Institute for
Interlaboratory Studies

Results of Proficiency Test
Jet Fuel A1
March 2022

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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CONTENTS

1 INTRODUCTION

Since 1995 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Jet Fuel A1 twice a year in accordance with the latest version of the "Aviation Fuel Quality Requirements for Jointly Operated Systems (AFQRJOS)", sometimes referred to as the "Joint Fuelling System Check List for Jet A1". During the annual proficiency testing program 2021/2022 it was decided to continue the round robin for the analysis of Jet Fuel A1.

In this interlaboratory study registered for participation:
- 85 laboratories in 43 countries for regular analyzes in Jet Fuel A1 iis22J01
- 33 laboratories in 25 countries on Jet Fuel A1 Particle Size Distribution iis22J01PS

In total 85 laboratories in 43 countries registered for participation in one or two proficiency tests, see appendix 4 for the number of participants per country. In this report the results of the Jet Fuel A1 proficiency tests are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory.
For the regular round it was decided to send two identical samples Jet Fuel A1 in 1 L bottles labelled #22035 and one sample Jet Fuel A1 in a 0.5 L bottle labelled #22036 for the Particle Size Distribution round.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5). This protocol is electronically available through the iis website www.iisnl.com, from the FAQ page.

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

For the preparation of the sample for the regular analyzes in Jet Fuel A1 a batch of approximately 300 L of Jet Fuel A1 was obtained from a third party. After homogenization 250 amber glass bottles of 1 L were filled and labelled #22035.
The homogeneity of the subsamples was checked by the determination of Density at 15 °C in accordance with ASTM D4052 on 12 stratified randomly selected subsamples.

	Density at 15 °C in kg/m^3
sample #22035-1	797.61
sample #22035-2	797.58
sample #22035-3	797.59
sample #22035-4	797.60
sample #22035-5	797.59
sample #22035-6	797.59
sample #22035-7	797.58
sample #22035-8	797.59
sample #22035-9	797.59
sample #22035-10	797.59
sample #22035-11	797.59
sample #22035-12	797.59

Table 1: homogeneity test results of subsamples #22035

From the above test results the repeatability was calculated and compared with 0.3 times the reproducibility of the reference test method in agreement with the procedure of ISO13528, Annex B2 in the next table.

	Density at 15 °C in kg/m^3
r (observed)	0.02
reference test method	ASTM D4052:22
0.3 x R (reference test method)	0.15

Table 2: evaluation of the repeatability of subsamples #22035

The calculated repeatability is in agreement with 0.3 times the reproducibility of the reference test method. Therefore, homogeneity of the subsamples was assumed.

For the preparation of the sample for the Particle Size Distribution in Jet Fuel A1 a batch of approximately 50 L of Jet Fuel A1 was obtained from a third party. After homogenization 65 amber glass bottles of 0.5 liter were filled and labelled #22036. Before filling with Jet Fuel A1 each bottle was spiked with 1 mL Lube Oil which contained suspended Arizona Dust A3. The homogeneity of the subsamples was checked by the determination of Particle Size Distribution in accordance with IP565 on 8 stratified randomly selected subsamples.

	> 4 µm (c) in counts/mL	> 6 µm (c) in counts/mL
sample #22036-1	11151	4309
sample #22036-2	11171	4239
sample #22036-3	11757	4638
sample #22036-4	11390	4457
sample #22036-5	11419	4494
sample #22036-6	11554	4519
sample #22036-7	11572	4506
sample #22036-8	11685	4650

Table 3: homogeneity test results of subsamples #22036

From the above test results the relative standard deviations (RSD) were calculated and compared with 0.3 times the corresponding average relative standard deviation obtained from the last 16 iis PTs on Particle Size Distribution in agreement with the procedure of ISO13528, Annex B2 in the next table.

	> 4 µm (c)	> 6 µm (c)
RSD% (observed)	2	3
reference method	iis PTs	iis PTs
0.3 x RSD% (reference method)	5	7

Table 4: evaluation of the relative standard deviations of subsamples #22036

The calculated relative standard deviations are in agreement with 0.3 times the corresponding average relative standard deviation obtained from the previous iis PTs. Therefore, homogeneity of the subsamples was assumed.

Depending on the registration of the participant the appropriate set of PT samples was sent on February 23, 2022. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

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

2.6 ANALYZES

The participants were requested to determine on sample #22035: Appearance, Total Acidity, Aromatics by FIA, Mono Aromatics (MAH) by HPLC, Di Aromatics (DAH) by HPLC, Total Aromatics by HPLC (in %M/M and %V/V), Color Saybolt (automated and manual), Copper Corrosion (2 hrs at 100 °C), Density at 15 °C, Distillation at 760 mmHg (IBP, temperature at 10%, 50%, 90% recovered, FBP and Distillation Residue and Loss), Existent Gum (unwashed), Flash Point, Freezing Point, Kinematic Viscosity at -20 °C, Mercaptan Sulfur as S, MSEP, Naphthalenes, Smoke Point, Specific Energy (Net) on Sulfur free basis and Total Sulfur.
On sample #22036 it was requested to determine Particle Size Distribution in counts/mL for ≥4, ≥6, ≥14, ≥21, ≥25 and ≥30 µm and scale number for ≥4, ≥6 and ≥14. Some extra information was asked about the equipment used for Particle Size Distribution.

It was explicitly requested to treat the samples as if they were routine samples and to report the test results using the indicated units on the report form and not to round the test results, but report as much significant figures as possible. It was also requested not to report ‘less than’ test results, which are above the detection limit, because such test results cannot be used for meaningful statistical evaluations.

To get comparable test results a detailed report form and a letter of instructions are prepared. On the report form the reporting units are given as well as the reference test methods (when applicable) that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

During five weeks after sample dispatch, the test results of the individual laboratories were gathered via the data entry portal www.kpmd.co.uk/sgs-iis/. The reported test results are tabulated per determination in appendix 1 of this report. The laboratories are presented by their code numbers.

Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline, the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results (no reanalyzes). Additional or corrected test results are used for data analysis and the original test results are placed under 'Remarks' in the result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

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 Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5).
For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as '<…' or '>…' were not used in the statistical evaluation.

