

Results of Proficiency Test  
Gasoil B10 (10% FAME)  
April 2012

Organised by: Institute for Interlaboratory Studies  
Spijkenisse, the Netherlands

Authors: ing. L. Dijkstra  
Correctors: dr. R.G. Visser & ing. R.J. Starink  
Report: iis12G03

July 2012

**CONTENTS**

1	INTRODUCTION.....	3
2	SET UP.....	3
2.1	ACCREDITATION.....	3
2.2	PROTOCOL.....	3
2.3	CONFIDENTIALITY STATEMENT.....	3
2.4	SAMPLES.....	4
2.5	STABILITY OF THE SAMPLES.....	5
2.6	ANALYSES.....	5
3	RESULTS.....	5
3.1	STATISTICS.....	5
3.2	GRAPHICS.....	6
3.3	Z-SCORES.....	6
4	EVALUATION.....	8
4.1	EVALUATION PER TEST.....	8
4.2	PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES.....	12
4.3	COMPARISON OF THE PROFICIENCY TEST OF APRIL 2012 WITH PREVIOUS PTS.....	13

## Appendices:

1.	Data, statistical results and graphic results.....	14
2.	z-Scores of the distillation.....	61
3.	Number of participants per country.....	62
4.	Abbreviations and literature.....	63

## **1 INTRODUCTION**

Since 2005, the Institute for Interlaboratory Studies organizes a proficiency test for automotive diesel containing 5 -10% FAME, according to EN590 and ASTM D7467 every year. In this interlaboratory study on gasoil B10, 60 laboratories from 30 countries have participated. See appendix 3 for the number of participating laboratories per country. In this report, the results of the Gasoil B10 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 gasoil B10 according the (different) test scopes of both EN590:09 and ASTM D7467:10. It was decided to send one 0.5 litre and one 1 litre bottle of Gasoil B10 (both labelled #12060), and separately, one 1 litre bottle Gasoil (labelled #12061) specially for Total Contamination. 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 the statistical evaluation.

### **2.1 ACCREDITATION**

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in accordance with ISO/IEC17043:2010 and ILAC-G13:2007, (R007), since January 2000, by the Dutch Accreditation Council: RvA (Raad voor Accreditatie). 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 January 2010 (iis-protocol, version 3.2). This protocol can be downloaded from the iis website <http://www.iisnl.com>.

### **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 with less than 0.5% FAME) was purchased from a local Gasoil producer. To 200 litre of the bulk material 20 litre of pure FAME (B100) was added to increase the FAME content upto 10%.

After homogenization, 103 subsamples were transferred to 1 litre brown glass bottles and labelled #12060. Another 96 bottles of 500 mL (also labelled #12060) were subsequently filled and another 50 bottles of one litre (labelled #12061) were filled with approx. 850 mL of material specially for Total Contamination.

The homogeneity of the subsamples #12060 (1 litre + ½ L) was checked by determination of Density in accordance with ISO12185:96.

	<i>Density @ 15 °C in kg/m<sup>3</sup></i>
sample #12060-1	836.49
sample #12060-2	836.49
sample #12060-3	836.49
sample #12060-4	836.49
sample #12060-5	836.49
sample #12060-6	836.49
sample #12060-7	836.49
sample #12060-8	836.49

table 1: homogeneity test results of subsamples #12060

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:

	<i>Density @ 15 °C in kg/m<sup>3</sup></i>
r (sample #12060)	0.00
reference test	ISO12185:96
0.3 x R(reference test)	0.15

table 2: repeatability of the subsamples #12060

The calculated repeatability was less than 0.3 times the respective reproducibility of the reference method. Therefore, homogeneity of the subsamples #12060 was assumed.

For Total Contamination, each bottle (labelled #12061) was spiked with 1 ml of a freshly prepared and ultrasonically homogenized, 8.08 g/kg particulate quartz material BCR-067 (Ø 2.4-32 µm) in oil suspension. The homogeneity was checked by weighing the bottles before and after addition of the spike.

Two bottles (1x1L + 1x0.5L, labelled #12060) and/or one bottle of 1L, labelled #12061 were sent to the participating laboratories on April 18, 2012.

## 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 Indices D976 and ISO4264, Cloud Point, Cold Filter Plugging Point, Conradson Carbon Residue on 10% Residue (ISO10370 and D524), Copper Corrosion, Density @ 15°C, Distillation, FAME, Flash Point PMcc, Kinematic Viscosity @40°C, Lubricity by HFRR @60°C, Oxidation Stability EN 15751 and ISO12205, Polycyclic Aromatic Hydrocarbons, Pour Point (manual and automated), 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 subsequently submitted 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.

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 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 4; 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.

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 the fit-for-useness of the reported test result.

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 proficiency test some problems with couriers and/or custom clearance were encountered during the execution. In total 12 participants reported test results after the final reporting date. All laboratories except 3 reported test results, but not all laboratories were able to perform all analyses requested. Finally, 57 participants reported in total 1197 numerical test results. Observed were 33 outlying results, which is 2.8%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

Not all original data sets proved to have a normal distribution. Non-Gaussian distributions were found for Ash Content, Cetane Index ISO4264, Cloud Point, Cold Filter Plugging Point, Density, Distillation 90% rec, Kinematic Viscosity, Polycyclic Aromatic Hydrocarbons, Pour Point (manual and automated), TAN and Water. 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, except 2, agreed that the ash content was equal or less than 0.001 %M/M.

Aromatics (FIA): This determination may be very problematic. One statistical outlier was observed. The calculated reproducibility is not at all in agreement with ASTM D1319:10, but the precision and bias of D1319:10 with biodiesel blends is not known and is currently under investigation, see paragraph X1.11.1 of ASTM D7467:10.

C.I. D976: This determination was not problematic. No statistical outliers were observed. And the calculated reproducibility is in good agreement with the requirements of ASTM D976:06. One laboratory used ASTM D4737. This test result was excluded from statistical evaluation because ASTM D4737 is not equal to ASTM D976.

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 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.



- Cloud Point: This determination was not problematic. Only one statistical outlier was observed. The calculated reproducibility, after rejection of the statistical outlier, is in agreement with the requirements of EN23015:94 and of ASTM D2500:11.
- CFPP: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility, after rejection of the statistical outliers is in agreement with the requirements of EN116:97 and of IP309:99.
- CCR 10% res.: No significant conclusions were drawn as the carbon residue content was below the application range of the reference method. All participants agreed that Conradson Carbon Residue was near or less than 0.1 %M/M.
- Ramsbottom.: Only four laboratories reported a test result. The test results vary over a wide range (0.0049 – 0.10 %M/M). Therefore no significant conclusions were drawn.
- Copper Corr.: No problems were observed, almost participants agreed on a result of 1 or 1A. Only one participant reported Copper Corrosion as 1B.
- Density @15°C: This determination was not problematic. No statistical outlier was observed. And the calculated reproducibility is in good agreement with the requirements of ISO12185:96 and of ASTM D4052:11.
- FAME: 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 EN14078:09.
- Flash Point: This determination was not problematic. Only one statistical outlier was observed. The calculated reproducibility, after rejection of the statistical outlier, is in agreement with the requirements of ISO2719:02 and also in agreement with the requirements of ASTM D93A:11.
- Kin. Visc. 40°C: This determination was problematic. Three statistical outliers were observed. And the calculated reproducibility, after rejection of the statistical outliers, is not in agreement with the requirements of ISO3104:96 and also not in agreement with the requirements of ASTM D445:11.
- Lubricity: This determination was not problematic. Only one statistical outlier was observed. However, the calculated reproducibility, after rejection of the statistical outlier, is in good agreement with the requirements of ISO12156-1:06 and in agreement with the requirements of ASTM D6079:11.

Ox. Stab. EN15751: This determination was very problematic. One statistical outlier was observed. The calculated reproducibility, after rejection of the statistical outlier, is not at all in agreement with the requirements of EN15751:09.

Ox. Stab. ISO12205: 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 ISO12205:95.

PAH: This determination was problematic. Only one statistical outlier was observed. However, the calculated reproducibility, after rejection of the statistical outlier, is not in agreement with the requirements of EN12916:06.

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

Pour Point (A): This determination was not problematic. Only one statistical outlier was observed. And the calculated reproducibility after rejection of the statistical outlier, is in agreement with the requirements of ASTM D5950:07. Remarkably two laboratories reported to have used ASTM D97:09, which is a manual test method. These results were excluded from the statistical evaluation and these test results were evaluated under the manual method.

Sulphur: This determination was not problematic. No statistical outliers were observed. And the calculated reproducibility, is in agreement with the requirements of ISO20846:11 and of ASTM D5453:09.

TAN: This determination was not problematic. Only one statistical outlier was observed. However, the calculated reproducibility, after rejection of the statistical outlier, is in agreement with the requirements of ASTM D664:11.  
Nine laboratories used test method ASTM D974. These D974 test results were excluded from the statistical evaluation because ASTM D974 is not technically equivalent to ASTM D664.

Water: This determination was not problematic. Only one statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier, is in agreement with the requirements of EN12937:00.

Distillation: As only eight laboratories reported results from a manual distillation, these results are listed and evaluated together with the results of the automated distillation. Only the 10% recovery point was problematic. In total five statistical outliers were observed and the calculated reproducibilities of ibp, 50% rec., 90% rec., 95% rec, FBP, vol @250° and vol @350°, after

rejection of the statistical outliers, are all agreement with the requirements of ISO3405:11 (auto) and of ASTM D86:11 (auto).

Total Contamination: The samples were spiked with a freshly prepared and well shaken suspension of particulate quartz material ( $\varnothing$  2.4-32  $\mu\text{m}$ ) in oil. The Total Contamination concentration of the gasoil after spiking is 9.9 mg/kg. Surprisingly, the average concentration found by the participants was 57.8 mg/kg.

Serious analytical problems have been observed. Six statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers, is in not agreement with the requirements of EN12662:08.

The participants were asked to provide the version of the used method. Sixteen laboratories used EN12662:2008 and only three participants used EN12662:1998. Ten laboratories did not report the version of the used method.

Three laboratories reported that the filter was blocked after a certain amount of sample and one laboratory reported that the sample was not filterable at all. No correlation is visible between the quality of the test result and the version of EN12662 that was used.

## 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	18	0.0007	0.0011	(0.0050) *
Aromatics by FIA	%V/V	13	23.95	11.27	unknown
Cetane Index D976		25	53.77	0.55	2.00
Cetane Index ISO4264		40	53.86	1.07	unknown
Cloud Point	°C	44	-8.58	2.41	4.00
Cold Filter Plugging Point	°C	43	-16.7	2.5	4.3
CCR on 10% residue	%M/M	28	0.043	0.050	(0.030) *
Ramsbottom CR on 10% residue	%M/M	4	0.07	n.a	n.a
Copper Corrosion 3hrs @ 50°C		47	1A	n.a	n.a
Density @ 15°C	kg/m <sup>3</sup>	54	836.46	0.24	0.50
Fatty Acid Methyl Ester	%V/V	45	9.22	0.86	0.69
Flash Point PMcc	°C	53	64.38	3.23	4.57
Kinematic Viscosity @ 40°C	mm <sup>2</sup> /s	46	2.7916	0.0243	0.0311
Lubricity	µm	39	186.6	51.0	102.0
Oxidation Stability EN15751	hrs	21	61.96	30.95	12.17
Oxidation Stability ISO12205	g/m <sup>3</sup>	15	2.90	6.13	7.78
Polycyclic Aromatic Hydrocarbons	%M/M	28	2.79	1.17	0.98
Pour Point (manual)	°C	21	-22.90	5.52	6.60
Pour Point (automated)	°C	26	-21.42	3.47	4.50
Sulphur	mg/kg	44	7.08	2.06	2.76
Total Acid Number	mgKOH/g	23	0.040	0.035	0.049
Water	mg/kg	47	56.39	45.12	51.64
Initial Boiling Point	°C	52	175.03	9.35	9.63
10% recovery	°C	52	215.75	6.18	4.75
50% recovery	°C	50	276.46	2.48	2.97
90% recovery	°C	52	330.88	3.12	4.96
95% recovery	°C	49	342.69	3.90	8.57
Final Boiling Point	°C	52	351.79	6.33	7.10
Volume @250°C	%V/V	49	29.99	2.23	2.66
Volume @350°C	%V/V	42	96.63	2.01	2.66
Total Contamination (#12061)	mg/kg	18	57.85	25.64	17.36

Table 3: summary of test results samples #12060 and #12061

\*) 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 2012 WITH PREVIOUS PTS.

	<i>April 2012</i>	<i>April 2011</i>	<i>April 2010</i>	<i>April 2009</i>	<i>April 2008</i>
Number of reporting labs	57	67	55	69	75
Number of results reported	1197	1363	1023	1059	1136
Statistical outliers	33	50	39	54	38
Percentage outliers	2.8%	3.7%	3.8%	5.1%	3.3%

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 standards. The conclusions are given the following table:

	<i>April 2012</i>	<i>April 2011</i>	<i>April 2010</i>	<i>April 2009*</i>	<i>April 2008*</i>
Ash content	(++)	(++)	(++)	(++)	(++)
Aromatics by FIA	n.e	n.e.	n.e.	n.e.	n.e.
Cetane Index D976	++	++	++	n.e.	n.e.
Cetane Index ISO4264	n.e	n.e.	n.e.	n.e.	n.e.
Conradson CR on 10% res.	(--)	(--)	(--)	(--)	(--)
Ramsbottom CR on 10% res.	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.
Polycyclic Aromatic Hydrocar.	-	--	--	-	-
Pour Point manual	+	++	+	n.e.	n.e.
Pour Point automated	+	++	+/-	n.e.	n.e.
Sulphur	+	--	++	++	+/-
Total Contamination	-	--	--	--	--
TAN	+	(++)	++	n.e.	n.e.
Water content	+	++	++	++	++
Distillation	+	+/-	+/-	++	+/-

table 5: comparison determinations against the standard

\* NB.: in 2007-2009 B5 was evaluated, not B10

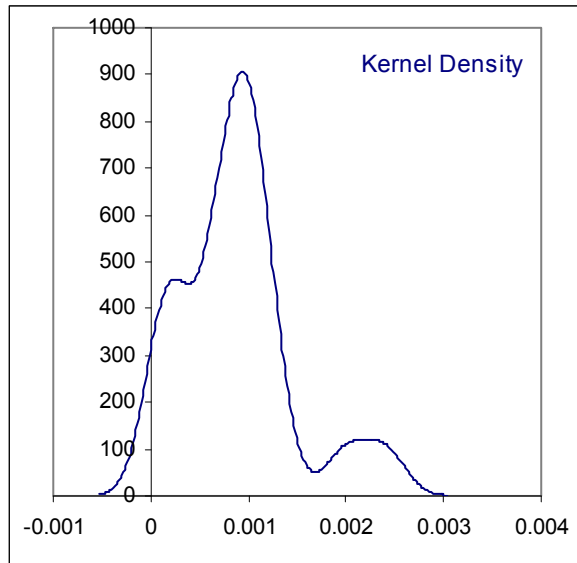
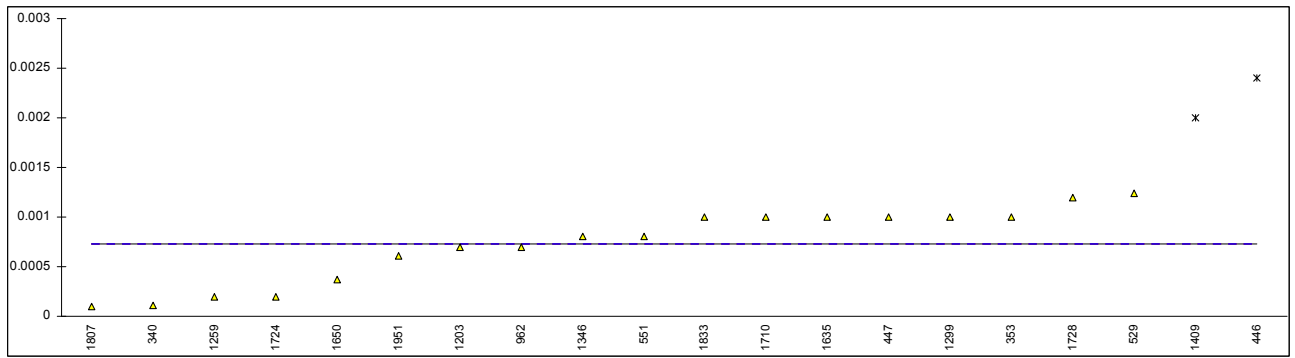
The performance of the determinations against the requirements of the respective standards is listed in the above table. The following performance categories were used:

- ++: 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 #12060; result in %M/M

