Results of Proficiency Test
Jet Fuel A1
March 2012

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1995, the Institute for Interlaboratory Studies organises every year proficiency tests for Jet Fuel A1. The interlaboratory study on Jet Fuel of March 2012 was extended with a PT for the determination for Particle Size Distribution.
In the main PT, 97 laboratories in 45 different countries have participated; in the PT for the Particle Size Distribution, 40 laboratories in 24 different countries. See appendix 4 for the number of participants per country. In this report, the results of the proficiency test are presented and discussed.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, The Netherlands, was the organiser of this proficiency test. In the main Jet Fuel round robin, it was decided to send two identical samples (2*1 liter bottles with sample #12022) for the analyses according to the "Aviation Fuel Quality Requirements for Jointly Operated Systems (AFQRJOS)", sometimes referred to as the "Joint Fuelling System Check List For Jet A-1" In the Particle Size round robin, it was decided to send one sample of 0.5 L (#12023).
The participants were requested to report the analytical results using the indicated units on the report form and 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/IEC 17043:2010 and ILAC-G13:2007, (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentially of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organization, Statistics and Evaluation' of January 2010 (iis-protocol, version 3.2), which can be downloaded from 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

2.4.1 JET FUEL (MAIN SAMPLE)

The necessary bulk material was obtained from a local refinery. The approx. 220 litre bulk sample was homogenised and divided over 206 amber glass bottles of one litre with inner and outer caps and labelled #12022. The homogeneity of the subsamples #12022 was checked by the determination of Density in accordance with ASTM D 4052:11 on 8 stratified randomly selected samples.

	Density @ 15°C in kg/m^3
Sample #12022-1	796.19
Sample #12022-2	796.19
Sample #12022-3	796.20
Sample #12022-4	796.20
Sample #12022-5	796.20
Sample #12022-6	796.21
Sample #12022-7	796.21
Sample #12022-8	796.20

table 1: homogeneity test results of sub samples #12022

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

	Density @ 15°C in kg/m^3
r (observed)	0.02
reference method	D 4052:11
0.3 x R (ref. method)	0.15

Table 2: evaluation of repeatability of subsamples #12022

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

2.4.2 JET FUEL PARTICLE SIZE DETERMINATION

The second bulk material was obtained from a participating laboratory. The approx. 120 litre bulk sample was homogenised and divided over 106 amber glass bottles of 0.5 L with inner and outer caps and labelled #12023. The homogeneity of the subsamples #12023 was checked by the determination of Particle Size Distribution in accordance with IP564:10 on ten stratified randomly selected samples.

	> 4 µm	> 6 µm	> 14 µm	> 21 µm	> 25 µm	> 30 µm
Sample #12023-1	7935	1394	19	3	1	1
Sample #12023-2	7855	1354	19	3	1	1
Sample #12023-3	7688	1300	17	2	1	1
Sample #12023-4	7564	1266	15	2	1	1
Sample #12023-5	7557	1285	17	3	1	1
Sample #12023-6	7234	1183	16	3	1	1
Sample #12023-7	7391	1276	20	4	2	1
Sample #12023-8	7333	1240	20	3	2	1
Sample #12023-9	7283	1245	19	4	2	1
Sample #12023-10	7172	1209	20	4	2	1

Table 3: homogeneity test results of sub samples #12023

From the above test results, the repeatability was calculated and compared with the repeatability of the reference method.

	> 4 µm	> 6 µm	> 14 µm	> 21 µm	> 25 µm	> 30 µm
r (observed)	736.8	177.5	5.1	2.1	1.4	0.0
reference method	IP564:10	IP564:10	IP564:10	IP564:10	IP564:10	IP564:10
r (ref. method)	1086.5	280.4	14.9	3.2	1.5	1.3

Table 4: evaluation of repeatabilities of subsamples #12023

The calculated repeatabilities are all smaller than the repeatabilities of the reference method.Therefore, homogeneity of the subsamples #12023 was assumed.

Depending on the registration of each participant, the following samples were dispatched on February 29, 2012: 2 bottles of 1 litre, labelled #12022 and/or 1*0.5 L, labelled #12023.

2.5 STABILITY OF THE SAMPLES

The stability of Jet Fuel A1, packed in the brown glass bottles was checked. The type of bottle was chosen in accordance with ASTM D4306:07. The material has been found sufficiently stable for the period of the proficiency test.

2.6 ANALYSIS

The participants were requested to determine on sample #12022: Aromatics by FIA, Aromatics by HPLC (in %M/M and %V/V), Colour Saybolt, Density @15°C, Distillation (IBP, 10%, 20%, 50%, 90% recovered and FBP), Existent Gum, Flash Point, Freezing Point, JFTOT, Mercaptans, MSEP, Naphthalenes, Smoke Point, Specific Energy (on Sulphur free basis), Total Acidity, Total Sulphur and Viscosity @ -20°C. The participants were requested to determine Particle Size only on sample #12023.

The analyses should be performed according to the "Aviation Fuel Quality Requirements for Jointly Operated Systems (AFQRJOS)", also referred to as the "Joint Fuelling System Check List" or simply "Check List".

To get comparable results a detailed report form, on which the units were prescribed as well as some of the required standards and a letter of instructions were prepared and made available for download on the iis website.
A SDS and a form to confirm receipt of the samples were added to the sample 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.

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 visualise 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 cross. Accepted data are represented as a triangle.
Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms (see appendix 5, nr.14-15).

3.3 Z-SCORES

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

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

The $z_{(target)}$ 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:

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

4 EVALUATION

In these interlaboratory studies, some major problems with couriers and/or customs clearance were encountered during dispatch of the samples to laboratories in Côte D'Ivoire, Jordan, Mozambique, Qatar, Sudan, Tanzania and Togo.
For the "main Jet Fuel A1" PT, 14 participants reported the results after the final reporting date and 6 participants did not report any results at all.
For the PT "Particle Size", 3 participants reported the results after the final reporting date and 6 participants did not report any results at all.

The 97 participants of the main round and the 40 participants of the particle size round reported in total 1704 numerical results. Observed were 53 outlying results, which is 3.1%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

4.1 EVALUATION PER TEST

Not all original data sets proved to have a normal distribution. Anormal distributions were found for the following determinations on sample #12023: Aromatics by HPLC in %V/V, Colour Saybolt (D156 & D6045), Density, Distillation 10% & 90%rec., Existent Gum, Flash Point, Freezing Point, JFTOT, Mercaptan Sulphur, MSEP, Naphthalenes, Smoke Point, Total Acidity, Viscosity and Particle Size >21µm, >25µm and >30µm. Therefore, the statistical evaluation for these determinations should be used with care.
In this section, the results are discussed per test.
Since the checklist is continuously updated, the users are advised to monitor the updates. The latest version at this moment is "DEF STAN 91-91/Issue 7, dated: 8 February 2011" and ASTM D165:10. One must keep in mind that ISO-methods are not mentioned in the "Checklist".

Aromatics by: FIA (D1319): This determination was not problematic. No statistical outliers were observed. And the calculated reproducibility is in good agreement with ASTM D1319:10.

Aromatics by: HPLC (D6379) The %M/M determination was not problematic. No statistical outliers were observed. The calculated reproducibility is almost in agreement with ASTM D6379:04.
The %V/V determination may be problematic. Regretfully, no precision data for the determination in %V/V is mentioned in ASTM D6379:04, but the observed reproducibility was much larger than for the determination in %M/M.

Colour Saybolt: This determination was problematic for both the manual (ASTM D156) and the automated (ASTM D6045) mode. In total only one statistical outlier was observed. Both calculated reproducibilities are, after rejection of the statistical outlier, not in agreement with the respective requirements of ASTM D156:07a and ASTM D6045:09.

Density: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of ASTM D4052:11.

Distillation: In total five statistical outliers were observed. All calculated reproducibilities for the automated determination are, after rejection of the statistical outliers, in good agreement with the requirements of ASTM D86:11a (group 4, automated). However, the calculated reproducibilities for the manual determination for 50% rec., 90% rec. and fbp are, after rejection of the statistical outliers, not at all in agreement with the requirements of ASTM D86:11a (group 4, manual).

Existent Gum: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility, after rejection of the statistical outliers, is in good agreement with ASTM D381:09.

Flash Point: This determination was not problematic. Only one statistical outlier was observed. The calculated reproducibility, after rejection of the statistical outlier, is in full agreement with the requirements of IP170:09.
Twentythree laboratories reported a method that is not mentioned in the Joint Fuelling System Checklist. After exclusion of these 23 test results, the calculated reproducibility is somewhat smaller and of course again in good agreement with the requirements of IP170:09.

Freezing Point: This determination was not problematic. Only one statistical outlier was observed and the calculated reproducibility, after rejection of the statistical outlier, is in good agreement with the requirements of ASTM D2386:06.

JFTOT: Some reporting problems have been observed. Six laboratories reported a higher volume than the maximum allowed (450 ± 45 mL may be pumped in a valid test, see ASTM D 3241:09-B table 2). It should be noted that a pumped volume higher than 495 mL or below 405 mL means that the test is not performed correctly and results obtained are suspect.

Mercaptan Sulphur: This determination was problematic for a number of laboratories. Six statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is in full agreement with the requirements of ASTM D3227:10.

MSEP: This determination was not problematic. Only one statistical outlier was observed. The calculated reproducibility, after rejection of the statistical outliers, is almost in agreement with the requirements of ASTM D3948:08.

Naphthalenes: This determination was problematic for a number of laboratories at a level of 0.83 %V/V. Five statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is in full agreement with the requirements of ASTM D1840:07-B. When the results from procedure A are evaluated separately it is clear that the spread of these test results is not in agreement with the more strict reproducibility requirements for this procedure A.

Smoke Point: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D1322:08.

Specific Energy: This determination was problematic. Only one statistical outlier was observed. However, the calculated reproducibility, after rejection of the statistical outliers is not in agreement with the requirements of ASTM D3338:09.

Total Acidity: This determination was very problematic. Five statistical outliers were observed and the calculated reproducibility, after rejection of the statistical outliers, is not at all in agreement with the requirements of ASTM D3242:08.

Total Sulphur: This determination was problematic for a number of laboratories. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full in agreement with the requirements of ASTM D5453:09.

Viscosity: This determination was problematic. Six statistical outliers were observed and the calculated reproducibility, after rejection of the statistical outliers, is still not in agreement with the requirements of ASTM D445:11.

Particle Size: This determination was problematic. In total thirteen statistical outliers were observed. Also, after rejection of the statistical outliers, none of the calculated reproducibilities is in agreement with the requirements of IP564:10.

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 laboratories that participated. The reproducibilities derived from literature standards (in casu ASTM standards) and the calculated reproducibilities of samples #12022 and #12023 are compared in the next tables.

Parameter	unit	n	Average	2.8 * sd	R (lit)
Aromatics by FIA	%V/V	59	17.73	2.02	2.96
Aromatics by HPLC	%M/M	17	21.09	2.21	2.00
Aromatics by HPLC	%V/V	17	18.37	3.56	unknown
Colour Saybolt (ASTM D156)		49	22.7	3.7	2.0
Colour Saybolt (ASTM D6045)		30	23.3	2.0	1.2
Density at 15°C	kg/m^3	87	796.17	0.32	0.50
Initial Boiling Point (Auto)	°C	79	150.80	5.44	8.29
10% recovered (Auto)	°C	78	169.50	2.80	3.73
50% recovered (Auto)	°C	78	195.65	2.48	2.97
90% recovered (Auto)	°C	78	236.18	3.65	3.54
Final Boiling Point (Auto)	°C	78	261.92	4.21	7.10
Initial Boiling Point (Manual)	°C	10	149.88	5.13	4.54
10% recovered (Manual)	°C	9	168.53	2.05	2.99
50% recovered (Manual)	°C	10	194.78	5.43	2.89
90% recovered (Manual)	°C	10	234.00	6.83	3.59
Final Boiling Point (Manual)	°C	10	261.90	10.01	4.27
Existent Gum	mg/100mL	54	0.72	0.94	3.14
Flash Point	°C	83	42.58	3.13	3.20
Freezing Point	°C	80	-53.49	1.96	2.50
Mercaptan Sulphur	%M/M	56	0.0008	0.0003	0.0003
MSEP	rating	68	93.8	9.7	9.0
Naphthalenes	%V/V	47	0.83	0.08	0.08
Smoke Point	mm	68	24.0	3.7	3.0
Specific Energy	MJ/kg	55	43.296	0.053	0.046
Total Acidity	mg KOH/g	55	0.0024	0.0035	0.0020
Total Sulphur	mg/kg	61	778.4	83.0	85.4
Viscosity @ -20°C	cSt	56	3.735	0.082	0.071

table 5: comparison of the observed and target reproducibilities of sample #12022

Parameter	unit	n	Average	2.8 * sd	R (lit)
Particle Size >4 µm	mL^{-1}	34	11710	7057	2273
Particle Size >6 µm	mL^{-1}	33	2227	1203	727
Particle Size >14 µm	mL^{-1}	32	63.3	67.0	39.8
Particle Size >21 µm	mL^{-1}	31	11.1	18.1	14.1
Particle Size >25 µm	mL^{-1}	30	4.7	8.6	6.4
Particle Size >30 µm	mL^{-1}	30	1.9	3.8	3.2

table 6: comparison of the observed and target reproducibilities of sample #12023

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF MARCH 2012 WITH PREVIOUS PTS

	March 2012	March 2011	September 2010	March 2010
Number of reporting labs	91	126	208	65
Number of results reported	1704	1713	2759	1257
Statistical outliers	53	80	59	64
Percentage outliers	3.1%	4.7%	2.1%	5.1%

table 7: 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:

Parameter	March 2012	March 2011	September 2010	March 2010
Aromatics by FIA	++	++	++	++
Aromatics by HPLC	+/-	++	--	++
Colour Saybolt	--	--	--	--
Density at 15°C	++	++	++	++
Distillation automated	++	++	++	++
Distillation manual	--	n.e.	--	n.e.
Existent Gum	++	++	++	++
Flash Point	+/-	++	++	++
Freezing Point	++	++	++	++
Mercaptan Sulphur	+/-	++	++	+/-
MSEP	+/-	-	--	--
Naphthalenes	+/-	--	+	++
Smoke Point	--	--	+/-	--
Specific Energy	-	++	--	--
Total Acidity	--	+/-	--	--
Total Sulphur	+/-	--	--	+
Viscosity @ -20°C	-	--	++	-
Particle Size Distribution	--	+/-	--	--

table 8: comparison determinations against the standard requirements

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

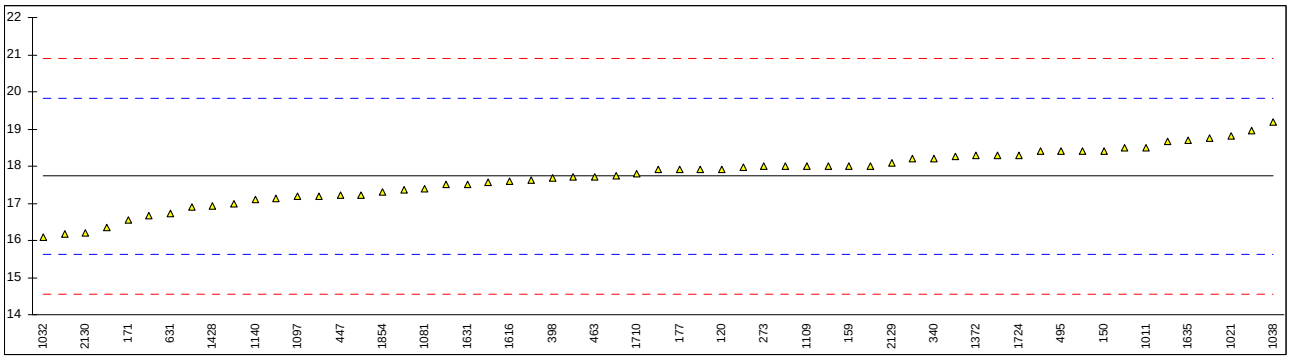
APPENDIX 1

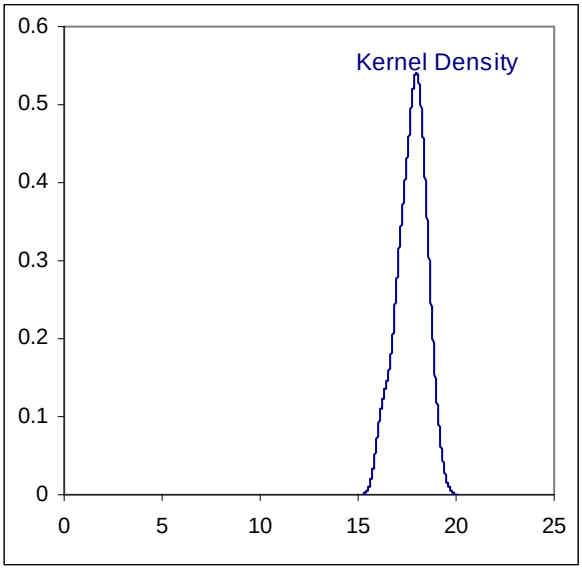
Determination of Aromatics by FIA on sample #12022; results in %V/V

lab	method	value	mark	z(targ)	remarks
120	D1319	17.9		0.16	
132	D1319	18.67		0.89	
140	D1319	16.16		-1.49	
150	D1319	18.4		0.64	
153	D1319	18.4		0.64	
159	D1319	18.0		0.26	
169	D1319	17.62		-0.10	
171	D1319	16.5485		-1.12	
175		-----		-----	
177	D1319	17.9		0.16	
225		-----		-----	
228		-----		-----	
237	D1319	17.57		-0.15	
252		-----		-----	
253	D1319	18.50		0.73	
256		-----		-----	
258		-----		-----	
273	D1319	18.0		0.26	
311	D1319	18.3		0.54	
335		-----		-----	
340	D1319	18.2		0.45	
353		-----		-----	
391	D1319	17.9		0.16	
398	D1319	17.68		-0.05	
447	D1319	17.22		-0.48	
448	D1319	16.677		-1.00	
463	D1319	17.7		-0.03	
468		-----		-----	
473		-----		-----	
495	D1319	18.4		0.64	
496	D1319	17.75		0.02	
594		-----		-----	
606		-----		-----	
631	D1319	16.73		-0.95	
671		-----		-----	
824	D1319	18.0		0.26	
962	D1319	18.75		0.97	
963	D1319	18.97		1.18	
1011	D1319	18.50		0.73	
1017		-----		-----	
1021	D1319	18.8		1.01	
1026		-----		-----	
1032	D1319	16.1		-1.54	
1038	D1319	19.2		1.39	
1039		-----		-----	
1049		-----		-----	
1059	D1319	17.0		-0.69	
1062	D1319	18.0		0.26	
1064	D1319	17.90		0.16	
1079	D1319	17.37		-0.34	
1081	D1319	17.4		-0.31	
1094		-----		-----	
1097	D1319	17.2		-0.50	
1105	D1319	18.2		0.45	
1108		-----		-----	
1109	D1319	18.00		0.26	
1126		-----		-----	
1140	D1319	17.09		-0.61	
1150		-----		-----	
1167		-----		-----	
1191		-----		-----	
1203	D1319	17.5		-0.22	
1237		-----		-----	
1276	D1319	17.12		-0.58	
1293		-----		-----	
1299	D1319	18.0		0.26	
1300	D1319	18.25		0.49	
1318		-----		-----	
1372	D1319	18.28		0.52	
1395		-----		-----	
1417		-----		-----	
1428	ISO3837	16.93		-0.76	
1483		-----		-----	

1487		-----	-----
1531		-----	-----
1538	D1319	17.7	-0.03
1610	IP156	17.226	-0.48
1613	D1319	17.978	0.24
1616	D1319	17.60	-0.12
1631	D1319	17.5	-0.22
1634		-----	-----
1635	D1319	18.7	0.92
1651		-----	-----
1710	D1319	17.8	0.07
1715		-----	-----
1720		-----	-----
1724	D1319	18.3	0.54
1730		-----	-----
1811	D1319	18.4	0.64
1833	D1319	17.2	-0.50
1854	D1319	17.3	-0.41
1914	D1319	16.90	-0.79
1948		-----	-----
1951		-----	-----
2129	D1319	18.1	0.35
2130	D1319	16.19	-1.46
2133	D1319	16.36	-1.30

normality	OK
n	59
outliers	0
mean (n)	17.729
st.dev. (n)	0.7227
R(calc.)	2.024
R(D1319:10)	2.955