First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test, a variant of the Kolmogorov-Smirnov test and by the calculation of skewness and kurtosis. Evaluation of the three normality indicators in combination with the visual evaluation of the graphic Kernel density plot, lead to judgement of the normality being either 'unknown', 'OK', 'suspect' or 'not OK'. After removal of outliers, this check was repeated. If a data set does not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

The assigned value is determined by consensus based on the test results of the group of participants after rejection of the statistical outliers and/or suspect data.

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner's outlier test can be used. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of 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. In this PT, the criterion of ISO13528, paragraph 9.2.1. was met for all evaluated tests, therefore, the uncertainty of all assigned values may be negligible and need not be included in the PT report.

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

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported test results are plotted. The corresponding laboratory numbers are on the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected reference test method. 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. Also, a normal Gauss curve (dotted line) was projected over the Kernel Density Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

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 (derived from e.g. ISO or ASTM test methods), the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation in this interlaboratory study.

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used, like Horwitz or an estimated reproducibility based on former iis proficiency tests.

When a laboratory did use a test method with a reproducibility that is significantly different from the reproducibility of the reference test method used in this report, it is strongly advised to recalculate the z-score, while using the reproducibility of the actual test method used, this in order to evaluate whether the reported test result is fit-for-use.

The z-scores were calculated according to:

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

The $z_{(target)}$ scores are listed in the test result tables in appendix 1 and 2.

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

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

4 EVALUATION

In this proficiency test some problems were encountered with the dispatch of the samples. For the regular Jet Fuel A1 PT six participants reported test results after the final reporting date and five other participants were not able to report any test results.
For the Jet Fuel A1 Particle Size PT all of the reporting participants reported test results before the final reporting date and nine other participants were not able to report any test results.
Not all participants were able to report all tests requested. In total 80 participants reported 1400 numerical test results. Observed were 28 outlying test results, which is 2.0%. In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER SAMPLE AND PER TEST

In this section the reported test results are discussed per sample and per test. The test methods which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the original data in appendix 1. The abbreviations, used in these tables, are explained in appendix 5.

In the iis PT reports ASTM test methods are referred to with a number (e.g. D3242) and an added designation for the year that the test method was adopted or revised (e.g. D3242:11). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D3242:11(2017)). In the test results tables of appendix 1 only the method number and year of adoption or revision (e.g. D3242:11) will be used.

Since the Joint Fuelling System Check List for Jet-A1 is continuously updated, the participants are advised to monitor the updates. The latest version at the time of this Round Robin is DEF STAN 91-091/Issue 13, January 2022 and ASTM D1655:21c. One must keep in mind that ISO test methods are not mentioned in the “Checklist”.

sample #22035

Appearance: This determination was not problematic. All reporting participants agreed about the appearance of the sample which was Clear and Bright (Pass).

Total Acidity: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of ASTM D3242:11(2017).

Aromatics by FIA: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with requirements of ASTM D1319:20a.

Mono Aromatics (MAH) by HPLC: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D6379:21e1.

Di Aromatics (DAH) by HPLC: This determination was very problematic. No statistical outliers were observed. The calculated reproducibility is not at all in agreement with the requirements of ASTM D6379:21e1.

Total Aromatics by HPLC: This determination was problematic for %M/M as well as for %V/V. One statistical outlier was observed in %V/V. The calculated reproducibilities for %M/M as well as for %V/V after rejection of the statistical outlier are not in agreement with ASTM D6379:21e1.

Color Saybolt: This determination was very problematic for the automatic test method. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the requirements of ASTM D6045:20. When comparing the results of the separate evaluation of the 50 and 100 mm cell sizes it is observed that the test results with the 100 mm cell size have less variation.
The determination for the manual test method was also problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D156:15.

Copper Corrosion: This determination was not problematic. All reporting participants agreed on a test result of 1 (1a/1b).

Density at 15 °C: This determination was not problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D4052:22.

Distillation at 760 mmHg: This determination was not problematic. In total over five parameters three statistical outliers were observed. All calculated reproducibilities after rejection of the statistical outliers are in agreement with the automated mode requirements of ASTM D86:20b.
When compared to the manual mode requirements of ASTM D86:20b only the calculated reproducibilities for 10%, 50% and 90% recovered are in agreement.

Existent Gum (unwashed): This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D381:22.

Flash Point: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of IP170:21.

Freezing Point: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D2386:19.

Kin. Viscosity at -20 °C: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of IP71-1:96(2020).
It was decided not to evaluate against the requirements of ASTM D445:21 because the requirements in this version are very strict compared to the requirements from version ASTM D445:19 and to IP71-1:96(2020).

Mercaptan Sulfur: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D3227:16.

MSEP: This determination was not problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D3948:20.

Naphthalenes: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1840:07(2017) for procedure B and also for procedure A.

Smoke Point: This determination may be problematic depending on test mode used. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of the manual mode of ASTM D1322:19 but not with the much stricter requirements of the automated mode.

Specific Energy (Net) on Sulfur free basis: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of ASTM D3338:20a.

Total Sulfur: This determination may be problematic depending on the method used. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D5453:19a and ASTM D2622:21 but is in agreement with ASTM D4294:21.

sample #22036

Particle Size Distribution Determination:

The Joint Fuelling System Check List for Jet-A1 lists test methods IP565 and IP577 as the reference test methods to determine the Particle Size Distribution in Jet Fuel A1.
Almost all reporting participants mentioned to have used IP565. One participant used IP564 which is not mentioned in the Checklist as test method since 2020. Therefore, it was decided to exclude the test results determined with IP564 from the statistical evaluation.
One participant used IP577. The test result determined with IP577 was also excluded from statical evaluations as it was observed in previous iis PTs that IP577 gives deviating test results compared to IP565.

All reporting participants used ISO11171 for the calibration and used ISO4406 for calculating the scale numbers from the counts per mL. For the conversion from counts/mL to scale numbers no calculation differences were found between reported conversion and the conversion calculated by iis.

Counts/mL: This determination was problematic. In total three statistical outliers were observed and twelve other test results were excluded over six particle size parameters. All calculated reproducibilities after rejection of the suspect data are not in agreement with the requirements of IP565:13.

Scale number: This determination was not problematic. No statistical outliers were observed but nine test results were excluded over three parameters. The calculated reproducibilities after rejection of the suspect data are in agreement with the indicative requirements of IP565:13 Annex C for ≥4 µm and ≥6 µm but not for ≥14 µm.

