Results of Proficiency Test
Jet Fuel A1
March 2011

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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Report: iis11J01

May 2011

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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 2011 was extended with a PT for the determination for Particle Size Distribution. In the main PT, 99 laboratories in 47 different countries have participated; in the PT for the Particle Size Distribution, 34 laboratories in 23 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 of sample #11016) 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 (#11017).
The participants were requested to report rounded and unrounded results. The unrounded results were preferably used for statistical evaluation.

2.1   ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO guide 43 and ILAC-G13:2007, (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This ensures 100% 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. The participants were asked to report the analytical results using the indicated units on the report form.

2.3   CONFIDENTIALITY STATEMENT

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

2.4   SAMPLES

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 210 amber glass bottles of one litre with inner and outer caps and labelled #11016. The homogeneity of the subsamples #11016 was checked by the determination of Density in accordance with ASTM D 4052:09 on 8 stratified randomly selected samples.

	Density @ 15°C in kg/m^3
Sample #11016-1	796.17
Sample #11016-2	796.17
Sample #11016-3	796.18
Sample #11016-4	796.18
Sample #11016-5	796.19
Sample #11016-6	796.18
Sample #11016-7	796.18
Sample #11016-8	796.19

table 1: homogeneity test of sub samples #11016

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 4052:09
0.3 x R (ref. method)	0.15

Table 2: evaluation of repeatability of subsamples #11016

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. 200 litre bulk sample was homogenised and divided over 60 amber glass bottles of 0.5 L with inner and outer caps and labelled #11017. The homogeneity of the subsamples #11017 was checked by the determination of Particle Size Distribution in accordance with IP564:10 on 7 stratified randomly selected samples.

	> 4 µm	> 6 µm	> 14 µm	> 21 µm	> 25 µm	> 30 µm
Sample #11017-1	25650	5340	187	35	16	5
Sample #11017-2	25639	5322	178	32	15	5
Sample #11017-3	25233	5126	150	25	11	4
Sample #11017-4	25429	5181	164	28	13	3
Sample #11017-5	25417	5329	179	32	15	5
Sample #11017-6	25195	5071	140	21	10	3
Sample #11017-7	25147	5079	141	23	10	3

Table 3: homogeneity test of sub samples #11017

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)	576	339	54	14.6	7.1	2.8
reference method	IP564:10	IP564:10	IP564:10	IP564:10	IP564:10	IP564:10
r (ref. method)	3372	980	65	28.5	13.4	5.2

Table 4: evaluation of repeatabilities of subsamples #11017

The calculated repeatabilities are all smaller than the repeatabilities of the reference method.Therefore, homogeneity of the subsamples #11017 was assumed.

Depending on the registration of each participant, the following samples were dispatched on March 2, 2011: 2 bottles of 1 litre, labelled #11016 and/or 1*0.5 L, labelled #11017.

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 #11016: 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 #11017.

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, was sent together with each set of samples. Also a letter of instructions and a SDS were added to the package.

3   RESULTS

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

Directly after deadline, a reminder fax was sent to those laboratories that had not yet reported. Shortly after the deadline, the available results were screened for suspect data. A result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the (raw data of the) reported results. Additional or corrected results have been used for data analysis and the original results are placed under 'Remarks' in the result tables in Appendix 1.

3.1   STATISTICS

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

For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded results. Results reported as '<…' or '>…' were not used in the statistical evaluation. First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test. After removal of outliers, this check was repeated. Not all data sets proved to have a normal distribution, in which cases the conclusions of statistical evaluation should be used with due care.
In accordance with ISO 5725 (1986 and 1994) the original results per determination were submitted subsequently to Dixon and Grubbs outlier tests.
Outliers are marked by D(0.01) for the Dixon test, by G(0.01) or DG(0.01) for the Grubbs test. Stragglers are marked by D(0.05) for the Dixon test, by G(0.05) or DG(0.05) for the Grubbs test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

Finally, the reproducibilities were calculated from the standard deviations by multiplying them with a factor of 2.8.

3.2   GRAPHICS

In order to 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 4, 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. The z-scores were calculated according to:

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

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:

| z | < 1   good
1 < | z | < 2   satisfactory
2 < | z | < 3   questionable
| z | > 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, Croatia, Cyprus, Georgia, Kazakhstan, P.R. of China, Saudi Arabia, Tanzania and Togo.
For the "main Jet Fuel A1" PT, 14 participants reported the results after the final reporting date and 5 participants did not report any results at all.
For the PT "Particle Size", 2 participants reported the results after the final reporting date and 9 participants did not report any results at all.

The 94 participants of the main round and the 32 participants of the particle size round reported in total 1713 numerical results. Observed were 80 outlying results, which is 4.7%. 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 #11017: Colour Saybolt, Density, Distillation 50% recovered, Existent Gum, Flash Point, Freezing Point, JFTOT, Mercaptan Sulphur, MSEP, Naphthalenes, Smoke Point, Total Acidity and Viscosity. 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. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with ASTM D1319:10.
Aromatics by: HPLC (D6379)	The %M/M determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers, is in good agreement with ASTM D6379:04. The %V/V determination may be problematic for only one laboratory. Regretfully, no precision data for the determination in %V/V is mentioned in ASTM D6379:04, therefore no further significant conclusions were drawn.
Colour Saybolt:	This determination was problematic for both the manual (ASTM D156) and the automated (ASTM D6045) mode. In total three statistical outliers were observed. Both calculated reproducibilities are, after rejection of the statistical outliers, not in agreement with the respective requirements of ASTM D156:07a and ASTM D6045:09.
Density:	This determination was not problematic. Six statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of ASTM D4052:09.
Distillation:	As only ten participants reported test results determined by the manual method, it was decided to evaluate these results together with the automated group. In total twelve statistical outliers were observed. One result was manually excluded as all other reported results for this participant were marked as statistical outliers. All calculated reproducibilities are, after rejection of the statistical outliers, in good agreement with the requirements of ASTM D86:10a (automated).

Existent Gum: 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 ASTM D381:09.

Flash Point: This determination was not problematic. Four statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is in good agreement with the requirements of IP170:09. Eight laboratories reported a method that is not mentioned in the Joint Fuelling System Checklist. After exclusion of these eight 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 problematic. Only two statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is not in agreement with the requirements of ASTM D3948:08.

Naphthalenes: This determination was very problematic at this level of 0.78 %V/V. Seven statistical outliers were observed. The calculated reproducibility, after rejection of the statistical outliers, is not at all in agreement with the requirements of ASTM D1840:07-B. Strict adherence to the test method may reduce the large spread to an acceptable value (see also PT: iis03J02)

Smoke Point: This determination was problematic. Only one statistical outlier was observed. However, the calculated reproducibility, after rejection of the statistical outlier, is not in agreement with the requirements of ASTM D1322:08.

Specific Energy: This determination was problematic for a number of laboratories. Three statistical outliers were observed. However, the calculated reproducibility,

after rejection of the statistical outliers is in agreement with the requirements of ASTM D3338:09. Two laboratories made probably a calculation error as the reported result differs from the result found after manual calculation by iis.

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

Total Sulphur: This determination was problematic at the high level of Sulphur present in this sample (367 mg/kg). Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D5453:09. When the reported data for ASTM D5453, D4294 and D2622, were evaluated separately, the calculated reproducibility for D2622 results is the smallest and within the requirements of the testmethod. The calculated reproducibility for D5453 results is large and not within the requirements of the test method.

Viscosity: This determination was very problematic. Only three statistical outliers were observed. However, the calculated reproducibility, after rejection of the statistical outliers, is not at all in agreement with the requirements of ASTM D445:11.

Particle Size: This determination was problematic. In total five statistical outliers were observed. Also, after rejection of the statistical outliers, only the calculated reproducibilities for >30, >25 and >21µm are 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 #11016 and #11017 are compared in the next tables.

Parameter	unit	n	Average	2.8 * sd	R (lit)
Aromatics by FIA	%V/V	55	16.97	1.79	2.83
Aromatics by HPLC	%M/M	13	20.05	1.52	1.93
Aromatics by HPLC	%V/V	11	18.04	1.31	unknown
Colour Saybolt (ASTM D156)		54	18.5	3.1	2.0
Colour Saybolt (ASTM D6045)		17	18.4	1.7	1.2
Density at 15°C	kg/m^3	85	796.17	0.27	0.50
Initial Boiling Point (all)	°C	89	153.04	5.93	8.42
10% recovered (all)	°C	89	169.53	2.99	3.73
50% recovered (all)	°C	89	193.53	2.51	2.97
90% recovered (all)	°C	91	233.42	3.58	3.50
Final Boiling Point (all)	°C	89	259.20	4.61	7.10
Existent Gum	mg/100mL	49	0.72	1.29	3.14
Flash Point	°C	82	43.54	2.13	3.20
Freezing Point	°C	77	-54.22	1.78	2.50
Mercaptan Sulphur	%M/M	51	0.0007	0.0002	0.0003
MSEP	rating	65	90.8	12.8	11.3
Naphthalenes	%V/V	43	0.78	0.14	0.08
Smoke Point	mm	62	23.9	4.0	3.0
Specific Energy	MJ/kg	43	43.306	0.029	0.046
Total Acidity	mg KOH/g	56	0.0027	0.0023	0.0021
Total Sulphur	mg/kg	56	366.8	61.6	48.6
Viscosity @ -20°C	cSt	54	3.660	0.098	0.070

table 5: comparison of the observed and target reproducibilities of sample #11016

Parameter	unit	n	Average	2.8 * sd	R (lit)
Particle Size >4 µm	mL^{-1}	23	26887	11491	4986
Particle Size >6 µm	mL^{-1}	23	5092	1997	1551
Particle Size >14 µm	mL^{-1}	25	228	156	114
Particle Size >21 µm	mL^{-1}	25	52.3	61.3	66.3
Particle Size >25 µm	mL^{-1}	24	21.6	26.9	29.0
Particle Size >30 µm	mL^{-1}	25	8.8	13.9	14.6

table 6: comparison of the observed and target reproducibilities of sample #11017

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 2011 WITH PREVIOUS PTS

	March 2011	September 2010	March 2010	September 2009
Number of reporting labs	126	208	65	186
Number of results reported	1713	2759	1257	2377
Statistical outliers	80	59	64	73
Percentage outliers	4.7%	2.1%	5.1%	3.1%

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 2011	September 2010	March 2010	September 2009
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.d.:   not determined
n.e.:   not evaluated

APPENDIX 1
Determination of Aromatics by FIA on sample #11016; results in %V/V

lab	method	value	mark	z(targ)	remarks
53	D1319	15.8		-1.16	
120	D1319	16.1		-0.86	
132	D1319	17.39		0.42	
150	D1319	18.4		1.42	
153	D1319	17.4		0.43	
159		-----		-----	
169	D1319	17.4		0.43	
171	D1319	17.84		0.86	
175	D1319	17.0		0.03	
177	D1319	16.9		-0.07	
194	D1319	17.61		0.63	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237	D1319	15.78		-1.18	
253	D1319	17.00		0.03	
256		-----		-----	
273		-----		-----	
311	D1319	17.8		0.82	
317		-----		-----	
333		-----		-----	
334	D1319	17.8		0.82	
335		-----		-----	
391	D1319	17.5		0.52	
399		-----		-----	
463	D1319	16.8		-0.17	
473		-----		-----	
495		-----		-----	
496	D1319	17.55		0.57	
594		-----		-----	
604		-----		-----	
606		-----		-----	
631	D1319	16.5		-0.47	
671	D1319	17.42		0.45	
732		-----		-----	
823	D1319	16.9		-0.07	
824	D1319	16.9		-0.07	
962		-----		-----	
1011	D1319	16.40		-0.56	
1017	D1319	16.5		-0.47	
1021	D1319	16.3		-0.66	
1026	IP436	19.6	DG(0.05)	2.60	
1032	D1319	15.71		-1.25	
1038	D1319	17.9		0.92	
1039		-----		-----	
1049		-----		-----	
1059	D1319	16.5		-0.47	
1062		-----		-----	
1064	D1319	17.54		0.56	
1065		-----		-----	
1079	D1319	16.8		-0.17	
1080		-----		-----	
1081	D1319	16.7		-0.27	
1094		-----		-----	
1097	D1319	17.03		0.06	
1105	D1319	16.1		-0.86	
1108		-----		-----	
1109	D1319	15.87		-1.09	
1126		-----		-----	
1140	D1319	16.8		-0.17	
1167		-----		-----	
1194	D1319	18.1		1.12	
1203	D1319	16.9		-0.07	
1215	D1319	19.10	DG(0.05)	2.11	
1237		-----		-----	
1264	D1319	17.71		0.73	
1293		-----		-----	
1318		-----		-----	
1347		-----	W	-----	Result withdrawn, reported 12.9
1348	D1319	16.7		-0.27	
1373		-----		-----	
1376	D1319	15.57		-1.39	
1378		-----		-----	

1379		-----		-----
1395		-----		-----
1399	D1319	16.82		-0.15
1428	ISO3837	16.14		-0.82
1531		-----		-----
1538	D1319	16.8		-0.17
1610	IP186	17.10		0.13
1613	D1319	17.46		0.48
1620		-----		-----
1634		-----		-----
1635	D1319	17.0		0.03
1636	D1319	17.12		0.15
1650	D1319	17.56		0.58
1651		-----		-----
1715		-----		-----
1720	D1319	17.6		0.62
1724	D1319	17.0		0.03
1730		-----		-----
1811	D1319	16.63		-0.34
1826	D1319	18.7	G(0.05)	1.71
1833	D1319	16.84		-0.13
1854	D1319	16.90		-0.07
1939		-----		-----
2130	D1319	17.1		0.13
2133	D1319	17.65		0.67
2136	D1319	16.72		-0.25

normality	OK
n	55
outliers	3
mean (n)	16.97
st.dev. (n)	0.641
R(calc.)	1.79
R(D1319:10)	2.83
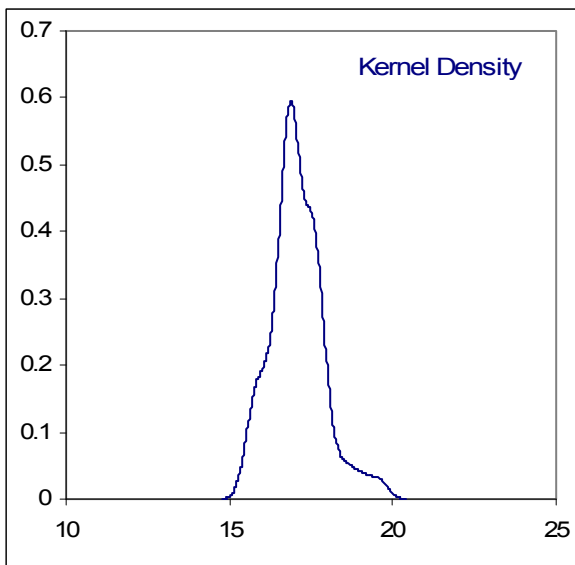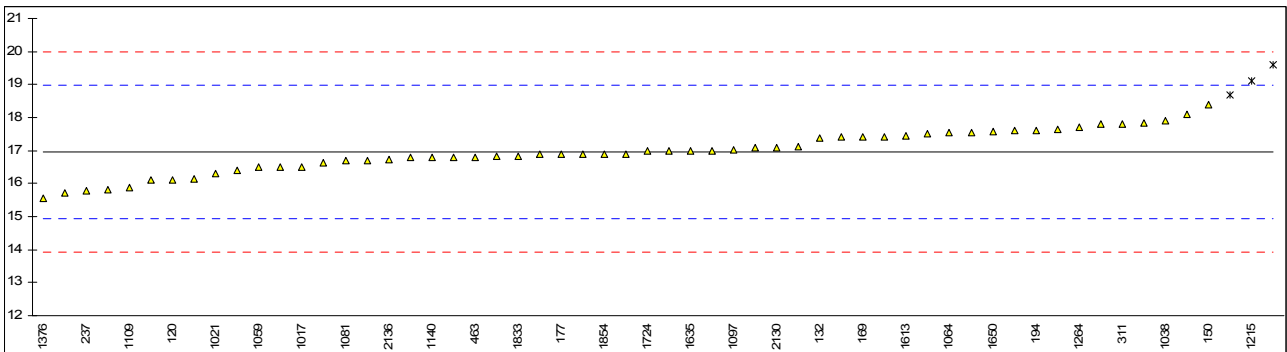
Determination of Aromatics by HPLC on sample #11016; results in %M/M & %V/V

lab	method	%M/M	mark	z(targ)	%V/V	mark	z(targ)	Remarks
53		-----		-----	-----		-----	
120		-----		-----	-----		-----	
132		-----		-----	-----		-----	
150		-----		-----	-----		-----	
153		-----		-----	-----		-----	
159		-----		-----	-----		-----	
169		-----		-----	-----		-----	
171	D6379	22.05	DG(0.05)	2.90	19.95	G(0.05)	-----	
175		-----		-----	-----		-----	
177		-----		-----	-----		-----	
194		-----		-----	-----		-----	
224		-----		-----	-----		-----	
225		-----		-----	-----		-----	
228		-----		-----	-----		-----	
237		-----		-----	-----		-----	
253		-----		-----	-----		-----	
256		-----		-----	-----		-----	
273		-----		-----	-----		-----	
311		-----		-----	-----		-----	
317		-----		-----	-----		-----	
333		-----		-----	-----		-----	
334		-----		-----	-----		-----	
335		-----		-----	-----		-----	
391		-----		-----	-----		-----	
399		-----		-----	-----		-----	
463	EN12916	20.11		0.08	-----		-----	
473		-----		-----	-----		-----	
495	D6379	19.51		-0.79	17.57		-----	
496		-----		-----	-----		-----	
594		-----		-----	-----		-----	
604		-----		-----	-----		-----	
606		-----		-----	-----		-----	
631		-----		-----	-----		-----	
671		-----		-----	-----		-----	
732		-----		-----	-----		-----	
823	D6379	19.85		-0.29	18.02		-----	
824	D6379	20.2		0.21	17.9		-----	
962		-----		-----	-----		-----	
1011		-----		-----	-----		-----	
1017		-----		-----	-----		-----	
1021		-----		-----	-----		-----	
1026		-----		-----	-----		-----	
1032		-----		-----	-----		-----	
1038		-----		-----	-----		-----	
1039	D6379	-----		-----	18.1		-----	
1049	D6379	20.042		-0.01	18.13537		-----	
1059		-----		-----	-----		-----	
1062		-----		-----	-----		-----	
1064		-----		-----	-----		-----	
1065		-----		-----	-----		-----	
1079	D6379	22.0	DG(0.05)	2.83	17.5		-----	
1080	EN12916	20.047		-0.01	-----		-----	
1081		-----		-----	-----		-----	
1094		-----		-----	-----		-----	
1097		-----		-----	-----		-----	
1105	D6379	20.28		0.33	18.21		-----	
1108	D6379	20.5		0.65	18.5		-----	
1109	D6591	20.28		0.33	-----		-----	
1126		-----		-----	-----		-----	
1140		-----		-----	-----		-----	
1167	D6379	21.21		1.68	18.91		-----	
1194		-----		-----	-----		-----	
1203	D6379	19.1		-1.38	17.3		-----	
1215		-----		-----	-----		-----	
1237		-----		-----	-----		-----	
1264		-----		-----	-----		-----	
1293		-----		-----	-----		-----	
1318		-----		-----	-----		-----	
1347		-----		-----	-----		-----	
1348		-----		-----	-----		-----	
1373		-----		-----	-----		-----	
1376		-----		-----	-----		-----	
1378	D6379	20.25		0.29	-----		-----	