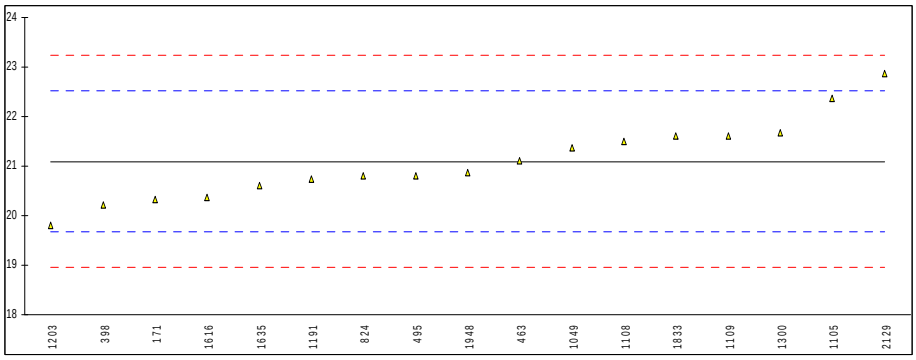


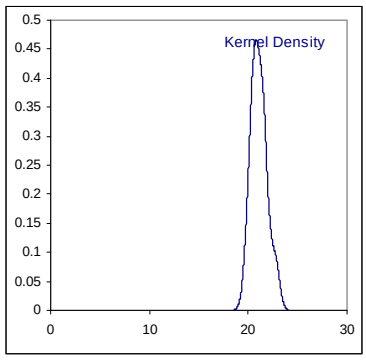
Determination of Aromatics by HPLC on sample #12022; results in %M/M & %V/V

lab	method	%M/M	mark	z(targ)	%V/V	mark	z(targ)	Remarks
120		-----		-----	-----		-----	
132		-----		-----	-----		-----	
140		-----		-----	-----		-----	
150		-----		-----	-----		-----	
153		-----		-----	-----		-----	
159		-----		-----	-----		-----	
169		-----		-----	-----		-----	
171	D6379	20.31935		-1.09	18.5983		-----	
175		-----		-----	-----		-----	
177		-----		-----	-----		-----	
225		-----		-----	-----		-----	
228		-----		-----	-----		-----	
237		-----		-----	-----		-----	
252		-----		-----	-----		-----	
253		-----		-----	-----		-----	
256		-----		-----	-----		-----	
258		-----		-----	-----		-----	
273		-----		-----	-----		-----	
311		-----		-----	-----		-----	
335		-----		-----	-----		-----	
340		-----		-----	-----		-----	
353		-----		-----	-----		-----	
391		-----		-----	-----		-----	
398	D6379	20.22		-1.23	18.90		-----	
447		-----		-----	-----		-----	
448		-----		-----	-----		-----	
463	EN12916	21.11		0.02	-----		-----	
468		-----		-----	-----		-----	
473		-----		-----	-----		-----	
495	D6379	20.81		-0.40	18.74		-----	
496		-----		-----	-----		-----	
594		-----		-----	-----		-----	
606		-----		-----	-----		-----	
631		-----		-----	-----		-----	
671		-----		-----	-----		-----	
824	D6379	20.8		-0.41	19.0		-----	
962		-----		-----	-----		-----	
963		-----		-----	-----		-----	
1011		-----		-----	-----		-----	
1017		-----		-----	-----		-----	
1021		-----		-----	-----		-----	
1026		-----		-----	18.6		-----	
1032		-----		-----	-----		-----	
1038		-----		-----	-----		-----	
1039		-----		-----	18.8		-----	
1049	D6379	21.375		0.39	19.353		-----	
1059		-----		-----	-----		-----	
1062		-----		-----	-----		-----	
1064		-----		-----	-----		-----	
1079		-----		-----	-----		-----	
1081		-----		-----	-----		-----	
1094		-----		-----	-----		-----	
1097		-----		-----	-----		-----	
1105	D6379	22.37	C	1.79	21.19		-----	first reported 23.606
1108	D6379	21.5		0.57	19.3		-----	
1109	D6591	21.60		0.71	-----		-----	
1126		-----		-----	-----		-----	
1140		-----		-----	-----		-----	
1150		-----		-----	-----		-----	
1167		-----		-----	-----		-----	
1191	D6379	20.73		-0.51	18.58		-----	
1203	D6379	19.8		-1.82	17.9		-----	
1237		-----		-----	-----		-----	
1276		-----		-----	-----		-----	
1293		-----		-----	-----		-----	
1299		-----		-----	19.0		-----	
1300	D6379	21.67		0.81	17.15		-----	
1318		-----		-----	-----		-----	
1372		-----		-----	-----		-----	
1395		-----		-----	-----		-----	
1417		-----		-----	-----		-----	
1428		-----		-----	-----		-----	
1483		-----		-----	-----		-----	

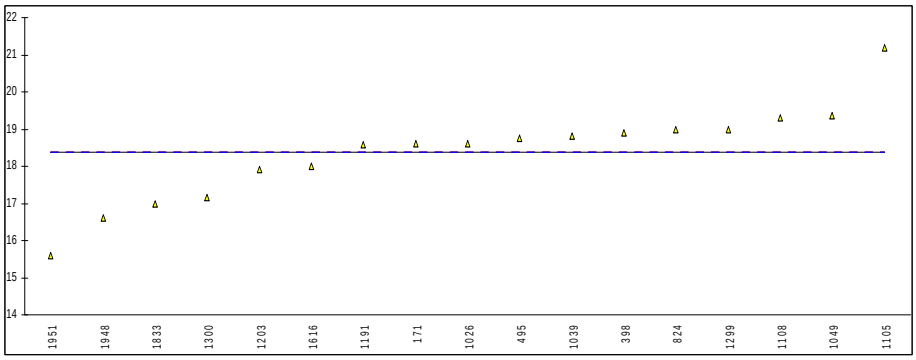
1487		-----	-----	-----	-----
1531		-----	-----	-----	-----
1538		-----	-----	-----	-----
1610		-----	-----	-----	-----
1613		-----	-----	-----	-----
1616	D6379	20.37	-1.02	18.01	-----
1631		-----	-----	-----	-----
1634		-----	-----	-----	-----
1635	D6591	20.6	-0.69	-----	-----
1651		-----	-----	-----	-----
1710		-----	-----	-----	-----
1715		-----	-----	-----	-----
1720		-----	-----	-----	-----
1724		-----	-----	-----	-----
1730		-----	-----	-----	-----
1811		-----	-----	-----	-----
1833	D6379	21.6	0.71	17.0	-----
1854		-----	-----	-----	-----
1914		-----	-----	-----	-----
1948	D6379	20.87	-0.31	16.61	-----
1951		-----	-----	15.6	-----
2129	D6379	22.86	2.48	-----	-----
2130		-----	-----	-----	-----
2133		-----	-----	-----	-----

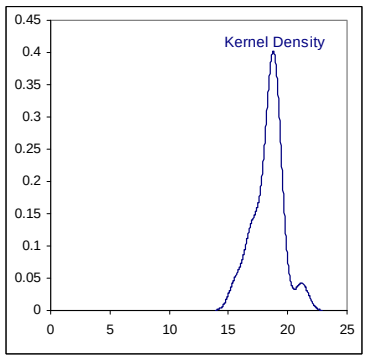
normality	OK	not OK
n	17	17
outliers	0	0
mean (n)	21.094	18.372
st.dev. (n)	0.7902	1.2702
R(calc.)	2.213	3.557
R(D6379:04)	1.995	unknown





Aromatics by HPLC in %M/M





Aromatics by HPLC in %V/V

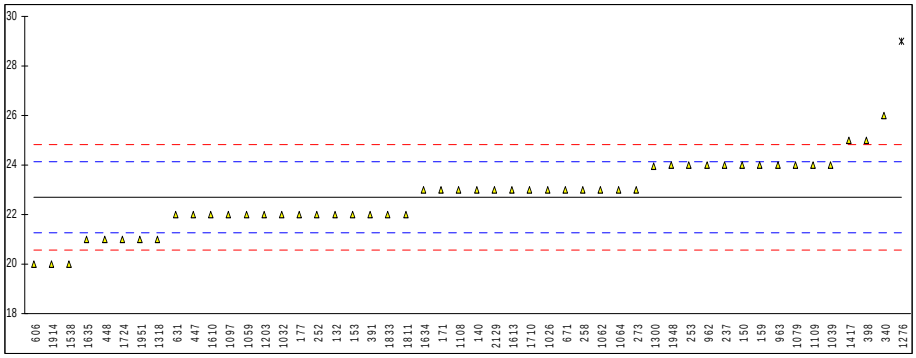
Determination of Colour Saybolt (D156 / D6045) on sample #12022;

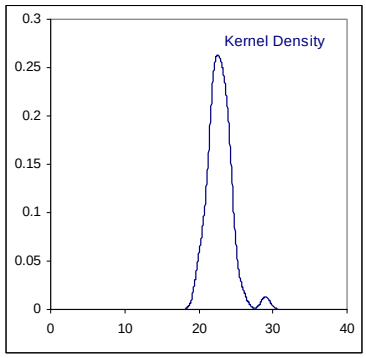
lab	method	D156	mark	z(targ)	method	D6045	mark	z(targ)	Remarks
120		-----		-----	D6045-N	24		1.54	
132	D156-N	22		-0.97		-----		-----	
140	D156-N	23		0.43		-----		-----	
150	D156-N	24		1.83		-----		-----	
153	D156-N	22		-0.97		-----		-----	
159	D156-N	24		1.83		-----		-----	
169		-----		-----	D6045-N	23		-0.72	
171	D156-N	23		0.43	D6045-N	23		-0.72	
175		-----		-----		-----		-----	
177	D156-N	22		-0.97		-----		-----	
225		-----		-----		-----		-----	
228		-----		-----		-----		-----	
237	D156-Y	24		1.83		-----		-----	
252	D156-N	22		-0.97		-----		-----	
253	D156-N	24		1.83		-----		-----	
256		-----		-----		-----		-----	
258	D156-N	23		0.43		-----		-----	
273	D156-N	23		0.43		-----		-----	
311		-----		-----	D6045-N	23		-0.72	
335		-----		-----		-----		-----	
340	D156-N	26		4.63		-----		-----	
353		-----		-----	D6045-N	24		1.54	
391	D156-N	22		-0.97		-----		-----	
398	D156-N	25		3.23		-----		-----	
447	D156-N	22		-0.97	D6045-N	24		1.54	
448	D156-Y	21		-2.37		-----		-----	
463		-----		-----		-----		-----	
468		-----		-----		-----		-----	
473		-----		-----	D6045-N	24		1.54	
495		-----		-----		-----		-----	
496		-----		-----		-----		-----	
594		-----		-----		-----		-----	
606	D156-N	20		-3.77		-----		-----	
631	D156-N	22		-0.97		-----		-----	
671	D156-N	23		0.43		-----		-----	
824		-----		-----	D6045	24		1.54	
962	D156-N	24		1.83		-----		-----	
963	D156-N	24		1.83		-----		-----	
1011		-----		-----		-----		-----	
1017		-----		-----		-----		-----	
1021		-----		-----	D6045-N	23		-0.72	
1026	D156-Y	23		0.43		-----		-----	
1032	D156-N	22		-0.97		-----		-----	
1038		-----		-----	D6045-N	23		-0.72	
1039	D156-N	24		1.83		-----		-----	
1049		-----		-----	D6045-N	25		3.80	
1059	D156-N	22		-0.97		-----		-----	
1062	D156-N	23		0.43		-----		-----	
1064	D156-N	23		0.43	D6045-N	23		-0.72	
1079	D156-N	24		1.83	D6045-N	24		1.54	
1081		-----		-----	D6045-N	24		1.54	
1094		-----		-----		-----		-----	
1097	INH-003-N	22		-0.97		-----		-----	
1105		-----		-----	D6045-N	23		-0.72	
1108	D156-N	23		0.43		-----		-----	
1109	D156-Y	24		1.83	D6045-Y	23		-0.72	
1126		-----		-----		-----		-----	
1140		-----		-----	D6045-N	22		-2.97	
1150		-----		-----		-----		-----	
1167		-----		-----		-----		-----	
1191		-----		-----	D6045-N	23		-0.72	
1203	D156-N	22		-0.97		-----		-----	
1237		-----		-----		-----		-----	
1276	D156-Y	29	G(0.01)	8.83		-----		-----	
1293		-----		-----		-----		-----	
1299		-----		-----	D6045-N	24		1.54	
1300	D156-Y	23.95	(*)	1.76	D6045-Y	24	(*)	1.54	results mixed up?
1318	D156-N	21		-2.37	D6045-N	24		1.54	
1372		-----		-----	D6045-N	23		-0.72	
1395		-----		-----		-----		-----	
1417	D156-N	25		3.23		-----		-----	
1428		-----		-----	D6045-N	23		-0.72	
1483		-----		-----		-----		-----	

1487		-----	-----		-----		-----	
1531		-----	-----		-----		-----	
1538	D156-N	20	-3.77		-----		-----	
1610	D156-N	22	-0.97		-----		-----	
1613	D156-N	23	0.43		-----		-----	
1616		-----	-----	D6045-N	23		-0.72	
1631		-----	-----	D6045-Y	22		-2.97	
1634	D156-N	23	0.43		-----		-----	
1635	D156	21	-2.37		-----		-----	
1651		-----	-----		-----		-----	
1710	D156-N	23	0.43		-----		-----	
1715		-----	-----	D6045-N	23.5		0.41	
1720		-----	-----		-----		-----	
1724	D156-N	21	-2.37		-----		-----	
1730		-----	-----		-----		-----	
1811	D156-N	22	-0.97		-----		-----	
1833	D156-Y	22	-0.97	D6045-Y	22	C	-2.97	First reported 23
1854		-----	-----	D6045-N	23		-0.72	
1914	D156-N	20	-3.77		-----		-----	
1948	D156-Y	24	1.83		-----		-----	
1951	D156-N	21	-2.37		-----		-----	
2129	D156-N	23	0.43	D6045-N	23		-0.72	
2130		-----	-----	D6045-N	23		-0.72	
2133		-----	-----		-----		-----	

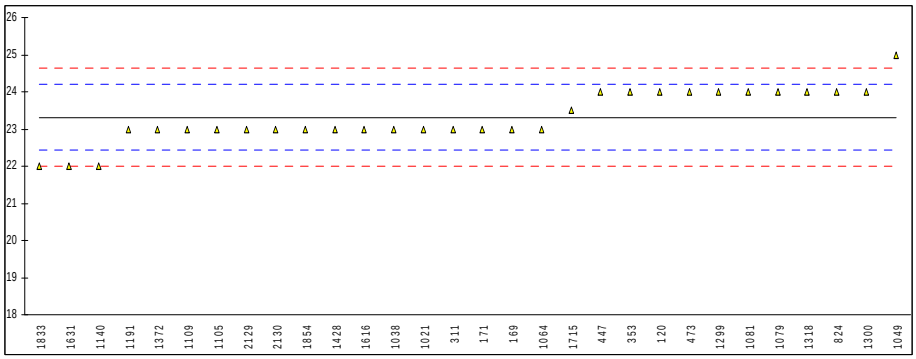
normality	not OK	normality	not OK
n	49	n	30
outliers	1	outliers	0
mean (n)	22.69	mean (n)	23.32
st.dev. (n)	1.325	st.dev. (n)	0.701
R(calc.)	3.71	R(calc.)	1.96
R(D156:07a)	2.00	R(D6045:09)	1.24

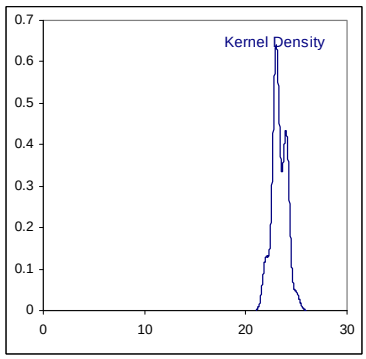
N: sample not filtered before measurement
Y: sample filtered before measurement





Colour Saybolt (D156)





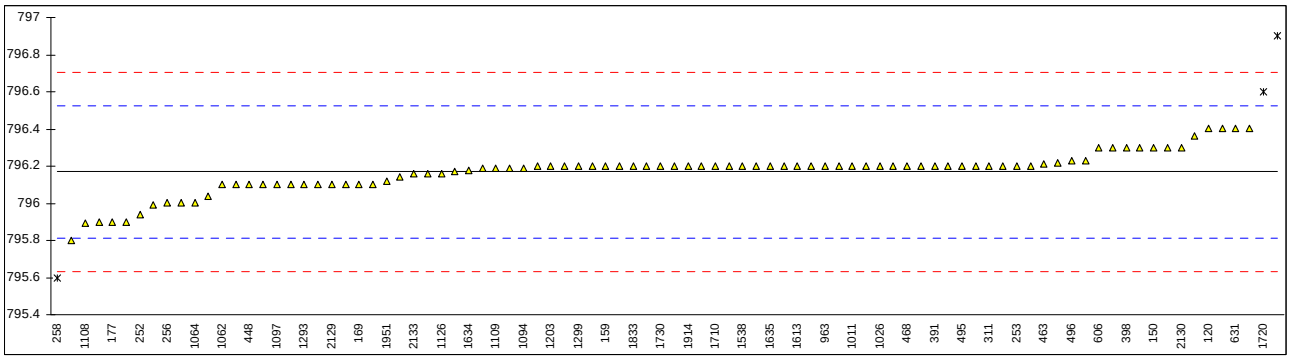
Colour Saybolt (D6045)

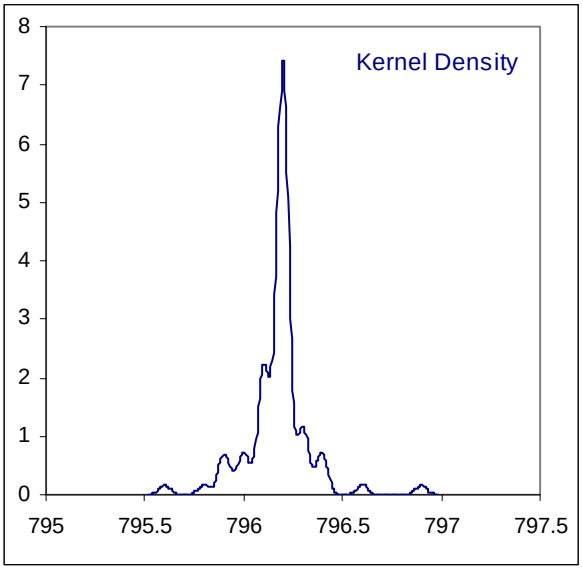
Determination of Density @ 15°C on sample #12022; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
120	D4052	796.4		1.29	
132	D4052	796.17		0.00	
140	D4052	796.2		0.17	
150	D4052	796.3		0.73	
153	D4052	796.2		0.17	
159	D4052	796.2		0.17	
169	D4052	796.1		-0.39	
171	D4052	796.23		0.34	
175	D4052	796.2		0.17	
177	D4052	795.9		-1.51	
225		-----		-----	
228	D1298	796.4	C	1.29	first reported 795.7
237	D4052	795.9		-1.51	
252	D1298	795.94		-1.28	
253	D4052	796.2		0.17	
256	D4052	796.0		-0.95	
258	D1298	795.6	G(0.05)	-3.19	
273	D4052	796.1		-0.39	
311	D4052	796.2		0.17	
335	D4052	796.9	G(0.01)	4.09	
340		-----		-----	
353	IP365	796.2		0.17	
391	D4052	796.2		0.17	
398	D4052	796.3		0.73	
447	D4052	796.2		0.17	
448	D4052	796.1		-0.39	
463	D4052	796.21		0.23	
468	D4052	796.2		0.17	
473	D4052	796.0		-0.95	
495	D4052	796.2		0.17	
496	D4052	796.23		0.34	
594	INH-18995	796.2		0.17	
606	D4052	796.3		0.73	
631	D4052	796.4		1.29	
671	D4052	796.3		0.73	
824	D4052	796.2		0.17	
962	D4052	796.2		0.17	
963	D4052	796.2		0.17	
1011	D4052	796.2		0.17	
1017		-----		-----	
1021	D4052	796.19		0.12	
1026	D4052	796.2		0.17	
1032	D4052	796.14		-0.16	
1038	D4052	796.4		1.29	
1039	D4052	796.1		-0.39	
1049	D4052	796.16		-0.05	
1059	D4052	796.2		0.17	
1062	D4052	796.1		-0.39	
1064	D4052	796.0		-0.95	
1079	D4052	796.2	C	0.17	first reported 801.7
1081	ISO12185	796.3		0.73	
1094	D4052	796.19		0.12	
1097	ISO12185	796.1		-0.39	
1105	D4052	795.8		-2.07	
1108	D4052	795.89		-1.56	
1109	D4052	796.19		0.12	
1126	D4052	796.16		-0.05	
1140	D4052	796.2		0.17	
1150	ISO12185	796.04		-0.72	
1167		-----		-----	
1191	D4052	796.1		-0.39	
1203	D4052	796.2		0.17	
1237	ISO12185	796.1		-0.39	
1276	D4052	795.99		-1.00	
1293	D1298	796.1		-0.39	
1299	D4052	796.2		0.17	
1300	D4052	796.2		0.17	
1318	D4052	796.22		0.28	
1372	D4052	796.36		1.07	
1395	D4052	796.1		-0.39	
1417	IP365	796.2		0.17	
1428	ISO12185	796.2		0.17	
1483		-----		-----	

1487	D1298	795.9	C	-1.51	reported in a different unit 0.7959
1531		-----		-----	
1538	D4052	796.2		0.17	
1610	IP365	796.2	C	0.17	first reported 0.7962
1613	D4052	796.2		0.17	
1616	D4052	796.1		-0.39	
1631	D4052	796.2		0.17	
1634	D4052	796.176		0.04	
1635	D4052	796.2		0.17	
1651		-----		-----	
1710	D4052	796.2		0.17	
1715	ISO12185	796.3		0.73	
1720	D4052	796.6	G(0.05)	2.41	
1724	D4052	796.19		0.12	
1730	D4052	796.2		0.17	
1811	D4052	796.2		0.17	
1833	D4052	796.2		0.17	
1854	D4052	796.2		0.17	
1914	D4052	796.2		0.17	
1948	D4052	796.2		0.17	
1951	D4052	796.12	C	-0.28	first reported 0.79612
2129	D4052	796.1		-0.39	
2130	D4052	796.3		0.73	
2133	D4052	796.16		-0.05	

normality	not OK
n	87
outliers	3
mean (n)	796.169
st.dev. (n)	0.1130
R(calc.)	0.316
R(D4052:11)	0.500





