

Results of Proficiency Test
Gasoil B10 (10% FAME)
April 2010

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 2005, the Institute for Interlaboratory Studies organizes every year a proficiency test for Gasoil B5 (5% FAME) according EN590:2004. In the annual proficiency testing program of 2009/2010, it was decided to change this into a round robin for the analysis of Gasoil B10 (10% FAME).

In this interlaboratory study, 56 laboratories from 26 countries have participated. See appendix 3 for a list of participants in alphabetical country order.

In this report, the results of the Gasoil B10 (10% FAME) proficiency test are presented and discussed.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, The Netherlands, was the organizer of this proficiency test. It was decided to evaluate the B10 diesel according the two different test scopes of ASTM D7467 and EN590.

Analyses for fit-for-use and homogeneity testing were subcontracted.

Participants were requested to report rounded and unrounded results. The unrounded 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 guide 43 and ILAC-G13:2007, (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This ensures 100% confidentiality of participant's data. Also customer's satisfaction is measured on a regular basis by sending questionnaires.

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organization, Statistics and Evaluation' of January 2010 (iis-protocol, version 3.2), which can be downloaded from www.iisnl.com. The participants were asked to report the analytical results using the indicated units on the report form.

2.3 CONFIDENTIALITY STATEMENT

All data present 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 bulk material (Gasoil B5 with approx. 5% FAME) was purchased from a local Gasoil producer. To 190 litre of the bulk material 10 litre of FAME (B100) was added to increase the FAME content upto 10%.

After homogenization, 105 subsamples were transferred to 1 litre brown glass bottles and labelled #1039. Another 104 bottles of 500 mL (also labelled #1039) were subsequently filled and another 60 bottles of one litre (labelled #1040) were filled with 850 mL of material each. The homogeneity of the subsamples #1039 was checked by determination of Density in accordance with ASTM D4052:09 and FAME content in accordance with EN14078:03 on 10 stratified randomly selected samples.

	<i>Density @ 15 °C in kg/L</i>	<i>FAME in %M/M</i>
sample #1039-1	0.84617	9.34
sample #1039-2	0.84616	9.33
sample #1039-3	0.84612	9.34
sample #1039-4	0.84617	9.33
sample #1039-5	0.84614	9.32
sample #1039-6	0.84617	9.32
sample #1039-7	0.84614	9.32
sample #1039-8	0.84617	9.33
sample #1039-9	0.84615	9.32
sample #1039-10	0.84618	9.33

table 1: homogeneity test results of subsamples #1039

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

	<i>Density @ 15 °C in kg/L</i>	<i>FAME in %V/V</i>
r (sample #1039)	0.00005	0.02
reference test	ISO12185:96	EN14078:03
r (reference test)	0.00015	0.27

table 2: repeatabilities of the subsamples #1039

The calculated repeatability was less than 0.3 times the reproducibility of the reference method. Therefore, homogeneity of the subsamples #1039 was assumed.

For Total Contamination, each bottle labelled #1040 was spiked with 1 ml of a freshly prepared and well shaken suspension. This suspension was prepared from 0.88 g BCR-067 (ϕ 2.4-32 μ m) and 0.87 g BCR-070 (ϕ 1.2-20 μ m) and 87.67 g oil.

The homogeneity was checked by weighing the bottles before and after addition.

Two bottles (1x1L + 1x0.5L, labelled #1039) and/or one bottle of 1L, labelled #1040 were sent to the participating laboratories on April 24, 2010.

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 ANALYSIS

The participants were asked to determine, according specifications ASTM D7467 and EN590: Ash Content, Aromatics by FIA, Cetane Index ISO4264, Cold Filter Plugging Point, Conradson Carbon Residue on 10% Residue, Ramsbottom Carbon Residue on 10% Residue, Copper Corrosion, Density @ 15°C, Distillation, FAME, Flash Point PMcc, Kinematic Viscosity @40°C, Lubricity, Oxidation Stability, Polycyclic Aromatic Hydrocarbons, Pour Point, Sulphur Content, TAN, Total Contamination and Water. To get comparable results a detailed report form, on which the units were prescribed as well as some of the required standards, was sent together with each set of samples. Also, a letter of instructions and a SDS were added to the package.

3 RESULTS

During four weeks after sample despatch, the results of the individual laboratories were gathered. The original data are tabulated per determination in the appendix 1 of this report. The laboratories are presented by their code numbers.

Directly after deadline, a reminder fax was sent to those laboratories that had not yet reported.

Shortly after the deadline, the available results were screened for suspect data. A 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 (raw data of the) reported results. Additional or corrected results have been used for data analysis and the original results are placed under 'Remarks' in the result tables in appendix 1.

3.1 STATISTICS

Statistical calculations were performed as described in the report 'iis Interlaboratory Studies: Protocol for the Organization, Statistics and Evaluation' of January 2010 (iis-protocol, version 3.2).

For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded results. 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. After removal of outliers, this check was repeated. Not all data sets proved to have a normal distribution, in which cases the conclusions of statistical evaluation should be used with due care.

In accordance with ISO 5725 (1986 and 1994) the original results per determination were submitted subsequently to Dixon and Grubbs outlier tests.

Outliers are marked by D(0.01) for the Dixon test, by G(0.01) or DG(0.01) for the Grubbs test. Stragglers are marked by D(0.05) for the Dixon test, by G(0.05) or DG(0.05) for the Grubbs test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

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 analysis results are plotted. The corresponding laboratory numbers are under 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 (see appendix 3; nr.13 and 14).

3.3 Z-SCORES

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

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

The $Z_{(\text{target})}$ scores are listed in the result tables in appendix 1.

Absolute values for $z < 2$ are very common and absolute values for $z > 3$ are very rare.

Therefore, the usual interpretation of z-scores is as follows:

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

4 EVALUATION

In this interlaboratory study, no problems with sample despatch were encountered during the execution. Two participants decided not to report any results. In total eleven participants reported results after the final reporting date. Finally, 55 participants reported in total 1023 numerical results. Observed were 39 outlying results, which is 3.8%. In proficiency studies, outlier percentages of 3 % - 7.5 % are quite normal.

Not all original data sets proved to have a normal distribution. For Calculated Cetane Index ISO4264, Cloud Point, Cold Filter Plugging Point, Density, Flash Point, Oxidation Stability in g/m^3 , and Pour Point (manual and automated) non-Gaussian distributions were found. Therefore, the statistical evaluation for these determinations should be used with care.

4.1 EVALUATION PER TEST

In this section, the results are discussed per test.

Ash: No significant conclusions were drawn as the consensus value is below the application range of the reference method. All participants agreed that ash was equal or less than 0.001 %M/M.

Aromatics (FIA): This determination may be problematic. No statistical outliers were detected, but the results vary over a large range (19.0 – 38.22 %V/V). The calculated reproducibility is not at all in agreement with ASTM D1319:08, but the precision and bias of D1319 with biodiesel blends is not known and is currently under investigation, see paragraph X1.11.1 of ASTM D7467:09a.

C.I. D976: This determination was not problematic. No statistical outliers were observed and the observed reproducibility is in good agreement with the requirements of ASTM D976:06.

C.I. ISO4264: Regretfully, no reproducibility limits are mentioned in ISO4264:07. 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 ISO 4264 was in 2007, which is the current version (and technically equivalent to the 1996a version of ASTM D4737). In ISO 4264 only one calculation routine is mentioned and in the latest ASTM D4737 (2004 version) two calculation routines are mentioned. The user should take care to use and report the correct method as required by clients.

Cloud Point: This determination was not problematic. Two statistical outliers were detected. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of EN23015:94 and/or ASTM D2500:09.

- CFPP: This determination was problematic. No statistical outliers were detected. However, the calculated reproducibility is not at all in agreement with the requirements of EN116:98.
- CCR 10% res.: No significant conclusions were drawn as the carbon residue content was below the application range of the target method. All participants agreed that Conradson Carbon Residue was less than 0.1 %M/M.
- Ramsbottom.: The test results vary over a large range (0.022 – 0.12 %M/M). Still, no conclusions were drawn as only six laboratories reported a test result.
- Copper Corr.: No problems have been observed, all participants agreed on a result of 1.
- Density @15°C: This determination was not problematic. Two statistical outliers were detected. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of ISO12185:96.
- FAME: This determination was problematic. Two statistical outliers were detected and the calculated reproducibility, after rejection of the statistical outliers, is not at all in agreement with the requirements of EN14078:03.
- Flash Point: This determination was not problematic. Only one statistical outlier was detected and the calculated reproducibility, after rejection of the statistical outlier, is in good agreement with the requirements of ISO2719:02 and ASTM D93:08.
- Kin. Visc. 40°C: This determination was problematic. Two statistical outliers were detected. The calculated reproducibility, after rejection of the statistical outliers, is not in agreement with the requirements of ISO3104:94 and/or ASTM D445:09.
- Lubricity: This determination was not problematic. Only one statistical outlier was detected and the calculated reproducibility, after rejection of the statistical outlier, is in good agreement with the requirements of ISO12156:97.
- Ox. Stab. EN15751: This determination was problematic for several laboratories. Three laboratories used EN14112, a test method applicable for B100, but not for B10 and three statistical outliers were detected. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of EN15751:09
- Ox. Stab. ISO12205: This determination was problematic for several laboratories. Four statistical outliers were detected. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of ISO12205:96.

- PAH: This determination was very problematic. Two statistical outliers were detected and the calculated reproducibility, after rejection of the statistical outliers, is not at all in agreement with the requirements of EN12916:06.
- Pour Point (M): This determination was not problematic. No statistical outliers were detected and the calculated reproducibility is in good agreement with the requirements of ASTM D97:09.
- Pour Point (A): This determination was not problematic. No statistical outliers were detected and the calculated reproducibility is in good agreement with the requirements of ASTM D5950:07.
- Sulphur: This determination was not problematic. Two statistical outliers were detected. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of ISO20846:04 and/or ASTM D5453:09.
- TAN: This determination was not problematic. Two statistical outliers were detected. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of ASTM D664:09a.
- Water: No analytical problems have been observed. Two statistical outliers were detected. However, the calculated reproducibility is in good agreement with the requirements of EN12937:00.
- Distillation: As only three laboratories reported results from a manual distillation, these results are listed and evaluated together with the results of the automated distillation.
Only the initial boiling point was somewhat problematic. In total only four statistical outliers were detected and the calculated reproducibilities of 10% rec., 50% rec., 90% rec., 95% rec, vol. @250° and vol. @350°, after rejection of the statistical outliers, are all in good agreement with the requirements of ISO/DIS3405:09 (auto) and/or ASTM D86:09e1 (auto).
- Total Contamination: Serious analytical problems for several laboratories have been observed. The samples were spiked with a freshly prepared and well shaken suspension of particulate quartz material (\emptyset 1.2-32 μ m) in oil. And therefore the minimum Total Contamination concentration to be found was known (added upto concentration of 25.2 mg/kg). The laboratories should be able to find at least 17.6 mg/kg [25.2 mg/kg (added) – 7.6 mg/kg (R EN12662)].
However, five laboratories reported TC results lower than 17.6 mg/kg. These low results were rejected prior to data analysis. The reason for the low TC results found may be insufficient homogenisation of the sample by the respective laboratory prior to sub sampling for analysis.

After exclusion of the suspicious data and the four statistical outliers, the calculated reproducibility of the remaining 15 test results is in good agreement with the requirements of EN12662:08. The average recovery (consensus value / spiked amount) is good (<101%)

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant standard and the reproducibility as found for the group of participating laboratories that participated. The average results of the evaluated parameters, calculated reproducibilities and reproducibilities, derived from literature standards (in casu ASTM, EN or ISO standards) are compared in the next tables.

<i>Parameters</i>	<i>unit</i>	<i>n</i>	<i>average</i>	<i>2.8 * sd</i>	<i>R (lit)</i>
Ash content	%M/M	12	0.0007	0.0008	(0.0050) *
Aromatics by FIA	%V/V	15	28.1	17.5	unknown
Cetane Index D976		9	50.74	0.58	2.00
Cetane Index ISO4264		37	50.30	0.69	unknown
Cloud Point	°C	39	-5.42	3.28	4.00
Cold Filter Plugging Point	°C	42	-22.93	8.53	4.94
CCR on 10% residue	%M/M	23	0.028	0.039	(0.022) *
Ramsbottom CR on 10% residue	%M/M	6	0.069	0.096	0.030
Density @ 15 °C	kg/m ³	50	846.14	0.26	0.50
Fatty Acid Methyl Ester	%V/V	42	9.15	1.13	0.68
Flash Point PMcc	°C	49	60.87	3.63	4.32
Kinematic Viscosity @ 40 °C	mm ² /s	44	2.9572	0.0392	0.0324
Lubricity	µm	30	199.3	80.9	102.0
Oxidation Stability EN15751	hrs	13	37.02	6.58	7.42
Oxidation Stability ISO12205	g/m ³	12	1.74	2.52	6.85
Polycyclic Aromatic Hydrocarbons	%M/M	24	2.00	1.36	0.84
Pour Point (manual)	°C	19	-34.11	6.39	6.60
Pour Point (automated)	°C	15	-33.47	4.47	4.50
Sulphur	mg/kg	41	8.86	1.81	2.11
Total Acid Number	mgKOH/g	23	0.019	0.016	0.144
Total Contamination	mg/kg	15	25.49	4.73	7.65
Water	mg/kg	44	70.81	24.46	57.87
Initial Boiling Point	°C	47	170.80	11.35	9.39
10% recovery	°C	47	215.69	5.06	4.74
50% recovery	°C	48	277.98	2.68	2.97
90% recovery	°C	48	340.30	3.65	5.10
95% recovery	°C	46	352.48	6.02	8.98
Volume @250°C	%V/V	47	30.76	2.13	2.66
Volume @350°C	%V/V	46	94.30	1.80	2.66

Table 4: summary of test results of Gasoil samples #1039

*) consensus value is below application range of the test method

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

4.3 COMPARISON OF THE INTERLABORATORY STUDY OF APRIL 2010 WITH PREVIOUS PTS.

	<i>April 2010</i>	<i>April 2009</i>	<i>April 2008</i>	<i>April 2007</i>	<i>April 2006</i>
Number of reporting labs	55	69	75	69	42
Number of results reported	1023	1059	1136	1122	675
Statistical outliers	39	54	38	34	28
Percentage outliers	3.8%	5.1%	3.3%	3.0%	4.1%

table 5: comparison with previous proficiency tests.

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

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

	<i>April 2010</i>	<i>April 2009*</i>	<i>April 2008*</i>	<i>April 2007*</i>	<i>April 2006*</i>
Ash content	(++)	(++)	(++)	(++)	(++)
Aromatics by FIA	--	n.e.	n.e.	n.e.	n.e.
Cetane Index D976	++	n.e.	n.e.	n.e.	n.e.
Cetane Index ISO4264	n.e.	n.e.	n.e.	n.e.	n.e.
Conradson CR on 10% residue	(--)	(--)	(--)	(--)	(--)
Ramsbottom CR on 10% residue	--	n.e.	n.e.	n.e.	n.e.
Cloud Point	++	++	++	++	++
Cold Filter Plugging Point	--	++	++	++	--
Density @ 15 °C	++	++	+	++	++
Fatty Acid Methyl Ester	--	-	++	++	++
Flash Point PMcc	++	+	++	++	-
Kinematic Viscosity @ 40 °C	-	+	++	--	-
Lubricity	++	++	++	++	+
Oxidation Stability EN15751	-	++	+	+	++
Oxidation Stability ISO12205	++	n.e.	n.e.	n.e.	n.e.
Polycyclic Aromatic Hydrocarbons	--	-	-	n.e.	--
Pour Point manual	+	n.e.	n.e.	n.e.	n.e.
Pour Point automated	+/-	n.e.	n.e.	n.e.	n.e.
Sulphur	++	++	+/-	+	-
Total Contamination	--	--	--	--	--
TAN	++	n.e.	n.e.	n.e.	n.e.
Water content	++	++	++	++	++
Distillation	+/-	++	+/-	++	++

table 6: comparison determinations against the standard

* NB.: in 2006-2009 B5 was evaluated, not B10

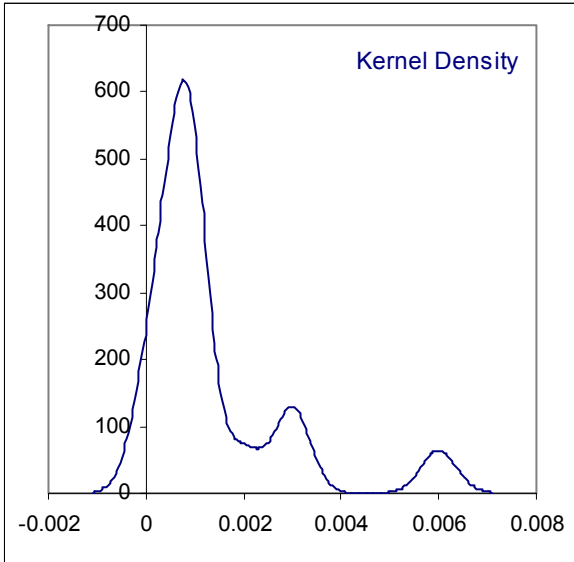
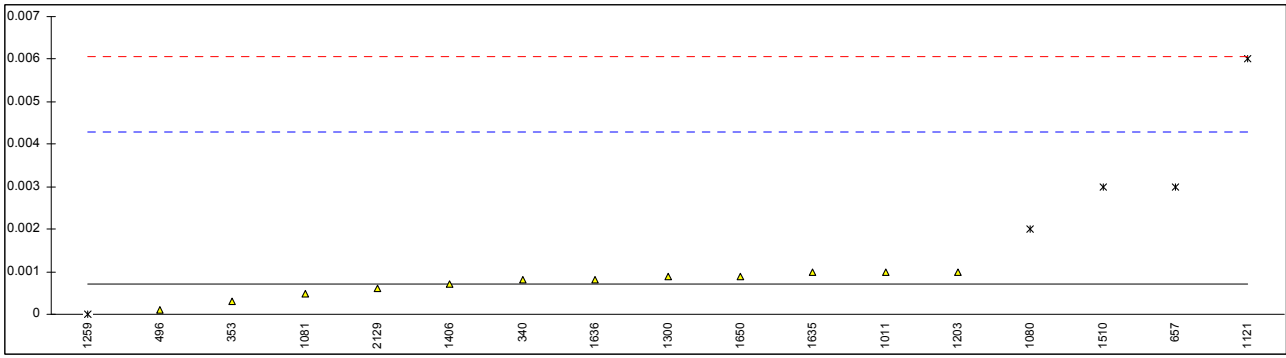
The performance of the determinations against the requirements of the respective standards is listed in the above table. The following performance categories were used:

- ++: group performed much better than the standard
- + : group performed better than the standard
- +/-: group performance equals the standard

- : group performed worse than the standard
- : group performed much worse than the standard
- n.e.: not evaluated

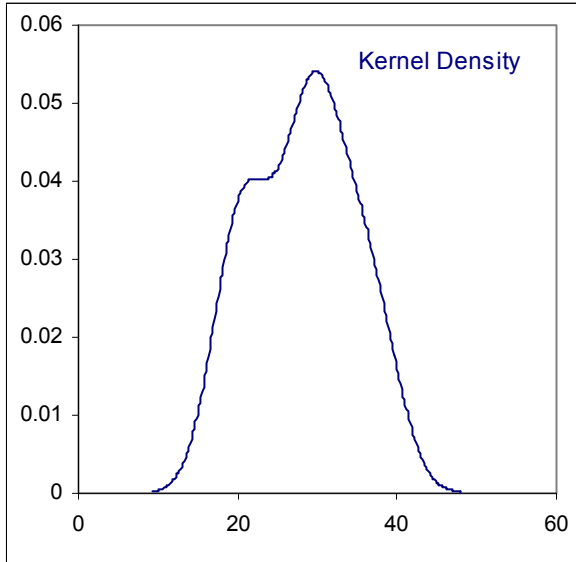
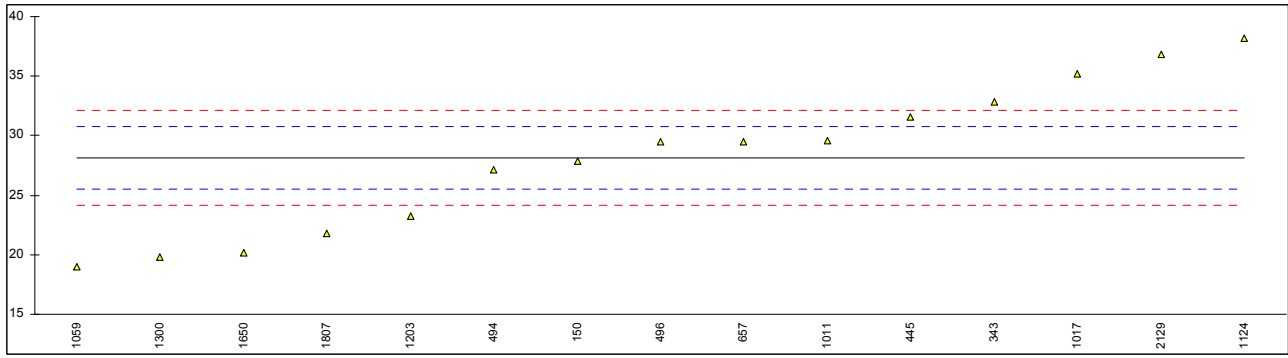
APPENDIX 1**Determination of Ash Content on sample #1039; result in %M/M**

lab	method	value	mark	z(targ)	remarks
150	D482	<0.001		----	
323	D482	<0.001		----	
335		----		----	
340	D482	0.0008		----	
343	ISO6245	<0.001		----	
353	IP4	0.0003		----	
432		----		----	
444		----		----	
445	IP4	<0.001		----	
463	D482	<0.001		----	
494	ISO6245	<0.001		----	
495		----		----	
496	D482	0.0001		----	
540		----		----	
657	D482/ISO6245	0.003	DG(0.01)	----	
1011	D482	0.001		----	
1017		----		----	
1033		----		----	
1047	ISO6245	<0.001		----	
1059	ISO6245	<0.001		----	
1080	ISO6245	0.002	G(0.05)	----	
1081	D482	0.00047		----	
1108		----		----	
1121	IP4	0.006	G(0.01)	----	
1124		----		----	
1126		----		----	
1138	D482	<0.001		----	
1140		----		----	
1146		----		----	
1161		----		----	
1194		----		----	
1201	D482	<0.005		----	
1203	D482/ISO6245	0.001		----	
1205		----		----	
1218		----		----	
1259	D482/ISO6245	0.000	ex	----	Result excluded not a real result
1280		----		----	
1300	ISO6245	0.000898		----	
1406	D482	0.0007		----	
1407		----		----	
1428	ISO6245	<0.001		----	
1510	D482/ISO6245	0.003	DG(0.01)	----	
1602	ISO6245	<0.001		----	
1634		----		----	
1635	D482/ISO6245	0.001		----	
1636	D482/ISO6245	0.00081		----	
1650	D482	0.0009		----	
1656	IP4	<0.01		----	
1706		----		----	
1724		----		----	
1807	ISO6245	<0.0010		----	
1810		----		----	
1811		----		----	
1833		----		----	
2129	D482/ISO6245	0.0006		----	
2146		----		----	
	normality	OK			
	n	12			
	outliers	5			
	mean (n)	0.00072			
	st.dev. (n)	0.000294			
	R(calc.)	0.00082			
	R(D482:07)	(0.005)			Application range 0.001 – 0.180%M/M



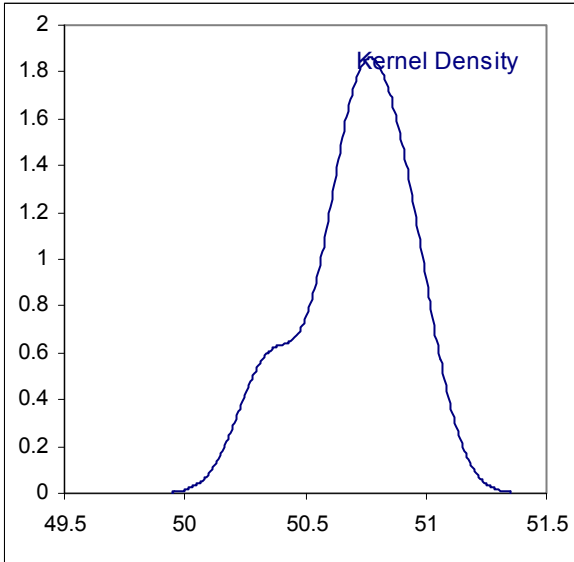
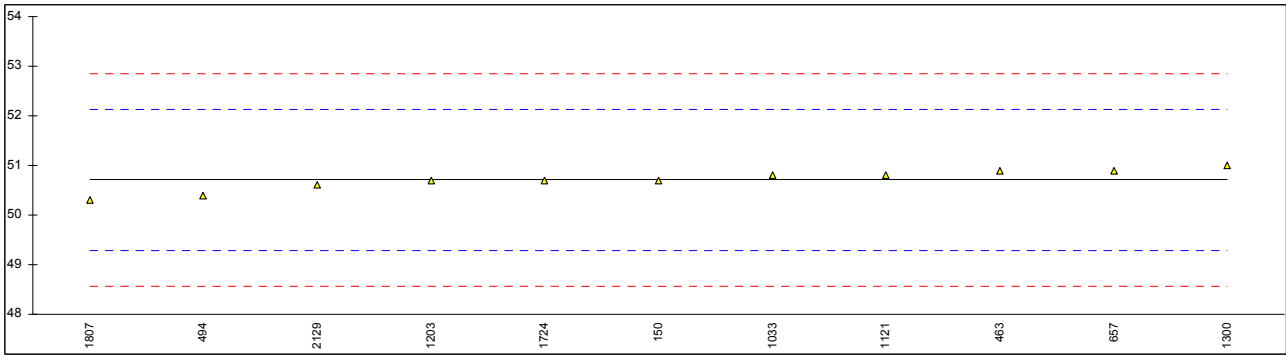
Determination of Aromatics by FIA on sample #1039; result in %V/V

lab	method	value	mark	z(targ)	remarks
150	D1319	27.9		----	
323		----		----	
335		----		----	
340		----		----	
343	D1319	32.86		----	
353		----		----	
432		----		----	
444		----		----	
445	D1319	31.6		----	
463		----		----	
494	D1319	27.1		----	
495		----		----	
496	D1319	29.5		----	
540		----		----	
657	D1319	29.5		----	
1011	D1319	29.6		----	
1017	D1319	35.17		----	
1033		----		----	
1047		----		----	
1059	D1319	19.0		----	
1080		----		----	
1081		----		----	
1108		----		----	
1121		----		----	
1124	D1319	38.22		----	
1126		----		----	
1138		----		----	
1140		----		----	
1146		----		----	
1161		----		----	
1194		----		----	
1201		----		----	
1203	D1319	23.2		----	
1205		----		----	
1218		----		----	
1259		----		----	
1280		----		----	
1300	D1319	19.7688		----	
1406		----		----	
1407		----		----	
1428		----		----	
1510		----		----	
1602		----		----	
1634		----		----	
1635		----		----	
1636		----		----	
1650	D1319	20.20		----	
1656		----		----	
1706		----		----	
1724		----		----	
1807	D1319	21.8		----	
1810		----		----	
1811		----		----	
1833		----		----	
2129	D1319	36.8		----	
2146		----		----	
	normality	OK			
	n	15			
	outliers	0			
	mean (n)	28.148			
	st.dev. (n)	6.2593			
	R(calc.)	17.526			
	R(D1319:08)	unknown			Compare R(D1319 for diesel without FAME) = 3.7



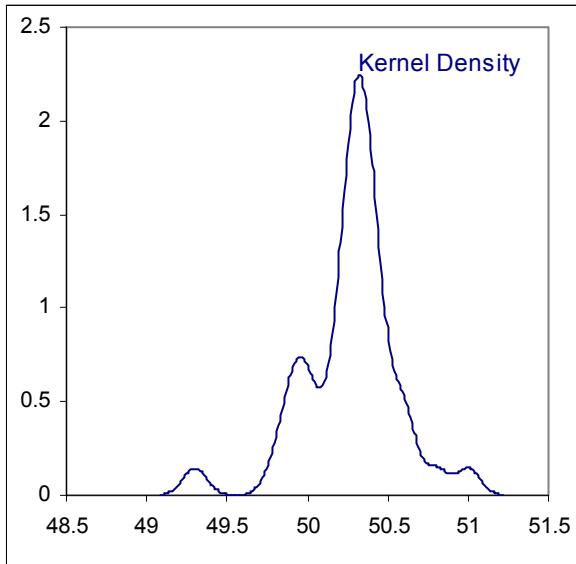
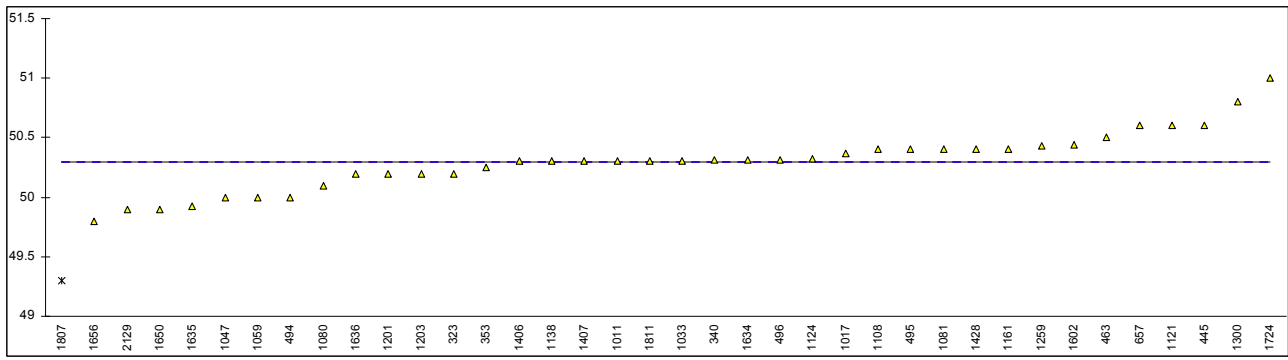
Determination of Cetane Index D976 on sample #1039

lab	method	value	mark	z(targ)	remarks
150	D976	50.70		-0.06	
323		----		----	
335		----		----	
340		----		----	
343		----		----	
353		----		----	
432		----		----	
444		----		----	
445		----		----	
463	D976	50.9		0.22	
494	D613	50.4	ex	-0.48	ASTM D613 is method for Cetane Number
495		----		----	
496		----		----	
540		----		----	
657	D976	50.9		0.22	
1011		----		----	
1017		----		----	
1033	D976	50.8		0.08	
1047		----		----	
1059		----		----	
1080		----		----	
1081		----		----	
1108		----		----	
1121	D976	50.8		0.08	
1124		----		----	
1126		----		----	
1138		----		----	
1140		----		----	
1146		----		----	
1161		----		----	
1194		----		----	
1201		----		----	
1203		----		----	
1205		----		----	
1218		----		----	
1259		----		----	
1280		----		----	
1300	D976	51.0		0.36	
1406		----		----	
1407		----		----	
1428		----		----	
1510		----		----	
1602		----		----	
1634		----		----	
1635		----		----	
1636		----		----	
1650		----		----	
1656		----		----	
1706		----		----	
1724	D976	50.7		-0.06	
1807	D976	50.3		-0.62	
1810		----		----	
1811		----		----	
1833		----		----	
2129	D976	50.6	C	-0.20	first reported 52.8
2146		----		----	
	normality	OK			
	n	9			
	outliers	0			
	mean (n)	50.744			
	st.dev. (n)	0.2068			
	R(calc.)	0.579			
	R(D976:06)	2			



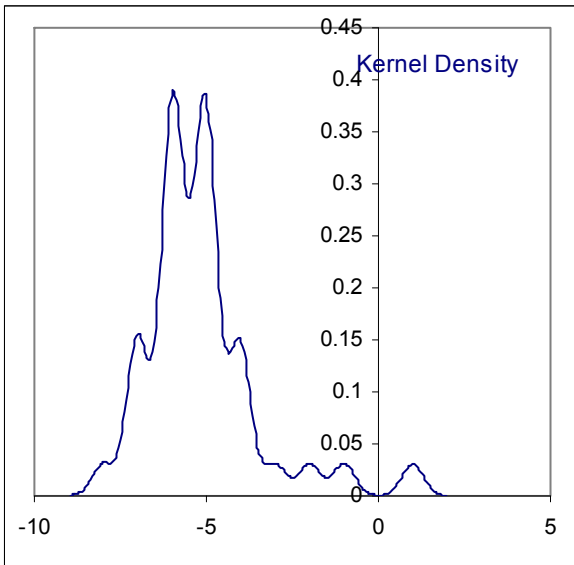
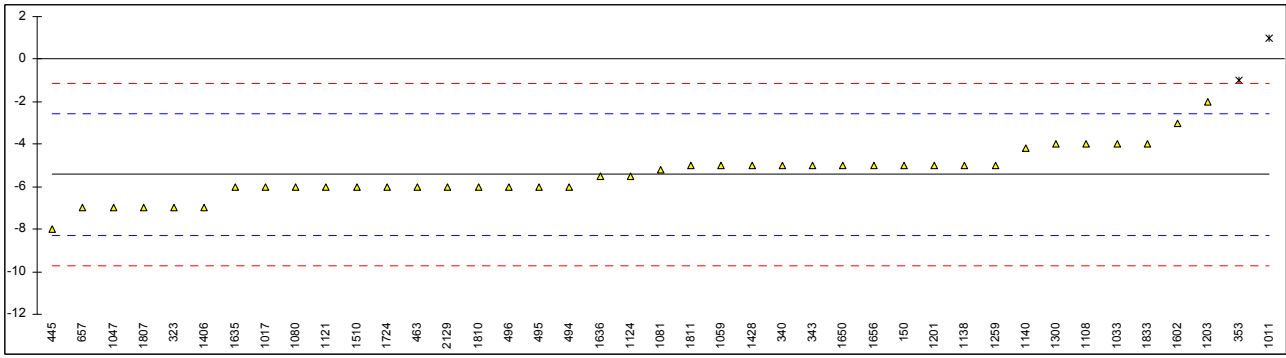
Determination of Cetane Index ISO4264 on sample #1039

lab	method	value	mark	z(targ)	remarks
150		----		----	
323	ISO4264	50.2		----	
335		----		----	
340	ISO4264	50.31		----	
343		----		----	
353	ISO4264	50.252		----	
432		----		----	
444		----		----	
445	IP380	50.6		----	
463	D4737	50.5		----	
494	ISO4264	50.0		----	
495	ISO4264	50.40		----	
496	ISO4264	50.31		----	
540		----		----	
657	ISO4264	50.6		----	
1011	ISO4264	50.3		----	
1017	ISO4264	50.37		----	
1033	IP380	50.3		----	
1047	ISO4264	50.0		----	
1059	ISO4264	50.0		----	
1080	ISO4264	50.1		----	
1081	ISO4264	50.4		----	
1108	ISO4264	50.4		----	
1121	IP380	50.6		----	
1124	ISO4264	50.32		----	
1126		----		----	
1138	IP380	50.3		----	
1140		----		----	
1146		----		----	
1161	D4737	50.4		----	
1194		----		----	
1201	ISO4264	50.2		----	
1203	ISO4264	50.2		----	reported also D4737 result: 50.7
1205		----		----	
1218		----		----	
1259	ISO4264	50.43		----	
1280		----		----	
1300	ISO4264	50.8		----	
1406	D4737	50.3		----	
1407	ISO4264	50.3		----	
1428	ISO4264	50.4		----	
1510		----		----	
1602	ISO4264	50.44		----	
1634	ISO4264	50.31		----	
1635	ISO4264	49.92		----	
1636	ISO4264	50.20		----	
1650	IP380	49.9		----	
1656	IP380	49.8		----	
1706		----		----	
1724	ISO4264	51.0		----	
1807	ISO4264	49.30	G(0.05)	----	
1810		----		----	
1811	ISO4264	50.3		----	
1833		----		----	
2129	ISO4264	49.9	C	----	first reported 52.9
2146		----		----	
	normality	not OK			
	n	37			
	outliers	1			
	mean (n)	50.299			
	st.dev. (n)	0.2477			
	R(calc.)	0.694			
	R(ISO4264)	n.a.			