1379		-----	-----	-----	-----
1395		-----	-----	-----	-----
1399	IP436	-----	-----	18.33	-----
1428		-----	-----	-----	-----
1531		-----	-----	-----	-----
1538		-----	-----	-----	-----
1610		-----	-----	-----	-----
1613		-----	-----	-----	-----
1620		-----	-----	-----	-----
1634		-----	-----	-----	-----
1635	D6379	19.3	-1.09	-----	-----
1636		-----	-----	-----	-----
1650		-----	-----	-----	-----
1651		-----	-----	-----	-----
1715		-----	-----	-----	-----
1720		-----	-----	-----	-----
1724		-----	-----	-----	-----
1730		-----	-----	-----	-----
1811		-----	-----	-----	-----
1826		-----	-----	-----	-----
1833		-----	-----	-----	-----
1854		-----	-----	-----	-----
1939		-----	-----	-----	-----
2130		-----	-----	-----	-----
2133		-----	-----	-----	-----
2136		-----	-----	-----	-----

normality	OK	OK
n	13	11
outliers	2	1
mean (n)	20.05	18.04
st.dev. (n)	0.541	0.466
R(calc.)	1.52	1.31
R(D6379:04)	1.93	unknown
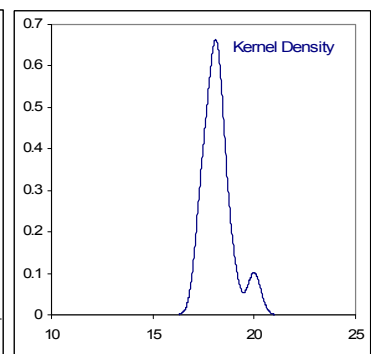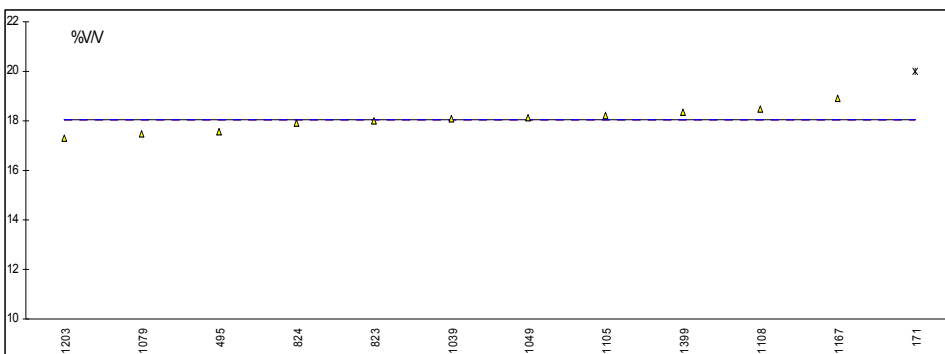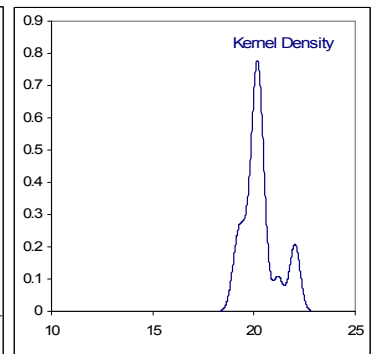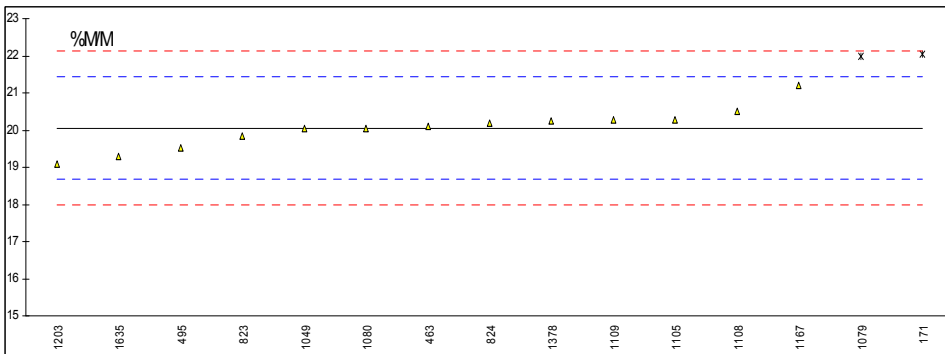
Determination of Colour Saybolt (D156 / D6045) on sample #11016;

lab	method	D156	mark	z(targ)	method	D6045	mark	z(targ)	Remarks
53	D156	16		-3.56		-----		-----	
120		-----		-----	D6045	19		1.33	
132	D156	19		0.64		-----		-----	
150	D156	20		2.04		-----		-----	
153	D156	18		-0.76		-----		-----	
159	D156	20		2.04		-----		-----	
169		-----		-----	D6045	18		-0.93	
171	D156	20		2.04		-----		-----	
175		-----		-----		-----		-----	
177	D156	19		0.64		-----		-----	
194	D156	19		0.64		-----		-----	
224		-----		-----		-----		-----	
225		-----		-----		-----		-----	
228		-----		-----		-----		-----	
237	D156	21		3.44		-----		-----	
253	D156	18		-0.76		-----		-----	
256		-----		-----		-----		-----	
273	D156	18		-0.76		-----		-----	
311	D156	17		-2.16		-----		-----	
317	D156	18		-0.76		-----		-----	
333		-----		-----	D6045	22	G(0.01)	8.10	
334		-----		-----		-----		-----	
335		-----		-----		-----		-----	
391	D156	19		0.64		-----		-----	
399	D156	18		-0.76		-----		-----	
463	D156	19		0.64		-----		-----	
473		-----		-----		-----		-----	
495		-----		-----		-----		-----	
496		-----		-----		-----		-----	
594		-----		-----		-----		-----	
604	D156	17		-2.16		-----		-----	
606	D156	17		-2.16		-----		-----	
631	D156	18		-0.76		-----		-----	
671	D156	17		-2.16		-----		-----	
732		-----		-----		-----		-----	
823	D156	17		-2.16	D6045	17		-3.19	
824		-----		-----	D6045	19		1.33	
962		-----		-----		-----		-----	
1011	D156	20		2.04		-----		-----	
1017		-----		-----		-----		-----	
1021		-----		-----	D6045	19		1.33	
1026	D156	19		0.64		-----		-----	
1032	D156	19		0.64		-----		-----	
1038		-----		-----	D6045	18		-0.93	
1039	D156	19		0.64		-----		-----	
1049	D156	11.5	G(0.01)	-9.86		-----		-----	
1059	D156	9	C,G(0.01)	-13.36		-----		-----	First reported 11
1062		-----		-----		-----		-----	
1064	D156	19		0.64	D6045	18		-0.93	
1065		-----		-----		-----		-----	
1079	D156	20		2.04	D6045	18		-0.93	
1080	D156	20		2.04		-----		-----	
1081		-----		-----	D6045	19		1.33	
1094		-----		-----		-----		-----	
1097	INH-003	18		-0.76		-----		-----	
1105	D156	19	C	0.64		-----		-----	First reported 23
1108	D156	19		0.64		-----		-----	
1109	D156	20		2.04		-----		-----	
1126		-----		-----		-----		-----	
1140		-----		-----	D6045	18		-0.93	
1167	INH-2991	19		0.64		-----		-----	
1194		-----		-----		-----		-----	
1203	D156	19		0.64		-----		-----	
1215	D156	19		0.64		-----		-----	
1237		-----		-----		-----		-----	
1264	D156	18		-0.76		-----		-----	
1293		-----		-----		-----		-----	
1318	D156	18		-0.76	D6045	19		1.33	
1347	D156	20		2.04		-----		-----	
1348		-----		-----		-----		-----	
1373		-----		-----		-----		-----	
1376		-----		-----	D6045	19		1.33	
1378		-----		-----		-----		-----	

1379	D156	20		2.04		-----		-----	
1395		----		-----		-----		-----	
1399	D156	19		0.64		-----		-----	
1428	D156	18		-0.76	D6045	18		-0.93	
1531		----		-----		-----		-----	
1538		----		-----		-----		-----	
1610	D156	18		-0.76		-----		-----	
1613	D156	19		0.64		-----		-----	
1620		----		-----		-----		-----	
1634	D156	18		-0.76		-----		-----	
1635	D156	18		-0.76		-----		-----	
1636		----		-----	D6045	18		-0.93	
1650	D156	18		-0.76		-----		-----	
1651	D156	18.5		-0.06		-----		-----	
1715		----		-----	D6045	19		1.33	
1720	D156	18		-0.76		-----		-----	
1724	D156	18		-0.76		-----		-----	
1730		----		-----		-----		-----	
1811	D156	18		-0.76		-----		-----	
1826	D156	17		-2.16		-----		-----	
1833	D156	20		2.04		-----		-----	
1854		----		-----	D6045	18		-0.93	
1939	D156	16		-3.56		-----		-----	
2130		----		-----	D6045	19		1.33	
2133		----		-----		-----		-----	
2136	D156	18	C	-0.76		-----		-----	First reported 24

normality	not OK	normality	not OK
n	54	n	17
outliers	2	outliers	1
mean (n)	18.5	mean (n)	18.4
st.dev. (n)	1.09	st.dev. (n)	0.62
R(calc.)	3.1	R(calc.)	1.7
R(D156:07a)	2.0	R(D6045:09)	1.2
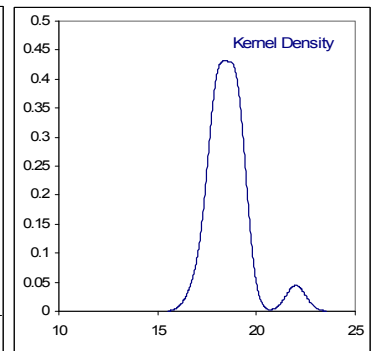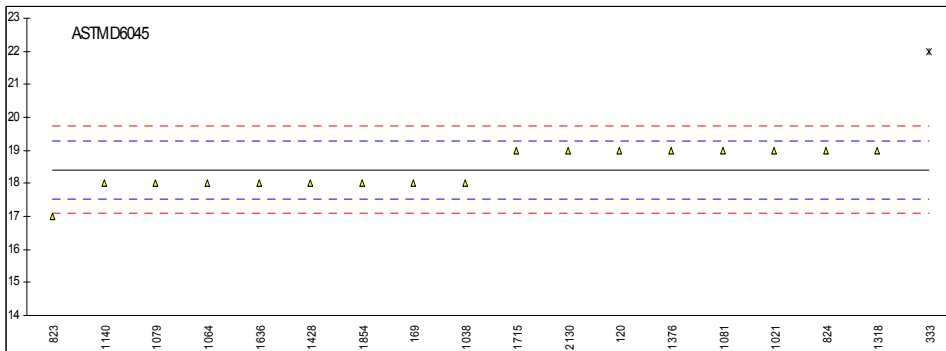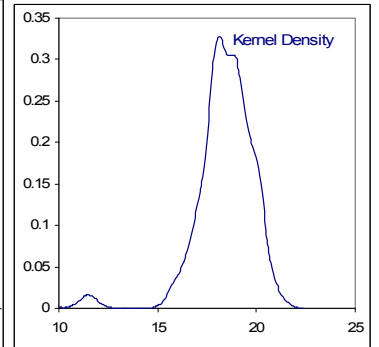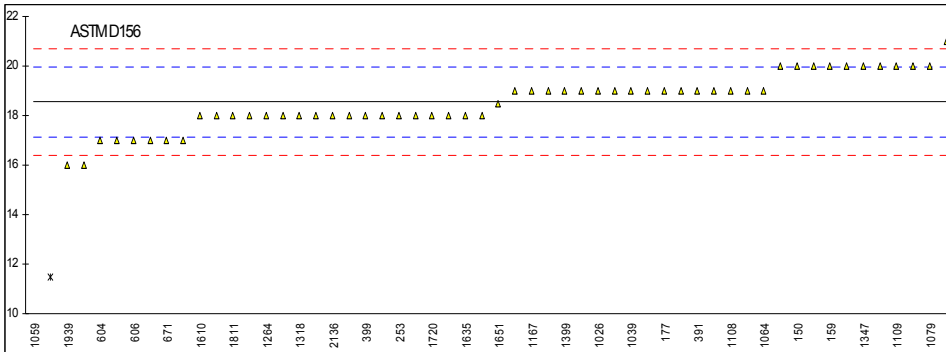
Determination of Density @ 15°C on sample #11016; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
53	D4052	796.2		0.18	
120	D4052	796.4		1.30	
132	D4052	796.19		0.12	
150	D4052	796.5	DG(0.05)	1.86	
153	D4052	796.1		-0.38	
159	D4052	796.3		0.74	
169	D4052	795.8	DG(0.05)	-2.06	
171	D4052	796.3		0.74	
175	D4052	796.2		0.18	
177	D4052	795.8	C,DG(0.05)	-2.06	First reported 0.7958
194	D4052	796.1		-0.38	
224	D1298	796.5	DG(0.05)	1.86	
225		-----		-----	
228	D1298	796.3		0.74	
237	D1298	795.9		-1.50	
253	D4052	796.0		-0.94	
256		-----		-----	
273	D4052	796.1		-0.38	
311	D4052	796.2		0.18	
317	D4052	796.2		0.18	
333	D4052	796.2		0.18	
334	D4052	796.1		-0.38	
335	D4052	796.2		0.18	
391	D4052	796.2		0.18	
399	D4052	795.9		-1.50	
463	D4052	796.17		0.01	
473		-----		-----	
495	D4052	796.15		-0.10	
496	D4052	796.10		-0.38	
594		-----		-----	
604	D4052	796.22		0.29	
606	D4052	796.3		0.74	
631	D4052	796.3		0.74	
671	D4052	796.3		0.74	
732	D4052	796.6	G(0.05)	2.42	
823	D4052	796.1		-0.38	
824	D4052	796.2		0.18	
962		-----		-----	
1011	D4052	796.2		0.18	
1017	D4052	796.19		0.12	
1021	D4052	796.18		0.07	
1026	D4052	796.2		0.18	
1032	D4052	796.16		-0.04	
1038	D4052	796.1		-0.38	
1039	D4052	796.1		-0.38	
1049	D4052	796.17		0.01	
1059	D4052	796.2		0.18	
1062		-----		-----	
1064	D4052	796.0		-0.94	
1065	D4052	796.1		-0.38	
1079	D4052	796.1		-0.38	
1080	D4052	796.2		0.18	
1081	ISO12185	796.3		0.74	
1094	D4052	796.18		0.07	
1097	ISO12185	796.1		-0.38	
1105	D4052	796.3	C	0.74	First reported 0.7963
1108	D4052	796.2		0.18	
1109	D4052	796.14		-0.16	
1126	D4052	796.16		-0.04	
1140	IP365	796.3		0.74	
1167	ISO12185	796.2		0.18	
1194	INH-ISO12185	790.1	G(0.01)	-33.98	
1203	D4052	796.2		0.18	
1215	D4052	796.2		0.18	
1237	ISO12185	796.1		-0.38	
1264	D4052	796.17		0.01	
1293	D1298	796.1		-0.38	
1318	D4052	796.16		-0.04	
1347	D4052	796.19		0.12	
1348	D4052	796.2		0.18	
1373	D4052	796.0	C	-0.94	First reported 0.7960
1376	D4052	796.2		0.18	
1378	D4052	796.2	C	0.18	First reported 0.7962

1379	D4052	796.3		0.74	
1395	D4052	796.1		-0.38	
1399	D4052	796.096		-0.40	
1428	ISO12185	796.2		0.18	
1531		-----		-----	
1538	D4052	796.2		0.18	
1610	IP365	796.0		-0.94	
1613	D4052	796.2		0.18	
1620		-----		-----	
1634	D4052	796.175		0.04	
1635	D4052	795.9		-1.50	
1636	D4052	796.2		0.18	
1650	D4052	796.16		-0.04	
1651	D4052	796.2		0.18	
1715	ISO12185	795.9		-1.50	
1720	D4052	796.3		0.74	
1724	D4052	796.16	C	-0.04	First reported 0.7966
1730	D4052	796.2		0.18	
1811	D4052	796.2		0.18	
1826	D4052	796.1		-0.38	
1833	D4052	796.18		0.07	
1854	D4052	796.2		0.18	
1939	D4052	796.2		0.18	
2130	D4052	796.3		0.74	
2133	D4052	796.17		0.01	
2136	D4052	796.24		0.40	

normality	not OK	
n	85	
outliers	6	
mean (n)	796.17	
st.dev. (n)	0.096	
R(calc.)	0.27	
R(D4052:09)	0.50	