Determination of Distillation ASTM D86 (automated) on sample #12022; results in °C

lab	method	IBP	mark	10%	mark	50%	mark	90%	mark	FBP	mark	res.	loss
120	D86-A	150.1		170.0		195.3		235.6		259.4		1.4	0.7
132	D86-A	150.6		168.5		195.0		236.8		260.8		1.4	1.1
140	D86-A	152.1		171.6		197.1		237.2		262.5		1.1	0.8
150	D86-A	150.4		169.9		195.9		236.3		261.4		1.4	0.7
153	D86-A	150.3		168.6		196.2		237.0		261.7		1.5	0.6
159	D86-A	153.9		170.9		197.0		237.9		264.4		1.5	0.9
169	D86-A	149.8		170.0		195.6		234.8		262.2		0.8	0.1
171	D86-A	148.9		168.4		195.9		238.0		262.7		1.2	1.4
175	D86-A	152.7		170.2		196.7		238.3		264.4		1.0	1.0
177	D86-A	153.8		169.1		194.5		234.5		261.8		1.3	0.5
225		-----		-----		-----		-----		-----		-----	-----
228		-----		-----		-----		-----		-----		-----	-----
237		-----		-----		-----		-----		-----		-----	-----
252		-----		-----		-----		-----		-----		-----	-----
253		-----		-----		-----		-----		-----		-----	-----
256		-----		-----		-----		-----		-----		-----	-----
258	D86-A	150.2		168.6		196.7		237.7		262.1		1.3	0.6
273	D86-A	152.3		168.3		195.1		236.2		262.5		1.5	0.2
311	D86-A	149.9		169.5		195.5		236.3		263.3		1.3	0.2
335	D86-A	150.5		168.3		176.3	G(0.01)	196.3	G(0.01)	237.4	G(0.01)	1.2	1.3
340	D86-A	152.3		170.0		196.6		237.1		262.3		1.2	1.1
353	IP123-A	151.0		169.9		196.5		237.4		264.8		1.3	0.4
391	D86-A	153.1		168.5	C	193.8		235.2		261.4		1.1	0.9
398	D86-A	151.9		168.1		194.6		236.5		260.6		0.8	0.7
447	D86-A	148.5		169.8		195.9		237.3		263.3		1.2	1.1
448	D86-A	147.5		165.0	G(0.01)	195.2		238.0		260.7		1.0	1.1
463	D86-A	150.9		168.8		195.1		235.8		262.2		1.5	0.1
468	D86-A	150.0		169.8		196.2		237.7		261.7		1.3	0.2
473	D86-A	147.8		169.5		195.9		236.4		262.3		1.2	1.0
495	D86-A	151.9		168.2		194.2		235.1		259.5		97.6	1.2
496	D86-A	152.1		170.8		195.8		236.8		262.8		1.1	0.2
594	INH-2177-A	152.9		170.4		196.8		239.6		266.0		1.2	0.6
606	D86-A	150.9		170.4		197.5		236.0		262.6		1.2	0.7
631		-----		-----		-----		-----		-----		-----	-----
671	D86-A	150.1		170.5		195.5		233.8		257.2		1.0	0.3
824	D86-A	151.6		170.0		197.5		238.0		262.8		1.0	1.0
962		-----		-----		-----		-----		-----		-----	-----
963	D86-A	154.4		170.8		196.5		235.9		262.3		1.2	0.5
1011	D86-A	153.4		170.5		195.9		237.5		262.4		1.2	1.2
1017		-----		-----		-----		-----		-----		-----	-----
1021	D86-A	151.9		169.5		196.7		237.1		260.4		1.2	0.4
1026	ISO3405-A	147.8		172.1	C	195.0		234.1		261.6		0.9	<0.1
1032	D86-A	150.7		170.4		196.1		235.4		262.4		1.3	0.1
1038	D86-A	145.7		169.8		195.6		235.9		263.3		1.1	0.4
1039	D86-A	152.2		170.6		195.9		236.8		261.6		1.3	0.6
1049	D86-A	147.5		170.5		195.4		236.4		262.5		1.3	0.9
1059	D86-A	149.9		167.6		194.0		234.0		260.3		1.4	0.7
1062	D86-A	152.5		170.9		196.6		236.4		261.1		1.2	0.5
1064	D86-A	152.2		169.8		195.9		236.2		263.4		1.3	0.7
1079	D86-A	150.8		170.2		196.9		236.2		262.8		1.2	0.2
1081	D86-A	149.6	C	169.6	C	196.1	C	237.1	C	262.3	C	1.0	-----
1094	D86-A	150.5		169.7		195.6		237.4		262.4		1.3	1.1
1097	ISO3405-A	152.8		168.9		195.4		236.0		261.8		0.6	0.2
1105	D86-A	148.2		170.3		195.5		234.7		260.7		1.2	0.8
1108	D86-A	150.1		167.6		194.4		235.1		261.9		1.1	0.9
1109	D86-A	150.5		168.8		195.9		236.8		260.5		1.5	0.7
1126	D86-A	149.1		169.4		197.4		235.9		262.2		-----	-----
1140	D86-A	149.3		169.8		195.4		236.1		261.5		1.0	0.5
1150	ISO3405-A	152.48		169.90	C	196.33		237.28		262.84		1.0	1.0
1167		-----		-----		-----		-----		-----		-----	-----
1191	D86-A	147.6		169.7		195.9		236.6		262.0		1.4	0.2
1203	ISO3405-A	151.5	C	169.7		196.4		236.4		262.2		1.0	1.0
1237		-----		-----		-----		-----		-----		-----	-----
1276	D86-A	149.6		169.1		193.4		233.1		259.5		1.0	0.2
1293		-----		-----		-----		-----		-----		-----	-----
1299	D86-A	148.0		169.1		195.3		235.9		263.3		1.2	0.3
1300	D86-A	150.3		170.8		196.7		239.0		264.8		1.1	0.1
1318	D86-A	148.3		169.6		195.9		236.1		261.5		1.2	0.6
1372	D86-A	146.2		169.6		195.8		236.9		260.3		1.5	1.0
1395	D86-A	152.5		167.9		193.7		233.1		260.1		0.9	1.6
1417	IP123-A	151.7		170.6		196.4		238.4		261.9		1.3	1.5
1428	ISO3405-A	150.7		169.7		195.5		234.8		263.8		1.3	0.7
1483		-----		-----		-----		-----		-----		-----	-----

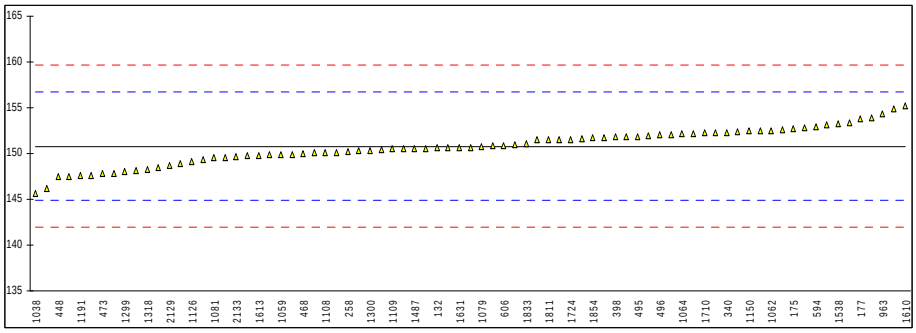
1487	D86-A	150.5		167.5	195.0	236.0	261.0	1.0	1.0
1531		-----		-----	-----	-----	-----	-----	-----
1538	D86-A	153.3		168.8	194.7	234.7	258.8	1.0	0.4
1610	IP123-A	155.2		170.6	195.7	237.1	262.4	1.2	0.1
1613	D86-A	149.8		168.9	195.9	234.9	262.8	1.2	0.1
1616		-----		-----	-----	-----	-----	-----	-----
1631	D86-A	150.7		168.0	195.6	235.8	264.7	1.3	0.7
1634	D86-A	147.6	C	170.2	195.9	236.9	263.0	1.2	0.8
1635	D86-A	154.9		169.5	195.6	235.0	261.3	1.6	0.4
1651		-----		-----	-----	-----	-----	-----	-----
1710	D86-A	152.3		169.4	195.8	236.3	262.1	1.1	0.6
1715	D86-A	151.5		169.3	195.1	237.2	262.2	1.3	1.4
1720	D86-A	149.9		168.1	194.9	235.2	263	1.2	0.3
1724	D86-A	151.5		169.3	195.6	235.3	262.1	1.2	0.5
1730		-----		-----	-----	-----	-----	-----	-----
1811	D86-A	151.5		169.6	194.6	236.5	260.6	1.4	1.2
1833	D86-A	151.1		168.3	194.5	235.7	263.1	1.3	0.5
1854	D86-A	151.7		168.9	195.2	234.6	261.0	-----	-----
1914		-----		-----	-----	-----	-----	-----	-----
1948	D86-A	152.4		169.6	194.7	233.9	260.5	1.4	0.5
1951	D86-A	152.6		168.7	195.7	236.3	263.2	1.0	0.3
2129	D86-A	148.7		166.7	194.0	234.1	259.1	1.2	0.1
2130	D86-A	152.0		169.7	195.0	235.7	259.1	1.1	1.1
2133	D86-A	149.7		170.5	196.2	235.3	260.8	1.2	0.4

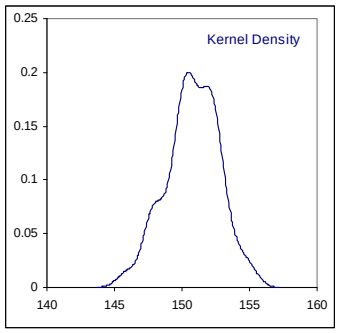
normality	OK	not OK	OK	OK	OK
n	79	78	78	78	78
outliers	0	1	1	1	1
mean (n)	150.796	169.496	195.652	236.184	261.921
st.dev. (n)	1.9440	0.9994	0.8846	1.3034	1.5025
R(calc.)	5.443	2.798	2.4769	3.650	4.207
R(D86:11a-A)	8.294	3.729	2.970	3.543	7.100

Originally reported test results:

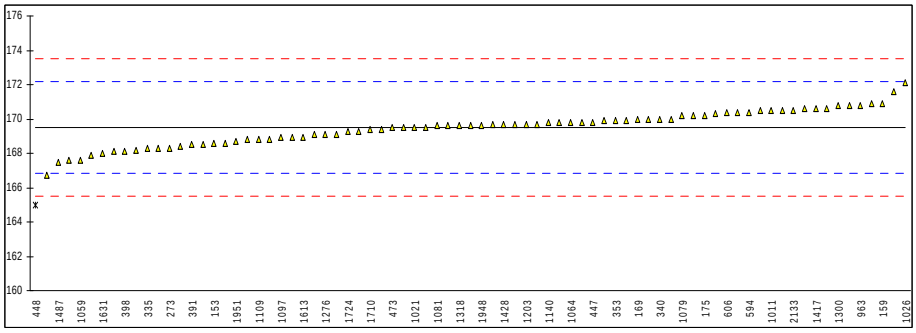
laboratory 391: 165.5
laboratory 1026: 173.7
laboratory 1081: 151.5, 171.6, 195.2, 231.9, 257.7, 1.6
laboratory 1203: 142.3
laboratory 1634: 174.6

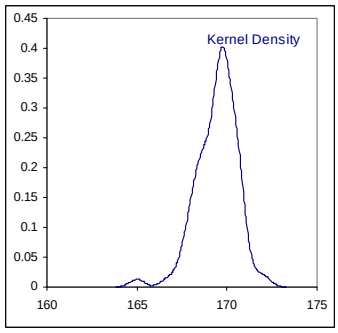
Determination of Distillation ASTM D86 (automated) on sample #12022; (graphics)





IBP





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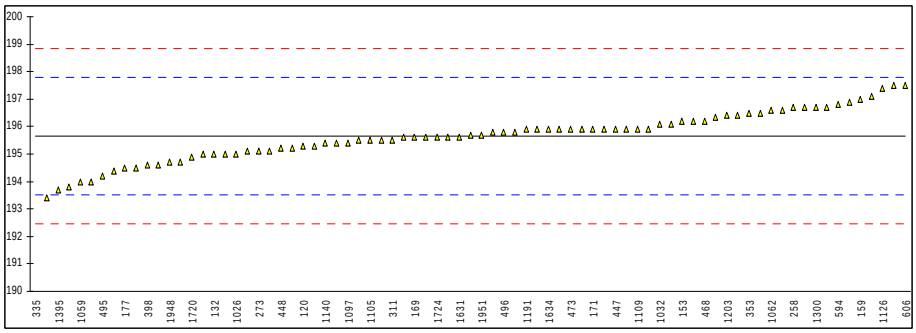

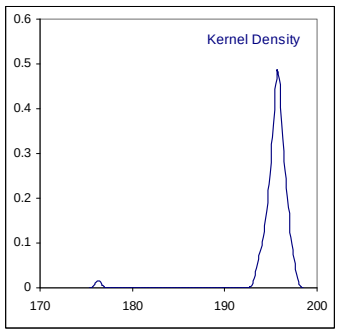

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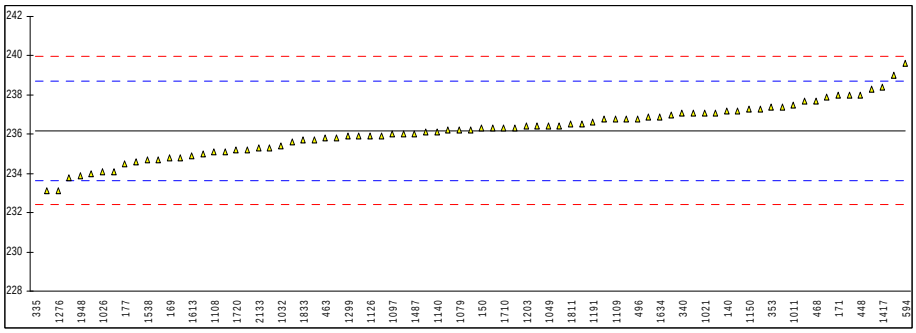

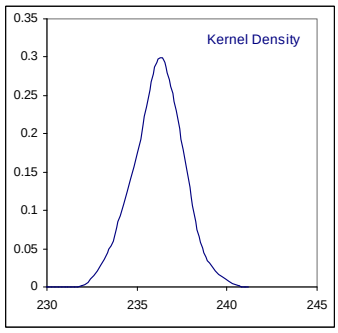

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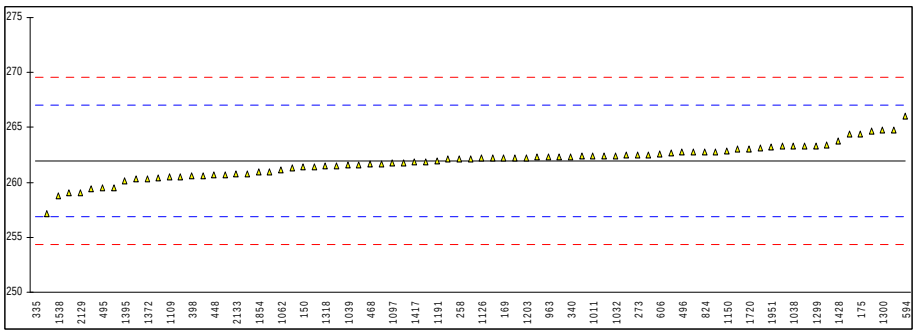
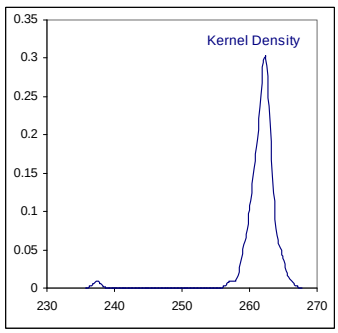




FBP

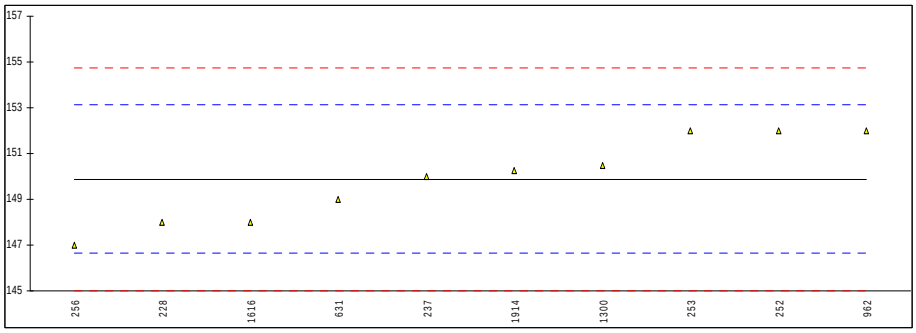
Determination of Distillation ASTM D86 (manual) on sample #12022; results in °C

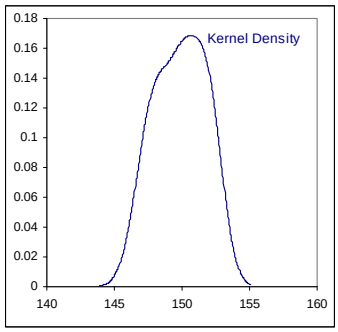
lab	method	IBP	mark	10%	mark	50%	mark	90%	mark	FBP	mark	res.	loss
120		-----		-----		-----		-----		-----		-----	-----
132		-----		-----		-----		-----		-----		-----	-----
140		-----		-----		-----		-----		-----		-----	-----
150		-----		-----		-----		-----		-----		-----	-----
153		-----		-----		-----		-----		-----		-----	-----
159		-----		-----		-----		-----		-----		-----	-----
169		-----		-----		-----		-----		-----		-----	-----
171		-----		-----		-----		-----		-----		-----	-----
175		-----		-----		-----		-----		-----		-----	-----
177		-----		-----		-----		-----		-----		-----	-----
225		-----		-----		-----		-----		-----		-----	-----
228	D86-M	148.0		168.0		192.0		231.0		260.0		1.1	0.4
237	D86-M	150.0		169.0		195.0		235.0		260.0		1.5	0.5
252	D86-M	152.0		169.0		195.0		231.0		263.0		-----	-----
253	D86-M	152.0		169.0		196.0		235.5		262.0		1.0	0.5
256	D86-M	147		168		197		237		262		1.3	0.7
258		-----		-----		-----		-----		-----		-----	-----
273		-----		-----		-----		-----		-----		-----	-----
311		-----		-----		-----		-----		-----		-----	-----
335		-----		-----		-----		-----		-----		-----	-----
340		-----		-----		-----		-----		-----		-----	-----
353		-----		-----		-----		-----		-----		-----	-----
391		-----		-----		-----		-----		-----		-----	-----
398		-----		-----		-----		-----		-----		-----	-----
447		-----		-----		-----		-----		-----		-----	-----
448		-----		-----		-----		-----		-----		-----	-----
463		-----		-----		-----		-----		-----		-----	-----
468		-----		-----		-----		-----		-----		-----	-----
473		-----		-----		-----		-----		-----		-----	-----
495		-----		-----		-----		-----		-----		-----	-----
496		-----		-----		-----		-----		-----		-----	-----
594		-----		-----		-----		-----		-----		-----	-----
606		-----		-----		-----		-----		-----		-----	-----
631	D86-M	149.0		167.0		194.0		234.0		258.0		1.0	1.0
671		-----		-----		-----		-----		-----		-----	-----
824		-----		-----		-----		-----		-----		-----	-----
962	D86-M	152.0		169.0		196.5		235.0		262.0		1.0	0.5
963		-----		-----		-----		-----		-----		-----	-----
1011		-----		-----		-----		-----		-----		-----	-----
1017		-----		-----		-----		-----		-----		-----	-----
1021		-----		-----		-----		-----		-----		-----	-----
1026		-----		-----		-----		-----		-----		-----	-----
1032		-----		-----		-----		-----		-----		-----	-----
1038		-----		-----		-----		-----		-----		-----	-----
1039		-----		-----		-----		-----		-----		-----	-----
1049		-----		-----		-----		-----		-----		-----	-----
1059		-----		-----		-----		-----		-----		-----	-----
1062		-----		-----		-----		-----		-----		-----	-----
1064		-----		-----		-----		-----		-----		-----	-----
1079		-----		-----		-----		-----		-----		-----	-----
1081		-----		-----		-----		-----		-----		-----	-----
1094		-----		-----		-----		-----		-----		-----	-----
1097		-----		-----		-----		-----		-----		-----	-----
1105		-----		-----		-----		-----		-----		-----	-----
1108		-----		-----		-----		-----		-----		-----	-----
1109		-----		-----		-----		-----		-----		-----	-----
1126		-----		-----		-----		-----		-----		-----	-----
1140		-----		-----		-----		-----		-----		-----	-----
1150		-----		-----		-----		-----		-----		-----	-----
1167		-----		-----		-----		-----		-----		-----	-----
1191		-----		-----		-----		-----		-----		-----	-----
1203		-----		-----		-----		-----		-----		-----	-----
1237		-----		-----		-----		-----		-----		-----	-----
1276		-----		-----		-----		-----		-----		-----	-----
1293		-----		-----		-----		-----		-----		-----	-----
1299		-----		-----		-----		-----		-----		-----	-----
1300	D86-M	150.5		168.5		196.0		236.0		266		1.0	0.1
1318		-----		-----		-----		-----		-----		-----	-----
1372		-----		-----		-----		-----		-----		-----	-----
1395		-----		-----		-----		-----		-----		-----	-----
1417		-----		-----		-----		-----		-----		-----	-----
1428		-----		-----		-----		-----		-----		-----	-----
1483		-----		-----		-----		-----		-----		-----	-----