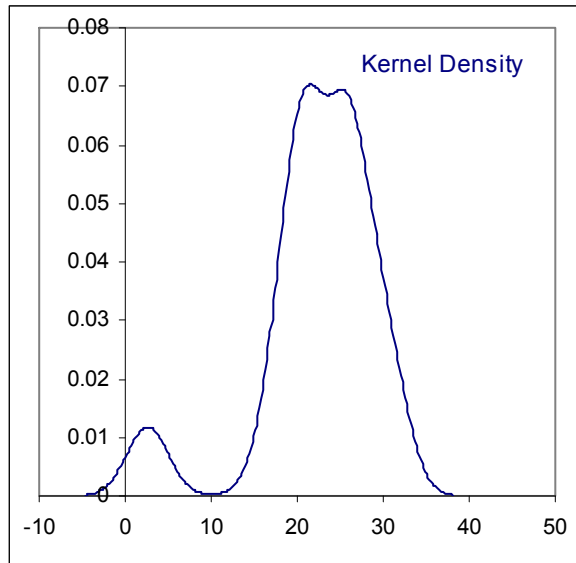
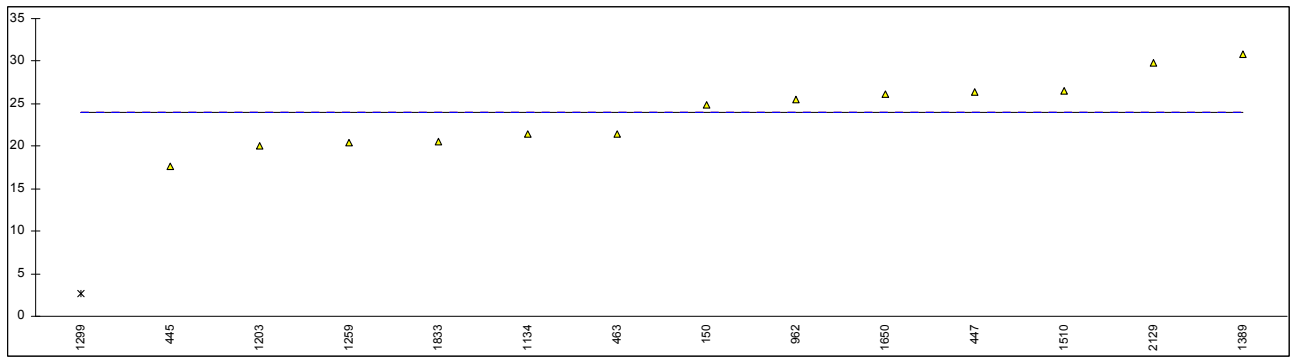
lab	method	value	mark	z(targ)	remarks
150	D482	<0.001		----	
311	ISO6245	<0.001		----	
312		----		----	
323		----		----	
340	ISO6245	0.00011		----	
343		----		----	
353	IP4	0.001		----	
432		----		----	
444		----		----	
445	ISO6245	<0.001		----	
446	ISO6245	0.0024	DG(0.05)	----	
447	ISO6245	0.001		----	
463	ISO6245	<0.01		----	
495	ISO6245	<0.001		----	
496	ISO6245	<0.001		----	
529	D482	0.00124		----	
551	D482	0.0008		----	
631		----		----	
913		----		----	
962	ISO6245	0.0007		----	
1006	D482	<0.001		----	
1017		----		----	
1026	ISO6245	<0.001		----	
1033		----		----	
1065		----		----	
1080		----		----	
1081	D482	<0.0001		----	
1108		----		----	
1134	IP4	<0.001		----	
1140	ISO6245	<0.01		----	
1194		----		----	
1203	ISO6245	0.0007		----	
1205		----		----	
1227		----		----	
1237		----		----	
1259	ISO6245	0.000199		----	
1292		----		----	
1299	ISO6245	0.001		----	
1346	ISO6245	0.0008		----	
1389		----		----	
1395	ISO6245	<0.01		----	
1404	ISO6245	<0.001		----	
1409	ISO6245	0.002	DG(0.05)	----	
1419		----		----	
1443		----		----	
1510	ISO6245	<0.001		----	
1634		----		----	
1635	ISO6245	0.001		----	
1650	D482	0.00037		----	
1706		----		----	
1708	ISO6245	<0.001		----	
1710	ISO6245	0.001		----	
1724	ISO6245	0.0002		----	
1728	D482	0.0012		----	
1807	ISO6245	0.0001		----	
1810		----		----	
1811		----		----	
1833	ISO6245	0.001		----	
1951	ISO6245	0.000607		----	
2129	ISO6245	<0.001		----	
	normality	not OK			
	n	18			
	outliers	2			
	mean (n)	0.00072			
	st.dev. (n)	0.000377			
	R(calc.)	0.00106			Application range 0.001 – 0.180 %M/M
	R(ISO6245:93)	(0.00500)			Compare R(D482:07) = (0.005)



Determination of Aromatics by FIA on sample #12060; result in %V/V

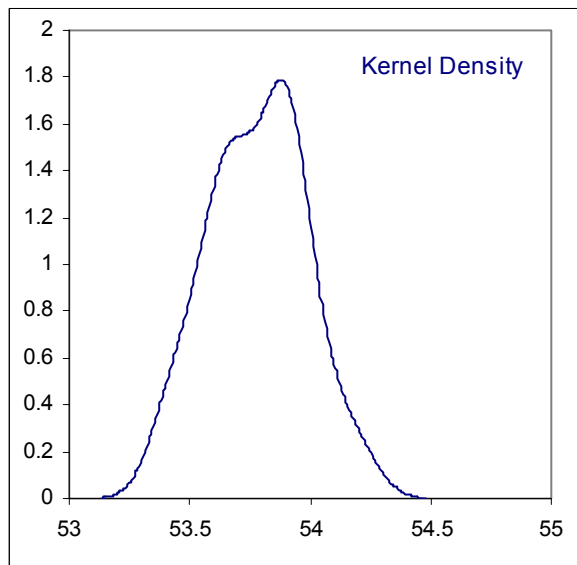
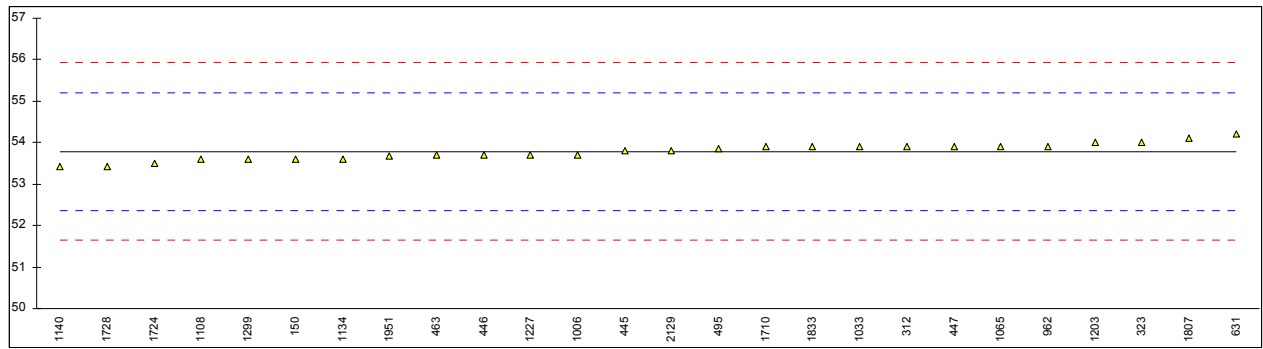
lab	method	value	mark	z(targ)	remarks
150	D1319	24.9		----	
311		----		----	
312		----		----	
323		----		----	
340		----		----	
343		----		----	
353		----		----	
432		----		----	
444		----		----	
445	D1319	17.6		----	
446		----		----	
447	D1319	26.4		----	
463	D1319	21.4		----	
495		----		----	
496		----		----	
529		----		----	
551		----		----	
631		----		----	
913		----		----	
962	D1319	25.5		----	
1006		----		----	
1017		----		----	
1026		----		----	
1033		----		----	
1065		----		----	
1080		----		----	
1081		----		----	
1108		----		----	
1134	IP156	21.4		----	
1140		----		----	
1194		----		----	
1203	D1319	20.0		----	
1205		----		----	
1227		----		----	
1237		----		----	
1259	D1319	20.40		----	
1292		----		----	
1299	EN12916	2.6	G(0.01)	----	
1346		----		----	
1389	D1319	30.8		----	
1395		----		----	
1404		----		----	
1409		----		----	
1419		----		----	
1443		----		----	
1510	D1319	26.5		----	
1634		----		----	
1635		----		----	
1650	D1319	26.1		----	
1706		----		----	
1708		----		----	
1710		----		----	
1724		----		----	
1728		----		----	
1807		----		----	
1810		----		----	
1811		----		----	
1833	D1319	20.6		----	
1951		----		----	
2129	D1319	29.8		----	
	normality	OK			
	n	13			
	outliers	1			
	mean (n)	23.954			
	st.dev. (n)	4.0242			
	R(calc.)	11.268			
	R(D1319:10)	unknown			Compare R(D1319:10 for diesel without FAME) = 3.7





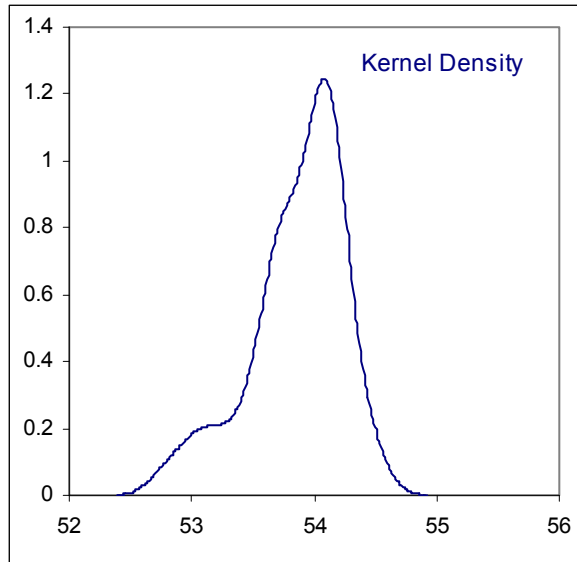
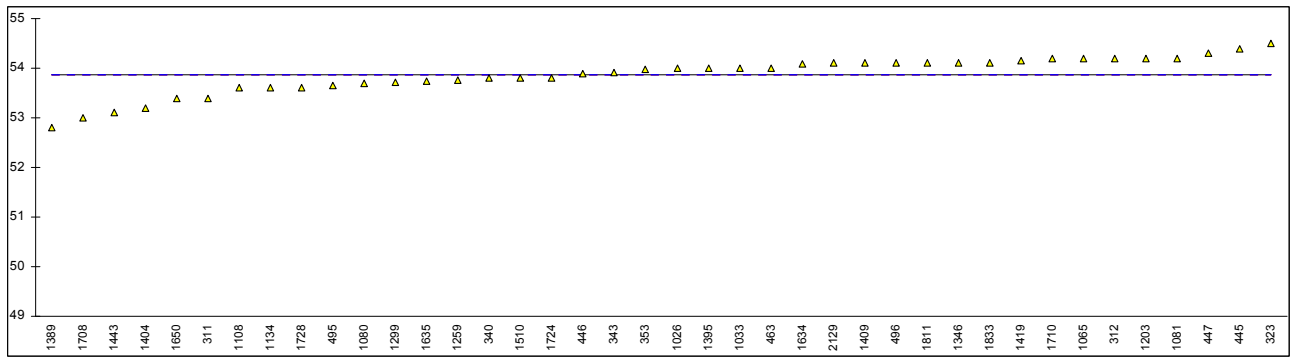
Determination of Cetane Index D976 on sample #12060

lab	method	value	mark	z(targ)	remarks
150	D976	53.6		-0.24	
311		----		----	
312	D976	53.9		0.18	
323	D976	54.0		0.32	
340		----		----	
343		----		----	
353		----		----	
432		----		----	
444		----		----	
445	D976	53.8		0.04	
446	D976	53.7		-0.10	
447	D976	53.9		0.18	
463	D976	53.7		-0.10	
495	D976	53.86		0.12	
496		----		----	
529		----		----	
551		----		----	
631	D976	54.2		0.60	
913		----		----	
962	D976	53.91		0.19	
1006	D976	53.7		-0.10	
1017		----		----	
1026		----		----	
1033	D976	53.9		0.18	
1065	D976	53.9		0.18	
1080		----		----	
1081		----		----	
1108	D976	53.6		-0.24	
1134	D976	53.6		-0.24	
1140	Calc.	53.4120		-0.50	
1194		----		----	
1203	D4737	54.0	ex	0.32	method is not equivalent with D976
1205		----		----	
1227	D976	53.7		-0.10	
1237		----		----	
1259		----		----	
1292		----		----	
1299	D976	53.60		-0.24	
1346		----		----	
1389		----		----	
1395		----		----	
1404		----		----	
1409		----		----	
1419		----		----	
1443		----		----	
1510		----		----	
1634		----		----	
1635		----		----	
1650		----		----	
1706		----		----	
1708		----		----	
1710	D976	53.9		0.18	
1724	D976	53.5		-0.38	
1728	D976	53.4304		-0.48	
1807	D976	54.1		0.46	
1810		----		----	
1811		----		----	
1833	D976	53.9		0.18	
1951	D976	53.68	C	-0.13	first reported : 57.22
2129	D976	53.8		0.04	
	normality	OK			
	n	25			
	outliers	0			
	mean (n)	53.772			
	st.dev. (n)	0.1976			
	R(calc.)	0.553			
	R(D976:06)	2.000			



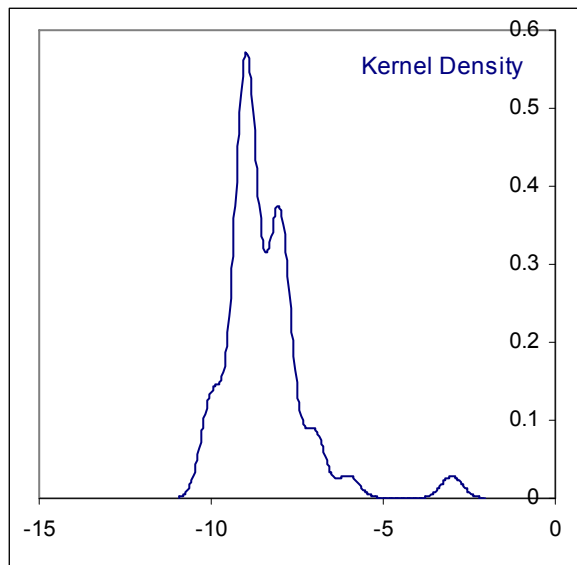
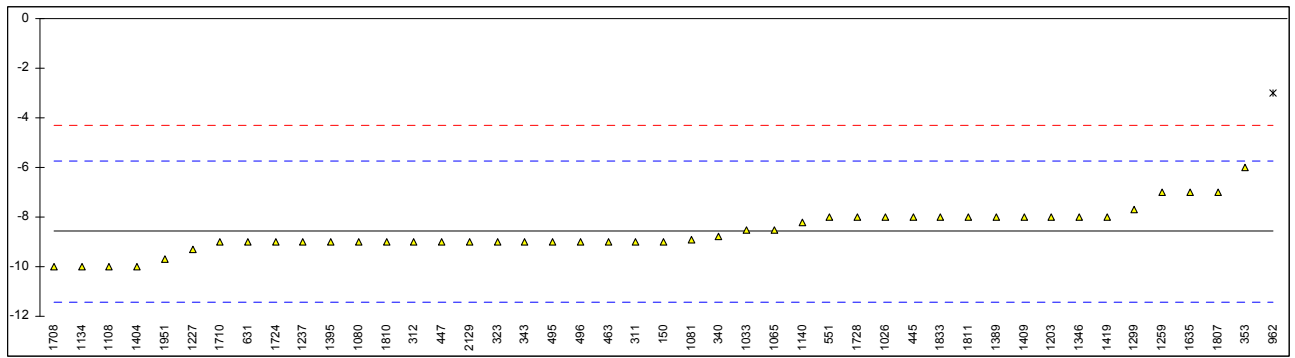
## Determination of Cetane Index ISO4264 on sample #12060

lab	method	value	mark	z(targ)	remarks
150		----		----	
311	ISO4264	53.4		----	
312	ISO4264	54.2		----	
323	ISO4264	54.5		----	
340	ISO4264	53.8		----	
343	ISO4264	53.92		----	
353	IP380	53.978		----	
432		----		----	
444		----		----	
445	ISO4264	54.4		----	
446	ISO4264	53.9		----	
447	ISO4264	54.3		----	
463	ISO4264	54.0		----	
495	ISO4264	53.66		----	
496	ISO4264	54.10		----	
529		----		----	
551		----		----	
631		----		----	
913		----		----	
962		----		----	
1006		----		----	
1017		----		----	
1026	ISO4264	54.0		----	
1033	IP380	54.0		----	
1065	ISO4264	54.2		----	
1080	ISO4264	53.7		----	
1081	ISO4264	54.2		----	
1108	ISO4264	53.6		----	
1134	ISO4264	53.6		----	
1140		----		----	
1194		----		----	
1203	ISO4264	54.2		----	
1205		----		----	
1227		----		----	
1237		----		----	
1259	ISO4264	53.76		----	
1292		----		----	
1299	ISO4264	53.71		----	
1346	ISO4264	54.1		----	
1389	ISO4264	52.8		----	
1395	ISO4264	54.0		----	
1404	ISO4264	53.2		----	
1409	ISO4264	54.1		----	
1419	ISO4264	54.15		----	
1443	ISO4264	53.1		----	
1510	ISO4264	53.8		----	
1634	ISO4264	54.09		----	
1635	ISO4264	53.74		----	
1650	D4737	53.4		----	
1706		----		----	
1708	ISO4264	53.0		----	
1710	ISO4264	54.2		----	
1724	ISO4264	53.8		----	
1728	ISO4264	53.6176		----	
1807		----		----	
1810		----		----	
1811	ISO4264	54.1		----	
1833	ISO4264	54.1		----	
1951		----		----	
2129	ISO4264	54.1		----	
	normality	not OK			
	n	40			
	outliers	0			
	mean (n)	53.863			
	st.dev. (n)	0.3813			
	R(calc.)	1.068			
	R(ISO4264:07)	n.a			