Kernel Density
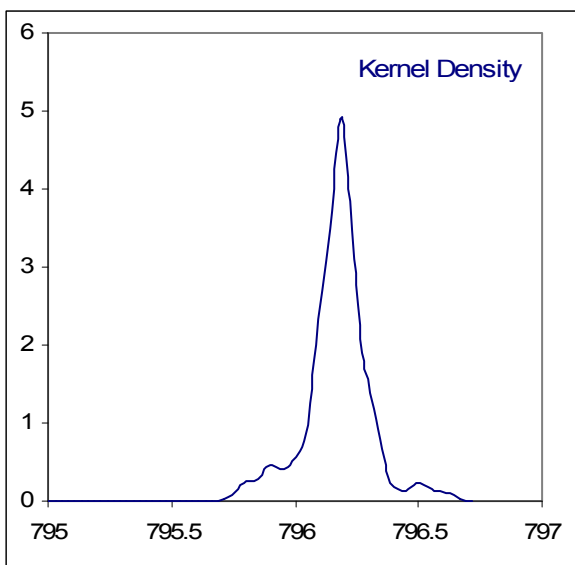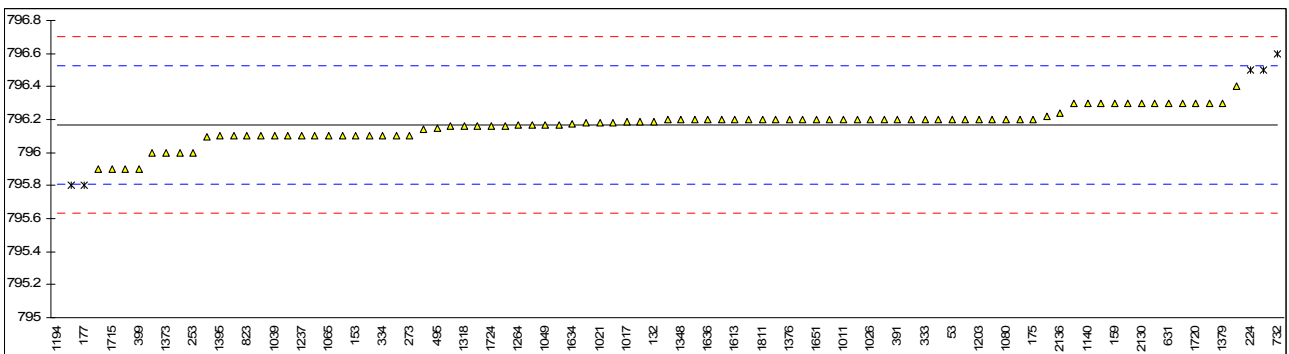
Determination of Distillation ASTM D86 (automated + manual) on sample #11016; results in °C

lab	method	IBP	mark	10%	mark	50%	mark	90%	mark	FBP	mark	res.	loss
53	D86-A	152.5		170.1		193.8		233.7		261.5		1.1	0.3
120	D86-A	153.5		168.9		193.8		233.7		258.2		1.0	1.0
132	D86-A	153.2		169.2		194.1		234.4		260.0		1.4	0.8
150	D86-A	154.0		169.1		193.5		233.6		258.7		1.5	0.4
153	D86-A	153.2		168.6		194.2		234.3		260.0		1.4	0.2
159	D86-A	153.8		170.2		195.1		234.8		260.7		1.2	0.6
169	D86-A	151.3		170.2		193.9		233.5		260.5		1.4	0.2
171	D86-A	151.5		169.4		194.1		235.1		259.2		1.3	1.5
175	D86-A	156.1		170.2		195.4		235.8		262.4		1.1	0.8
177	D86-A	148.1		168.3		191.5		231.0		257.9		1.0	0.4
194	D86-A	153.44		170.72		193.94		234.66		260.38		1.2	0.8
224	D86-M	155.09		170.03		193.53		233.88		258.89		1.2	0.8
225		-----		-----		-----		-----		-----		-----	-----
228	D86-M	147.0	ex	165.0	G(0.05)	190.0	DG(0.01)	229.0	G(0.05)	254.0	DG(0.05)	1.4	0.6
237	D86-M	151.0		169.0		192.0		233.0		257.0		1.0	0.5
253	D86-M	152.0		169.0		192.0		231.5		258.5		0.9	0.5
256		-----		-----		-----		-----		-----		-----	-----
273	D86-A	155.2		169.8		193.9		234.2		259.8		1.0	0.8
311	D86-A	152.6		169.7		194.5		236.6		259.2		1.5	1.3
317	D86-A	152.5		170.3		193.8		234.0		259.6		1.4	0.6
333	D86-A	151.7		168.7		193.0		231.4		258.8		1.0	0
334	D86-A	153.9		169.0		193.2		233.1		261.2		0.8	0.2
335	D86-A	152.9		169.6		193.2		232.9		257.5		0.7	0.9
391	D86-A	156.4		167.8		192.0		231.8		257.5		0.7	0.8
399	D86-A	154.7		168.4		192.8		231.9		260.9		0.5	0.5
463	D86-A	149.6		168.0		192.5		232.6		258.8		1.4	0.1
473	D86-A	151.7		169.7		193.8		234.1		260.9		1.2	0.7
495	D86-A	151.7		167.4		191.7		231.8		256.4		1.2	0.9
496	D86-A	153.9		168.9		193.7		z235.3		261.8		1.0	1.1
594	INH-2177-A	151.6		167.5		190.0	DG(0.01)	231.3		255.0		1.2	0.7
604	D86-A	153.6		169.2		193.4		232.8		258.8		1.2	0.3
606	D86-A	153.9		170.8		195.6		233.7		259.1		1.2	0.5
631	D86-M	157		169		192		233		257		1.1	1.0
671	D86-A	153.9		171.0		194.0		233.3		258.5		1.3	0.1
732	INH-2177-M	153.0		168.0		192.5		232.5		261.0		1.0	-----
823	D86-A	156.7		171.8		194.6		233.9		262.1		1.2	0.1
824	D86-A	155.0		170.5		194.0		234.4		256.7		1.0	1.0
962		-----		-----		-----		-----		-----		-----	-----
1011	D86-A	153.8		170.6		193.8		233.9		260.5		1.3	0.5
1017	D86-A	151.7		167.1		191.7		230.8		255.2		1.5	0.0
1021	D86-A	152.2		168.2		193.9		235.5		258.2		1.4	1.0
1026	ISO3403-A	151.6		170.3		192.6		231.9		259.2		1.2	0.1
1032	D86-A	150.4		170.5		193.2		230.8		256.0		1.2	0.1
1038	D86-A	156.5		170.5		195.6		235.8		268.4	G(0.01)	1.0	0.4
1039	D86-A	152.0		171.5		194.5		235.1		260.8		1.3	1.1
1049	D86-A	152.7		170.7		194.4		233.7		260.9		1.1	0.5
1059	D86-A	151.3		169.2		194.3		233.4		260.3		1.4	1.1
1062		-----		-----		-----		-----		-----		-----	-----
1064	D86-A	155.3		170.2		194.1		235.0		260.6		1.4	0.4
1065	D86-A	153.5		168.7		192.8		233.0		259.2		1.4	1.0
1079	D86-A	150.7		169.9		193.7		233.1		260.4		1.2	0.1
1080	D86-A	152.8		168.4		191.7		231.8		256.9		1.2	0.8
1081	D86-A	153.5		169.8		193.5		233.3		257.6		1.1	-----
1094	D86-A	152.7		169.9		193.9		234.6		260.3		1.4	0.6
1097	ISO3405-A	154.9		170.7		194.1		233.7		259.6		0.7	0.3
1105	D86-A	151.8		169.7		193.3		234.2		257.9		1.2	1.0
1108	D86-A	156.1		169.7		192.2		232.8		258.1		-----	-----
1109	D86-A	152.4		168.9		193.6		234.2		258.3		1.2	0.8
1126	In house-A	148.6		167.9		195.0		231.7		258.4		-----	-----
1140	D86-A	148.4		169.1		192.9		234.2		256.2		1.2	0.9
1167	ISO3405-A	152.0		169.1		193.9		232.9		260.3		0.9	0.3
1194	INH-D86-A	144.8	DG(0.05)	166.7		193.6		231.6		253.3	DG(0.05)	1.3	-----
1203	ISO3405-A	148.5		169.9		193.8		233.4		259.0		0.7	0.3
1215	D86-A	151.7		169.7		193.6		234.0		258.6		1.4	0.6
1237	D86	153		168		194		232		260		1	0
1264	D86-A	151		170		194.5		233.5		262		0.6	0.5
1293		-----		-----		-----		-----		-----		-----	-----
1318	D86-A	152.4		169.8		193.4		233.4		259.5		1.2	0.4
1347	D86-M	157		170		194		232		258		0.5	0.5
1348	D86-A	155.5		170.4		193.5		233.6		258.0		1.2	0.7
1373	D86-M	152.5		169.5		193.5		234.5		258.0		1.5	0
1376	D86-A	154.1		170.2		193.8		232.8		259.6		1.2	0.2
1378	D86-A	156.8		170.3		194.4		234.4		260.6		1.2	0.7

1379	INH-2177-M	157		169		194		230	258	1.2	0.8
1395	D86-A	150.2		168.7		192.7		233.3	258.0	1.2	0.9
1399	D86	155.2		174.0	G(0.05)	196.9	G(0.05)	235.4	263.2	1.0	0.7
1428	ISO3405-A	152.5		169.3		193.4		232.7	261.1	1.2	0.7
1531	D86-A	156.5		169.4		194.1		233.9	260.2	1.0	0.8
1538	D86-A	156.2		170.1		193.2		233.6	258.5	1.0	0.9
1610	IP123-A	154.1		168.9		193.4		234.0	258.5	1.3	0.4
1613	D86-A	152.0		172.4	fr 173.1	194.3		234.3	259.1	1.7	-----
1620		-----		-----		-----		-----	-----	-----	-----
1634	D86-A	149.6		170.0		192.9		233.1	259.8	1.2	0.4
1635	D86-A	152.2		152.2	G(0.01)	191.9		233.1	257.5	1.2	1.2
1636	D86-A	154.8		168.5		194.1		233.6	259.8	1.2	0.2
1650	D86-A	154.1		169.2		193.1		234.7	261.5	1.2	1.2
1651	D86-A	153.7		170.7		194.0		233.0	257.3	1.5	0.6
1715	D86-A	155.3		170.1		193.5		234.4	260.0	1.3	1.2
1720	D86-M	146.0	DG(0.05)	170.5		195.0		234.5	259.0	1.2	0.3
1724	D86-A	149.9		168.9		193.0		233.0	258.7	1.2	0.6
1730		-----		-----		-----		-----	-----	-----	-----
1811	D86-A	151.2		167.9		191.6	fr 161.6	231.4	256.2	1.2	1.2
1826	D86-A	154.1		170.6		194		234.4	260.6	1.2	0.2
1833	D86-A	154.5		169.5		192.6		232.3	260.2	1.2	0.8
1854	D86-M	154.1		172.1		193.3		232.1	261.0	0.8	0.2
1939	D86-A	151.0		170.2		194.0		235.4	258.1	1.2	0.3
2130	D86-A	153.0		170.2		193.6		234.9	260.8	1.0	1.2
2133	D86-A	150.8		169.9		193.1		232.4	259.0	1.4	0.5
2136	D86-A	150.5		168.8		193.1		233.3	260.2	1.2	0.9
	normality	OK		OK		not OK		OK	OK		
	n	89		89		89		91	89		
	outliers	2		3		3		1	3		
	mean (n)	153.04		169.53		193.53		233.42	259.20		
	st.dev. (n)	2.118		1.068		0.898		1.280	1.647		
	R(calc.)	5.93		2.99		2.51		3.58	4.61		
	R(D86:10a-A)	8.42		3.73		2.97		3.50	7.10		
	R(D86:10a-M)	4.24		2.88		2.88		3.55	4.18		
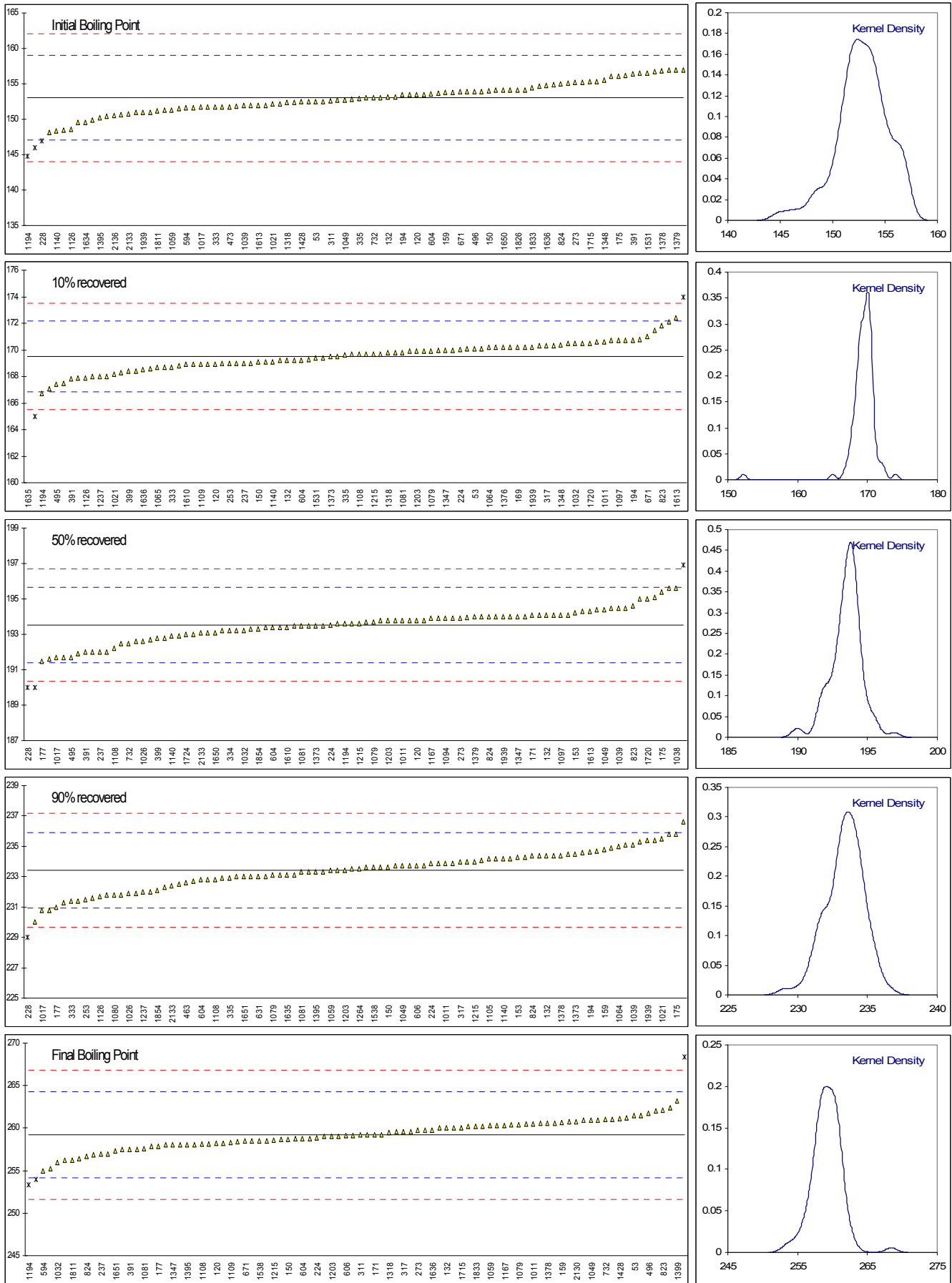
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Determination of Existent Gum on sample #11016; results in mg/100 mL

lab	method	value	mark	z(targ)	remarks
53		-----		-----	
120	D381	1.0		0.25	
132	D381	0.4		-0.28	
150	D381	1.0		0.25	
153	D381	0.6		-0.11	
159		-----		-----	
169	D381	1		0.25	
171	D381	<1		-----	
175	D381	<1		-----	
177	D381	<1		-----	
194	D381	0.4		-0.28	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237	D381	0.2		-0.46	
253	D381	<1.0		-----	
256		-----		-----	
273		-----		-----	
311	D381	<1		-----	
317	D381	1.8		0.96	
333		-----		-----	
334		-----		-----	
335	IP540	<1		-----	
391	D381	3	G(0.01)	2.03	
399		-----		-----	
463	IP540	0.2		-0.46	
473		-----		-----	
495	D381	<1		-----	
496	D381	<1		-----	
594	INH-1567	1.8		0.96	
604		-----		-----	
606	IP540	0.2		-0.46	
631	D381	0.2		-0.46	
671	D381	0.3		-0.37	
732		-----		-----	
823	D381	<1		-----	
824		-----		-----	
962		-----		-----	
1011	D381	1.3		0.52	
1017		-----		-----	
1021	IP540	0.6		-0.11	
1026	ISO6246	<1		-----	
1032	D381	0.6		-0.11	
1038		-----		-----	
1039	D381	<1		-----	
1049	D381	0.8		0.07	
1059	D381	<1		-----	
1062		-----		-----	
1064	D381	0		-0.64	
1065		-----		-----	
1079	D381	<1		-----	
1080	ISO6246	0.3		-0.37	
1081	D381	<1		-----	
1094	IP540	0.4		-0.28	
1097	IP540	0.1		-0.55	
1105	D381	0.7		-0.02	
1108	D381	0.5		-0.20	
1109	IP540	0.9		0.16	
1126		-----		-----	
1140	IP131	1		0.25	
1167	ISO6246	0.7		-0.02	
1194		-----		-----	
1203	D381	1.4		0.61	
1215	D381	<1		-----	
1237		-----		-----	
1264		-----		-----	
1293		-----		-----	
1318		-----		-----	
1347	D381	0.4		-0.28	
1348	D381	0.6		-0.11	
1373		-----		-----	
1376	D381	1.4		0.61	
1378	D381	0.2		-0.46	