1487		-----	-----	-----	-----	-----	-----	-----
1531		-----	-----	-----	-----	-----	-----	-----
1538		-----	-----	-----	-----	-----	-----	-----
1610		-----	-----	-----	-----	-----	-----	-----
1613		-----	-----	-----	-----	-----	-----	-----
1616	D86-M	148.0	165.0 G(0.05)	191.0	230.0	257.0	1.5	0.0
1631		-----	-----	-----	-----	-----	-----	-----
1634		-----	-----	-----	-----	-----	-----	-----
1635		-----	-----	-----	-----	-----	-----	-----
1651		-----	-----	-----	-----	-----	-----	-----
1710		-----	-----	-----	-----	-----	-----	-----
1715		-----	-----	-----	-----	-----	-----	-----
1720		-----	-----	-----	-----	-----	-----	-----
1724		-----	-----	-----	-----	-----	-----	-----
1730		-----	-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	-----
1833		-----	-----	-----	-----	-----	-----	-----
1854		-----	-----	-----	-----	-----	-----	-----
1914	D86-M	150.25	169.25	195.25	235.5	269.0	0.85	0.2
1948		-----	-----	-----	-----	-----	-----	-----
1951		-----	-----	-----	-----	-----	-----	-----
2129		-----	-----	-----	-----	-----	-----	-----
2130		-----	-----	-----	-----	-----	-----	-----
2133		-----	-----	-----	-----	-----	-----	-----

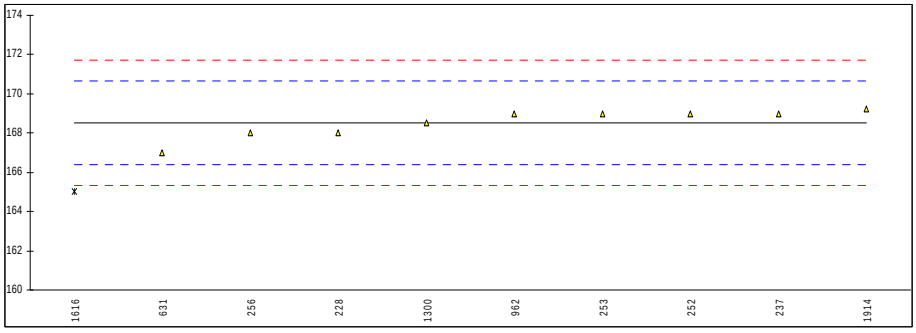
normality	OK	not OK	OK	not OK	OK
n	10	9	10	10	10
outliers	0	1	0	0	0
mean (n)	149.875	168.528	194.775	234.000	261.900
st.dev. (n)	1.8305	0.7336	1.9381	2.4381	3.5730
R(calc.)	5.125	2.054	5.427	6.827	10.005
R(D86:11a-M)	4.535	2.994	2.888	3.586	4.272

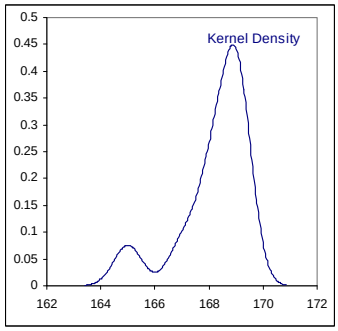
Determination of Distillation ASTM D86 (manual) on sample #12022; (graphics)





IBP





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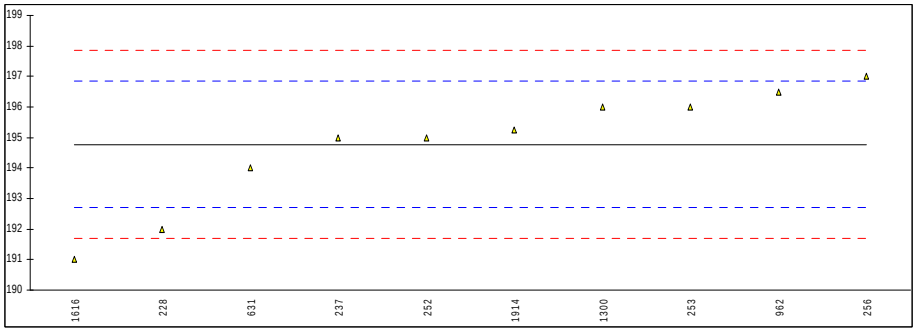

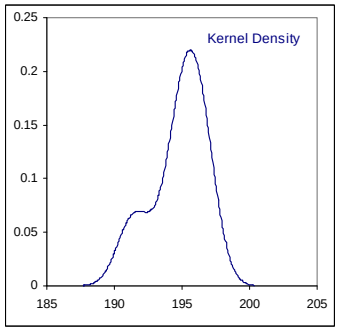

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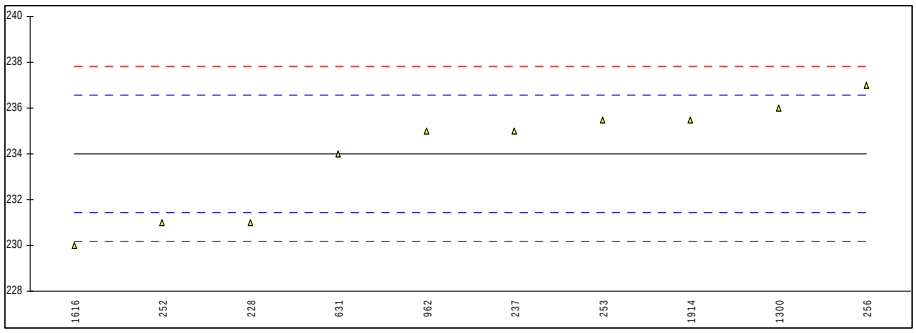
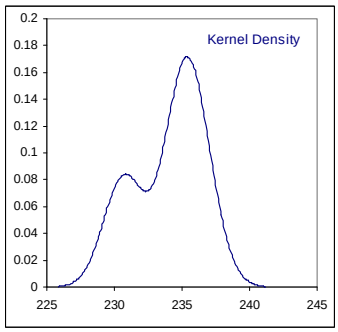
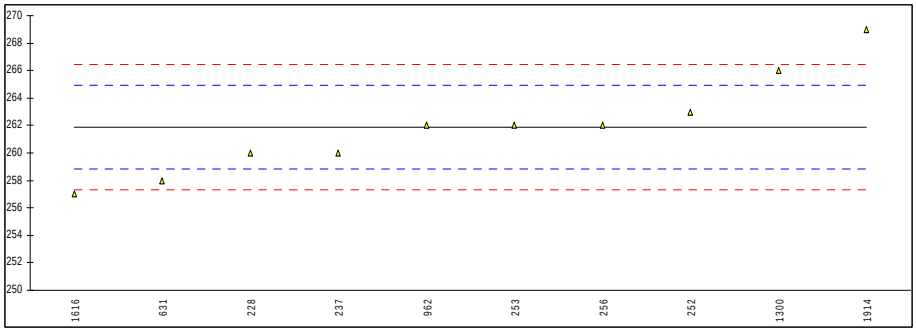
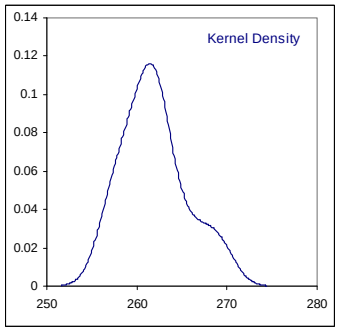




90% recovered





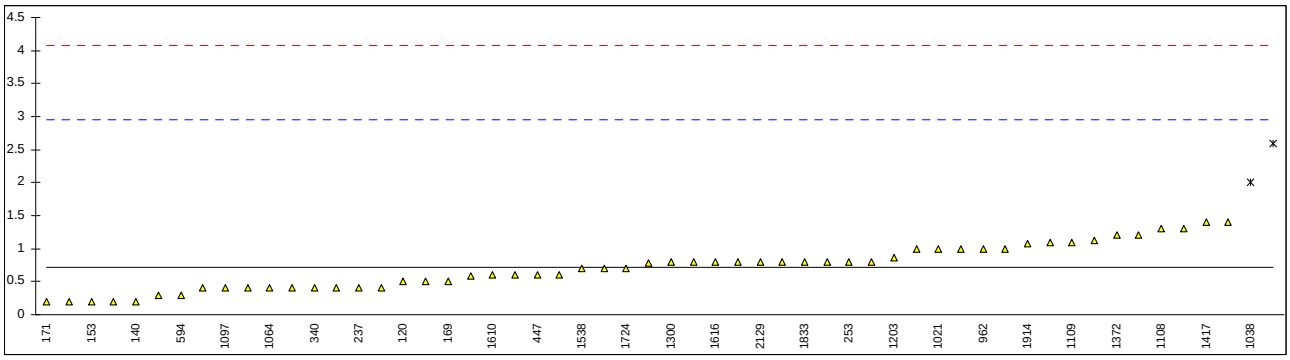
FBP

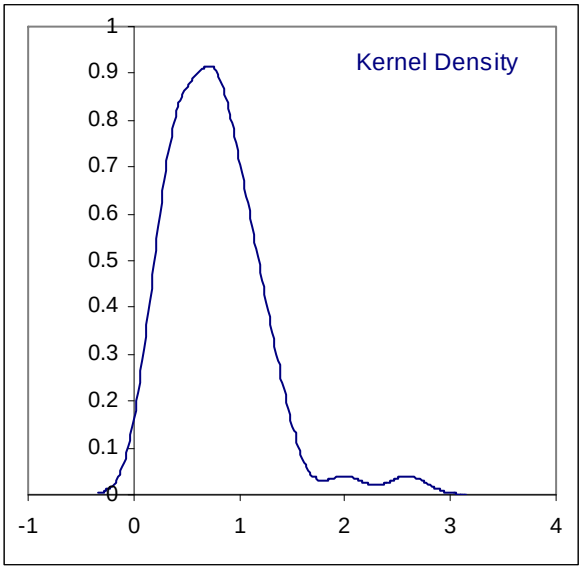
Determination of Existent Gum on sample #12022; results in mg/100 mL

lab	method	value	mark	z(targ)	remarks
120	D381	0.5		-0.19	
132	D381	<1		-----	
140	D381	0.2		-0.46	
150	D381	<1		-----	
153	D381	0.2		-0.46	
159		-----		-----	
169	D381	0.5		-0.19	
171	D381	0.2		-0.46	
175		-----		-----	
177	D381	<1		-----	
225		-----		-----	
228		-----		-----	
237	D381	0.4		-0.28	
252	D381	0.4		-0.28	
253	D381	0.8		0.08	
256		-----		-----	
258	D381	1.0		0.25	
273		-----		-----	
311	D381	<1		-----	
335		-----		-----	
340	D381	0.4		-0.28	
353	IP540	<1		-----	
391	D381	<1		-----	
398	D381	0.4		-0.28	
447	D381	0.6		-0.10	
448	D381	0.8		0.08	
463		-----		-----	
468	D381	1.4		0.61	
473	IP540	<1		-----	
495	D381	<1		-----	
496		-----		-----	
594	INH-1567	0.3		-0.37	
606	IP540	0.58		-0.12	
631	IP540	0.2		-0.46	
671	D381	0.6		-0.10	
824	D381	<1		-----	
962	D381	1.00		0.25	
963	D381	1.3		0.52	
1011	D381	<1.0		-----	
1017		-----		-----	
1021	IP540	1.0		0.25	
1026	IOS6246	<1		-----	
1032	D381	0.4		-0.28	
1038	IP540	2	G(0.05)	1.15	
1039	D381	<1		-----	
1049	D381	2.6	C, G(0.01)	1.68	first reported 3
1059	D381	<1		-----	
1062	D381	0.3		-0.37	
1064	D381	0.4		-0.28	
1079	D381	<1		-----	
1081	D381	<10		-----	
1094	D381	0.4		-0.28	
1097	IP540	0.4		-0.28	
1105	D381	0.7		-0.01	
1108	D381	1.3		0.52	
1109	IP540	1.1		0.34	
1126		-----		-----	
1140	D381	0.6		-0.10	
1150	ISO6246	1.12		0.36	
1167		-----		-----	
1191	D381	<1		-----	
1203	D381	0.87		0.14	
1237		-----		-----	
1276	D381	0.4		-0.28	
1293		-----		-----	
1299	D381	1.0		0.25	
1300	D381	0.8		0.08	
1318		-----		-----	
1372	D381	1.2		0.43	
1395		-----		-----	
1417	IP540	1.4		0.61	
1428	ISO6246	0.8		0.08	
1483		-----		-----	

1487		-----	-----
1531		-----	-----
1538	IP540	0.7	-0.01
1610	IP540	0.6	-0.10
1613	D381	0.79	0.07
1616	IP540	0.8	0.08
1631	D381	0.8	0.08
1634	D381	1.1	0.34
1635		-----	-----
1651		-----	-----
1710	D381	0.8	0.08
1715		-----	-----
1720	D381	1.2	0.43
1724	D381	0.7	-0.01
1730		-----	-----
1811		-----	-----
1833	D381	0.8	0.08
1854	D381	0.5	-0.19
1914	D381	1.07	0.32
1948	D381	0.2	-0.46
1951	IP131	0.8	0.08
2129	D381	0.8	0.08
2130		-----	-----
2133	D381	1.00	0.25

normality	not OK
n	54
outliers	2
mean (n)	0.715
st.dev. (n)	0.3354
R(calc.)	0.939
R(D381:09)	3.141





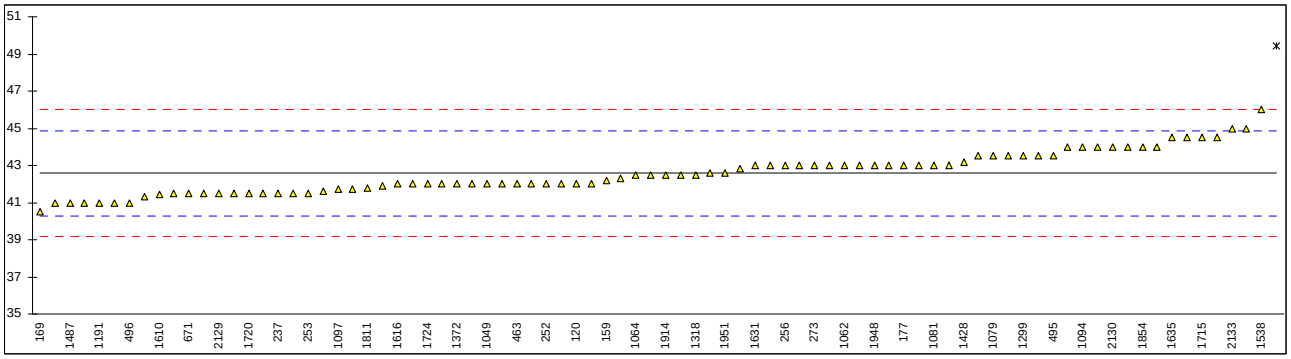
Determination of Flash Point on sample #12022; results in °C

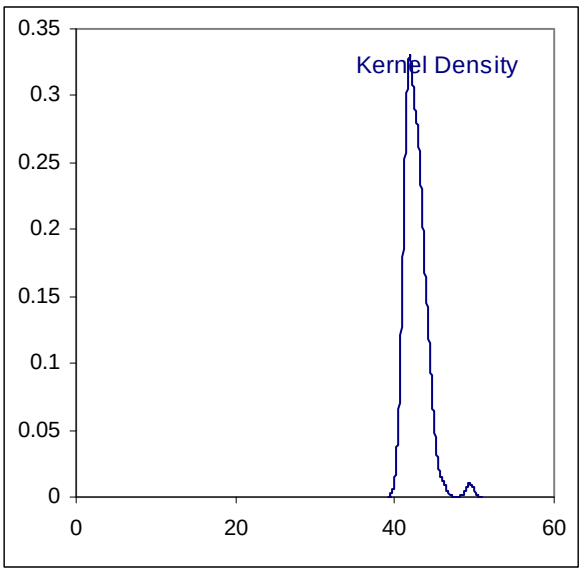
lab	method	value	mark	z(targ)	remarks
120	D56-E	42.0		-0.51	
132	D56-E	43.0		0.37	
140	D56-E	43.5		0.80	
150	D56-AE	45.0		2.12	
153	D56-MF	42.3		-0.25	
159	D56-E	42.2		-0.33	
169	D56-M	40.5		-1.82	
171		-----		-----	
175	D56-MF	43.0		0.37	
177	D56-MF	43.0		0.37	
225		-----		-----	
228	D3828-MF	41.0		-1.38	
237	IP170-MF	41.5		-0.95	
252	IP170-MF	42.0		-0.51	
253	IP170-MF	41.5		-0.95	
256	IP170-MF	43		0.37	
258	IP170-F	42.8		0.19	
273	IP170-AE	43		0.37	
311	IP170-AE	44.5		1.68	
335	IP170-AF	41.0		-1.38	
340	IP170-F	44.0		1.24	
353	IP170-MF	41.750		-0.73	
391	IP170-MF	42.0		-0.51	
398	D3828-F	41.5		-0.95	
447	IP170-AF	41.5		-0.95	
448	IP170-AF	41.3		-1.12	
463	IP170-E	42.0		-0.51	
468	IP170-E	43.0		0.37	
473	IP170-AE	42.0		-0.51	
495	IP170-AE	43.5		0.80	
496	ISO3679	41.0		-1.38	
594		-----		-----	
606	IP170-AE	42.5		-0.07	
631	D56-MF	42.0		-0.51	
671	IP170-MF	41.5		-0.95	
824	IP170-E	42.5		-0.07	
962	IP170-MF	41.5		-0.95	
963	IP170-MF	41.5		-0.95	
1011	IP170-F	44.0		1.24	
1017		-----		-----	
1021		-----		-----	
1026	IP170-AE	43.5		0.80	
1032	IP170-AE	43.0		0.37	
1038	IP170-AE	42.0		-0.51	
1039	IP170-AE	43.5		0.80	
1049	ISO13736-E	42.0		-0.51	
1059	IP170-AE	42.0		-0.51	
1062	IP170-E	43.0		0.37	
1064	IP170-AE	42.5		-0.07	
1079	IP170-AE	43.5		0.80	
1081	IP170	43.0		0.37	
1094	D56-AE	44.0		1.24	
1097	ISO13736-AF	41.7		-0.77	
1105	IP170-AF	41.9		-0.60	
1108	D56-AE	42.0		-0.51	
1109	IP170-AF	41.5		-0.95	
1126	D93-AE	44		1.24	
1140	IP170-E	41.6		-0.86	
1150	D56-AF	49.44	C, G(0.01)	6.00	first reported 50.054
1167		-----		-----	
1191	IP170-AE	41.0		-1.38	
1203	D56-AF	44.0		1.24	
1237		-----		-----	
1276	IP170-F	41.0		-1.38	
1293		-----		-----	
1299	IP170	43.5		0.80	
1300	D93-E	44.5		1.68	
1318	IP170-AE	42.5		-0.07	
1372	IP170-MF	42.0		-0.51	
1395		-----		-----	
1417	IP170-AE	42.6		0.02	
1428	IP170-AF	43.2		0.54	
1483		-----		-----	

1487	IP170-F	41.0		-1.38	
1531		-----		-----	
1538	D56	46.0		2.99	
1610	IP170-MF	41.46		-0.98	
1613	D56-AE	43.0		0.37	
1616	IP170-F	42.0		-0.51	
1631	IP170-E	43		0.37	
1634	IP170-E	42.0		-0.51	
1635	D56-MF	44.5		1.68	
1651		-----		-----	
1710	D56-AF	43		0.37	
1715	D56-AE	44.5		1.68	
1720	D3828-AF	41.5		-0.95	
1724	IP170-F	42.0		-0.51	
1730		-----		-----	
1811	IP170-F	41.8		-0.68	
1833	IP170-AE	43		0.37	
1854	D93-MF	44.0		1.24	
1914	IP170-MF	42.5		-0.07	
1948	IP170-AE	43	C	0.37	first reported 47.0
1951	IP170-AF	42.6		0.02	
2129	IP170-F	41.5		-0.95	
2130	IP170-AF	44.0		1.24	
2133	D93-AE	45.0		2.12	

		ASTM D93 excluded:	Only IP170/ISO13736:	Only D56:
normality	not OK	not OK	not OK	OK
n	83	79	57	18
outliers	1	1	0	1
mean (n)	42.581	42.490	42.355	43.194
st.dev. (n)	1.1184	1.0643	0.8715	1.3162
R(calc.)	3.132	2.980	2.440	3.685
R(IP170:09)	3.200	3.200	3.200	4.300