Determination of Cloud Point on sample #12060; result in °C

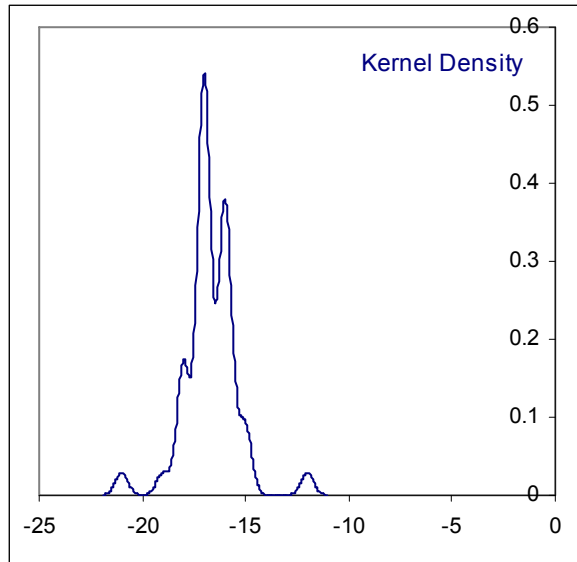
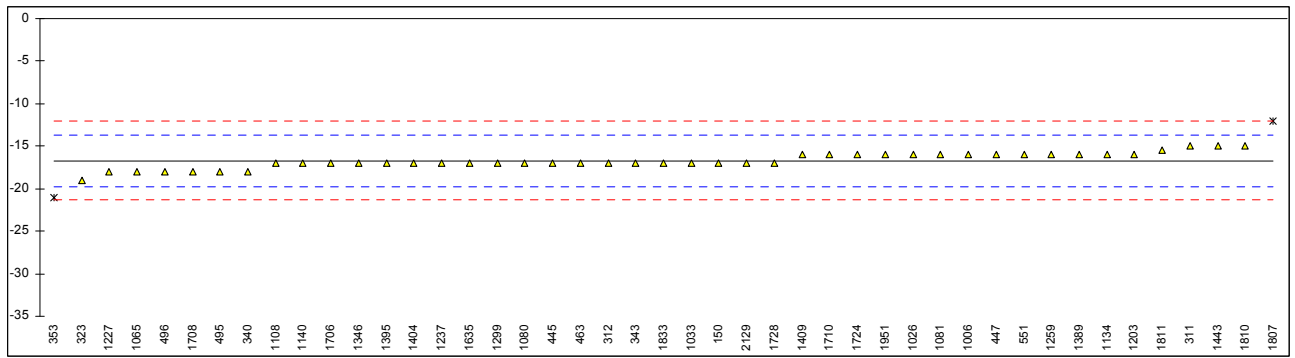
lab	method	value	mark	z(targ)	remarks
150	D5771	-9		-0.29	
311	EN23015	-9		-0.29	
312	EN23015	-9		-0.29	
323	EN23015	-9		-0.29	
340	EN23015	-8.8		-0.15	
343	EN23015	-9.0		-0.29	
353	IP219	-6		1.81	
432		----		----	
444		----		----	
445	EN23015	-8.0		0.41	
446		----		----	
447	IP219	-9		-0.29	
463	EN23015	-9		-0.29	
495	EN23015	-9		-0.29	
496	EN23015	-9.0		-0.29	
529		----		----	
551	D2500	-8		0.41	
631	D2500	-9		-0.29	
913		----		----	
962	EN23015	-3	G(0.01)	3.91	
1006		----		----	
1017		----		----	
1026	D5773	-8		0.41	
1033	D5772	-8.5		0.06	
1065	EN23015	-8.5		0.06	
1080	EN23015	-9		-0.29	
1081	D5772	-8.9		-0.22	
1108	EN23015	-10		-0.99	
1134	IP219	-10		-0.99	
1140	EN23015	-8.2		0.27	
1194		----		----	
1203	EN23015	-8		0.41	
1205		----		----	
1227	D2500	-9.3		-0.50	
1237	EN23015	-9		-0.29	
1259	EN23015	-7		1.11	
1292		----		----	
1299	EN23015	-7.7		0.62	
1346	EN23015	-8		0.41	
1389	EN23015	-8		0.41	
1395	EN23015	-9	C	-0.29	first reported: -5
1404	EN23015	-10		-0.99	
1409	EN23015	-8		0.41	
1419	EN23015	-8		0.41	
1443		----		----	
1510		----		----	
1634		----		----	
1635	EN23015	-7		1.11	
1650		----		----	
1706		----		----	
1708	EN23015	-10		-0.99	
1710	EN23015	-9		-0.29	
1724	EN23015	-9		-0.29	
1728	EN23015	-8		0.41	
1807	EN23015	-7		1.11	
1810	EN23015	-9		-0.29	
1811	EN23015	-8		0.41	
1833	EN23015	-8		0.41	
1951	EN23015	-9.7		-0.78	
2129	IP444	-9		-0.29	
	normality	not OK			
	n	44			
	outliers	1			
	mean (n)	-8.58			
	st.dev. (n)	0.859			
	R(calc.)	2.41			
	R(EN23015:94)	4.00			compare R(D2500:11)=3.0



Determination of Cold Filter Plugging Point on sample #12060; result in °C

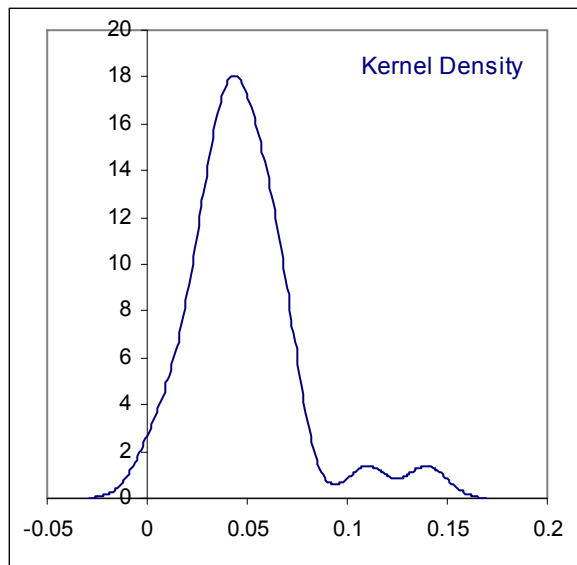
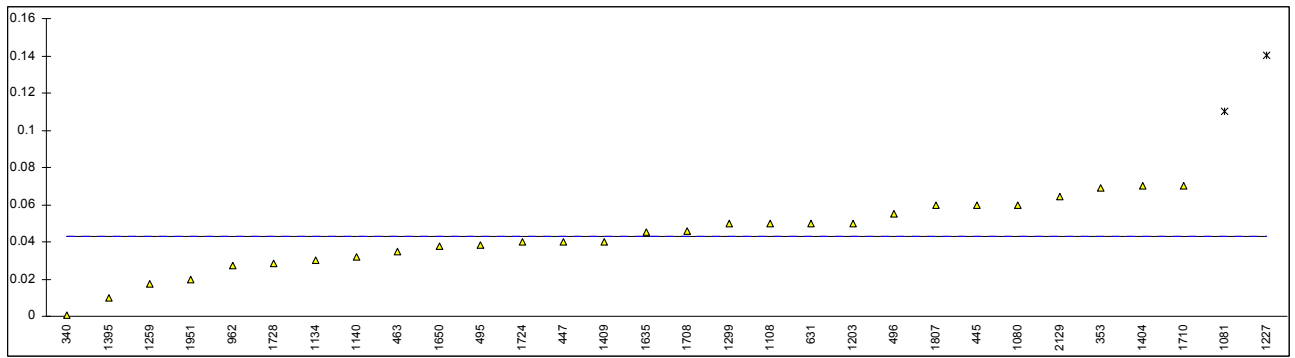
lab	method	value	mark	z(targ)	remarks
150	EN116	-17		-0.19	
311	EN116	-15		1.11	
312	EN116	-17		-0.19	
323	EN116	-19		-1.49	
340	EN116	-18		-0.84	
343	EN116	-17		-0.19	
353	IP309	-21	G(0.05)	-2.80	
432		----		----	
444		----		----	
445	EN116	-17		-0.19	
446		----		----	
447	IP309	-16		0.46	
463	EN116	-17		-0.19	
495	EN116	-18		-0.84	
496	EN116	-18.0		-0.84	
529		----		----	
551	D6371	-16		0.46	
631		----		----	
913		----		----	
962		----		----	
1006	D6371	-16		0.46	
1017		----		----	
1026	EN116	-16		0.46	
1033	IP309	-17		-0.19	
1065	EN116	-18		-0.84	
1080	EN116	-17		-0.19	
1081	EN116	-16		0.46	
1108	EN116	-17		-0.19	
1134	IP309	-16		0.46	
1140	EN116	-17.0		-0.19	
1194		----		----	
1203	EN116	-16		0.46	
1205		----		----	
1227	EN116	-18		-0.84	
1237	EN116	-17		-0.19	
1259	EN116	-16		0.46	
1292		----		----	
1299	EN116	-17		-0.19	
1346	EN116	-17		-0.19	
1389	IP309	-16		0.46	
1395	EN116	-17		-0.19	
1404	EN116	-17		-0.19	
1409	EN116	-16		0.46	
1419		----		----	
1443	EN116	-15		1.11	
1510		----		----	
1634		----		----	
1635	EN116	-17		-0.19	
1650		----		----	
1706	EN116	-17.0		-0.19	
1708	EN116	-18		-0.84	
1710	EN116	-16		0.46	
1724	EN116	-16		0.46	
1728	D6371	-17		-0.19	
1807	EN116	-12	C,G(0.01)	3.07	first reported: -9
1810	EN116	-15		1.11	
1811	EN116	-15.5		0.79	
1833	EN116	-17		-0.19	
1951	EN116	-16		0.46	
2129	EN116	-17		-0.19	
	normality	not OK			
	n	43			
	outliers	2			
	mean (n)	-16.7			
	st.dev. (n)	0.89			
	R(calc.)	2.5			
	R(EN116:97)	4.3			R(IP309:99) = R(EN116:97)





Determination of Carbon Residue on 10% dist. res. on sample #12060; result in %M/M

lab	method	value	mark	z(targ)	remarks
150		----		----	
311	ISO10307	<0.1		----	
312		----		----	
323		----		----	
340	ISO10307	0.0006		----	
343	ISO10307	<0.1		----	
353	IP13	0.069		----	
432		----		----	
444		----		----	
445	IP398	0.06		----	
446		----		----	
447	IP398	0.04		----	
463	ISO10307	0.0350		----	
495	ISO10307	0.038		----	
496	ISO10307	0.055		----	
529		----		----	
551		----		----	
631	D4530	0.05		----	
913		----		----	
962	ISO10307	0.027		----	
1006		----		----	
1017		----		----	
1026		----		----	
1033		----		----	
1065		----		----	
1080	ISO10307	0.06		----	
1081	ISO10307	0.11	G(0.05)	----	
1108	ISO10307	0.05		----	
1134	IP13	0.03		----	
1140	ISO10307	0.0317		----	
1194		----		----	
1203	ISO10307	0.05		----	
1205		----		----	
1227	D4530	0.14	G(0.01)	----	
1237		----		----	
1259	ISO10307	0.017535		----	
1292		----		----	
1299	ISO10307	0.05		----	
1346		----		----	
1389		----		----	
1395	ISO10307	0.01		----	
1404	ISO10307	0.07		----	
1409	ISO10307	0.04		----	
1419		----		----	
1443		----		----	
1510		----		----	
1634		----		----	
1635	ISO10307	0.045		----	
1650	D189	0.0378		----	
1706		----		----	
1708	ISO10307	0.046		----	
1710	ISO10307	0.07		----	
1724	ISO10307	0.04		----	
1728	ISO10307	0.0285		----	
1807	ISO10307	0.06		----	
1810		----		----	
1811		----		----	
1833	ISO10307	<0.1		----	
1951	ISO10307	0.02		----	
2129	ISO10307	0.0643		----	
	normality	OK			
	n	28			
	outliers	2			
	mean (n)	0.0427			
	st.dev. (n)	0.01803			
	R(calc.)	0.0505			
	R(ISO10370:93)	(0.0299)			Application range: 0.1-30 %M/M



Determination of Ramsbottom Carbon Res. on 10% dist. res. on sample #12060; result in %M/M

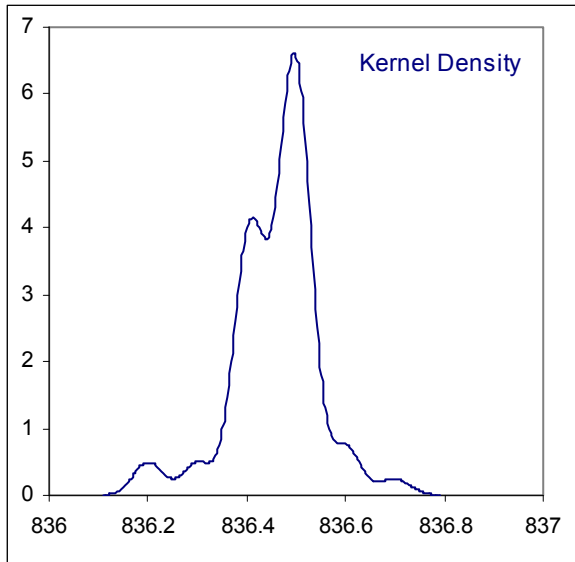
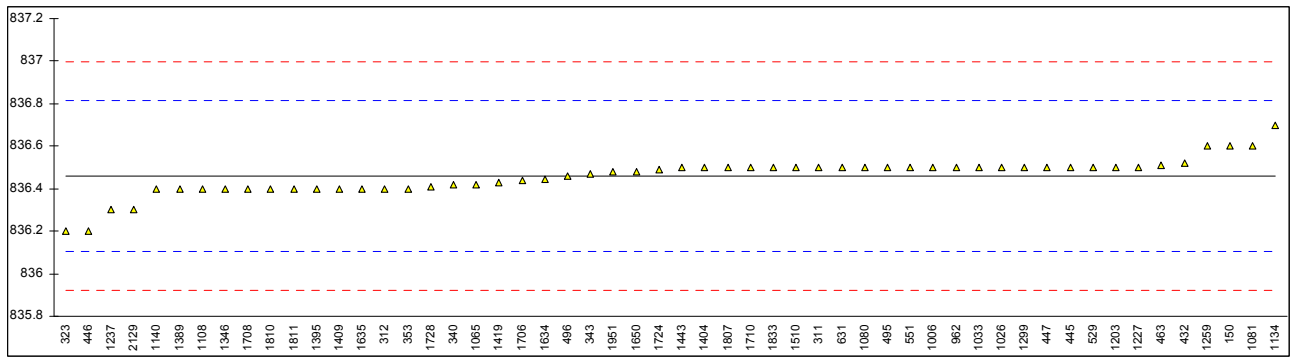
lab	method	value	mark	z(targ)	remarks
150	D524	0.10		----	
311		----		----	
312		----		----	
323		----		----	
340		----		----	
343		----		----	
353		----		----	
432		----		----	
444		----		----	
445		----		----	
446		----		----	
447		----		----	
463		----		----	
495	D524	0.09		----	
496		----		----	
529		----		----	
551	D524	0.0049		----	
631		----		----	
913		----		----	
962		----		----	
1006	D524	0.083		----	
1017		----		----	
1026		----		----	
1033		----		----	
1065		----		----	
1080		----		----	
1081		----		----	
1108		----		----	
1134		----		----	
1140		----		----	
1194		----		----	
1203		----		----	
1205		----		----	
1227		----		----	
1237		----		----	
1259		----		----	
1292		----		----	
1299		----		----	
1346		----		----	
1389		----		----	
1395		----		----	
1404		----		----	
1409		----		----	
1419		----		----	
1443		----		----	
1510		----		----	
1634		----		----	
1635		----		----	
1650		----		----	
1706		----		----	
1708		----		----	
1710		----		----	
1724		----		----	
1728		----		----	
1807		----		----	
1810		----		----	
1811		----		----	
1833		----		----	
1951		----		----	
2129		----		----	
	normality	n.a			
	n	4			
	outliers	n.a			
	mean (n)	0.0694			
	st.dev. (n)	n.a			
	R(calc.)	n.a			
	R(D524:10)	n.a			

## Determination of Copper Corrosion 3hrs @ 50 °C on sample #12060

lab	method	value	mark	z(targ)	remarks
150	D130	1A		----	
311	ISO2160	1A		----	
312	D130	1A		----	
323	ISO2160	1A		----	
340	ISO2160	1A		----	
343	ISO2160	1A		----	
353	IP154	1A		----	
432		----		----	
444		----		----	
445	ISO2160	1B		----	
446		----		----	
447	IP154	1A		----	
463	ISO2160	1A		----	
495	ISO2160	1		----	
496	ISO2160	1A		----	
529	D130	1A		----	
551	D130	1A		----	
631	D130	1A		----	
913		----		----	
962	ISO2160	1A		----	
1006	D130	1A		----	
1017		----		----	
1026	ISO2160	1A		----	
1033	IP154	1A		----	
1065		----		----	
1080	ISO2160	1A		----	
1081	D130	1A		----	
1108	ISO2160	1		----	
1134	IP154	1A		----	
1140	ISO2160	1A		----	
1194		----		----	
1203	ISO2160	1		----	
1205		----		----	
1227	D130	1A		----	
1237		----		----	
1259	ISO2160	1		----	
1292		----		----	
1299	ISO2160	1A		----	
1346	ISO2160	1A		----	
1389	D130	1A		----	
1395	ISO2160	1A		----	
1404	ISO2160	1A		----	
1409	ISO2160	1A		----	
1419		----		----	
1443	ISO2160	1A		----	
1510	ISO2160	1A		----	
1634	ISO2160	1A		----	
1635	ISO2160	1A		----	
1650	ISO2160	1A		----	
1706		----		----	
1708	ISO2160	1		----	
1710	ISO2160	1A		----	
1724	ISO2160	1A		----	
1728	D130	1A		----	
1807	ISO2160	1A		----	
1810		----		----	
1811	ISO2160	1		----	
1833	ISO2160	1A		----	
1951	ISO2160	1		----	
2129	ISO2160	1A		----	
	normality	n.a			
	n	47			
	outliers	n.a			
	mean (n)	1 (1A)			
	st.dev. (n)	n.a			
	R(calc.)	n.a			
	R(ISO2160:98/D130:10)	n.a			