1379		-----		-----
1395		-----		-----
1399	D381	0.4		-0.28
1428	ISO6246	1.0		0.25
1531		-----		-----
1538	D381	0.7		-0.02
1610	IP540	0.2		-0.46
1613	D381	0.5		-0.20
1620		-----		-----
1634	D381	2.0		1.14
1635	D381	1.0		0.25
1636	IP540	1.0		0.25
1650	D381	0.6		-0.11
1651	D381	0.8		0.07
1715		-----		-----
1720	D381	1.2		0.43
1724	D381	0.6		-0.11
1730		-----		-----
1811	D381	1.05	C	0.29
1826	D381	<1		-----
1833	D381	0.6		-0.11
1854	D381	0.60		-0.11
1939	D381	0.8		0.07
2130	D381	1		0.25
2133	D381	<0.1		-----
2136	D381	0.2		-0.46

normality	not OK
n	49
outliers	1
mean (n)	0.72
st.dev. (n)	0.459
R(calc.)	1.29
R(D381:09)	3.14

Kernel Density
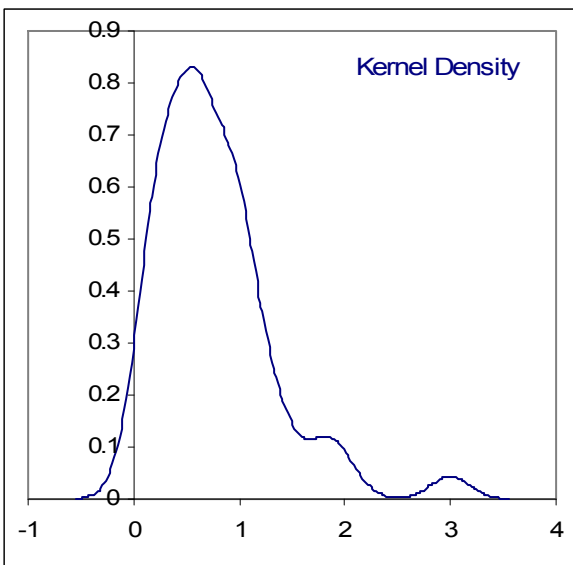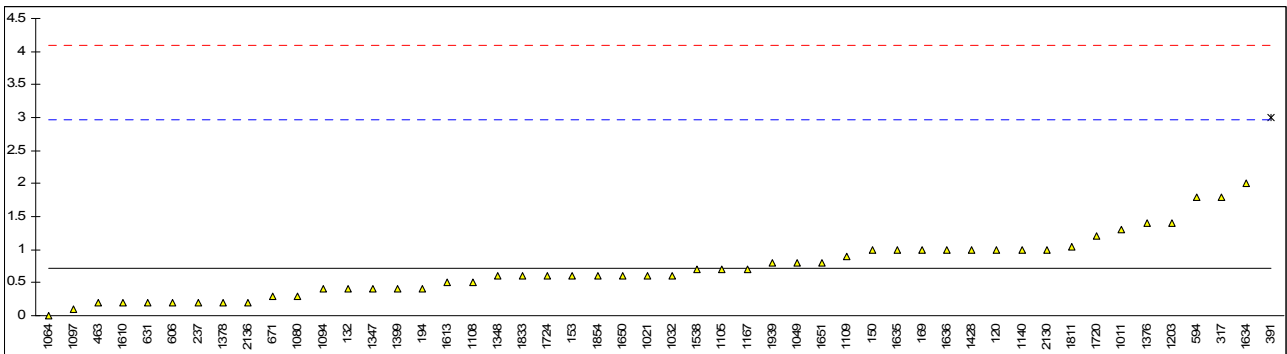
Determination of Flash Point on sample #11016; results in °C

lab	method	value	mark	z(targ)	remarks
53	IP170-MF	42.5		-0.91	
120	D56-E	43.0		-0.47	
132	D56-AE	44.0		0.41	
150	D56	45.0		1.28	
153	D56-MF	43.2		-0.29	
159	D56-E	48.3	G(0.01)	4.17	
169	D56-MF	43.9		0.32	
171	D93-AF	44.4		0.76	
175	IP170-F	44		0.41	
177	IP170-MF	43.0		-0.47	
194	D56-MF	42.22		-1.15	
224		-----		-----	
225		-----		-----	
228	D3828-ME	43.5		-0.03	
237	IP170-MF	42.5		-0.91	
253	IP170-MF	43		-0.47	
256		-----		-----	
273	IP170-MF	44.5		0.84	
311	IP170-AE	42.5		-0.91	
317		-----		-----	
333	IP170-AF	42.5		-0.91	
334	IP170-AF	44.0		0.41	
335	IP170-F	42.0		-1.34	
391	IP170-MF	43.5		-0.03	
399	IP170-MF	43		-0.47	
463	IP170-AF	44.0		0.41	
473	IP170	44.0		0.41	
495	IP170-E	46.5	DG(0.05)	2.59	
496	IP523-MF	41.7		-1.61	
594	INH-6356-E	44.5		0.84	
604	IP170-AE	43.5		-0.03	
606	IP170-AE	43.5		-0.03	
631	D56-MF	43.0		-0.47	
671	IP170-SAF	42.533		-0.88	
732	D93-AF	44		0.41	
823	IP171-AF	43.0		-0.47	
824	IP170-E	42.5		-0.91	
962		-----		-----	
1011	IP170-MF	44.0		0.41	
1017	D93-AF	45.0		1.28	
1021	D56-AE	43.670		0.12	
1026	IP170-AE	44.5		0.84	
1032	IP170-AE	43.0		-0.47	
1038	IP170-AE	43.5		-0.03	
1039	IP170-AE	43.5		-0.03	
1049	ISO13736-E	43.5		-0.03	
1059	IP170-AE	43.0		-0.47	
1062		-----		-----	
1064	IP170-AE	44.0		0.41	
1065		-----		-----	
1079	IP170-AE	43.0		-0.47	
1080	IP170-AE	44.5		0.84	
1081	IP170	43.5		-0.03	
1094	D56-AF	44.5		0.84	
1097	ISO13736-AF	43.5		-0.03	
1105	IP170-F	43.0		-0.47	
1108	D56-AE	43.0		-0.47	
1109	IP170-AF	42.5		-0.91	
1126	D93-E	45.5		1.72	
1140	IP170-E	43.0		-0.47	
1167	ISO2719-AE	45.0		1.28	
1194		-----		-----	
1203	D56-AF	43.5	C	-0.03	First reported 49.5
1215	IP170-F	43.0		-0.47	
1237		-----		-----	
1264	IP170-AE	43.5		-0.03	
1293	D6450-AE	44		0.41	
1318	IP170-AE	43.5		-0.03	
1347	D3828-F	44.0		0.41	
1348	IP170-F	43.0		-0.47	
1373	D56-MF	44.23		0.61	
1376	D56-AF	44.0		0.41	
1378	IP170-AE	43		-0.47	

1379	D93-ME	46	DG(0.05)	2.16
1395		-----		-----
1399	IP170-AE	44.5		0.84
1428	D56-AF	43.2		-0.29
1531		-----		-----
1538	D56-AE	44.2		0.58
1610	IP170-AF	43.1		-0.38
1613	D56-AE	43.5		-0.03
1620		-----		-----
1634	IP170-AE	42.7		-0.73
1635	D93-MF	46	G(0.05)	2.16
1636	IP170-AE	44.5		0.84
1650	IP170-AE	44.0		0.41
1651	IP170-AE	43.8		0.23
1715	D56-AE	44		0.41
1720	D3828-F	44.0		0.41
1724	IP170-F	43		-0.47
1730		-----		-----
1811	IP170-F	43.0		-0.47
1826	IP170-F	43.5		-0.03
1833	IP170-AF	43		-0.47
1854	IP170-F	45.0		1.28
1939	IP170-MF	42.566		-0.85
2130	IP170-AF	43.5		-0.03
2133	D93-E	44.5		0.84
2136	D56-AE	43.5		-0.03

			After exclusion of ASTM D93 data:	Only IP170 data	Only D56 data
normality	not OK		not OK	not OK	OK
n	82		76	50	18
outliers	4		2	1	1
mean (n)	43.54		43.45	43.34	43.65
st.dev. (n)	0.761		0.715	0.677	0.660
R(calc.)	2.13		2.00	1.90	1.85
R(IP170:09)	3.20		3.20	3.20	4.30
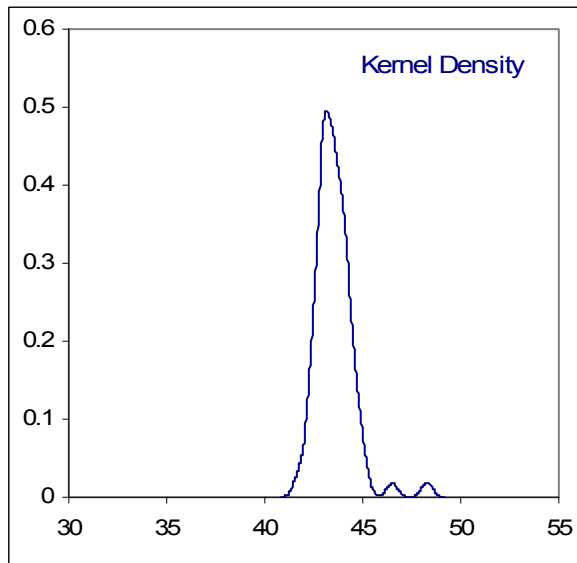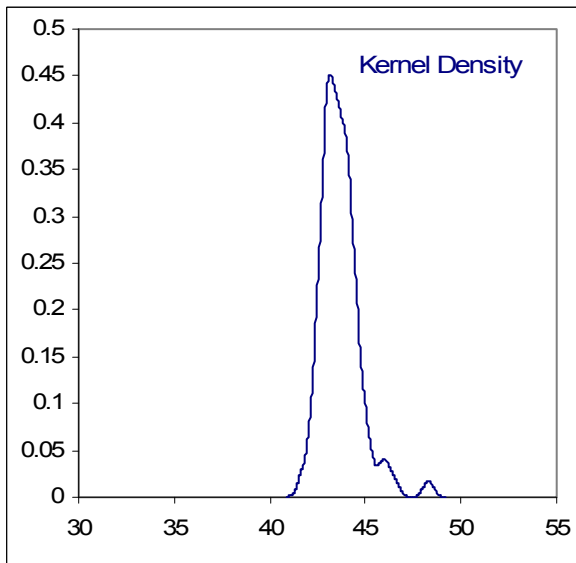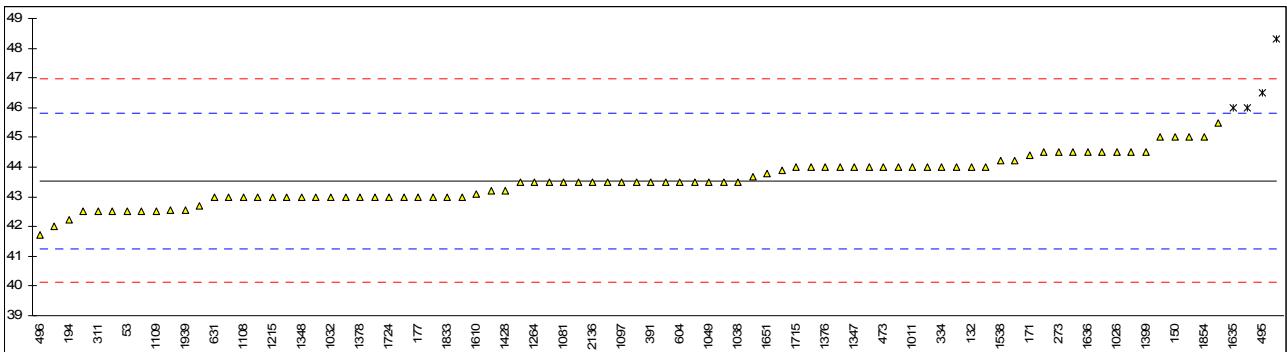
Determination of Freezing Point on sample #11016; results in °C

lab	method	value	mark	z(targ)	remarks
53	D2386-M	-55.0		-0.87	
120		-----		-----	
132	D2386-M	-54.5		-0.31	
150	D2386-M	-55.0		-0.87	
153	D2386-M	-54.0		0.25	
159	D2386-A	-55.60		-1.54	
169	D2386-M	-54.0		0.25	
171	D2386	-57.0	G(0.01)	-3.11	
175	D2386-M	-54		0.25	
177	D2386-M	-54.0		0.25	
194	D2386-M	-54.0		0.25	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237	D2386-M	-54.0		0.25	
253	D2386-M	-54.5		-0.31	
256		-----		-----	
273		-----		-----	
311	D2386-M	-55.0		-0.87	
317	D5972-A	-55.0		-0.87	
333	IP529-A	-54.2		0.03	
334	D7153-A	-54.0		0.25	
335	D2386-M	-55.0		-0.87	
391	D2386-M	-54		0.25	
399	D2386-M	-54		0.25	
463	D2386-M	-55.5		-1.43	
473	D2386	-54.0		0.25	
495	D2386-M	-55.5		-1.43	
496	D2386-M	-54		0.25	
594		-----		-----	
604	D2386-M	-54.0		0.25	
606	D2386-M	-54.5		-0.31	
631	D2386-M	-54.0		0.25	
671	D2386-M	-54.40		-0.20	
732		-----		-----	
823	D2386-M	-55.0		-0.87	
824	D2386-M	-53.5		0.81	
962		-----		-----	
1011	D2386-M	-54.5		-0.31	
1017	D2386-M	-55.3		-1.21	
1021	D2386-M	-53.23		1.11	
1026	D2386-M	-55.0		-0.87	
1032	IP529-A	-54.0		0.25	
1038	D5972-A	-55.3		-1.21	
1039	D2386-A	-54.5		-0.31	
1049	D7153-A	-54.0		0.25	
1059	D2386-M	-52.5		1.93	
1062		-----		-----	
1064	D2386-A	-52.8		1.59	
1065		-----		-----	
1079	D5972-A	-54.3		-0.09	
1080		-----		-----	
1081	D7153-A	-53.9		0.36	
1094	D2386-M	-54.5		-0.31	
1097	IP529-A	-54.0		0.25	
1105	D7153-A	-54.1		0.14	
1108	D5972-A	-53.8		0.47	
1109	D5972-A	-54.8		-0.65	
1126		-----		-----	
1140	D7153-A	-54.2		0.03	
1167		-----		-----	
1194		-----		-----	
1203	D2386-M	-54		0.25	
1215	D2386-M	-55.0		-0.87	
1237		-----		-----	
1264	D5972-A	-53.2		1.15	
1293		-----		-----	
1318	D2386-M	-53.5		0.81	
1347	D2386-M	-54.5		-0.31	
1348	D2386-M	-53.5		0.81	
1373		-----		-----	
1376	D2386-M	-54.14		0.09	
1378	D2386-M	-54		0.25	

1379	INH-5066	-53.5	C	0.81	First reported -51
1395		-----		-----	
1399	D7153-A	-54.1		0.14	
1428	D7153-A	-53.8		0.47	
1531		-----		-----	
1538	D5972-A	-54.9		-0.76	
1610	IP16-M	-54.0		0.25	
1613	D7153-A	-53.8		0.47	
1620		-----		-----	
1634	D2386-M	-54.5		-0.31	
1635	D2386-M	-54		0.25	
1636	D2386-M	-54.0		0.25	
1650	D2386-M	-55.0		-0.87	
1651	D2386-A	-54.46		-0.27	
1715	D5972-A	-54.6		-0.42	
1720	D5972-A	-53.3		1.03	
1724	D2386-M	-54.5		-0.31	
1730	D2386-M	-53.5		0.81	
1811	D2386	-53.6		0.70	
1826	D5972-A	-54.8		-0.65	
1833	D2386-M	-53.8		0.47	
1854	D2386-M	-54		0.25	
1939	D2386	-52.85		1.54	
2130	D2386-M	-55.0		-0.87	
2133	D5972-A	-54.6		-0.42	
2136	D7153-A	-53.8		0.47	

		Only manual data	Only automated data:
normality	not OK	not OK	OK
n	77	46	27
outliers	1	0	0
mean (n)	-54.22	-54.29	-54.22
st.dev. (n)	0.635	0.621	0.626
R(calc.)	1.78	1.74	1.75
R(D2386:06)	2.50	2.50	2.50

