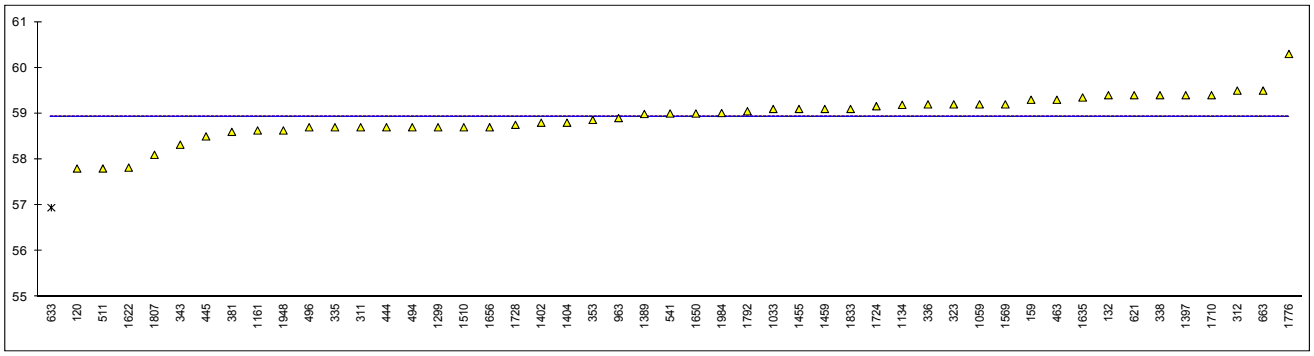


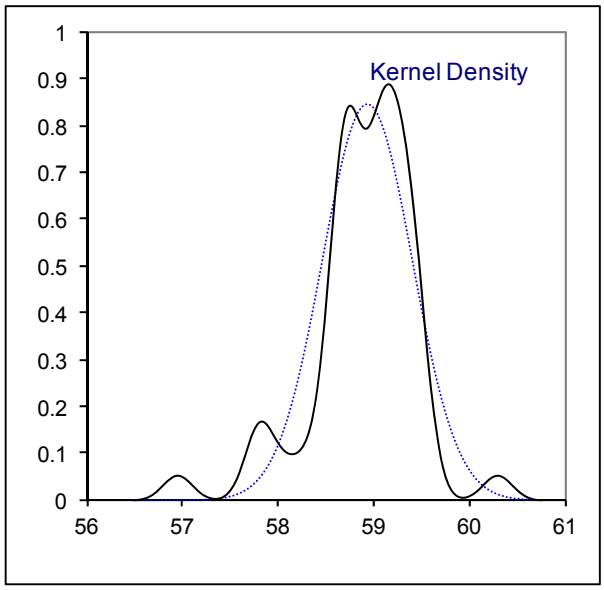
Determination of Cetane Index, four variables ISO4264 on sample #16093

lab	method	value	mark	z(targ)	remarks
120	D4737	57.8	E	-----	iis calculated 58.93
132	D4737	59.4		-----	
150	ISO4264	>56.5		-----	
159	D4737	59.3		-----	
171		-----		-----	
175		-----		-----	
311	ISO4264	58.7		-----	
312	ISO4264	59.5		-----	
323	ISO4264	59.2		-----	
334		-----		-----	
335	ISO4264	58.7		-----	
336	ISO4264	59.2		-----	
338	ISO4264	59.4		-----	
340		-----		-----	
343	D4737	58.32		-----	
353	IP380	58.86		-----	
381	ISO4264	58.6		-----	
444	ISO4264	58.7		-----	
445	IP380	58.5		-----	
463	ISO4264	59.3		-----	
494	ISO4264	58.7		-----	
496	ISO4264	58.7		-----	
511	D4737	57.8		-----	
541	ISO4264	59.0		-----	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621	D4737	59.4		-----	
633	D4737	56.94477	R(0.01),E	-----	iis calculated 57.95
634		-----		-----	
663	D4737	59.5		-----	
963	ISO4264	58.9		-----	
1017		-----		-----	
1033	IP380	59.1		-----	
1059	ISO4264	59.2		-----	
1065		-----		-----	
1080		-----		-----	
1081		-----		-----	
1134	ISO4264	59.1892		-----	
1146		-----		-----	
1161	ISO4264	58.63		-----	
1194		-----		-----	
1237		-----		-----	
1299	D4737	58.7		-----	
1389	ISO4264	58.99	E	-----	iis calculated 58.77
1397	ISO4264	59.4		-----	
1402	IP380	58.8		-----	
1404	ISO4264	58.8		-----	
1455	ISO4264	59.1		-----	
1459	D4737	59.1		-----	
1510	IP380	58.7		-----	
1569	ISO4264	59.2		-----	
1622	D4737	57.8195		-----	
1631		-----		-----	
1634		-----		-----	
1635	ISO4264	59.35		-----	
1650	ISO4264	59		-----	
1656	ISO4264	58.7		-----	
1659		-----		-----	
1706		-----		-----	
1710	ISO4264	59.4		-----	
1724	ISO4264	59.16		-----	
1728	ISO4264	58.7534		-----	
1776	ISO4264	60.3	E	-----	iis calculated 58.68
1792	ISO4264	59.05		-----	
1807	ISO4264	58.1		-----	
1810		-----		-----	
1811		-----		-----	
1833	ISO4264	59.1		-----	
1948	ISO4264	58.63		-----	
1984	ISO4264	59.01		-----	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	suspect
n	48
outliers	1
mean (n)	58.933
st.dev. (n)	0.4717
R(calc.)	1.321
R(ISO4264:07)	n.a.

Compare R(iis15G03) = 0.786



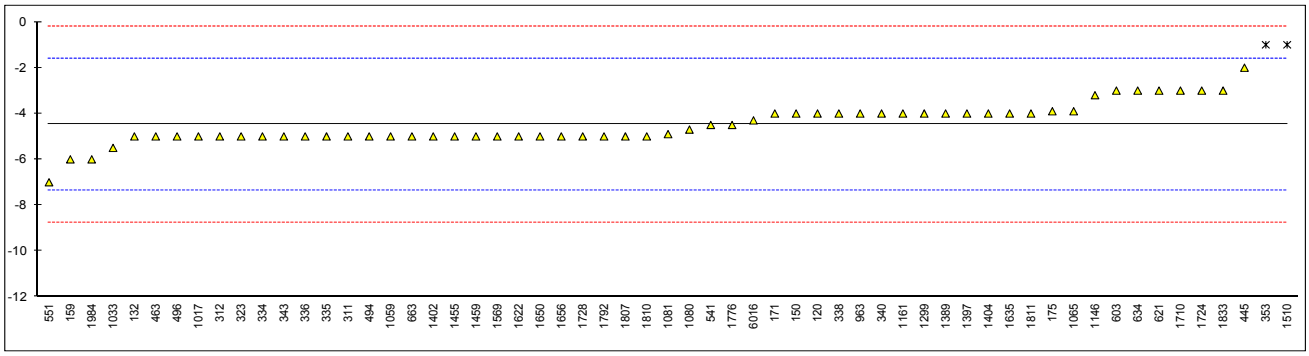


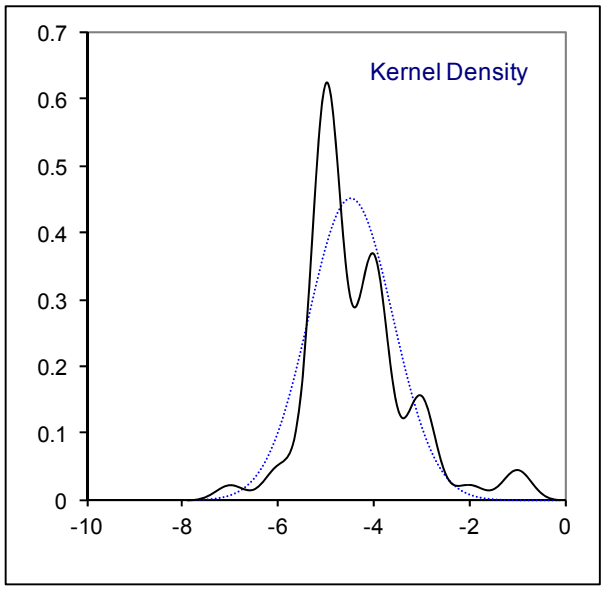
Determination of Cloud Point on sample #16093; result in °C

lab	method	value	mark	z(targ)	remarks
120	D2500	-4		0.34	
132	D2500	-5		-0.36	
150	D5771	-4		0.34	
159	D2500	-6		-1.06	
171	D2500	-4		0.34	
175	D5771	-3.9		0.41	
311	D5771	-5		-0.36	
312	D2500	-5		-0.36	
323	EN23015	-5		-0.36	
334	EN23015	-5		-0.36	
335	EN23015	-5		-0.36	
336	EN23015	-5		-0.36	
338	EN23015	-4		0.34	
340	EN23015	-4		0.34	
343	D2500	-5		-0.36	
353	IP219	-1	R(0.05)	2.44	
381		-----		-----	
444		-----		-----	
445	IP219	-2		1.74	
463	EN23015	-5		-0.36	
494	EN23015	-5		-0.36	
496	EN23015	-5.0		-0.36	
511		-----		-----	
541	D5771	-4.5		-0.01	
551	D2500	-7		-1.76	
556		-----		-----	
603	D2500	-3		1.04	
621	D2500	-3.0		1.04	
633		-----		-----	
634	D2500	-3		1.04	
663	D2500	-5		-0.36	
963	EN23015	-4		0.34	
1017	D2500	-5		-0.36	
1033	D5772	-5.5		-0.71	
1059	EN23015	-5		-0.36	
1065	D5771	-3.9		0.41	
1080	D2500	-4.7		-0.15	
1081	D5771	-4.9		-0.29	
1134		-----		-----	
1146	D2500	-3.2		0.90	
1161	EN23015	-4		0.34	
1194		-----		-----	
1237		-----		-----	
1299	D2500	-4		0.34	
1389	D2500	-4		0.34	
1397	EN23015	-4		0.34	
1402	EN23015	-5		-0.36	
1404	D5771	-4		0.34	
1455	D5771	-5		-0.36	
1459	ISO3015	-5.0		-0.36	
1510	D2500	-1	R(0.05)	2.44	
1569	EN23015	-5		-0.36	
1622	D2500	-5		-0.36	
1631		-----		-----	
1634		-----		-----	
1635	EN23015	-4		0.34	
1650	D5771	-5		-0.36	
1656	IP219	-5		-0.36	
1659		-----		-----	
1706		-----		-----	
1710	EN23015	-3		1.04	
1724	D2500	-3		1.04	
1728	D2500	-5.0		-0.36	
1776	EN23015	-4.5		-0.01	
1792	D2500	-5		-0.36	
1807	EN23015	-5		-0.36	
1810	EN23015	-5		-0.36	
1811	EN23015	-4		0.34	
1833	D2500	-3		1.04	
1948		-----		-----	
1984	EN23015	-6		-1.06	
1987		-----		-----	
2146		-----		-----	
6016	D2500	-4.3		0.13	

normality	OK
n	57
outliers	2
mean (n)	-4.48
st.dev. (n)	0.883
R(calc.)	2.47
R(EN23015:94)	4.00

Compare R(D2500:11) = 4.00

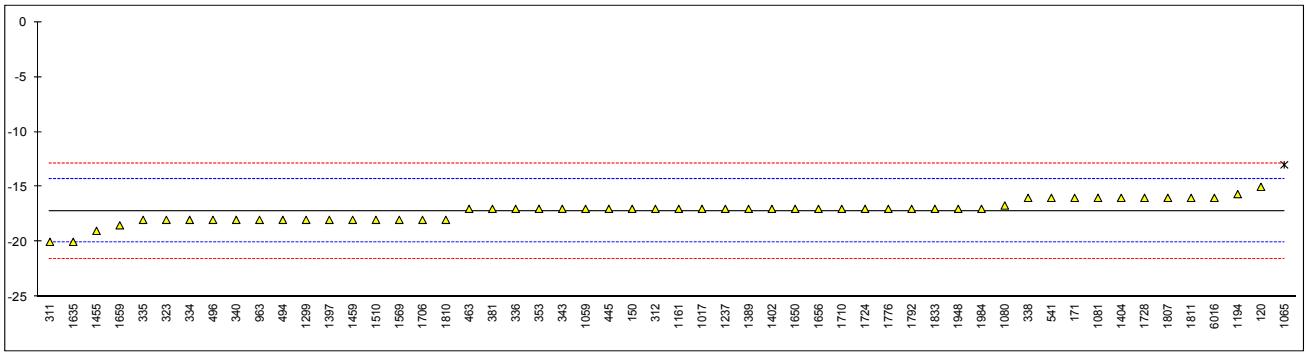


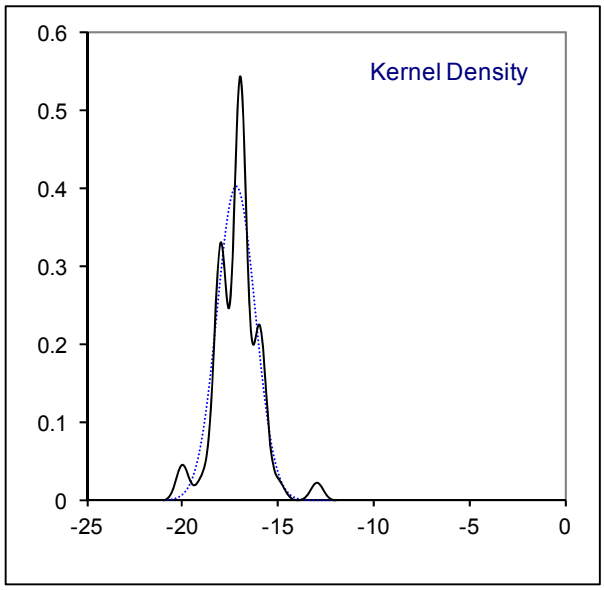


Determination of Cold Filter Plugging Point on sample #16093; result in °C

lab	method	value	mark	z(targ)	remarks
120	EN116	-15		1.53	
132		-----		-----	
150	EN116	-17		0.14	
159		-----		-----	
171	D6371	-16		0.84	
175		-----		-----	
311	EN116	-20		-1.94	
312	D6371	-17		0.14	
323	EN116	-18		-0.55	
334	EN116	-18		-0.55	
335	EN116	-18		-0.55	
336	EN116	-17		0.14	
338	EN116	-16		0.84	
340	EN116	-18		-0.55	
343	EN116	-17		0.14	
353	IP309	-17		0.14	
381	EN116	-17.0		0.14	
444		-----		-----	
445	IP309	-17		0.14	
463	EN116	-17		0.14	
494	EN116	-18		-0.55	
496	EN116	-18.0		-0.55	
511		-----		-----	
541	EN116	-16		0.84	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
963	EN116	-18		-0.55	
1017	EN116	-17		0.14	
1033		-----		-----	
1059	EN116	-17		0.14	
1065	D6371	-13	R(0.01)	2.92	
1080	EN116	-16.7		0.35	
1081	EN116	-16		0.84	
1134		-----		-----	
1146		-----		-----	
1161	EN116	-17		0.14	
1194	EN116	-15.66		1.07	
1237	EN116	-17		0.14	
1299	EN116	-18		-0.55	
1389	IP309	-17		0.14	
1397	EN116	-18		-0.55	
1402	EN116	-17		0.14	
1404	EN116	-16		0.84	
1455	EN116	-19		-1.25	
1459	EN116	-18.0		-0.55	
1510	IP309	-18		-0.55	
1569	EN116	-18		-0.55	
1622		-----		-----	
1631		-----		-----	
1634		-----		-----	
1635	EN116	-20		-1.94	
1650	EN116	-17		0.14	
1656	IP309	-17		0.14	
1659	EN116	-18.5		-0.90	
1706	EN116	-18		-0.55	
1710	EN116	-17		0.14	
1724	IP309	-17		0.14	
1728	D6371	-16.0		0.84	
1776	EN116	-17	C	0.14	First reported 17
1792	EN116	-17		0.14	
1807	EN116	-16		0.84	
1810	EN116	-18		-0.55	
1811	EN116	-16		0.84	
1833	EN116	-17		0.14	
1948	EN116	-17	C	0.14	First reported -23
1984	EN116	-17		0.14	
1987		-----		-----	
2146		-----		-----	
6016	D6371	-16		0.84	

normality	suspect
n	53
outliers	1
mean (n)	-17.20
st.dev. (n)	0.989
R(calc.)	2.77
R(EN116:15)	4.03