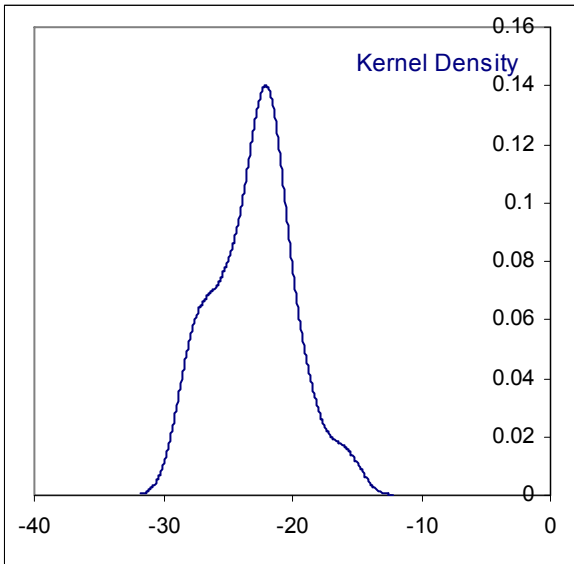
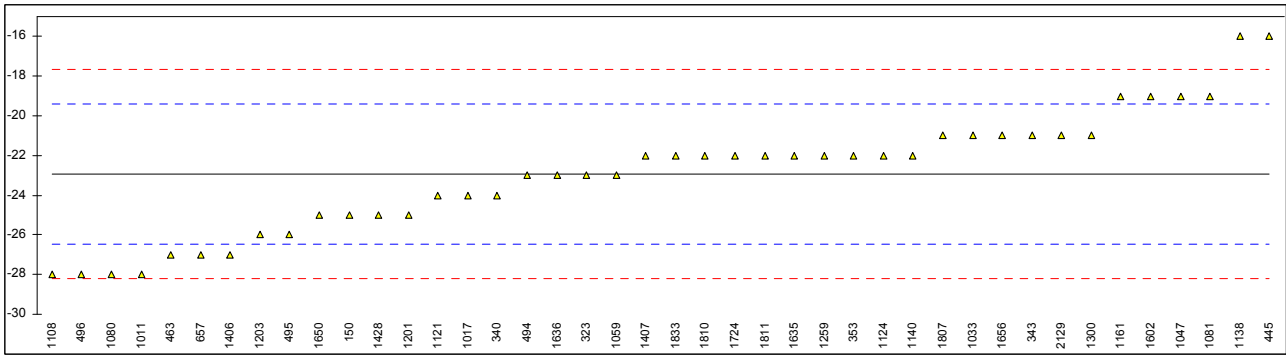
Determination of Cloud Point on sample #1039; result in °C

lab	method	value	mark	z(targ)	remarks
150	D2500	-5		0.29	
323	D2500	-7		-1.11	
335		----		----	
340	D2500	-5		0.29	
343	D2500	-5		0.29	
353	IP219	-1	G(0.05)	3.09	
432		----		----	
444		----		----	
445	IP219	-8		-1.81	
463	D2500	-6		-0.41	
494	EN23015	-6		-0.41	
495	D2500/EN23015	-6		-0.41	
496	EN23015	-6		-0.41	
540		----		----	
657	D2500/EN23015	-7		-1.11	
1011	D2500	1	G(0.01)	4.49	
1017	D2500/EN23015	-6		-0.41	
1033	IP219	-4		0.99	
1047	ISO3015	-7		-1.11	
1059	ISO3015	-5		0.29	
1080	EN23015	-6		-0.41	
1081	D5772	-5.2		0.15	
1108	D5771	-4		0.99	
1121	IP219	-6		-0.41	
1124	EN23015	-5.5		-0.06	
1126		----		----	
1138	D2500	-5		0.29	
1140	IP446	-4.2		0.85	
1146		----		----	
1161		----		----	
1194		----		----	
1201	D2500	-5		0.29	
1203	D2500/EN23015	-2		2.39	
1205		----		----	
1218		----		----	
1259	D2500/EN23015	-5		0.29	
1280		----		----	
1300	EN23015	-4		0.99	
1406	EN23015	-7		-1.11	
1407		----		----	
1428	EN23015	-5		0.29	
1510	D2500/EN23015	-6		-0.41	
1602	EN3015	-3		1.69	
1634		----		----	
1635	D2500/EN23015	-6		-0.41	
1636	D2500/EN23015	-5.5		-0.06	
1650	D2500	-5.0		0.29	
1656	IP444	-5		0.29	
1706		----		----	
1724	D2500	-6	C	-0.41	first reported +1
1807	EN23015	-7		-1.11	
1810	D2500/EN23015	-6		-0.41	
1811	D2500/EN23015	-5		0.29	
1833	D2500	-4		0.99	
2129	D2500/EN23015	-6.0		-0.41	
2146		----		----	
	normality	not OK			
	n	39			
	outliers	2			
	mean (n)	-5.42			
	st.dev. (n)	1.173			
	R(calc.)	3.28			
	R(D2500:09)	4.00			



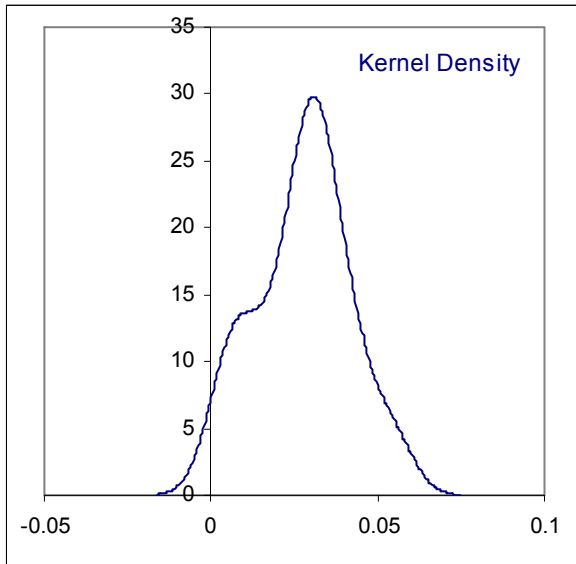
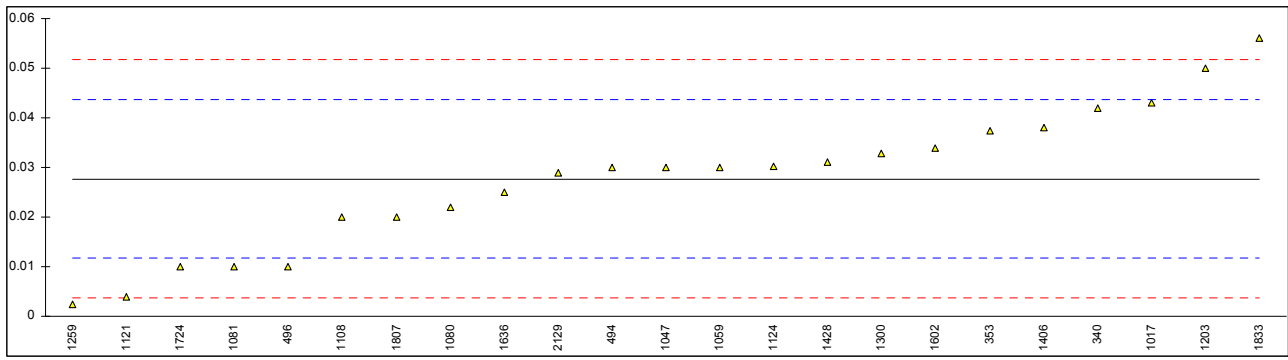
Determination of Cold Filter Plugging Point on sample #1039; result in °C

lab	method	value	mark	z(targ)	remarks
150	EN116	-25		-1.17	
323	EN116	-23		-0.04	
335		----		----	
340	EN116	-24		-0.61	
343	EN116	-21		1.09	
353	IP309	-22		0.53	
432		----		----	
444		----		----	
445	IP309	-16		3.93	
463	EN116	-27		-2.31	
494	EN116	-23		-0.04	
495	EN116	-26		-1.74	
496	EN116	-28		-2.88	
540		----		----	
657	EN116	-27.0		-2.31	
1011	EN116	-28		-2.88	
1017	EN116	-24		-0.61	
1033	IP309	-21		1.09	
1047	EN116	-19		2.23	
1059	EN116	-23		-0.04	
1080	EN116	-28		-2.88	
1081	EN116	-19		2.23	
1108	EN116	-28		-2.88	
1121	IP309	-24		-0.61	
1124	EN116	-22		0.53	
1126		----		----	
1138	IP309	-16		3.93	
1140	IP309	-22		0.53	
1146		----		----	
1161	EN116	-19		2.23	
1194		----		----	
1201	EN116	-25		-1.17	
1203	EN116	-26		-1.74	
1205		----		----	
1218		----		----	
1259	EN116	-22		0.53	
1280		----		----	
1300	EN116	-21		1.09	
1406	EN116	-27		-2.31	
1407	EN116	-22		0.53	
1428	EN116	-25		-1.17	
1510		----		----	
1602	EN116	-19		2.23	
1634		----		----	
1635	EN116	-22	C	0.53	first reported -30
1636	D6371	-23		-0.04	
1650	EN116	-25.0		-1.17	
1656	IP309	-21		1.09	
1706		----		----	
1724	EN116	-22		0.53	
1807	EN116	-21		1.09	
1810	EN116	-22		0.53	
1811	EN116	-22		0.53	
1833	EN116	-22		0.53	
2129	EN116	-21.0		1.09	
2146		----		----	
	normality	not OK			
	n	42			
	outliers	0			
	mean (n)	-22.929			
	st.dev. (n)	3.0475			
	R(calc.)	8.533			
	R(EN116:98)	4.937			



Determination of Carbon Residue on 10% distillation residue on sample #1039; result in %M/M

lab	method	value	mark	z(targ)	remarks
150	D4530	<0.1		----	
323	ISO10370	<0.10		----	
335		----		----	
340	ISO10370	0.042		----	
343	ISO10370	<0.1		----	
353	IP13	0.0373		----	
432		----		----	
444		----		----	
445		----		----	
463		----		----	
494	ISO10370	0.03		----	
495	ISO10370	<0.01		----	
496	ISO10370	0.01		----	
540		----		----	
657		----		----	
1011		----		----	
1017	ISO10370	0.043		----	
1033		----		----	
1047	ISO10370	0.030		----	
1059	ISO10370	0.03		----	
1080	D4530	0.022		----	
1081	ISO10370	0.01		----	
1108	ISO10370	0.02		----	
1121	IP13	0.004		----	
1124	ISO10370	0.0303		----	
1126		----		----	
1138	D189	<0.1		----	
1140		----		----	
1146		----		----	
1161		----		----	
1194		----		----	
1201	ISO10370	<0.1		----	
1203	ISO10370	0.05		----	
1205		----		----	
1218		----		----	
1259	ISO10370	0.0023		----	
1280		----		----	
1300	ISO10370	0.03282		----	
1406	ISO10370	0.038		----	
1407		----		----	
1428	ISO10370	0.031		----	
1510		----		----	
1602	ISO10370	0.034		----	
1634		----		----	
1635		----		----	
1636	D4530	0.025		----	
1650		----		----	
1656	IP398	<0.1		----	
1706		----		----	
1724	ISO10370	0.01		----	
1807	ISO10370	0.02		----	
1810		----		----	
1811		----		----	
1833	ISO10370	0.056		----	
2129	IP398	0.029	C	----	first reported 0.062
2146		----		----	
	normality	OK			
	n	23			
	outliers	0			
	mean (n)	0.0277			
	st.dev. (n)	0.01405			
	R(calc.)	0.0393			
	R(ISO10370)	(0.0224)			Application range 0.1 – 30%M/M



Determination of Ramsbottom Carbon Res. on 10% dist. res. on sample #1039; result in %M/M

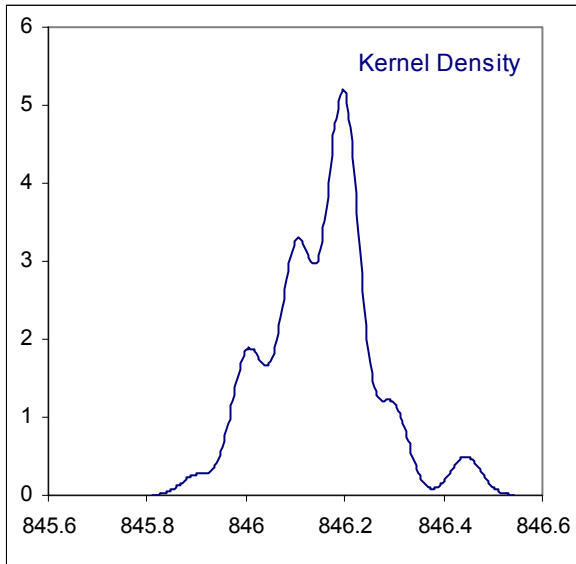
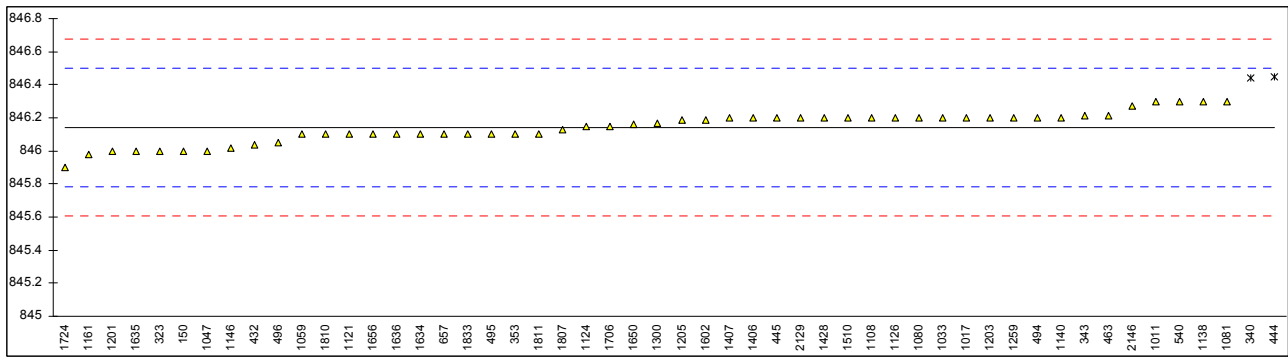
lab	method	value	mark	z(targ)	remarks
150	D524	0.08		1.06	
323		----		----	
335		----		----	
340		----		----	
343		----		----	
353		----		----	
432		----		----	
444		----		----	
445		----		----	
463	D4530	0.022		-4.36	
494		----		----	
495		----		----	
496		----		----	
540		----		----	
657		----		----	
1011	D524	0.08		1.06	
1017		----		----	
1033		----		----	
1047		----		----	
1059		----		----	
1080		----		----	
1081		----		----	
1108		----		----	
1121		----		----	
1124		----		----	
1126		----		----	
1138		----		----	
1140		----		----	
1146		----		----	
1161		----		----	
1194		----		----	
1201		----		----	
1203		----		----	
1205		----		----	
1218		----		----	
1259		----		----	
1280		----		----	
1300		----		----	
1406		----		----	
1407		----		----	
1428		----		----	
1510	D524	0.07		0.12	
1602		----		----	
1634		----		----	
1635	D524	0.04		-2.68	
1636		----		----	
1650		----		----	
1656		----		----	
1706		----		----	
1724		----		----	
1807		----		----	
1810		----		----	
1811		----		----	
1833	D524	0.12		4.79	
2129		----		----	
2146		----		----	
	normality	OK			
	n	6			
	outliers	0			
	mean (n)	0.0687			
	st.dev. (n)	0.03433			
	R(calc.)	0.0961			
	R(D524:04)	0.0300			

Determination of Copper Corrosion 3hrs @ 50 °C on sample #01039

lab	method	value	mark	z(targ)	remarks
150	D130	1A		----	
323	D130	1A		----	
335		----		----	
340	D130	1A		----	
343	D130	1A		----	
353	D130	1A		----	
432		----		----	
444		----		----	
445	D130/ISO2160	1A		----	
463	D130	1A		----	
494	D130	1		----	
495	D130/ISO2160	1		----	
496	ISO2160	1A		----	
540		----		----	
657	D130/ISO2160	1		----	
1011	D130	1B		----	
1017	D130/ISO2160	1A		----	
1033	IP154	1A		----	
1047	ISO2160	1A		----	
1059	ISO2160	1A		----	
1080	ISO2160	1A		----	
1081	D130	1A		----	
1108	D130	1A		----	
1121	IP154	1A		----	
1124	ISO2160	1A		----	
1126		----		----	
1138	D130	1A		----	
1140	D130	1A		----	
1146		----		----	
1161	ISO2160	1		----	
1194		----		----	
1201	D130	1A		----	
1203	D130/ISO2160	1		----	
1205		----		----	
1218		----		----	
1259	D130/ISO2160	1		----	
1280		----		----	
1300	ISO2160	1A		----	
1406	ISO2160	1A		----	
1407		----		----	
1428	ISO2160	1A		----	
1510	D130/ISO2160	1A		----	
1602	ISO2160	1A		----	
1634	D130	1A		----	
1635	D130/ISO2160	1A		----	
1636	D130/ISO2160	1A		----	
1650	D130	1A		----	
1656	IP154	1A		----	
1706		----		----	
1724	D130	1A		----	
1807	ISO2160	1A		----	
1810		----		----	
1811	D130/ISO2160	1		----	
1833	D130	1A		----	
2129	D130/ISO2160	1A		----	
2146		----		----	
	normality	n.a.			
	n	42			
	outliers	0			
	mean (n)	1A			
	st.dev. (n)	n.a.			
	R(calc.)	n.a.			
	R(D130:04e1)	n.a.			