Kernel Density
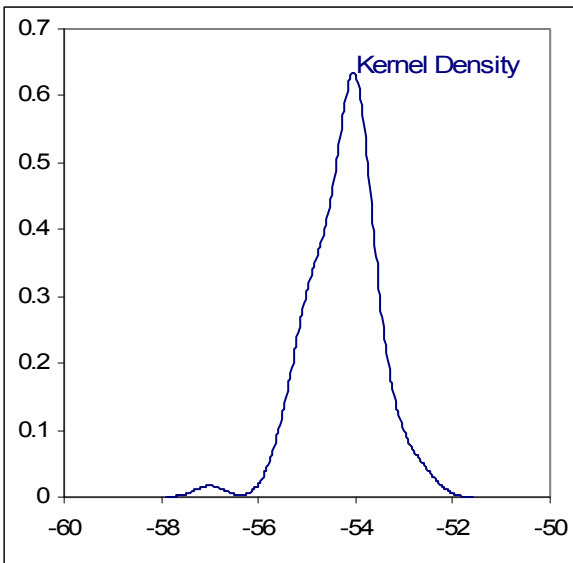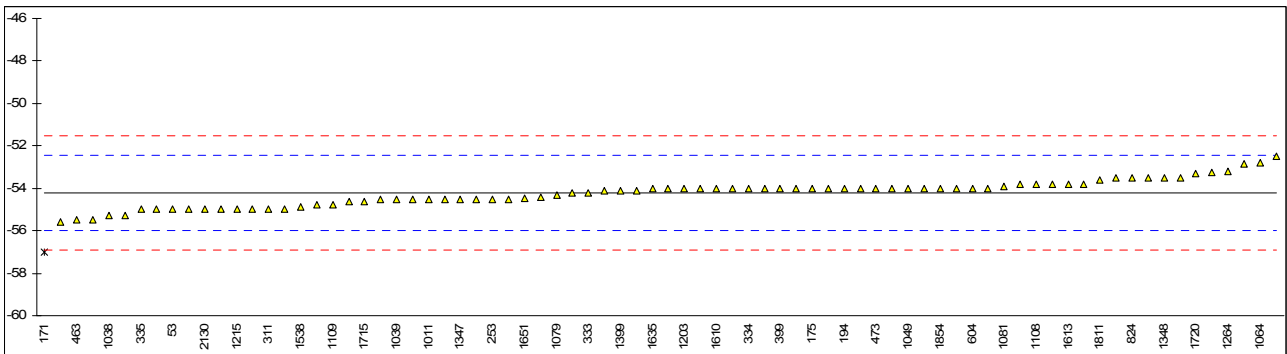
Determination of JFTOT; Tube Rating, Delta P in mmHg, Pumped Vol. in mL, Temp. in $^{\circ}$C

lab	method	tube	mark	Delta P	mark	volume	mark	temp	mark	remarks
53	D3241	<1		0		465		260		
120	D3241	1		0		465		260		
132	D3241	<1		0.0		450		260		
150	D3241	<1		0		450		260		
153	D3241	1		0.0		510	ex	260		Volume >495mL
159	D3241	1		-1	G(0.01)	450		260		
169	D3241	1		3	G(0.01)	450		260		
171	D3241	<1		0		450		260		
175	D3241	<1		1		440		260		
177	D3241	1		1		450		260		
194	D3241	<1		1		450		260		
224		-----		-----		-----		-----		
225		-----		-----		-----		-----		
228		-----		-----		-----		-----		
237	D3241	1		0		450		260		
253	D3241	<1		0		450		260		
256		-----		-----		-----		-----		
273		-----		-----		-----		-----		
311		-----		-----		-----		-----		
317		-----		-----		-----		-----		
333		-----		-----		-----		-----		
334	D3241	0		0		450		260		
335		-----		-----		-----		-----		
391	D3241	0		0		455		260		
399	D3241	1		0		450		260		
463		-----		-----		-----		-----		
473		-----		-----		-----		-----		
495	D3241	1		0		480		260		
496		-----		-----		-----		-----		
594		-----		-----		-----		-----		
604		-----		-----		-----		-----		
606	D3241	1		0.2		470.0		260		
631	D3241	<1		<1		490		260		
671	D3241	<1		0		455		260		
732		-----		-----		-----		-----		
823	D3241	1		0.0		450		260		
824		-----		-----		-----		-----		
962		-----		-----		-----		-----		
1011		-----		-----		-----		-----		
1017		-----		-----		-----		-----		
1021		-----		-----		-----		-----		
1026	D3241	<1		<1		-----		260		
1032	D3241	1		0.2		430		260		
1038		-----		-----		-----		-----		
1039	D3241	<1		0.1		460		260		
1049	D3241	1		0		507	ex	260		Volume >495mL
1059		-----		-----		-----		-----		
1062		-----		-----		-----		-----		
1064	D3241	0		1		450		260		
1065	D3241	1		1		-----		-----		
1079	D3241	<1		0		460		260		
1080		-----		-----		-----		-----		
1081		-----		-----		-----		-----		
1094		-----		-----		-----		-----		
1097	D3241	1		0.1		480		260		
1105	D3241	1		0		478		260		
1108		-----		-----		-----		-----		
1109	D3241	<1		0		430		260		
1126		-----		-----		-----		-----		
1140	IP323	<1		0		-----		-----		
1167		-----		-----		-----		-----		
1194		-----		-----		-----		-----		
1203	D3241	1		0		450		260		
1215	D3241	<1		0		450		260		
1237	D3241	<1		0.0		455		260		
1264	D3241	<1		0		450		260		
1293		-----		-----		-----		-----		
1318	D3241	<1		0		450		260		
1347	D3241	1		0		410		260		
1348	D3241	1		0		450		260		
1373		-----		-----		-----		-----		
1376	D3241	<1		0		450		260		
1378	D3241	1		1		460		260		

1379		-----	-----	-----		-----	
1395		-----	-----	-----		-----	
1399		-----	-----	-----		-----	
1428	D3241	<1	0	455		260	
1531		-----	-----	-----		-----	
1538	D3241	<1	<1	450		260	
1610	IP323	<1	<1	450		260	
1613	D3241	<1	0.0	450		260	
1620		-----	-----	-----		-----	
1634		-----	-----	-----		-----	
1635	D3241	1	>25	600	ex	260	Volume >495mL
1636		-----	-----	-----		-----	
1650	D3241	1	0	450		260	
1651	D3241	1	0	450		260	
1715		-----	-----	-----		-----	
1720		-----	-----	-----		-----	
1724		-----	-----	-----		-----	
1730		-----	-----	-----		-----	
1811		-----	-----	-----		-----	
1826	D3241	<1	<1	490		260	
1833	D3241	<1	0.0	510	ex	260	Volume >495mL
1854	D3241	<1	<1	500	ex	260	Volume >495mL
1939		-----	-----	-----		-----	
2130	D3241	<1	0.1	450		260	
2133	D3241	<1	0.0	510	ex	260	Volume >495mL
2136	D3241	1	0	450		260	
	normality	n.a.	n.a.	n.a.		not OK	
	n	26	45	45		52	
	outliers	0	2	0		0	
	mean (n)	0.88	0.15	454.0		260	
	st.dev. (n)	0.326	0.341	14.17		0	
	R(calc.)	0.91	0.95	39.7		0	
	R(D3241:09e1)	n.a.	n.a.	n.a.		n.a.	

Determination of Mercaptan Sulphur on sample #11016; results in % M/M

lab	method	value	mark	z(targ)	remarks
53	D3227	<0.0003		<-3.29	False negative?
120	D3227	0.0007		0.05	
132	D3227	0.0010	G(0.05)	2.52	
150	D3227	<0.0003		<-3.29	False negative?
153	D3227	0.0009		1.70	
159		-----		-----	
169	D3227	0.0009		1.70	
171	D3227	0.00068		-0.12	
175	D3227	0.0006		-0.78	
177		-----		-----	
194	D3227	0.00061		-0.70	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237	D3227	0.00079	C	0.79	First reported 0.00114
253	D3227	0.0006		-0.78	
256		-----		-----	
273	D3227	0.00065		-0.37	
311	D3227	0.0006		-0.78	
317		-----		-----	
333		-----		-----	
334	D3227	0.0006		-0.78	
335		-----		-----	
391		-----		-----	
399		-----		-----	
463		-----		-----	
473		-----		-----	
495	D3227	0.0008		0.87	
496	D3227	0.0007		0.05	
594		-----		-----	
604		-----		-----	
606		-----		-----	
631	D3227	0.0006	C	-0.78	First reported 0.0004
671		-----		-----	
732	D3227	0.00109	G(0.01)	3.26	
823	D3227	0.0007	C	0.05	First reported 0.011
824	D3227	0.0007		0.05	
962		-----		-----	
1011	D3227	0.0007		0.05	
1017		-----		-----	
1021		-----		-----	
1026	D3227	<0.0001		<-4.91	False negative?
1032		-----		-----	
1038	D3227	0.0006		-0.78	
1039	D3227	0.0007		0.05	
1049	D3227	0.000633		-0.51	
1059	D3227	0.0007		0.05	
1062		-----		-----	
1064	D3227	0.00068		-0.12	
1065	D3227	0.0009		1.70	
1079	D3227	0.0007		0.05	
1080		-----		-----	
1081	D3227	0.0006		-0.78	
1094		-----		-----	
1097	ISO3012	0.00064		-0.45	
1105	D3227	0.00063		-0.53	
1108	D3227	0.00069		-0.04	
1109	D3227	0.00061		-0.70	
1126		-----		-----	
1140	D3227	0.0007		0.05	
1167	ISO3012	0.00079		0.79	
1194		-----		-----	
1203	UOP163	0.00064		-0.45	
1215		-----		-----	
1237		-----		-----	
1264	D3227	0.0008		0.87	
1293		-----		-----	
1318	D3227	0.000618		-0.64	
1347	D3227	0.00076		0.54	
1348	D3227	0.00073		0.29	
1373		-----		-----	
1376	D3227	0.00070		0.05	
1378	D3227	0.0007		0.05	

1379	D3227	0.00125	CG(0.05)	4.59	First reported 0.0015
1395		-----		-----	
1399	D3227	0.000631		-0.52	
1428	ISO3012	0.00074		0.38	
1531		-----		-----	
1538	D3227	0.00075		0.46	
1610	IP342	0.0002	G(0.01)	-4.08	
1613		-----		-----	
1620		-----		-----	
1634		-----		-----	
1635	D3227	0.00067		-0.20	
1636	D3227	0.00071		0.13	
1650	D3227	0.0006		-0.78	
1651		-----		-----	
1715		-----		-----	
1720	D3227	0.0011	C,G(0.05)	3.35	First reported 0.0013
1724	D3227	0.00071		0.13	
1730		-----		-----	
1811		-----		-----	
1826	D3227	0.00075		0.46	
1833	D3227	0.00069		-0.04	
1854	D3227	0.00074		0.38	
1939	D3227	0.00059		-0.86	
2130	D3227	0.0008		0.87	
2133	D3227	0.0001	G(0.01)	-4.91	
2136	D3227	0.00069		-0.04	

normality	not OK
n	51
outliers	6
mean (n)	0.00070
st.dev. (n)	0.000080
R(calc.)	0.00022
R(D3227:10)	0.00034

Kernel Density
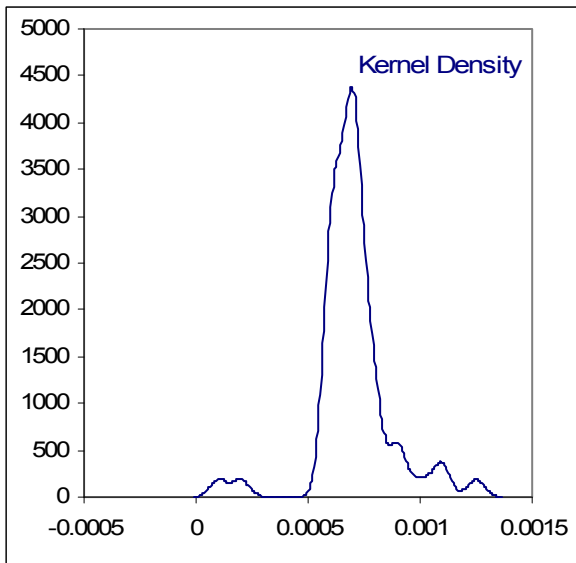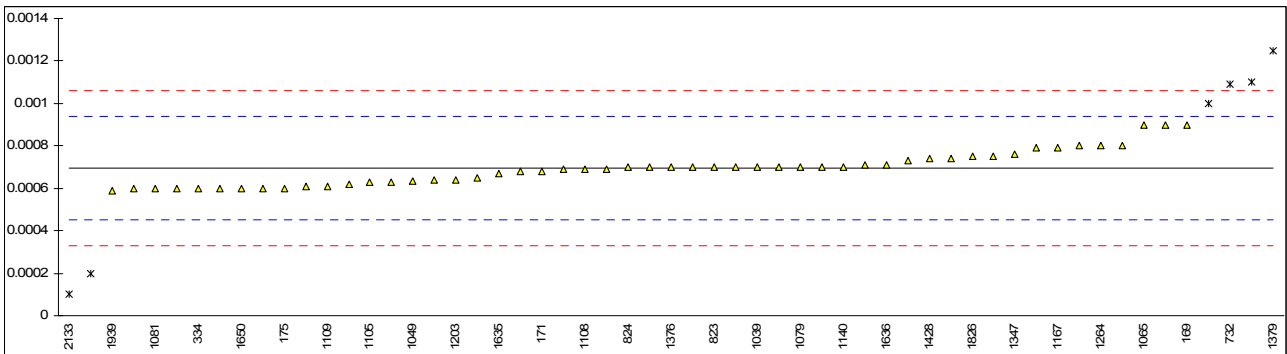
Determination of MSEP on sample #11016;

lab	method	value	mark	z(targ)	remarks
53	D3948	93		0.54	
120	D3948	95		1.04	
132	D3948	87		-0.95	
150		-----		-----	
153	D3948	93		0.54	
159	D3948	93		0.54	
169	D3948	91		0.05	
171	D3948	95		1.04	
175	D3948	86		-1.19	
177	D3948	95		1.04	
194	D3948	84		-1.69	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237	D3948	91		0.05	
253	D3948	93		0.54	
256		-----		-----	
273		-----		-----	
311	D3948	91		0.05	
317	D3948	93		0.54	
333	D3948	85		-1.44	
334	D3948	94		0.79	
335	D3948	98		1.79	
391	D3948	98		1.79	
399	D3948	97		1.54	
463	D3948	86	C	-1.19	First reported 56
473	D3948	81		-2.44	
495	D3948	92		0.30	
496	D3948	90		-0.20	
594		-----		-----	
604		-----		-----	
606	D3948	90		-0.20	
631	D3948	96		1.29	
671	D3948	89		-0.45	
732		-----		-----	
823	D3948	93		0.54	
824		-----		-----	
962		-----		-----	
1011	D3948	85.5		-1.32	
1017		-----		-----	
1021	D3948	97		1.54	
1026	D3948	92		0.30	
1032	D3948	82		-2.19	
1038	D3948	93		0.54	
1039	D3948	86		-1.19	
1049	D3948	89		-0.45	
1059	D3948	87		-0.95	
1062		-----		-----	
1064	D3948	86		-1.19	
1065		-----		-----	
1079	D3948	90		-0.20	
1080		-----		-----	
1081	D3948	78	G(0.05)	-3.18	
1094		-----		-----	
1097	D3948	88		-0.70	
1105	D3948	97		1.54	
1108	D3948	90		-0.20	
1109	D3948	95		1.04	
1126		-----		-----	
1140	D3948	97		1.54	
1167		-----		-----	
1194		-----		-----	
1203		-----		-----	
1215	D3948	92		0.30	
1237		-----		-----	
1264	D3948	86		-1.19	
1293		-----		-----	
1318	D3948	92		0.30	
1347	D3948	84		-1.69	
1348	D3948	87		-0.95	
1373		-----		-----	
1376	D3948	98		1.79	
1378	D3948	88		-0.70	

1379		-----		-----
1395		-----		-----
1399	D3948	100		2.28
1428		-----		-----
1531		-----		-----
1538	D3948	95		1.04
1610	D3948	93		0.54
1613	D3948	87.0		-0.95
1620		-----		-----
1634	D3948	75	G(0.01)	-3.93
1635	D3948	85		-1.44
1636		-----		-----
1650	D3948	93		0.54
1651	D3948	92		0.30
1715		-----		-----
1720	D3948	92		0.30
1724	D3948	86		-1.19
1730		-----		-----
1811	D3948	98		1.79
1826	D3948	93		0.54
1833	D3948	85		-1.44
1854	D3948	91		0.05
1939		-----		-----
2130	D3948	89		-0.45
2133	D3948	81		-2.44
2136	D3948	92		0.30

normality	not OK
n	65
outliers	2
mean (n)	90.81
st.dev. (n)	4.584
R(calc.)	12.84
R(D3948:08)	11.28
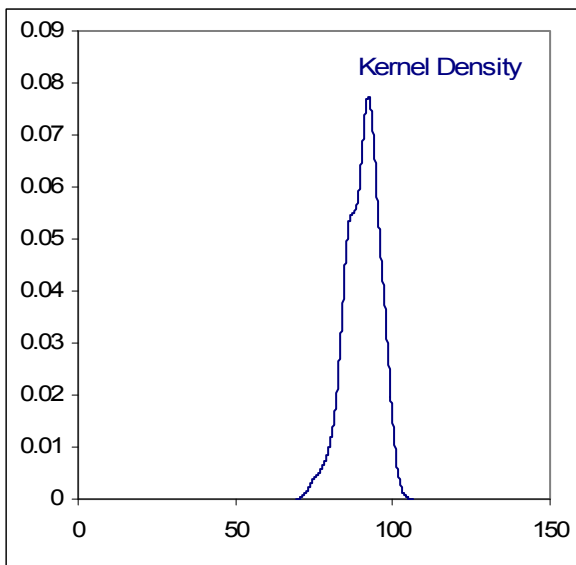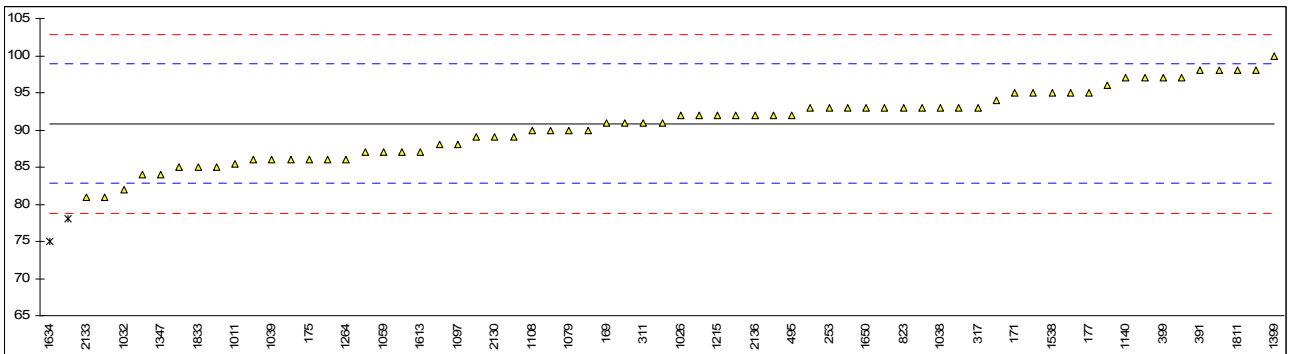
Determination of Naphthalenes on sample #11016; results in %V/V

lab	method	value	mark	z(targ)	remarks
53	D1840-B	0.76		-0.63	
120	D1840-B	0.78		0.06	
132	D1840-A	0.75		-0.97	
150	D1840-B	0.83		1.80	
153	D1840-A	1.14	G(0.01)	12.53	
159	D1840-B	0.7445		-1.16	
169	D1840-B	1.21	G(0.05)	14.95	
171	D1840-B	0.7481		-1.04	
175		-----		-----	
177	D1840	0.89		3.87	
194	D1840-A	0.74		-1.32	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237	D1840-B	1.04	C,G(0.01)	9.07	First repored 0.981
253	D1840-B	0.76		-0.63	
256		-----		-----	
273		-----		-----	
311	D1840-B	0.76	C	-0.63	First reported 1.15
317		-----		-----	
333	D1840-B	0.74		-1.32	
334		-----		-----	
335		-----		-----	
391	D1840-B	0.95		5.95	
399		-----		-----	
463		-----		-----	
473		-----		-----	
495	D1840-B	0.76		-0.63	
496	D1840-A	0.831		1.83	
594		-----		-----	
604		-----		-----	
606		-----		-----	
631	D1840-A	0.81		1.10	
671	D1840-A	0.7866		0.29	
732		-----		-----	
823	D1840-A	0.77	C	-0.28	First reported 0.98
824		-----		-----	
962		-----		-----	
1011	D1840-B	0.770		-0.28	
1017		-----		-----	
1021	D1840-B	0.77		-0.28	
1026		-----		-----	
1032		-----		-----	
1038	D1840-B	0.78		0.06	
1039	D1840-B	0.76		-0.63	
1049	D1840-A	0.77		-0.28	
1059		-----		-----	
1062		-----		-----	
1064	D1840-A	0.777		-0.04	
1065		-----		-----	
1079	D1840-A	0.75		-0.97	
1080		-----		-----	
1081	D1840-B	0.77		-0.28	
1094		-----		-----	
1097	D1840-A	0.776		-0.07	
1105	D1840-A	0.8259		1.65	
1108	D1840-B	0.87		3.18	
1109	D1840-A	0.381	G(0.05)	-13.75	
1126		-----		-----	
1140	D1840	0.81		1.10	
1167		-----		-----	
1194	INH-D1840	1.89	G(0.01)	38.50	
1203	D1840-A	0.812		1.17	
1215	D1840-A	0.789		0.38	
1237		-----		-----	
1264		-----		-----	
1293		-----		-----	
1318	D1840-B	0.794		0.55	
1347	D1840	0.3242	G(0.05)	-15.72	
1348	D1840-B	0.61		-5.82	
1373		-----		-----	
1376	D1840-A	0.771		-0.25	
1378	D1840-A	0.77		-0.28	