Determination of Density @15 °C on sample #12060; result in kg/m<sup>3</sup>

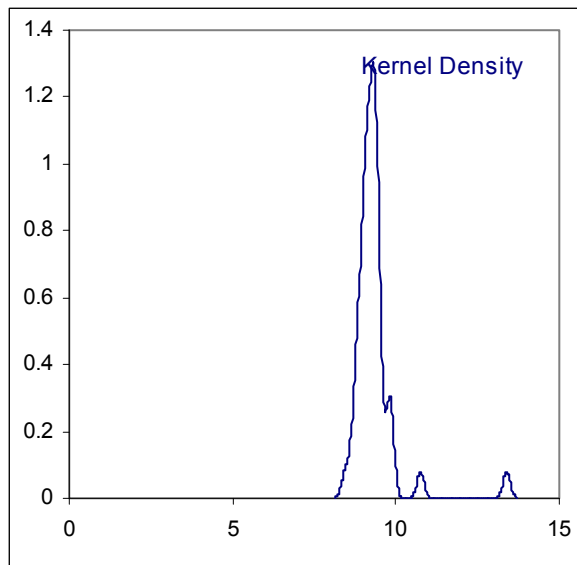
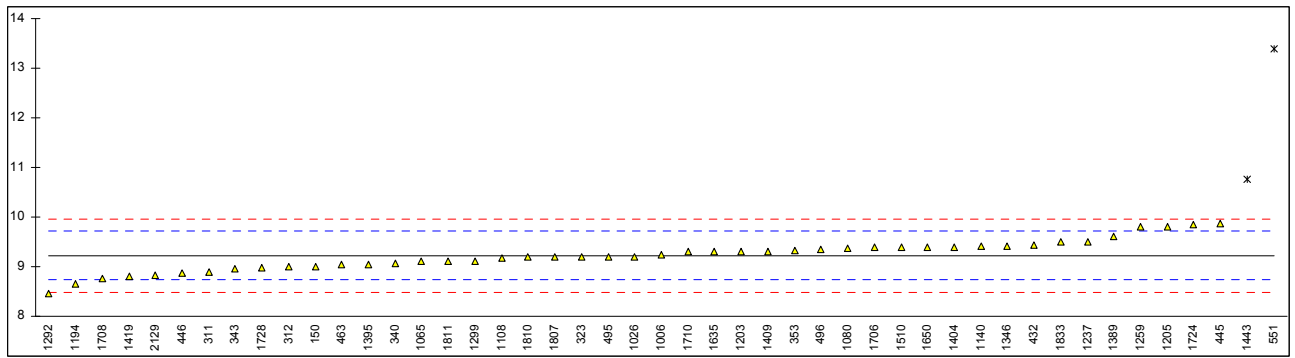
lab	method	value	mark	z(targ)	remarks
150	D4052	836.6		0.79	
311	ISO12185	836.5		0.23	
312	ISO12185	836.4		-0.33	
323	ISO12185	836.2		-1.45	
340	ISO12185	836.42		-0.22	
343	ISO12185	836.47		0.06	
353	IP365	836.4		-0.33	
432	ISO12185	836.52		0.34	
444		----		----	
445	ISO12185	836.5		0.23	
446	D4052	836.2		-1.45	
447	IP365	836.5		0.23	
463	ISO12185	836.51		0.29	
495	ISO12185	836.5		0.23	
496	ISO12185	836.46		0.01	
529	D4052	836.5		0.23	
551	D4052	836.5		0.23	
631	D4052	836.5		0.23	
913		----		----	
962	ISO12185	836.5		0.23	
1006	D4052	836.5		0.23	
1017		----		----	
1026	D4052	836.5		0.23	
1033	IP365	836.5		0.23	
1065	ISO12185	836.42		-0.22	
1080	ISO12185	836.5		0.23	
1081	ISO12185	836.6		0.79	
1108	ISO12185	836.4		-0.33	
1134	IP365	836.7	U	1.35	probably unit error, reported: 0.8367
1140	ISO12185	836.4	C	-0.33	first reported: 0.836
1194		----		----	
1203	ISO12185	836.5		0.23	
1205		----		----	
1227	D4052	836.5		0.23	
1237	ISO12185	836.3		-0.89	
1259	ISO12185	836.6		0.79	
1292		----		----	
1299	ISO12185	836.5		0.23	
1346	ISO12185	836.40		-0.33	
1389	ISO12185	836.4		-0.33	
1395	ISO12185	836.4		-0.33	
1404	ISO12185	836.5		0.23	
1409	ISO12185	836.4		-0.33	
1419	ISO12185	836.43		-0.16	
1443	ISO12185	836.5		0.23	
1510	ISO12185	836.5		0.23	
1634	ISO12185	836.446		-0.07	
1635	ISO12185	836.4		-0.33	
1650	D4052	836.48		0.12	
1706	ISO12185	836.44		-0.11	
1708	ISO12185	836.4		-0.33	
1710	ISO12185	836.5		0.23	
1724	ISO12185	836.49		0.17	
1728	D4052	836.41		-0.27	
1807	ISO12185	836.5		0.23	
1810	ISO12185	836.4		-0.33	
1811	ISO12185	836.4		-0.33	
1833	ISO12185	836.5		0.23	
1951	ISO12185	836.48	C	0.12	first reported: 0.83648
2129	D4052	836.3		-0.89	
	normality	not OK			
	n	54			
	outliers	0			
	mean (n)	836.459			
	st.dev. (n)	0.0863			
	R(calc.)	0.242			
	R(ISO12185:96)	0.500			Compare R(4052:11) = 0.500



## Determination of Fatty Acid Methyl Esters content on sample #12060; result in %V/V

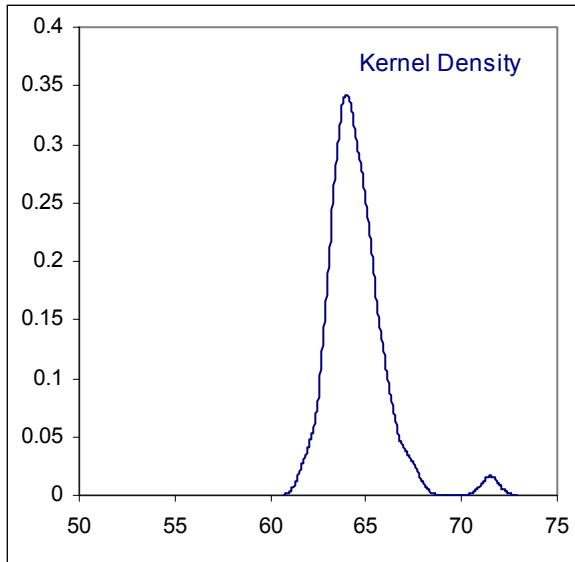
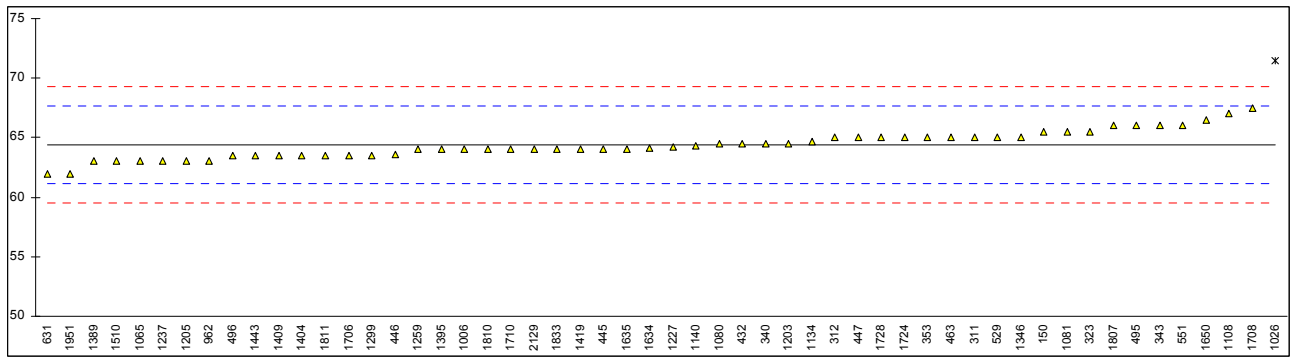
lab	method	value	mark	z(targ)	remarks
150	D7371	9.01		-0.87	
311	EN14078	8.9		-1.32	
312	EN14078	9.0		-0.91	
323	EN14078	9.2		-0.10	
340	EN14078	9.07		-0.63	
343	EN14078	8.95		-1.11	
353	EN14078	9.333		0.44	
432	EN14078	9.44		0.87	
444		----		----	
445	EN14078	9.88		2.66	
446	EN14078	8.86		-1.48	
447		----		----	
463	EN14078	9.046		-0.72	
495	EN14078	9.2		-0.10	
496	EN14078	9.35		0.51	
529		----		----	
551	EN14078	13.40	C,G(0.01)	16.94	first reported: 1.5110
631		----		----	
913		----		----	
962		----		----	
1006	EN14078	9.24		0.06	
1017		----		----	
1026	EN14078	9.2		-0.10	
1033		----		----	
1065	EN14078	9.1	C	-0.51	first reported: 8.3
1080	EN14078	9.375		0.61	
1081		----		----	
1108	EN14078	9.17		-0.22	
1134		----		----	
1140	EN14078	9.4032		0.72	
1194	INH-12185	8.66		-2.29	
1203	EN14078	9.3		0.31	
1205	EN14078	9.8		2.33	
1227		----		----	
1237	EN14078	9.5		1.12	
1259	EN14078	9.799		2.33	
1292	EN14078	8.45		-3.14	
1299	EN14078	9.1		-0.51	
1346	EN14078	9.42		0.79	
1389	EN14078	9.6		1.52	
1395	EN14078	9.05		-0.71	
1404	EN14078	9.4		0.71	
1409	EN14078	9.3		0.31	
1419	EN14078	8.8		-1.72	
1443	EN14078	10.757	C,G(0.01)	6.22	first reported: 10.8
1510	EN14078	9.4		0.71	
1634		----		----	
1635	EN14078	9.3		0.31	
1650	EN14078	9.4		0.71	
1706	EN14078	9.4		0.71	
1708	EN14078	8.76		-1.88	
1710	EN14078	9.3		0.31	
1724	EN14078	9.84		2.50	
1728	EN14078	8.98		-0.99	
1807	EN14078	9.2		-0.10	
1810	EN14078	9.2		-0.10	
1811	EN14078	9.1		-0.51	
1833	EN14078	9.5		1.12	
1951		----		----	
2129	EN14078	8.817		-1.65	
	normality	OK			
	n	45			
	outliers	2			
	mean (n)	9.225			
	st.dev. (n)	0.3076			
	R(calc.)	0.861			
	R(EN14078:09)	0.690			





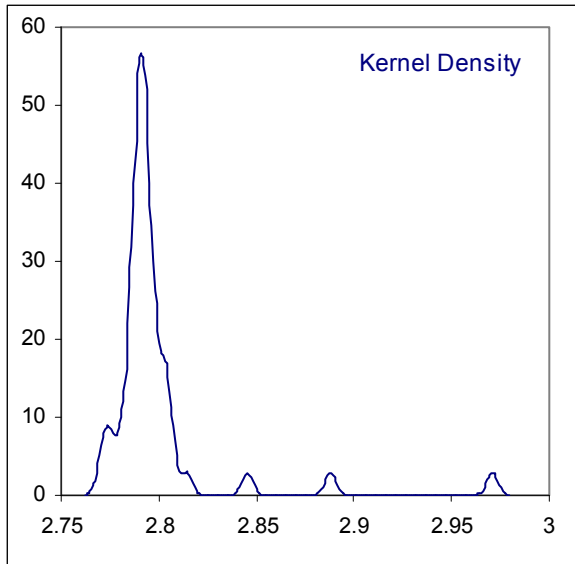
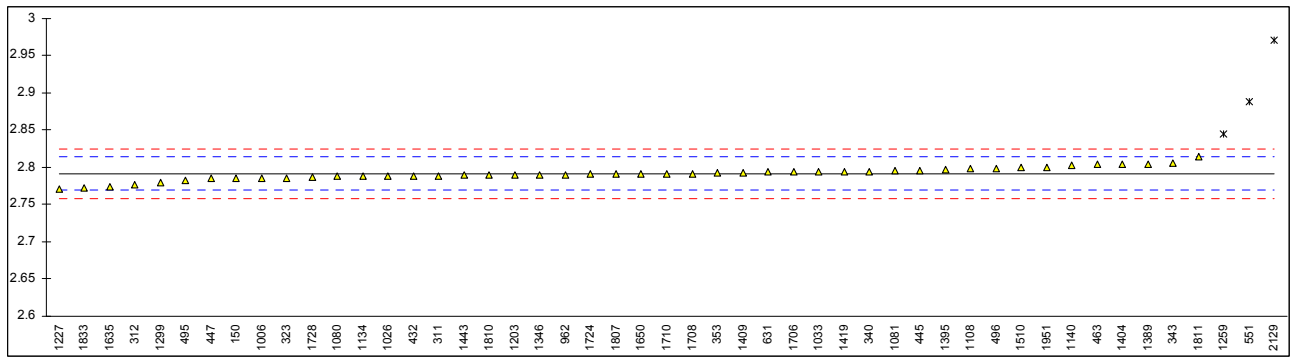
## Determination of Flash Point PMcc on sample #12060; result in °C

lab	method	value	mark	z(targ)	remarks
150	ISO2719	65.5		0.69	
311	ISO2719	65.0		0.38	
312	D93	65.0		0.38	
323	ISO2719	65.5		0.69	
340	ISO2719	64.5		0.08	
343	ISO2719	66.0		1.00	
353	IP34	65.0		0.38	
432	ISO2719	64.5		0.08	
444		----		----	
445	ISO2719	64.0		-0.23	
446	ISO2719	63.6		-0.48	
447	ISO2719	65.0		0.38	
463	ISO2719	65.0		0.38	
495	ISO2719	66.0		1.00	
496	ISO2719	63.5		-0.54	
529	D93	65		0.38	
551	D93	66.0	C	1.00	first reported: 76.0
631	D93	62.0		-1.46	
913		----		----	
962	ISO2719	63.0		-0.84	
1006	D93	64.0		-0.23	
1017		----		----	
1026	D93	71.5	C,G(0.01)	4.36	first reported: 67.0
1033		----		----	
1065	ISO2719	63		-0.84	
1080	ISO2719	64.5		0.08	
1081	D93	65.5		0.69	
1108	ISO2719	67.0		1.61	
1134	IP34	64.7		0.20	
1140	ISO2719	64.3		-0.05	
1194		----		----	
1203	ISO2719	64.5		0.08	
1205	D93	63.0		-0.84	
1227	D93	64.2		-0.11	
1237	ISO2719	63.0		-0.84	
1259	ISO2719	64.0		-0.23	
1292		----		----	
1299	ISO2719	63.5		-0.54	
1346	ISO2719	65		0.38	
1389	D93	63.0		-0.84	
1395	ISO2719	64.0		-0.23	
1404	ISO2719	63.5		-0.54	
1409	ISO2719	63.5		-0.54	
1419	ISO2719	64.0		-0.23	
1443	ISO2719	63.5		-0.54	
1510	ISO2719	63		-0.84	
1634	ISO2719	64.1		-0.17	
1635	ISO2719	64.0		-0.23	
1650	D93	66.5		1.30	
1706	ISO2719	63.5		-0.54	
1708	ISO2719	67.5		1.91	
1710	ISO2719	64.0		-0.23	
1724	ISO2719	65		0.38	
1728	D93	65		0.38	
1807	ISO2719	66.0		1.00	
1810	ISO2719	64.0		-0.23	
1811	ISO2719	63.5		-0.54	
1833	ISO2719	64		-0.23	
1951	ISO2719	62.0		-1.46	
2129	ISO2719	64.0		-0.23	
	normality	OK			
	n	53			
	outliers	1			
	mean (n)	64.38			
	st.dev. (n)	1.154			
	R(calc.)	3.23			
	R(ISO2719:02)	4.57			R(ISO2719:02) = R(D93A:11)



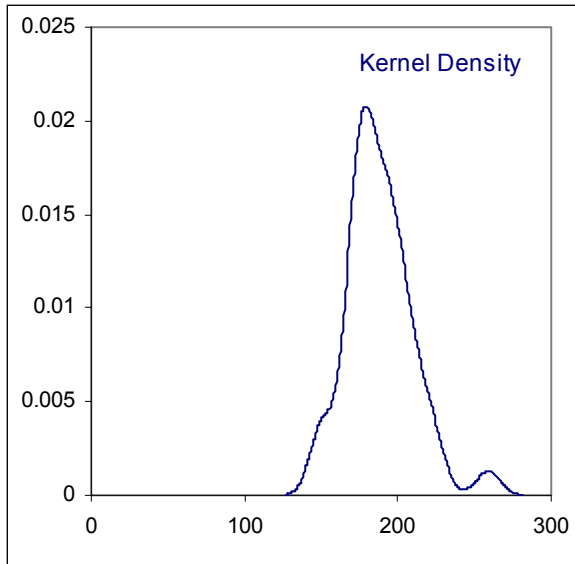
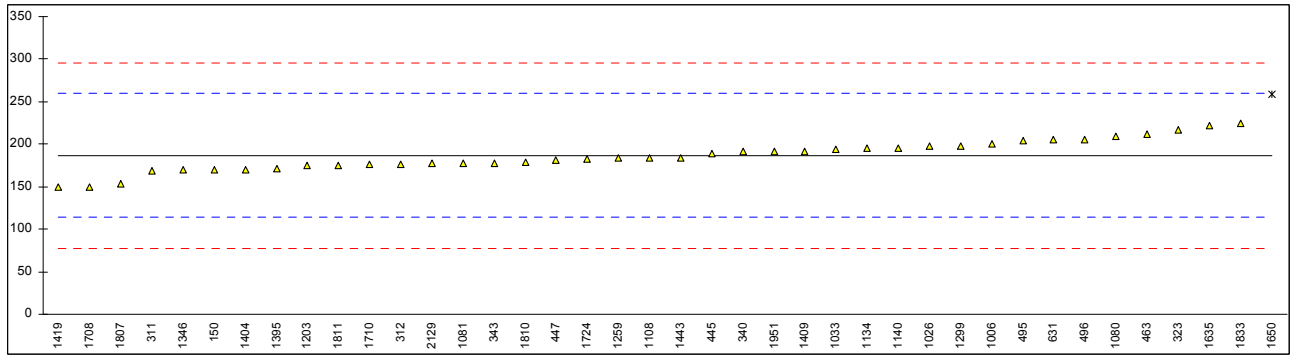
Determination of Kinematic Viscosity @ 40°C on sample #12060; result in mm<sup>2</sup>/s

lab	method	value	mark	z(targ)	remarks
150	ISO3104	2.785		-0.60	
311	ISO3104	2.789		-0.24	
312	D445	2.777		-1.32	
323	ISO3104	2.786		-0.51	
340	ISO3104	2.7945		0.26	
343	ISO3104	2.8064		1.33	
353	IP71	2.7921		0.04	
432	ISO3104	2.789		-0.24	
444		----		----	
445	ISO3104	2.795		0.30	
446		----		----	
447	D445	2.785		-0.60	
463	ISO3104	2.8037		1.09	
495	ISO3104	2.783		-0.78	
496	ISO3104	2.7985		0.62	
529		----		----	
551	D445	2.888	C,G(0.01)	8.68	first reported: 2.860
631	D445	2.7937		0.19	
913		----		----	
962	ISO3104	2.790		-0.15	
1006	D445	2.7860		-0.51	
1017		----		----	
1026	ISO3104	2.789		-0.24	
1033	IP71	2.794		0.21	
1065		----		----	
1080	ISO3104	2.789		-0.24	
1081	D445	2.795		0.30	
1108	ISO3104	2.798		0.57	
1134	IP71	2.789		-0.24	
1140	ISO3104	2.803		1.02	
1194		----		----	
1203	ISO3104	2.790		-0.15	
1205		----		----	
1227	D445	2.7706		-1.89	
1237		----		----	
1259	ISO3104	2.8453	G(0.01)	4.83	
1292		----		----	
1299	ISO3104	2.780		-1.05	
1346	ISO3104	2.7900		-0.15	
1389	D445	2.805		1.20	
1395	ISO3104	2.797		0.48	
1404	ISO3104	2.804		1.11	
1409	ISO3104	2.7928		0.11	
1419	ISO3104	2.794		0.21	
1443	ISO3104	2.7896		-0.18	
1510	ISO3104	2.800		0.75	
1634		----		----	
1635	ISO3104	2.774		-1.59	
1650	D445	2.792		0.03	
1706	ISO3104	2.7938		0.20	
1708	ISO3104	2.792		0.03	
1710	ISO3104	2.792		0.03	
1724	ISO3104	2.7913		-0.03	
1728	D445	2.7865		-0.46	
1807	ISO3104	2.792		0.03	
1810	ISO3104	2.790		-0.15	
1811	ISO3104	2.8142		2.03	
1833	ISO3104	2.773		-1.68	
1951	ISO3104	2.8000		0.75	
2129	ISO3104	2.971	G(0.01)	16.15	
	normality	not OK			
	n	46			
	outliers	3			
	mean (n)	2.79162			
	st.dev. (n)	0.008686			
	R(calc.)	0.02432			
	R(ISO3104:96)	0.03109			Compare (D445:12) = 0.02122