It appears that the requirements of IP565:13 for counts/ml is much stricter than for scale number.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the reference test method and the reproducibility as found for the group of participating laboratories. The number of significant test results, the average, the calculated reproducibility (2.8 * standard deviation) and the target reproducibility derived from reference methods are presented in the next tables.

Parameter	unit	n	average	2.8 * sd	R(lit)
Appearance		64	C&B (Pass)	n.a.	n.a.
Total Acidity	mg KOH/g	44	0.0019	0.0020	0.0018
Aromatics by FIA	%V/V	32	16.33	1.92	2.72
Mono Aromatics (MAH) by HPLC	%M/M	18	18.16	1.72	1.12
Di Aromatics (DAH) by HPLC	%M/M	18	1.20	0.44	0.17
Total Aromatics by HPLC	%M/M	18	19.38	1.82	1.22
Total Aromatics by HPLC	%V/V	26	17.21	1.25	1.05
Color Saybolt (automated)		39	21.7	2.9	1.2
Color Saybolt (manual)		32	21.0	2.9	2
Copper Corrosion 2 hrs at 100 °C		64	1 (1a/1b)	n.a.	n.a.
Density at 15 °C	kg/m^3	75	797.60	0.19	0.5
Initial Boiling Point	°C	73	149.1	5.4	8.2
Temp at 10% recovered	°C	74	168.8	2.8	3.7
Temp at 50% recovered	°C	75	195.8	2.1	3.0
Temp at 90% recovered	°C	75	239.0	3.7	3.6
Final Boiling Point	°C	75	267.0	5.2	7.1
Existent Gum (unwashed)	mg/100 mL	39	0.70	1.16	3.14
Flash Point	°C	76	40.6	3.3	3.2
Freezing Point	°C	62	-53.3	1.7	2.5
Kinematic Viscosity at -20 °C	mm^2/s	42	3.819	0.120	0.073
Mercaptan Sulfur as S	%M/M	43	0.00038	0.00025	0.00033
MSEP		50	96.6	3.7	6.2
Naphthalenes	%V/V	33	0.801	0.041	0.082
Smoke Point	mm	55	24.2	1.3	3.8
Specific Energy (Net)	MJ/kg	40	43.309	0.046	0.046
Total Sulfur	mg/kg	63	414	66	52

Table 5: reproducibilities of tests on sample #22035

Parameter	unit	n	average	2.8 * sd	R(lit)
Particle Size ≥4 µm (c)	counts/mL	20	11349	4092	1329
Particle Size ≥6 µm (c)	counts/mL	21	4682	1802	1033
Particle Size ≥14 µm (c)	counts/mL	21	322	292	165
Particle Size ≥21 µm (c)	counts/mL	21	57.0	79.4	45.1
Particle Size ≥25 µm (c)	counts/mL	20	21.4	33.6	21.3
Particle Size ≥30 µm (c)	counts/mL	20	7.9	16.1	10.7
Particle Size ≥4 µm (c)	ISO scale	16	20.8	1.1	1.0
Particle Size ≥6 µm (c)	ISO scale	17	19.2	1.1	1.0
Particle Size ≥14 µm (c)	ISO scale	18	15.5	1.7	1.4

Table 6: reproducibilities of tests on sample #22036

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF MARCH 2022 WITH PREVIOUS PTS

	March 2022	September 2021	March 2021	September 2020	March 2020
Number of reporting laboratories	80	160	91	152	90
Number of test results	1400	3091	1676	2992	1666
Number of statistical outliers	28	42	58	94	67
Percentage of statistical outliers	2.0%	1.4%	3.5%	3.1%	4.0%

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 to the requirements of the reference test methods. The conclusions are given in the following table.

Parameter	March 2022	September 2021	March 2021	September 2020	March 2020
Total Acidity	+/-	-	-	-	-
Aromatics by FIA	+	+	+	+	+
Aromatics by HPLC	-	-	+	+	+/-
Color Saybolt (automated)	--	--	--	--	-
Color Saybolt (manual)	-	--	-	-	-
Density at 15 °C	++	++	++	++	++
Distillation at 760 mmHg	+	+	+	+	+
Existent Gum (unwashed)	++	++	++	++	++
Flash Point	+/-	+	+/-	+/-	+
Freezing Point	+	+	+	+	+
Kinematic Viscosity at -20 °C	-	-	-	-	+/-

Parameter	March 2022	September 2021	March 2021	September 2020	March 2020
Mercaptan Sulfur	+	+/-	+	+	+
MSEP	+	+	+	+	+/-
Naphthalenes	+	+/-	+/-	+	+
Smoke Point	++	+	++	++	++
Specific Energy (Net)	+/-	+/-	+/-	-	-
Total Sulfur	-	-	+	+	-
Cumulative counts/mL	-	-	--	-	--
ISO scale numbers	+	+	+	+	++

Table 8: comparison of determinations to the reference test methods

The following performance categories were used:

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

APPENDIX 1

Determination of Appearance on sample #22035;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	Visual	Clear & Bright		-----	
159		-----		-----	
169	Visual	Pass		-----	
171		-----		-----	
175	Visual	C&B		-----	
177		-----		-----	
225	Visual	Clear &Bright		-----	
228	Visual	CLEAR AND BRIGHT		-----	
237	Visual	C&B		-----	
238	Visual	B & C		-----	
253	Visual	Clear & Bright		-----	
317	Visual	Bright & Clear		-----	
323	Visual	clear and bright		-----	
328	Visual	C&B		-----	
333		-----		-----	
334	Visual	clear and bright		-----	
335	Visual	clair et limpide		-----	
360	Visual	Clear and Bright		-----	
365	D4176	Pass		-----	
391	Visual	C&B		-----	
396	Visual	Clear & Bright		-----	
398	Visual	Clear & Bright		-----	
399	Visual	c&b		-----	
447	Visual	Clear & Bright		-----	
594	Visual	Clear & bright		-----	
631	Visual	clear & bright		-----	
633	Visual	Clear & Bright		-----	
634	Visual	Clear & Bright		-----	
663	Visual	Bright & Clear		-----	
671	Visual	C/B		-----	
759	Visual	C&B		-----	
781	Visual	cleare&bright		-----	
782		-----		-----	
785	Visual	Clear, bright		-----	
825	Visual	Clear & Bright		-----	
840	Visual	Clear & Bright		-----	
875		-----		-----	
922	Visual	Clear & Bright		-----	
962	Visual	Clear & bright		-----	
963	Visual	Bright &Clear		-----	
970	Visual	Clear & Bright		-----	
974	Visual	Clear and Bright		-----	
1039	Visual	Clear & Bright		-----	
1049	Visual	Br & Cl		-----	
1059	Visual	clear & bright		-----	
1062		Pass		-----	
1064	Visual	C&B		-----	
1097	Visual	Clair et limpide		-----	
1108	Visual	Bright and Clear		-----	
1109	Visual	Pass		-----	
1126		-----		-----	
1212	Visual	C&B		-----	
1284		-----		-----	
1297		-----		-----	
1299	Visual	CL&BR		-----	
1320	Visual	C & B		-----	
1357	Visual	Clear & Bright		-----	
1429	Visual	Clear and Bright		-----	
1483		-----		-----	
1496		-----		-----	
1498	Visual	Clear And Bright		-----	
1531	Visual	clear		-----	
1538	Visual	C&B		-----	
1564		-----		-----	
1586	Visual	clear & bright		-----	
1587	Visual	B&C		-----	
1610	Visual	Bright & Clear		-----	
1631	Visual	Clear and Bright		-----	
1720	Visual	C&B		-----	
1730		-----		-----	
1740	Visual	bright & clear		-----	
1776		-----		-----	
1810		-----		-----	