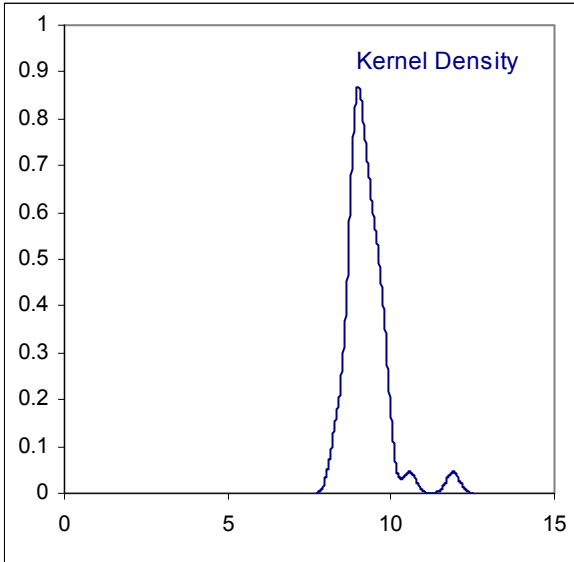
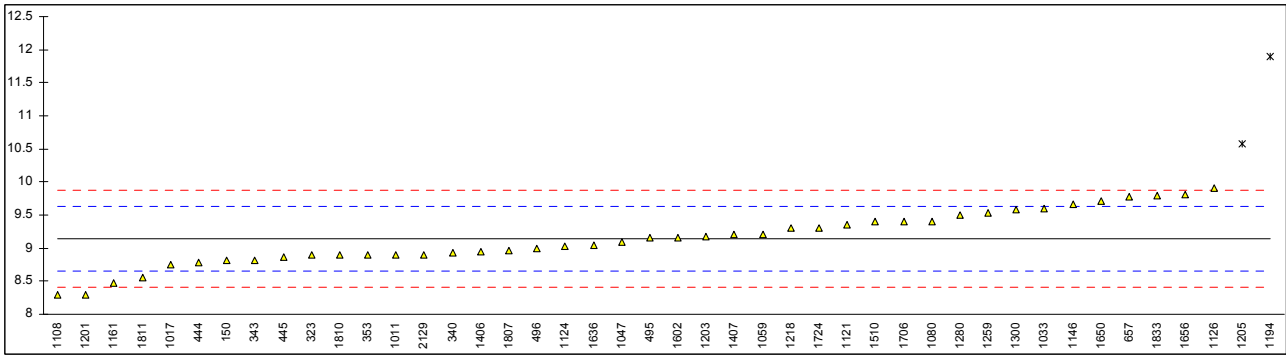
Determination of Density @15 °C on sample #1039; result in kg/m³

lab	method	value	mark	z(targ)	remarks
150	D4052	846.0		-0.80	
323	D4052	846.0		-0.80	
335		-----		-----	
340	D4052/ISO12185	846.44	DG(0.05)	1.67	
343	D4052/ISO12185	846.21		0.38	
353	ISO12185	846.1		-0.24	
432	ISO12185	846.04	C	-0.57	first reported 846.44
444	D4052	846.45	C, DG(0.05)	1.72	first reported 0.84645
445	IP365	846.2		0.32	
463	ISO12185	846.21		0.38	
494	D4052	846.2		0.32	
495	ISO12185	846.1		-0.24	
496	ISO12185	846.05		-0.52	
540	D4052	846.3		0.88	
657	ISO12185	846.1		-0.24	
1011	ISO12185	846.3		0.88	reported 0.8463
1017	D4052/ISO12185	846.2		0.32	
1033	IP365	846.2		0.32	
1047	ISO12185	846.0		-0.80	
1059	ISO12185	846.1		-0.24	
1080	ISO12185	846.2		0.32	
1081	ISO12185	846.3		0.88	
1108	ISO12185	846.2		0.32	
1121	IP365	846.1	C	-0.24	first reported 0.8461
1124	ISO12185	846.146		0.02	
1126	D4052	846.2		0.32	
1138	D4052	846.3		0.88	reported 0.8463
1140	D4052	846.2		0.32	
1146	ISO12185	846.02		-0.68	
1161	ISO12185	845.98		-0.91	
1194		-----		-----	
1201	D4052	846.0		-0.80	
1203	ISO12185	846.2		0.32	
1205	ISO12185	846.19		0.27	
1218		-----		-----	
1259	D7042	846.2		0.32	
1280		-----		-----	
1300	ISO12185	846.17		0.16	
1406	ISO3675	846.2		0.32	
1407	ISO12185	846.2		0.32	
1428	ISO12185	846.2		0.32	
1510	ISO12185	846.2		0.32	
1602	ISO12185	846.19		0.27	
1634	D4052	846.1		-0.24	
1635	D4052/ISO12185	846.0		-0.80	
1636	D4052/ISO12185	846.1		-0.24	
1650	D4052	846.16		0.10	
1656	IP365	846.1	C	-0.24	first reported 845.5
1706	ISO12185	846.15		0.04	
1724	ISO12185	845.9		-1.36	
1807	ISO12185	846.13		-0.07	
1810	ISO12185	846.1		-0.24	
1811	D4052/ISO12185	846.1		-0.24	
1833	ISO12185	846.1		-0.24	
2129	D4052	846.2		0.32	
2146	ISO12185	846.27		0.72	
	normality	not OK			
	n	50			
	outliers	2			
	mean (n)	846.14			
	st.dev. (n)	0.093			
	R(calc.)	0.26			
	R(ISO12185)	0.50			



Determination of Fatty Acid Methyl Esters content on sample #1039; result in %V/V

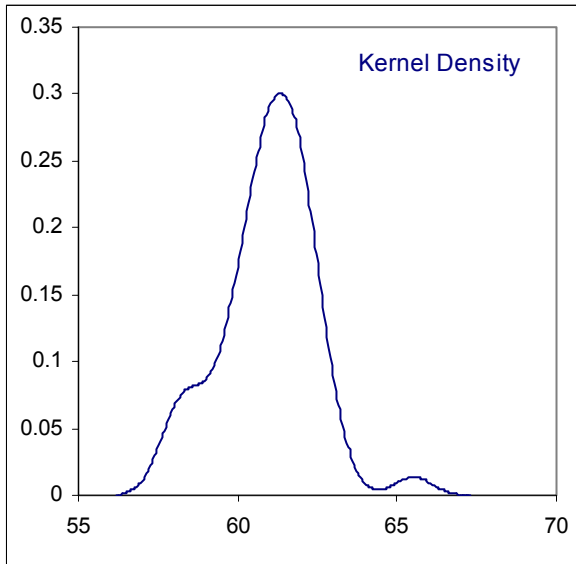
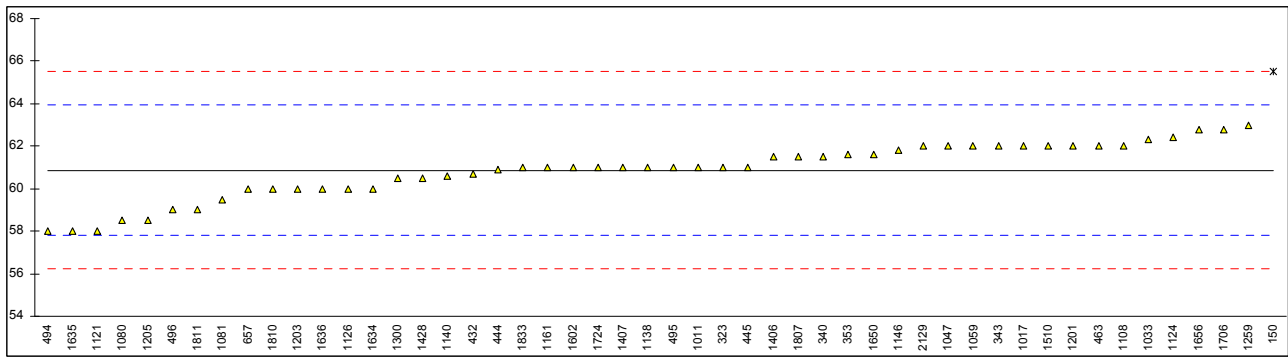
lab	method	value	mark	z(targ)	remarks
150	D7371	8.81		-1.37	
323	EN14078	8.9		-1.00	
335		----		----	
340	D7371/EN14078	8.93		-0.88	
343	EN14078	8.82		-1.33	
353	EN14078	8.9		-1.00	
432		----		----	
444	EN14078	8.78		-1.50	
445	EN14078	8.86		-1.17	
463		----		----	
494		----		----	
495	EN14078	9.15		0.02	
496	EN14078	9.0		-0.59	
540		----		----	
657	EN14078	9.77		2.56	
1011	EN14078	8.9		-1.00	
1017	D7371/EN14078	8.742		-1.65	
1033	EN14078	9.6	C	1.86	first reported 10.5
1047	EN14078	9.1		-0.19	
1059	EN14078	9.2		0.22	
1080	EN14078	9.4		1.04	
1081		----		----	
1108	EN14078	8.3		-3.46	
1121	EN14078	9.36		0.88	
1124	EN14078	9.03		-0.47	
1126	In house	9.9		3.09	
1138		----		----	
1140		----		----	
1146	EN14078	9.67		2.15	
1161	EN14078	8.48		-2.72	
1194	EN14078	11.9	G(0.01)	11.28	
1201	EN14078	8.3		-3.46	
1203	EN14078	9.18		0.14	
1205	EN14078	10.57	D(0.05)	5.83	
1218	EN14078	9.3		0.63	
1259	EN14078	9.535		1.60	
1280	EN14078	9.5		1.45	
1300	EN14078	9.5766		1.77	
1406	EN14078	8.938		-0.85	
1407	EN14078	9.2		0.22	
1428		----		----	
1510	EN14078	9.4		1.04	
1602	EN14078	9.16		0.06	
1634		----		----	
1635		----		----	W: unreliable result, apparatus defect
1636	D7371/EN14078	9.05		-0.39	
1650	EN14078	9.72		2.35	
1656	EN14078	9.81		2.72	
1706	EN14078	9.4		1.04	
1724	EN14078	9.3	C	0.63	first reported 10.341
1807	EN14078	8.97		-0.72	
1810	EN14078	8.9		-1.00	
1811	D7371/EN14078	8.56		-2.40	
1833	EN14078	9.8		2.68	
2129	EN14078	8.902		-1.00	
2146		----		----	
	normality	OK			
	n	42			
	outliers	2			
	mean (n)	9.145			
	st.dev. (n)	0.4036			
	R(calc.)	1.130			
	R(EN14078:09)	0.684	range B		



Determination of Flash Point PMcc on sample #1039; result in °C

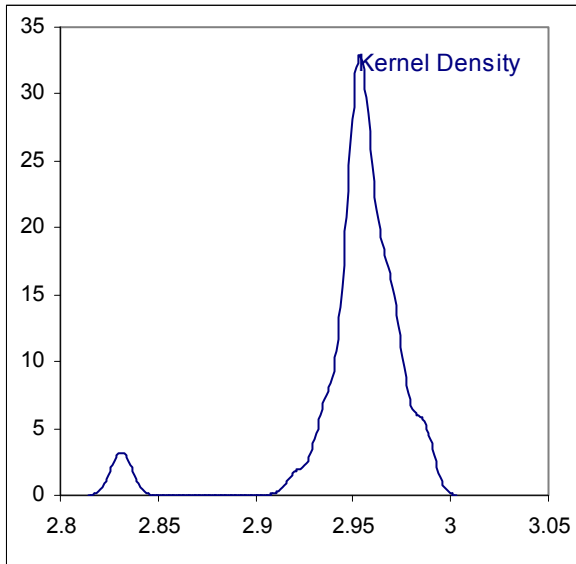
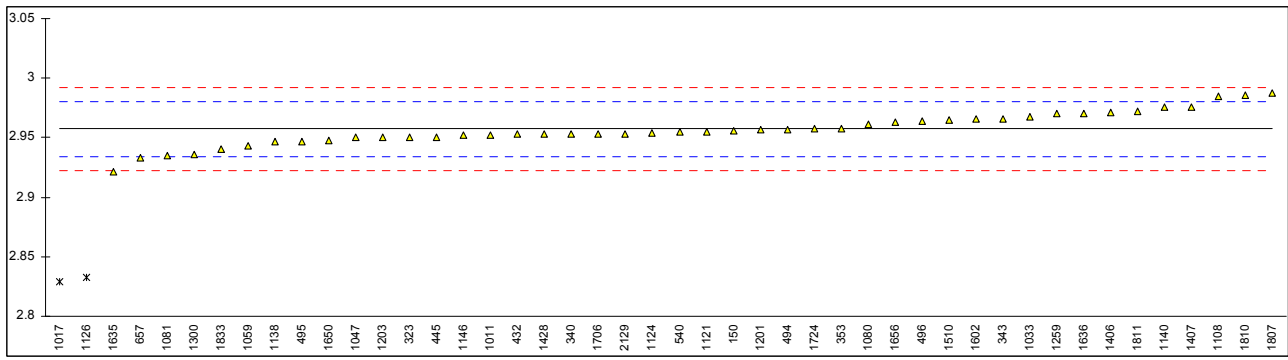
lab	method	value	mark	z(targ)	remarks
150	D93-AE	65.5	C, G(0.05)	3.00	first reported 95.5
323	D93-AF	61.0		0.09	
335		-----		-----	
340	D93/ISO2719-	61.5		0.41	
343	D93/ISO2719-AE	62.0		0.73	
353	D93/ISO2719-ME	61.60		0.47	
432	D93-AE	60.7		-0.11	
444	D93-AF	60.9		0.02	
445	IP34-AF	61.0		0.09	
463	D93-AE	62		0.73	
494	D93-AE	58.0		-1.86	
495	D93/ISO2719-AF	61.0		0.09	
496	ISO2719-AE	59.0		-1.21	
540		-----		-----	
657	D93/ISO2719-AF	60.0		-0.56	
1011	D93-AE	61.0		0.09	
1017	D93/ISO2719-AF	62.0		0.73	
1033	IP34-AF	62.3	C	0.93	first reported 100.1
1047	ISO2719-AE	62.0		0.73	
1059	ISO2719-AE	62.0		0.73	
1080	D93-AE	58.5		-1.53	
1081	D93-AE	59.5		-0.89	
1108	ISO2719-AE	62.0		0.73	
1121	IP34-ME	58		-1.86	
1124	ISO3679-MF	62.40		0.99	
1126	D93-AE	60		-0.56	
1138	D93-AF	61.0		0.09	
1140	D93-AE	60.6		-0.17	
1146	D93/ISO2719-AE	61.80		0.60	
1161	ISO2719-AE	61		0.09	
1194		-----		-----	
1201	D93-AE	62.0		0.73	
1203	D93/ISO2719-AF	60.0		-0.56	
1205	D93-	58.5		-1.53	
1218		-----		-----	
1259	D93/ISO2719-MF	63.0		1.38	
1280		-----		-----	
1300	ISO2719-AF	60.5		-0.24	
1406	ISO2719-AE	61.5		0.41	
1407	ISO2719-AE	61.0		0.09	
1428	ISO2719-AE	60.5		-0.24	
1510	D93/ISO2719-	62		0.73	
1602	ISO2719-AE	61.0		0.09	
1634	D93-AE	60.0		-0.56	
1635	D93/ISO2719-	58.0		-1.86	
1636	D93/ISO2719-AE	60.0		-0.56	
1650	D93-AF	61.6		0.47	
1656	IP34-AF	62.8		1.25	
1706	D93-AE	62.8		1.25	
1724	D93-AE	61		0.09	
1807	ISO2719-	61.5		0.41	
1810	D93/ISO2719-AF	60		-0.56	
1811	D93/ISO2719-AF	59.0		-1.21	
1833	D93-AF	61		0.09	
2129	D93/ISO2719-MF	62.0		0.73	
2146		-----		-----	
	normality	not OK			
	n	49			
	outliers	1			
	mean (n)	60.87			
	st.dev. (n)	1.298			
	R(calc.)	3.63			
	R(D93:08)	4.32			