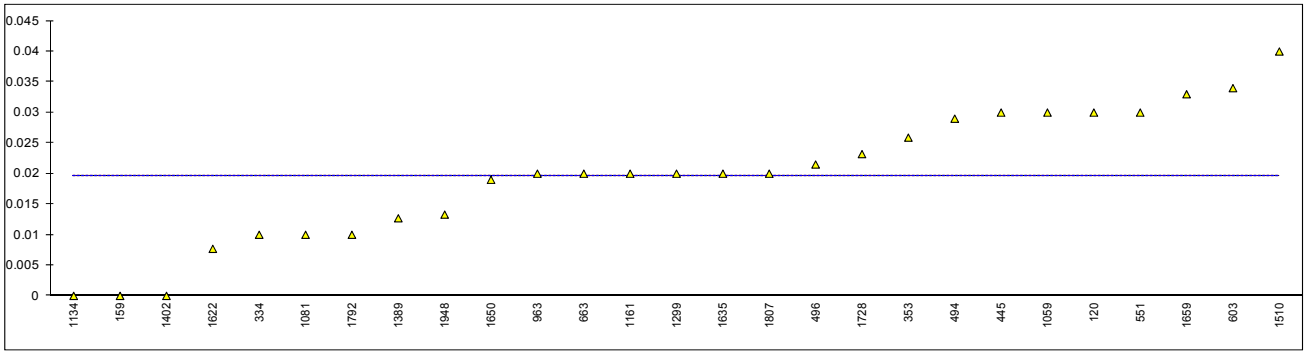


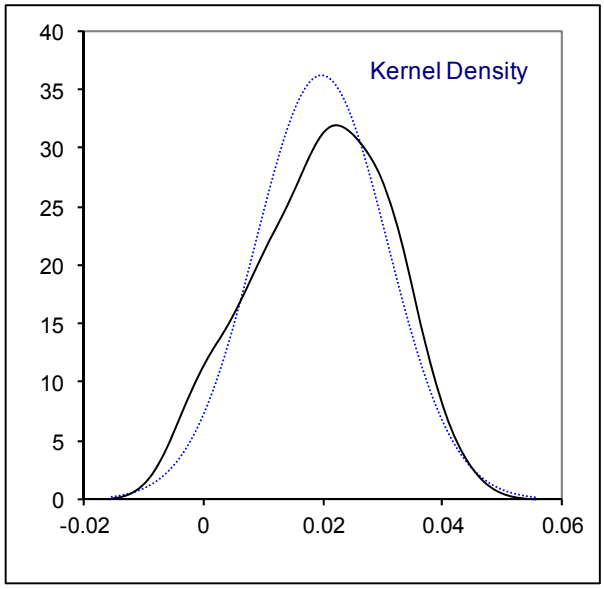
Determination of Carbon Residue, micro method on 10% dist. res. on sample #16093; result in %M/M

lab	method	value	mark	z(targ)	remarks
120	ISO10370	0.03		-----	
132	D4530	<0.1		-----	
150	D4530	<0.10		-----	
159	D4530	0.00		-----	
171		-----		-----	
175		-----		-----	
311	ISO10370	<0.10		-----	
312		-----		-----	
323	ISO10370	<0.10		-----	
334	ISO10370	0.01		-----	
335		-----		-----	
336	ISO10370	<0.10		-----	
338		-----		-----	
340	ISO10370	<0.10		-----	
343		-----		-----	
353	IP13	0.0259		-----	
381		-----		-----	
444		-----		-----	
445	IP398	0.030		-----	
463	ISO10370	<0.10		-----	
494	ISO10370	0.029		-----	
496	ISO10370	0.0215		-----	
511		-----		-----	
541		-----		-----	
551	D4530	0.030		-----	
556		-----		-----	
603	D4530	0.034		-----	
621	D189	< 0.1		-----	
633		-----		-----	
634		-----		-----	
663	D4530	0.02		-----	
963	ISO10370	0.02		-----	
1017		-----		-----	
1033		-----		-----	
1059	ISO10370	0.03		-----	
1065		-----		-----	
1080		-----		-----	
1081	ISO10370	0.01		-----	
1134	IP398	0		-----	
1146		-----		-----	
1161	ISO10370	0.02	C	-----	First reported 0.05
1194		-----		-----	
1237		-----		-----	
1299	D4530	0.02		-----	
1389	ISO10370	0.0127		-----	
1397	ISO10370	<0.01		-----	
1402	ISO10370	0.00		-----	
1404	ISO10370	<0.10		-----	
1455	ISO10370	< 0.10		-----	
1459		-----		-----	
1510	D4530	0.04		-----	
1569	ISO10370	<0.10		-----	
1622	D4530	0.0077		-----	
1631		-----		-----	
1634		-----		-----	
1635	ISO10370	0.02		-----	
1650	D189	0.019		-----	
1656	IP398	<0.1		-----	
1659	ISO10370	0.033		-----	
1706		-----		-----	
1710		-----	W	-----	Result withdrawn, reported 0.08
1724	D4530	<0.1		-----	
1728	ISO10370	0.0232		-----	
1776		-----		-----	
1792	ISO10370	0.01		-----	
1807	ISO10370	0.02		-----	
1810		-----		-----	
1811		-----		-----	
1833	ISO10370	<0.1		-----	
1948	ISO10370	0.0133		-----	
1984		-----		-----	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	OK
n	27
outliers	0
mean (n)	0.0196
st.dev. (n)	0.01081
R(calc.)	0.0303
R(ISO10370:14)	(0.0178)

Application range: 0.1 – 30 %M/M
Compare R(D4530) = 0.1414
Compare R(EN590:13, annex A) = 0.0298

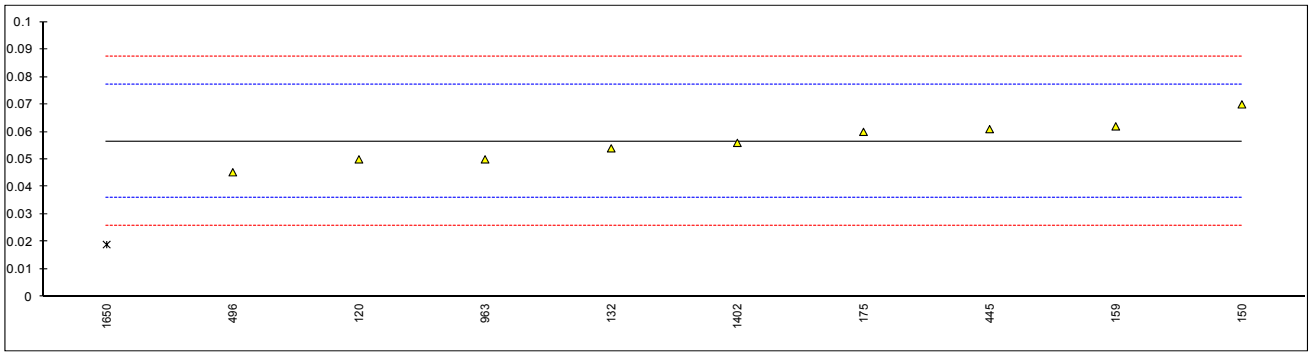


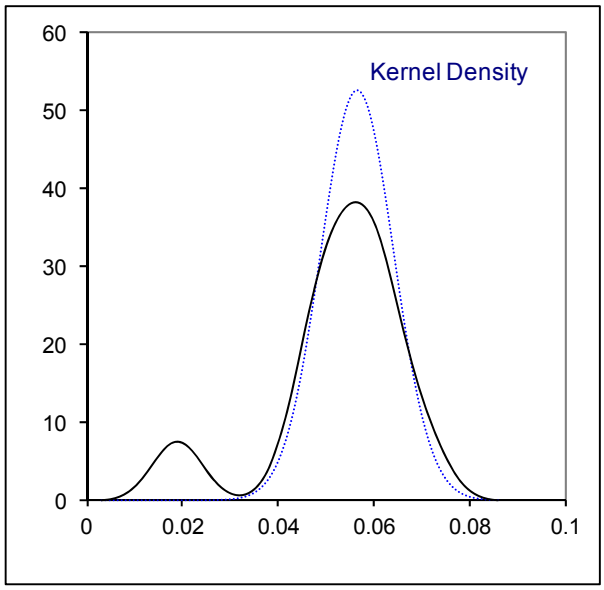


Determination of Ramsbottom Carbon Res. on 10% dist. res. on sample #16093; result in %M/M

lab	method	value	mark	z(targ)	remarks
120	D524	0.05		-0.63	
132	D524	0.054		-0.24	
150	D524	0.07	C	1.32	First reported 0.1
159	D524	0.062	C	0.54	First reported 0.004
171		-----		-----	
175	D524	0.06		0.34	
311		-----		-----	
312		-----		-----	
323		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
338		-----		-----	
340		-----		-----	
343		-----		-----	
353		-----		-----	
381		-----		-----	
444		-----		-----	
445	IP14	0.061		0.44	
463		-----		-----	
494		-----		-----	
496	D524	0.0453		-1.09	
511		-----		-----	
541		-----		-----	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
963	D524	0.05		-0.63	
1017		-----		-----	
1033		-----		-----	
1059		-----		-----	
1065		-----		-----	
1080		-----		-----	
1081		-----		-----	
1134		-----		-----	
1146		-----		-----	
1161		-----		-----	
1194		-----		-----	
1237		-----		-----	
1299		-----		-----	
1389		-----		-----	
1397		-----		-----	
1402	IP14	0.056		-0.05	
1404		-----		-----	
1455		-----		-----	
1459		-----		-----	
1510		-----		-----	
1569		-----		-----	
1622		-----		-----	
1631		-----		-----	
1634		-----		-----	
1635		-----		-----	
1650	D189	0.019	ex	-3.66	Result excluded, reported test method is not equivalent to ASTM D524
1656		-----		-----	
1659		-----		-----	
1706		-----		-----	
1710		-----		-----	
1724		-----		-----	
1728		-----		-----	
1776		-----		-----	
1792		-----		-----	
1807		-----		-----	
1810		-----		-----	
1811		-----		-----	
1833		-----		-----	
1948		-----		-----	
1984		-----		-----	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	OK	
n	9	
outliers	0	(+1 excl)
mean (n)	0.056	
st.dev. (n)	0.0076	
R(calc.)	0.021	
R(D524:15)	0.029	





Determination of Copper Corrosion 3hrs at 50 °C on sample #16093

lab	method	value	mark	z(targ)	remarks
120	D130	1A		-----	
132	D130	1a		-----	
150	D130	1a		-----	
159		-----		-----	
171	D130	1a		-----	
175	D130	1a		-----	
311	ISO2160	1A		-----	
312		-----		-----	
323	D130	1A		-----	
334	D130	1a		-----	
335	D130	1b		-----	
336	D130	1		-----	
338		-----		-----	
340	D130	1a		-----	
343	D130	1a		-----	
353	IP154	1a		-----	
381		-----		-----	
444		-----		-----	
445	IP154	1a		-----	
463	ISO2160	1A		-----	
494	ISO2160	1a		-----	
496	ISO2160	1a		-----	
511	D130	1A		-----	
541	D130	1A		-----	
551	D130	1A		-----	
556		-----		-----	
603	D130	1A		-----	
621	D130	1A		-----	
633	D130	1a		-----	
634	D130	1a		-----	
663		-----		-----	
963	D130	1a		-----	
1017	ISO2160	1a		-----	
1033		-----		-----	
1059	ISO2160	1a		-----	
1065		-----		-----	
1080	D130	1a		-----	
1081	D130	1a		-----	
1134		1A		-----	
1146		-----		-----	
1161	ISO2160	1A		-----	
1194		-----		-----	
1237		-----		-----	
1299	D130	1A		-----	
1389	D130	1A		-----	
1397	ISO2160	1		-----	
1402	D130	1A		-----	
1404	ISO2160	1a		-----	
1455	D130	1A		-----	
1459		-----		-----	
1510	D130	1A		-----	
1569	ISO2160	1a		-----	
1622	D130	1a		-----	
1631		-----		-----	
1634	ISO2160	1a		-----	
1635	ISO2160	1a		-----	
1650	ISO2160	1a		-----	
1656	IP154	1		-----	
1659	ISO2160	1A		-----	
1706		-----		-----	
1710	ISO2160	1B		-----	
1724	D130	1a		-----	
1728	D130	1a		-----	
1776		-----		-----	
1792	D130	1A		-----	
1807	D130	1a		-----	
1810		-----		-----	
1811		-----		-----	
1833	ISO2160	1a		-----	
1948	ISO2160	1A		-----	
1984		-----		-----	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

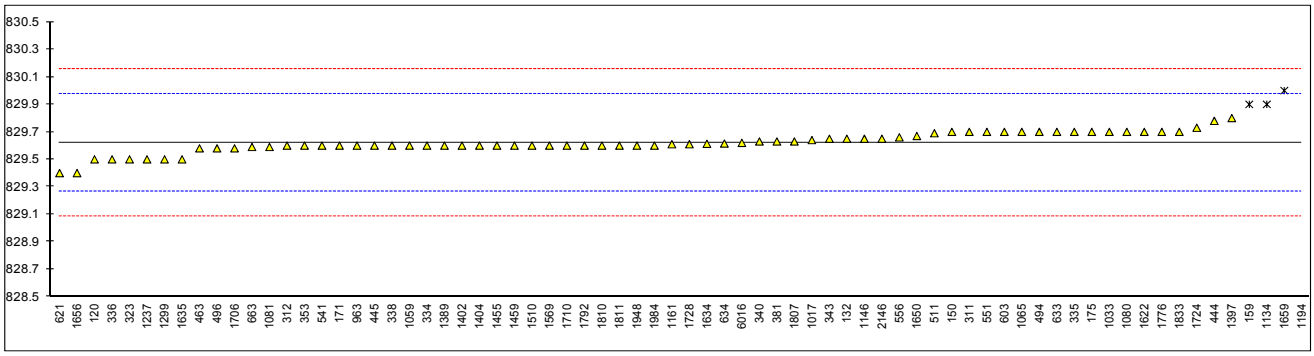
normality	n.a.
n	52
outliers	n.a.
mean (n)	1(1A/1B)
st.dev. (n)	n.a.
R(calc.)	n.a.
R(ISO2160:98)	n.a.

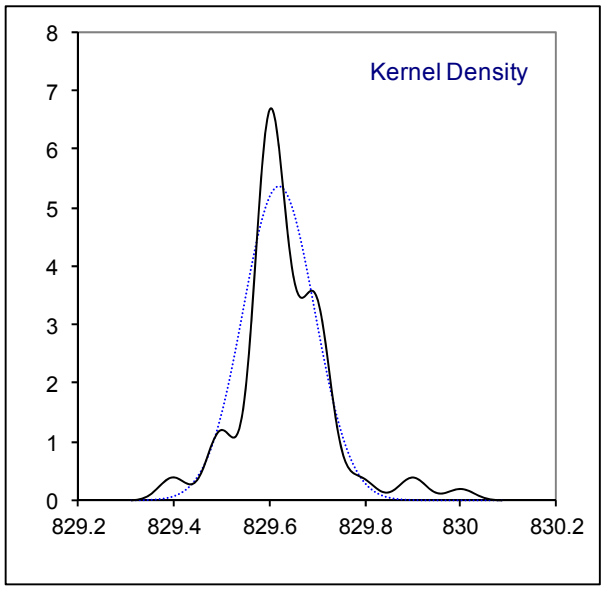
Determination of Density at 15 °C on sample #16093; result in kg/m^3

lab	method	value	mark	z(targ)	remarks
120	ISO12185	829.5		-0.68	
132	D4052	829.65		0.16	
150	ISO12185	829.7		0.44	
159	D4052	829.9	R(0.05)	1.56	
171	D4052	829.6		-0.12	
175	D4052	829.7		0.44	
311	ISO12185	829.7		0.44	
312	ISO12185	829.6		-0.12	
323	ISO12185	829.5		-0.68	
334	ISO12185	829.6		-0.12	
335	ISO12185	829.7		0.44	
336	ISO12185	829.5		-0.68	
338	ISO12185	829.6		-0.12	
340	ISO12185	829.63		0.05	
343	D4052	829.65		0.16	
353	IP365	829.6		-0.12	
381	D4052	829.63		0.05	
444	IP365	829.78		0.89	
445	IP365	829.6		-0.12	
463	ISO12185	829.58		-0.23	
494	ISO12185	829.7		0.44	
496	ISO12185	829.58		-0.23	
511	D4052	829.69		0.39	
541	ISO12185	829.6		-0.12	
551	D4052	829.7		0.44	
556	D4052	829.66		0.22	
603	D4052	829.7		0.44	
621	D4052	829.4		-1.24	
633	D4052	829.7		0.44	
634	D4052	829.615		-0.03	
663	D4052	829.59		-0.17	
963	ISO12185	829.6		-0.12	
1017	ISO12185	829.64		0.11	
1033	IP365	829.7		0.44	
1059	ISO12185	829.6		-0.12	
1065	D4052	829.7		0.44	
1080	ISO12185	829.7		0.44	
1081	D4052	829.59		-0.17	
1134	IP365	829.9	R(0.05)	1.56	
1146	ISO12185	829.65		0.16	
1161	ISO12185	829.61		-0.06	
1194	ISO12185	831.9	R(0.01)	12.76	
1237	ISO12185	829.5		-0.68	
1299	D4052	829.5		-0.68	
1389	D4052	829.6		-0.12	
1397	ISO12185	829.8		1.00	
1402	ISO12185	829.6		-0.12	
1404	ISO12185	829.6		-0.12	
1455	ISO12185	829.6		-0.12	
1459	ISO12185	829.6		-0.12	
1510	IP365	829.6		-0.12	
1569	ISO12185	829.6		-0.12	
1622	D4052	829.7		0.44	
1631		-----		-----	
1634	ISO12185	829.613		-0.04	
1635	ISO12185	829.5		-0.68	
1650	ISO12185	829.67		0.27	
1656	IP365	829.4		-1.24	
1659	ISO12185	830	R(0.01)	2.12	
1706	ISO12185	829.58		-0.23	
1710	ISO12185	829.6		-0.12	
1724	D4052	829.73		0.61	
1728	D4052	829.61		-0.06	
1776	ISO12185	829.7	C	0.44	First reported 826.4
1792	ISO12185	829.6		-0.12	
1807	ISO12185	829.63		0.05	
1810	ISO12185	829.6		-0.12	
1811	ISO12185	829.6		-0.12	
1833	D4052	829.7		0.44	
1948	ISO12185	829.6		-0.12	
1984	ISO12185	829.6		-0.12	
1987		-----		-----	
2146	ISO12185	829.65		0.16	
6016	D4052	829.62		-0.01	

normality	suspect
n	68
outliers	4
mean (n)	829.62
st.dev. (n)	0.074
R(calc.)	0.21
R(ISO12185:96)	0.50