1379		-----		-----
1395		-----		-----
1399		-----		-----
1428		-----		-----
1531		-----		-----
1538	D1840-B	0.76		-0.63
1610	D1840-B	0.76		-0.63
1613		-----		-----
1620		-----		-----
1634		-----		-----
1635	D1840-B	0.728		-1.74
1636	D1840-B	0.767		-0.39
1650		-----		-----
1651		-----		-----
1715		-----		-----
1720		-----		-----
1724		-----		-----
1730		-----		-----
1811	D1840-A	0.76		-0.63
1826	D1840-A	0.76		-0.63
1833		-----		-----
1854		-----		-----
1939		-----		-----
2130	D1840-B	1.09	G(0.01)	10.80
2133	D1840-A	0.780		0.06
2136	D1840	0.76		-0.63

normality	not OK	
n	43	
outliers	7	
mean (n)	0.778	
st.dev. (n)	0.0495	
R(calc.)	0.139	
R(D1840:07-B)	0.081	Compare R(D1840:07-A) = 0.053
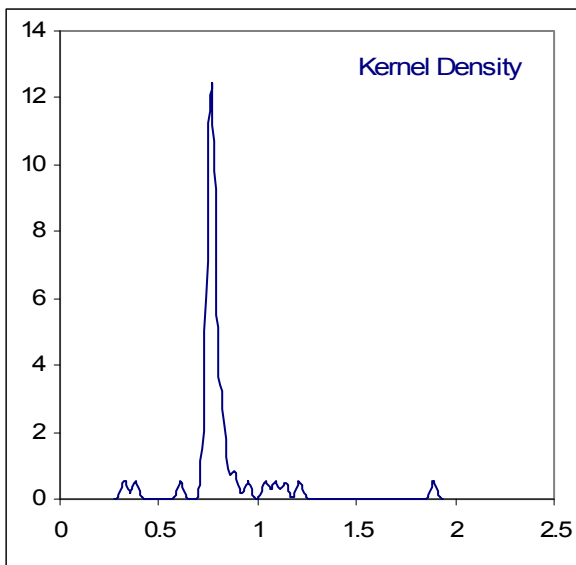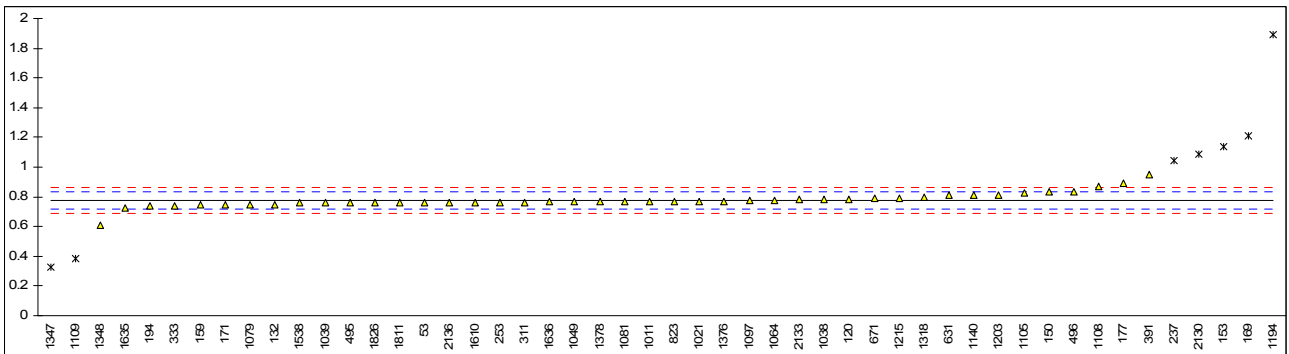
Determination of Smoke Point on sample #11016; results in mm

lab	method	value	mark	z(targ)	remarks
53	D1322	22		-1.77	
120		-----		-----	
132	D1322	23.4		-0.46	
150	D1322	26		1.96	
153	D1322	23		-0.84	
159		-----		-----	
169	D1322	23.5		-0.37	
171	D1322	25		1.03	
175	D1322	24		0.10	
177	D1322	24		0.10	
194	D1322	25.0		1.03	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237	D1322	24		0.10	
253	D1322	26		1.96	
256		-----		-----	
273		-----		-----	
311	D1322	21.5		-2.24	
317		-----		-----	
333		-----		-----	
334	D1322	25.0		1.03	
335		-----		-----	
391		-----		-----	
399		-----		-----	
463		-----		-----	
473		-----		-----	
495		-----		-----	
496	D1322	23		-0.84	
594		-----		-----	
604		-----		-----	
606		-----		-----	
631	D1322	23.0		-0.84	
671	D1322	22.5	C	-1.30	First reported 20.84
732		-----		-----	
823	D1322	24.0		0.10	
824	D1322	23.5		-0.37	
962		-----		-----	
1011	D1322	25.0		1.03	
1017		-----		-----	
1021	D1322	24.03		0.12	
1026	D1322	26.0		1.96	
1032	D1322	24		0.10	
1038	D1322	25.0		1.03	
1039	D1322	23.5		-0.37	
1049	D1322	24		0.10	
1059	D1322	20.5	C	-3.17	First reported 19.5
1062		-----		-----	
1064	D1322	24.5		0.56	
1065		-----		-----	
1079	D1322	20.5	C	-3.17	First reported 19.5
1080		-----		-----	
1081	D1322	24.5		0.56	
1094		-----		-----	
1097	D1322	25.5		1.50	
1105	D1322	24.5		0.56	
1108		-----		-----	
1109	D1322	23.2		-0.65	
1126		-----		-----	
1140	D1322	23.0		-0.84	
1167		-----		-----	
1194	INH -D1322	20.9		-2.80	
1203	D1322	23.7		-0.18	
1215	D1322	25.0		1.03	
1237		-----		-----	
1264	D1322	24		0.10	
1293		-----		-----	
1318	D1322	24.505		0.57	
1347	D1322	25.0		1.03	
1348	D1322	21.0		-2.70	
1373		-----		-----	
1376	D1322	24.83		0.87	
1378	D1322	25		1.03	

1379	INH-4338	25.2		1.22	
1395		----		-----	
1399	D1322	30	G(0.01)	5.70	
1428	D1322	24		0.10	
1531		----		-----	
1538	D1322	22.5	C	-1.30	First reported 20.5
1610	IP57	24.3		0.38	
1613	D1322	24		0.10	
1620		----		-----	
1634		----		-----	
1635	D1322	21		-2.70	
1636	D1322	25.23	1.24	1.24	
1650	D1322	24.75		0.80	
1651	D1322	24.1		0.19	
1715	D1322	23.5		-0.37	
1720	D1322	22.5	C	-1.30	First reported 20.0
1724	D1322	26		1.96	
1730		----		-----	
1811	D1322	24.6		0.66	
1826	D1322	22.0		-1.77	
1833	D1322	27		2.90	
1854	D1322	24.5		0.56	
1939	D1322	22.65		-1.16	
2130	D1322	23		-0.84	
2133	D1322	25.67		1.66	
2136	D1322	25.0		1.03	

normality	not OK
n	62
outliers	1
mean (n)	23.90
st.dev. (n)	1.439
R(calc.)	4.03
R(D1322:08)	3.00
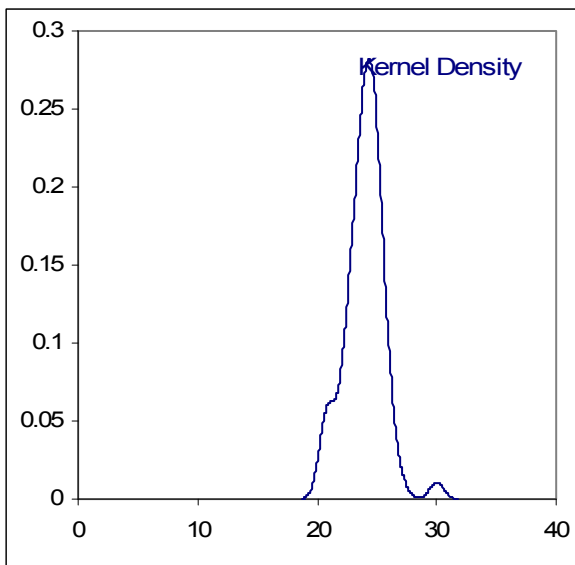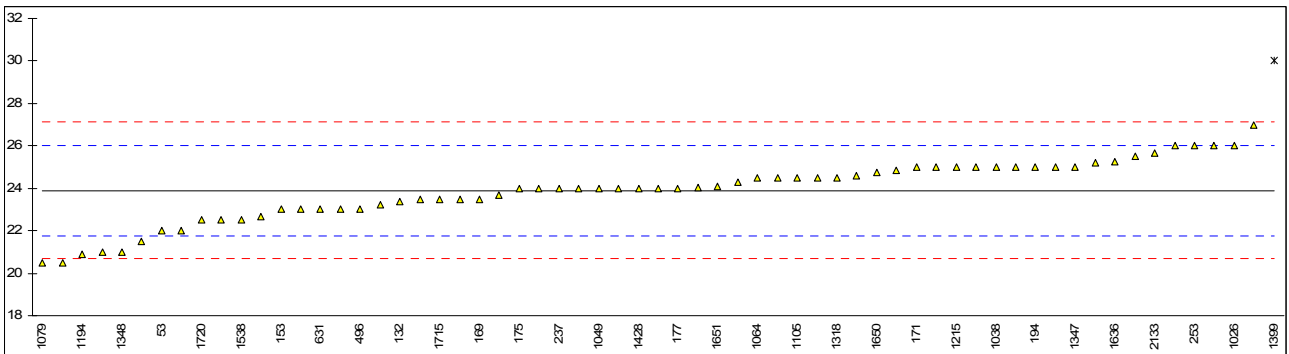
Determination of Specific Energy on sample #11016; results in MJ/kg

lab	method	value	mark	z(targ)	remarks
53		-----		-----	
120	D3338	43.322		0.99	
132	D3338	43.305		-0.05	
150		-----		-----	
153	D4529	43.302		-0.23	
159		-----		-----	
169	D3338	40.309	E,G(0.01)	-182.41	After manual recalculation by iis: 43.309 (z target = 0.19)
171		-----		-----	
175		-----		-----	
177	D3338	43.289		-1.02	
194	D3338	43.305		-0.05	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
253	D3338	43.3053		-0.03	
256		-----		-----	
273		-----		-----	
311	D3338	43.31		0.26	
317		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
391		-----		-----	
399		-----		-----	
463		-----		-----	
473		-----		-----	
495		-----		-----	
496	D3338	43.303		-0.17	
594		-----		-----	
604		-----		-----	
606		-----		-----	
631	D3338	43.313		0.44	
671	D3338	43.280		-1.57	
732		-----		-----	
823	D3338	43.308		0.14	
824	D3338	43.315		0.56	
962		-----		-----	
1011	D3338	43.311		0.32	
1017	D3338	43.30676		0.06	
1021		-----		-----	
1026		-----		-----	
1032	D3338	43.328		1.35	
1038		-----		-----	
1039	D3338	43.306		0.01	
1049	D3338	43.3122		0.39	
1059	D3338	43.307		0.07	
1062		-----		-----	
1064	D3338	43.2961		-0.59	
1065		-----		-----	
1079	D3338	43.302		-0.23	
1080		-----		-----	
1081	D3338	43.301		-0.29	
1094		-----		-----	
1097	D3338	43.304		-0.11	
1105	D3338	43.31		0.26	
1108		-----		-----	
1109	D3338	43.31		0.26	
1126		-----		-----	
1140	D3338	43.295		-0.66	
1167		-----		-----	
1194	INH-D3338	43.094	E,G(0.01)	-12.89	After manual recalculation by iis: 43.351 (z target = 2.75)
1203	D3338	43.30		-0.35	
1215	D3338	43.263	G(0.01)	-2.60	
1237		-----		-----	
1264	D3338	43.301		-0.29	
1293		-----		-----	
1318		-----		-----	
1347		-----	W	-----	Result withdrawn, reported 43.382
1348	D3338	43.31		0.26	
1373		-----		-----	
1376	D3338	43.3339		1.71	
1378		-----		-----	

1379	INH-11065	43.282	-1.45
1395		-----	-----
1399		-----	-----
1428		-----	-----
1531		-----	-----
1538	D3338	43.317	0.68
1610	D3338	43.310	0.26
1613	D3338	43.31027	0.27
1620		-----	-----
1634		-----	-----
1635	D3338	43.308	0.14
1636	D3338	43.3077	0.12
1650	D3338	43.301	-0.29
1651		-----	-----
1715		-----	-----
1720		-----	-----
1724	D3338	43.291	-0.90
1730		-----	-----
1811	D3338	43.3067	0.06
1826		-----	-----
1833	D3338	43.29	-0.96
1854	D3338	43.313	0.44
1939		-----	-----
2130	D3338	43.311	0.32
2133	D3338	43.297	-0.53
2136	D3338	43.312	0.38

normality	OK
n	43
outliers	3
mean (n)	43.3058
st.dev. (n)	0.01039
R(calc.)	0.0291
R(D3338:09)	0.0460
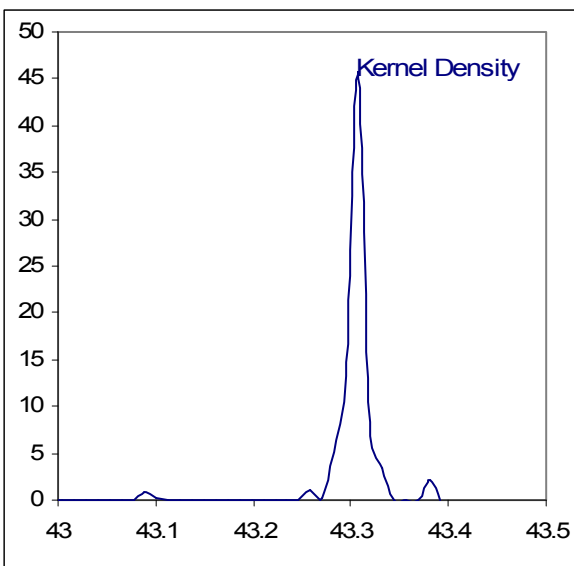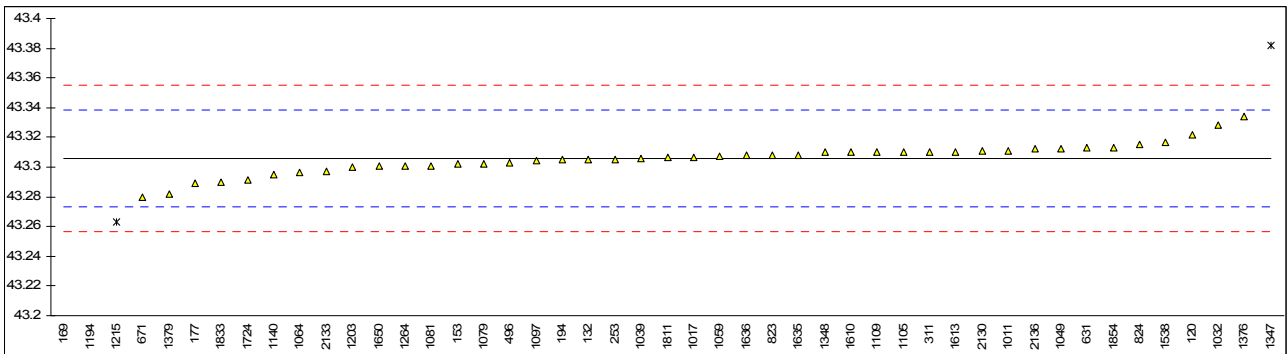
Determination of Total Acidity on sample #11016; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
53	D3242-Y	0.003		0.47	
120	D3242-Y	0.001		-2.21	
132	D3242-Y	0.002		-0.87	
150	D3242-N	0.0017		-1.27	
153	D3242-Y	0.0021		-0.73	
159	D3242	0.01500	G(0.01)	16.55	
169	D3242-Y	0.006	DG(0.01)	4.49	
171	D3242-Y	0.00196		-0.92	
175	D3242-Y	0.002		-0.87	
177	D3242-Y	0.0022		-0.60	
194	D3242-Y	0.0027		0.07	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237	D3242-Y	0.004		1.81	
253		-----		-----	
256		-----		-----	
273		-----		-----	
311	D3242-Y	0.002		-0.87	
317		-----		-----	
333		-----		-----	
334	D3242-Y	0.006	DG(0.01)	4.49	
335		-----		-----	
391	D3242-Y	0.007	G(0.01)	5.83	
399		-----		-----	
463	D3242-Y	0.00345		1.07	
473		-----		-----	
495	D3242-Y	0.0024		-0.33	
496	D3242-Y	0.0018		-1.14	
594		-----		-----	
604		-----		-----	
606		-----		-----	
631	D3242-Y	0.003		0.47	
671	D3242-Y	0.0025		-0.20	
732		-----		-----	
823	D3242-Y	0.003		0.47	
824	D3242-Y	0.004		1.81	
962		-----		-----	
1011	D3242-Y	0.0039		1.68	
1017	D3242-Y	0.0034		1.01	
1021	D3242-Y	0.002		-0.87	
1026	D3242-Y	0.003		0.47	
1032	D3242-Y	0.0024		-0.33	
1038	D3242-Y	0.003		0.47	
1039	D3242-Y	0.002		-0.87	
1049	D3242-Y	0.00245		-0.27	
1059	D3242-Y	0.003		0.47	
1062		-----		-----	
1064	D3242-Y	0.0030		0.47	
1065		-----		-----	
1079	D3242-Y	<0.001		<-2.21	False negative?
1080		-----	W	-----	Result withdrawn, reported 0.01
1081	D3242-Y	0.0017		-1.27	
1094		-----		-----	
1097	D3242-Y	0.0034		1.01	
1105	D3242-Y	0.0017		-1.27	
1108	D3242-N	0.002		-0.87	
1109	D3242-Y	0.0018		-1.14	
1126		-----		-----	
1140	IP354-Y	0.004		1.81	
1167		-----		-----	
1194		-----		-----	
1203	D3242-Y	0.003		0.47	
1215		-----		-----	
1237		-----		-----	
1264	D3242	0.0032	C	0.74	First reported 0.0064
1293		-----		-----	
1318	D3242-Y	0.0036		1.28	
1347	D3242-Y	0.0075	G(0.05)	6.50	
1348	D3242-Y	0.00219		-0.61	
1373		-----		-----	
1376	D3242-Y	0.0018		-1.14	
1378	D3242-Y	0.0017		-1.27	