M = Manual; A = Automated; E = Electric; F = Flame



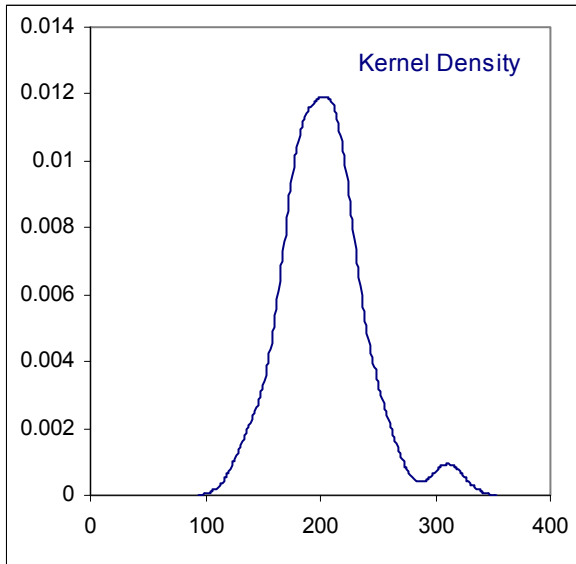
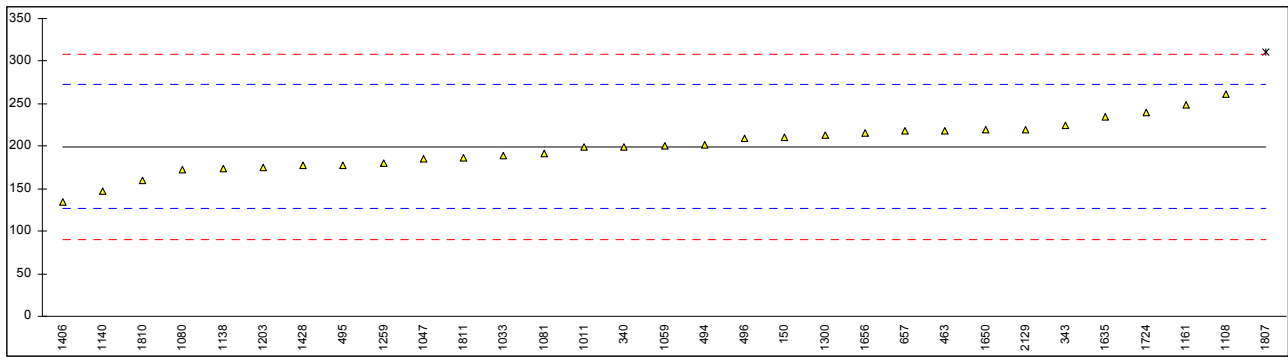
Determination of Kinematic Viscosity @ 40°C on sample #1039; result in mm²/s

lab	method	value	mark	z(targ)	remarks
150	D445	2.956		-0.10	
323	D445	2.950		-0.62	
335		----		----	
340	D445/ISO3104	2.9532		-0.34	
343	D445/ISO3104	2.9658		0.74	
353	D445	2.958		0.07	
432	D445	2.953		-0.36	
444		----		----	
445	IP71	2.9505		-0.58	
463		----		----	
494	D445	2.957		-0.02	
495	D445/ISO3104	2.9471		-0.87	
496	ISO3104	2.964		0.59	
540	D445	2.955		-0.19	
657	D445/ISO3104	2.933		-2.09	
1011	D445	2.952		-0.45	
1017	D445/ISO3104	2.8294	G(0.01)	-11.03	
1033	IP71	2.968		0.93	
1047	ISO3104	2.950		-0.62	
1059	ISO3104	2.943		-1.22	
1080	ISO3104	2.961		0.33	
1081	D445	2.935		-1.91	
1108	D445	2.985		2.40	
1121	IP71	2.955		-0.19	
1124	ISO3104	2.9542		-0.26	
1126	D445	2.833	G(0.01)	-10.72	
1138	D445	2.947		-0.88	
1140	D445	2.976		1.62	
1146	D445/ISO3104	2.9518		-0.47	
1161		----		----	
1194		----		----	
1201	D445	2.957		-0.02	
1203	D445/ISO3104	2.950		-0.62	
1205		----		----	
1218		----		----	
1259	D445/ISO3104	2.9700		1.11	
1280		----		----	
1300	ISO3104	2.93558		-1.86	
1406	ISO3104	2.9716		1.24	
1407	ISO3104	2.976		1.62	
1428	ISO3104	2.953		-0.36	
1510	D445/ISO3104	2.965		0.67	
1602	ISO3104	2.9656		0.73	
1634		----		----	
1635	D445/ISO3104	2.921		-3.12	
1636	D445/ISO3104	2.9703		1.13	
1650	D445	2.9477		-0.82	
1656	IP71	2.963		0.50	
1706	D445	2.9533		-0.34	
1724	D445	2.9575		0.03	
1807	ISO3104	2.9875		2.62	
1810	D445/ISO3104	2.986		2.49	
1811	D445/ISO3104	2.9722		1.30	
1833	ISO3104	2.94		-1.48	
2129	D445/ISO3104	2.9535	C	-0.32	first reported 3.0743
2146		----		----	
	normality	OK			
	n	44			
	outliers	2			
	mean (n)	2.95719			
	st.dev. (n)	0.013993			
	R(calc.)	0.03918			
	R(D445:09)	0.03245			



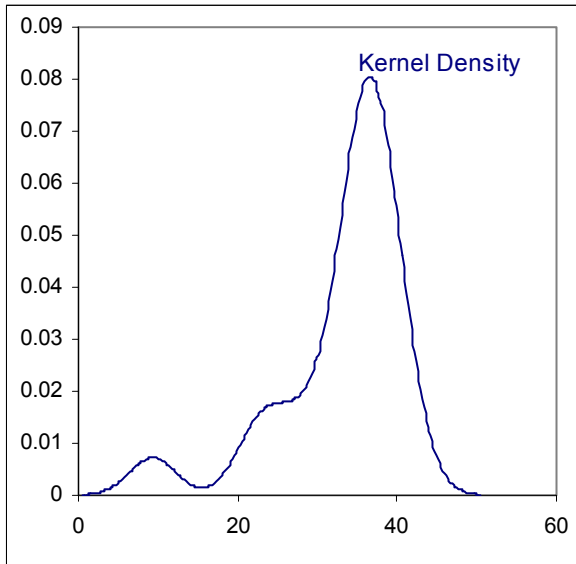
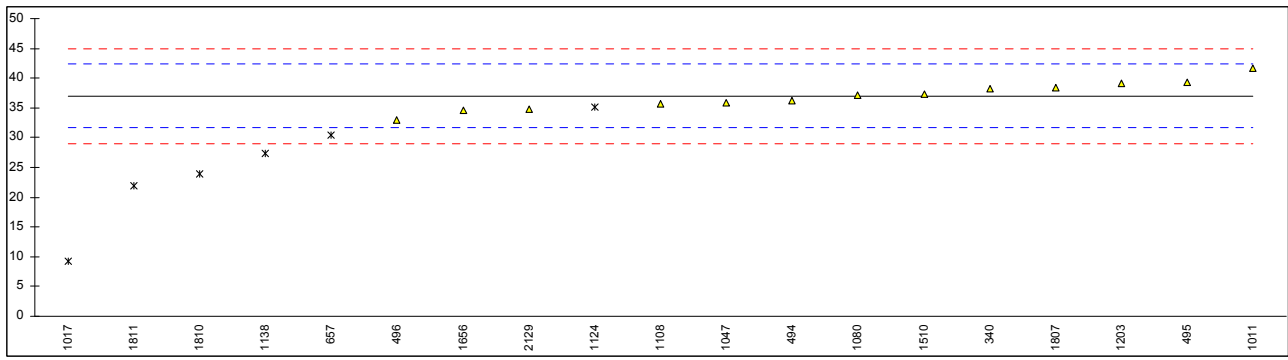
Determination of Lubricity by HFRR on sample #1039; result in μm

lab	method	value	mark	z(targ)	remarks
150	D6079	210		0.29	
323		----		----	
335		----		----	
340	D6079/ISO12156	199		-0.01	
343	ISO12156	224		0.68	
353		----		----	
432		----		----	
444		----		----	
445		----		----	
463	ISO12156	218.6		0.53	
494	ISO12156	201		0.05	
495	ISO12156	178		-0.59	
496	ISO12156	209		0.27	
540		----		----	
657	ISO12156	218		0.51	
1011	ISO12156	199		-0.01	
1017		----		----	
1033	IP450	189		-0.28	
1047	ISO12156	185		-0.39	
1059	ISO12156	200		0.02	
1080	ISO12156	172		-0.75	
1081	ISO12156	192		-0.20	
1108	ISO12156	261		1.69	
1121		----		----	
1124		----		----	
1126		----		----	
1138	IP450	174		-0.70	
1140	IP450	147		-1.44	
1146		----		----	
1161	ISO12156	248.56		1.35	
1194		----		----	
1201		----		----	
1203	ISO12156	175		-0.67	
1205		----		----	
1218		----		----	
1259	ISO12156	180		-0.53	
1280		----		----	
1300	ISO12156	213.5		0.39	
1406	ISO12156	135		-1.77	
1407		----		----	
1428	ISO12156	177		-0.61	
1510		----		----	
1602		----		----	
1634		----		----	
1635	D6079/ISO12156	235		0.98	
1636		----		----	
1650	ISO12156	219		0.54	
1656	IP450	215		0.43	
1706		----		----	
1724	ISO12156	240		1.12	
1807	ISO12156	311	G(0.05)	3.07	
1810	ISO12156	160		-1.08	
1811	D6079/ISO12156	186		-0.37	
1833		----		----	
2129	ISO12156	219		0.54	
2146		----		----	
	normality	OK			
	n	30			
	outliers	1			
	mean (n)	199.32			
	st.dev. (n)	28.880			
	R(calc.)	80.86			
	R(ISO12156:97)	102.00			



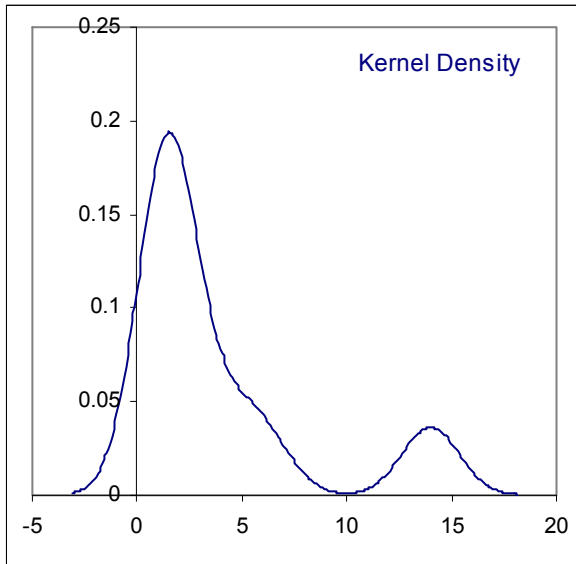
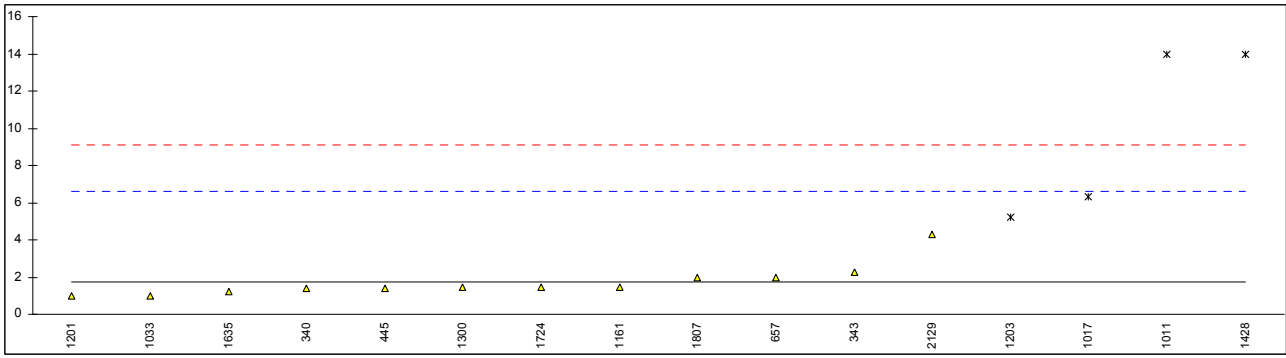
Determination of Oxidation Stability EN15751 on sample #1039; result in hours

lab	method	value	mark	z(targ)	remarks
150		----		----	
323		----		----	
335		----		----	
340	EN15751	38.2		0.44	
343	EN15751	>24		----	
353		----		----	
432		----		----	
444		----		----	
445		----		----	
463		----		----	
494	EN15751	36.2		-0.31	
495	EN15751	39.35		0.88	
496	EN15751	32.95		-1.54	
540		----		----	
657	EN14112	30.4	ex	-2.50	method not applicable for B10
1011	EN15751	41.7		1.77	
1017	EN15751	9.32	G(0.01)	-10.45	
1033	IP574	>20		----	
1047	EN15751	35.9		-0.42	
1059		----		----	
1080	EN15751	37.2		0.07	
1081		----		----	
1108	EN15751	35.6		-0.54	
1121		----		----	
1124	EN14112	35.13	ex	-0.71	method not applicable for B10
1126		----		----	
1138	EN14112	27.4	ex	-3.63	method not applicable for B10
1140		----		----	
1146		----		----	
1161		----		----	
1194		----		----	
1201		----		----	
1203	EN15751	39.1		0.78	
1205		----		----	
1218		----		----	
1259		----		----	
1280		----		----	
1300	EN15751	>32		----	
1406		----		----	
1407		----		----	
1428		----		----	
1510	EN15751	37.25		0.09	
1602		----		----	
1634		----		----	
1635		----		----	
1636		----		----	
1650		----		----	
1656	EN15751	34.64		-0.90	
1706		----		----	
1724		----		----	
1807	EN15751	38.4		0.52	
1810	EN15751	24	CDG(0.01)	-4.91	first reported 23.5
1811	EN15751	22.0	CDG(0.01)	-5.67	first reported 23.9
1833		----		----	
2129	EN15751	34.79		-0.84	
2146		----		----	
	normality	OK			
	n	13			
	outliers	3			
	mean (n)	37.022			
	st.dev. (n)	2.3485			
	R(calc.)	6.576			
	R(EN15751:09)	7.421			



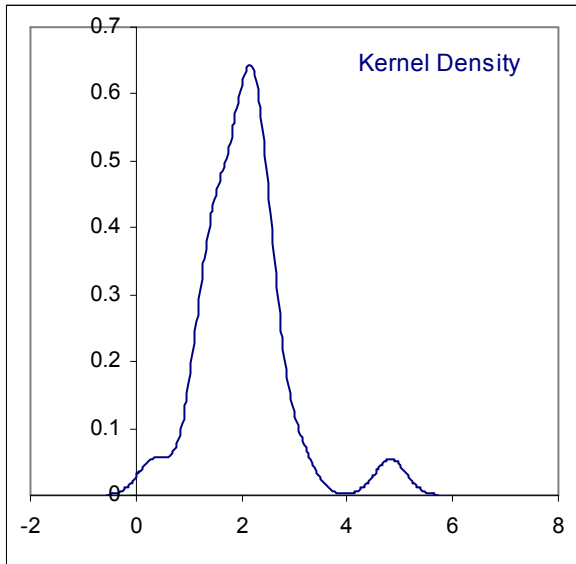
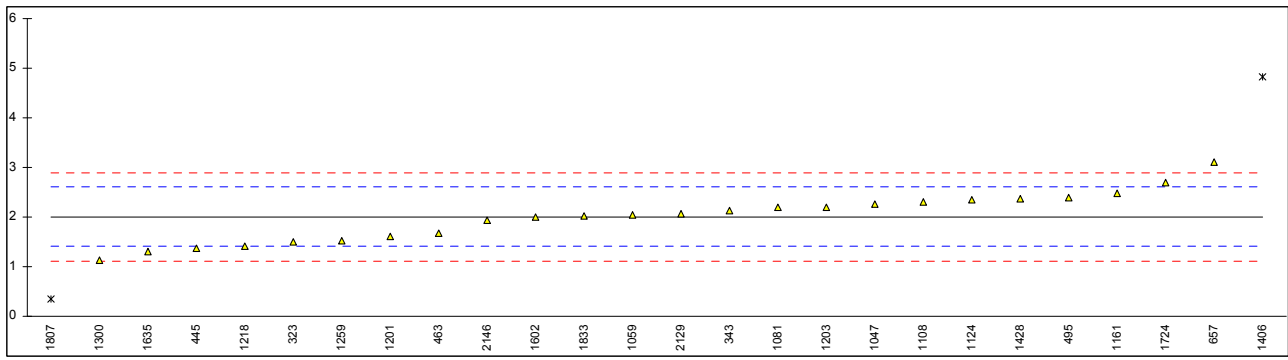
Determination of Oxidation Stability ISO12205 on sample #1039; result in g/m³

lab	method	value	mark	z(targ)	remarks
150	ISO12205	<0.01		<-0.71	probably reported in a deviating unit, e.g. mg/100mL
323		----		----	
335		----		----	
340	ISO12205	1.4		-0.14	
343	ISO12205	2.28		0.22	
353		----		----	
432		----		----	
444		----		----	
445	IP388	1.4		-0.14	
463		----		----	
494		----		----	
495		----		----	
496		----		----	
540		----		----	
657	D2274	2		0.11	
1011	ISO12205	14	DG(0.01)	5.02	
1017	ISO12205	6.3	DG(0.05)	1.87	
1033	D2274	1.0		-0.30	
1047		----		----	
1059	ISO12205	<1		<-0.30	
1080		----		----	
1081		----		----	
1108		----		----	
1121	IP388	<1	C	<-0.30	first reported 0.01937
1124		----		----	
1126		----		----	
1138		----		----	
1140		----		----	
1146		----		----	
1161	ISO12205	1.43		-0.13	
1194		----		----	
1201	ISO12205	1		-0.30	
1203	ISO12205	5.2	C, DG(0.05)	1.42	first reported 4.3
1205		----		----	
1218		----		----	
1259		----		----	
1280		----		----	
1300	ISO12205	1.4285		-0.13	
1406		----		----	
1407		----		----	
1428	ISO12205	14	C, DG(0.01)	5.02	first reported 4
1510		----		----	
1602		----		----	
1634		----		----	
1635	ISO12205	1.2		-0.22	
1636		----		----	
1650		----		----	
1656	ISO12205	<0.1		<-0.67	
1706		----		----	
1724	ISO12205	1.43		-0.13	
1807	ISO12205	2.0		0.11	
1810		----		----	
1811		----		----	
1833		----		----	
2129	ISO12205	4.3		1.05	
2146		----		----	
	normality	not OK			
	n	12			
	outliers	4			
	mean (n)	1.739			
	st.dev. (n)	0.8989			
	R(calc.)	2.517			
	R(ISO12205:96)	6.845			