Compare R(D4052:15) = 0.50





Determination of Distillation on sample #16093; result in °C

Lab	method	mode	IBP	mark	10%rec	mark	50%rec	mark	90%rec	mark	95%rec	mark	FBP	mark
120	D86	Automated	185.1		221.1		283.6		338.9		353.1		357.9	
132	D86	Automated	183.5		225.7		284.4		337.8		351.7		358.7	
150	ISO3405	Automated	172.7		221.4		283.2		337.1		350.1		356.6	
159	D86	Automated	183.5		225.5		284.2		337.2		349.1		357.0	
171	D86	Automated	174.7		225.7		284.4		337.6		350.7		356.2	
175	D86	Automated	179.2		222.4		284.1		338.6		351.7		356.4	
311	ISO3405	Automated	181.2		220.4		283.3		336.9		348.6		358.5	
312	D86	Automated	175.8		224.6		285.1		337.6		351.5		357.4	
323	ISO3405	Automated	179.5		221.9		284.5		338.5		352.0		358.4	
334	ISO3405	Automated	183.8		221.7		283.0		337.7		350.9		361.0	
335	ISO3405	Automated	182.2		220.5		283.4		338.6		353.7		359.5	
336	ISO3405	Automated	182.8		222.8		284.1		337.6		349.9		359.9	
338	ISO3405	Automated	182.7		223.7		285.1		339.4		354.1		360.4	
340	ISO3405	Automated	188.0		223.0		284.6		338.0		349.8		359.6	
343	D86	Automated	182.6		219.3		281.7		337.8		349.0		358.3	
353	ISO3405	Automated	179.0		220.3		283.9		338.8		352.1		360.7	
381	ISO3405	Automated	172.3		220.5		282.5		336.4		348.0		359.3	
444	D86	Automated	173.1		220.7		283.1		337.0		350.3		358.3	
445	IP123	Automated	178.8		220.8		281.9		335.0		347.0		355.5	
463	ISO3405	Automated	186.1		222.9		284.9		339.2		352.0		360.9	
494	ISO3405	Automated	177.8		221.3		282.9		336.8		-----		336.8	R(1)
496	ISO3405	Automated	173.1		220.6		282.8		335.5		347.1		358.2	
511	D86	Manual	178.8		217.8		280.0		333.5		344.8		357.5	
541	ISO3405	Automated	178.5		222.0		283.8		337.1		350.0		359.3	
551	D86	Automated	181.2		221.8		282.6		334.2		343.6		355.4	
556			-----		-----		-----		-----		-----		-----	
603			-----		-----		-----		-----		-----		-----	
621	D86	Manual	178.0		221.0		286.0		339.0		353.0		363.0	
633	D86	Manual	180.0		219.0		280.0		331.0	R(1)	347.0		356.0	
634	D86	Manual	179.5		223.5		283.5		337.5		350.5		360.5	
663	D86	Automated	180.35		224.95		284.95		337.35		349.85		358.40	
963	ISO3405	Automated	180.0		221.4		283.7		336.2		348.6		357.7	
1017			-----		-----		-----		-----		-----		-----	
1033	IP123	Automated	177.8		221.7		284.8		338.3		346.7		358.5	
1059	ISO3405	Automated	184.1		223.5		284.1		336.4		349.5		357.9	
1065	D86	Automated	179.1		220.5		283.8		337.6		348.9		358.1	
1080			-----		-----		-----		-----		-----		-----	
1081	D86	Automated	181.8		223.4		284.8		338.2		350.4		360.4	
1134	IP123	Automated	179.3		222.2		285.4		340.1		353.6		361.9	
1146	D86	Automated	184.9		223.3		285.5		339.4		352.9		362.2	
1161	ISO3405	Automated	174.0	C	218.0	C	284.5		338.7		353.5		358.6	
1194	D86	Automated	168.43		213.37	R(1)	282.4		337.86		349.8		350.8	R(5)
1237	ISO3405	Manual	182.0		217.0		281.1		337.1		349.1		356.1	
1299	D86	Automated	176.0		220.6		282.8		336.4		348.6		356.3	
1389	D86	Automated	177.0		220.6		283.2		336.7		349.1		356.6	
1397	ISO3405	Automated	185.1		224.5		284.8		337.6		350.1		359.8	
1402	IP123	Automated	184.9		221.4		283.2		336.3		347.0		358.6	
1404	ISO3405	Automated	165.2	R(5)	222.3		282.6		336.0		347.9		357.9	
1455	ISO3405	Automated	181.6		222.6		283.7		336.8		348.3		357.9	
1459	ISO3405	Automated	178.9		222.4		284.1		337.2		349.3		358.2	
1510	D86	Automated	175.5		220.6		282.6		336.0		347.5		355.8	
1569	ISO3405	Automated	178.9		223.6		283.6		338.1		348.6		355.6	
1622	D86	Automated	184.63		219.39		279.16		331.8	R(5)	343.12		354.74	
1631			-----		-----		-----		-----		-----		-----	
1634	ISO3405	Automated	174.7		223.3		285.2		338.8		350.8		361.5	
1635	ISO3405	Automated	185.4		223.9		284.3		337.0		350.2		357.3	
1650	D86	Automated	181.1		221.3		284.2		339.1		353.2		361.5	
1656	IP123	Automated	180.8		218.1		283.4		338.3		351.3		357.7	
1659			-----		-----		-----		-----		-----		-----	
1706	ISO3405	Automated	179.9		222.4		283.55		337.4		349.9		357.25	
1710	ISO3405	Automated	182.7		224.4		284.6		337.6		350.0		358.1	
1724	D86	Automated	179.4		223.2		284.2		337.7		350.7		358.2	
1728	ISO3405	Manual	178.8		222.2		282.4		338		350		357.6	
1776	ISO3405	Automated	176.5		220.6		283.0		336.5		348.6		356.5	
1792	D86	Automated	181.4		221.8		284.1		338.1		350.8		358.8	
1807	ISO3405	Automated	175.0		216.9		281.3		335.3		346.8		358.5	
1810	ISO3405	Automated	173.6		218.4		281.7		334.7		344.9		352.4	
1811	ISO3405	Automated	178.8		219.4		282.5		335.9		347.4		357.9	
1833	D86	Automated	175.5		223.5		283.0		336.2		348.1		359.1	
1948	ISO3405	Automated	176.6		220.8		282.4		336.2		347.7		357.1	
1984	ISO3405	Automated	179.5		221.8		283.9		337.5		350.7		358.1	
1987			-----		-----		-----		-----		-----		-----	
2146	ISO3405	Automated	186.2	ex	232.2	R(1)	287.4	ex	342.0	R(5)	358.6	R(5)	360.5	ex
6016	D86	Automated	176.4		220.3		283.3		337.0		349.8		358.8	

normality	OK	OK	suspect	OK	OK	OK
n	65	65	66	64	65	64
outliers	1(+1ex)	2	0(+1ex)	3	1	2(+1ex)
mean (n)	179.44	221.66	283.46	337.33	349.61	358.25
st.dev (n)	3.925	2.024	1.331	1.290	2.358	1.923
R(calc.)	10.99	5.67	3.73	3.61	6.60	5.38
R(ISO 3405:11 auto)	9.87	4.88	2.97	5.06	8.86	7.10

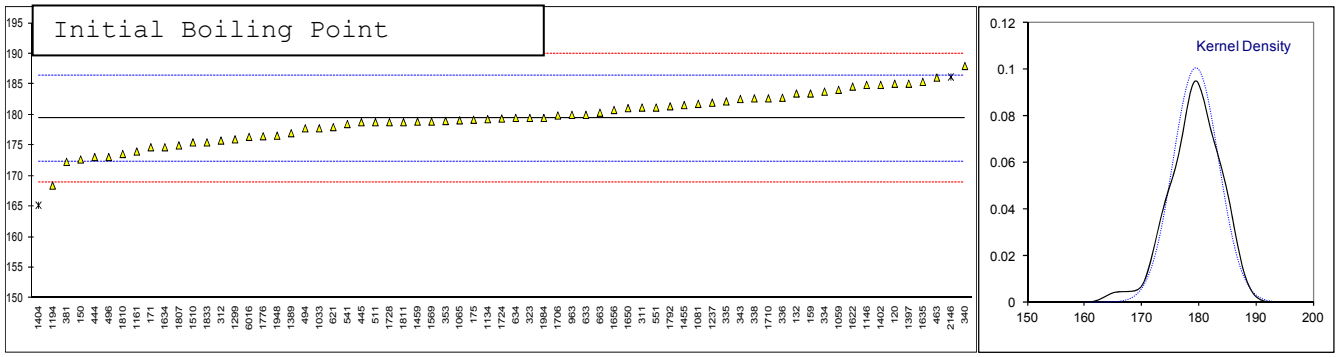
Lab 1161: first reported 169.3, 216.5
Lab 494: reported result for final boiling point is equal to 90% recovered, distillation was stopped.
Lab 2146: four of the eight test results were statistical outliers. As the results are not in depended from each other the four other test results were excluded for statistical evaluation

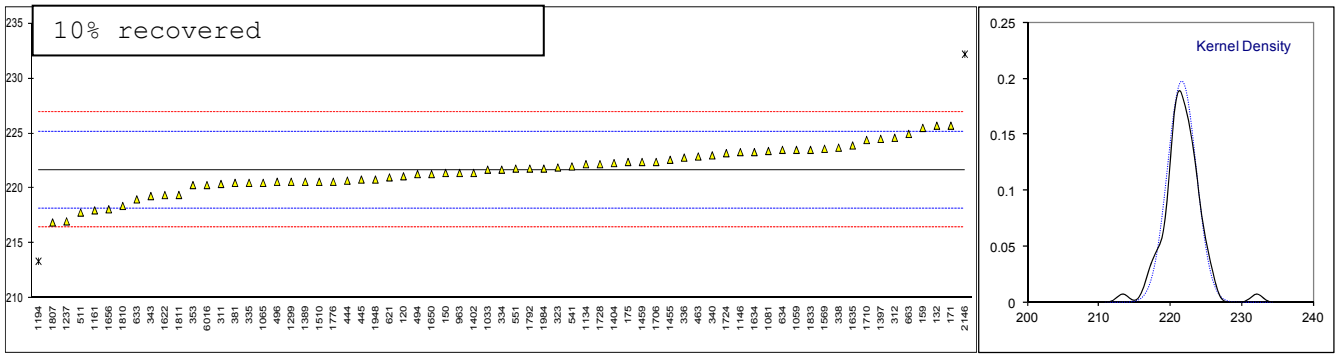
Determination of Distillation on sample #16093; result in %V/V

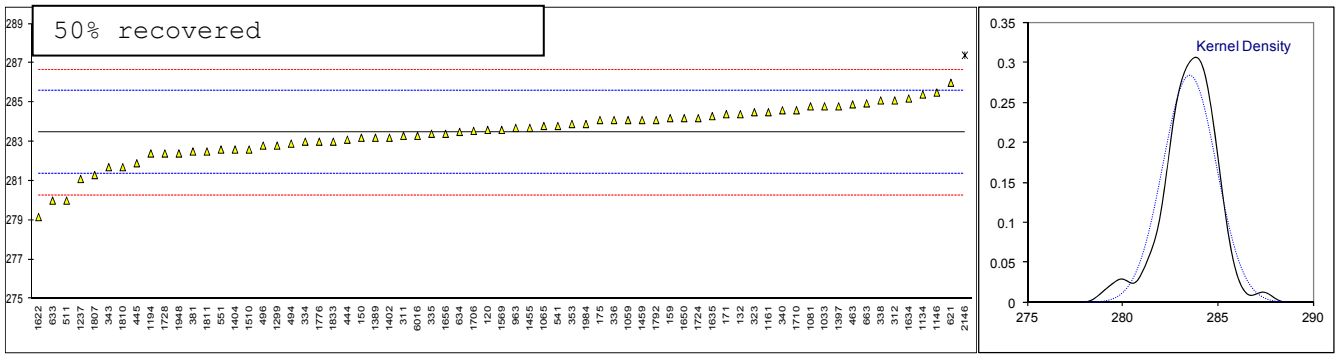
Lab	method	mode	Vol at 250°C	mark	Vol at 350°C	mark	% residue	mark
120	D86	Automated	25.8		94.2		1.2	
132	D86	Automated	24.4		94.3		1.5	
150	ISO3405	Automated	25.6		95.4		1.5	
159	D86	Automated	24.6		95.2		1.1	
171	D86	Automated	-----		-----		1.3	
175	D86	Automated	-----		-----		1.7	
311	ISO3405	Automated	25.6		94.9		1.4	
312	D86	Automated	24.1		94.7		-----	
323	ISO3405	Automated	25.4		94.4		1.5	
334	ISO3405	Automated	25.8		94.7		1.0	
335	ISO3405	Automated	25.8		94.2		1.0	
336	ISO3405	Automated	24.5		95.0		0.4	
338	ISO3405	Automated	24.2		94.0		1.4	
340	ISO3405	Automated	24.9		95.1		1.4	
343	D86	Automated	26.2		95.4		1.4	
353	ISO3405	Automated	25.3		94.4		1.1	
381	ISO3405	Automated	26.72		95.56		1.3	
444	D86	Automated	25.8		94.9		1.8	
445	IP123	Automated	26.4		95.9		1.5	
463	ISO3405	Automated	25.5		94.4		1.0	
494	ISO3405	Automated	25.4		-----		0	
496	ISO3405	Automated	25.6		95.8		1.5	
511	D86	Manual	27.5		96.0		1.0	
541	ISO3405	Automated	25.7		95.0		1.4	
551	D86	Automated	-----		-----		-----	
556			-----		-----		-----	
603			-----		-----		-----	
621	D86	Manual	28.0		94.0		1.0	
633	D86	Manual	-----		-----		1.3	
634	D86	Manual	25		92	R(1)	1.0	
663	D86	Automated	24.3		95.4		1.70	
963	ISO3405	Automated	25.2		95.4		1.2	
1017			-----		-----		-----	
1033	IP123	Automated	-----		-----		1.4	
1059	ISO3405	Automated	24.7		95.1		1.4	
1065	D86	Automated	25.9		96.6		1.2	
1080			-----		-----		-----	
1081	D86	Automated	25.15		94.88		1.2	
1134	IP123	Automated	25.0		94.1		1.0	
1146	D86	Automated	24.8		94.0		0.9	
1161	ISO3405	Automated	26.9		94.2		-----	
1194	D86	Automated	27.6		95.13		1.8	
1237	ISO3405	Manual	27.3		95.5		1.9	
1299	D86	Automated	26.1		95.4		1.5	
1389	D86	Automated	25.4		95.2		1.4	
1397	ISO3405	Automated	24.2		95.0		1.3	
1402	IP123	Automated	26.1		95.9		1.0	
1404	ISO3405	Automated	26.3		95.7		1.4	
1455	ISO3405	Automated	25.6		95.4		1.4	
1459	ISO3405	Automated	24.9		95.2		1.4	
1510	D86	Automated	25.6		95.7		1.6	
1569	ISO3405	Automated	25.5		95.4		1.4	
1622	D86	Automated	28.7		96.9		1.7	
1631			-----		-----		-----	
1634	ISO3405	Automated	24.6		94.7		1.4	
1635	ISO3405	Automated	24.8		95.0		1.4	
1650	D86	Automated	25.2		94.2		1.2	
1656	IP123	Automated	26.6		94.9		1.7	
1659			-----		-----		-----	
1706	ISO3405	Automated	25.35		95.05		1.65	
1710	ISO3405	Automated	24.4		95.0		1.5	
1724	D86	Automated	25.2		94.8		1.4	
1728	ISO3405	Manual	25.5		95.0		1.5	
1776	ISO3405	Automated	25.9		95.4		1.4	
1792	D86	Automated	25.2		94.7		1.4	
1807	ISO3405	Automated	27.5		95.8		1.4	
1810	ISO3405	Automated	26.9		96.7		1.2	
1811	ISO3405	Automated	26.1		95.8		1.4	
1833	D86	Automated	25.5		95.5		1.6	
1948	ISO3405	Automated	25.8		95.0		1.5	
1984	ISO3405	Automated	25.9		95.5		1.4	
1987			-----		-----		-----	
2146	ISO3405	Automated	21.0	R(1)	92.9	ex	1.7	
6016	D86	Automated	26		95		1.4	