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





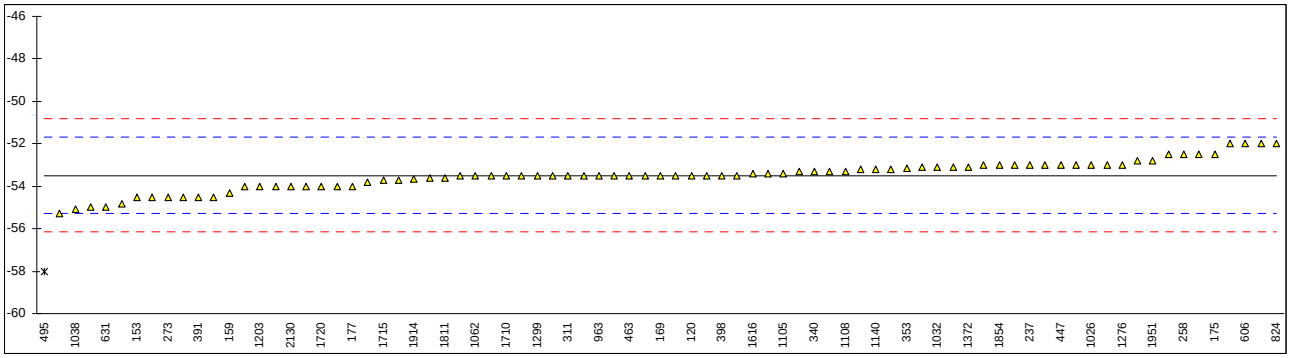
Determination of Freezing Point on sample #12022; results in °C

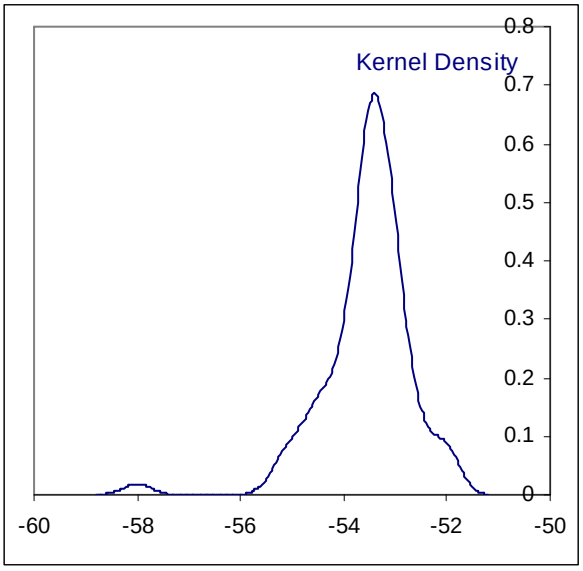
lab	method	value	mark	z(targ)	remarks
120	D2386-A	-53.5		-0.01	
132	D2386-M	-53.0		0.55	
140	D5972-A	-53.5	C	-0.01	first reported 54.1
150	D2386-M	-54.0		-0.57	
153	D2386-M	-54.5		-1.13	
159	D2386-A	-54.33		-0.94	
169	D2386-M	-53.5		-0.01	
171	D2386-M	-54.0		-0.57	
175	D2386-A	-52.5		1.11	
177	D2386-M	-54.0		-0.57	
225		-----		-----	
228		-----		-----	
237	D2386-M	-53.0		0.55	
252		-----		-----	
253	D2386-M	-53.5		-0.01	
256		-----		-----	
258	D2386-M	-52.5		1.11	
273	D2386-M	-54.5		-1.13	
311	D2386-M	-53.5		-0.01	
335	D2386-M	-53.5		-0.01	
340	D2386-A	-53.3		0.21	
353	IP16-M	-53.16		0.37	
391	D2386-M	-54.5		-1.13	
398	D2386-M	-53.5		-0.01	
447	D2386-M	-53.0		0.55	
448	D2386-M	-53.5		-0.01	
463	D2386-M	-53.5		-0.01	
468	D2386-M	-53.0		0.55	
473	D2386-M	-53.5		-0.01	
495	D2386-M	-58.00	G(0.01)	-5.05	
496	D2386-	-54		-0.57	
594		-----		-----	
606	D2386-M	-52.0		1.67	
631	D2386-M	-55.0		-1.69	
671	D2386-M	-54.0		-0.57	
824	D2386-M	-52.0		1.67	
962		-----		-----	
963	D2386-	-53.5		-0.01	
1011	D2386-M	-53.5		-0.01	
1017		-----		-----	
1021	D2386-M	-52.81		0.76	
1026	D5972-A	-53.0		0.55	
1032	IP529-A	-53.1		0.44	
1038	D5972-A	-55.1		-1.80	
1039	D2386-A	-53.5		-0.01	
1049	D7153-A	-53.3		0.21	
1059	D2386-M	-52.0		1.67	
1062	IP529-A	-53.5		-0.01	
1064	D2386-A	-53.2		0.33	
1079	D5972-A	-53.8		-0.35	
1081	D7153-A	-53		0.55	
1094	D2386-	-54.5		-1.13	
1097	IP529-A	-53.3		0.21	
1105	D7153-A	-53.4		0.10	
1108	D5901-A	-53.3		0.21	
1109	D5972-A	-55.3		-2.03	
1126		-----		-----	
1140	D2386-A	-53.2		0.33	
1150	ISO3013-M	-54.83		-1.50	
1167		-----		-----	
1191	IP529-A	-53.4		0.10	
1203	D2386-M	-54		-0.57	
1237		-----		-----	
1276	D2386-M	-53.0		0.55	
1293		-----		-----	
1299	D2386-M	-53.5		-0.01	
1300	D2386-M	-53.5		-0.01	
1318	D7153-A	-53.1		0.44	
1372	D7153-A	-53.1		0.44	
1395		-----		-----	
1417	IP16-M	-54.5		-1.13	
1428	D7153-A	-53.1		0.44	
1483		-----		-----	

1487	D2386-M	-52.0		1.67	
1531		-----		-----	
1538	D2386-M	-53.5		-0.01	
1610	IP16-M	-53.0		0.55	
1613	D7153-A	-53.2		0.33	
1616	D7153-A	-53.4		0.10	
1631	D7153-A	-52.5	C	1.11	reported +52.5
1634	D2386-M	-53.5		-0.01	
1635	D2386-M	-55		-1.69	
1651		-----		-----	
1710	D2386-A	-53.5		-0.01	
1715	D5972-A	-53.7		-0.23	
1720	D5972-A	-54.0		-0.57	
1724	IP435-A	-53.6		-0.12	
1730	D2386-M	-53		0.55	
1811	D2386-A	-53.6		-0.12	
1833	IP435-A	-52.5	C	1.11	first reported -53.2
1854	D2386-M	-53.0		0.55	
1914	D2386-M	-53.67		-0.20	
1948		-----		-----	
1951	IP529-A	-52.8		0.77	
2129	D2386-M	-54.5		-1.13	
2130	D2386-M	-54.0		-0.57	
2133	D7153-A	-53.7		-0.23	

normality	not OK
n	80
outliers	1
mean (n)	-53.491
st.dev. (n)	0.6995
R(calc.)	1.959
R(D2386:06)	2.500

M: manual
A: Automated





Determination of JFTOT; Tube Rating, Delta P in mmHg, Pumped Vol. in mL, Temp. in ^{o}C

lab	method	tube	mark	Delta P	mark	volume	mark	temp	mark	remarks
120	D3241	1		0		460		-----		
132	D3241	<1		0.1		450		260		
140	D3241	<1		0		450		260		
150	D3241	<1		<1		450		260		
153	D3241	1		1.5		510		260		volume>495 mL
159	D3241	1		0		450		260		
169	D3241	1		0		450		260		
171	D3241	<1		0		450		260		
175	D3241	<1		1		440		260		
177	D3241	1		0		450		260		
225		-----		-----		-----		-----		
228		-----		-----		-----		-----		
237	D3241	1		0		450		260		
252	D3241	1		1		450		260		
253	D3241	<1		0		450		260		
256		-----		-----		-----		-----		
258	D3241	<1.0		0.4		450		260		
273		-----		-----		-----		-----		
311	D3241	<1		<1		510		260		volume>495 mL
335		-----		-----		-----		-----		
340	D3241	1		<1		460		260		
353		-----		-----		-----		-----		
391	D3241	0		0		450		260		
398		-----		-----		-----		-----		
447	D3241	1		<1		450		260		
448	D3241	1		<1		455		260		
463		-----		-----		-----		-----		
468		-----		-----		-----		-----		
473		-----		-----		-----		-----		
495	D3241	1		0		460		260		
496		-----		-----		-----		-----		
594		-----		-----		-----		-----		
606	D3241	1		<1		510		260		volume>495 mL
631		-----		-----		-----		-----		
671	D3241	1		0		455		260		
824	D3241	1		0.00		450		260		
962		-----		-----		-----		-----		
963	D3241	1		0		450		260		
1011	D3241	<1		0.0		510		260		volume>495 mL
1017		-----		-----		-----		-----		
1021	D3241	0		0		450		260		
1026	D3241	<1		<1		450		260		
1032	D3241	1		0.1		460		260		
1038		-----		-----		-----		-----		
1039	D3241	<1		0.2		450		260		
1049	D3241	<1		0.0		492.5		260		
1059		-----		-----		-----		-----		
1062	D3241	0		0		500		260		volume>495 mL
1064	D3241	1		0		450		260		
1079	D3241	<1		0		450		260		
1081	D3241	<1		0		490		260		
1094		-----		-----		-----		-----		
1097	D3241	1		0		460		260		
1105	D3241	1		0		482		260		
1108		-----		-----		-----		-----		
1109	D3241	<1		1		450		260		
1126		-----		-----		-----		-----		
1140	D3241	1		0.0		450		260		
1150		-----		-----		-----		-----		
1167		-----		-----		-----		-----		
1191		-----		-----		-----		-----		
1203	D3241	1		0		450		260		
1237	D3241	<1		0.0		460		260		
1276	D3241	<1.0		0		450		260		
1293		-----		-----		-----		-----		
1299	D3241	1		0		460		260		
1300		-----		-----		-----		-----		
1318	D3241	<1		0.0		450		260		
1372	D3241	<1		0.0		460		260		
1395		-----		-----		-----		-----		
1417	D3241	<1		0		450		260		
1428	D3241	<1		0		455		260		
1483		-----		-----		-----		-----		

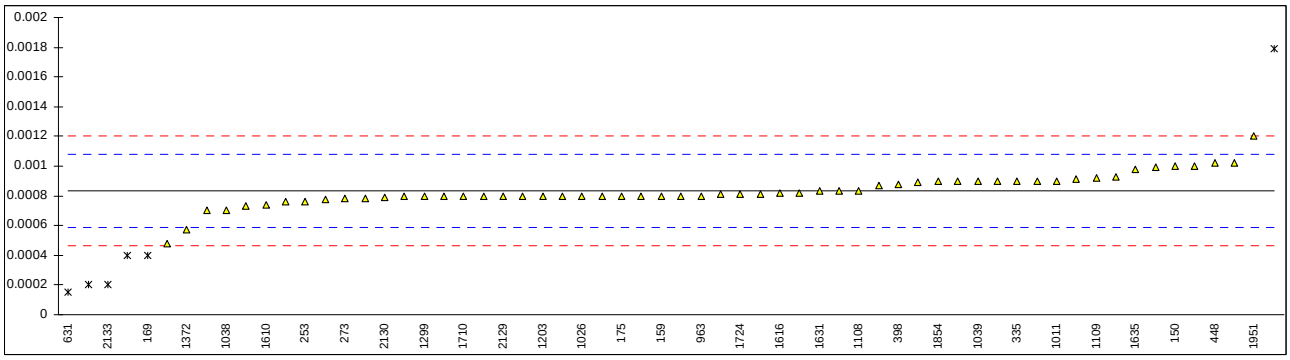
1487		-----	-----	-----	-----	
1531		-----	-----	-----	-----	
1538	D3241	<1	0.1	450	260	
1610	IP323	1	<1	450	260	
1613	D3241	<1	0.0	450	260	
1616		-----	-----	-----	-----	
1631	D3241	<1.0	0	-----	260	
1634		-----	-----	-----	-----	
1635		-----	-----	-----	-----	
1651		-----	-----	-----	-----	
1710	D3241	1	0	450	260	
1715		-----	-----	-----	-----	
1720	D3241	<1	0.1	478	260	
1724	D3241	<1	0.1	460	260	
1730	D3241	<1	0	450	260	
1811		-----	-----	-----	-----	
1833	D3241	<1	0	400	260	
1854	D3241	0	<1	450	260	
1914		-----	-----	-----	-----	
1948		-----	-----	-----	-----	
1951	D3241	<1	2	480	260	
2129	D3241	1	0	452	260	
2130		-----	-----	-----	-----	
2133	D3241	<1	<0.1	510	260	volume>495 mL
	normality	not OK	not OK	not OK	n.a.	
	n	29	49	58	58	
	outliers	0	0	0	0	
	mean (n)	0.86	0.16	459.8	260	
	st.dev. (n)	0.351	0.416	20.78	0	
	R(calc.)	0.98	1.17	58.2	0	
	R(D3241:09e1)	n.a.	n.a.	n.a.	n.a.	

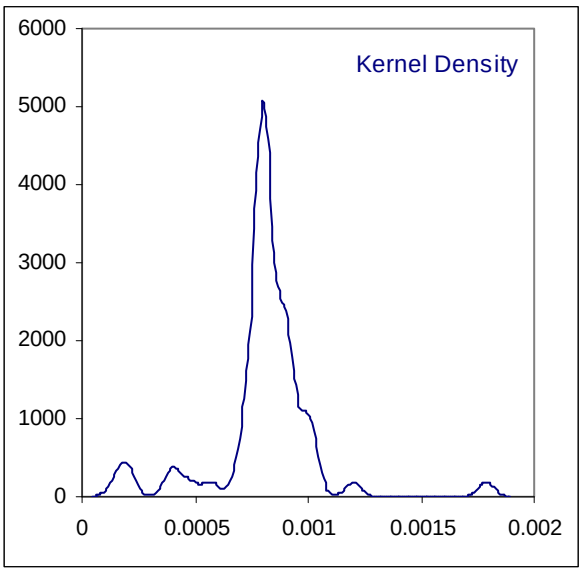
Determination of Mercaptan Sulphur on sample #12022; results in % M/M

lab	method	value	mark	z(targ)	remarks
120	D3227	0.0009		0.52	
132	D3227	0.0009		0.52	
140	D3227	0.0002	G(0.05)	-5.16	
150	D3227	0.0010		1.33	
153	D3227	0.0010		1.33	
159	D3227	0.0008		-0.29	
169	D3227	0.0004	DG(0.01)	-3.54	
171	D3227	0.00081		-0.21	
175	D3227	0.0008		-0.29	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237	D3227	0.00099		1.25	
252		-----		-----	
253	D3227	0.00076		-0.62	
256		-----		-----	
258		-----		-----	
273	D3227	0.00078		-0.46	
311	D3227	0.0008		-0.29	
335	D3227	0.0009		0.52	
340	D3227	0.00073		-0.86	
353		-----		-----	
391	D3227	0.0008		-0.29	
398	D3227	0.00088		0.35	
447	D3227	0.00091		0.60	
448	D3227	0.00102		1.49	
463	IP30	POS		-----	
468		-----		-----	
473		-----		-----	
495	D3227	0.00089		0.44	
496	D3227	0.00082		-0.13	
594		-----		-----	
606		-----		-----	
631	D3227	0.00015	G(0.05)	-5.57	
671		-----		-----	
824	D3227	0.0008		-0.29	
962	D3227	0.00076		-0.62	
963	D3227	0.0008		-0.29	
1011	D3227	0.0009		0.52	
1017		-----		-----	
1021		-----		-----	
1026	D3227	0.0008		-0.29	
1032		-----		-----	
1038	D3227	0.0007		-1.11	
1039	D3227	0.0009		0.52	
1049	D3227	0.000772		-0.52	
1059	D3227	0.0008		-0.29	
1062	D3227	0.0009		0.52	
1064	D3227	0.00080		-0.29	
1079	D3227	0.00048		-2.89	
1081	D3227	0.0007		-1.11	
1094		-----		-----	
1097	ISO3012	0.0008		-0.29	
1105	D3227	0.000795		-0.34	
1108	D3227	0.00083		-0.05	
1109	D3227	0.00092		0.68	
1126		-----		-----	
1140	D3227	0.000815	C	-0.17	reported in a different unit 8.15
1150		-----		-----	
1167		-----		-----	
1191	D3227	0.00087		0.27	
1203	UOP163	0.0008		-0.29	
1237		-----		-----	
1276	D3227	0.00179	G(0.01)	7.74	
1293		-----		-----	
1299	D3227	0.0008		-0.29	
1300	D3227	0.001023		1.51	
1318		-----		-----	
1372	D3227	0.00057		-2.16	
1395		-----		-----	
1417		-----		-----	
1428	D3227	0.00093		0.76	
1483		-----		-----	

1487		-----		-----	
1531		-----		-----	
1538	D3227	0.0008		-0.29	
1610	IP342	0.00074		-0.78	
1613		-----		-----	
1616	D3227	0.00082		-0.13	
1631	D3227	0.00083		-0.05	
1634		-----		-----	
1635	D3227	0.00098		1.17	
1651		-----		-----	
1710	D3227	0.0008		-0.29	
1715		-----		-----	
1720		-----		-----	
1724	D3227	0.00081		-0.21	
1730		-----		-----	
1811		-----		-----	
1833	D3227	0.00083		-0.05	
1854	D3227	0.0009		0.52	
1914	D3227	0.00078		-0.46	
1948	D3227	0.0004	C, DG(0.01)	-3.54	first reported 0.0041
1951	IP342	0.0012		2.95	
2129	D3227	0.0008		-0.29	
2130	D3227	0.00079		-0.38	
2133	D3227	0.0002	G(0.01)	-5.16	

normality	not OK
n	56
outliers	6
mean (n)	0.00084
st.dev. (n)	0.000109
R(calc.)	0.00031
R(D3227:10)	0.00035



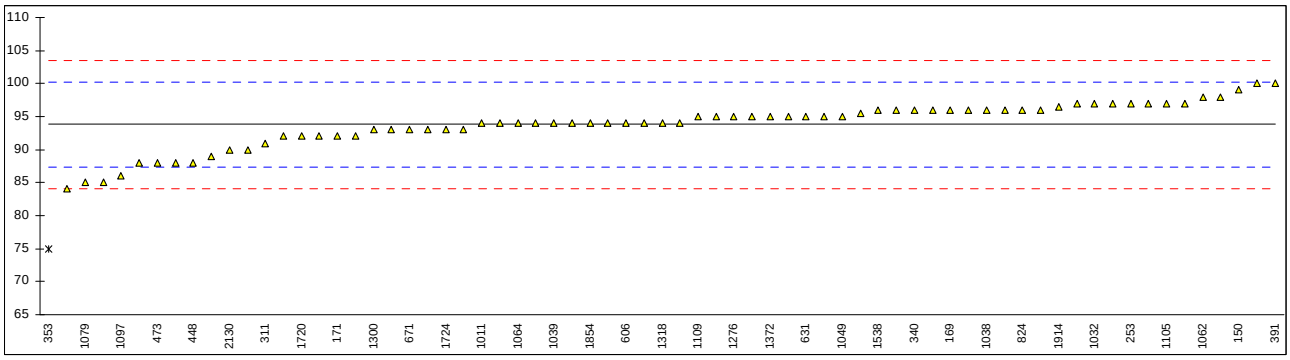


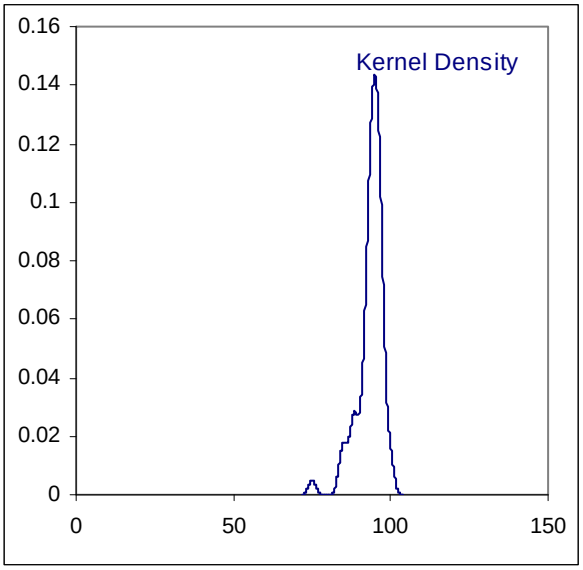
Determination of MSEP on sample #12022;

lab	method	value	mark	z(targ)	remarks
120	D3948	96		0.68	
132	D3948	85		-2.73	
140	D3948	94		0.06	
150	D3948	99		1.61	
153	D3948	94		0.06	
159	D3948	95		0.37	
169	D3948	96		0.68	
171	D3948	92		-0.56	
175	D3948	88		-1.80	
177	D3948	84		-3.04	
225		-----		-----	
228		-----		-----	
237	D3948	97		0.99	
252	D3948	96		0.68	
253	D3948	97		0.99	
256		-----		-----	
258	D3948	92		-0.56	
273		-----		-----	
311	D3948	91		-0.87	
335		-----		-----	
340	D3948	96		0.68	
353	D3948	75	G(0.01)	-5.83	
391	D3948	100		1.92	
398	D3948	100		1.92	
447	D3948	92		-0.56	
448	D3948	88		-1.80	
463	D3948	95		0.37	
468		-----		-----	
473	D3948	88		-1.80	
495	D3948	94.0		0.06	
496	D3949	89		-1.49	
594		-----		-----	
606	D3948	94		0.06	
631	D3948	95		0.37	
671	D3948	93		-0.25	
824	D3948	96		0.68	
962	D3948	96		0.68	
963	D3948	97		0.99	
1011	D3948	94		0.06	
1017		-----		-----	
1021	D3948	95		0.37	
1026	D3948	94		0.06	
1032	D3948	97		0.99	
1038	D3948	96		0.68	
1039	D3948	94		0.06	
1049	D3948	95		0.37	
1059	D3948	97		0.99	
1062	D3948	98		1.30	
1064	D3948	94		0.06	
1079	D3948	85		-2.73	
1081	D3948	98		1.30	
1094		-----		-----	
1097	D3948	86		-2.42	
1105	D3948	97		0.99	
1108	D3948	94		0.06	
1109	D3948	95		0.37	
1126		-----		-----	
1140	D3948	95		0.37	
1150		-----		-----	
1167		-----		-----	
1191		-----		-----	
1203		-----		-----	
1237		-----		-----	
1276	D3948	95		0.37	
1293		-----		-----	
1299		-----		-----	
1300	D3948	93		-0.25	
1318	D3948	94		0.06	
1372	D3948	95		0.37	
1395		-----		-----	
1417		-----		-----	
1428		-----		-----	
1483		-----		-----	