Determination of Lubricity by HFRR on sample #12060; result in  $\mu\text{m}$

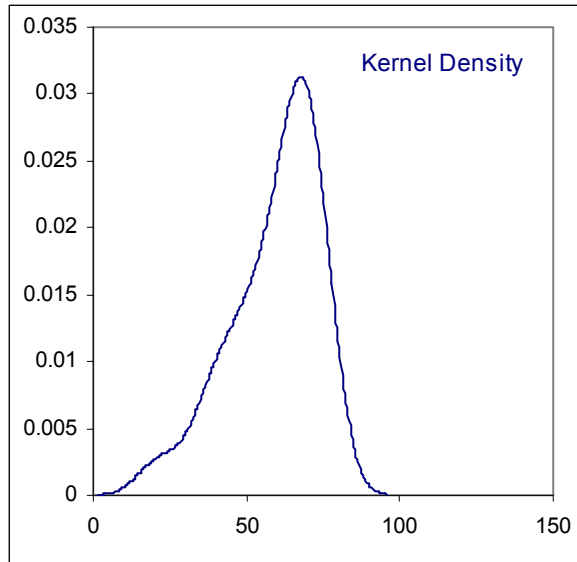
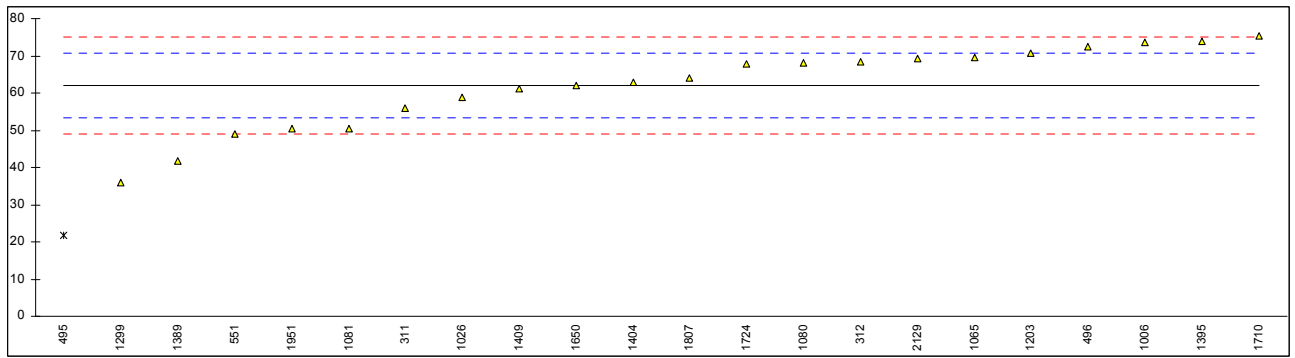
lab	method	value	mark	z(targ)	remarks
150	D6079	170		-0.46	
311	ISO12156	169		-0.48	
312	ISO12156	176		-0.29	
323	ISO12156	217		0.84	
340	ISO12156	191		0.12	
343	ISO12156	178		-0.24	
353		----		----	
432		----		----	
444		----		----	
445	ISO12156	189		0.07	
446		----		----	
447	IP450	181		-0.15	
463	ISO12156	212.1		0.70	
495	ISO12156	204		0.48	
496	ISO12156	206		0.53	
529		----		----	
551		----		----	
631	D7688	205		0.51	
913		----		----	
962		----		----	
1006	D6079	200		0.37	
1017		----		----	
1026	ISO12156	198		0.31	
1033	IP450	194		0.20	
1065		----		----	
1080	ISO12156	209		0.62	
1081	ISO12156	178		-0.24	
1108	ISO12156	184		-0.07	
1134	ISO12156	195		0.23	
1140	ISO12156	195		0.23	
1194		----		----	
1203	ISO12156	175		-0.32	
1205		----		----	
1227		----		----	
1237		----		----	
1259	ISO12156	184		-0.07	
1292		----		----	
1299	ISO12156	198		0.31	
1346	ISO12156	170		-0.46	
1389		----		----	
1395	ISO12156	171		-0.43	
1404	ISO12156	170		-0.46	
1409	ISO12156	192		0.15	
1419	ISO12156	150		-1.00	
1443	ISO12156	184.5		-0.06	
1510		----		----	
1634		----		----	
1635	ISO12156	222		0.97	
1650	ISO12156	259	G(0.05)	1.99	
1706		----		----	
1708	ISO12156	150		-1.00	
1710	ISO12156	176		-0.29	
1724	ISO12156	182		-0.13	
1728		----		----	
1807	ISO12156	153		-0.92	
1810	ISO12156	179		-0.21	
1811	ISO12156	175		-0.32	
1833	ISO12156	225		1.05	
1951	ISO12156	192		0.15	
2129	ISO12156	177		-0.26	
	normality	OK			
	n	39			
	outliers	1			
	mean (n)	186.58			
	st.dev. (n)	18.202			
	R(calc.)	50.97			
	R(ISO12156:06)	102.00			Compare R(D6079:11) = 80



## Determination of Oxidation Stability EN15751 on sample #12060; result in hours

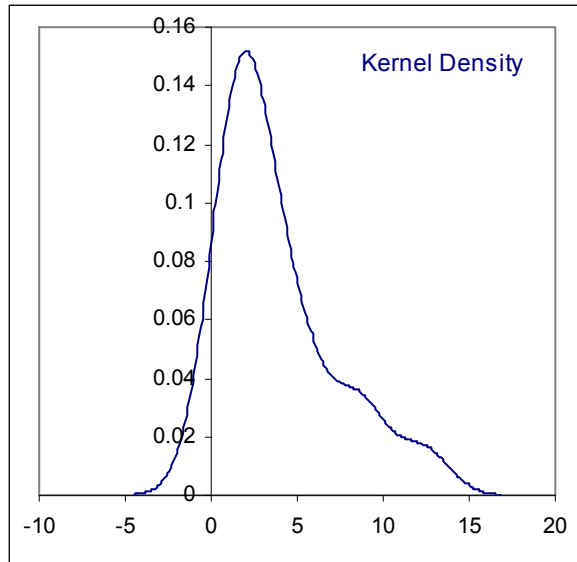
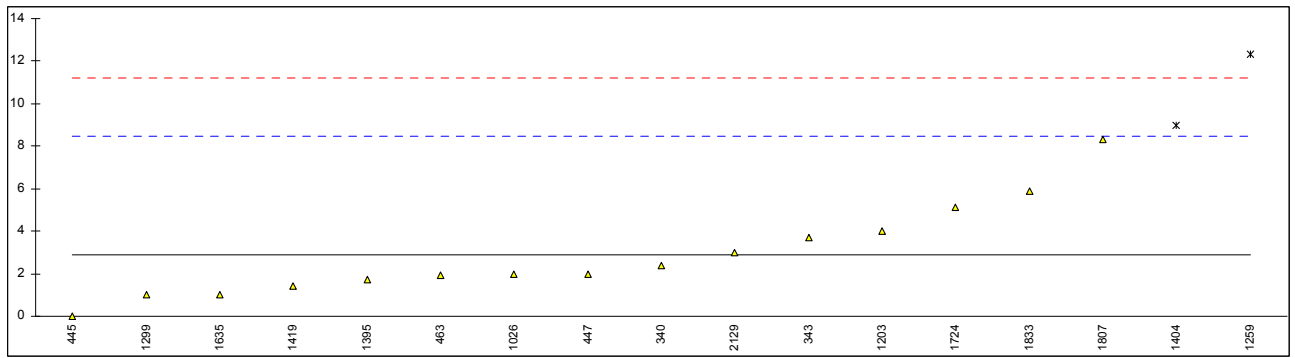
lab	method	value	mark	z(targ)	remarks
150		----		----	
311	EN15751	55.8		-1.42	
312	EN15751	68.3		1.46	
323	EN15751	>40		----	reported as +40
340	EN15751	>50		----	
343	EN15751	>35		----	
353		----		----	
432		----		----	
444		----		----	
445		----		----	
446		----		----	
447	EN15751	>20		----	
463		----		----	
495	EN15751	21.66	C,G(0.05)	-9.27	reported under oxidation stability ISO12205
496	EN15751	72.45		2.41	
529		----		----	
551	EN14112	49.03		-2.97	
631		----		----	
913		----		----	
962		----		----	
1006	EN15751	73.5		2.66	
1017		----		----	
1026	EN15751	58.70		-0.75	
1033	EN15751	>20		----	
1065	EN15751	69.5		1.74	
1080	EN15751	68.0		1.39	
1081	EN15751	50.4		-2.66	
1108	EN15751	>45		----	
1134		----		----	
1140		----		----	
1194		----		----	
1203	EN15751	70.75		2.02	
1205		----		----	
1227	EN15751	>30		----	
1237		----		----	
1259		----		----	
1292		----		----	
1299	EN15751	35.9		-6.00	
1346		----		----	
1389	EN15751	41.7		-4.66	
1395	EN15751	73.8		2.73	
1404	EN15751	62.9		0.22	
1409	EN15751	61.28		-0.16	
1419		----		----	
1443		----		----	
1510		----		----	
1634		----		----	
1635		----		----	
1650	EN15751	62.05		0.02	
1706		----		----	
1708		----		----	
1710	EN15751	75.3		3.07	
1724	EN15751	67.86		1.36	
1728		----		----	
1807	EN15751	64.2		0.52	
1810		----		----	
1811		----		----	
1833		----	W	----	result withdrawn, first reported: 16
1951	EN15751	50.3		-2.68	
2129	EN15751	69.38		1.71	
	normality	OK			
	n	21			
	outliers	1			
	mean (n)	61.957			
	st.dev. (n)	11.0529			
	R(calc.)	30.948			
	R(EN15751:09)	12.168			





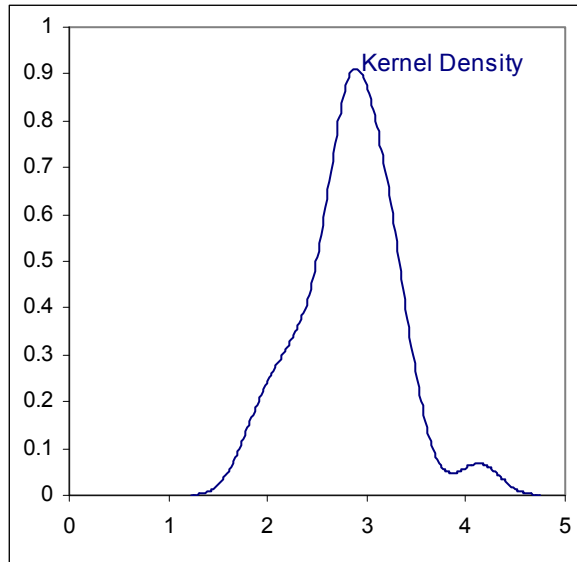
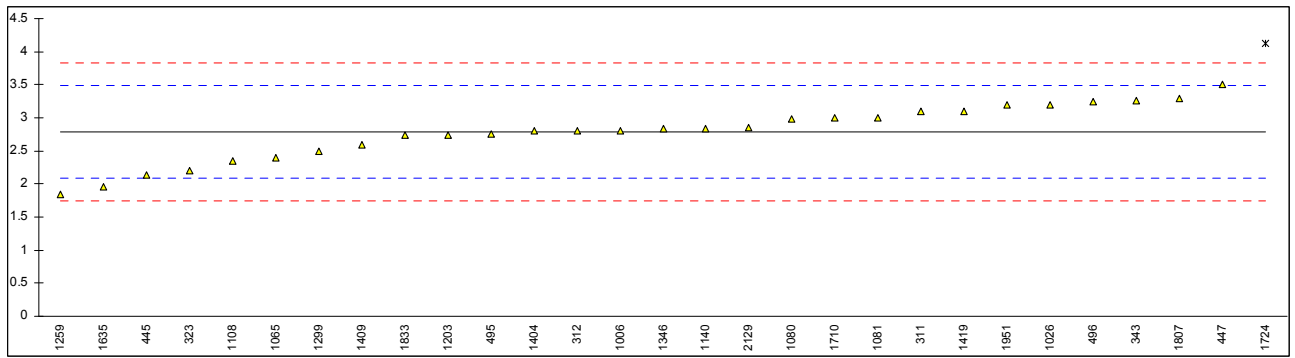
Determination of Oxidation Stability ISO12205 on sample #12060; result in g/m<sup>3</sup>

lab	method	value	mark	z(targ)	remarks
150		----		----	
311		----		----	
312		----		----	
323		----		----	
340	ISO12205	2.4		-0.18	
343	ISO12205	3.71		0.29	
353		----		----	
432		----		----	
444		----		----	
445	IP388	0		-1.04	
446		----		----	
447	ISO12205	2		-0.32	
463	ISO12205	1.94		-0.35	
495	EN15751	21.66	ex	----	result excluded, EN15751 not equal to ISO12205
496		----		----	
529		----		----	
551		----		----	
631		----		----	
913		----		----	
962		----		----	
1006		----		----	
1017		----		----	
1026	ISO12205	2		-0.32	
1033		----		----	
1065		----		----	
1080		----		----	
1081		----		----	
1108		----		----	
1134		----		----	
1140		----		----	
1194		----		----	
1203	ISO12205	4.0		0.40	
1205		----		----	
1227		----		----	
1237		----		----	
1259	ISO12205	12.34	DG(0.05)	3.40	
1292		----		----	
1299	ISO12205	1		-0.68	
1346		----		----	
1389		----		----	
1395	ISO12205	1.7		-0.43	
1404	ISO12205	9	DG(0.05)	2.20	
1409		----		----	
1419	ISO12205	1.4		-0.54	
1443		----		----	
1510		----		----	
1634		----		----	
1635	ISO12205	1		-0.68	
1650		----		----	
1706		----		----	
1708		----		----	
1710		----		----	
1724	ISO12205	5.14		0.81	
1728		----		----	
1807	ISO12205	8.3		1.94	
1810		----		----	
1811		----		----	
1833	ISO12205	5.9		1.08	
1951		----		----	
2129	ISO12205	3		0.04	
	normality	OK			
	n	15			
	outliers	2			
	mean (n)	2.899			
	st.dev. (n)	2.1903			
	R(calc.)	6.133			
	R(ISO12205:95)	7.778			



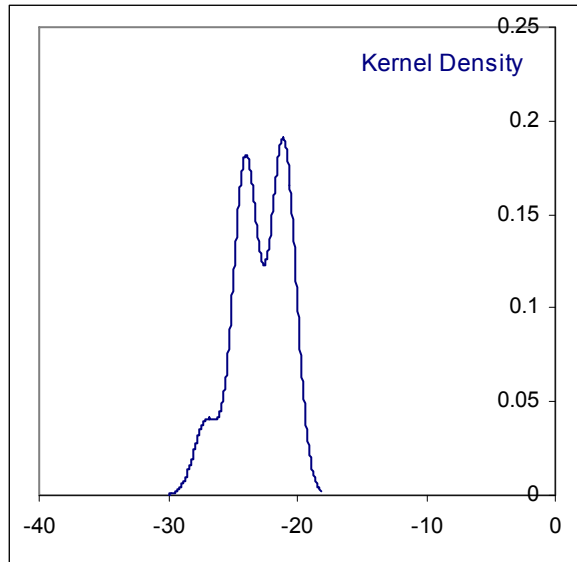
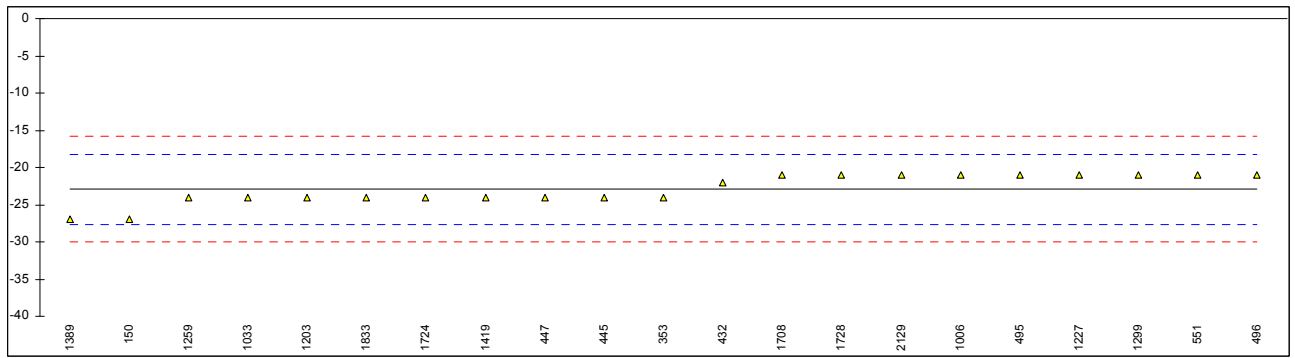
Determination of Polycyclic Aromatic Hydrocarbons on sample #12060; result in %M/M

lab	method	value	mark	z(targ)	remarks
150		----		----	
311	EN12916	3.1		0.89	
312	EN12916	2.8		0.04	
323	EN12916	2.2		-1.68	
340		----		----	
343	EN12916	3.26		1.35	
353		----		----	
432		----		----	
444		----		----	
445	IP391	2.14		-1.85	
446		----		----	
447	IP391	3.5		2.04	
463		----		----	
495	EN12916	2.75		-0.11	
496	EN12916	3.252		1.33	
529		----		----	
551		----		----	
631		----		----	
913		----		----	
962		----		----	
1006	D6591	2.8		0.04	
1017		----		----	
1026	EN12916	3.2	C	1.18	first reported: 23.9 (=total arom)
1033		----		----	
1065	EN12916	2.4		-1.11	
1080	EN12916	2.98		0.55	
1081	EN12916	3.0		0.61	
1108	EN12916	2.34		-1.28	
1134		----		----	
1140	EN12916	2.84		0.15	
1194		----		----	
1203	EN12916	2.74		-0.13	
1205		----		----	
1227		----		----	
1237		----		----	
1259	EN12916	1.848		-2.68	
1292		----		----	
1299	EN12916	2.5		-0.82	
1346	EN12916	2.84		0.15	
1389		----		----	
1395		----		----	
1404	EN12916	2.8		0.04	
1409	EN12916	2.6		-0.53	
1419	EN12916	3.1	C	0.89	first reported: 23.9
1443		----		----	
1510		----		----	
1634		----		----	
1635	EN12916	1.96		-2.36	
1650		----		----	
1706		----		----	
1708		----		----	
1710	EN12916	3.0		0.61	
1724	EN12916	4.13	G(0.05)	3.83	
1728		----		----	
1807	EN12916	3.3		1.46	
1810		----		----	
1811		----		----	
1833	EN12916	2.74		-0.13	
1951	IP391	3.2		1.18	
2129	EN12916	2.85		0.18	
	normality	not OK			
	n	28			
	outliers	1			
	mean (n)	2.787			
	st.dev. (n)	0.4167			
	R(calc.)	1.167			
	R(EN12916:06)	0.981			