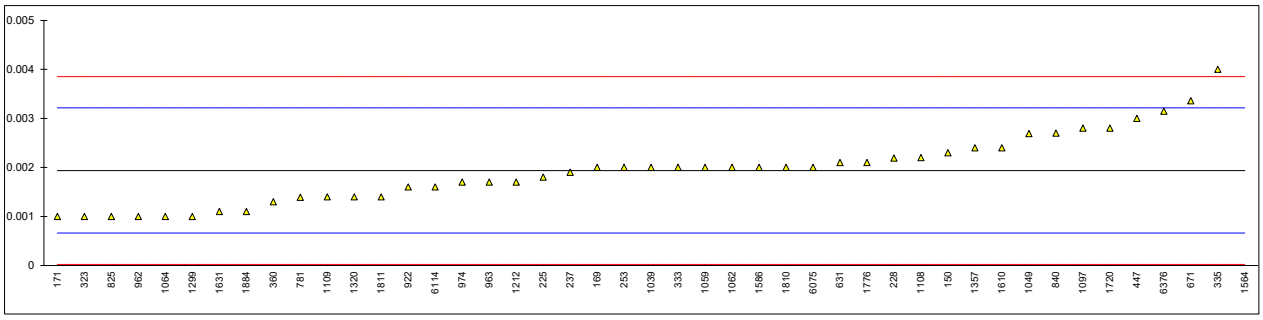
lab	method	value	mark	z(targ)	remarks
1811		-----		-----	
1884	Visual	clear, bright, free from water impurities		-----	
6075	Visual	Clear & Bright		-----	
6114	Visual	Clear & Bright		-----	
6142		-----		-----	
6192	Visual	B/C		-----	
6299		-----		-----	
6312		-----		-----	
6376	Visual	clair & bright		-----	
6416	D4176	C & B		-----	
	n	64			
	mean (n)	Clear and Bright (Pass)			

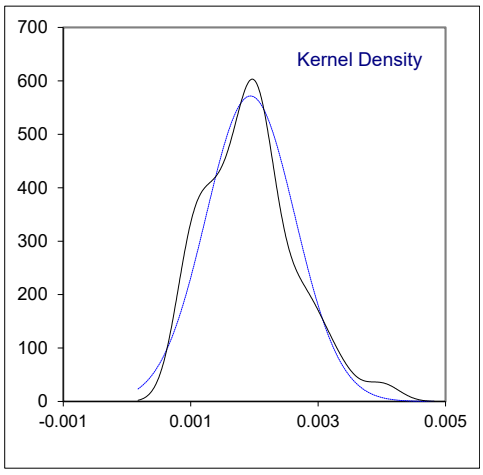
Determination of Total Acidity on sample #22035; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D3242	0.0023	C	0.57	first reported 0.0043
159		-----		-----	
169	D3242	0.002		0.10	
171	D3242	0.001		-1.47	
175		-----		-----	
177		-----		-----	
225	D3242	0.0018		-0.22	
228	D3242	0.00219		0.39	
237	D3242	0.0019		-0.06	
238		-----		-----	
253	D3242	0.002		0.10	
317		-----		-----	
323	D3242	0.001		-1.47	
328		-----		-----	
333	D3242	0.002		0.10	
334		-----		-----	
335	D3242	0.004		3.23	
360	D3242	0.0013		-1.00	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D3242	0.003		1.66	
594		-----		-----	
631	D3242	0.00210		0.25	
633		-----		-----	
634		-----		-----	
663		-----		-----	
671	D3242	0.00336		2.23	
759		-----		-----	
781	D3242	0.00139	C	-0.86	first reported 0.0139
782		-----		-----	
785		-----		-----	
825	D3242	0.001		-1.47	
840	D3242	0.0027		1.19	
875		-----		-----	
922	D664-A	0.0016		-0.53	
962	D3242	0.001		-1.47	
963	D3242	0.0017		-0.37	
970		-----		-----	
974	D3242	0.0017		-0.37	
1039	D3242	0.002		0.10	
1049	D3242	0.00269		1.18	
1059	D3242	0.002		0.10	
1062	D3242	0.0020		0.10	
1064	D3242	0.0010		-1.47	
1097	D3242	0.0028	C	1.35	first reported 0.0058
1108	D3242	0.0022		0.41	
1109	D3242	0.0014		-0.84	
1126		-----		-----	
1212	D3242	0.0017		-0.37	
1284		-----		-----	
1297		-----		-----	
1299	D3242	0.001		-1.47	
1320	D3242	0.0014		-0.84	
1357	D3242	0.0024		0.72	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1564	D3242	0.8520	R(0.01)	1331.64	
1586	D3242	0.002		0.10	
1587		-----		-----	
1610	IP354	0.0024		0.72	
1631	D3242	0.0011		-1.31	
1720	D3242	0.0028		1.35	
1730		-----		-----	
1740		-----		-----	
1776	D664-A	0.0021		0.25	
1810	D3242	0.0020		0.10	

lab	method	value	mark	z(targ)	remarks
1811	D3242	0.0014		-0.84	
1884	D664-A	0.0011	C	-1.31	first reported 0.011
6075	D3242	0.0020		0.10	
6114	D3242	0.0016		-0.53	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	
6376	D3242	0.00315		1.90	
6416		-----		-----	

normality	OK
n	44
outliers	1
mean (n)	0.00194
st.dev. (n)	0.000698
R(calc.)	0.00195
st.dev.(D3242:11)	0.000638
R(D3242:11)	0.00179