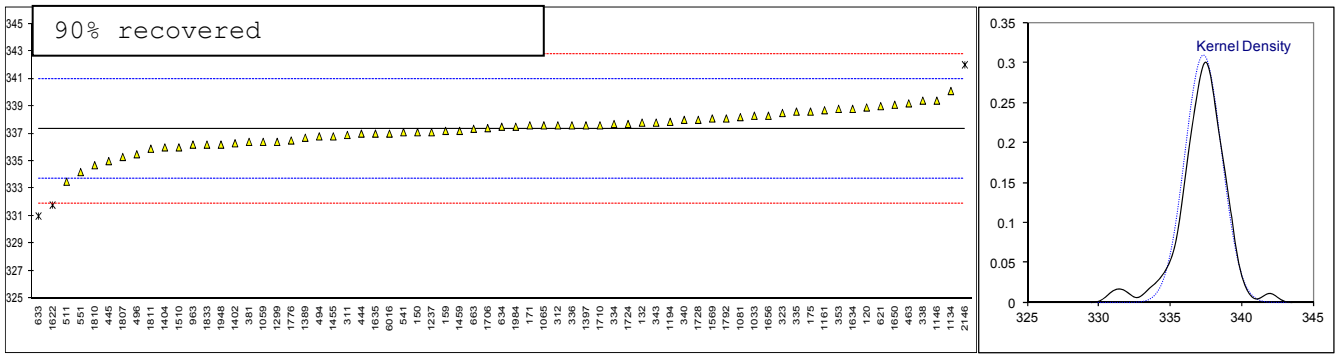
normality	OK	OK
n	61	59
outliers	1	1 (+1 excl)
mean (n)	25.66	95.11
st.dev (n)	0.972	0.653
R(calc.)	2.72	1.83
R(ISO 3405:11 auto)	2.70	2.70

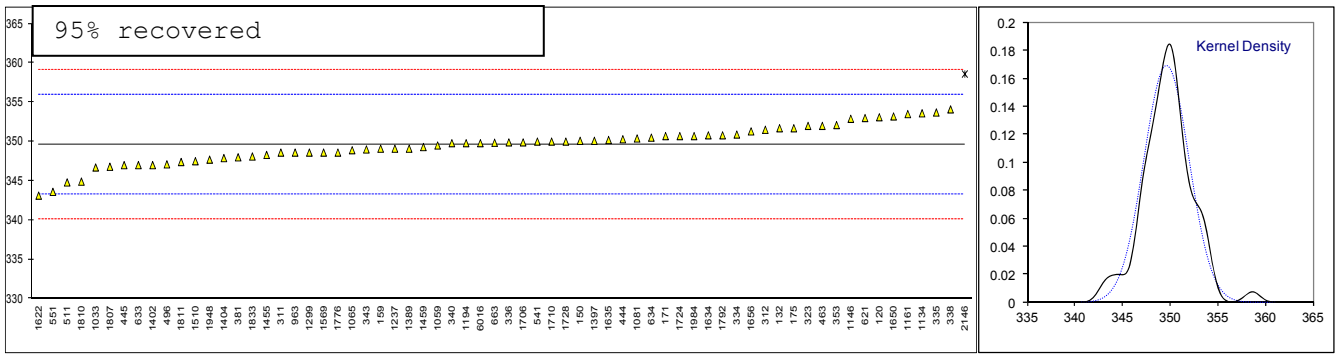
Lab 2146: four of the eight test results were statistical outliers. As the results are not in depended from each other the four other test results were excluded for statistical evaluation

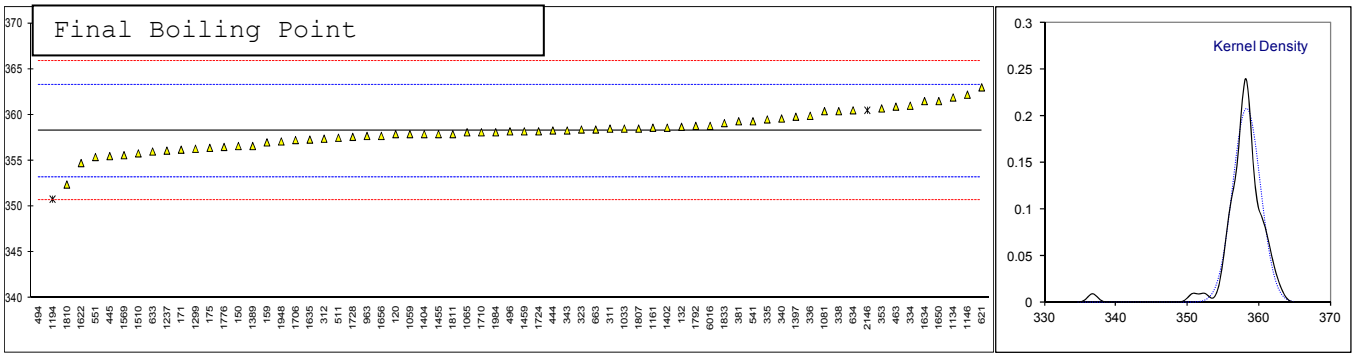

Initial Boiling Point
Kernel Density

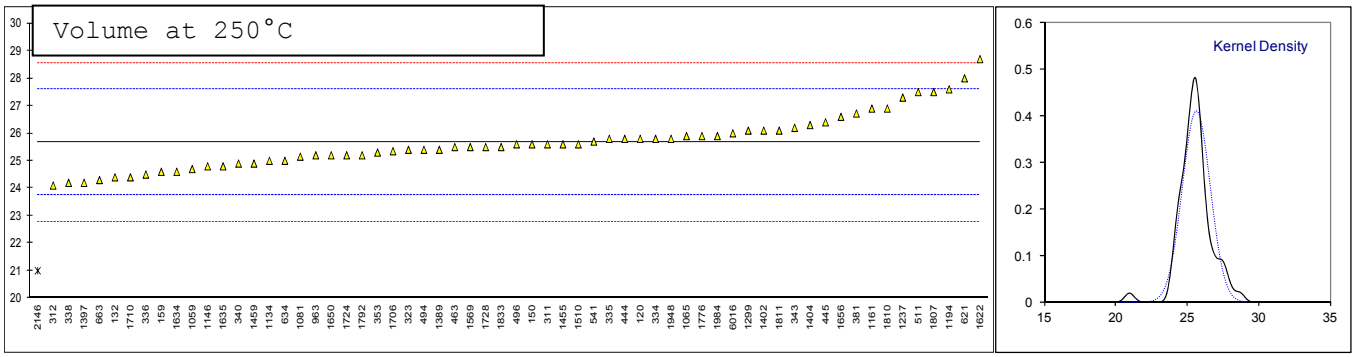

10% recovered
Kernel Density

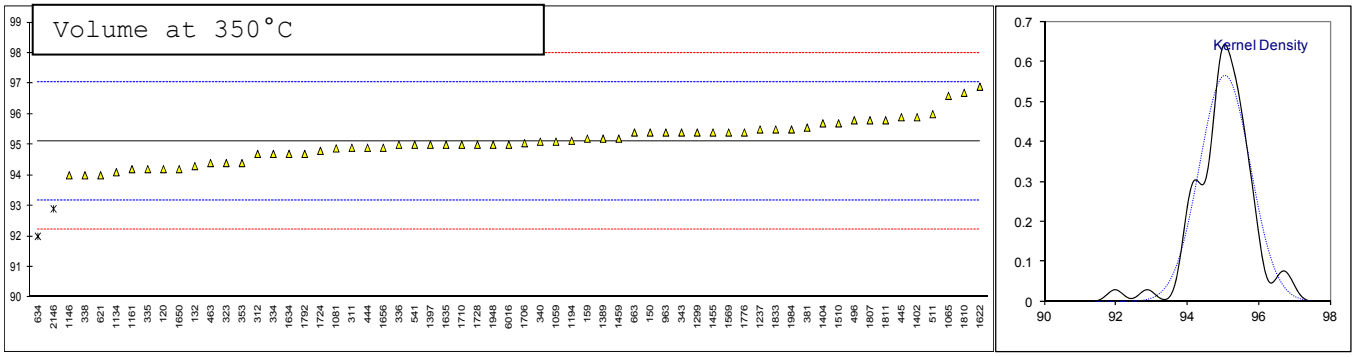

50% recovered
Kernel Density


90% recovered
Kernel Density


95% recovered
Kernel Density


Final Boiling Point
Kernel Density


Volume at 250°C
Kernel Density

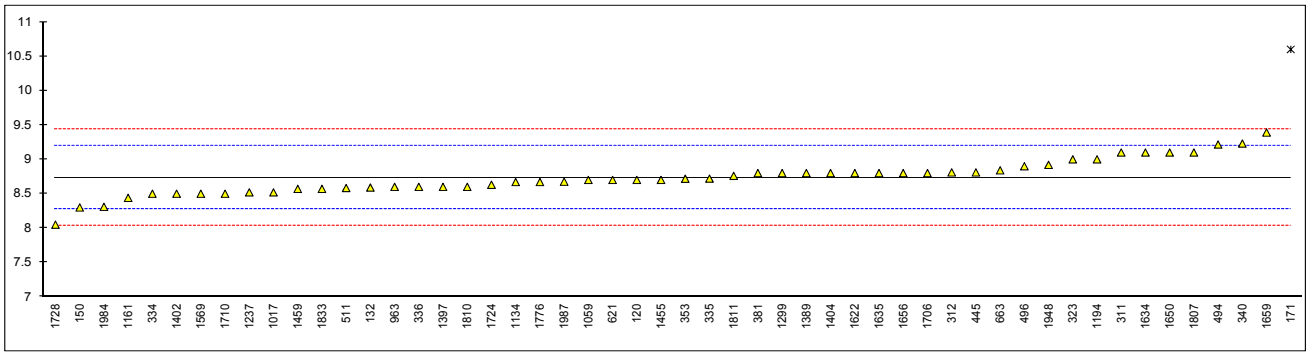

Volume at 350°C
Kernel Density

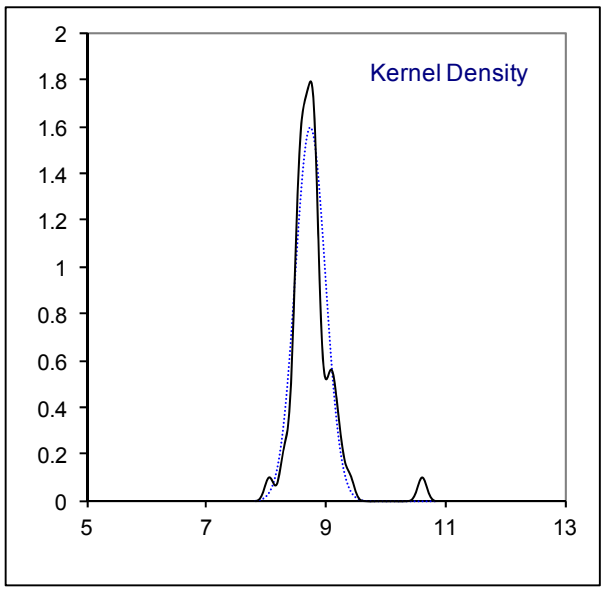
Determination of Fatty Acid Methyl Esters (FAME) content on sample #16093; result in %V/V

lab	method	value	mark	z(targ)	remarks
120	D7371	8.7		-0.14	
132	D7371	8.59		-0.62	
150	D7371	8.3		-1.86	
159		-----		-----	
171		10.6	R(0.01)	8.02	
175		-----		-----	
311	EN14078	9.1		1.58	
312	EN14078	8.81		0.33	
323	EN14078	9.0		1.15	
334	EN14078	8.5		-1.00	
335	EN14078	8.72		-0.06	
336	EN14078	8.6		-0.57	
338		-----		-----	
340	EN14078	9.23		2.13	
343		-----		-----	
353	EN14078	8.718		-0.07	
381	EN14078	8.8		0.29	
444		-----		-----	
445	EN14078	8.81		0.33	
463		-----		-----	
494	EN14078	9.2158		2.07	
496	EN14078	8.9		0.72	
511	D7371	8.583		-0.65	
541		-----		-----	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621	EN14078	8.7		-0.14	
633		-----		-----	
634		-----		-----	
663	EN14078	8.84		0.46	
963	EN14078	8.60		-0.57	
1017	EN14078	8.52		-0.92	
1033		-----		-----	
1059	EN14078	8.7		-0.14	
1065		-----		-----	
1080		-----		-----	
1081		-----		-----	
1134	EN14078	8.67		-0.27	
1146		-----		-----	
1161	EN14078	8.44		-1.26	
1194	EN14078	9		1.15	
1237	EN14078	8.52		-0.92	
1299	EN14078	8.8		0.29	
1389	EN14078	8.8	C	0.29	First reported 9.8
1397	EN14078	8.6		-0.57	
1402	EN14078	8.5		-1.00	
1404	EN14078	8.8		0.29	
1455	EN14078	8.7		-0.14	
1459	EN14078	8.57		-0.70	
1510		-----		-----	
1569	EN14078	8.5		-1.00	
1622	D7371	8.8		0.29	
1631		-----		-----	
1634	EN14078	9.1		1.58	
1635	EN14078	8.8		0.29	
1650	EN14078	9.1		1.58	
1656	EN14078	8.8		0.29	
1659	EN14078	9.39	C	2.82	First reported 10.0
1706	EN14078	8.8		0.29	
1710	EN14078	8.5		-1.00	
1724	EN14078	8.63		-0.45	
1728	EN14078	8.05		-2.94	
1776	EN14078	8.67		-0.27	
1792		-----		-----	
1807	EN14078	9.1		1.58	
1810	EN14078	8.6		-0.57	
1811	EN14078	8.76		0.11	
1833	EN14078	8.57	C	-0.70	First reported 7.26
1948	EN14078	8.92		0.80	
1984	EN14078	8.309		-1.83	
1987	D7371	8.675		-0.25	
2146		-----		-----	
6016		-----		-----	

normality	OK
n	51
outliers	1
mean (n)	8.734
st.dev. (n)	0.2505
R(calc.)	0.701
R(EN14078:14)	0.651