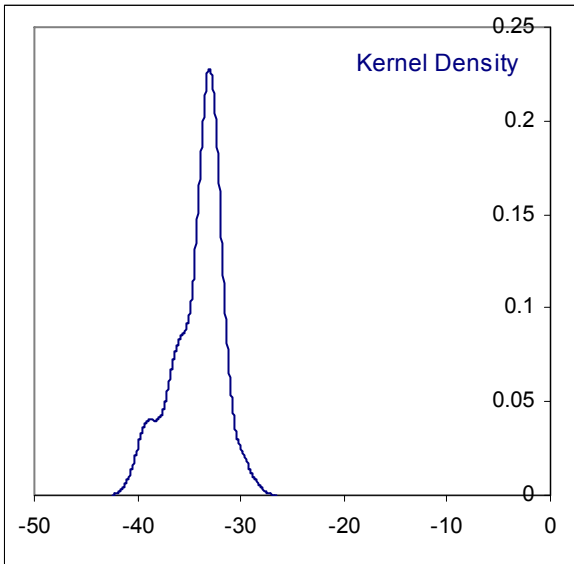
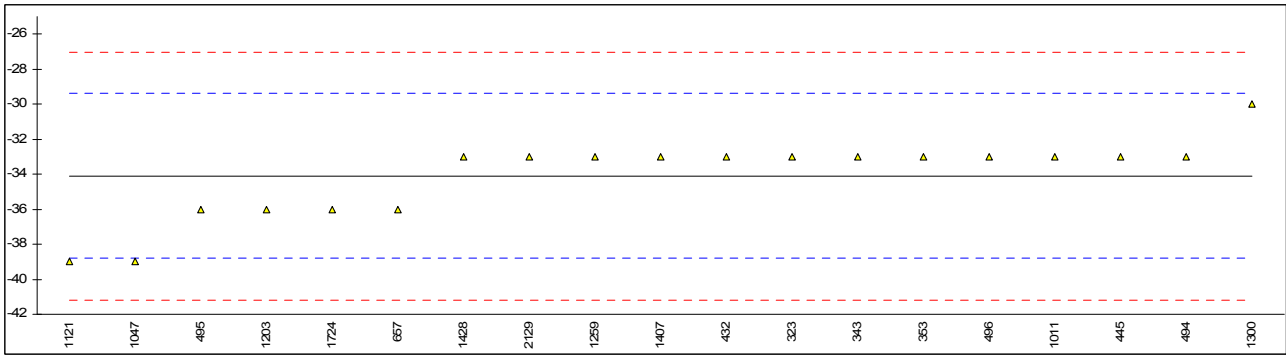
Determination of Polycyclic Aromatic Hydrocarbons on sample #1039; result in %M/M

lab	method	value	mark	z(targ)	remarks
150		----		----	
323	EN12916	1.5		-1.68	
335		----		----	
340		----		----	
343	EN12916	2.14		0.46	
353		----		----	
432		----		----	
444		----		----	
445	IP391	1.36		-2.15	
463	EN12916	1.68		-1.08	
494		----		----	
495	EN12916	2.40		1.33	
496		----		----	
540		----		----	
657	IP391	3.11		3.71	
1011		----		----	
1017		----		----	
1033		----		----	
1047	EN12916	2.27		0.90	
1059	EN12916	2.04		0.12	
1080		----		----	
1081	IP391	2.2		0.66	reported di-aromatics 2.0 and tri-aromatics 0.2
1108	EN12916	2.3		1.00	
1121		----		----	
1124	EN12916	2.35		1.16	
1126		----		----	
1138		----		----	
1140		----		----	
1146		----		----	
1161	EN12916	2.47		1.57	
1194		----		----	
1201	EN12916	1.6		-1.35	
1203	IP391	2.2		0.66	
1205		----		----	
1218	EN12916	1.41		-1.99	
1259	EN12916	1.53		-1.58	
1280		----		----	
1300	EN12916	1.1217		-2.95	
1406	EN12916	4.82	G(0.01)	9.44	
1407		----		----	
1428	EN12916	2.37		1.23	
1510		----		----	
1602	EN12916	1.99		-0.04	
1634		----		----	
1635	EN12916	1.3		-2.36	
1636		----		----	
1650		----		----	
1656		----		----	
1706		----		----	
1724	EN12916	2.705		2.35	
1807	EN12916	0.344	D(0.05)	-5.56	
1810		----		----	
1811		----		----	
1833	EN12916	2.025		0.07	
2129	EN12916	2.0641		0.21	
2146	EN12916	1.93		-0.24	
	normality	OK			
	n	24			
	outliers	2			
	mean (n)	2.003			
	st.dev. (n)	0.4843			
	R(calc.)	1.356			
	R(EN12916:06)	0.836			



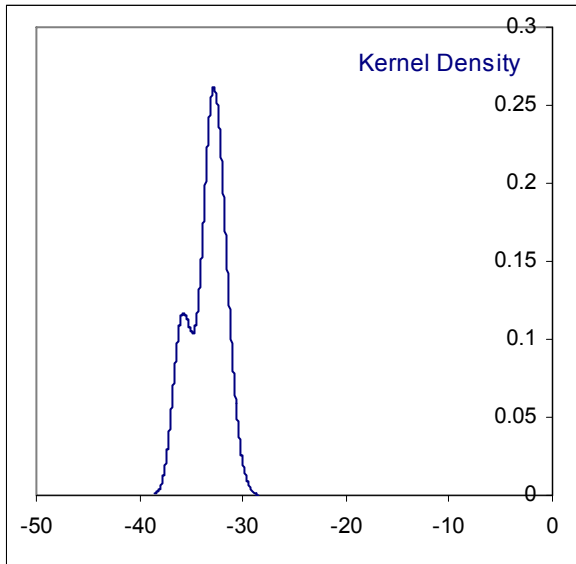
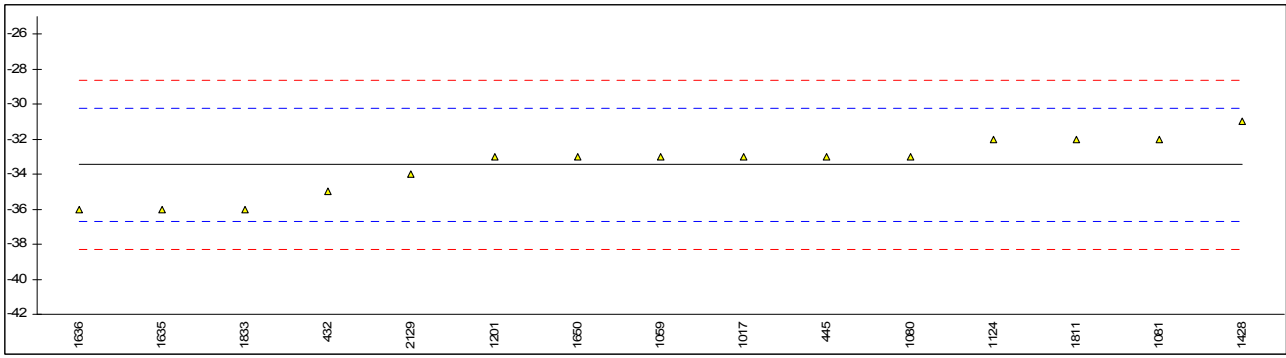
Determination of Pour Point (manual) on sample #1039; results in °C

lab	method	value	mark	z(targ)	remarks
150	D97	<-33		----	
323	D97	-33		0.47	
335		----		----	
340		----		----	
343	D97	-33		0.47	
353	D97	-33		0.47	
432	D97	-33		0.47	
444		----		----	
445	D97	-33		0.47	
463		----		----	
494	ISO3016	-33		0.47	
495	D97	-36		-0.80	
496	D97	-33		0.47	
540		----		----	
657	D97	-36		-0.80	
1011	D97	-33		0.47	
1017		----		----	
1033	IP15	>-39		----	
1047	ISO3016	-39		-2.08	
1059		----		----	
1080		----		----	
1081		----		----	
1108		----		----	
1121	IP15	-39		-2.08	
1124		----		----	
1126		----		----	
1138		----		----	
1140		----		----	
1146		----		----	
1161		----		----	
1194		----		----	
1201		----		----	
1203	ISO3016	-36		-0.80	
1205		----		----	
1218		----		----	
1259	D97	-33		0.47	
1280		----		----	
1300	D97	-30		1.74	
1406	ISO3016	<-39		----	
1407	ISO3106	-33		0.47	
1428	ISO3016	-33		0.47	
1510		----		----	
1602	ISO3016	<-35		----	
1634		----		----	
1635	D97	<-27		----	
1636		----		----	
1650		----		----	
1656	IP15	<-30	C	----	first reported -21
1706		----		----	
1724	D97	-36		-0.80	
1807	D97	<-24		----	
1810		----		----	
1811		----		----	
1833		----		----	
2129	D97	-33		0.47	
2146		----		----	
	normality	not OK			
	n	19			
	outliers	0			
	mean (n)	-34.11			
	st.dev. (n)	2.283			
	R(calc.)	6.39			
	R(D97:09)	6.60			



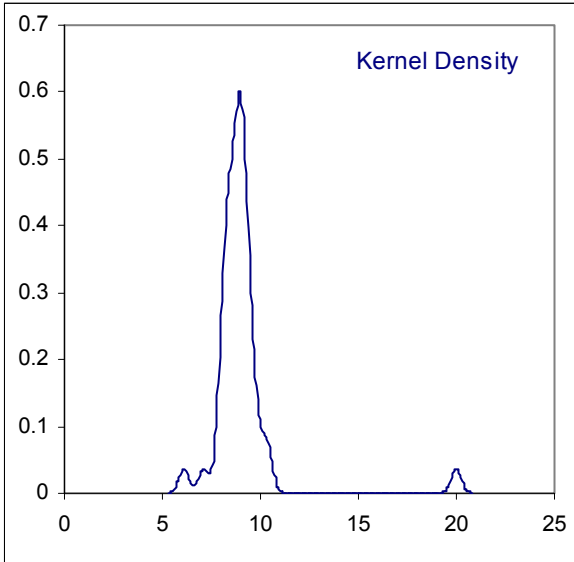
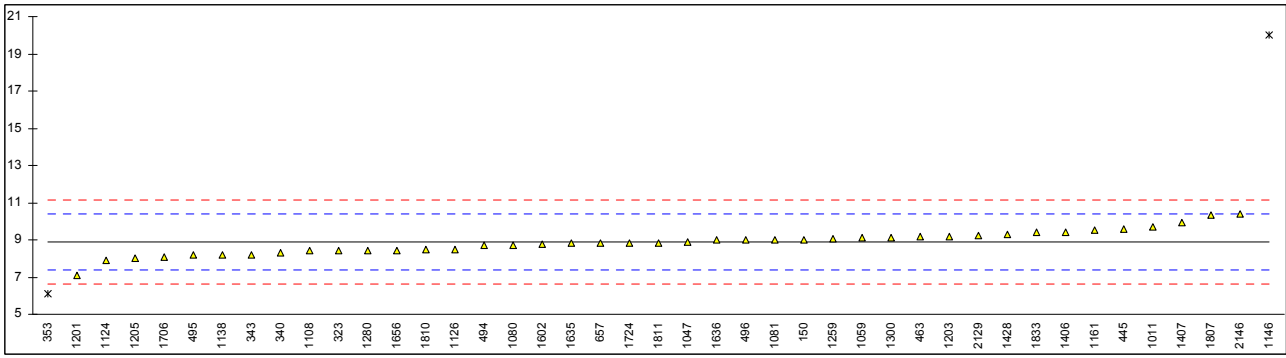
Determination of Pour Point (automated) on sample #1039; results in °C

lab	method	value	mark	z(targ)	remarks
150		----		----	
323		----		----	
335		----		----	
340		----		----	
343		----		----	
353		----		----	
432	D5950	-35		-0.95	
444		----		----	
445	D5950	-33		0.29	
463		----		----	
494		----		----	
495		----		----	
496		----		----	
540		----		----	
657		----		----	
1011		----		----	
1017	D5950	-33		0.29	
1033		----		----	
1047		----		----	
1059	ISO3016	-33		0.29	
1080	ISO3016	-33		0.29	
1081	D5950	-32		0.91	
1108		----		----	
1121		----		----	
1124	ISO3016	-32		0.91	
1126		----		----	
1138		----		----	
1140		----		----	
1146		----		----	
1161		----		----	
1194		----		----	
1201	D5950	-33		0.29	
1203		----		----	
1205		----		----	
1218		----		----	
1259		----		----	
1280		----		----	
1300		----		----	
1406		----		----	
1407		----		----	
1428	D5950	-31		1.53	
1510		----		----	
1602		----		----	
1634		----		----	
1635	D5950	-36		-1.58	
1636	D6749	-36		-1.58	
1650	D5950	-33.0		0.29	
1656		----		----	
1706		----		----	
1724		----		----	
1807		----		----	
1810		----		----	
1811	D5950	-32		0.91	
1833	D5950	-36		-1.58	
2129	D5950	-34		-0.33	
2146		----		----	
	normality	not OK			
	n	15			
	outliers	0			
	mean (n)	-33.47			
	st.dev. (n)	1.598			
	R(calc.)	4.47			
	R(D5950:07)	4.50			



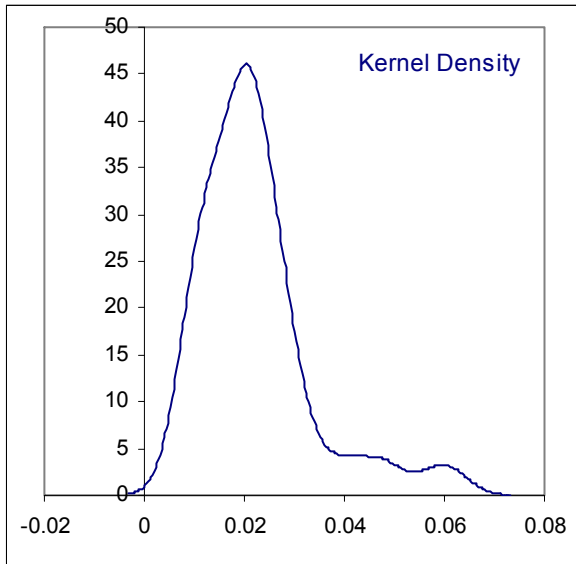
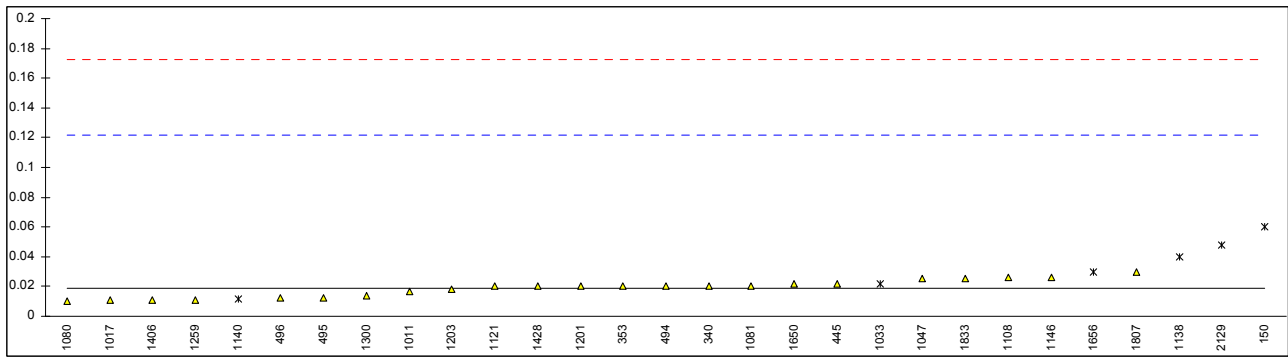
Determination of Sulphur Content on sample #1039; result in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5453	9		0.18	
323	ISO20846	8.4		-0.61	
335		----		----	
340	D5453/ISO20846	8.3		-0.75	
343	D5453/ISO20846	8.215		-0.86	
353	IP531	6.1	G(0.01)	-3.66	
432		----		----	
444		----		----	
445	IP490	9.58		0.95	
463	ISO20846	9.15		0.38	
494	D5453	8.7		-0.22	
495	ISO20846	8.19		-0.89	
496	ISO20846	9.0		0.18	
540		----		----	
657	ISO20846	8.8		-0.08	
1011	ISO20846	9.7		1.11	
1017		----		----	
1033		----		----	
1047	ISO20846	8.9		0.05	
1059	ISO20846	9.1		0.31	
1080	ISO20846	8.7		-0.22	
1081	ISO20846	9.0		0.18	
1108	D5453	8.4		-0.61	
1121		----		----	
1124	ISO20884	7.91		-1.26	
1126	ISO20864	8.5		-0.48	
1138	IP490	8.2		-0.88	
1140		----		----	
1146	XRF	20	G(0.01)	14.76	
1161	ISO20846	9.55		0.91	
1194		----		----	
1201	D5453	7.1		-2.34	
1203	ISO20846	9.2		0.45	
1205	ISO20846	8.0		-1.14	
1218		----		----	
1259	ISO20846	9.08		0.29	
1280	ISO20846	8.4		-0.61	
1300	ISO20846	9.101		0.32	
1406	ISO20846	9.43		0.75	
1407	ISO20846	9.9		1.37	
1428	ISO20846	9.3		0.58	
1510		----		----	
1602	ISO20846	8.78		-0.11	
1634		----		----	
1635	D5453/ISO20846	8.8		-0.08	
1636	D5453/ISO20846	8.98		0.15	
1650		----		----	
1656	ISO20846	8.40		-0.61	
1706	ISO20846	8.1		-1.01	
1724	ISO20846	8.81		-0.07	
1807	ISO20846	10.34		1.96	
1810	ISO20846	8.5		-0.48	
1811	D5453/ISO20846	8.85		-0.02	
1833	D5453	9.42		0.74	
2129	D5453	9.23		0.49	
2146	ISO20846	10.37		2.00	
	normality	OK			
	n	41			
	outliers	2			
	mean (n)	8.863			
	st.dev. (n)	0.6474			
	R(calc.)	1.813			
	R(ISO20846:04)	2.113			Compare R(D5453:09) = 2.978