1487	D3948	95.5	0.52
1531		-----	-----
1538	D3948	96	0.68
1610	D3948	97	0.99
1613	D3948	90	-1.18
1616	D3948	93	-0.25
1631	D3948	96	0.68
1634	D3948	94	0.06
1635		-----	-----
1651		-----	-----
1710	D3948	96	0.68
1715		-----	-----
1720	D3948	92	-0.56
1724	D3948	93	-0.25
1730		-----	-----
1811		-----	-----
1833	D3948	93	-0.25
1854	D3948	94	0.06
1914	D3948	96.5	0.83
1948		-----	-----
1951	D3948	92	-0.56
2129	D3948	93	-0.25
2130	D3948	90	-1.18
2133	D3948	88	-1.80

normality	not OK
n	68
outliers	1
mean (n)	93.809
st.dev. (n)	3.4749
R(calc.)	9.730
R(D3948:08)	9.030



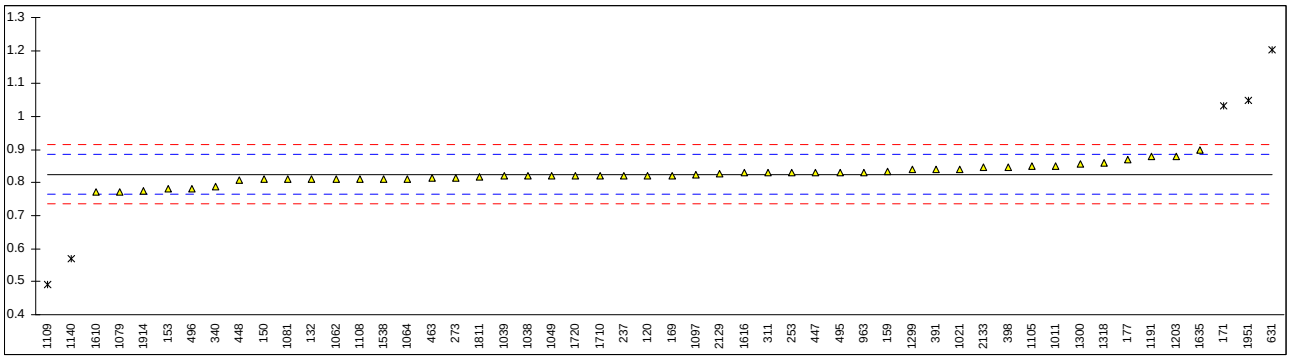


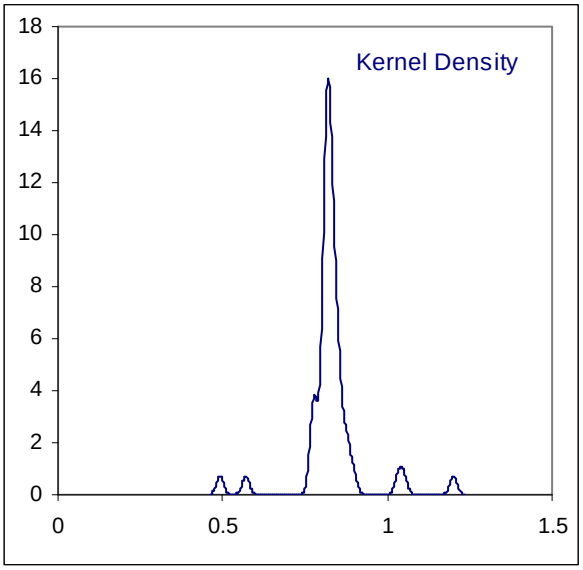
Determination of Naphthalenes on sample #12022; results in %V/V

lab	method	value	mark	z(targ)	remarks
120	D1840-B	0.82		-0.17	
132	D1840-B	0.81		-0.51	
140		-----		-----	
150	D1840-A	0.81		-0.51	
153	D1840-B	0.78		-1.51	
159	D1840-B	0.8327		0.25	
169	D1840-B	0.82		-0.17	
171	D1840-B	1.0341	G(0.01)	6.99	
175		-----		-----	
177	D1840	0.87		1.50	
225		-----		-----	
228		-----		-----	
237	D1840-B	0.82		-0.17	
252		-----		-----	
253	D1840-B	0.83		0.16	
256		-----		-----	
258		-----		-----	
273	D1840-A	0.815		-0.34	
311	D1840-B	0.83		0.16	
335		-----		-----	
340	D1840-A	0.787		-1.27	
353		-----		-----	
391	D1840-B	0.84		0.50	
398	D1840-B	0.848		0.76	
447	D1840-B	0.83		0.16	
448	D1840-A	0.809		-0.54	
463	D1840-B	0.814		-0.37	
468		-----		-----	
473		-----		-----	
495	D1840-B	0.83		0.16	
496	D1840-A	0.782		-1.44	
594		-----		-----	
606		-----		-----	
631	D1840-A	1.202	G(0.01)	12.60	
671		-----		-----	
824		-----		-----	
962		-----		-----	
963	D1840-A	0.832		0.23	
1011	D1840-B	0.85		0.83	
1017		-----		-----	
1021	D1840-B	0.84		0.50	
1026		-----		-----	
1032		-----		-----	
1038	D1840-B	0.82		-0.17	
1039	D1840-B	0.82		-0.17	
1049	D1840-A	0.82		-0.17	
1059		-----		-----	
1062	D1840-A	0.81		-0.51	
1064	D1840-A	0.811		-0.47	
1079	D1840-A	0.772		-1.78	
1081	D1840-B	0.81		-0.51	
1094		-----		-----	
1097	D1840-A	0.823		-0.07	
1105	D1840-A	0.849		0.80	
1108	D1840-B	0.81		-0.51	
1109	D1840-A	0.492	G(0.01)	-11.14	
1126		-----		-----	
1140	D1840-B	0.57	G(0.01)	-8.53	
1150		-----		-----	
1167		-----		-----	
1191	D1840-B	0.879		1.80	
1203	D1840-A	0.8807		1.86	
1237		-----		-----	
1276		-----		-----	
1293		-----		-----	
1299	D1840	0.84		0.50	
1300	D1840-B	0.856		1.03	
1318	D1840-B	0.860		1.17	
1372		-----		-----	
1395		-----		-----	
1417		-----		-----	
1428		-----		-----	
1483		-----		-----	

1487		-----		-----
1531		-----		-----
1538	D1840-B	0.81		-0.51
1610	D1840-A	0.7715		-1.79
1613		-----		-----
1616	D1840-A	0.83		0.16
1631		-----		-----
1634		-----		-----
1635	D1840-B	0.899		2.47
1651		-----		-----
1710	D1840-A	0.82		-0.17
1715		-----		-----
1720	D1840-B	0.82		-0.17
1724		-----		-----
1730		-----		-----
1811	D1840-A	0.819		-0.21
1833		-----		-----
1854		-----		-----
1914	D1840-A	0.7766		-1.62
1948		-----		-----
1951	D1840-B	1.05	G(0.01)	7.52
2129	D1840-B	0.827		0.06
2130		-----		-----
2133	D1840-A	0.848		0.76

		Only D1840-A:	Only D1840-B:
normality	not OK	OK	OK
n	47	19	26
outliers	5	2	2
mean (n)	0.8251	0.8140	0.8310
st.dev. (n)	0.02737	0.02826	0.02417
R(calc.)	0.0766	0.0791	0.0677
R(D1840:07-B)	0.0838	0.0542	0.0841



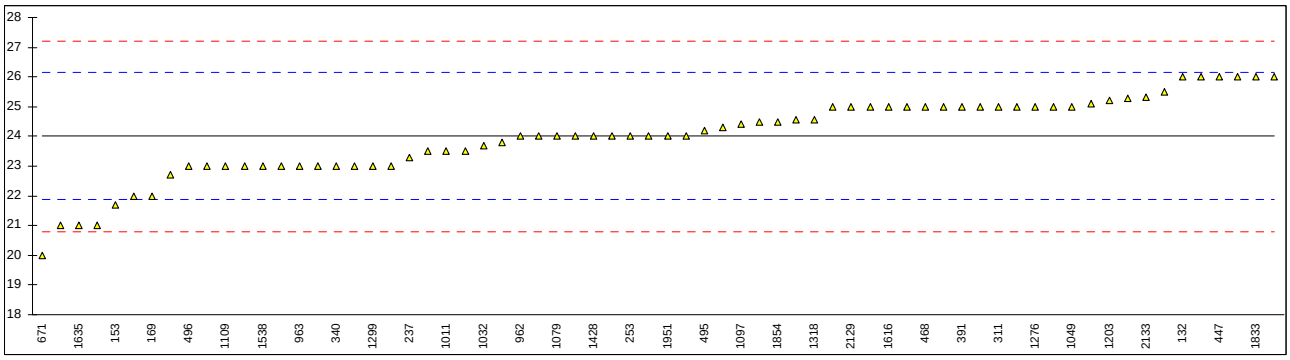


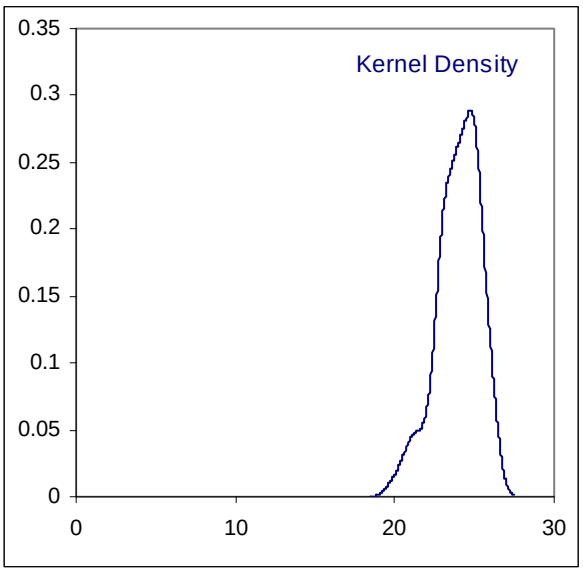
Determination of Smoke Point on sample #12022; results in mm

lab	method	value	mark	z(targ)	remarks
120	D1322	25.0		0.93	
132	D1322	26.0		1.86	
140	D1322	26		1.86	
150	D1322	23		-0.94	
153	D1322	21.7		-2.15	
159		-----		-----	
169	D1322	22		-1.87	
171	D1322	23.0		-0.94	
175		-----		-----	
177	D1322	23		-0.94	
225		-----		-----	
228		-----		-----	
237	D1322	23.3		-0.66	
252		-----		-----	
253	D1322	24		0.00	
256		-----		-----	
258		-----		-----	
273	D1322	25.0	C	0.93	first reported 28.5
311	D1322	25.0		0.93	
335		-----		-----	
340	D1322	23.0		-0.94	
353	D1322	24.3		0.28	
391	D1322	25		0.93	
398	D1322	26		1.86	
447	D1322	26.0		1.86	
448	D1322	26		1.86	
463	D1322	24.57		0.53	
468	D1322	25.0		0.93	
473		-----		-----	
495	D1322	24.2		0.18	
496	D1322	23		-0.94	
594		-----		-----	
606		-----		-----	
631	D1322	23.0		-0.94	
671	D1322	20.0		-3.74	
824	D1322	25.0		0.93	
962	D1322	24.00		0.00	
963	D1322	23.0		-0.94	
1011	D1322	23.5		-0.47	
1017		-----		-----	
1021	D1322	21.02		-2.78	
1026	D1322	24.0		0.00	
1032	D1322	23.7		-0.28	
1038	D1322	21.0		-2.80	
1039	D1322	25.0		0.93	
1049	D1322	25		0.93	
1059	D1322	25.0		0.93	
1062	D1322	24.0		0.00	
1064	D1322	25.1		1.02	
1079	D1322	24	C	0.00	first reported 19.0
1081	D1322	23.0		-0.94	
1094		-----		-----	
1097	D1322	24.42		0.39	
1105	D1322	24.0		0.00	
1108		-----		-----	
1109	D1322	23.0		-0.94	
1126		-----		-----	
1140	D1322	23.5		-0.47	
1150		-----		-----	
1167		-----		-----	
1191	D1322	22		-1.87	
1203	D1322	25.2		1.12	
1237		-----		-----	
1276	D1322	25.0		0.93	
1293		-----		-----	
1299	D1322	23.0		-0.94	
1300	D1322	23.5		-0.47	
1318	D1322	24.576		0.53	
1372	D1322	22.7		-1.22	
1395		-----		-----	
1417		-----		-----	
1428	D1322	24		0.00	
1483		-----		-----	

1487		-----	-----
1531		-----	-----
1538	D1322	23.0	-0.94
1610	IP57	23.8	-0.19
1613	D1322	24.0	0.00
1616	D1322	25	0.93
1631	D1322	25.3	1.21
1634		-----	-----
1635	D1322	21.0	-2.80
1651		-----	-----
1710	D1322	23	-0.94
1715	D1322	25.5	1.40
1720		-----	-----
1724	D1322	25	0.93
1730		-----	-----
1811	D1322	24	0.00
1833	D1322	26	1.86
1854	D1322	24.5	0.46
1914	D1322	24.5	0.46
1948		-----	-----
1951	D1322	24.0	0.00
2129	D1322	25.0	0.93
2130	D1322	25.0	0.93
2133	D1322	25.33	1.24

normality	not OK
n	68
outliers	0
mean (n)	24.003
st.dev. (n)	1.3330
R(calc.)	3.732
R(D1322:08)	3.000



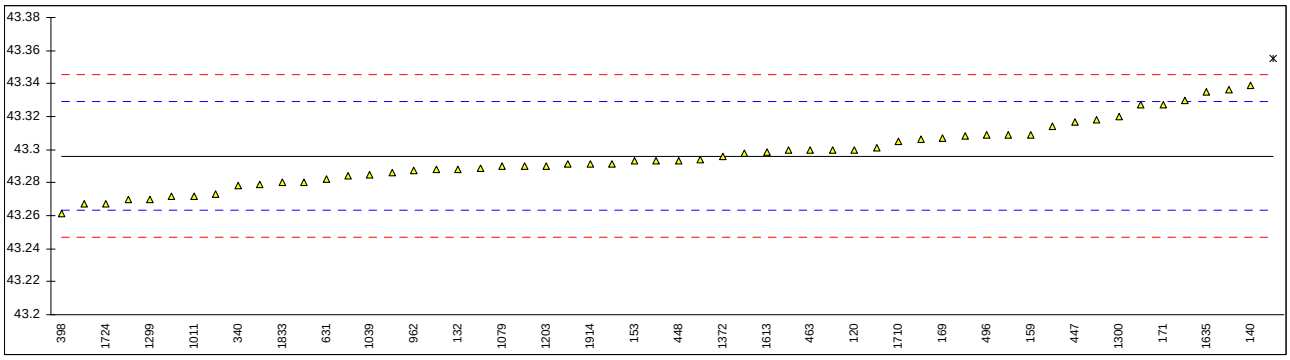


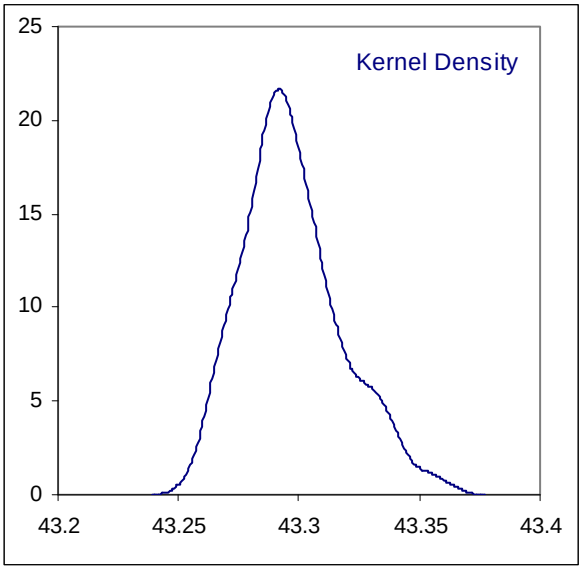
Determination of Specific Energy on sample #12022; results in MJ/kg

lab	method	value	mark	z(targ)	remarks
120	D3338	43.300		0.24	
132	D3338	43.288		-0.49	
140	D3338	43.339		2.61	
150	D3338	43.293		-0.19	
153	D3338	43.293		-0.19	
159	D3338	43.309		0.79	
169	D3338	43.307		0.67	
171	D3338	43.327		1.88	
175		-----		-----	
177	D3338	43.273		-1.40	
225		-----		-----	
228		-----		-----	
237	D3338	43.327		1.88	
252		-----		-----	
253	D3338	43.2915		-0.28	
256		-----		-----	
258		-----		-----	
273		-----		-----	
311	D3338	43.30		0.24	
335		-----		-----	
340	D3338	43.278		-1.10	
353		-----		-----	
391	D3338	43.291		-0.31	
398	D3338	43.2611		-2.13	
447	D3338	43.317		1.27	
448	D3338	43.293		-0.19	
463	D3338	43.30		0.24	
468		-----		-----	
473		-----		-----	
495	D3338	43.301		0.30	
496	D3338	43.309		0.79	
594		-----		-----	
606		-----		-----	
631	D3338	43.2822		-0.84	
671		-----		-----	
824	D3338	43.308		0.73	
962	D3338	43.2874		-0.53	
963	D3338	43.2884		-0.47	
1011	D3338	43.272		-1.46	
1017		-----		-----	
1021		-----		-----	
1026		-----		-----	
1032	D3338	43.336		2.43	
1038		-----		-----	
1039	D3338	43.285		-0.67	
1049	D3338	43.298	C	0.12	first reported 43.247
1059	D3338	43.284		-0.73	
1062		-----		-----	
1064	D3338	43.3063		0.62	
1079	D3338	43.29	C	-0.37	first reported 43.228
1081	D3338	43.279		-1.04	
1094		-----		-----	
1097	D3338	43.288		-0.49	
1105	D3338	43.27		-1.59	
1108		-----		-----	
1109	D3338	43.28		-0.98	
1126		-----		-----	
1140	D3338	43.286		-0.61	
1150		-----		-----	
1167		-----		-----	
1191	D3338	43.267		-1.77	
1203	D3338	43.29		-0.37	
1237		-----		-----	
1276	D3338	43.309		0.79	
1293		-----		-----	
1299	D3338	43.27		-1.59	
1300	D3338	43.32		1.46	
1318		-----		-----	
1372	D3338	43.2958		-0.02	
1395		-----		-----	
1417		-----		-----	
1428		-----		-----	
1483		-----		-----	

1487		-----		-----	
1531		-----		-----	
1538	D3338	43.314		1.09	
1610	D3338	43.318		1.34	
1613	D3338	43.2985		0.15	
1616	D3338	43.272		-1.46	
1631	D3338	43.3		0.24	
1634		-----		-----	
1635	D3338	43.335		2.37	
1651		-----		-----	
1710	D3338	43.305	C	0.54	first reported 43.044
1715		-----		-----	
1720		-----		-----	
1724	D3338	43.267		-1.77	
1730		-----		-----	
1811	D3338	43.2936		-0.15	
1833	D3338	43.28		-0.98	
1854		-----		-----	
1914	D3338	43.291		-0.31	
1948		-----		-----	
1951	D3338	43.355	G(0.05)	3.59	
2129	D3338	43.29		-0.37	
2130		-----		-----	
2133	D3338	43.330		2.07	

normality	OK
n	55
outliers	1
mean (n)	43.2961
st.dev. (n)	0.01877
R(calc.)	0.0525
R(D3338:09)	0.0460