1379		-----		-----
1395		-----		-----
1399	D3242-Y	0.0031		0.61
1428		-----		-----
1531		-----		-----
1538	D3242-Y	0.0034		1.01
1610	IP354-Y	0.0026		-0.06
1613	D3242-Y	0.0028		0.20
1620		-----		-----
1634		-----		-----
1635	D3242-Y	0.00498		3.13
1636	D3242-Y	0.00359		1.26
1650	D3242-Y	0.00187		-1.04
1651	D3242-Y	0.0022		-0.60
1715		-----		-----
1720	D3242-Y	0.002		-0.87
1724	D3242-Y	0.0026		-0.06
1730		-----		-----
1811		-----		-----
1826	D3242	0.0096	G(0.01)	9.32
1833	D3242-Y	0.0013		-1.81
1854	D3242-N	0.0030		0.47
1939	D3242-Y	0.0039		1.68
2130	D3242-Y	0.004		1.81
2133	D3242-Y	0.0016		-1.40
2136	D3242-Y	0.0023		-0.47

normality	not OK
n	56
outliers	6
mean (n)	0.00265
st.dev. (n)	0.000834
R(calc.)	0.00234
R(D3242:08)	0.00209

Kernel Density
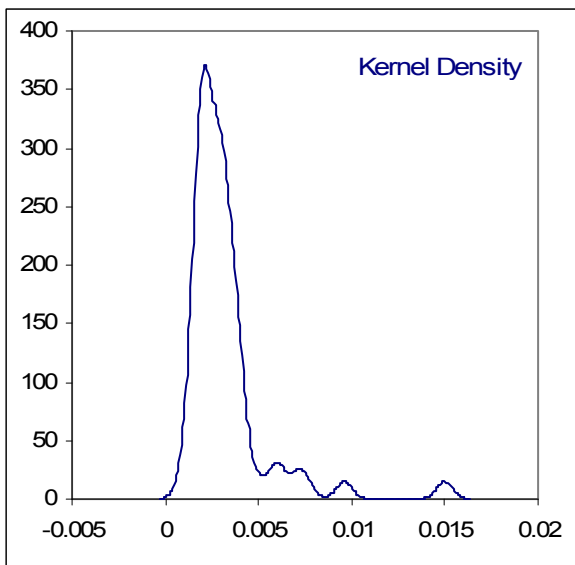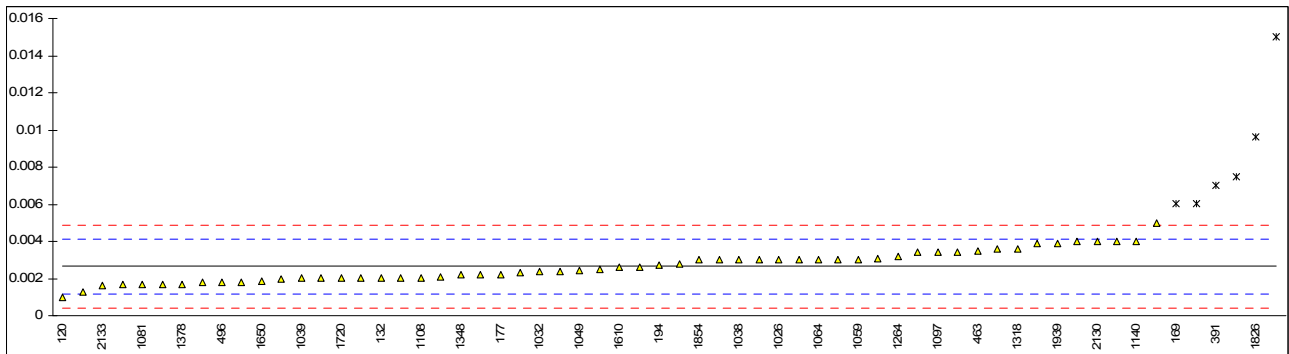
Determination of Total Sulphur on sample #11016; results in mg/kg

lab	method	value	mark	z(targ)	remarks
53		-----		-----	
120	D2622	368		0.07	
132	D2622	375		0.47	
150	D5453	343.6		-1.34	
153	D4294	376		0.53	
159		-----		-----	
169	D4294	381		0.82	
171	D5453	357.71		-0.52	
175		-----		-----	
177	D4294	351	C	-0.91	First reported 0.0351
194	D5453	355.9		-0.63	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237	D4294	372	C	0.30	First reported 0.0372
253		-----		-----	
256		-----		-----	
273		-----		-----	
311	D5453	395		1.63	
317	ISO20884	326		-2.35	
333		-----		-----	
334	D5453	298	DG(0.05)	-3.96	
335		-----		-----	
391		-----		-----	
399		-----		-----	
463	D5453	346.43		-1.17	
473		-----		-----	
495		-----		-----	
496	D2622	369.85		0.18	
594		-----		-----	
604		-----		-----	
606		-----		-----	
631		-----		-----	
671		-----		-----	
732		-----		-----	
823	D5453	345		-1.26	
824	D5453	360		-0.39	
962		-----		-----	
1011	D4294	349	C	-1.03	First reported 0.0349
1017		-----		-----	
1021	D2622	379		0.70	
1026	ISO20884	390		1.34	
1032	D5453	359.48		-0.42	
1038		-----		-----	
1039	D2622	373		0.36	
1049	D5453	373		0.36	
1059	ISO14596	360		-0.39	
1062		-----		-----	
1064	D5453	370.0		0.18	
1065	D7212	378		0.65	
1079	D4294	370		0.18	
1080	D5453	292	DG(0.05)	-4.31	
1081	D4294	380		0.76	
1094	In house	371.2		0.25	
1097	D5453	311		-3.22	
1105	D4294	377.12		0.59	
1108	D4294	382		0.88	
1109	D4294	462	G(0.05)	5.49	
1126	ISO20846	352.84		-0.80	
1140	IP336	500	G(0.01)	7.68	Possibly an unit error, reported 0.05
1167	ISO20846	358.8		-0.46	
1194	D4294	365.4		-0.08	
1203	ISO14596	370		0.18	
1215	D2622	366	C	-0.05	First reported 0.0366
1237		-----		-----	
1264		-----		-----	
1293		-----		-----	
1318	D4294	375.3		0.49	
1347		-----		-----	
1348	D4294	350		-0.97	
1373		-----		-----	
1376	D5453	312.7		-3.12	
1378	D4294	360		-0.39	

1379	D4294	370	0.18
1395		-----	-----
1399	IP336	422.7	3.22
1428	D5453	357	-0.56
1531		-----	-----
1538	D4294	334	-1.89
1610	IP336	347	-1.14
1613		-----	-----
1620		-----	-----
1634		-----	-----
1635	D4294	323	-2.52
1636	D4294	392	1.45
1650		-----	-----
1651		-----	-----
1715		-----	-----
1720	D5453	409	2.43
1724	D5453	357.8	-0.52
1730		-----	-----
1811	D5453	376.4	0.55
1826	D2622	374	0.41
1833	D5453	395	1.63
1854	D4294	408	2.37
1939	D5453	364.8	-0.12
2130	IP496	388	1.22
2133	D5453	366.7	-0.01
2136	D5453	399	1.86

|		Only D5453 data:	Only D4294 data:	Only D2622 data:
normality	OK	OK	OK	OK
n	56	20	18	7
outliers	4	2	1	0
mean (n)	366.80	362.78	367.55	372.12
st.dev. (n)	21.987	25.315	20.482	4.463
R(calc.)	61.56	70.88	57.35	12.50
R(D5453:09)	48.59	48.19	86.40	28.21
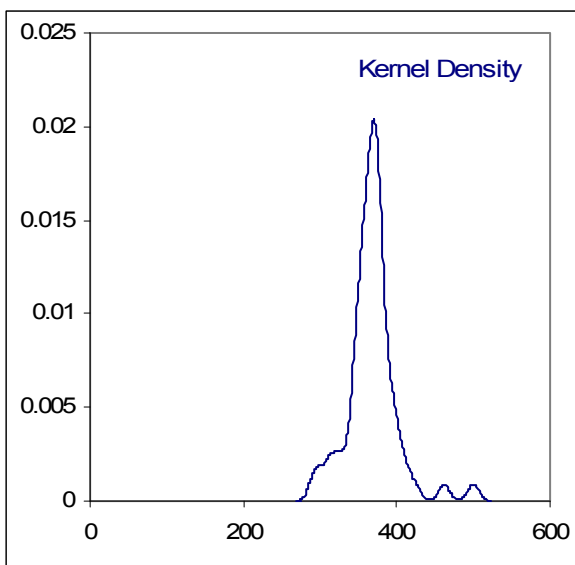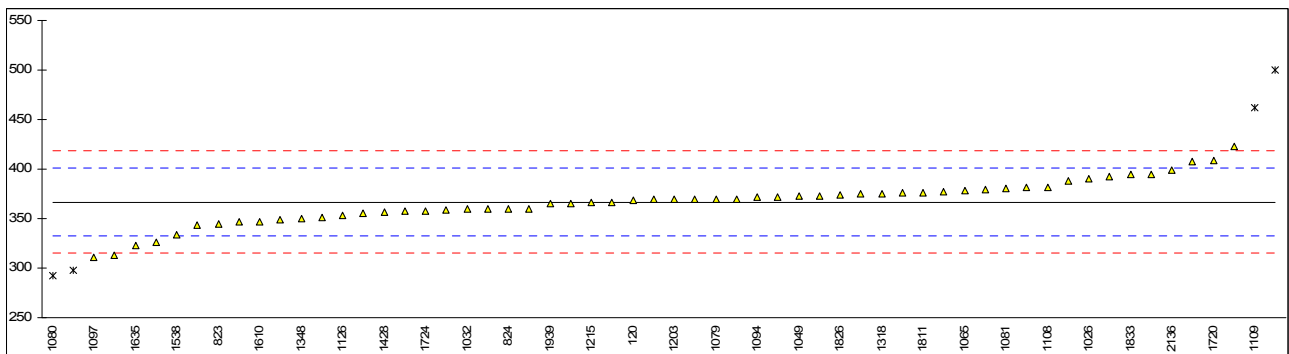
Determination of Viscosity @ -20°C on sample #11016; results in cSt

lab	method	value	mark	z(targ)	remarks
53	D445-M	3.664		0.15	
120	D445-M	3.640		-0.82	
132	D445-M	3.6075		-2.12	
150	D445-A	3.666		0.23	
153	D445-M	3.813	G(0.05)	6.15	
159	D445-M	3.590		-2.83	
169	D445-M	3.5529		-4.32	
171	D445-M	3.6512		-0.36	
175	D445-M	3.651		-0.37	
177	D445-M	3.659		-0.05	
194	D445-M	3.667		0.27	
224		-----		-----	
225		-----		-----	
228		-----		-----	
237	D445-M	3.6822		0.88	
253	D445-M	3.614		-1.86	
256		-----		-----	
273		-----		-----	
311	D445-M	3.654	C	-0.25	First reported 3.824
317		-----		-----	
333		-----		-----	
334	D445-M	3.727		2.69	
335	D445-M	3.632		-1.14	
391		-----		-----	
399		-----		-----	
463		-----		-----	
473		-----		-----	
495	D445-M	3.644		-0.65	
496	D445-A	3.6715		0.45	
594		-----		-----	
604		-----		-----	
606		-----		-----	
631	D445-M	3.700		1.60	
671		-----		-----	
732		-----		-----	
823	D445-M	3.670		0.39	
824		-----		-----	
962		-----		-----	
1011	D445-M	3.6441		-0.65	
1017	D445-M	3.6850		1.00	
1021		-----		-----	
1026		-----		-----	
1032	D445-M	3.7248		2.60	
1038	D445-M	3.666		0.23	
1039	D445-M	3.682		0.88	
1049	D445-M	3.650		-0.41	
1059	D445-M	3.668		0.31	
1062		-----		-----	
1064	D445-A	3.6582		-0.08	
1065		-----		-----	
1079	D445-M	3.654		-0.25	
1080		-----		-----	
1081	D445-M	3.669		0.35	
1094		-----		-----	
1097	ISO3104-M	3.663		0.11	
1105	D445-M	3.6241		-1.46	
1108	D445-M	3.698		1.52	
1109	D445-M	3.6625		0.09	
1126		-----		-----	
1140	IP71	3.650		-0.41	
1167		-----		-----	
1194		-----		-----	
1203	D445-M	3.658	C	-0.09	First reported 3.264
1215		-----		-----	
1237		-----		-----	
1264	D445	3.5347	C,G(0.05)	-5.05	First reported 3.820
1293		-----		-----	
1318		-----		-----	
1347	D445-M	3.624		-1.46	
1348		-----		-----	
1373		-----		-----	
1376	D445-M	3.6586		-0.07	
1378	D445-M	3.677		0.67	

1379	D445	3.641		-0.77
1395		-----		-----
1399	D445	4.183	G(0.01)	21.05
1428	ISO3104-A	3.707		1.88
1531		-----		-----
1538	D445-M	3.7125		2.10
1610	IP71-M	3.6580		-0.09
1613	D445-A	3.6598		-0.02
1620		-----		-----
1634		-----		-----
1635	D445-M	3.585		-3.03
1636		-----		-----
1650	D445-M	3.6455		-0.59
1651	D445-A	3.6614		0.05
1715		-----		-----
1720		-----		-----
1724	D445-A	3.674		0.55
1730		-----		-----
1811	D445-A	3.6348		-1.02
1826	D445	3.674		0.55
1833	D445-M	3.651		-0.37
1854	D445-M	3.659		-0.05
1939		-----		-----
2130	D445-M	3.744		3.37
2133	D445-A	3.7319		2.89
2136	D445-A	3.6546		-0.23

normality	not OK	
n	54	
outliers	3	
mean (n)	3.6602	
st.dev. (n)	0.03492	
R(calc.)	0.0978	
R(D445:11)	0.0695	
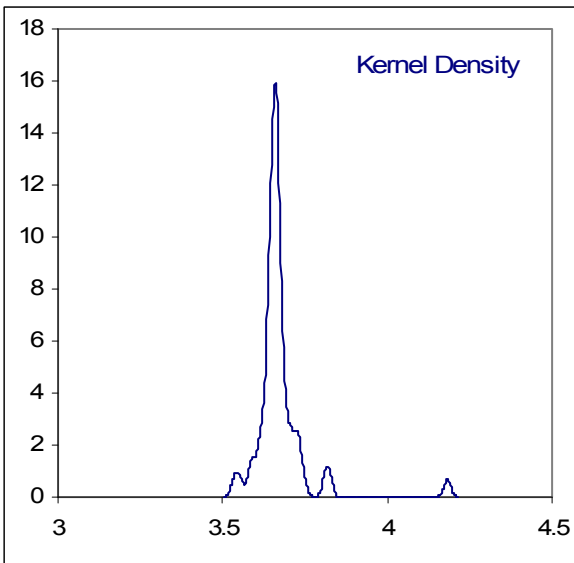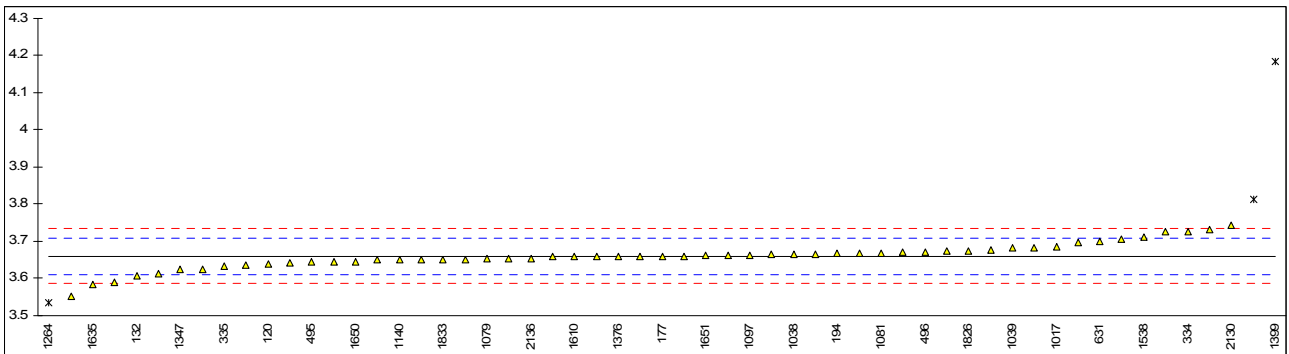
Determination of Particle Size Distribution on sample #11017; results per mL