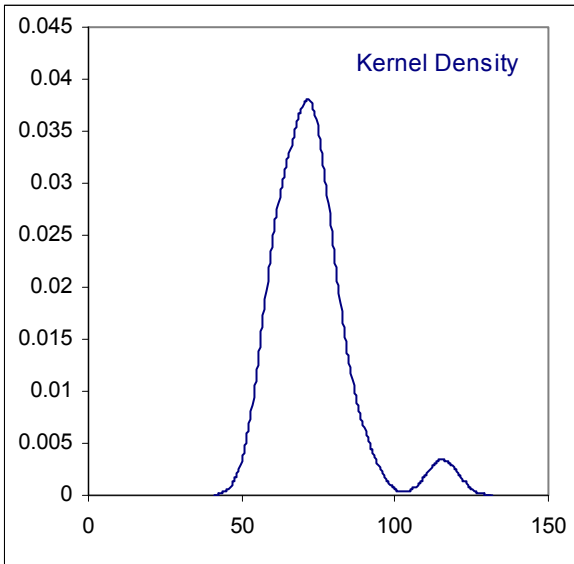
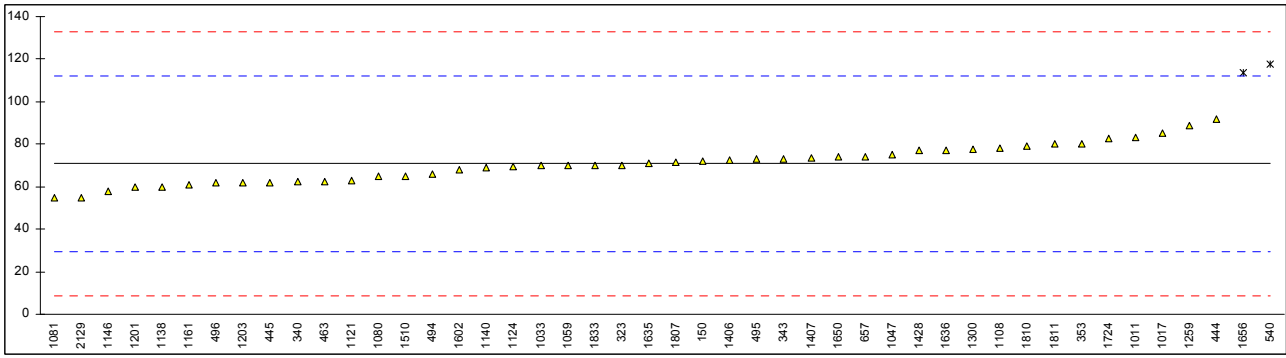
Determination of Total acid Number (TAN) on sample #1039; result in mgKOH/g

lab	method	value	mark	z(targ)	remarks
150	D664	0.06	G(0.01)	0.80	
323		----		----	
335		----		----	
340	D664	0.02		0.02	
343	D664	<0.05	C	----	first reported 0.2998
353	D664	0.020		0.02	
432		----		----	
444		----		----	
445	D664	0.022		0.06	
463		----		----	
494	D664	0.020		0.02	
495	D664	0.012		-0.13	
496	D664	0.012		-0.13	
540		----		----	
657	D664	<0.05		----	
1011	D664	0.017		-0.04	
1017	D974	0.01078		-0.16	
1033	IP974	0.022	ex	0.06	method not equivalent with ASTM D664
1047	D664	0.025		0.12	
1059	ISO6619	<0.05		----	
1080	D664	0.01		-0.17	
1081	D664	0.02		0.02	
1108	D664	0.026		0.14	
1121	IP177	0.02		0.02	
1124		----		----	
1126		----		----	
1138	D974	0.04	ex	0.41	method not equivalent with ASTM D664
1140	D3242	0.01147	ex	-0.14	method not equivalent with ASTM D664
1146	D664	0.026		0.14	
1161		----		----	
1194		----		----	
1201	D664	0.02		0.02	
1203	D664	0.018		-0.02	
1205		----		----	
1218		----		----	
1259	D664	0.0112		-0.15	
1280		----		----	
1300	D664	0.01406		-0.09	
1406	D664	0.0109		-0.15	
1407		----		----	
1428	D664	0.020		0.02	
1510		----		----	
1602		----		----	
1634		----		----	
1635		----		----	
1636		----		----	
1650	D664	0.022		0.06	
1656	IP139	0.03	ex	0.22	method not equivalent with ASTM D664
1706		----		----	
1724		----		----	
1807	D664	0.030		0.22	
1810		----		----	
1811		----		----	
1833	D664	0.0256		0.13	
2129	D664	0.048	G(0.05)	0.57	
2146		----		----	
	normality	not OK			
	n	23			
	outliers	2			
	mean (n)	0.01880			
	st.dev. (n)	0.005741			
	R(calc.)	0.01607			
	R(D664B:09a)	0.14365			



Determination of Water on sample #1039; result in mg/kg

lab	method	value	mark	z(targ)	remarks
150	EN12937	72		0.06	
323	D6304	70		-0.04	
335		----		----	
340	D6304/EN12937	62.3		-0.41	
343	D6304/EN12937	73.25		0.12	
353	IP439	80		0.44	
432		----		----	
444	EN12937	92		1.03	
445	IP438	62.1		-0.42	
463	EN12937	62.5		-0.40	
494	EN12937	66		-0.23	
495	EN12937	73		0.11	
496	EN12937	62		-0.43	
540	EN12937	117.5	G(0.01)	2.26	
657	EN12937	74		0.15	
1011	EN12937	83		0.59	
1017	D6304/EN12937	85		0.69	
1033	IP438	69.965		-0.04	
1047	EN12937	75		0.20	
1059	EN12937	70		-0.04	
1080	EN12937	65		-0.28	
1081	D6304	55		-0.77	
1108	EN12937	78		0.35	
1121	IP438	62.9		-0.38	
1124	EN12937	69.6		-0.06	
1126		----		----	
1138	IP438	60		-0.52	
1140	IP438	69		-0.09	
1146	D6304	58		-0.62	
1161	EN12937	61		-0.47	reported in deviating unit: 0.0061
1194		----		----	
1201	EN12937	60		-0.52	
1203	EN12937	62		-0.43	
1205		----		----	
1218		----		----	
1259	EN12937	89.0		0.88	
1280		----		----	
1300	EN12937	77.584		0.33	
1406	EN12937	72.5		0.08	
1407	EN12937	73.5		0.13	
1428	EN12937	77		0.30	
1510	IP438	65		-0.28	
1602	EN12937	68.0		-0.14	
1634		----		----	
1635	EN12937	71.2		0.02	
1636	D6304	77.03		0.30	
1650	IP438	74		0.15	
1656	IP438	113.48	G(0.01)	2.06	
1706		----		----	
1724	EN12937	82.8		0.58	
1807	EN12937	71.57		0.04	
1810	EN12937	79		0.40	
1811	D6304/EN12937	80		0.44	
1833	D6304	70		-0.04	
2129	IP439	55		-0.77	
2146		----		----	
	normality	OK			
	n	44			
	outliers	2			
	mean (n)	70.814			
	st.dev. (n)	8.7340			
	R(calc.)	24.455			
	R(EN12937:00)	57.871			



Determination of Distillation (Automated & Manual) on sample #1039; result in °C

Lab	method	IBP	mark	10%rec	mark	50%rec	mark	90%rec	mark	95%rec	mark
150	D86-A	171.8		218.4		278.7		338.7		350.7	
323	D86-A	169.4		214.7		277.8		340.6		355.2	
335		----		----		----		----		----	
340	D86-A	172.6		214.5		279.0		341.3		353.2	
343	D86-A	174.8	C	217.6		279.0		339.4		350.7	
353	IP123-A	162.4		214.2		278.5		342.1		355.0	
432		----		----		----		----		----	
444		----		----		----		----		----	
445	IP123-A	179.8		219.3		278.6		339.6		352.2	
463	ISO3405-A	167.4		216.7		279.1		342.7		356.5	
494	D86-A	171.1		215.3		276.5		338.2		349.4	
495	ISO3405-A	171.3		216.2		277.9		339.9		352.5	
496	ISO3405	169.2		215.2		278.2		341.5		355.7	
540		----		----		----		----		----	
657	ISO3405-A	173.2		218.7		278.8		338.9		350.4	
1011	ISO3405-A	173.4		216.3		278.0		340.0		351.7	
1017	D86-A	172.8		217.2		278.1		339.1		352.3	
1033	IP123-A	174.4		215.7		278.5		341.3		353.7	
1047	ISO3405-A	170.0		213.6		277.2		341.8		353.9	
1059	ISO3405-A	172.8		213.4		277.5		339.0		350.6	
1080	ISO3405-A	175.2		214.7		277.3		340.6		353.8	
1081	D86-A	174.7		216.8		278.8		339.8		----	
1108	D86-A	174.2		216.9		278.2		339.5		349.9	
1121	IP123-M	165.0		215.0		277.0		340.0		350.0	
1124	ISO3405-A	169.5		215.5		277.5		339.5		352.0	
1126	in house-A	172.0		215.2		275.4		340.0		365.2	G(0.01)
1138	IP123-A	173.7		215.0		278.7		341.5		355.6	
1140	D86-A	170.1		214.9		276.1		337.9		348.9	
1146		----		----		----		----		----	
1161	ISO3405-A	168.10		217.47		277.40		341.30		351.70	
1194		----		----		----		----		----	
1201	D86-A	167.3		214.4		277.6		340.8		352.6	
1203	ISO3405-A	173.3		214.4		278.2		340.4		352.2	
1205	D86-A	172.8		216.8		279.1		339.6		352.9	
1218		----		----		----		----		----	
1259	ISO3405-A	166.7		216.6		278.7		340.5		352.5	
1280		----		----		----		----		----	
1300	ISO3405-A	170.4		219.7		279.2		343.4		356.9	
1406	ISO3405-A	178.4		216.9		277.5		337.9		349.1	
1407	ISO3405-A	185.7	G(0.05)	216.5		278.4		338.3		349.1	
1428	ISO3405-A	173.7		216.4		279.0		339.5		351.6	
1510	D86-A	177.6		217.2		277.8		340.7		352.8	
1602	ISO3405-A	172		216.8		278.7		339.7		351.9	
1634	D86-A	168.5		217.7		277.1		338.7		350.3	
1635	D86-M	172.0		211.0		278.0		341.0		353.0	
1636	D86-A	164.2		213.4		278.6		342.4		355.3	
1650	D86-A	170.6		212.1		277.9		341.6		355.2	
1656	IP123-A	160.0	C	213.0		276.6		340.0		352.1	
1706	ISO3405-A	172.5		215.3		279.0		341.0		353.6	
1724	ISO3405	170.5		215.8		280.1		341.7		354.0	
1807	ISO3405-A	168.6		207.9	G(0.01)	275.8		339.9		349.9	
1810	ISO3405-A	166.3		215.7		277.0		338.5		348.5	
1811	D86-A	163.0		216.9		277.0		340.4		352.1	
1833	D86-A	170.7		213.7		277.6		341.2		353.7	
2129	IP123-M	166.3	C	213.4	C	277.7	C	340.5	C	353.7	C
2146	ISO3405-A	173.1		215.2		278.4		342.4		355.3	
	normality	OK		OK		OK		OK		OK	
	n	47		47		48		48		46	
	outliers	1		1		0		0		1	
	mean (n)	170.796		215.689		277.975		340.298		352.476	
	st.dev. (n)	4.05446		1.8083		0.9580		1.3052		2.1508	
	R(calc.)	11.352		5.063		2.682		3.655		6.022	
	R(target*)	9.394		4.745		2.970		5.104		8.981	

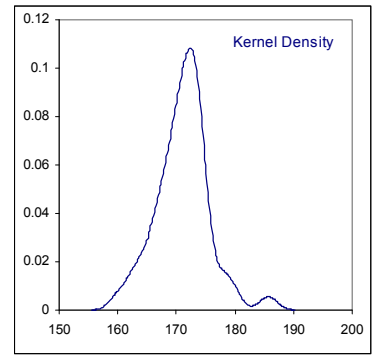
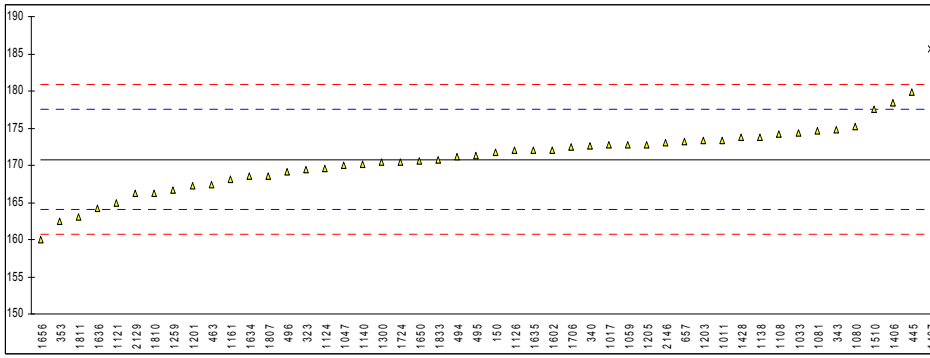
* target reproducibility from ISO/DIS 3405:2009 (identical to ASTM D86:2009e1)

Originally reported results:

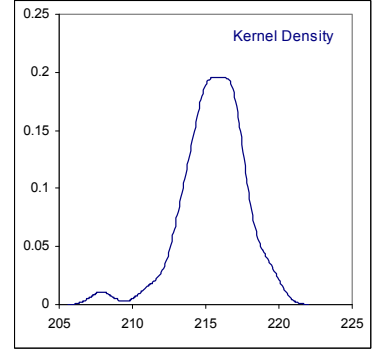
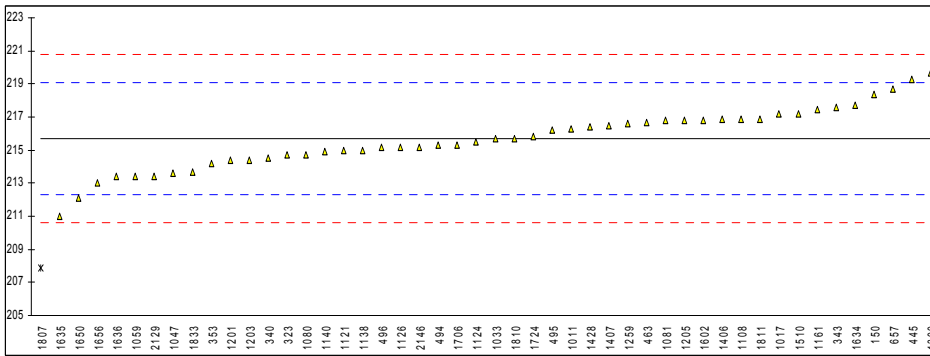
lab 343: ibp: 180.3°C

lab 1656: ibp: 159.2°C

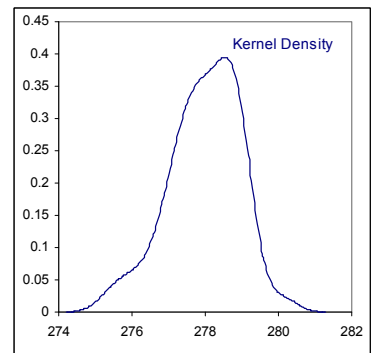
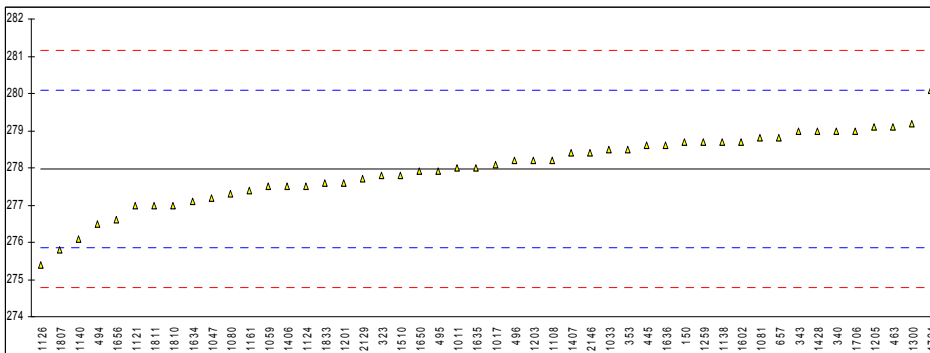
lab 2129: all results: 167.7°C, 225.1°C, 289.7°C, 354.9°C, 367.5°C



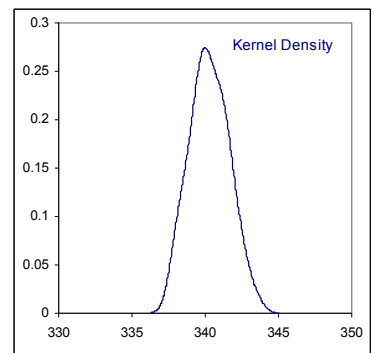
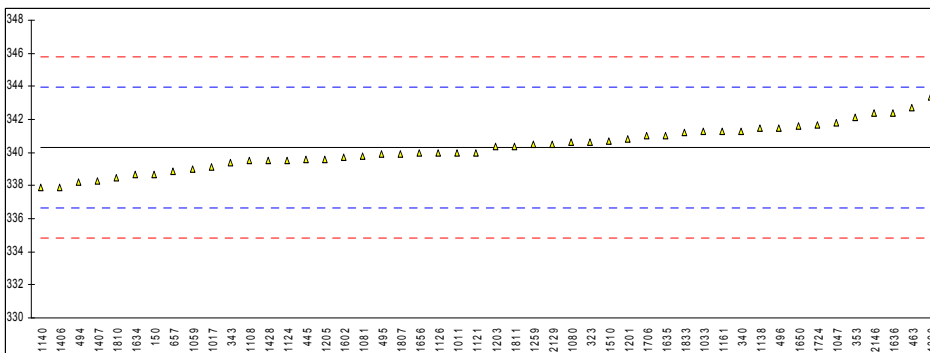
ibp



10% rec.



50% rec.



90% rec.