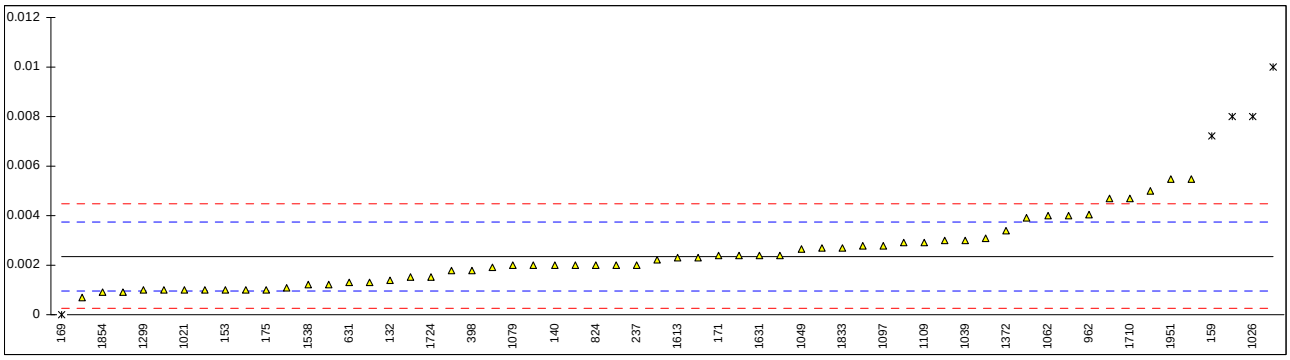


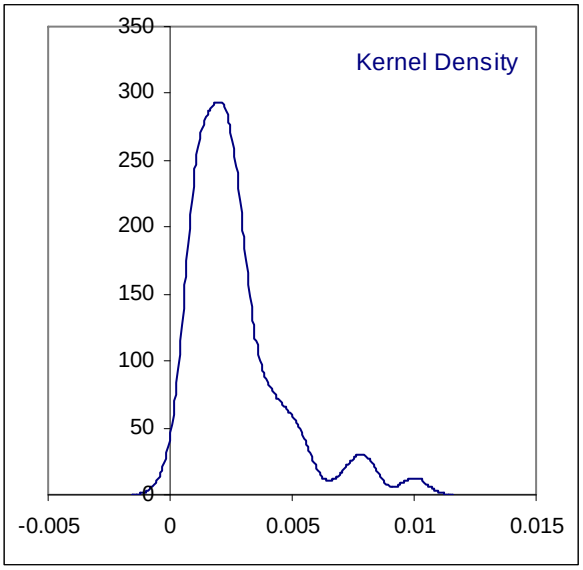
Determination of Total Acidity on sample #12022; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
132	D3242-Y	0.0014		-1.35	
140	D3242-Y	0.002		-0.50	
150	D3242-Y	0.0024		0.07	
153	D3242-Y	0.0010		-1.92	
159	D3242-Y	0.0072	G(0.05)	6.90	
169	D3242-Y	0.000	ex	-3.34	result excluded; zero is not a real result
171	D3242-Y	0.0024		0.07	
175	D3242-Y	0.001		-1.92	
177	D3242-Y	0.0028		0.64	
225		-----		-----	
228		-----		-----	
237	D3242-Y	0.002		-0.50	
252		-----		-----	
253		-----		-----	
256		-----		-----	
258		-----		-----	
273		-----		-----	
311	D3242-Y	0.001		-1.92	
335		-----		-----	
340	D3242-Y	0.0031		1.07	
353		-----		-----	
391	D3242-Y	0.010	G(0.01)	10.89	
398	D3242-N	0.0018	C	-0.78	first reported 0.0078
447	D3242-Y	0.0018		-0.78	
448	D3242-Y	0.003		0.93	
463	D3242-Y	0.0047		3.35	
468		-----		-----	
473		-----		-----	
495	D3242-Y	0.008	DG(0.01)	8.04	
496	D3242-Y	0.0012		-1.63	
594		-----		-----	
606		-----		-----	
631	D3242-Y	0.0013		-1.49	
671		-----		-----	
824	D3242-Y	0.002		-0.50	
962	D3242-Y	0.00405		2.42	
963	D3242-Y	0.004		2.35	
1011	D3242-Y	0.005		3.77	
1017		-----		-----	
1021	D3242-Y	0.001		-1.92	
1026	D3242-Y	0.008	DG(0.01)	8.04	
1032	D3242-Y	0.0019		-0.64	
1038	D3242-Y	0.002		-0.50	
1039	D3242-Y	0.003		0.93	
1049	D3242-Y	0.00264		0.41	
1059	D3242-Y	0.002		-0.50	
1062	D3242-Y	0.0040		2.35	
1064	D3242-Y	0.0013		-1.49	
1079	D3242-Y	0.002		-0.50	
1081	D3242-Y	0.0007		-2.35	
1094		-----		-----	
1097	D3242-Y	0.0028		0.64	
1105	D3242-Y	0.0022		-0.21	
1108	D3242-Y	0.0055		4.48	
1109	D3242-Y	0.0029		0.78	
1126		-----		-----	
1140	D3242-Y	0.0010		-1.92	
1150		-----		-----	
1167		-----		-----	
1191	D3242-Y	0.0015		-1.21	
1203	D3242-Y	0.0039		2.21	
1237		-----		-----	
1276	D3242-Y	0.0029		0.78	
1293		-----		-----	
1299	D3242-	0.001		-1.92	
1300	D3242-N	0.002697		0.50	
1318		-----		-----	
1372	D3242-Y	0.0034		1.50	
1395		-----		-----	
1417		-----		-----	
1428		-----	W	-----	result withdrawn, originally reported 0.010
1483		-----		-----	

1487		-----		-----	
1531		-----		-----	
1538	D3242-Y	0.0012		-1.63	
1610	IP354-Y	0.0023		-0.07	
1613	D3242-Y	0.0023		-0.07	
1616	D3242-Y	0.001		-1.92	
1631	D3242-Y	0.0024		0.07	
1634		-----		-----	
1635		-----		-----	
1651		-----		-----	
1710	D3242-Y	0.0047		3.35	
1715		-----		-----	
1720	D3242-Y	0.002		-0.50	
1724	D3242-Y	0.0015		-1.21	
1730		-----		-----	
1811		-----		-----	
1833	D3242-Y	0.0027		0.50	
1854	D3242-N	0.0009	C	-2.06	first reported 0.009
1914	D3242-Y	0.00108		-1.81	
1948		-----		-----	
1951	D3242-Y	0.00547		4.44	
2129	D3242-Y	0.0024		0.07	
2130		-----		-----	
2133	D3242-Y	0.00093	C	-2.02	first reported 0.0093

normality	not OK
n	55
outliers	5
mean (n)	0.00235
st.dev. (n)	0.001235
R(calc.)	0.00346
R(D3242:08)	0.00197



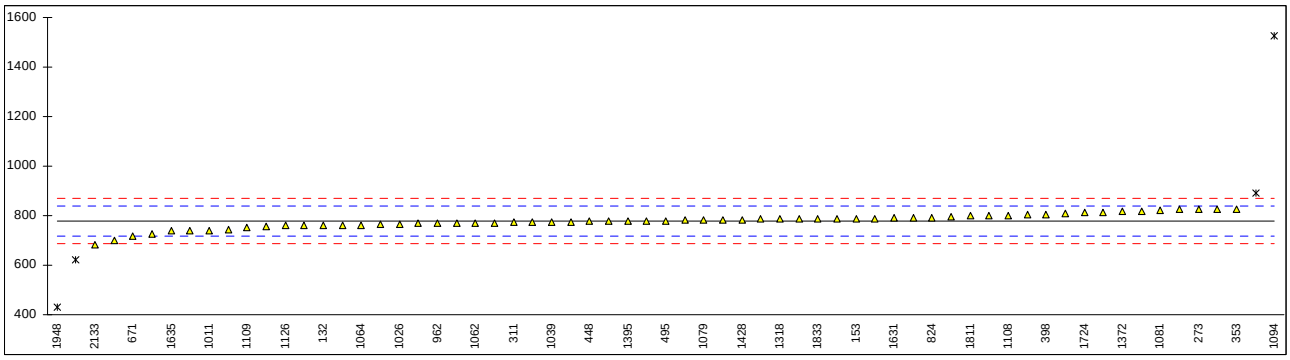


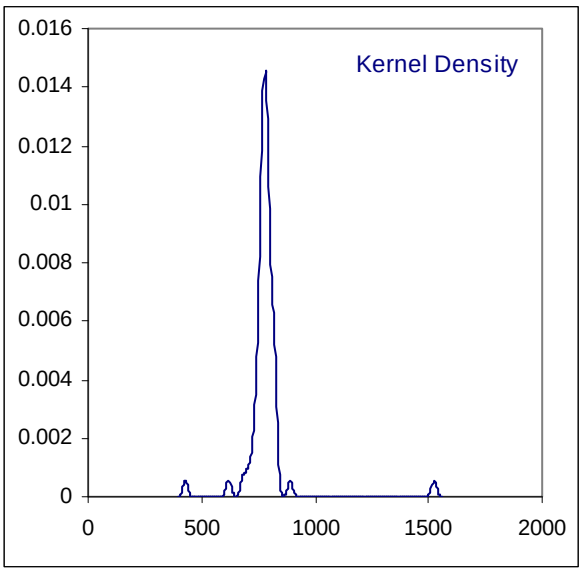
Determination of Total Sulphur on sample #12022; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D2622	762		-0.54	
132	D4294	760.8		-0.58	
140		-----		-----	
150	D5453	745.3		-1.09	
153	D4294	787.9		0.31	
159	D4294	817.4		1.28	
169		-----		-----	
171	D5453	780.88		0.08	
175		-----		-----	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
252		-----		-----	
253		-----		-----	
256		-----		-----	
258		-----		-----	
273	D4294	826	C	1.56	first reported 885
311	D2622	772		-0.21	
335		-----		-----	
340	D5453	769.9		-0.28	
353	IP336	828.0		1.62	
391	ISO8754	815		1.20	
398	D5453	805		0.87	
447	D5453	804.9		0.87	
448	D4294	777		-0.05	
463	D4294	770.95		-0.25	
468	D5453	768		-0.34	
473		-----		-----	
495	D5453	780	C	0.05	reported in a different unit 0.078
496	D2622	725.8		-1.73	
594		-----		-----	
606		-----		-----	
631		-----		-----	
671	D5453	716.72		-2.02	
824	D5453	793		0.48	
962	D5453	768.4		-0.33	
963	D4294	792.7		0.47	
1011	D4294	741	C	-1.23	first reported 672
1017		-----		-----	
1021	D2622	774		-0.15	
1026	ISO20884	767		-0.37	
1032		-----		-----	
1038	D4294	788		0.31	
1039	D2622	774.8		-0.12	
1049		-----		-----	
1059	ISO1459	740		-1.26	
1062	D5453	770		-0.28	
1064	D5453	763.0		-0.51	
1079	D4294	782	C	0.12	reported in a different unit 0.0782
1081	D4294	820		1.36	
1094	in house	1524	G(0.01)	24.44	
1097	D5453	782		0.12	
1105	D4294	787.52		0.30	
1108	D4294	800		0.71	
1109	D2622	751.1		-0.90	
1126	ISO20846	759.5		-0.62	
1140	D5453	892	G(0.05)	3.72	
1150		-----		-----	
1167		-----		-----	
1191	D4294	800		0.71	
1203	ISO14596	760		-0.60	
1237		-----		-----	
1276	D5453	700		-2.57	
1293		-----		-----	
1299	D2622	780		0.05	
1300	D5453	778.2		-0.01	
1318	D4294	786.3		0.26	
1372	D4294	816		1.23	
1395	ISO8754	778.9		0.02	
1417	in house	620	G(0.01)	-5.19	
1428	ISO8754	782.5		0.13	
1483		-----		-----	

1487		-----		-----	
1531		-----		-----	
1538	D4294	797.6	C	0.63	first reported 841
1610	IP336	826		1.56	
1613		-----		-----	
1616	D4294	785.3		0.22	
1631	D5453	792.1		0.45	
1634		-----		-----	
1635	D4294	740	C	-1.26	first reported 680
1651		-----		-----	
1710	D2622	764		-0.47	
1715		-----		-----	
1720	D5453	825.0	C	1.53	first reported 687.0
1724	IP336	814		1.17	
1730		-----		-----	
1811	D5453	799.0		0.67	
1833	D5453	787.09		0.28	
1854	ISO8754	807		0.94	
1914	D5453	754.5		-0.78	
1948	D5453	430.8	C, G(0.01)	-11.39	first reported 498.9
1951	IP497	786.5		0.26	
2129	IP496	775.4		-0.10	
2130		-----		-----	
2133	D5453	681.7		-3.17	

normality	OK
n	61
outliers	4
mean (n)	778.437
st.dev. (n)	29.6462
R(calc.)	83.009
R(D5453:09)	85.432



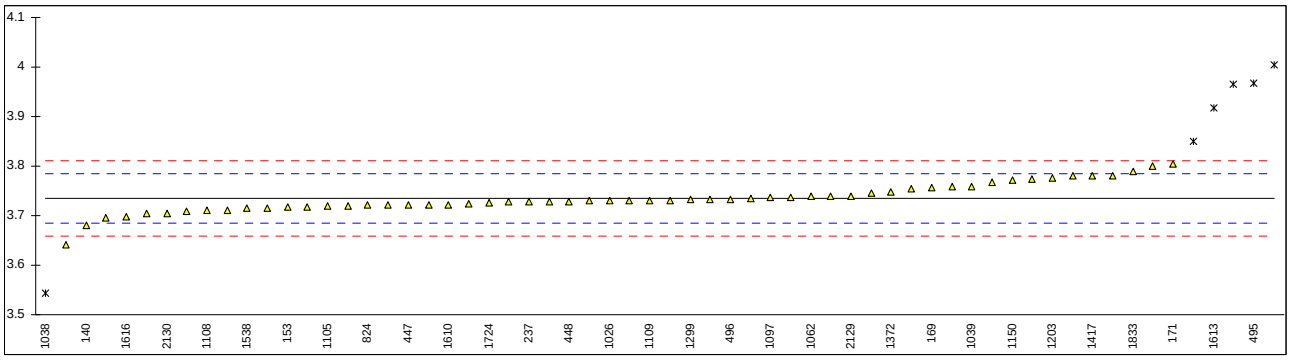


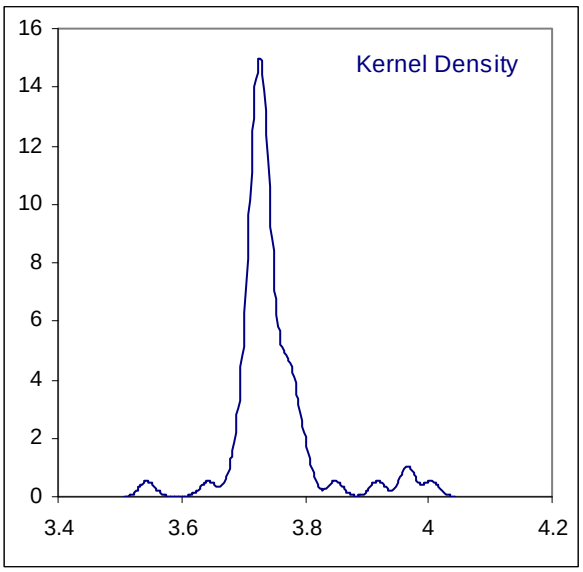
Determination of Viscosity @ -20°C on sample #12022; results in cSt

lab	method	value	mark	z(targ)	remarks
120	D445-M	3.722		-0.50	
132	D445-M	3.6953		-1.56	
140	D445-M	3.680		-2.16	
150	D445-A	3.738		0.13	
153	D445-M	3.717		-0.70	
159		-----		-----	
169	D445-M	3.7565		0.86	
171	D445-M	3.804		2.73	
175	D445-M	3.719		-0.62	
177	D445-M	3.716		-0.74	
225		-----		-----	
228		-----		-----	
237	D445-M	3.728		-0.27	
252		-----		-----	
253	D445-M	3.754		0.76	
256		-----		-----	
258		-----		-----	
273		-----		-----	
311	D445-A	3.709		-1.02	
335		-----		-----	
340	D445-M	3.8491	G(0.05)	4.51	
353		-----		-----	
391	D445-M	3.780	C	1.78	first reported 3.650
398	D445	3.7399		0.20	
447	D445-M	3.7210		-0.54	
448	D445-M	3.7286		-0.24	
463		-----		-----	
468		-----		-----	
473		-----		-----	
495	D445-M	3.967	G(0.01)	9.16	
496	D445	3.7335		-0.05	
594		-----		-----	
606		-----		-----	
631	D445-M	3.7455		0.42	
671	D445-M	3.730716		-0.16	
824	D445-M	3.721		-0.54	
962		-----		-----	
963	D445-M	3.7742		1.56	
1011	D445-M	3.7300		-0.19	
1017		-----		-----	
1021		-----		-----	
1026	ISO3104	3.730		-0.19	
1032	D445-M	3.7665		1.25	
1038	D445-M	3.544	G(0.05)	-7.53	
1039	D445-M	3.759		0.96	
1049	D445-M	3.734		-0.03	
1059	D445-M	4.005	C, G(0.01)	10.66	first reported 4.231
1062	D445-M	3.739		0.17	
1064	D445-A	3.7239		-0.43	
1079	D445-M	3.721		-0.54	
1081	D445-M	3.965	G(0.01)	9.08	
1094		-----		-----	
1097	ISO3104-M	3.737		0.09	
1105	D445-M	3.7186		-0.64	
1108	D445-M	3.710		-0.98	
1109	D445-M	3.7304		-0.17	
1126		-----		-----	
1140	D445-A	3.728		-0.27	
1150	ISO3104-A	3.771	C	1.43	first reported 3.6510
1167		-----		-----	
1191	D445-M	3.799		2.53	
1203	D445-M	3.777		1.67	
1237		-----		-----	
1276		-----		-----	
1293		-----		-----	
1299	D445	3.732		-0.11	
1300	D445-A	3.7182		-0.65	
1318		-----		-----	
1372	D445-M	3.7482		0.53	
1395		-----		-----	
1417	D445-M	3.78		1.78	
1428	ISO3104-A	3.728		-0.27	
1483		-----		-----	

1487		-----		-----
1531		-----		-----
1538	D445-M	3.7145		-0.80
1610	IP71-M	3.7227		-0.48
1613	D445-A	3.9175	G(0.01)	7.21
1616	D445-M	3.697		-1.49
1631	D445-A	3.73		-0.19
1634		-----		-----
1635	D445	3.642		-3.66
1651		-----		-----
1710	D445	3.710		-0.98
1715		-----		-----
1720		-----		-----
1724	D445-M	3.726		-0.35
1730		-----		-----
1811	D445-A	3.7048		-1.18
1833	D445-M	3.79		2.18
1854	D445-M	3.733		-0.07
1914	D445-M	3.7798		1.78
1948		-----		-----
1951	IP71-M	3.758		0.92
2129	D445-M	3.740		0.21
2130	D445-M	3.7054		-1.16
2133		-----		-----

normality	not OK
n	56
outliers	6
mean (n)	3.73477
st.dev. (n)	0.029409
R(calc.)	0.08234
R(D445:11)	0.07096





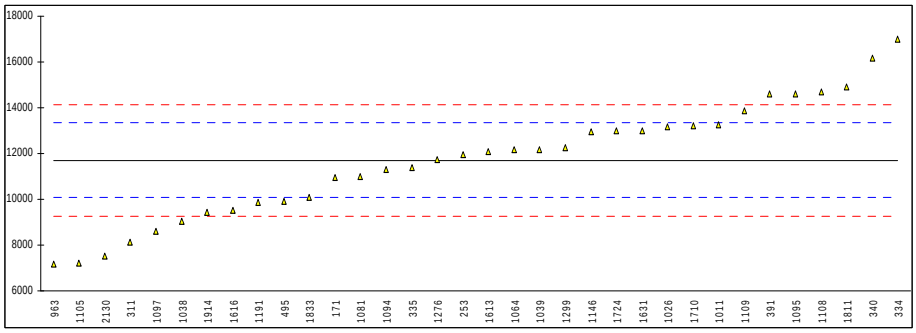
Determination of Particle Size Distribution on sample #12023; results per mL

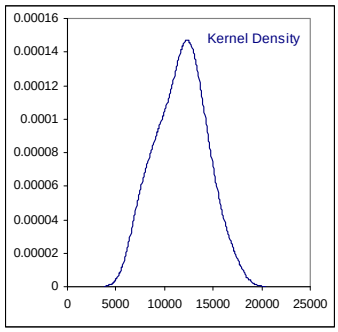
lab	method	>4 µm	mark	>6 µm	mark	>14µm	mark	>21µm	mark	>25µm	mark	>30µm	mark
171	IP565	10973.2		1872.7		34.5		2.1		1.0		0.3	
225		-----		-----		-----		-----		-----		-----	
253	IP564	11937		2290		73.9		9.4		4.8		2.6	
311	IP564	8133	C	1615	C	33	C	7	C	3	C	1	
334	IP565	17015.7		2982.3		106	C	23	C	15	CDG(0.05	5	C
335	IP565	11400		2584		104		23		12		4	
340	IP565	16182.6		3033.9		61.7		5.0		1.3		0.4	
391	IP565	14603.9		2875.1		87.6		15.8		7.7		2.4	
495	IP564	9906.8		2054.0		102.9		31.6	DG(0.05)	16.1	DG(0.05)	7.7	DG(0.01)
671		-----		-----		-----		-----		-----		-----	
963	IP564	7192.5		1460.6		37.3		10.2		6.4		3.9	
1011	IP565	13266.3		2298.6		67.8		9.2		3.5		1.2	
1017		-----		-----		-----		-----		-----		-----	
1026	IP565	13195		2361		67		12		6		3	
1038	IP565	9037.0		1019.4	G(0.05)	8.3		0.7		0.2		<1	
1039	IP565	12172		2379		72		9		4		2	
1064	IP565	12160.1		1890.5		21.9	C	3.8	C	3.1	C	0.1	
1081	IP564	10979		2364		53		8.6		2.9		1.1	
1094	IP577mod	11296		1963		78.1		15.6	C	7.0		2.4	
1095	IP565	14630		2537		59		6		3		1	
1097	IP564	8624.2		1566.6		41.0		7.8		3.1		1.1	
1105	IP564	7237.2	C	1420.4	C	31.6		4.2		1.5		0.3	
1108	IP564	14711		2523		77.0		11.7		5.1		1.3	
1109	IP565	13872.3		2697.9		65.5		9.1		3.0		1.1	
1146	in house	12953.7		2142.1		54.13		11.87		4.53		1.20	
1191	IP564	9887.8		2165.2		90.7		24.2		11.3		3.4	
1200		-----		-----		-----		-----		-----		-----	
1276	IP564	11742.5		2170.1		130.5	DG(0.05)	36.1	D(0.05)	20.2	DG(0.05)	11.6	G(0.01)
1299	IP564	12252.2		2580.4		60.4		10.5		2.9		0.5	
1395		-----		-----		-----		-----		-----		-----	
1610		-----		-----		-----		-----		-----		-----	
1613	IP565	12101.2		2221.0		49.3		6.8		2.9		1.1	
1616	IP564	9510.8		1895.5		47.8		10.2		3.7		1.4	
1631	IP564	13009		2342		58		9.4		3.9		1.8	
1710	IP564	13206		2496		77.2		9.3		3.7		1.5	
1724	IP564	12989.7		2373.5		136.2	DG(0.05)	31.3	DG(0.05)	14.8	DG(0.05)	7.3	DG(0.01)
1811	IP564	14899		2796		68.5		9.3		3.4		0.9	
1833	IP564	10102.8		1959.0		71.7		15.2		6.4		2.6	
1914	IP564	9439.9		2041.0		95.3		27.2		12.1		4.9	
2130	IP564	7504.9		1526.2		70.0		17.4		8.8		3.6	
	normality	OK		OK		OK		not OK		not OK		not OK	
	n	34		33		32		31		30		30	
	outliers	0		1		2		3		4		3	
	mean (n)	11709.5		2226.6		63.32		11.12		4.74		1.90	
	st.dev. (n)	2520.27		429.68		23.916		6.446		3.084		1.369	
	R(calc.)	7056.8		1203.1		66.96		18.05		8.64		3.83	
	R(IP564:10)	2272.5		726.9		39.79		14.09		6.35		3.15	