Determination of Pour Point (manual) on sample #12060; results in °C

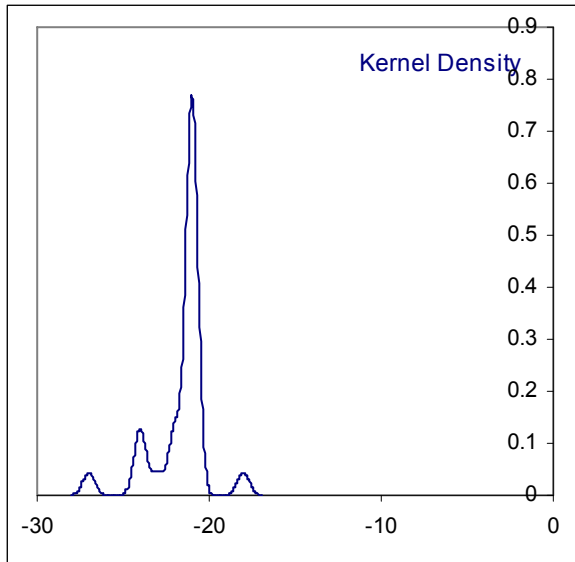
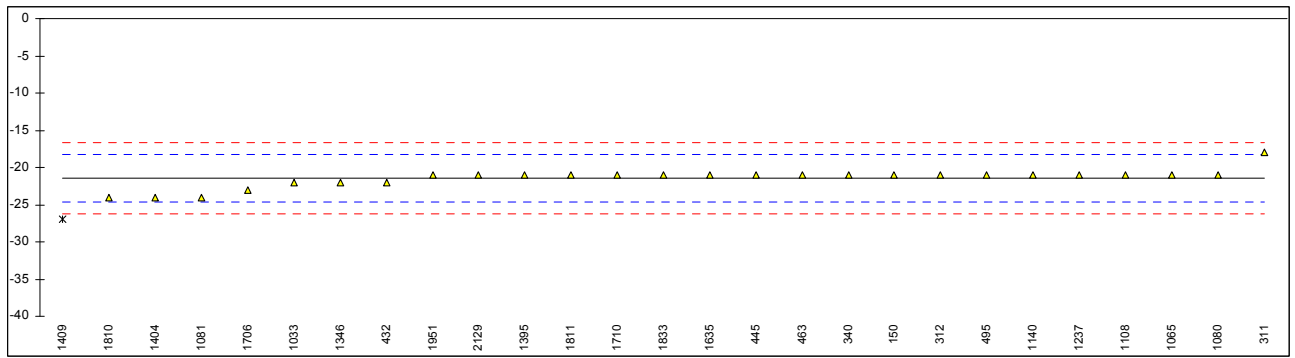
lab	method	value	mark	z(targ)	remarks
150	D97	-27		-1.74	
311		----		----	
312		----		----	
323		----		----	
340		----		----	
343		----		----	
353	IP15	-24		-0.46	
432	ISO3016	-22		0.38	
444		----		----	
445	D97	-24		-0.46	
446		----		----	
447	IP15	-24		-0.46	
463		----		----	
495	ISO3016	-21		0.81	
496	ISO3016	-21		0.81	
529		----		----	
551	D97	-21	C	0.81	reported under automated method, first reported: -27
631		----		----	
913		----		----	
962		----		----	
1006	D97	-21	C	0.81	reported under automated method
1017		----		----	
1026		----		----	
1033	IP15	-24		-0.46	
1065		----		----	
1080		----		----	
1081		----		----	
1108		----		----	
1134		----		----	
1140		----		----	
1194		----		----	
1203	ISO3016	-24		-0.46	
1205		----		----	
1227	D97	-21		0.81	
1237		----		----	
1259	ISO3016	-24		-0.46	
1292		----		----	
1299	ISO3016	-21		0.81	
1346		----		----	
1389	D97	-27		-1.74	
1395		----		----	
1404		----		----	
1409		----		----	
1419	ISO3016	-24		-0.46	
1443		----		----	
1510		----		----	
1634		----		----	
1635		----		----	
1650		----		----	
1706		----		----	
1708	ISO3016	-21		0.81	
1710		----		----	
1724	ISO3016	-24		-0.46	
1728	D97	-21		0.81	
1807	ISO3016	<-24		----	
1810		----		----	
1811		----		----	
1833	ISO3016	-24		-0.46	
1951		----		----	
2129	ISO3016	-21		0.81	
	normality	not OK			
	n	21			
	outliers	0			
	mean (n)	-22.90			
	st.dev. (n)	1.972			
	R(calc.)	5.52			
	R(ISO3016:94)	6.60			



## Determination of Pour Point (automated) on sample #12060; results in °C

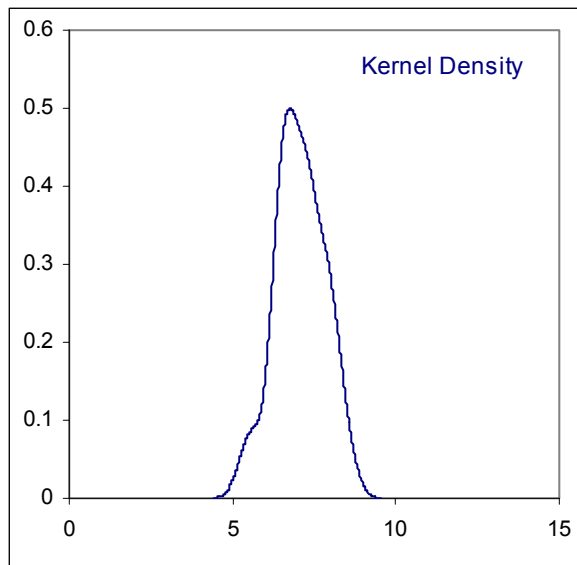
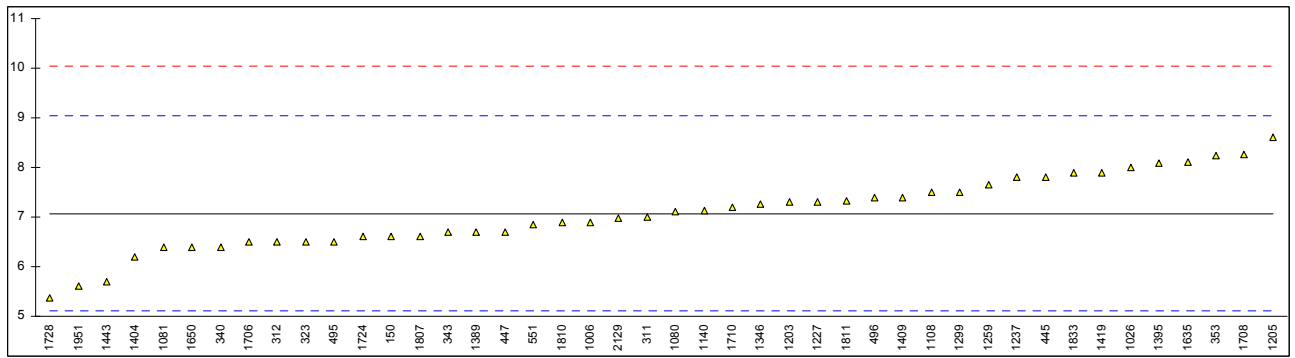
lab	method	value	mark	z(targ)	remarks
150	D5950	-21		0.26	
311	D5950	-18		2.13	
312	D5950	-21		0.26	
323		----		----	
340	D5950	-21		0.26	
343		----		----	
353		----		----	
432	D5950	-22		-0.36	
444		----		----	
445	D5950	-21		0.26	
446		----		----	
447		----		----	
463	D6892	-21		0.26	
495	D5950	-21		0.26	
496		----		----	
529		----		----	
551	D97	-21	ex	0.26	result excluded, D97 describes the manual method
631		----		----	
913		----		----	
962		----		----	
1006	D97	-21	ex	0.26	result excluded, D97 describes the manual method
1017		----		----	
1026		----		----	
1033	D5950	-22		-0.36	
1065	D5950	-21		0.26	
1080	D5950	-21		0.26	
1081	D5950	-24		-1.60	
1108	D5950	-21		0.26	
1134		----		----	
1140	D5950	-21.0		0.26	
1194		----		----	
1203		----		----	
1205		----		----	
1227		----		----	
1237	D5950	-21		0.26	
1259		----		----	
1292		----		----	
1299		----		----	
1346	D5950	-22		-0.36	
1389		----		----	
1395	D5950	-21		0.26	
1404	ISO3016	-24		-1.60	
1409	D5950	-27	G(0.01)	-3.47	
1419		----		----	
1443		----		----	
1510		----		----	
1634		----		----	
1635	D5950	-21		0.26	
1650		----		----	
1706	D5950	-23.0		-0.98	
1708		----		----	
1710	D5950	-21		0.26	
1724		----		----	
1728		----		----	
1807		----		----	
1810	D5950	-24		-1.60	
1811	D5950	-21		0.26	
1833	D5950	-21		0.26	
1951	D5950	-21		0.26	
2129	D5950	-21		0.26	
	normality	not OK			
	n	26			
	outliers	1			
	mean (n)	-21.42			
	st.dev. (n)	1.238			
	R(calc.)	3.47			
	R(D5950:07)	4.50			





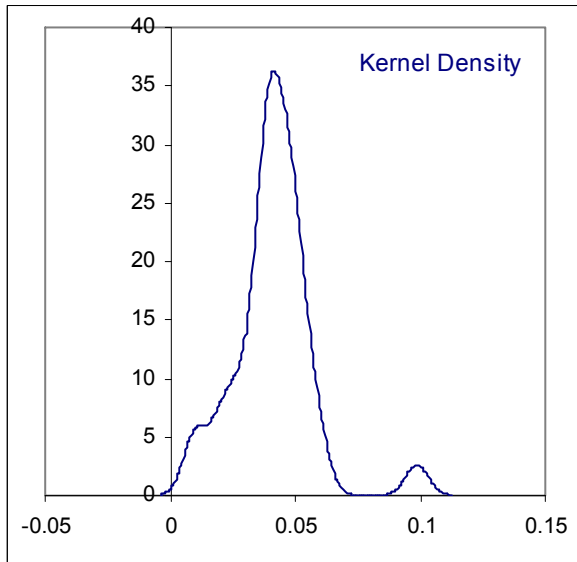
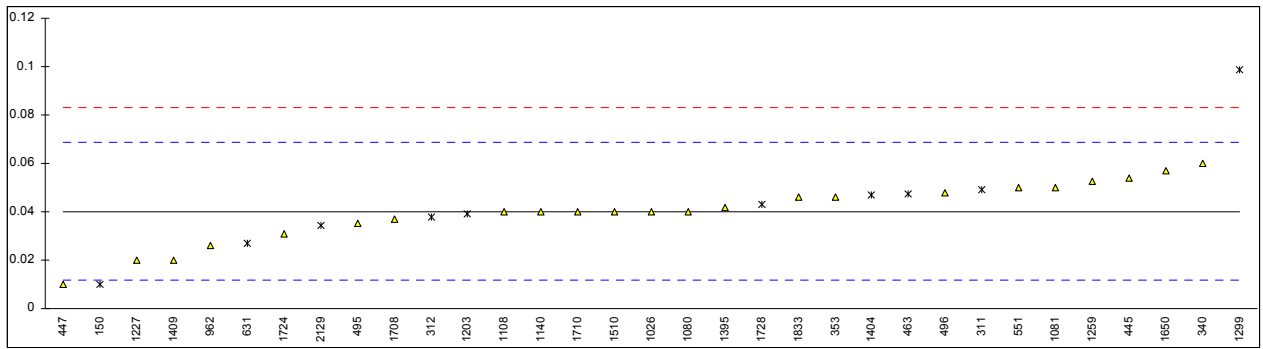
Determination of Sulphur Content on sample #12060; result in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D2622	6.6		-0.48	
311	ISO20846	7.0		-0.08	
312	D5453	6.5		-0.58	
323	ISO20846	6.5		-0.58	
340	ISO20846	6.40		-0.68	
343	ISO20846	6.698		-0.38	
353	IP531	8.24		1.18	
432		----		----	
444		----		----	
445	ISO20846	7.8	C	0.73	first reported: 327.78
446		----		----	
447	IP490	6.7		-0.38	
463		----		----	
495	ISO20846	6.5		-0.58	
496	ISO20846	7.39		0.32	
529		----		----	
551	D5453	6.85		-0.23	
631		----		----	
913		----		----	
962		----		----	
1006	D5453	6.9		-0.18	
1017		----		----	
1026	ISO20884	8		0.94	
1033		----		----	
1065		----		----	
1080	ISO20846	7.11		0.03	
1081	ISO20846	6.4		-0.68	
1108	ISO20846	7.5		0.43	
1134		----		----	
1140	ISO20846	7.13		0.05	
1194		----		----	
1203	ISO20846	7.3		0.23	
1205	ISO20884	8.6		1.54	
1227	D5453	7.3		0.23	
1237	ISO20846	7.8		0.73	
1259	ISO20846	7.65		0.58	
1292		----		----	
1299	ISO20846	7.5		0.43	
1346	ISO20846	7.27		0.20	
1389	ISO20846	6.7		-0.38	
1395	ISO20846	8.09		1.03	
1404	ISO20846	6.2		-0.89	
1409	ISO20846	7.4		0.33	
1419	ISO20846	7.90		0.83	
1443	ISO20846	5.7		-1.39	
1510		----		----	
1634		----		----	
1635	ISO20846	8.1		1.04	
1650	ISO20846	6.4		-0.68	
1706	ISO20884	6.5		-0.58	
1708	ISO20846	8.27		1.21	
1710	ISO20846	7.2		0.13	
1724	ISO20846	6.599		-0.48	
1728	D5453	5.36		-1.74	
1807	ISO20846	6.6		-0.48	
1810	ISO20846	6.9		-0.18	
1811	ISO20846	7.32		0.25	
1833	ISO20846	7.9		0.83	
1951	ISO20846	5.6		-1.50	
2129	ISO20846	6.97		-0.11	
	normality	OK			
	n	44			
	outliers	0			
	mean (n)	7.076			
	st.dev. (n)	0.7356			
	R(calc.)	2.060			
	R(ISO 20846:11)	2.764			Compare R(5453:09) = 2.51 Application range 1 – 8000 mg/kg