Compare R(D7371:14) = 1.128



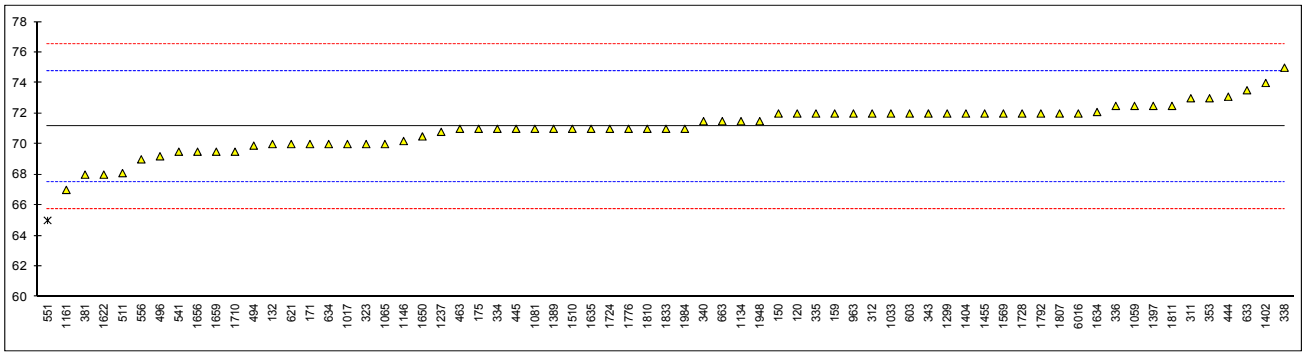


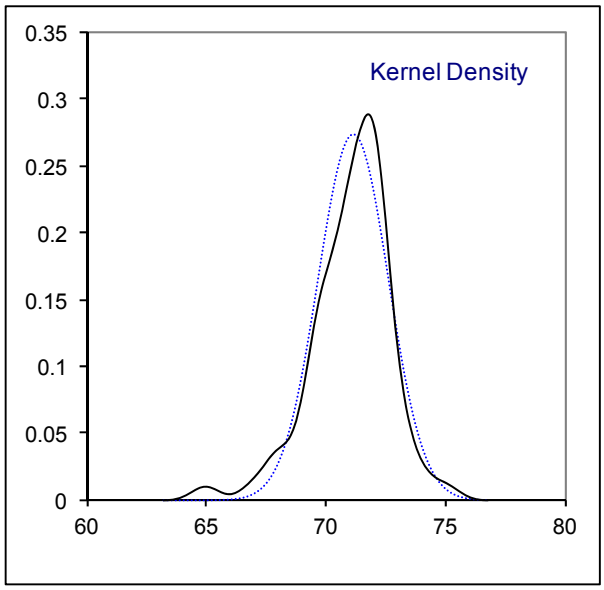
Determination of Flash Point PMcc on sample #16093; result in °C

lab	method	value	mark	z(targ)	remarks
120	D93	72		0.48	
132	D93	70.0		-0.63	
150	D93	72.0		0.48	
159	D93	72.0		0.48	
171		70.0		-0.63	
175	D93	71		-0.08	
311	ISO2719	73.0		1.03	
312	ISO2719	72.0		0.48	
323	ISO2719	70.0		-0.63	
334	ISO2719	71.0		-0.08	
335	ISO2719	72.0		0.48	
336	ISO2719	72.5		0.75	
338	ISO2719	75.0		2.14	
340	ISO2719	71.5		0.20	
343	D93	72.0		0.48	
353	IP34	73.0		1.03	
381	ISO2719	68.0		-1.74	
444	D93	73.1		1.08	
445	IP34	71.0		-0.08	
463	ISO2719	71		-0.08	
494	ISO2719	69.9		-0.69	
496	ISO2719	69.2		-1.08	
511	D93	68.1		-1.69	
541	ISO2719	69.5		-0.91	
551	D93	65.0	R(0.01)	-3.41	
556	NBR14598	69.0		-1.19	
603	D93	72		0.48	
621	D93	70.0		-0.63	
633	D93	73.525		1.32	
634	D93	70.0		-0.63	
663	D93	71.5		0.20	
963	ISO2719	72.0		0.48	
1017	D93	70.0		-0.63	
1033	IP34	72.0		0.48	
1059	ISO2719	72.5		0.75	
1065	D93	70		-0.63	
1080		-----		-----	
1081	D93	71.0		-0.08	
1134	IP34	71.5		0.20	
1146	D93	70.2		-0.52	
1161	ISO2719	67.0		-2.30	
1194		-----		-----	
1237	ISO2719	70.8		-0.19	
1299	D93	72.0		0.48	
1389	D93	71.0		-0.08	
1397	ISO2719	72.5		0.75	
1402	IP34	74.0		1.58	
1404	ISO2719	72.0		0.48	
1455	ISO2719	72.0		0.48	
1459		-----		-----	
1510	IP34	71		-0.08	
1569	ISO2719	72		0.48	
1622	D93	68.0		-1.74	
1631		-----		-----	
1634	ISO2719	72.1		0.53	
1635	ISO2719	71.0		-0.08	
1650	ISO2719	70.5		-0.36	
1656	ISO2719	69.5		-0.91	
1659	ISO3679	69.5		-0.91	
1706		-----		-----	
1710	ISO2719	69.5		-0.91	
1724	D93	71		-0.08	
1728	D93	72.0		0.48	
1776	ISO2719	71.0		-0.08	
1792	ISO2719	72.0		0.48	
1807	ISO2719	72.0		0.48	
1810	ISO2719	71		-0.08	
1811	ISO2719	72.5		0.75	
1833	ISO2719	71		-0.08	
1948	ISO2719	71.5		0.20	
1984	ISO2719	71.0		-0.08	
1987		-----		-----	
2146		-----		-----	
6016	D93	72		0.48	

normality	OK
n	66
outliers	1
mean (n)	71.143
st.dev. (n)	1.4594
R(calc.)	4.086
R(ISO2719:16)	5.051

Compare R(D93:16) =5.051



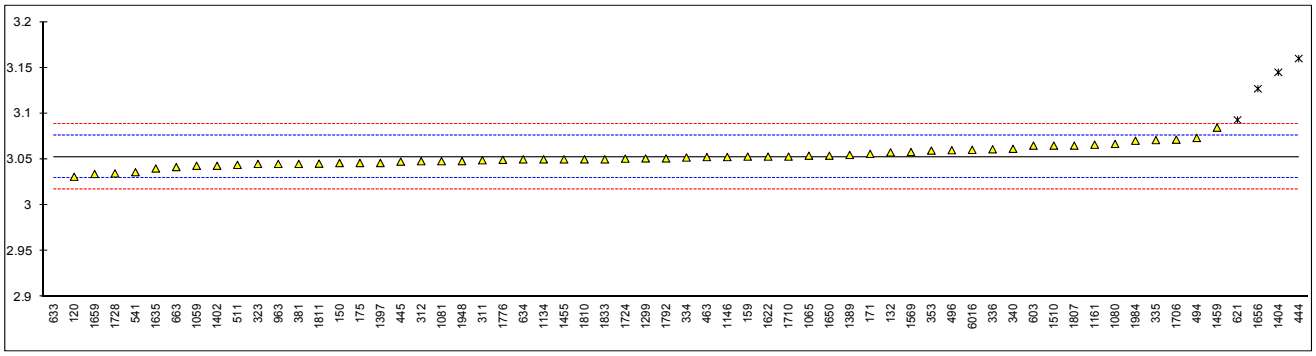


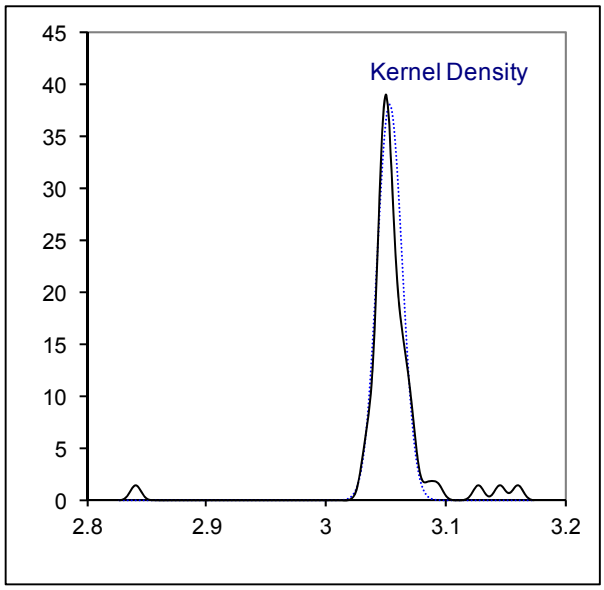
Determination of Kinematic Viscosity at 40°C on sample #16093; result in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	D445	3.031		-1.84	
132	D445	3.0576		0.40	
150	D445	3.046		-0.57	
159	D445	3.053		0.02	
171		3.056		0.27	
175	D445	3.046		-0.57	
311	ISO3104	3.049		-0.32	
312	D445	3.048		-0.41	
323	ISO3104	3.045		-0.66	
334	ISO3104	3.052		-0.07	
335	ISO3104	3.071		1.53	
336	ISO3104	3.061		0.69	
338		-----		-----	
340	ISO3104	3.0615		0.73	
343		-----		-----	
353	ISO3104	3.0596		0.57	
381	D445	3.045		-0.66	
444	D445	3.1600	C,R(0.01)	9.03	First reported 5.3556
445	ISO3104	3.0475		-0.45	
463	ISO3104	3.0525		-0.03	
494	ISO3104	3.0734		1.73	
496	ISO3104	3.0600	C	0.61	First reported 3.006
511	D445	3.0440		-0.74	
541	ISO3104	3.036		-1.42	
551		-----		-----	
556		-----		-----	
603	D445	3.065		1.03	
621	D445	3.093	R(0.05)	3.39	
633	D445	2.8405687	R(0.01)	-17.88	
634	D445	3.0500		-0.24	
663	D445	3.0416		-0.94	
963	ISO3104	3.045		-0.66	
1017		-----		-----	
1033		-----		-----	
1059	ISO3104	3.043		-0.83	
1065	D445	3.0540	C	0.10	First reported 3.10035
1080	D7042	3.0668		1.18	
1081	D445	3.048		-0.41	
1134		3.050		-0.24	
1146	D445	3.0525		-0.03	
1161	ISO3104	3.066		1.11	
1194		-----		-----	
1237		-----		-----	
1299	D445	3.051		-0.15	
1389	D445	3.0548		0.17	
1397	ISO3104	3.046		-0.57	
1402	ISO3104	3.043		-0.83	
1404	ISO3104	3.145	R(0.01)	7.77	
1455	ISO3104	3.050		-0.24	
1459	D7042	3.0846		2.68	
1510	D445	3.065		1.03	
1569	ISO3104	3.058		0.44	
1622	D445	3.053		0.02	
1631		-----		-----	
1634		-----		-----	
1635	ISO3104	3.040		-1.08	
1650	ISO3104	3.0540		0.10	
1656	ISO3104	3.127	C,R(0.01)	6.25	First reported 3.134
1659	ISO3104	3.034		-1.58	
1706	ISO3104	3.0715		1.57	
1710	ISO3104	3.053		0.02	
1724	D445	3.0508		-0.17	
1728	D445	3.0347		-1.53	
1776	ISO3104	3.0495		-0.28	
1792	ISO3104	3.051		-0.15	
1807	ISO3104	3.065		1.03	
1810	ISO3104	3.050		-0.24	
1811	ISO3104	3.0453		-0.63	
1833	D445	3.05		-0.24	
1948	ISO3104	3.0481		-0.40	
1984	ISO3104	3.07037		1.48	
1987		-----		-----	
2146		-----		-----	
6016	D7042	3.0604		0.64	

normality	OK
n	57
outliers	5
mean (n)	3.0528
st.dev. (n)	0.01048
R(calc.)	0.0294
R(ISO3104:94)	0.0332

Compare R(EN590:13,A) = 0.0550

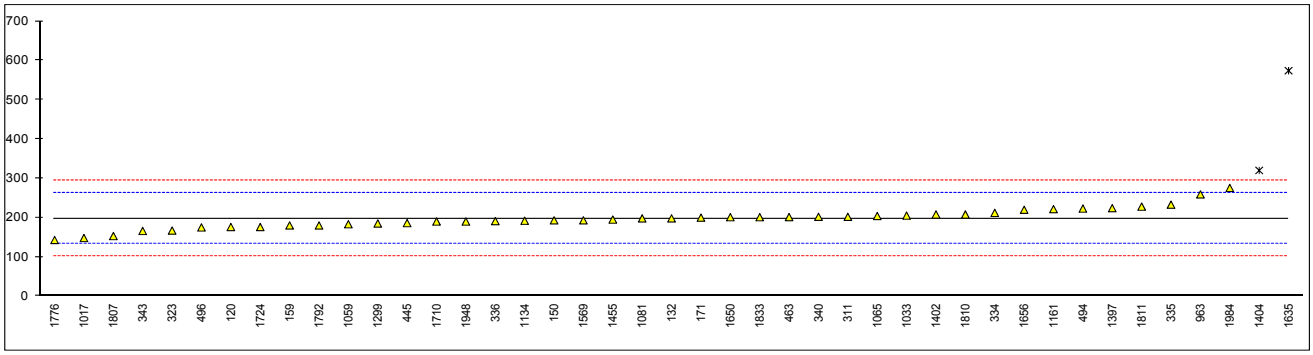


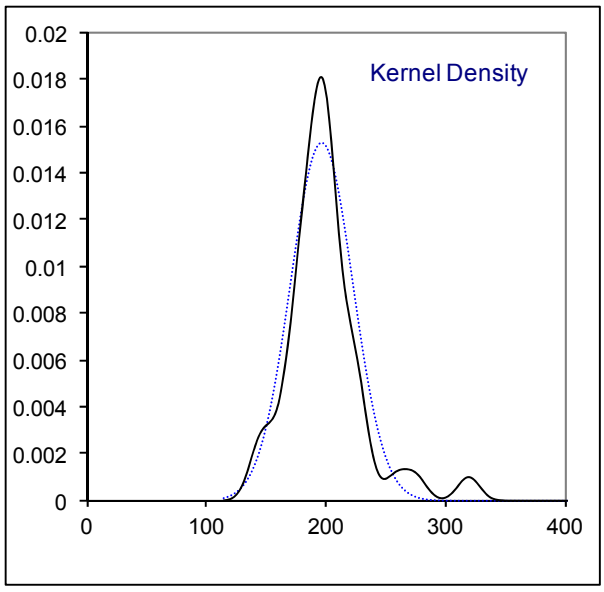


Determination of Lubricity by HFRR at 60°C on sample #16093; result in µm

lab	method	value	mark	z(targ)	remarks
120	D6079	176.0		-0.66	
132	D6079	198		0.02	
150	D6079	193.0		-0.13	
159	D6079	180		-0.54	
171		200		0.09	
175		-----		-----	
311	ISO12156-1	202		0.15	
312		-----		-----	
323	ISO12156-1	167		-0.94	
334	ISO12156-1	212		0.46	
335	ISO12156-1	233		1.11	
336	ISO12156-1	191		-0.19	
338		-----		-----	
340	ISO12156-1	202		0.15	
343	ISO12156-1	166		-0.97	
353		-----		-----	
381		-----		-----	
444		-----		-----	
445	ISO12156-1	186		-0.35	
463	ISO12156-1	201.3		0.13	
494	ISO12156-1	223		0.80	
496	ISO12156-1	175.0		-0.69	
511		-----		-----	
541		-----		-----	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
963	ISO12156-1	259		1.92	
1017	ISO12156-1	148		-1.53	
1033	IP450	205		0.24	
1059	ISO12156-1	183		-0.44	
1065	ISO12156-1	204		0.21	
1080		-----		-----	
1081	ISO12156-1	198		0.02	
1134	ISO12156-1	192		-0.16	
1146		-----		-----	
1161	ISO12156-1	221.6		0.76	
1194		-----		-----	
1237		-----		-----	
1299	ISO12156-1	185		-0.38	
1389		-----		-----	
1397	ISO12156-1	224		0.83	
1402	ISO12156-1	208		0.34	
1404	ISO12156-1	320	R(0.01)	3.82	
1455	ISO12156-1	195		-0.07	
1459		-----		-----	
1510		-----		-----	
1569	ISO12156-1	193		-0.13	
1622		-----		-----	
1631		-----		-----	
1634		-----		-----	
1635	ISO12156-1	574	R(0.01)	11.72	
1650	ISO12156-1	201		0.12	
1656	IP450	220		0.71	
1659		-----		-----	
1706		-----		-----	
1710	ISO12156-1	190		-0.22	
1724	IP450	176		-0.66	
1728		-----		-----	
1776	ISO12156-1	143		-1.69	
1792	ISO12156-1	180		-0.54	
1807	ISO12156-1	153		-1.38	
1810	ISO12156-1	208		0.34	
1811	ISO12156-1	228		0.96	
1833	ISO12156-1	201		0.12	
1948	ISO12156-1	190.00	C	-0.22	First reported 58.63
1984	ISO12156-1	275.5		2.44	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	suspect		
n	41		
outliers	2		
mean (n)	197.23		
st.dev. (n)	26.080		
R(calc.)	73.02		
R(ISO12156-1:16)	90.00	(visual)	Compare R(ISO12156-1:16) = 80.00 (digital camera) Compare R(6079:11) = 80.00 (digital camera)