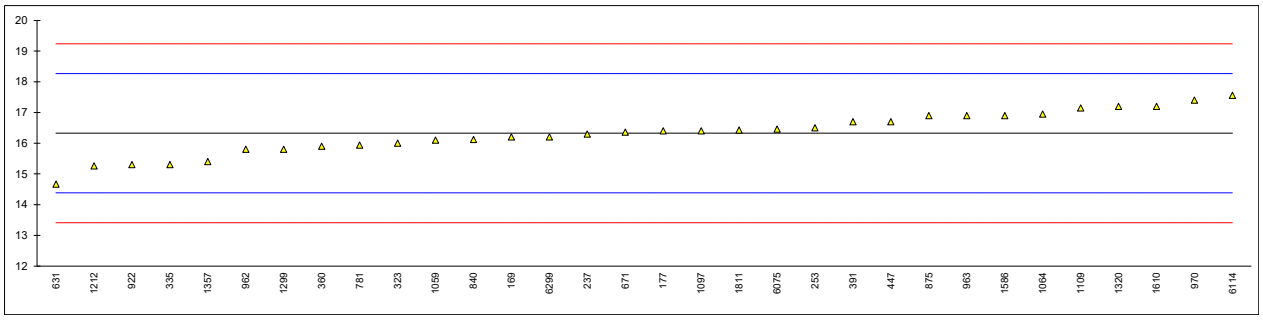


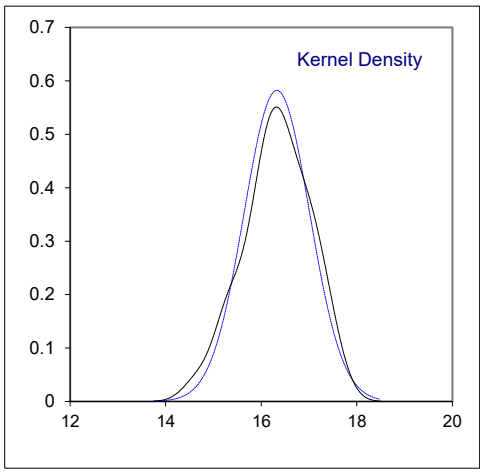
Determination of Aromatics by FIA on sample #22035; results in %V/V

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150		-----		-----	
159		-----		-----	
169	D1319	16.2		-0.13	
171		-----		-----	
175		-----		-----	
177	D1319	16.4		0.08	
225		-----		-----	
228		-----		-----	
237	D1319	16.3		-0.03	
238		-----		-----	
253	D1319	16.5		0.18	
317		-----		-----	
323	D1319	16.0		-0.33	
328		-----		-----	
333		-----		-----	
334		-----		-----	
335	D1319	15.3	C	-1.05	first reported 13.2
360	D1319	15.9		-0.44	
365		-----		-----	
391	D1319	16.7		0.39	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D1319	16.7		0.39	
594		-----		-----	
631	D1319	14.67		-1.70	
633		-----		-----	
634		-----		-----	
663		-----		-----	
671	D1319	16.36		0.04	
759		-----		-----	
781	D1319	15.94		-0.40	
782		-----		-----	
785		-----		-----	
825		-----		-----	
840	D1319	16.12		-0.21	
875	D1319	16.9		0.59	
922	D1319	15.3		-1.05	
962	D1319	15.8		-0.54	
963	D1319	16.9		0.59	
970	D1319	17.4		1.11	
974		-----		-----	
1039		-----		-----	
1049		-----		-----	
1059	D1319	16.1		-0.23	
1062		-----		-----	
1064	D1319	16.95		0.64	
1097	D1319	16.4		0.08	
1108		-----		-----	
1109	D1319	17.15		0.85	
1126		-----		-----	
1212	D1319	15.26		-1.10	
1284		-----		-----	
1297		-----		-----	
1299	D1319	15.8		-0.54	
1320	D1319	17.2		0.90	
1357	D1319	15.4		-0.95	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1564		-----		-----	
1586	D1319	16.9		0.59	
1587		-----		-----	
1610	IP156	17.2		0.90	
1631		-----		-----	
1720		-----		-----	
1730		-----		-----	
1740		-----		-----	
1776		-----		-----	
1810		-----		-----	

lab	method	value	mark	z(targ)	remarks
1811	D1319	16.43		0.11	
1884		-----		-----	
6075	D1319	16.46		0.14	
6114	D1319	17.56		1.27	
6142		-----		-----	
6192		-----		-----	
6299	D1319	16.2		-0.13	
6312		-----		-----	
6376		-----		-----	
6416		-----		-----	

normality	OK
n	32
outliers	0
mean (n)	16.325
st.dev. (n)	0.6855
R(calc.)	1.920
st.dev.(D1319:20a)	0.9717
R(D1319:20a)	2.721