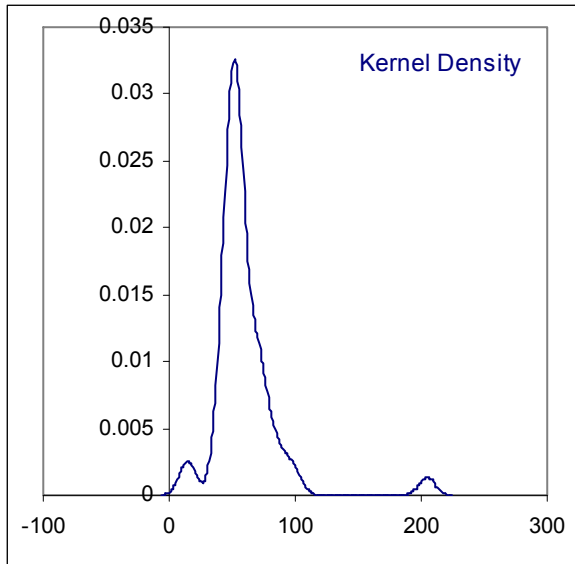
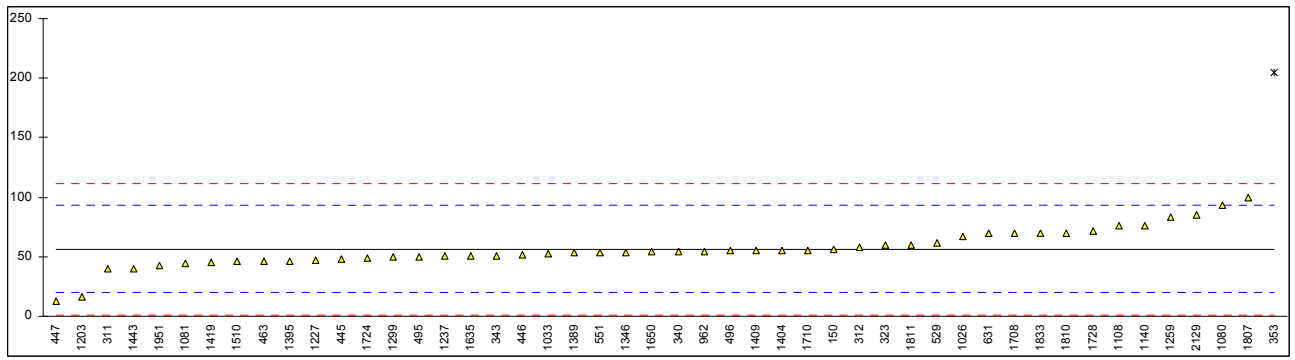
## Determination of Total acid Number (TAN) on sample #12060; result in mgKOH/g

lab	method	value	mark	z(targ)	remarks
150	D974	0.01	ex	-1.73	method is not equivalent with D664
311	D974	0.049	ex	0.50	method is not equivalent with D664
312	D974	0.038	ex	-0.13	method is not equivalent with D664
323		----		----	
340	D664	0.06		1.13	
343		----		----	
353	IP177	0.046		0.33	
432		----		----	
444		----		----	
445	D664	0.054		0.79	
446		----		----	
447	D664	0.01		-1.73	
463	D974	0.0474	ex	0.41	method is not equivalent with D664
495	D664	0.035		-0.30	
496	D664	0.048		0.45	
529		----		----	
551	D664	0.05	C	0.56	first reported: 0.555
631	D974	0.027	ex	-0.75	method is not equivalent with D664
913		----		----	
962	D664	0.026		-0.81	
1006		----		----	
1017		----		----	
1026	D664	0.04		-0.01	
1033	D664	<0.01		----	
1065		----		----	
1080	D664	0.04		-0.01	
1081	D664	0.05		0.56	
1108	D664	0.040		-0.01	
1134		----		----	
1140	D664	0.04		-0.01	
1194		----		----	
1203	D974	0.039	ex	-0.07	method is not equivalent with D664
1205		----		----	
1227	D664	0.02		-1.16	
1237		----		----	
1259	D664	0.0524		0.70	
1292		----		----	
1299	D664	0.09887	G(0.01)	3.36	
1346		----		----	
1389		----		----	
1395	D664	0.0419		0.10	
1404	D974	0.047	ex	0.39	method is not equivalent with D664
1409	D664	0.02		-1.16	
1419		----		----	
1443		----		----	
1510	D664	0.040		-0.01	
1634		----		----	
1635		----		----	
1650	D664	0.057		0.96	
1706		----		----	
1708	D664	0.037		-0.18	
1710	D664	0.04		-0.01	
1724	D664	0.031		-0.53	
1728	D974	0.04324	ex	0.17	method is not equivalent with D664
1807		----		----	
1810		----		----	
1811		----		----	
1833	D664	0.046		0.33	
1951		----		----	
2129	D974	0.0342	ex	-0.34	method is not equivalent with D664
	normality	not OK			
	n	23			
	outliers	1			
	mean (n)	0.0402			
	st.dev. (n)	0.01241			
	R(calc.)	0.0347			
	R(D664:11)	0.0489			



## Determination of Water on sample #12060; result in mg/kg

lab	method	value	mark	z(targ)	remarks
150	E1064	56		-0.02	
311	ISO12937	40		-0.89	
312	ISO12937	58.3		0.10	
323	ISO12937	60		0.20	
340	ISO12937	54.1		-0.12	
343	ISO12937	51		-0.29	
353	IP439	205	G(0.01)	8.06	
432		----		----	
444		----		----	
445	ISO12937	47.7		-0.47	
446	ISO12937	52		-0.24	
447	IP438	13		-2.35	
463	ISO12937	46		-0.56	
495	ISO12937	50		-0.35	
496	ISO12937	55.0		-0.08	
529	E1064	61.91		0.30	
551	D6304	53.1		-0.18	
631	D6304	69.3		0.70	
913		----		----	
962	ISO12937	54.47		-0.10	
1006		----		----	
1017		----		----	
1026	ISO12937	67		0.58	
1033	IP438	52.59		-0.21	
1065		----		----	
1080	ISO12937	93		1.99	
1081	D6304	44		-0.67	
1108	ISO12937	76		1.06	
1134		----		----	
1140	ISO12937	76		1.06	
1194		----		----	
1203	ISO12937	16.4		-2.17	
1205		----		----	
1227	D6304	47.5		-0.48	
1237	ISO12937	51		-0.29	
1259	ISO12937	83.4		1.46	
1292		----		----	
1299	ISO12937	49.5		-0.37	
1346	ISO12937	53.5		-0.16	
1389	ISO12937	53		-0.18	
1395	ISO12937	46.55		-0.53	
1404	ISO12937	55		-0.08	
1409	ISO12937	55		-0.08	
1419	ISO12937	45		-0.62	
1443	ISO12937	40.09		-0.88	
1510	ISO12937	46		-0.56	
1634		----		----	
1635	ISO12937	51		-0.29	
1650	ISO12937	54		-0.13	
1706		----		----	
1708	ISO12937	70		0.74	
1710	ISO12937	55.1		-0.07	
1724	ISO12937	48.9		-0.41	
1728	E203	71.19		0.80	
1807	ISO3405	100		2.36	
1810	ISO12937	70		0.74	
1811	ISO12937	60		0.20	
1833	ISO12937	70		0.74	
1951	ISO12937	42.7		-0.74	
2129	IP439	85		1.55	
	normality	not OK			
	n	47			
	outliers	1			
	mean (n)	56.389			
	st.dev. (n)	16.1149			
	R(calc.)	45.122			
	R(ISO12937:00)	51.641			



## Determination of Distillation (Automated &amp; Manual) on sample #12060; result in °C

Lab method	IBP	mark	10%rec	mark	50%rec	mark	90%rec	mark	95%rec	mark	FBP	mark
150 ISO3405-A	176.1		216.5		276.6		330.5		343.6		349.2	
311 ISO3405-A	167		212.6		275.4		330.2		341.5		354.0	
312 D86-A	173.4		217.2		276.9		330.1		341.5		347.2	
323 ISO3405-A	178.4		218.6		277.5		330.7		341.6		350.5	
340 ISO3405-A	175.1		211.4		276.6		333.4		347.1	DG(0.05)	351.4	
343 ISO3405-A	174.8	C	215.2		276.7		331.0		343.1		346.1	
353 IP123-A	172.5		214.7		277.1		331.2		342.4		353.9	
432 ISO3405-	----		----		----		----		----		----	
444 ISO3405-	----		----		----		----		----		----	
445 IP123-A	169.8		219.8		277.1		330.5		344.0		351.6	
446 D86-A	172.8		215.2		276.0		330.0		341.3		350.7	
447 IP123-A	176.7		217.6		277.7		332.3		345.4		354.5	
463 ISO3405-A	175.0		217.4		276.2		332.7		343.7		353.3	
495 ISO3405-A	173.0		215.7		276.2		330.9		344.0		351.4	
496 ISO3405-A	175.2		217.2		276.6		331.2		342.9		350.4	
529 ISO3405-	----		----		----		----		----		----	
551 ISO3405-	----		----		----		----		----		----	
631 D86-M	180.0		217.0		277.0		331.0		343.0		353.0	
913 ISO3405-	----		----		----		----		----		----	
962 ISO3405-M	176.5		218.0		277.5		330.5		342.0		351.5	
1006 D86-A	174.6		215.7		276.5		332.6		343.8		351.3	
1017 ISO3405-	----		----		----		----		----		----	
1026 ISO3405-A	172.3		218.6		275.7		331.0		342.6		351.6	
1033 IP123-A	177.2		214.9		277.3		332.2		344.0		352.8	
1065 ISO3405-A	180.5		217.1		277.3		331.9		343.1		356.6	
1080 ISO3405-A	179.2		214.3		275.8		331.0		342.9		352.2	
1081 D86-A	175.5		219.2		276.7		329.9		341.4		351.5	
1108 ISO3405-A	174.7		213.0		275.7		331.1		343.3		353.2	
1134 D86-A	167.1		213.6		276.3		330.8		342.5		353.5	
1140 D86-A	169.2		214.4		274.2		328.6		339.9		346.9	
1194 ISO3405-	----		----		----		----		----		----	
1203 ISO3405-A	169.8		215.1		278.2		332.9		344.4		350.4	
1205 D86-A	175.5		217.2		277.1		329.5		340.7		348.9	
1227 D86-A	177.0		215.2		277.9		330.6		342.7		350.2	
1237 ISO3405-M	175.2		217.3		274.3	C	330.3	C	350.3	G(0.01)	355.3	
1259 ISO3405-A	175.8		216.4		275.7		328.2		338.7		349.6	
1292 ISO3405-	----		----		----		----		----		----	
1299 ISO3405-A	174.7		214.6		275.9		330.5		343.3		352.0	
1346 ISO3405-A	179.0		216.2		276.8		330.9		342.3		354.0	
1389 D86-M	177.3		211.2		273.1	DG(0.05)	330.0		340.0		353.0	
1395 ISO3405-A	177.4		216.2		276.7		330.2		341.2		353.7	
1404 ISO3405-A	170.3		211.1		274.9		329.8		341.4		349.0	
1409 ISO3405-A	171.3		216.3		276.7		331.4		343.3		347.7	
1419 ISO3405-M	180.7		218.3		276.4		329.6		342.3		351.0	
1443 ISO3405-M	172.0		212.0		276.5		331.0		343.0		354.0	
1510 ISO3405-A	178.6		215.1		276.1		331.6		344.5		354.4	
1634 ISO3405-A	171.1		217.2		276.5		330.6		343.8		351.5	
1635 ISO3405-A	172.5		215.6		275.4		329.8		342.0		350.6	
1650 ISO3405-A	173.7		211.7		275.7		330.6		342.5		352.8	
1706 ISO3405-A	179.1		217.7		277.9		330.6		342.7		350.4	
1708 ISO3405-M	176.5		211.0		273.5	DG(0.05)	329.0		341.0		352.0	
1710 ISO3405-A	175.1		217.5		277.2		332.9		347.7	DG(0.05)	353.2	
1724 ISO3405-A	173.7		215.6		276.0		330.1		343.2		351.3	
1728 ISO3405-M	178.94		214.93		274.93		331.92		344.92		350.92	
1807 ISO3405-A	176.4		216.2		277.1		330.8		343.1		350.1	
1810 ISO3405-A	180.1		218.6		276.9		329.8		341.4		353.0	
1811 ISO3405-A	178		218.5		275.9		333.0		345.0		356.7	
1833 ISO3405-A	174.8		215.9		277.4		332.0		344.8		352.2	
1951 ISO3405-A	172.6		214.9		275.5		331.8		343.5		354.7	
2129 ISO3405-A	177.9		216.8		276.7		331.0		342.6		352.1	
normality	OK		OK		OK		not OK		OK		OK	
n	52		52		50		52		49		52	
outliers	0		0		2		0		3		0	
mean (n)	175.03		215.75		276.46		330.88		342.69		351.79	
st.dev. (n)	3.338		2.208		0.884		1.11		1.391		2.261	
R(calc.)	9.35		6.18		2.48		3.12		3.90		6.33	
R(ISO3405:11/D86:11)	9.63		4.75		2.97		4.96		8.57		7.10	



Determination of Distillation (Automated+Manual) on sample #12060; result in %V/V, (continued)

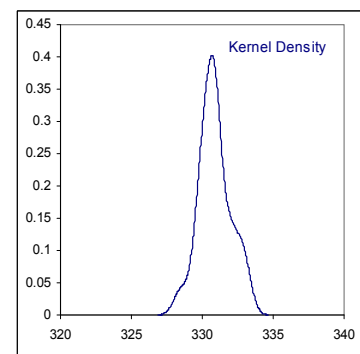
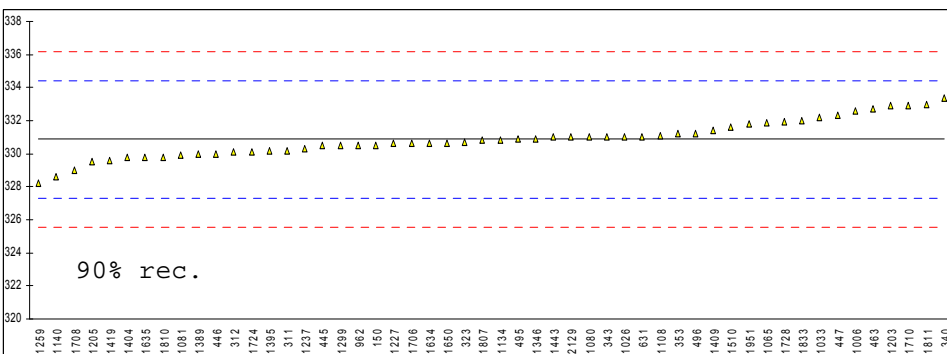
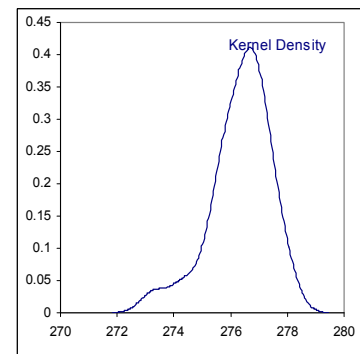
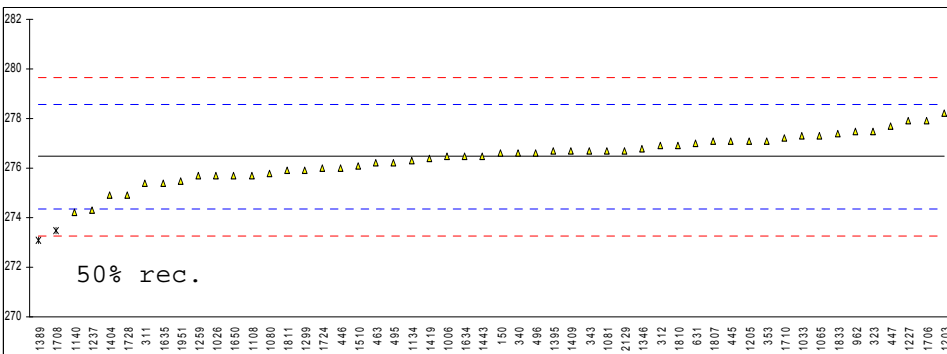
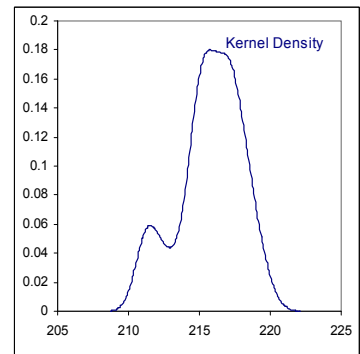
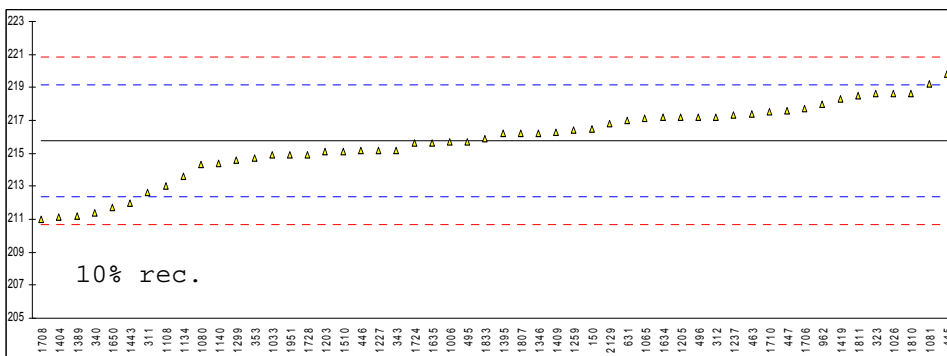
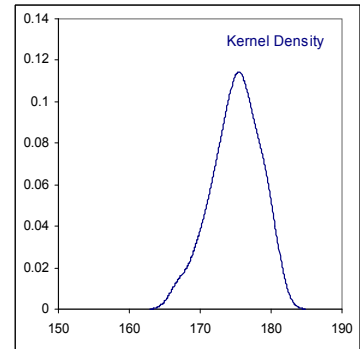
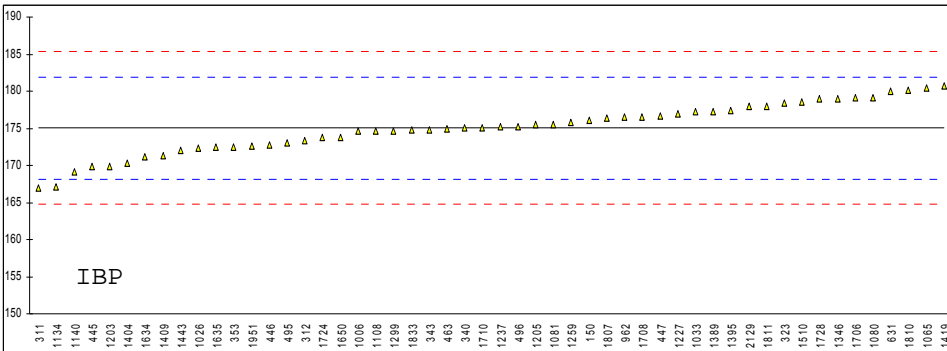
Lab method	Volume at 250°C mark	z(targ)	Volume at 350°C mark	z(targ)	%residue	mark
150	----	----	----	----	1.7	C
311 ISO3405-A	30.7	0.75	97.0	0.39	0.6	
312 D86-A	29.6	-0.41	98.0	1.44	2.0	
323 ISO3405-A	28.6	-1.46	95.0	----	1.6	
340 ISO3405-A	30.4	0.43	95.6	-1.09	1.2	
343 ISO3405-A	29.4	-0.62	----	----	2.2	
353 IP123-A	30.1	0.12	96.7	0.07	0.8	
432	----	----	----	----	----	
444	----	----	----	----	----	
445 IP123-A	29.4	-0.62	96.4	-0.24	1.2	
446 D86-A	30.5	0.54	97.3	0.70	1.2	
447 IP123-A	29.4	-0.62	96.0	-0.66	1.0	
463 ISO3405-A	29.9	-0.09	96.5	-0.14	1.8	
495 ISO3405-A	30.6	0.64	96.9	0.28	1.4	
496 ISO3405-A	29.2	-0.83	96.8	0.18	1.4	
529	----	----	----	----	----	
551	----	----	----	----	----	
631	----	----	----	----	1.5	
913	----	----	----	----	----	
962 ISO3405-M	29.0	-1.04	----	----	1.5	
1006	----	----	----	----	1.4	
1017	----	----	----	----	----	
1026 ISO3405-A	30.0	0.01	96.6	-0.03	1.9	
1033 IP123-A	29.4	-0.62	96.3	-0.35	1.8	
1065 ISO3405-A	30.2	0.22	96.8	0.18	1.1	
1080 ISO3405-A	30.4	0.43	96.6	-0.03	1.2	
1081 D86-A	29.6	-0.41	97.1	0.49	0.6	
1108 ISO3405-A	30.3	0.33	96.3	-0.35	1.5	
1134 D86-A	30.3	0.33	97.0	0.39	1.6	
1140 D86-A	31.5	1.59	----	----	1.8	
1194	----	----	----	----	----	
1203 ISO3405-A	29.4	-0.62	96.8	0.18	1.7	
1205 D86-A	29.1	-0.94	----	----	1.7	
1227 D86-A	30.6	0.64	97.6	1.02	1.0	
1237 ISO3405-M	27.8	-2.30	95.8	-0.88	1.1	
1259 ISO3405-A	30.1	0.12	----	----	1.4	
1292	----	----	----	----	----	
1299 ISO3405-A	30.3	0.33	96.3	-0.35	1.4	
1346 ISO3405-A	29.5	-0.52	97.0	0.39	0.8	
1389 D86-M	31.3	1.38	----	----	0.7	
1395 ISO3405-A	29.8	-0.20	97.2	0.60	0.9	
1404 ISO3405-A	31.9	2.01	94.5	-2.24	0.8	
1409 ISO3405-A	29.5	-0.52	----	----	1.7	
1419 ISO3405-M	29.3	-0.73	96.6	-0.03	1.6	
1443 ISO3405-M	30	0.01	97	0.39	1.7	
1510 ISO3405-A	30.3	0.33	96.2	-0.45	1.0	
1634 ISO3405-A	29.8	-0.20	97.4	0.81	1.6	
1635 ISO3405-A	30.7	0.75	96.9	0.28	1.4	
1650 ISO3405-A	30.7	0.75	96.6	-0.03	1.2	
1706 ISO3405-A	28.6	-1.46	96.6	-0.03	1.7	
1708 ISO3405-M	31.5	1.59	96.5	-0.14	1.4	
1710 ISO3405-A	29.8	-0.20	95.5	-1.19	1.5	
1724 ISO3405-A	30.3	0.33	96.4	-0.24	1.5	
1728 ISO3405-M	31.48	1.57	97.12	0.51	2.0	
1807 ISO3405-A	29.6	-0.41	98.4	1.86	1.2	
1810 ISO3405-A	30.2	0.22	97.5	0.91	1	
1811 ISO3405-A	29.7	-0.30	96.4	-0.24	1.4	
1833 ISO3405-A	29.3	-0.73	96.1	-0.56	1.8	
1951 ISO3405-A	30.2	0.22	96.3	-0.35	1.0	
2129 ISO3405-A	30.2	0.22	96.9	0.28	1.0	
normality	OK		OK			
n	49		42			
outliers	0		0			
mean (n)	29.99		96.63			
st.dev. (n)	0.798		0.718			
R(calc.)	2.23		2.01			
R(ISO3405:11/D86:11)	2.66		2.66			