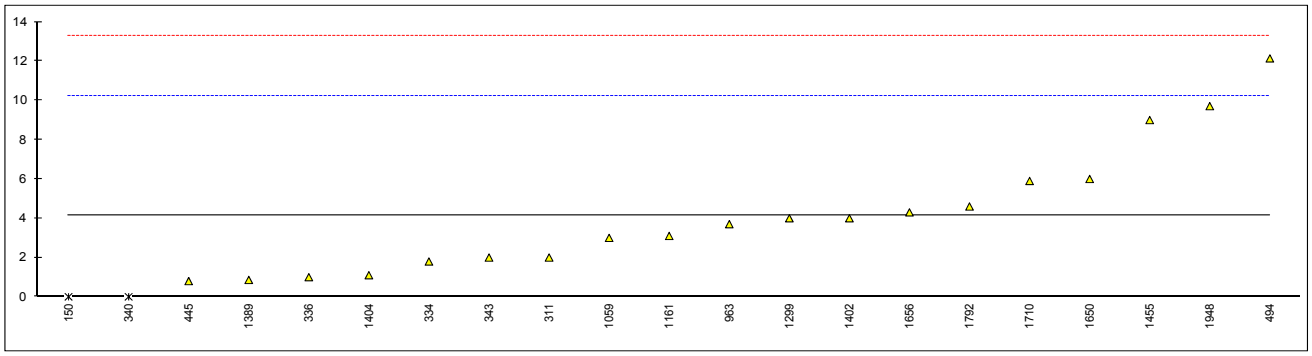


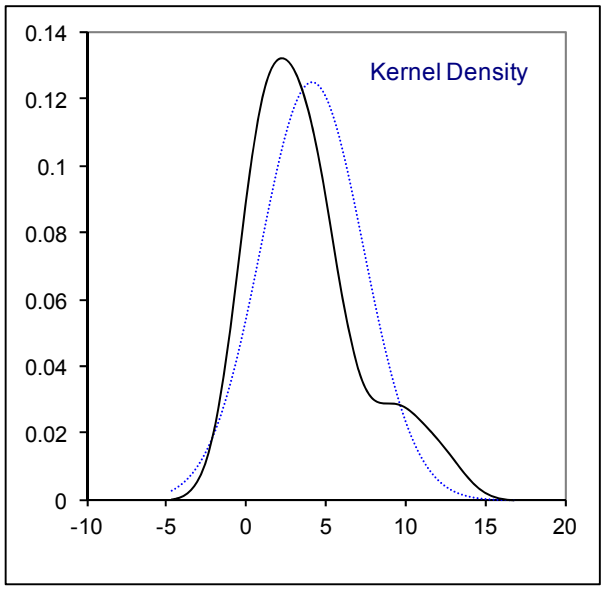


Determination of Oxidation Stability ISO12205 on sample #16093; result in g/m^3

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
132	D2274	<0.20		<-1.30	
150	ISO12205	0	ex	-1.37	Result excluded, zero is not a real result
159		-----		-----	
171		-----		-----	
175		-----		-----	
311	ISO12205	2		-0.71	
312		-----		-----	
323		-----		-----	
334	ISO12205	1.8		-0.78	
335		-----		-----	
336	ISO12205	1		-1.04	
338		-----		-----	
340	ISO12205	0	ex	-1.37	Result excluded, zero is not a real result
343	ISO12205	2.0		-0.71	
353		-----		-----	
381		-----		-----	
444		-----		-----	
445	ISO12205	0.8		-1.10	
463		-----		-----	
494	ISO12205	12.14		2.63	
496		-----		-----	
511		-----		-----	
541		-----		-----	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
963	ISO12205	3.7		-0.15	
1017		-----		-----	
1033		-----		-----	
1059	ISO12205	3		-0.38	
1065		-----		-----	
1080		-----		-----	
1081		-----		-----	
1134		-----		-----	
1146		-----		-----	
1161	ISO12205	3.1		-0.35	
1194		-----		-----	
1237		-----		-----	
1299	D2274	4		-0.05	
1389	D2274	0.86		-1.08	
1397		-----		-----	
1402	ISO12205	4		-0.05	
1404	ISO12205	1.1		-1.01	
1455	ISO12205	9		1.59	
1459		-----		-----	
1510		-----		-----	
1569		-----		-----	
1622		-----		-----	
1631		-----		-----	
1634		-----		-----	
1635		-----		-----	
1650	ISO12205	6		0.61	
1656	IP388	4.3		0.05	
1659		-----		-----	
1706		-----		-----	
1710	ISO12205	5.9		0.57	
1724		-----		-----	
1728		-----		-----	
1776		-----		-----	
1792	D2274	4.60		0.15	
1807		-----		-----	
1810		-----		-----	
1811		-----		-----	
1833		-----		-----	
1948	ISO12205	9.71		1.83	
1984		-----		-----	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	Suspect	
n	19	
outliers	0	(+2 excl)
mean (n)	4.158	
st.dev. (n)	3.1946	
R(calc.)	8.945	
R(ISO12205:95)	8.512	

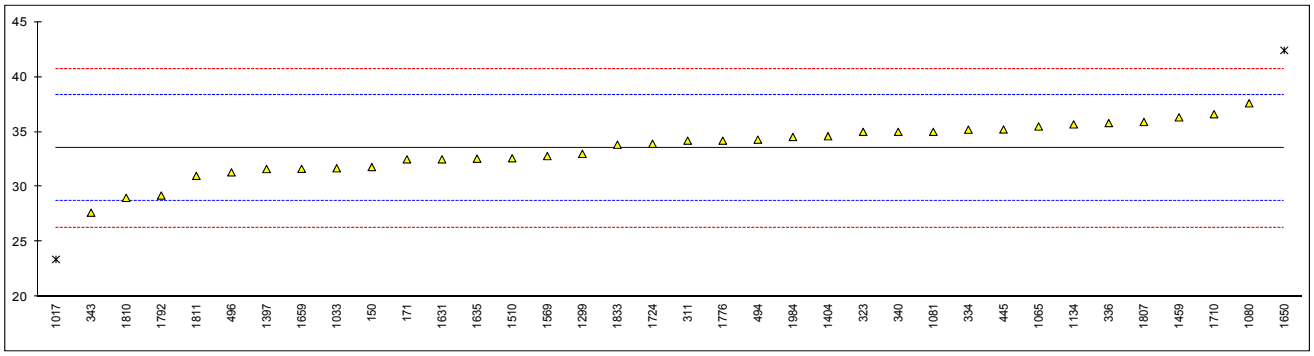


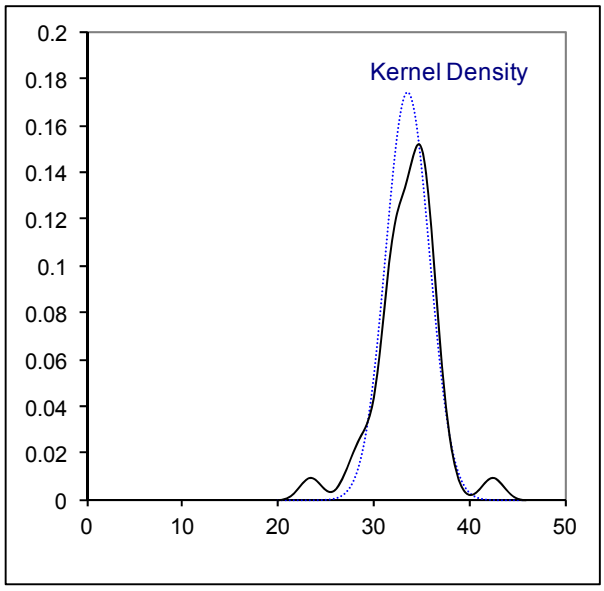


Determination of Oxidation Stability EN15751 on sample #16093; result in hours

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
132		-----		-----	
150	EN15751	31.8		-0.71	
159		-----		-----	
171	EN15751	32.5		-0.42	
175		-----		-----	
311	EN15751	34.2		0.29	
312		-----		-----	
323	EN15751	35.0		0.62	
334	EN15751	35.2		0.70	
335		-----		-----	
336	EN15751	35.8		0.95	
338		-----		-----	
340	EN15751	35.0		0.62	
343	EN15751	27.65		-2.43	
353		-----		-----	
381		-----		-----	
444		-----		-----	
445	EN15751	35.22		0.71	
463		-----		-----	
494	EN15751	34.29		0.32	
496	EN15751	31.32		-0.91	
511		-----		-----	
541		-----		-----	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
963		-----		-----	
1017	EN15751	23.4	R(0.05)	-4.19	
1033	EN15751	31.69		-0.75	
1059		-----		-----	
1065	EN15751	35.49		0.82	
1080	EN15751	37.6		1.70	
1081	EN15751	35.0		0.62	
1134	EN15751	35.68		0.90	
1146		-----		-----	
1161		-----		-----	
1194		-----		-----	
1237		-----		-----	
1299	EN15751	33		-0.21	
1389		-----		-----	
1397	EN15751	31.62		-0.78	
1402		-----		-----	
1404	EN15751	34.6		0.45	
1455		-----		-----	
1459	EN15751	36.32		1.17	
1510	EN15751	32.6		-0.38	
1569	EN15751	32.8		-0.29	
1622		-----		-----	
1631	EN15751	32.5		-0.42	
1634		-----		-----	
1635	EN15751	32.56		-0.39	
1650	EN15751	42.410	C,R(0.05)	3.69	First reported 43.415
1656	EN15751	>20	C	-----	First reported 17.7
1659	EN15751	31.64		-0.77	
1706		-----		-----	
1710	EN15751	36.6		1.28	
1724	EN15751	33.92		0.17	
1728		-----		-----	
1776	EN14112	34.2		0.29	
1792	EN15751	29.21		-1.78	
1807	EN15751	35.9		0.99	
1810	EN15751	29		-1.87	
1811	EN15751	31		-1.04	
1833	EN15751	33.83		0.13	
1948		-----		-----	
1984	EN15751	34.535		0.43	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	OK
n	34
outliers	2
mean (n)	33.508
st.dev. (n)	2.2855
R(calc.)	6.399
R(EN15751:14)	6.752

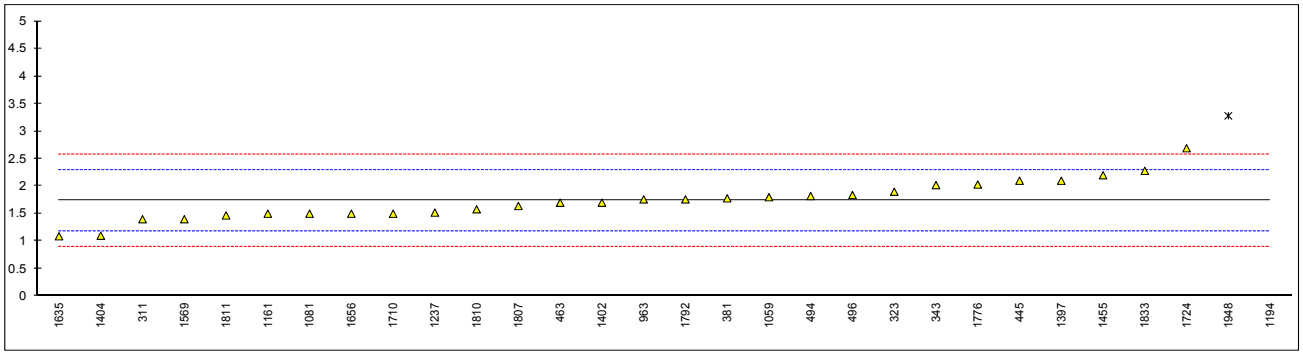


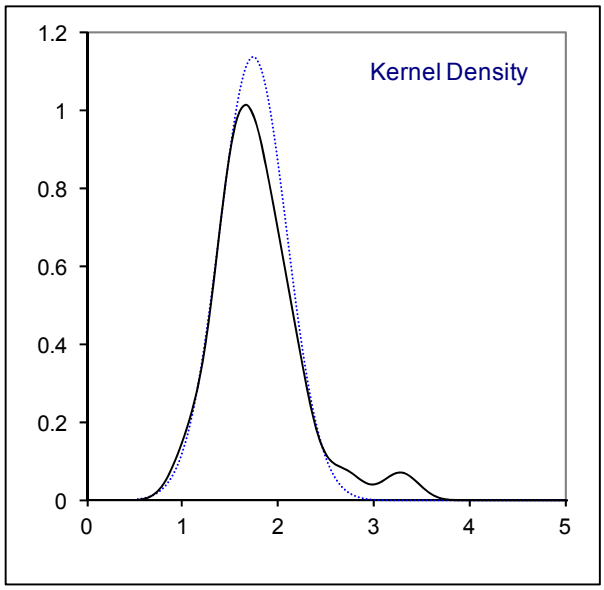


Determination of Polycyclic Aromatic Hydrocarbons on sample #16093; result in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
132		-----		-----	
150		-----		-----	
159		-----		-----	
171		-----		-----	
175		-----		-----	
311	EN12916	1.4		-1.20	
312		-----		-----	
323	EN12916	1.9		0.57	
334		-----		-----	
335		-----		-----	
336		-----		-----	
338		-----		-----	
340		-----		-----	
343	EN12916	2.02		1.00	
353		-----		-----	
381	EN12916	1.78		0.15	
444		-----		-----	
445	IP391	2.1		1.29	
463	EN12916	1.70		-0.14	
494	EN12916	1.82	C	0.29	First reported 1.182
496	EN12916	1.840		0.36	
511		-----		-----	
541		-----		-----	
551		-----		-----	
556		-----		-----	
603		-----		-----	
621		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
963	EN12916	1.76		0.08	
1017		-----		-----	
1033		-----		-----	
1059	EN12916	1.8		0.22	
1065		-----		-----	
1080		-----		-----	
1081	EN12916	1.5		-0.85	
1134		-----		-----	
1146		-----		-----	
1161	EN12916	1.5		-0.85	
1194	EN12916	19.3	R(0.01)	62.51	
1237	EN12916	1.52		-0.78	
1299		-----		-----	
1389		-----		-----	
1397	EN12916	2.1		1.29	
1402	IP391	1.7		-0.14	
1404	EN12916	1.1		-2.27	
1455	EN12916	2.2		1.64	
1459		-----		-----	
1510		-----		-----	
1569	EN12916	1.4		-1.20	
1622		-----		-----	
1631		-----		-----	
1634		-----		-----	
1635	EN12916	1.09		-2.31	
1650		-----		-----	
1656	IP391	1.5		-0.85	
1659		-----		-----	
1706		-----		-----	
1710	EN12916	1.50		-0.85	
1724	IP391	2.69		3.39	
1728		-----		-----	
1776	EN12916	2.03		1.04	
1792	EN12916	1.76		0.08	
1807	EN12916	1.64		-0.35	
1810	EN12916	1.58		-0.56	
1811	IP391	1.468		-0.96	
1833	EN12916	2.28		1.93	
1948	EN12916	3.28	C,R(0.01)	5.49	First reported 3.04
1984		-----		-----	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	OK
n	28
outliers	2
mean (n)	1.738
st.dev. (n)	0.3512
R(calc.)	0.983
R(EN12916:16)	0.787