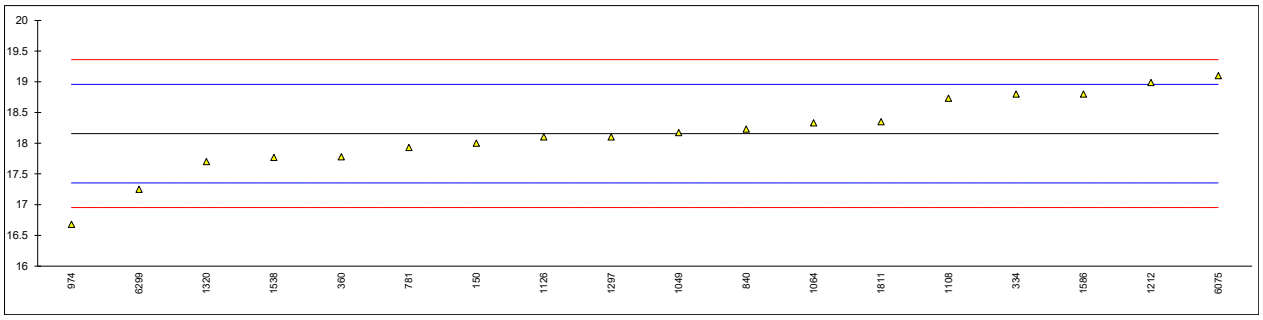


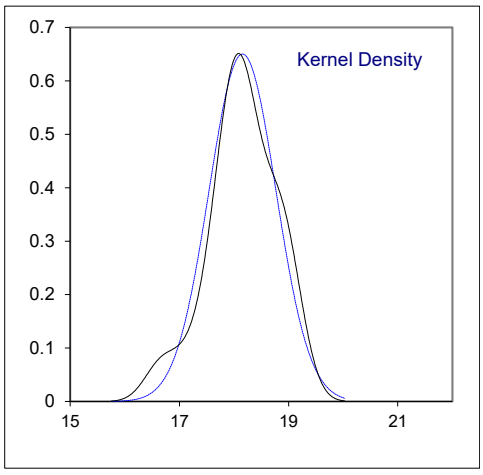
Determination of Mono Aromatics (MAH) by HPLC on sample #22035; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D6379	18.0		-0.39	
159		-----		-----	
169		-----		-----	
171		-----		-----	
175		-----		-----	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
317		-----		-----	
323		-----		-----	
328		-----		-----	
333		-----		-----	
334	D6379	18.8		1.60	
335		-----		-----	
360	D6379	17.78		-0.94	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447		-----		-----	
594		-----		-----	
631		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	EN12916	17.93		-0.56	
782		-----		-----	
785		-----		-----	
825		-----		-----	
840	IP391	18.23		0.18	
875		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
970		-----		-----	
974	D6379	16.68	C	-3.68	first reported 1.24
1039		-----		-----	
1049	D6379	18.173		0.04	
1059		-----		-----	
1062		-----		-----	
1064	D6379	18.33		0.43	
1097		-----		-----	
1108	D6379	18.732		1.44	
1109		-----		-----	
1126	EN12916	18.1		-0.14	
1212	D6379	18.988		2.07	
1284		-----		-----	
1297	EN12916	18.10		-0.14	
1299		-----		-----	
1320	D6379	17.70		-1.14	
1357	D6379	n.a		-----	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538	D6379	17.77		-0.96	
1564		-----		-----	
1586	D6379	18.8		1.60	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1720		-----		-----	
1730		-----		-----	
1740		-----		-----	
1776		-----		-----	
1810		-----		-----	

lab	method	value	mark	z(targ)	remarks
1811	D6379	18.35		0.48	
1884		-----		-----	
6075	D6379	19.10		2.35	
6114		-----		-----	
6142		-----		-----	
6192		-----		-----	
6299	D6379	17.25		-2.26	
6312		-----		-----	
6376		-----		-----	
6416		-----		-----	

normality	OK
n	18
outliers	0
mean (n)	18.156
st.dev. (n)	0.6135
R(calc.)	1.718
st.dev.(D6379:21e1)	0.4011
R(D6379:21e1)	1.123



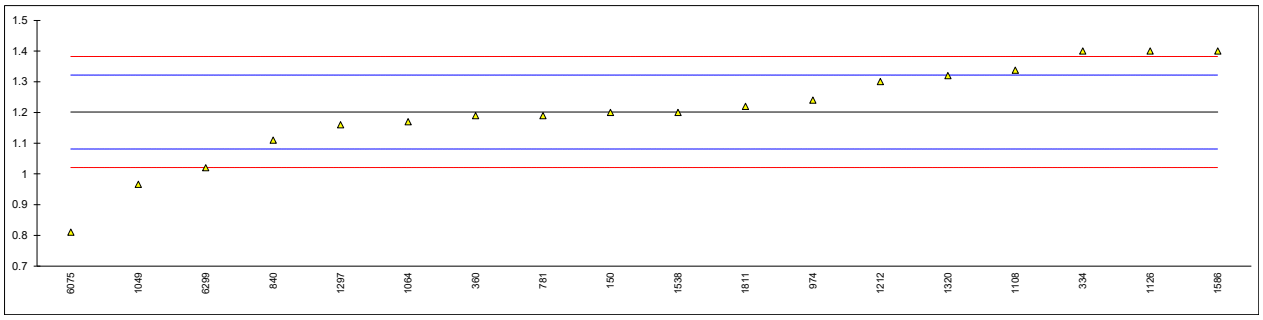


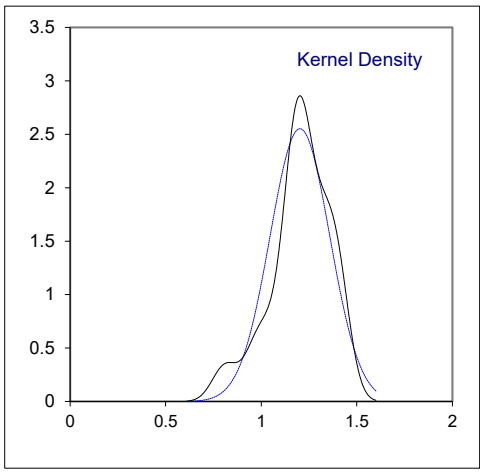
Determination of Di Aromatics (DAH) by HPLC on sample #22035; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D6379	1.2		-0.03	
159		-----		-----	
169		-----		-----	
171		-----		-----	
175		-----		-----	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
317		-----		-----	
323		-----		-----	
328		-----		-----	
333		-----		-----	
334	D6379	1.4		3.29	
335		-----		-----	
360	D6379	1.19		-0.20	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447		-----		-----	
594		-----		-----	
631		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	EN12916	1.19		-0.20	
782		-----		-----	
785		-----		-----	
825		-----		-----	
840	IP391	1.11		-1.53	
875		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
970		-----		-----	
974	D6379	1.24	C	0.63	first reported 16.68
1039		-----		-----	
1049	D6379	0.966		-3.91	
1059		-----		-----	
1062		-----		-----	
1064	D6379	1.17		-0.53	
1097		-----		-----	
1108	D6379	1.338		2.26	
1109		-----		-----	
1126	EN12916	1.4		3.29	
1212	D6379	1.301		1.64	
1284		-----		-----	
1297	EN12916	1.16		-0.70	
1299		-----		-----	
1320	D6379	1.32		1.96	
1357	D6379	n.a		-----	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538	D6379	1.20		-0.03	
1564		-----		-----	
1586	D6379	1.4		3.29	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1720		-----		-----	
1730		-----		-----	
1740		-----		-----	
1776		-----		-----	
1810		-----		-----	

lab	method	value	mark	z(targ)	remarks
1811	D6379	1.22		0.30	
1884		-----		-----	
6075	D6379	0.81		-6.50	
6114		-----		-----	
6142		-----		-----	
6192		-----		-----	
6299	D6379	1.02		-3.02	
6312		-----		-----	
6376		-----		-----	
6416		-----		-----	

normality	suspect
n	18
outliers	0
mean (n)	1.202
st.dev. (n)	0.1564
R(calc.)	0.438
st.dev.(D6379:21e1)	0.0603
R(D6379:21e1)	0.169