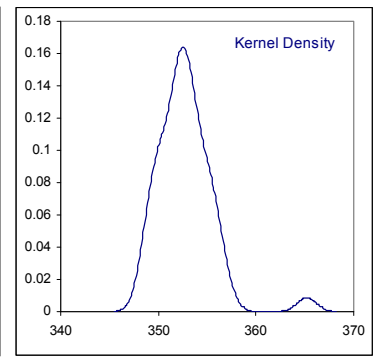
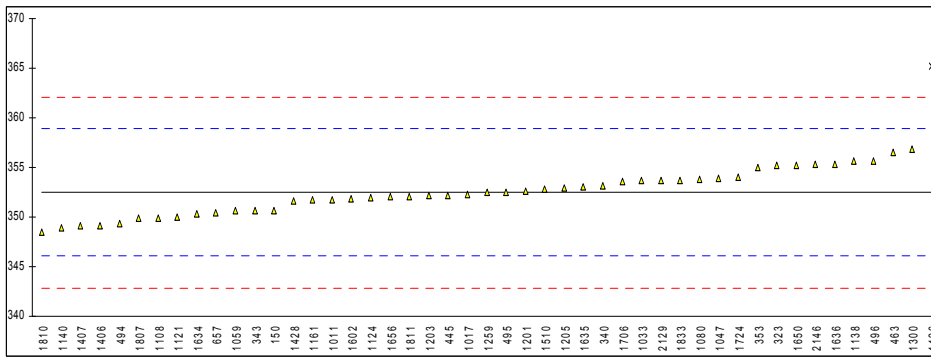
Determination of Distillation (Automated+Manual) on sample #1039; result in %V/V, (continued)

Lab	method	Volume at 250°C	mark	z(targ)	Volume at 350°C	mark	z(targ)	%residue	mark
150		----		----			----	1.9	
323	D86-A	30.7		-0.06	93.7		-0.63	1.6	
335		----		----			----	----	
340	D86-A	31.4		0.68	94.6		0.32	1.4	
343	D86-A	29.0		-1.85	95.2	C	0.95	1.2	
353	IP123-A	31.1		0.36	93.5		-0.84	1.4	
432		----		----			----	----	
444		----		----			----	----	
445	IP123-A	30.5		-0.27	94.4		0.11	1.6	
463	ISO3405-A	29.9		-0.90	93.1		-1.26	1.8	
494	D86-A	31.5		0.78	95.1		0.84	1.5	
495	ISO3405-A	30.9		0.15	94.3		0.00	1.4	
496	ISO3405	30.6		-0.16	93.3		-1.05	1.4	
540		----		----			----	----	
657	ISO3405-A	29.9		-0.90	94.8		0.53	1.2	
1011	ISO3405-A	30.1		-0.69	94.5		0.21	0.5	
1017	D86-A	30.2		-0.58	94.4		0.11	1.6	
1033	IP123-A	30.4		-0.37	93.8		-0.52	1.2	
1047	ISO3405-A	31.1		0.36	93.6		-0.73	1.8	
1059	ISO3405-A	30.9		0.15	94.8		0.53	1.8	
1080	ISO3405-A	31.6		0.89	93.9		-0.42	1.5	
1081	D86-A	30.2		-0.58	91.3	G(0.01)	-3.16	1.3	
1108	D86-A	30.2		-0.58	95.1		0.84	----	
1121	IP123-M	32		1.31	95		0.74	2.0	
1124	ISO3405-A	31.0		0.26	94.2		-0.10	2.2	
1126	in house-A	31.8		1.10	93.7		-0.63	----	
1138	IP123-A	31.2		0.47	94.4		0.11	1.0	
1140	D86-A	31.7		0.99	95.2		0.95	1	
1146		----		----			----	----	
1161	ISO3405-A	30.80		0.05	94.40		0.11	1.50	
1194		----		----			----	----	
1201	D86-A	31.1		0.36	94.2		-0.10	1.2	
1203	ISO3405-A	30.9		0.15	94.3		0.00	1.6	
1205	D86-A	31.1		0.36	95.3	C	1.05	1.4	
1218		----		----			----	----	
1259	ISO3405-A	30.6		-0.16	94.2		-0.10	1.4	
1280		----		----			----	----	
1300	ISO3405-A	28.8		-2.06	93.0		-1.37	1.8	
1406	ISO3405-A	30.6		-0.16	95.3		1.05	1.3	
1407	ISO3405-A	30.2		-0.58	95.3		1.05	1.3	
1428	ISO3405-A	29.8		-1.01	94.5		0.21	1.7	
1510	D86-A	31.0		0.26	94.1		-0.21	0.9	
1602	ISO3405-A	30.3		-0.48	94.4		0.11	1.9	
1634	D86-A	31.2		0.47	94.9		0.63	1.3	
1635	D86-M	30.0		-0.80	94.0		-0.31	1.3	
1636	D86-A	31.1		0.36	93.6		-0.73	1.5	
1650	D86-A	31.3		0.57	93.6		-0.73	1.4	
1656	IP123-A	31.3		0.57	94.3		0.00	1.2	
1706	ISO3405-A	30.3		-0.48	94.0		-0.31	1.4	
1724	ISO3405	29.6		-1.22	93.7		-0.63	1.6	
1807	ISO3405-A	32.6		1.94	95.0		0.74	1.0	
1810	ISO3405-A	32		1.31	95.4		1.16	1	
1811	D86-A	30.0		-0.80	94.5		0.21	1	
1833	D86-A	31.5		0.78	93.9		-0.42	1.8	
2129	IP123-M	30.8	C	0.05	93.9	C	-0.42	1.8	C
2146	ISO3405-A	30.7		-0.06	93.3		-1.05	2.7	
	normality	OK		OK					
	n	47		46					
	outliers	0		1					
	mean (n)	30.755		94.298					
	st.dev. (n)	0.7604		0.6413					
	R(calc.)	2.129		1.796					
	R(target*)	2.660		2.660					

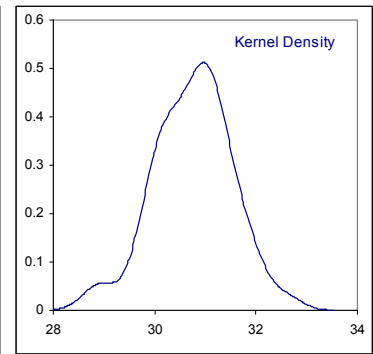
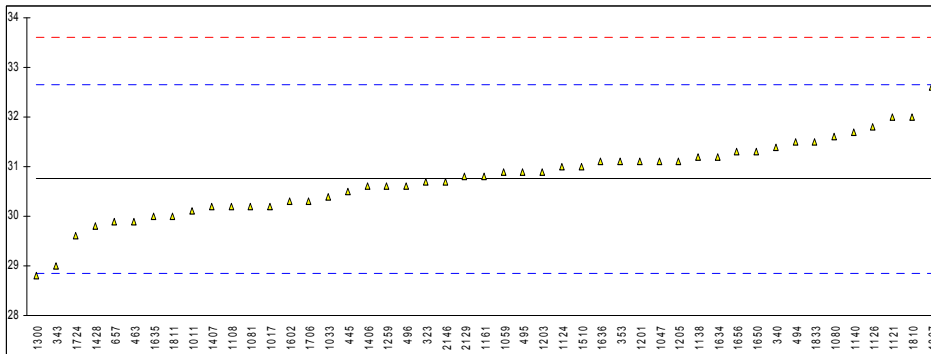
* target reproducibility from ISO/DIS 3405:2009 (identical to ASTM D86:2009e1)

Originally reported results:

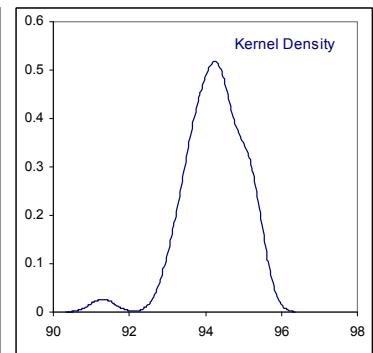
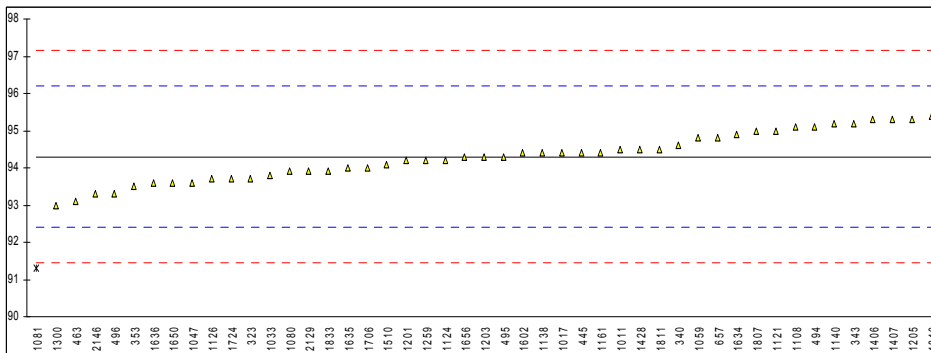
lab 343: volume @ 350°C: 50.0%V/V
lab 1205: volume @ 350°C: 348.9%V/V
lab 2129: all results: 24.8%V/V, 88.3%V/V, 1.1%V/V



95% rec.



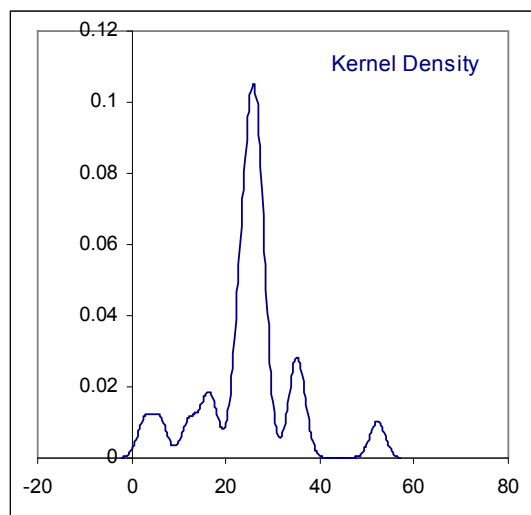
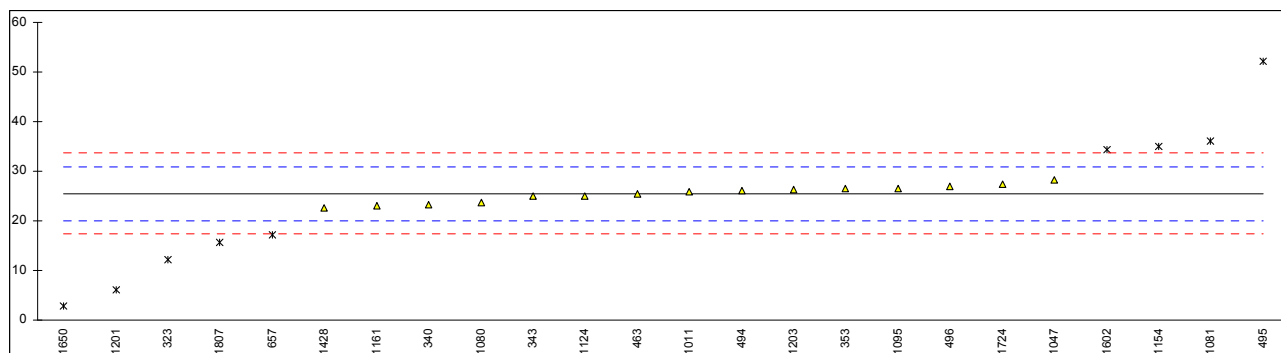
volume@250°C



volume@350°C

Determination of Total Contamination on sample #1040; result in mg/kg

lab	method	value	mark	z(targ)	remarks
323	EN12662:08	12.2	ex	-4.87	see §4.1
340	EN12662:98	23.3		-0.80	
343	EN12662:08	25.025		-0.17	
353	EN12662:08	26.46		0.36	
445		-----		-----	
463	D6217	25.36		-0.05	
494	EN12662:08	26.1		0.22	
495	EN12662:08	52.26	G(0.01)	9.80	
496	EN12662:08	27.0		0.55	
657	EN12662	17.2	ex	-3.04	see §4.1
1011	EN12662:08	25.8		0.11	
1047	EN12662:08	28.36		1.05	
1059	EN12662:08	>30.0		>1.65	
1080	EN12662:08	23.8		-0.62	
1081	EN12662	36	DG(0.05)	3.85	
1095	EN12662:08	26.6		0.41	
1124	EN12662:08	25.06		-0.16	
1138		-----		-----	
1154	EN12662:08	35.09	DG(0.05)	3.52	
1161	EN12662	23.07		-0.89	
1201	EN12662:08	6	ex	-7.14	see §4.1
1203	EN12662	26.4		0.33	
1428	EN12662	22.6		-1.06	
1602	EN12662:08	34.40	G(0.01)	3.26	
1650	EN12662:98	2.79	ex	-8.31	see §4.1
1724	EN12662:08	27.4		0.70	
1807	EN12662:08	15.67	ex	-3.60	see §4.1
normality		OK			
n		15			
outliers		9			
mean (n)		25.489	spike 25.2 mg/kg		
st.dev. (n)		1.6885			
R(calc.)		4.728			
R(EN12662:08)		7.647			



APPENDIX 2

Z-scores Distillation

lab	IBP	10%	50%	90%	95%	vol @250°C	vol @350°C
150	0.30	1.60	0.68	-0.88	-0.55	----	----
323	-0.42	-0.58	-0.16	0.17	0.85	-0.06	-0.61
335	----	----	----	----	----	----	----
340	0.54	-0.70	0.97	0.55	0.23	0.68	0.34
343	1.19	1.13	0.97	-0.49	-0.55	-1.85	-46.61
353	-2.50	-0.88	0.49	0.99	0.79	0.36	-0.82
432	----	----	----	----	----	----	----
444	----	----	----	----	----	----	----
445	2.68	2.13	0.59	-0.38	-0.09	-0.27	0.13
463	-1.01	0.60	1.06	1.32	1.25	-0.90	-1.24
494	0.09	-0.23	-1.39	-1.15	-0.96	0.78	0.87
495	0.15	0.30	-0.07	-0.22	0.01	0.15	0.02
496	-0.48	-0.29	0.21	0.66	1.01	-0.16	-1.03
540	----	----	----	----	----	----	----
657	0.72	1.78	0.78	-0.77	-0.65	-0.90	0.55
1011	0.78	0.36	0.02	-0.16	-0.24	-0.69	0.23
1017	0.60	0.89	0.12	-0.66	-0.05	-0.58	0.13
1033	1.07	0.01	0.49	0.55	0.38	-0.37	-0.50
1047	-0.24	-1.23	-0.73	0.82	0.44	0.36	-0.71
1059	0.60	-1.35	-0.45	-0.71	-0.58	0.15	0.55
1080	1.31	-0.58	-0.64	0.17	0.41	0.89	-0.40
1081	1.16	0.66	0.78	-0.27	----	-0.58	-3.13
1108	1.01	0.71	0.21	-0.44	-0.80	-0.58	0.87
1121	-1.73	-0.41	-0.92	-0.16	-0.77	1.31	0.76
1124	-0.39	-0.11	-0.45	-0.44	-0.15	0.26	-0.08
1126	0.36	-0.29	-2.43	-0.16	3.97	1.10	-0.61
1138	0.87	-0.41	0.68	0.66	0.97	0.47	0.13
1140	-0.21	-0.47	-1.77	-1.32	-1.11	0.99	0.97
1146	----	----	----	----	----	----	----
1161	-0.80	1.05	-0.54	0.55	-0.24	0.05	0.13
1194	----	----	----	----	----	----	----
1201	-1.04	-0.76	-0.35	0.28	0.04	0.36	-0.08
1203	0.75	-0.76	0.21	0.06	-0.09	0.15	0.02
1205	0.60	0.66	1.06	-0.38	0.13	0.36	1.08
1218	----	----	----	----	----	----	----
1259	-1.22	0.54	0.68	0.11	0.01	-0.16	-0.08
1280	----	----	----	----	----	----	----
1300	-0.12	2.37	1.15	1.70	1.38	-2.06	-1.35
1406	2.27	0.71	-0.45	-1.32	-1.05	-0.16	1.08
1407	4.44	0.48	0.40	-1.10	-1.05	-0.58	1.08
1428	0.87	0.42	0.97	-0.44	-0.27	-1.01	0.23
1510	2.03	0.89	-0.16	0.22	0.10	0.26	-0.19
1602	0.36	0.66	0.68	-0.33	-0.18	-0.48	0.13
1634	-0.68	1.19	-0.82	-0.88	-0.68	0.47	0.65
1635	0.36	-2.77	0.02	0.39	0.16	-0.80	-0.29
1636	-1.97	-1.35	0.59	1.15	0.88	0.36	-0.71
1650	-0.06	-2.12	-0.07	0.71	0.85	0.57	-0.71
1656	-3.22	-1.59	-1.30	-0.16	-0.12	0.57	0.02
1706	0.51	-0.23	0.97	0.39	0.35	-0.48	-0.29
1724	-0.09	0.07	2.00	0.77	0.48	-1.22	-0.61
1807	-0.65	-4.60	-2.05	-0.22	-0.80	1.94	0.76
1810	-1.34	0.01	-0.92	-0.99	-1.24	1.31	1.18
1811	-2.32	0.71	-0.92	0.06	-0.12	-0.80	0.23
1833	-0.03	-1.17	-0.35	0.49	0.38	0.78	-0.40
2129	-1.34	-1.35	-0.26	0.11	0.38	0.05	-0.40
2146	0.69	-0.29	0.40	1.15	0.88	-0.06	-1.03

APPENDIX 3

Number of participants per country

1 lab in ARGENTINA
2 labs in AUSTRIA
3 labs in BELGIUM
1 lab in BULGARIA
2 labs in CROATIA
1 lab in CYPRUS
2 labs in CZECH REPUBLIC
1 lab in ESTONIA
1 lab in FINLAND
2 labs in FRANCE
3 labs in GERMANY
3 labs in GREECE
2 labs in HUNGARY
2 labs in IRELAND
1 lab in LATVIA
2 labs in POLAND
2 labs in PORTUGAL
2 labs in REPUBLIC OF MACEDONIA
1 lab in SINGAPORE
1 lab in SLOVENIA
2 labs in SPAIN
1 lab in SWEDEN
4 labs in THE NETHERLANDS
4 labs in TURKEY
1 lab in U.S.A.
9 labs in UNITED KINGDOM

APPENDIX 4**Abbreviations:**

C	= final result after checking of first reported suspect 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
ex	= excluded from calculations
E	= error in calculations
n.a.	= not applicable
W	= result withdrawn
SDS	= Safety Data Sheet

Literature:

- 1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, January 2010
- 2 ASTM E178-02
- 3 ASTM E1301-03
- 4 ISO 5725-86
- 5 ISO 5725, parts 1-6, 1994
- 6 ISO13528-05
- 7 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
- 8 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
- 9 IP 367/84
- 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, No4 January 2001
- 14 The Royal Society of Chemistry 2002, Analyst 2002, 127 page1359-1364, P.J. Lowthian and M. Thompson. (see <http://www.rsc.org/suppdata/an/b2/b205600n/>)