Originally reported test results:

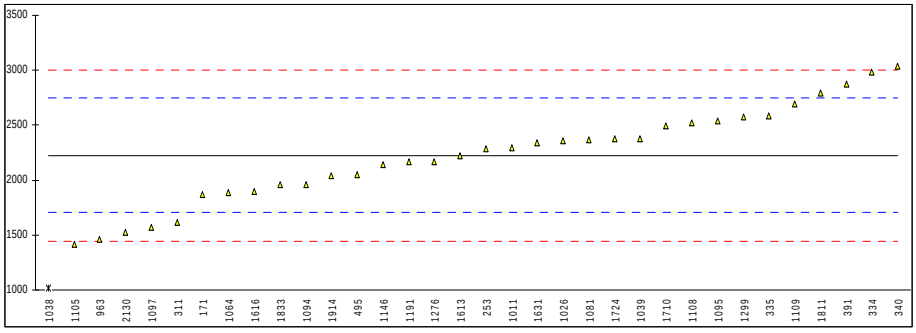
laboratory 311: 7228, 1225, 19, 4, 2
laboratory 334: 147.9, 38.0, 23.0, 9.1
laboratory 1064: 18.5, 0.6, 0.7
laboratory 1094: 45.6
laboratory 1105: 7337.2, 1450.4

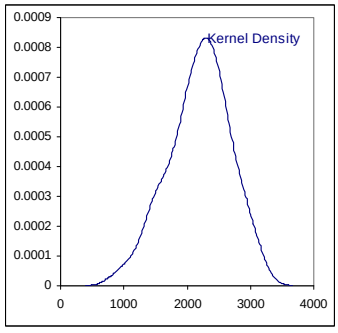
Determination of Particle Size Distribution on sample #12023; graphs



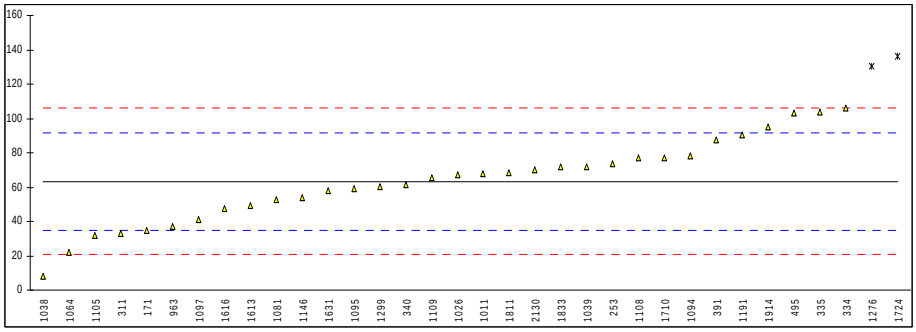


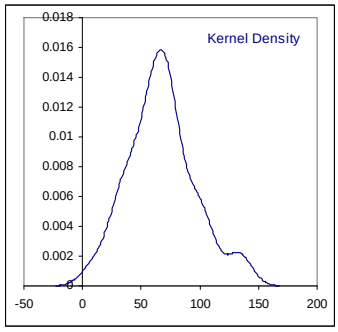
>4µm



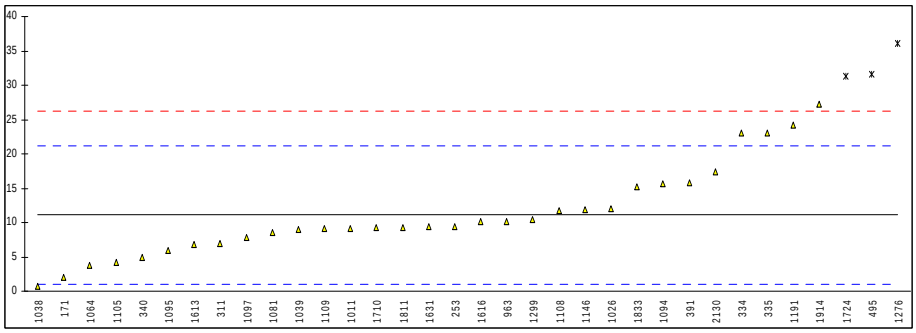


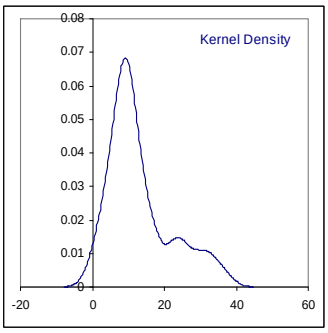
>6µm



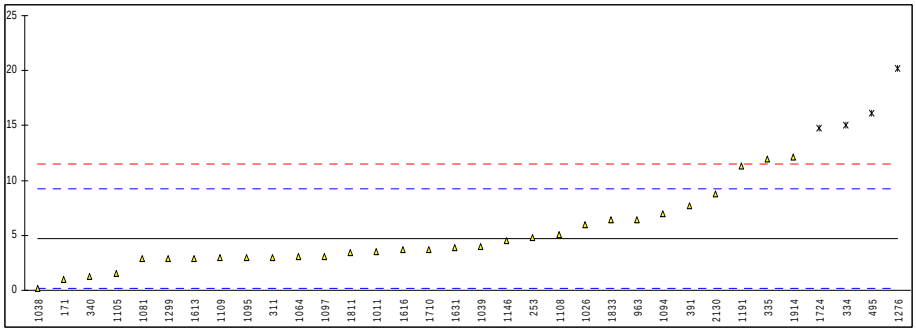


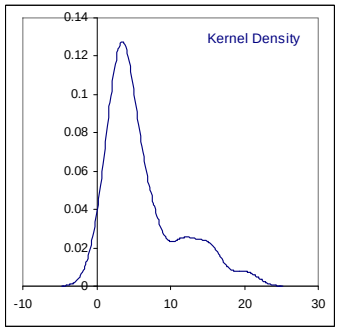
>14µm





>21µm





>25µm

APPENDIX 2

z-scores distillation ASTM D86 (automated and manual mode)

	Automated mode					Manual mode				
lab	IBP	10%	50%	90%	FBP	IBP	10%	50%	90%	FBP
120	-0.23	0.38	-0.33	-0.46	-0.99	-----	-----	-----	-----	-----
132	-0.07	-0.75	-0.61	0.49	-0.44	-----	-----	-----	-----	-----
140	0.44	1.58	1.37	0.80	0.23	-----	-----	-----	-----	-----
150	-0.13	0.30	0.23	0.09	-0.21	-----	-----	-----	-----	-----
153	-0.17	-0.67	0.52	0.64	-0.09	-----	-----	-----	-----	-----
159	1.05	1.05	1.27	1.36	0.98	-----	-----	-----	-----	-----
169	-0.34	0.38	-0.05	-1.09	0.11	-----	-----	-----	-----	-----
171	-0.64	-0.82	0.23	1.43	0.31	-----	-----	-----	-----	-----
175	0.64	0.53	0.99	1.67	0.98	-----	-----	-----	-----	-----
177	1.01	-0.30	-1.09	-1.33	-0.05	-----	-----	-----	-----	-----
225	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
228	-----	-----	-----	-----	-----	-1.16	-0.49	-2.69	-2.34	-1.25
237	-----	-----	-----	-----	-----	0.08	0.44	0.22	0.78	-1.25
252	-----	-----	-----	-----	-----	1.31	0.44	0.22	-2.34	0.72
253	-----	-----	-----	-----	-----	1.31	0.44	1.19	1.17	0.07
256	-----	-----	-----	-----	-----	-1.78	-0.49	2.16	2.34	0.07
258	-0.20	-0.67	0.99	1.20	0.07	-----	-----	-----	-----	-----
273	0.51	-0.90	-0.52	0.01	0.23	-----	-----	-----	-----	-----
311	-0.30	0.00	-0.14	0.09	0.54	-----	-----	-----	-----	-----
335	-0.10	-0.90	-18.24	-31.52	-9.67	-----	-----	-----	-----	-----
340	0.51	0.38	0.89	0.72	0.15	-----	-----	-----	-----	-----
353	0.07	0.30	0.80	0.96	1.14	-----	-----	-----	-----	-----
391	0.78	-0.75	-1.75	-0.78	-0.21	-----	-----	-----	-----	-----
398	0.37	-1.05	-0.99	0.25	-0.52	-----	-----	-----	-----	-----
447	-0.78	0.23	0.23	0.88	0.54	-----	-----	-----	-----	-----
448	-1.11	-3.38	-0.43	1.43	-0.48	-----	-----	-----	-----	-----
463	0.04	-0.52	-0.52	-0.30	0.11	-----	-----	-----	-----	-----
468	-0.27	0.23	0.52	1.20	-0.09	-----	-----	-----	-----	-----
473	-1.01	0.00	0.23	0.17	0.15	-----	-----	-----	-----	-----
495	0.37	-0.97	-1.37	-0.86	-0.95	-----	-----	-----	-----	-----
496	0.44	0.98	0.14	0.49	0.35	-----	-----	-----	-----	-----
594	0.71	0.68	1.08	2.70	1.61	-----	-----	-----	-----	-----
606	0.04	0.68	1.74	-0.15	0.27	-----	-----	-----	-----	-----
631	-----	-----	-----	-----	-----	-0.54	-1.43	-0.75	0.00	-2.56
671	-0.23	0.75	-0.14	-1.88	-1.86	-----	-----	-----	-----	-----
824	0.27	0.38	1.74	1.43	0.35	-----	-----	-----	-----	-----
962	-----	-----	-----	-----	-----	1.31	0.44	1.67	0.78	0.07
963	1.22	0.98	0.80	-0.22	0.15	-----	-----	-----	-----	-----
1011	0.88	0.75	0.23	1.04	0.19	-----	-----	-----	-----	-----
1017	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1021	0.37	0.00	0.99	0.72	-0.60	-----	-----	-----	-----	-----
1026	-1.01	1.96	-0.61	-1.65	-0.13	-----	-----	-----	-----	-----
1032	-0.03	0.68	0.42	-0.62	0.19	-----	-----	-----	-----	-----
1038	-1.72	0.23	-0.05	-0.22	0.54	-----	-----	-----	-----	-----
1039	0.47	0.83	0.23	0.49	-0.13	-----	-----	-----	-----	-----
1049	-1.11	0.75	-0.24	0.17	0.23	-----	-----	-----	-----	-----
1059	-0.30	-1.42	-1.56	-1.73	-0.64	-----	-----	-----	-----	-----
1062	0.58	1.05	0.89	0.17	-0.32	-----	-----	-----	-----	-----
1064	0.47	0.23	0.23	0.01	0.58	-----	-----	-----	-----	-----
1079	0.00	0.53	1.18	0.01	0.35	-----	-----	-----	-----	-----
1081	-0.40	0.08	0.42	0.72	0.15	-----	-----	-----	-----	-----
1094	-0.10	0.15	-0.05	0.96	0.19	-----	-----	-----	-----	-----
1097	0.68	-0.45	-0.24	-0.15	-0.05	-----	-----	-----	-----	-----
1105	-0.88	0.60	-0.14	-1.17	-0.48	-----	-----	-----	-----	-----
1108	-0.23	-1.42	-1.18	-0.86	-0.01	-----	-----	-----	-----	-----
1109	-0.10	-0.52	0.23	0.49	-0.56	-----	-----	-----	-----	-----
1126	-0.57	-0.07	1.65	-0.22	0.11	-----	-----	-----	-----	-----
1140	-0.51	0.23	-0.24	-0.07	-0.17	-----	-----	-----	-----	-----
1150	0.57	0.30	0.64	0.87	0.36	-----	-----	-----	-----	-----
1167	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1191	-1.08	0.15	0.23	0.33	0.03	-----	-----	-----	-----	-----
1203	0.24	0.15	0.71	0.17	0.11	-----	-----	-----	-----	-----
1237	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1276	-0.40	-0.30	-2.12	-2.44	-0.95	-----	-----	-----	-----	-----
1293	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1299	-0.94	-0.30	-0.33	-0.22	0.54	-----	-----	-----	-----	-----
1300	-0.17	0.98	0.99	2.23	1.14	0.39	-0.03	1.19	1.56	2.69
1318	-0.84	0.08	0.23	-0.07	-0.17	-----	-----	-----	-----	-----
1372	-1.55	0.08	0.14	0.57	-0.64	-----	-----	-----	-----	-----
1395	0.58	-1.20	-1.84	-2.44	-0.72	-----	-----	-----	-----	-----

1417	0.31	0.83	0.71	1.75	-0.01	-----	-----	-----	-----	-----
1428	-0.03	0.15	-0.14	-1.09	0.74	-----	-----	-----	-----	-----
1483	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1487	-0.10	-1.50	-0.61	-0.15	-0.36	-----	-----	-----	-----	-----
1531	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1538	0.85	-0.52	-0.90	-1.17	-1.23	-----	-----	-----	-----	-----
1610	1.49	0.83	0.05	0.72	0.19	-----	-----	-----	-----	-----
1613	-0.34	-0.45	0.23	-1.02	0.35	-----	-----	-----	-----	-----
1616	-----	-----	-----	-----	-----	-1.16	-3.30	-3.66	-3.12	-3.21
1631	-0.03	-1.12	-0.05	-0.30	1.10	-----	-----	-----	-----	-----
1634	-1.08	0.53	0.23	0.57	0.43	-----	-----	-----	-----	-----
1635	1.39	0.00	-0.05	-0.94	-0.24	-----	-----	-----	-----	-----
1651	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1710	0.51	-0.07	0.14	0.09	0.07	-----	-----	-----	-----	-----
1715	0.24	-0.15	-0.52	0.80	0.11	-----	-----	-----	-----	-----
1720	-0.30	-1.05	-0.71	-0.78	0.43	-----	-----	-----	-----	-----
1724	0.24	-0.15	-0.05	-0.70	0.07	-----	-----	-----	-----	-----
1730	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1811	0.24	0.08	-0.99	0.25	-0.52	-----	-----	-----	-----	-----
1833	0.10	-0.90	-1.09	-0.38	0.46	-----	-----	-----	-----	-----
1854	0.31	-0.45	-0.43	-1.25	-0.36	-----	-----	-----	-----	-----
1914	-----	-----	-----	-----	-----	0.23	0.68	0.46	1.17	4.65
1948	0.54	0.08	-0.90	-1.81	-0.56	-----	-----	-----	-----	-----
1951	0.61	-0.60	0.05	0.09	0.50	-----	-----	-----	-----	-----
2129	-0.71	-2.10	-1.56	-1.65	-1.11	-----	-----	-----	-----	-----
2130	0.41	0.15	-0.61	-0.38	-1.11	-----	-----	-----	-----	-----
2133	-0.37	0.75	0.52	-0.70	-0.44	-----	-----	-----	-----	-----

APPENDIX 3

Z-scores of individual participants for particle size

lab	>4 µm	>6 µm	>14µm	>21µm	>25µm	>30µm
171	-0.91	-1.36	-2.03	-1.79	-1.65	-1.43
225	-----	-----	-----	-----	-----	-----
253	0.28	0.24	0.74	-0.34	0.03	0.62
311	-4.41	-2.36	-2.13	-0.82	-0.77	-0.80
334	6.54	2.91	3.00	2.36	4.52	2.75
335	-0.38	1.38	2.86	2.36	3.20	1.86
340	5.51	3.11	-0.11	-1.21	-1.52	-1.34
391	3.57	2.50	1.71	0.93	1.31	0.44
495	-2.22	-0.66	2.79	4.07	5.01	5.15
671	-----	-----	-----	-----	-----	-----
963	-5.57	-2.95	-1.83	-0.18	0.73	1.77
1011	1.92	0.28	0.32	-0.38	-0.55	-0.63
1017	-----	-----	-----	-----	-----	-----
1026	1.83	0.52	0.26	0.18	0.56	0.97
1038	-3.29	-4.65	-3.87	-2.07	-2.00	-----
1039	0.57	0.59	0.61	-0.42	-0.33	0.09
1064	0.56	-1.29	-2.91	-1.45	-0.72	-1.60
1081	-0.90	0.53	-0.73	-0.50	-0.81	-0.71
1094	-0.51	-1.02	1.04	0.89	1.00	0.44
1095	3.60	1.20	-0.30	-1.02	-0.77	-0.80
1097	-3.80	-2.54	-1.57	-0.66	-0.72	-0.71
1105	-5.51	-3.11	-2.23	-1.37	-1.43	-1.43
1108	3.70	1.14	0.96	0.12	0.16	-0.54
1109	2.66	1.82	0.15	-0.40	-0.77	-0.71
1146	1.53	-0.33	-0.65	0.15	-0.09	-0.63
1191	-2.24	-0.24	1.93	2.60	2.89	1.33
1200	-----	-----	-----	-----	-----	-----
1276	0.04	-0.22	4.73	4.96	6.82	8.62
1299	0.67	1.36	-0.21	-0.12	-0.81	-1.25
1395	-----	-----	-----	-----	-----	-----
1610	-----	-----	-----	-----	-----	-----
1613	0.48	-0.02	-0.99	-0.86	-0.81	-0.71
1616	-2.71	-1.28	-1.09	-0.18	-0.46	-0.45
1631	1.60	0.44	-0.37	-0.34	-0.37	-0.09
1710	1.84	1.04	0.98	-0.36	-0.46	-0.36
1724	1.58	0.57	5.13	4.01	4.44	4.80
1811	3.93	2.19	0.36	-0.36	-0.59	-0.89
1833	-1.98	-1.03	0.59	0.81	0.73	0.62
1914	-2.80	-0.71	2.25	3.20	3.25	2.66
2130	-5.18	-2.70	0.47	1.25	1.79	1.51

APPENDIX 4

Number of participants per country

2 labs in AUSTRALIA
5 labs in BELGIUM
1 lab in BULGARIA
1 lab in CÔTE D'IVOIRE
1 lab in CROATIA
1 lab in CZECH REPUBLIC
1 lab in DENMARK
1 lab in EGYPT
1 lab in ESTONIA
1 lab in FINLAND
3 labs in FRANCE
1 lab in French Guiana
4 labs in GERMANY
4 labs in GREECE
1 lab in GUAM
3 labs in HUNGARY
1 lab in IRELAND
2 labs in ITALY
1 lab in JORDAN
1 lab in KENYA
1 lab in KOREA
1 lab in LATVIA
1 lab in MALAYSIA
1 lab in MAURITIUS
1 lab in MOZAMBIQUE
2 labs in NIGERIA
2 labs in NORWAY
1 lab in PHILIPPINES
2 labs in POLAND
2 labs in PORTUGAL
1 lab in QATAR
1 lab in REPUBLIC OF DJIBOUTI
2 labs in SAUDI ARABIA
2 labs in SLOVENIA
1 lab in SOUTH AFRICA
2 labs in SPAIN
1 lab in SUDAN
2 labs in SWEDEN
1 lab in TANZANIA
6 labs in THE NETHERLANDS
1 lab in TOGO
8 labs in TURKEY
1 lab in U.A.E.
10 labs in U.S.A.
8 labs in UNITED KINGDOM

APPENDIX 5

Abbreviations:

C	= final result after checking of first reported suspect result
U	= reported in wrong unit
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	= withdrawn on request participant
fr.	= first reported
U	= reported in a deviating unit
SDS	= Safety Data Sheet

Literature:

1 i.i.s. Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, January 2010

2 Defence Standard 91-91, Issue 7 Publication date 18 February 2011.

3 Aviation Fuel Quality Requirements for Jointly Operated Systems (AFQRJOS), Issue 22–28 June 2007, Bulletin No. 21.

4 ASTM E178-02

5 ASTM E1301-03

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7 ISO 5725, parts 1-6, 1994

8 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)

9 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)

10 IP 367/84

11 DIN 38402 T41/42

12 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)

13 J.N. Miller, Analyst, 118, 455, (1993)

14 Analytical Methods Committee Technical Brief, No4 January 2001

15 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/)