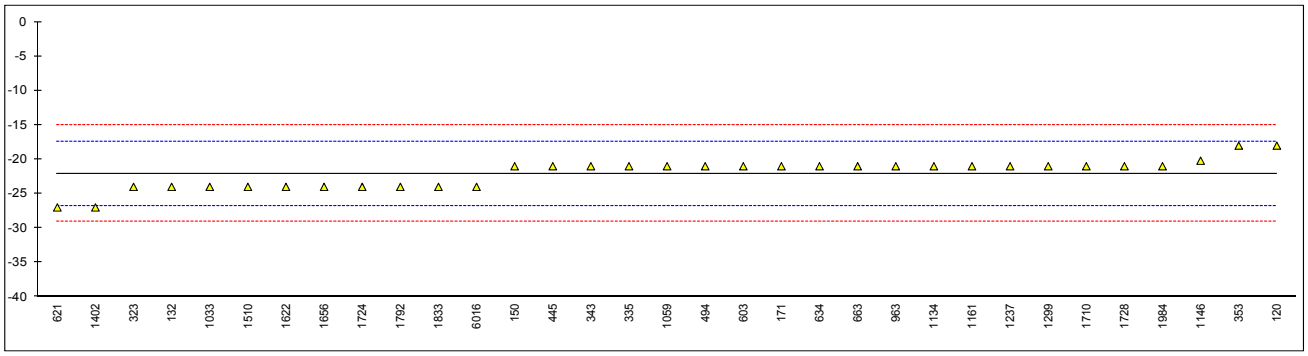


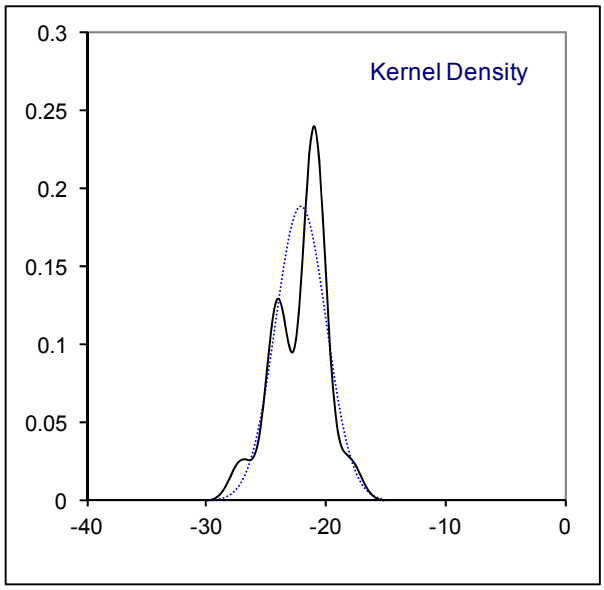


Determination of Pour Point, manual on sample #16093; results in °C

lab	method	value	mark	z(targ)	remarks
120	D97	-18		1.73	
132	D97	-24		-0.82	
150	D97	-21		0.45	
159		-----		-----	
171	D97	-21		0.45	
175		-----		-----	
311		-----		-----	
312		-----		-----	
323	ISO3016	-24		-0.82	
334		-----		-----	
335	ISO3016	-21		0.45	
336		-----		-----	
338		-----		-----	
340		-----		-----	
343	D97	-21		0.45	
353	IP15	-18		1.73	
381		-----		-----	
444		-----		-----	
445	IP15	-21		0.45	
463		-----		-----	
494	ISO3016	-21		0.45	
496		-----		-----	
511		-----		-----	
541		-----		-----	
551		-----		-----	
556		-----		-----	
603	D97	-21		0.45	
621	D97	-27.0		-2.10	
633		-----		-----	
634	D97	-21		0.45	
663	D97	-21		0.45	
963	ISO3016	-21		0.45	
1017		-----		-----	
1033	IP15	-24		-0.82	
1059	ISO3016	-21		0.45	
1065		-----		-----	
1080		-----		-----	
1081		-----		-----	
1134	IP15	-21		0.45	
1146	D97	-20.2		0.79	
1161	ISO3016	-21		0.45	
1194		-----		-----	
1237	ISO3016	-21		0.45	
1299	D97	-21		0.45	
1389	D97	<-21		-----	
1397		-----		-----	
1402	IP15	-27		-2.10	
1404		-----		-----	
1455		-----		-----	
1459		-----		-----	
1510	D97	-24		-0.82	
1569		-----		-----	
1622	D97	-24		-0.82	
1631		-----		-----	
1634		-----		-----	
1635		-----		-----	
1650		-----		-----	
1656	IP15	-24		-0.82	
1659		-----		-----	
1706		-----		-----	
1710	ISO3016	-21		0.45	
1724	D97	-24		-0.82	
1728	D97	-21.0		0.45	
1776		-----		-----	
1792	ISO3016	-24		-0.82	
1807		-----		-----	
1810		-----		-----	
1811		-----		-----	
1833	ISO3016	-24		-0.82	
1948		-----		-----	
1984	ISO3016	-21		0.45	
1987		-----		-----	
2146		-----		-----	
6016	D97	-24		-0.82	

normality	OK
n	33
outliers	0
mean (n)	-22.07
st.dev. (n)	2.115
R(calc.)	5.92
R(ISO3016:94)	6.59

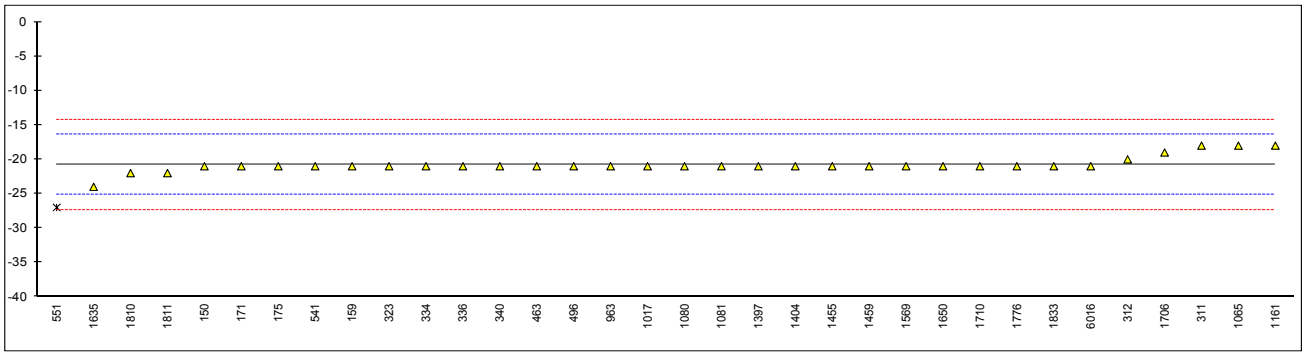


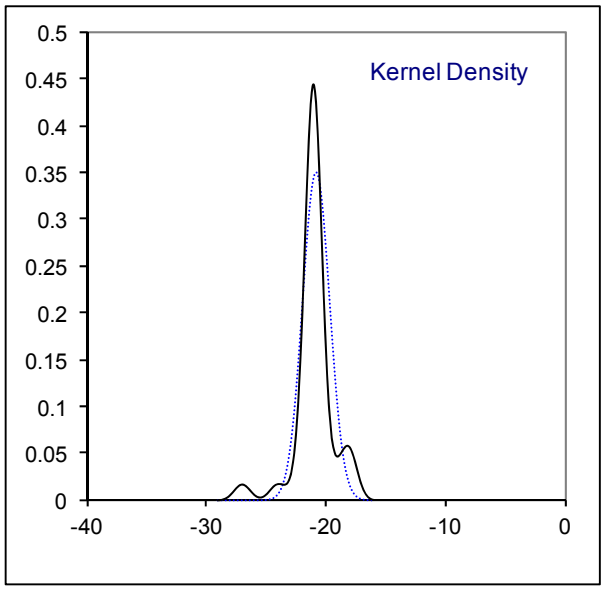


Determination of Pour Point, automated (3°C interval) on sample #16093; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
132		-----		-----	
150	D5950	-21		-0.10	
159	D5950	-21		-0.10	
171	D5950	-21		-0.10	
175	D5950	-21		-0.10	
311	D5950	-18		1.28	
312	D5950	-20		0.36	
323	D5950	-21		-0.10	
334	D5950	-21		-0.10	
335		-----		-----	
336	D5950	-21		-0.10	
338		-----		-----	
340	D5950	-21		-0.10	
343		-----		-----	
353		-----		-----	
381		-----		-----	
444		-----		-----	
445		-----		-----	
463	D6892	-21		-0.10	
494		-----		-----	
496	D5950	-21		-0.10	
511		-----		-----	
541	D5950	-21		-0.10	
551	D5950	-27	R(0.01)	-2.85	
556		-----		-----	
603		-----		-----	
621		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
963	D5950	-21		-0.10	
1017	D5950	-21		-0.10	
1033		-----		-----	
1059		-----		-----	
1065	D5950	-18		1.28	
1080	D6749	-21		-0.10	
1081	D5950	-21		-0.10	
1134		-----		-----	
1146		-----		-----	
1161	D6749	-18		1.28	
1194		-----		-----	
1237		-----		-----	
1299		-----		-----	
1389		-----		-----	
1397	D5950	-21		-0.10	
1402		-----		-----	
1404		-21		-0.10	
1455	D5950	-21		-0.10	
1459		-21.0		-0.10	
1510		-----		-----	
1569	D5950	-21		-0.10	
1622		-----		-----	
1631		-----		-----	
1634		-----		-----	
1635	D5950	-24		-1.47	
1650	D5950	-21		-0.10	
1656		-----		-----	
1659		-----		-----	
1706	D5950	-19		0.82	
1710	D5950	-21		-0.10	
1724		-----		-----	
1728		-----		-----	
1776	D5950	-21		-0.10	
1792		-----		-----	
1807		-----		-----	
1810	D5950	-22		-0.56	
1811	D5950	-22		-0.56	
1833	D5950	-21		-0.10	
1948		-----		-----	
1984		-----		-----	
1987		-----		-----	
2146		-----		-----	
6016	D5950	-21		-0.10	

normality	not OK
n	33
outliers	1
mean (n)	-20.79
st.dev. (n)	1.139
R(calc.)	3.19
R(D5950:14)	6.10



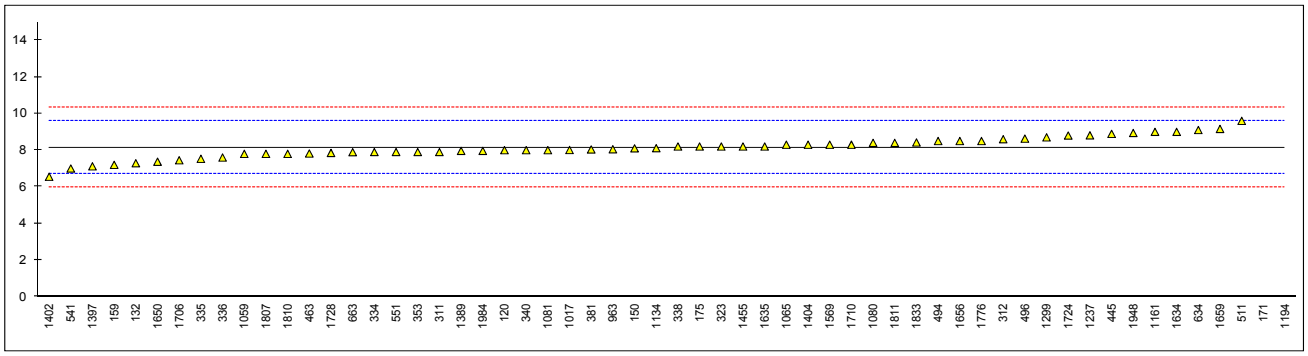


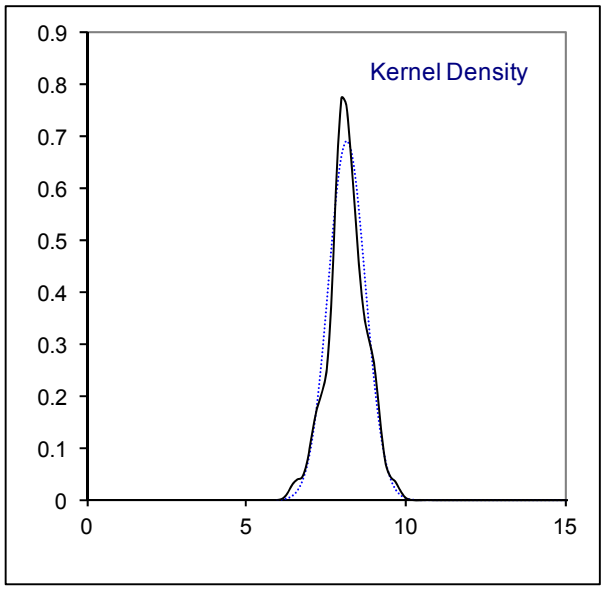
Determination of Sulphur Content on sample #16093; result in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D5453	8.0		-0.20	
132	D7039	7.29		-1.18	
150	D5453	8.1		-0.06	
159	D5453	7.2		-1.30	
171	D4294	19.5	R(0.01)	15.65	
175	D5453	8.2		0.08	
311	ISO20846	7.9		-0.34	
312	ISO20846	8.6		0.63	
323	ISO20846	8.2		0.08	
334	ISO20846	7.9		-0.34	
335	ISO20846	7.53		-0.85	
336	ISO20846	7.6		-0.75	
338	ISO20846	8.2		0.08	
340	ISO20846	8.0		-0.20	
343		-----		-----	
353	IP531	7.9		-0.34	
381	D5453	8.04		-0.14	
444		-----		-----	
445	IP490	8.89		1.03	
463	D5453	7.82		-0.45	
494	ISO20846	8.5		0.49	
496	ISO20846	8.63		0.67	
511	D5453	9.60		2.01	
541	ISO20846	7.0		-1.58	
551	D5453	7.9		-0.34	
556		-----		-----	
603		-----		-----	
621		-----		-----	
633		-----		-----	
634	D7039	9.10		1.32	
663	D5453	7.89		-0.35	
963	ISO20846	8.05		-0.13	
1017	ISO20846	8.01		-0.18	
1033		-----		-----	
1059	ISO20846	7.8		-0.47	
1065	D5453	8.3		0.22	
1080	D5453	8.4		0.35	
1081	ISO20846	8.00		-0.20	
1134	IP490	8.11		-0.05	
1146		-----		-----	
1161	ISO20846	9.0		1.18	
1194	INH-7220	44.6	R(0.01)	50.23	
1237	ISO20846	8.81		0.92	
1299	ISO20884	8.7		0.77	
1389	ISO20846	7.96		-0.25	
1397	ISO20846	7.12		-1.41	
1402	ISO20846	6.55		-2.20	
1404	ISO20846	8.3		0.22	
1455	D2622	8.2		0.08	
1459		-----		-----	
1510		-----		-----	
1569	ISO20846	8.3		0.22	
1622	D4294	<17		-----	
1631		-----		-----	
1634	ISO20846	9.0		1.18	
1635	ISO20846	8.2		0.08	
1650	ISO20846	7.37		-1.07	
1656	IP490	8.5		0.49	
1659	ISO20846	9.16		1.40	
1706	ISO20846	7.45		-0.96	
1710	ISO20846	8.3		0.22	
1724	D5453	8.8		0.90	
1728	D5453	7.85		-0.40	
1776	ISO20846	8.5		0.49	
1792		-----		-----	
1807	ISO20846	7.8		-0.47	
1810	ISO20846	7.8		-0.47	
1811	ISO20846	8.4		0.35	
1833	ISO20846	8.42		0.38	
1948	ISO20846	8.94		1.10	
1984	ISO20846	7.96		-0.25	
1987		-----		-----	
2146		-----		-----	
6016		-----		-----	

normality	OK
n	56
outliers	2
mean (n)	8.14
st.dev. (n)	0.577
R(calc.)	1.62
R(ISO20846:11)	2.03