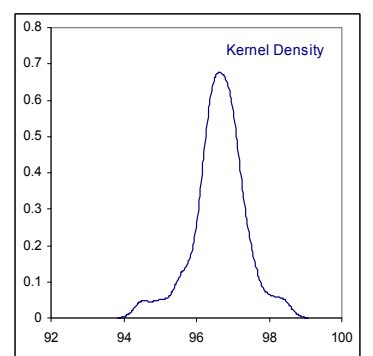
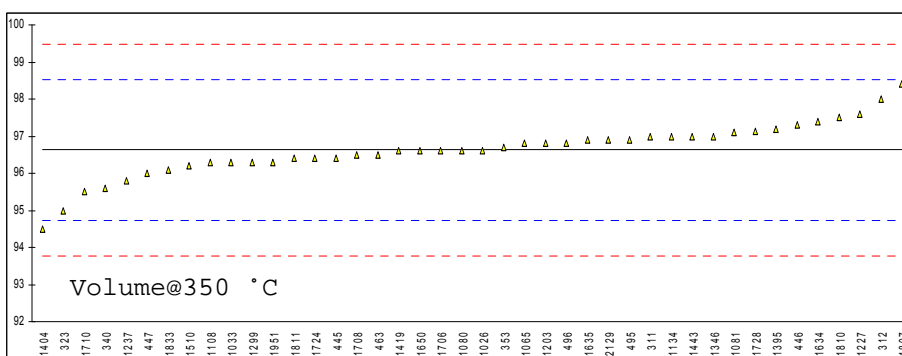
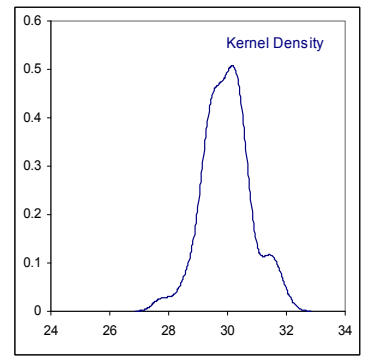
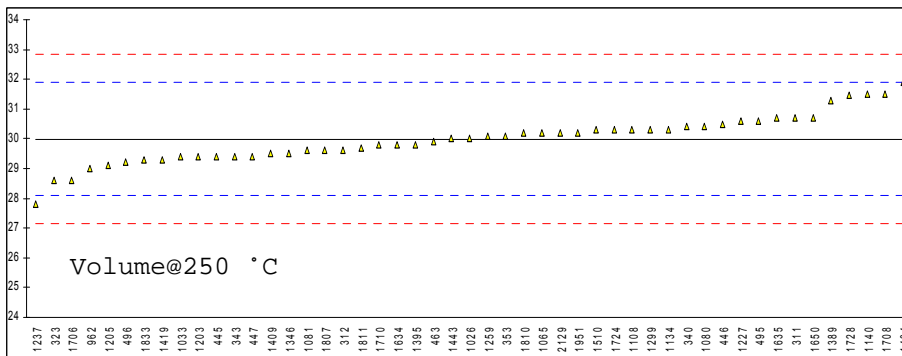
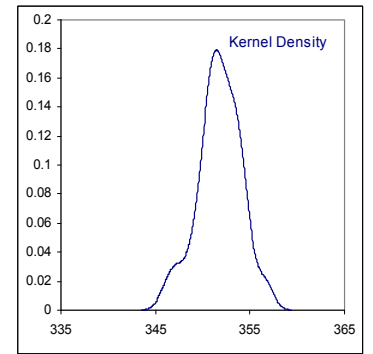
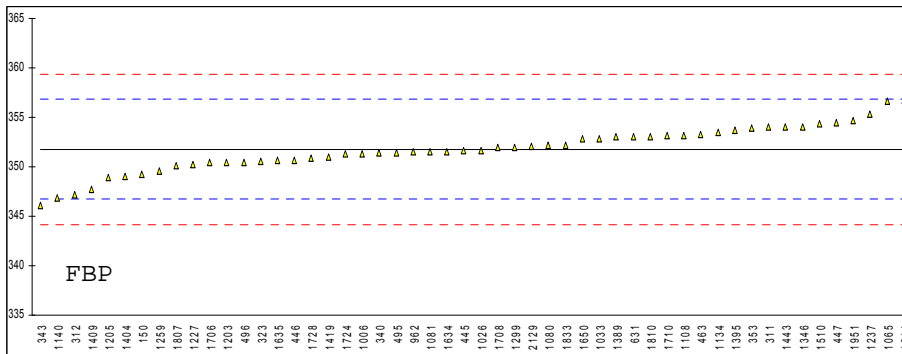
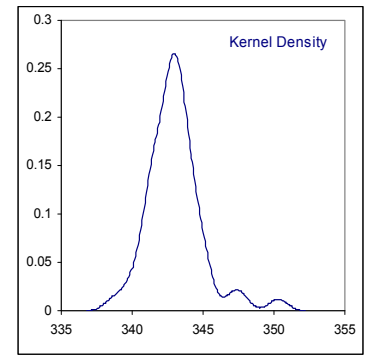
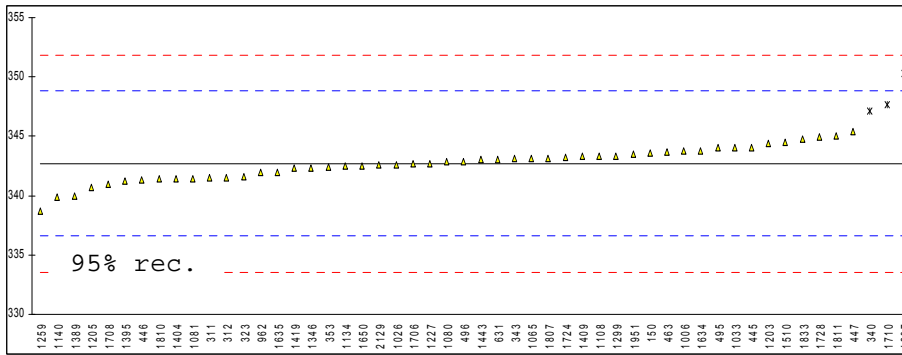
first reported results:

lab 343: IBP: 194.7

lab 1237: 50% rec: 280.3 90% rec: 336.3

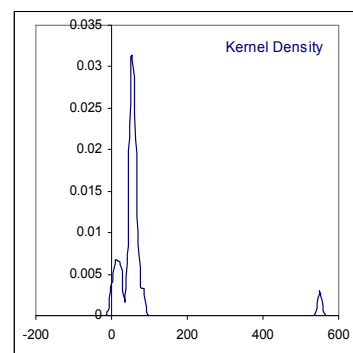
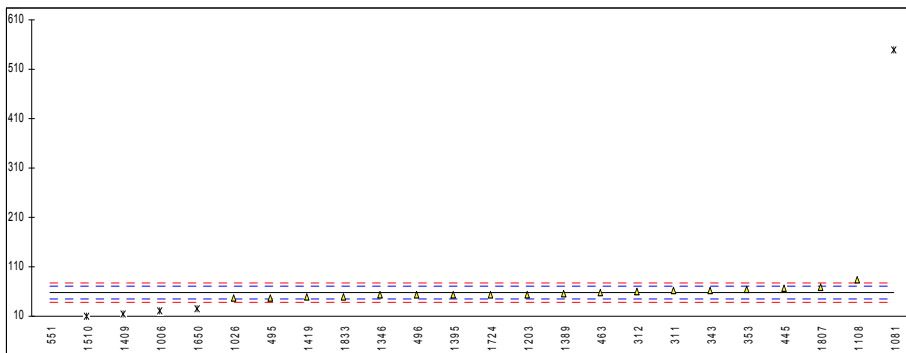
lab 1510: volume at 250 °C: 23.8





Determination of Total Contamination on sample #12061; result in mg/kg

lab	method	value	mark	z(targ)	vol. used	remarks
311	EN12662	62		0.67	500	
312	EN12662:08	61.07		0.52	800	
323	EN12662:08	>30		----	----	fail after 600 ml, 47 mm filter
340	EN12662:08	fail		----	----	
343	EN12662:08	62.05		0.68	800	
353	EN12662:08	64.87		1.13	850	
445	EN12662:98	66.55		1.40	----	274.95 gram
447	EN12662	----		----	----	
463	EN12662:08	57.4		-0.07	500	
495	EN12662:08	47.7		-1.64	580	
496	EN12662:98	52.55		-0.86	400	
551	EN12662:08	0.102	G(0.01)	-9.32	800	
1006	EN12662	21.3	G(0.05)	-5.90	800	
1017	EN12662	----		----	----	
1026	EN12662:08	46.3		-1.86	785	
1033	EN12662:08	filter blocked		----	300	
1080	EN12662:08	fail		----	800	blocked after 150 ml
1081	EN12662	550	G(0.01)	79.40	75	filter blocked
1095	EN12662	----	W	----	800	result withdrawn, first reported 5.2 EN12662
1108	EN12662:08	83		4.06	395	
1134	EN12662	----		----	----	
1203	EN12662	54.4		-0.56	700	
1259	EN12662	----		----	----	
1346	EN12662:08	52.46		-0.87	800	
1389	EN12662:98	55.7		-0.35	----	
1395	EN12662	53.2		-0.75	800	
1404	EN12662	fail		----	800	not filtrable
1409	EN12662:08	13.3	G(0.05)	-7.19	750	
1419	EN12662	49.59		-1.33	800	
1510	EN12662	9.1	G(0.05)	-7.87	----	
1650	EN12662:08	25.71	C,G(0.05)	-5.19	800	first reported 19.71
1710	EN12662	----	W	----	800	result withdrawn, first reported 30.1 EN12662
1724	EN12662	53.2		-0.75	800	
1807	EN12662:08	69.5		1.88	637	
1833	EN12662	49.8		-1.30	800	
normality		OK				
n		18				
outliers		6				
mean (n)		57.852				
st.dev. (n)		9.1556				
R(calc.)		25.636				
R(EN12662:08)		17.356				



**APPENDIX 2**

z-scores Distillation

lab	IBP	10%	50%	90%	95%	FBP
150	0.31	0.44	0.13	-0.21	0.30	-1.02
311	-2.34	-1.86	-1.00	-0.38	-0.39	0.87
312	-0.47	0.85	0.42	-0.44	-0.39	-1.81
323	0.98	1.68	0.98	-0.10	-0.36	-0.51
340	0.02	-2.57	0.13	1.42	1.44	-0.15
343	-0.07	-0.33	0.23	0.07	0.13	-2.24
353	-0.74	-0.62	0.60	0.18	-0.09	0.83
432	----	----	----	----	----	----
444	----	----	----	----	----	----
445	-1.52	2.39	0.60	-0.21	0.43	-0.07
446	-0.65	-0.33	-0.43	-0.50	-0.45	-0.43
447	0.49	1.09	1.17	0.80	0.89	1.07
463	-0.01	0.97	-0.24	1.03	0.33	0.60
495	-0.59	-0.03	-0.24	0.01	0.43	-0.15
496	0.05	0.85	0.13	0.18	0.07	-0.55
529	----	----	----	----	----	----
551	----	----	----	----	----	----
631	1.45	0.73	0.51	0.07	0.10	0.48
913	----	----	----	----	----	----
962	0.43	1.32	0.98	-0.21	-0.23	-0.11
1006	-0.13	-0.03	0.04	0.97	0.36	-0.19
1017	----	----	----	----	----	----
1026	-0.79	1.68	-0.72	0.07	-0.03	-0.07
1033	0.63	-0.50	0.79	0.75	0.43	0.40
1065	1.59	0.79	0.79	0.58	0.13	1.90
1080	1.21	-0.86	-0.62	0.07	0.07	0.16
1081	0.14	2.03	0.23	-0.55	-0.42	-0.11
1108	-0.10	-1.62	-0.72	0.12	0.20	0.56
1134	-2.31	-1.27	-0.15	-0.04	-0.06	0.67
1140	-1.70	-0.80	-2.13	-1.29	-0.91	-1.93
1194	----	----	----	----	----	----
1203	-1.52	-0.39	1.64	1.14	0.56	-0.55
1205	0.14	0.85	0.60	-0.78	-0.65	-1.14
1227	0.57	-0.33	1.36	-0.16	0.00	-0.63
1237	0.05	0.91	-2.04	-0.33	2.49	1.38
1259	0.22	0.38	-0.72	-1.51	-1.30	-0.86
1292	----	----	----	----	----	----
1299	-0.10	-0.68	-0.53	-0.21	0.20	0.08
1346	1.15	0.26	0.32	0.01	-0.13	0.87
1389	0.66	-2.69	-3.17	-0.50	-0.88	0.48
1395	0.69	0.26	0.23	-0.38	-0.49	0.75
1404	-1.38	-2.75	-1.47	-0.61	-0.42	-1.10
1409	-1.09	0.32	0.23	0.29	0.20	-1.61
1419	1.65	1.50	-0.06	-0.72	-0.13	-0.31
1443	-0.88	-2.21	0.04	0.07	0.10	0.87
1510	1.04	-0.39	-0.34	0.41	0.59	1.03
1634	-1.14	0.85	0.04	-0.16	0.36	-0.11
1635	-0.74	-0.09	-1.00	-0.61	-0.23	-0.47
1650	-0.39	-2.39	-0.72	-0.16	-0.06	0.40
1706	1.18	1.15	1.36	-0.16	0.00	-0.55
1708	0.43	-2.80	-2.79	-1.06	-0.55	0.08
1710	0.02	1.03	0.70	1.14	1.64	0.56
1724	-0.39	-0.09	-0.43	-0.44	0.17	-0.19
1728	1.14	-0.49	-1.44	0.59	0.73	-0.34
1807	0.40	0.26	0.60	-0.04	0.13	-0.67
1810	1.47	1.68	0.42	-0.61	-0.42	0.48
1811	0.86	1.62	-0.53	1.20	0.75	1.94
1833	-0.07	0.09	0.89	0.63	0.69	0.16
1951	-0.71	-0.50	-0.90	0.52	0.26	1.15
2129	0.83	0.62	0.23	0.07	-0.03	0.12

**APPENDIX 3****Number of participants per country**

2 labs in AUSTRIA  
4 labs in BELGIUM  
1 lab in BRAZIL  
2 labs in BULGARIA  
2 labs in CROATIA  
1 lab in CYPRUS  
2 labs in CZECH REPUBLIC  
2 labs in FRANCE  
2 labs in GERMANY  
2 labs in GREECE  
4 labs in HUNGARY  
1 lab in INDIA  
1 lab in IRELAND  
1 lab in ISRAEL  
1 lab in MEXICO  
1 lab in PHILIPPINES  
1 lab in POLAND  
1 lab in PORTUGAL  
1 lab in REPUBLIC OF MACEDONIA  
1 lab in ROMANIA  
1 lab in SAUDI ARABIA  
1 lab in SLOVAKIA  
1 lab in SLOVENIA  
5 labs in SPAIN  
1 lab in SWEDEN  
1 lab in TAIWAN R.O.C.  
4 labs in THE NETHERLANDS  
2 labs in TURKEY  
1 lab in U.S.A.  
10 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
n.a.	= not evaluated
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/>)