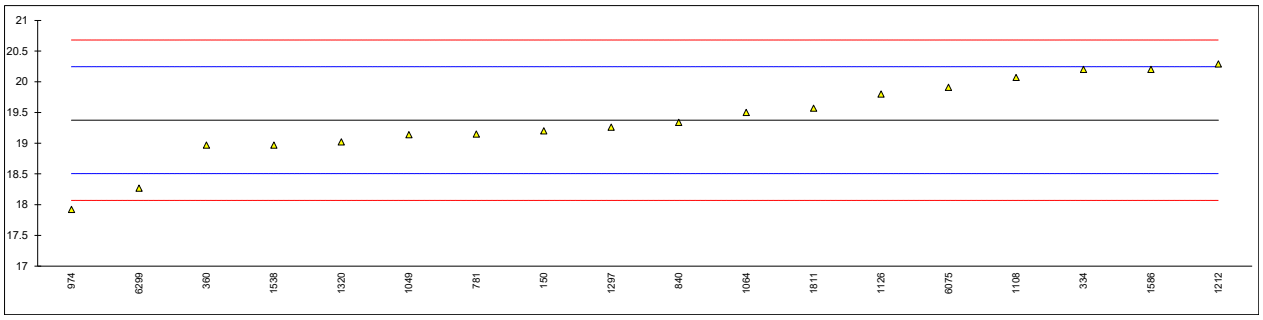


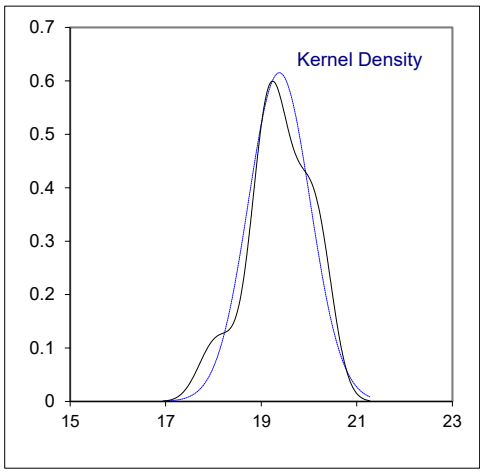
Determination of Total Aromatics by HPLC on sample #22035; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D6379	19.2		-0.41	
159		-----		-----	
169		-----		-----	
171		-----		-----	
175		-----		-----	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
317		-----		-----	
323		-----		-----	
328		-----		-----	
333		-----		-----	
334	D6379	20.2		1.89	
335		-----		-----	
360	D6379	18.97		-0.93	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447		-----		-----	
594		-----		-----	
631		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	EN12916	19.15		-0.52	
782		-----		-----	
785		-----		-----	
825		-----		-----	
840	IP391	19.34		-0.08	
875		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
970		-----		-----	
974	D6379	17.92		-3.34	
1039		-----		-----	
1049	D6379	19.140		-0.54	
1059		-----		-----	
1062		-----		-----	
1064	D6379	19.50		0.28	
1097		-----		-----	
1108	D6379	20.07		1.59	
1109		-----		-----	
1126	EN12916	19.8		0.97	
1212	D6379	20.29		2.10	
1284		-----		-----	
1297	EN12916	19.26	C	-0.27	first reported 0
1299		-----		-----	
1320	D6379	19.02		-0.82	
1357	D6379	n.a		-----	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538	D6379	18.97		-0.93	
1564		-----		-----	
1586	D6379	20.2		1.89	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1720		-----		-----	
1730		-----		-----	
1740		-----		-----	
1776		-----		-----	
1810		-----		-----	

lab	method	value	mark	z(targ)	remarks
1811	D6379	19.57		0.44	
1884		-----		-----	
6075	D6379	19.91		1.22	
6114		-----		-----	
6142		-----		-----	
6192		-----		-----	
6299	D6379	18.27		-2.54	
6312		-----		-----	
6376		-----		-----	
6416		-----		-----	

normality	OK
n	18
outliers	0
mean (n)	19.377
st.dev. (n)	0.6483
R(calc.)	1.815
st.dev.(D6379:21e1)	0.4355
R(D6379:21e1)	1.219



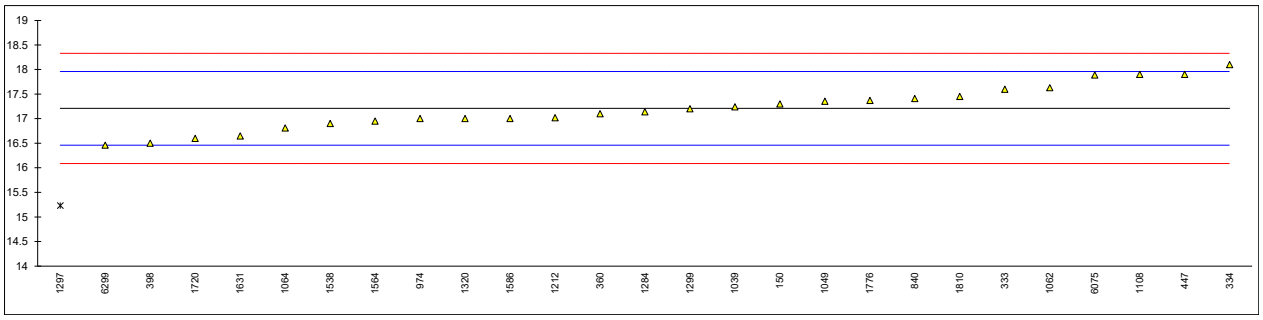


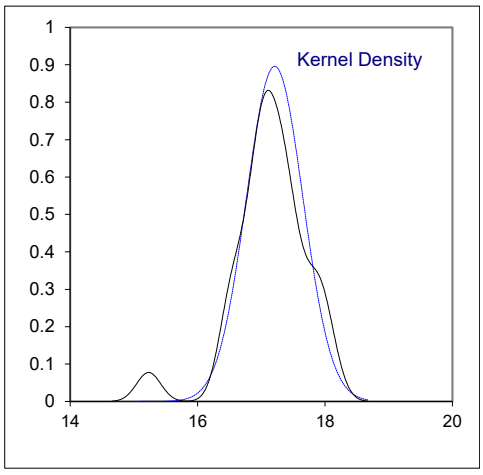
Determination of Total Aromatics by HPLC on sample #22035; results in %V/V