Compare R(D5453:16e1) = 2.79

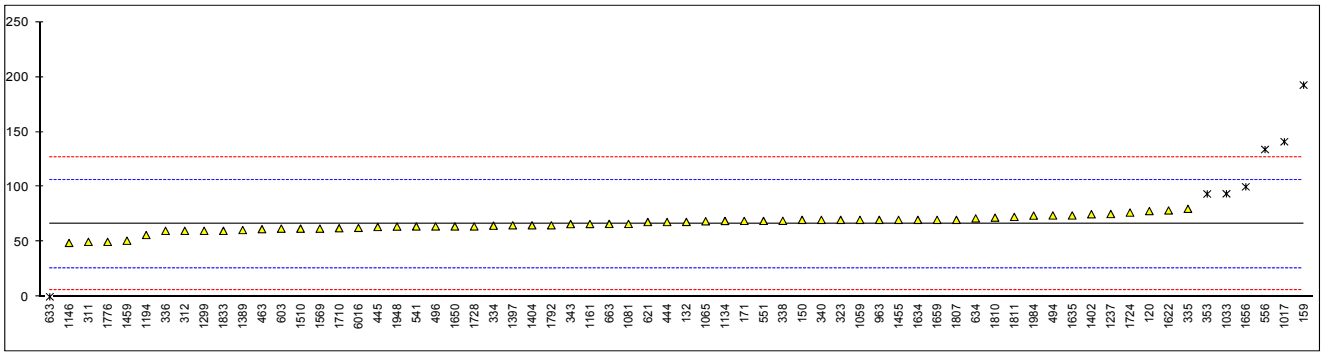


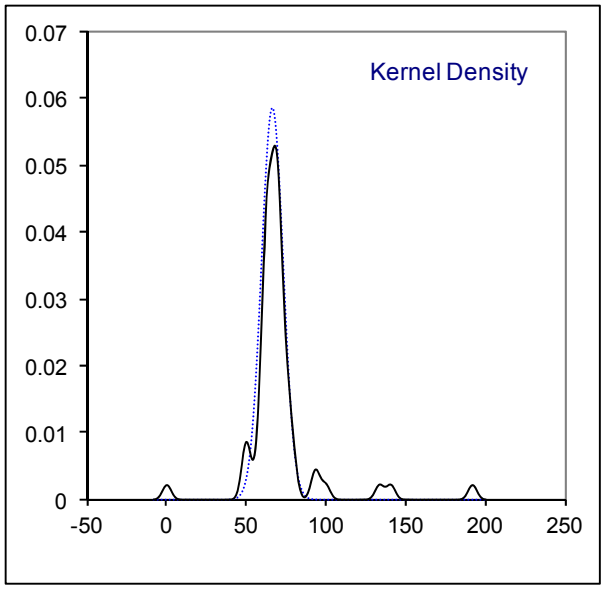


Determination of Water content, KF on sample #16093; result in mg/kg

lab	method	value	mark	z(targ)	remarks
120	ISO12937	78		0.58	
132	D6304	68.1		0.08	
150	D6304	70		0.18	
159	E1064	192.5	C,R(0.01)	6.30	First reported 0.01295 mg/kg
171	D6304	69		0.13	
175		-----		-----	
311	ISO12937	50		-0.82	
312	ISO12937	60		-0.32	
323	ISO12937	70		0.18	
334	ISO12937	64.7		-0.09	
335	ISO12937	80		0.68	
336	ISO12937	60		-0.32	
338	ISO12937	69.12		0.14	
340	ISO12937	70		0.18	
343	ISO12937	66.15		-0.01	
353	IP438	93.5	R(0.05)	1.35	
381		-----		-----	
444	IP438	68		0.08	
445	IP439	63.5		-0.15	
463	D6304	61.5		-0.25	
494	ISO12937	74		0.38	
496	ISO12937	64		-0.12	
511		-----		-----	
541	ISO12937	64		-0.12	
551	D6304	69		0.13	
556		133.92	R(0.01)	3.37	
603	D6304	62		-0.22	
621	D6304	68.0		0.08	
633	E203	0.0115	R(0.01)	-3.32	
634	IP438	71.3		0.24	
663	D6304	66.3		-0.01	
963	ISO12937	70		0.18	
1017	ISO12937	141	R(0.01)	3.73	
1033	IP438	93.668	R(0.05)	1.36	
1059	ISO12937	70		0.18	
1065	D6304	68.7		0.11	
1080		-----		-----	
1081	ISO12937	66.3		-0.01	
1134	IP438	68.985		0.13	
1146	D6304	49		-0.87	
1161	ISO12937	66.185		-0.01	
1194	ISO12937	56.2	C	-0.51	First reported 168.6
1237	ISO12937	75.3		0.44	
1299	ISO12937	60		-0.32	
1389	ISO12937	60.71		-0.28	
1397	ISO12937	65		-0.07	
1402	ISO12937	75.1		0.43	
1404	ISO12937	65		-0.07	
1455	ISO12937	70		0.18	
1459	ISO12937	51		-0.77	
1510	IP438	62		-0.22	
1569	KF	62		-0.22	
1622	D6304	78.56		0.61	
1631		-----		-----	
1634	ISO12937	70		0.18	
1635	ISO12937	74.0		0.38	
1650	ISO12937	64		-0.12	
1656	IP438	100	R(0.05)	1.68	
1659	ISO12937	70.0		0.18	
1706		-----		-----	
1710	ISO12937	62.4		-0.20	
1724	ISO12937	76.6		0.51	
1728	E203	64		-0.12	
1776	ISO12937	50		-0.82	
1792	ISO12937	65.0		-0.07	
1807	ISO12937	70		0.18	
1810	ISO12937	72		0.28	
1811	ISO12937	72.7		0.31	
1833	ISO12937	60		-0.32	
1948	ISO12937	63.87		-0.13	
1984	ISO12937	73.85		0.37	
1987		-----		-----	
2146		-----		-----	
6016	D6304	62.7		-0.19	

normality	OK
n	59
outliers	7
mean (n)	66.404
st.dev. (n)	6.8059
R(calc.)	19.057
R(ISO12937:00)	56.040

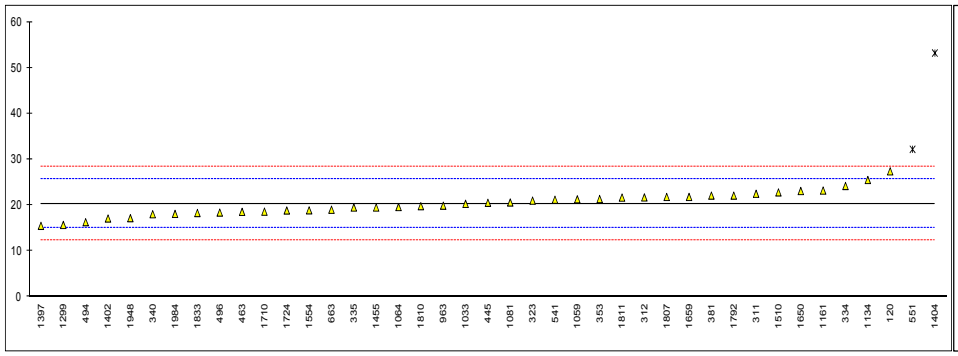


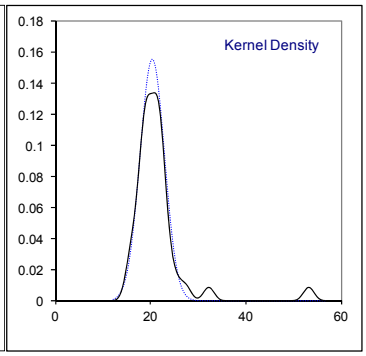


Determination of Total Contamination on sample #16094; result in mg/kg

lab	method	value	mark	z(targ)	Incomplete filtration	Volume used	remarks
120	EN12662:2014	27.4		2.65	No	-----	
171		-----		-----	-----	-----	
311	EN12662:2014	22.5		0.81	No	300	
312	EN12662:2014	21.7		0.51	No	300	
323	EN12662:2014	21		0.25	No	-----	
334	EN12662:2014	24.2		1.45	No	308	
335	EN12662:2014	19.5		-0.31	No	300	
340	EN12662:2014	18.04		-0.86	-----	-----	
343	EN12662:2014	>30		>3.63	-----	300	False positive test result?
353	IP440	21.35		0.38	No	375	
381	EN12662:2014	22.1		0.66	-----	-----	
445	EN12662:1998	20.53		0.07	No	-----	
463	EN12662:2014	18.55		-0.67	No	-----	
494	EN12662:2014	16.30		-1.51	Yes	-----	
496	EN12662:2014	18.4		-0.73	No	-----	
541	EN12662:1998	21.2		0.33	-----	400	
551	EN12662	32.2	R(0.01)	4.46	-----	-----	
621		-----		-----	-----	-----	
663	EN12662:2014	19.02		-0.49	No	300	
963	IP440	19.9		-0.16	No	-----	
1017		-----		-----	-----	-----	
1033	IP440	20.3		-0.01	No	544	
1059	EN12662:2014	21.3		0.36	-----	314	
1064	EN12662:2014	19.6		-0.28	No	300	
1081	EN12662:2014	20.6		0.10	No	-----	
1134	EN12662:2014	25.5		1.94	No	-----	
1161	EN12662:2014	23.2		1.08	-----	-----	
1299	EN12662:2014	15.7		-1.74	No	300	
1397	EN12662:2014	15.5		-1.82	No	300	
1402	IP440	17.1		-1.21	-----	-----	
1404	EN12662:2014	53.2	R(0.01)	12.35	No	300	
1455	EN12662:2014	19.5		-0.31	No	300	
1510	EN12662:1998	22.8		0.93	-----	-----	
1554	EN12662:2014	18.89		-0.54	No	-----	
1650	EN12662:2014	23.1		1.04	No	-----	
1659	EN12662:2014	21.81		0.55	No	300	
1710	EN12662:2008	18.6		-0.65	No	800	
1724	EN12662:2014	18.85		-0.56	Yes	-----	
1792	EN12662:2014	22.1		0.66	No	300	
1807	EN12662:1998	21.8		0.55	No	300	
1810	EN12662:2014	19.8		-0.20	-----	-----	
1811	EN12662:2014	21.67		0.50	-----	250	
1833	EN12662:2014	18.3		-0.76	-----	-----	
1948	EN12662:2014	17.17		-1.19	-----	-----	
1984	EN12662:2014	18.1		-0.84	No	286.644	

normality	OK
n	39
outliers	2
mean (n)	20.333
st.dev. (n)	2.5650
R(calc.)	7.182
R(EN12662:14)	7.454





APPENDIX 2

z-scores Distillation

lab	IBP	10% rec	50% rec	90% rec	95% rec	FBP	Vol at 250 °C	Vol at 350 °C
120	1.60	-0.32	0.13	0.87	1.10	-0.14	0.14	-0.95
132	1.15	2.32	0.88	0.26	0.66	0.18	-1.31	-0.84
150	-1.91	-0.15	-0.25	-0.13	0.16	-0.65	-0.07	0.30
159	1.15	2.20	0.70	-0.07	-0.16	-0.49	-1.10	0.09
171	-1.35	2.32	0.88	0.15	0.34	-0.81	-----	-----
175	-0.07	0.42	0.60	0.70	0.66	-0.73	-----	-----
311	0.50	-0.73	-0.15	-0.24	-0.32	0.10	-0.07	-0.22
312	-1.03	1.69	1.54	0.15	0.60	-0.34	-1.62	-0.43
323	0.02	0.14	0.98	0.65	0.76	0.06	-0.27	-0.74
334	1.24	0.02	-0.44	0.21	0.41	1.08	0.14	-0.43
335	0.78	-0.67	-0.06	0.70	1.29	0.49	0.14	-0.95
336	0.95	0.65	0.60	0.15	0.09	0.65	-1.21	-0.12
338	0.92	1.17	1.54	1.15	1.42	0.85	-1.52	-1.15
340	2.43	0.77	1.07	0.37	0.06	0.53	-0.79	-0.01
343	0.90	-1.36	-1.66	0.26	-0.19	0.02	0.56	0.30
353	-0.13	-0.78	0.41	0.82	0.79	0.97	-0.38	-0.74
381	-2.03	-0.67	-0.91	-0.51	-0.51	0.41	1.09	0.46
444	-1.80	-0.55	-0.34	-0.18	0.22	0.02	0.14	-0.22
445	-0.18	-0.50	-1.47	-1.29	-0.82	-1.08	0.76	0.82
463	1.89	0.71	1.36	1.04	0.76	1.05	-0.17	-0.74
494	-0.47	-0.21	-0.53	-0.29	-----	-8.46	-0.27	-----
496	-1.80	-0.61	-0.62	-1.01	-0.79	-0.02	-0.07	0.71
511	-0.18	-2.22	-3.26	-2.12	-1.52	-0.30	1.90	0.92
541	-0.27	0.19	0.32	-0.13	0.12	0.41	0.04	-0.12
551	0.50	0.08	-0.81	-1.73	-1.90	-1.12	-----	-----
556	-----	-----	-----	-----	-----	-----	-----	-----
603	-----	-----	-----	-----	-----	-----	-----	-----
621	-0.41	-0.38	2.39	0.93	1.07	1.87	2.42	-1.15
633	0.16	-1.53	-3.26	-3.50	-0.82	-0.89	-----	-----
634	0.02	1.05	0.04	0.10	0.28	0.89	-0.69	-3.23
663	0.26	1.89	1.40	0.01	0.08	0.06	-1.41	0.30
963	0.16	-0.15	0.22	-0.62	-0.32	-0.22	-0.48	0.30
1017	-----	-----	-----	-----	-----	-----	-----	-----
1033	-0.47	0.02	1.26	0.54	-0.92	0.10	-----	-----
1059	1.32	1.05	0.60	-0.51	-0.03	-0.14	-1.00	-0.01
1065	-0.10	-0.67	0.32	0.15	-0.22	-0.06	0.24	1.54
1080	-----	-----	-----	-----	-----	-----	-----	-----
1081	0.67	1.00	1.26	0.48	0.25	0.85	-0.53	-0.24
1134	-0.04	0.31	1.83	1.53	1.26	1.44	-0.69	-1.05
1146	1.55	0.94	1.92	1.15	1.04	1.56	-0.90	-1.15
1161	-1.54	-2.10	0.98	0.76	1.23	0.14	1.28	-0.95
1194	-3.12	-4.76	-1.00	0.30	0.06	-2.94	2.01	0.02
1237	0.72	-2.68	-2.23	-0.13	-0.16	-0.85	1.70	0.40
1299	-0.98	-0.61	-0.62	-0.51	-0.32	-0.77	0.45	0.30
1389	-0.69	-0.61	-0.25	-0.35	-0.16	-0.65	-0.27	0.09
1397	1.60	1.63	1.26	0.15	0.16	0.61	-1.52	-0.12
1402	1.55	-0.15	-0.25	-0.57	-0.82	0.14	0.45	0.82
1404	-4.04	0.37	-0.81	-0.73	-0.54	-0.14	0.66	0.61
1455	0.61	0.54	0.22	-0.29	-0.41	-0.14	-0.07	0.30
1459	-0.15	0.42	0.60	-0.07	-0.10	-0.02	-0.79	0.09
1510	-1.12	-0.61	-0.81	-0.73	-0.67	-0.97	-0.07	0.61
1569	-0.15	1.11	0.13	0.43	-0.32	-1.05	-0.17	0.30
1622	1.47	-1.31	-4.06	-3.06	-2.05	-1.38	3.15	1.85
1631	-----	-----	-----	-----	-----	-----	-----	-----
1634	-1.35	0.94	1.64	0.82	0.38	1.28	-1.10	-0.43
1635	1.69	1.28	0.79	-0.18	0.19	-0.37	-0.90	-0.12
1650	0.47	-0.21	0.70	0.98	1.13	1.28	-0.48	-0.95
1656	0.38	-2.05	-0.06	0.54	0.53	-0.22	0.97	-0.22
1659	-----	-----	-----	-----	-----	-----	-----	-----
1706	0.13	0.42	0.08	0.04	0.09	-0.39	-0.33	-0.06
1710	0.92	1.57	1.07	0.15	0.12	-0.06	-1.31	-0.12
1724	-0.01	0.88	0.70	0.21	0.34	-0.02	-0.48	-0.32
1728	-0.18	0.31	-1.00	0.37	0.12	-0.26	-0.17	-0.12
1776	-0.84	-0.61	-0.44	-0.46	-0.32	-0.69	0.24	0.30
1792	0.55	0.08	0.60	0.43	0.38	0.22	-0.48	-0.43
1807	-1.26	-2.74	-2.04	-1.12	-0.89	0.10	1.90	0.71
1810	-1.66	-1.87	-1.66	-1.45	-1.49	-2.31	1.28	1.65
1811	-0.18	-1.30	-0.91	-0.79	-0.70	-0.14	0.45	0.71
1833	-1.12	1.05	-0.44	-0.62	-0.48	0.34	-0.17	0.40
1948	-0.81	-0.50	-1.00	-0.62	-0.60	-0.45	0.14	-0.12
1984	0.02	0.08	0.41	0.10	0.34	-0.06	0.24	0.40
1987	-----	-----	-----	-----	-----	-----	-----	-----
2146	1.92	6.05	3.71	2.59	2.84	0.89	-4.84	-2.29
6016	-0.86	-0.78	-0.15	-0.18	0.06	0.22	0.35	-0.12

APPENDIX 3

Number of participants per country

1 lab in ARGENTINA
1 lab in AUSTRIA
2 labs in BELGIUM
2 labs in BRAZIL
1 lab in BULGARIA
2 labs in CROATIA
1 lab in CYPRUS
2 labs in CZECH REPUBLIC
1 lab in FINLAND
8 labs in FRANCE
3 labs in GERMANY
2 labs in HUNGARY
2 labs in INDONESIA
1 lab in IRELAND
1 lab in ISRAEL
1 lab in KAZAKHSTAN
1 lab in MACEDONIA
1 lab in MALAYSIA
5 labs in NETHERLANDS
2 labs in PERU
2 labs in PHILIPPINES
1 lab in PORTUGAL
1 lab in ROMANIA
1 lab in SAUDI ARABIA
1 lab in SERBIA
2 labs in SLOVENIA
7 labs in SPAIN
2 labs in SWEDEN
1 lab in THAILAND
5 labs in TURKEY
7 labs in UNITED KINGDOM
6 labs in UNITED STATES OF AMERICA

APPENDIX 4

Abbreviations

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

Literature

1. iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, April 2014
2. Horwitz, R. Albert, J. AOAC Int, 79, 3, 589, (1996)
3. ASTM E178:08
4. ASTM E1301:03
5. ISO 5725:86
6. ISO 5725, parts 1-6:94
7. ISO13528:05
8. M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
9. W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
10. DIN 38402 T41/42
11. P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
12. J.N. Miller, Analyst, 118, 455, (1993)
13. Analytical Methods Committee Technical Brief, No. 4 January 2001
14. The Royal Society of Chemistry 2002, Analyst 2002, 127, 1359-1364, P.J. Lowthian and M. Thompson. EN15293:11
15. Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, T*echnometrics*, 25(2), 165-172, (1983)