lab	method	>4 µm	mark	>6 µm	mark	>14µm	mark	>21µm	mark	>25µm	mark	>30µm	mark
171	ISO4406	38755.5	CG(5)	7398.5	CG(5)	231.1	C	34.4	C	14.9	C	5.3	C
225		-----		-----		-----		-----		-----		-----	
253	IP564	27640.8		4691.4		291.7		51.2		25.7		13.5	
311		-----		-----		-----		-----		-----		-----	
333	IP565	26491		4989		267		65		29		16	
334	IP564	25000		4390		242		54		25		11	
335		-----		-----		-----		-----		-----		-----	
391	IP564	29500		4818		230		61		34		17	
495	IP564	30605		5882		143		23		8.5		2.8	
631		-----		-----		-----		-----		-----		-----	
671	IP564	19305.8		5042.3		241.2		84.9		34.0		11.1	
1011	IP565	26949.9		4723.0		197.9		38.5		17.5		7.0	
1023		-----		-----		-----		-----		-----		-----	
1032	IP564	31211.6		5805.7		137.8		19.2		5.8		1.3	
1038	IP565	29468.0		5144.1		238.0		46.9		18.4		6.6	
1039	IP565	29205		5509		216		46		20		8	
1062		-----		-----		-----		-----		-----		-----	
1065	IP564	11907.7	G(5)	1529.5	G(1)	117.9		14.3		4.0		1.3	
1081	IP564	19321		4432		210		57		23		6	
1094	IP564Mod.	25608		4870		334		102		50	G(5)	12	
1095	IP564	28895		5002		256		58		27		10	
1105	IP564	32682		6393		237		45		15		6	
1108	IP564	30184.7		5159.1		179.1		60.0		35.6		19.8	
1109	IP565	30194.3		5822.3		238.9		48.8		18.7		8.6	
1131	IP565	30508.5		6351.2		307.1		80.3		36.0		14.5	
1146	In house	27186		4906		281		89		32	C	7	
1378	IP564	27292.4		3788.8		130.3		22.6		8.6		3.5	
1620		-----		-----		-----		-----		-----		-----	
1720		-----		-----		-----		-----		-----		-----	
1724	IP565	22495.9		4539.4		249.5		53.7		26.3		13.8	
1811	IP564	28676.0		6268.0		296.3		58.2		22.0		5.5	
1826		-----		-----		-----		-----		-----		-----	
1833	IP564	21980.4		4262.2		192.5		32.0		11.0		3.8	
2130	IP564	17990.6		4326.3		240.7		61.8		27.2		8.8	
	normality	OK		OK		OK		OK		OK		OK	
	n	23		23		25		25		24		25	
	outliers	2		2		0		0		1		0	
	mean (n)	26886.6		5091.95		228.24		52.27		21.63		8.81	
	st.dev. (n)	4103.94		713.277		55.786		21.874		9.614		4.974	
	R(calc.)	11491.0		1997.18		156.20		61.25		26.92		13.93	
	R(IP564:10)	4986.1		1551.26		114.08		66.28		28.97		14.58	

Lab 171 : first reported resp.: 94.7, 9.1, 1.2, 0.3, 0.1, 0.1
Lab 1146: first reported: 70

z-scores particle size

lab	>4 µm	>6 µm	>14µm	>21µm	>25µm	>30µm
171	6.67	4.16	0.07	-0.75	-0.65	-0.67
225	-----	-----	-----	-----	-----	-----
253	0.42	-0.72	1.56	-0.05	0.39	0.90
311	-----	-----	-----	-----	-----	-----
333	-0.22	-0.19	0.95	0.54	0.71	1.38
334	-1.06	-1.27	0.34	0.07	0.33	0.42
335	-----	-----	-----	-----	-----	-----
391	1.47	-0.49	0.04	0.37	1.20	1.57
495	2.09	1.43	-2.09	-1.24	-1.27	-1.15
631	-----	-----	-----	-----	-----	-----
671	-4.26	-0.09	0.32	1.38	1.20	0.44
1011	0.04	-0.67	-0.74	-0.58	-0.40	-0.35
1023	-----	-----	-----	-----	-----	-----
1032	2.43	1.29	-2.22	-1.40	-1.53	-1.44
1038	1.45	0.09	0.24	-0.23	-0.31	-0.42
1039	1.30	0.75	-0.30	-0.26	-0.16	-0.16
1062	-----	-----	-----	-----	-----	-----
1065	-8.41	-6.43	-2.71	-1.60	-1.70	-1.44
1081	-4.25	-1.19	-0.45	0.20	0.13	-0.54
1094	-0.72	-0.40	2.60	2.10	2.74	0.61
1095	1.13	-0.16	0.68	0.24	0.52	0.23
1105	3.25	2.35	0.21	-0.31	-0.64	-0.54
1108	1.85	0.12	-1.21	0.33	1.35	2.11
1109	1.86	1.32	0.26	-0.15	-0.28	-0.04
1131	2.03	2.27	1.94	1.18	1.39	1.09
1146	0.17	-0.34	1.29	1.55	1.00	-0.35
1378	0.23	-2.35	-2.40	-1.25	-1.26	-1.02
1620	-----	-----	-----	-----	-----	-----
1720	-----	-----	-----	-----	-----	-----
1724	-2.47	-1.00	0.52	0.06	0.45	0.96
1811	1.00	2.12	1.67	0.25	0.04	-0.64
1826	-----	-----	-----	-----	-----	-----
1833	-2.76	-1.50	-0.88	-0.86	-1.03	-0.96
2130	-5.00	-1.38	0.31	0.40	0.54	0.00
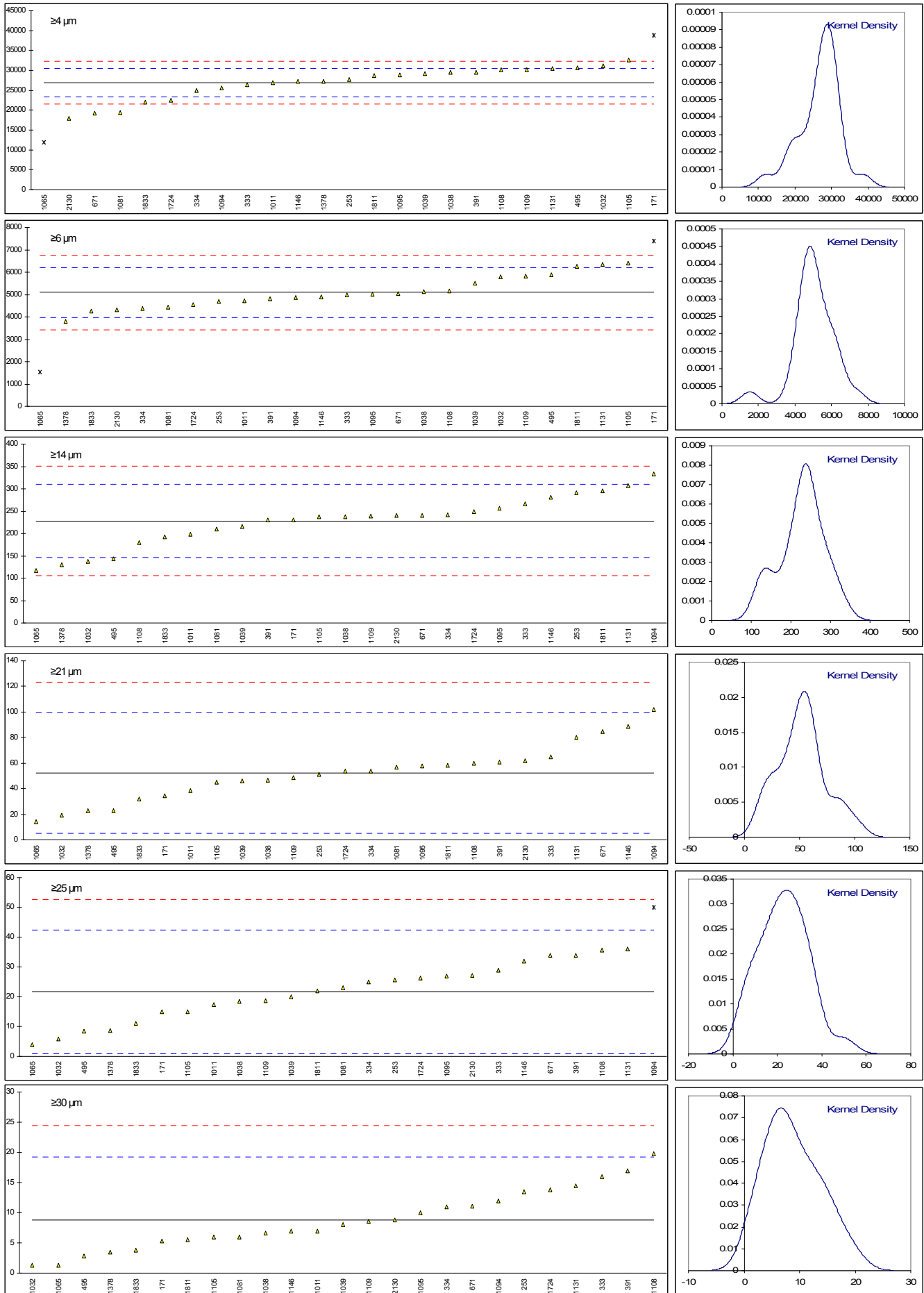
APPENDIX 2

Z-scores of individual participants for distillation

lab	IBP	10%	50%	90%	FBP
53	-0.18	0.43	0.26	0.23	0.91
120	0.15	-0.47	0.26	0.23	-0.40
132	0.05	-0.25	0.54	0.79	0.31
150	0.32	-0.32	-0.02	0.15	-0.20
153	0.05	-0.70	0.64	0.71	0.31
159	0.25	0.50	1.48	1.11	0.59
169	-0.58	0.50	0.35	0.07	0.51
171	-0.51	-0.10	0.54	1.35	0.00
175	1.02	0.50	1.77	1.91	1.26
177	-1.64	-0.92	-1.91	-1.93	-0.51
194	0.13	0.89	0.39	0.99	0.46
224	0.68	0.38	0.00	0.37	-0.12
225	-----	-----	-----	-----	-----
228	-2.01	-3.40	-3.32	-3.53	-2.05
237	-0.68	-0.40	-1.44	-0.33	-0.87
253	-0.34	-0.40	-1.44	-1.53	-0.28
256	-----	-----	-----	-----	-----
273	0.72	0.20	0.35	0.63	0.24
311	-0.14	0.13	0.92	2.55	0.00
317	-0.18	0.58	0.26	0.47	0.16
333	-0.44	-0.62	-0.50	-1.61	-0.16
334	0.29	-0.40	-0.31	-0.25	0.79
335	-0.04	0.05	-0.31	-0.41	-0.67
391	1.12	-1.30	-1.44	-1.29	-0.67
399	0.55	-0.85	-0.68	-1.21	0.67
463	-1.14	-1.15	-0.97	-0.65	-0.16
473	-0.44	0.13	0.26	0.55	0.67
495	-0.44	-1.60	-1.72	-1.29	-1.10
496	0.29	-0.47	0.16	1.51	1.02
594	-0.48	-1.52	-3.32	-1.69	-1.66
604	0.19	-0.25	-0.12	-0.49	-0.16
606	0.29	0.95	1.96	0.23	-0.04
631	1.32	-0.40	-1.44	-0.33	-0.87
671	0.29	1.10	0.45	-0.09	-0.28
732	-0.01	-1.15	-0.97	-0.73	0.71
823	1.22	1.71	1.01	0.39	1.14
824	0.65	0.73	0.45	0.79	-0.99
962	-----	-----	-----	-----	-----
1011	0.25	0.80	0.26	0.39	0.51
1017	-0.44	-1.82	-1.72	-2.09	-1.58
1021	-0.28	-1.00	0.35	1.67	-0.40
1026	-0.48	0.58	-0.87	-1.21	0.00
1032	-0.88	0.73	-0.31	-2.09	-1.26
1038	1.15	0.73	1.96	1.91	3.63
1039	-0.34	1.48	0.92	1.35	0.63
1049	-0.11	0.88	0.82	0.23	0.67
1059	-0.58	-0.25	0.73	-0.01	0.43
1062	-----	-----	-----	-----	-----
1064	0.75	0.50	0.54	1.27	0.55
1065	0.15	-0.62	-0.68	-0.33	0.00
1079	-0.78	0.28	0.16	-0.25	0.47
1080	-0.08	-0.85	-1.72	-1.29	-0.91
1081	0.15	0.20	-0.02	-0.09	-0.63
1094	-0.11	0.28	0.35	0.95	0.43
1097	0.62	0.88	0.54	0.23	0.16
1105	-0.41	0.13	-0.21	0.63	-0.51
1108	1.02	0.13	-1.25	-0.49	-0.43
1109	-0.21	-0.47	0.07	0.63	-0.36
1126	-1.48	-1.22	1.39	-1.37	-0.32
1140	-1.54	-0.32	-0.59	0.63	-1.18
1167	-0.34	-0.32	0.35	-0.41	0.43
1194	-2.74	-2.12	0.07	-1.45	-2.33
1203	-1.51	0.28	0.26	-0.01	-0.08
1215	-0.44	0.13	0.07	0.47	-0.24
1237	-0.01	-1.15	0.45	-1.13	0.31
1264	-0.68	0.35	0.92	0.07	1.10
1293	-----	-----	-----	-----	-----
1318	-0.21	0.20	-0.12	-0.01	0.12
1347	1.32	0.35	0.45	-1.13	-0.47
1348	0.82	0.65	-0.02	0.15	-0.47
1373	-0.18	-0.02	-0.02	0.87	-0.47

1376	0.35	0.50	0.26	-0.49	0.16
1378	1.25	0.58	0.82	0.79	0.55
1379	1.32	-0.40	0.45	-2.73	-0.47
1395	-0.94	-0.62	-0.78	-0.09	-0.47
1399	0.72	3.36	3.18	1.59	1.58
1428	-0.18	-0.17	-0.12	-0.57	0.75
1531	1.15	-0.10	0.54	0.39	0.39
1538	1.05	0.43	-0.31	0.15	-0.28
1610	0.35	-0.47	-0.12	0.47	-0.28
1613	-0.34	2.16	0.73	0.71	-0.04
1620	-----	-----	-----	-----	-----
1634	-1.14	0.35	-0.59	-0.25	0.24
1635	-0.28	-13.01	-1.53	-0.25	-0.67
1636	0.59	-0.77	0.54	0.15	0.24
1650	0.35	-0.25	-0.40	1.03	0.91
1651	0.22	0.88	0.45	-0.33	-0.75
1715	0.75	0.43	-0.02	0.79	0.31
1720	-2.34	0.73	1.39	0.87	-0.08
1724	-1.04	-0.47	-0.50	-0.33	-0.20
1730	-----	-----	-----	-----	-----
1811	-0.61	-1.22	-1.82	-1.61	-1.18
1826	0.35	0.80	0.45	0.79	0.55
1833	0.49	-0.02	-0.87	-0.89	0.39
1854	0.35	1.93	-0.21	-1.05	0.71
1939	-0.68	0.50	0.45	1.59	-0.43
2130	-0.01	0.50	0.07	1.19	0.63
2133	-0.74	0.28	-0.40	-0.81	-0.08
2136	-0.84	-0.55	-0.40	-0.09	0.39

APPENDIX 3

Number of participants per country

  2 laboratories in AUSTRALIA

  5 laboratories in BELGIUM

  1 laboratory in CANADA

  1 laboratory in CÔTE D'IVOIRE

  1 laboratory in CROATIA

  1 laboratory in CYPRUS

  1 laboratory in CZECH REPUBLIC

  1 laboratory in DENMARK

  4 laboratories in FRANCE

  1 laboratory in FRENCH GUIANA

  1 laboratory in GEORGIA

  5 laboratories in GERMANY

  5 laboratories in GREECE

  1 laboratory in GUAM

  3 laboratories in HUNGARY

  1 laboratory in INDIA

  1 laboratory in ISRAEL

  2 laboratories in ITALY

  1 laboratory in JORDAN

  1 laboratory in KAZAKHSTAN

  2 laboratories in KOREA

  2 laboratories in LEBANON

  2 laboratories in MALAYSIA

  1 laboratory in NIGERIA

  2 laboratories in NORWAY

  1 laboratory in P.R. of CHINA

  1 laboratory in PHILIPPINES

  2 laboratories in POLAND

  3 laboratories in PORTUGAL

  1 laboratory in REPUBLIC OF DJIBOUTI

  1 laboratory in REPUBLIC OF GUINEE

  2 laboratories in REPUBLIC OF MACEDONIA

  1 laboratory in SAUDI ARABIA

  2 laboratories in SLOVENIA

  2 laboratories in SOUTH AFRICA

  1 laboratory in SPAIN

  1 laboratory in SUDAN

  1 laboratory in SWEDEN

  1 laboratory in TANZANIA

  1 laboratory in THAILAND

  8 laboratories in THE NETHERLANDS

  1 laboratory in TOGO

  5 laboratories in TURKEY

  2 laboratories in U.A.E.

10 laboratories in U.S.A.

  3 laboratories in UNITED KINGDOM

  1 laboratory in URUGUAY

APPENDIX 4

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:

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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
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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)
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