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D6379	17.3		0.24	
159		-----		-----	
169		-----		-----	
171		-----		-----	
175		-----		-----	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
317		-----		-----	
323		-----		-----	
328		-----		-----	
333	D6379	17.6		1.04	
334	D6379	18.1		2.38	
335		-----		-----	
360	D6379	17.10		-0.30	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398	D6379	16.5	C	-1.90	first reported 15.74
399		-----		-----	
447	IP436	17.9		1.84	
594		-----		-----	
631		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781		-----		-----	
782		-----		-----	
785		-----		-----	
825		-----		-----	
840	IP391	17.41		0.53	
875		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
970		-----		-----	
974	D6379	17.0		-0.56	
1039	D6379	17.24		0.08	
1049	D6379	17.354		0.38	
1059		-----		-----	
1062		17.63		1.12	
1064	D6379	16.81		-1.07	
1097		-----		-----	
1108	D6379	17.9		1.84	
1109		-----		-----	
1126		-----		-----	
1212	D6379	17.020		-0.51	
1284	D6379	17.14		-0.19	
1297	EN12916	15.23	R(0.01)	-5.30	
1299	IP436	17.2		-0.03	
1320	D6379	17.00		-0.56	
1357	D6379	n.a		-----	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538	D6379	16.90		-0.83	
1564	D6379	16.950		-0.70	
1586	D6379	17.0		-0.56	
1587		-----		-----	
1610		-----		-----	
1631	D6379	16.646		-1.51	
1720	D6379	16.6		-1.63	
1730		-----		-----	
1740		-----		-----	
1776	D6379	17.369		0.42	
1810	D6379	17.45		0.64	

lab	method	value	mark	z(targ)	remarks
1811		-----		-----	
1884		-----		-----	
6075	D6379	17.89		1.82	
6114		-----		-----	
6142		-----		-----	
6192		-----		-----	
6299	D6379	16.46		-2.01	
6312		-----		-----	
6376		-----		-----	
6416		-----		-----	

normality	OK
n	26
outliers	1
mean (n)	17.210
st.dev. (n)	0.4451
R(calc.)	1.246
st.dev.(D6379:21e1)	0.3738
R(D6379:21e1)	1.047



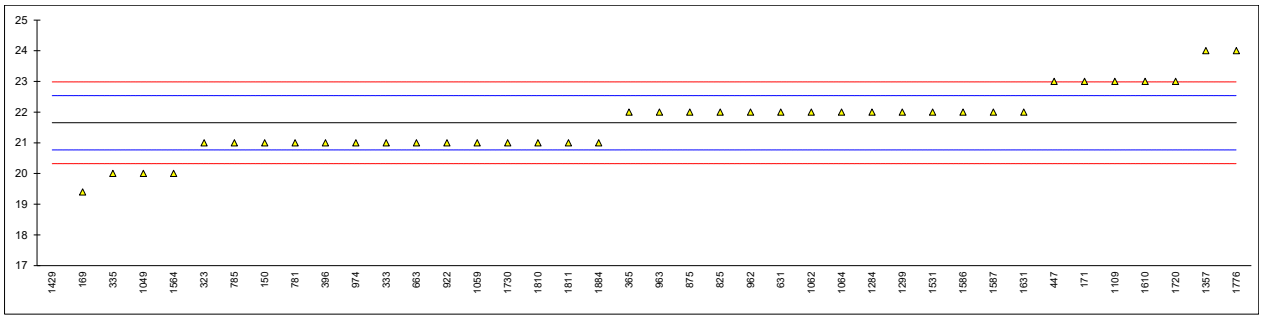


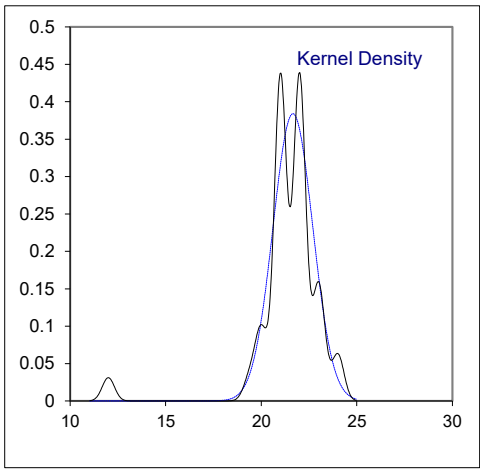
Determination of Color Saybolt (automated) on sample #22035; cell size in mm;

lab	method	cell size	value	mark	z(targ)	remarks
120		-----	-----		-----	
140		-----	-----		-----	
150	D6045	100 mm	21		-1.47	
159		-----	-----		-----	
169	D6045	50 mm	19.4		-5.08	
171	D6045	-----	23		3.05	
175		-----	-----		-----	
177		-----	-----		-----	
225		-----	-----		-----	
228		-----	-----		-----	
237		-----	-----		-----	
238		-----	-----		-----	
253		-----	-----		-----	
317		-----	-----		-----	
323	D6045	10 mm	21		-1.47	
328		-----	-----		-----	
333	D6045	33 mm	21		-1.47	
334		-----	-----		-----	
335	D6045	50 mm	20		-3.73	
360		-----	-----		-----	
365	D6045	50 mm	22		0.79	
391		-----	-----		-----	
396	D6045	50 mm	21		-1.47	
398		-----	-----		-----	
399		-----	-----		-----	
447	D6045	-----	23		3.05	
594		-----	-----		-----	
631	D6045	100 mm	22		0.79	
633		-----	-----		-----	
634		-----	-----		-----	
663	D6045	50 mm	21		-1.47	
671		-----	-----		-----	
759		-----	-----		-----	
781	D6045	100 mm	21		-1.47	
782		-----	-----		-----	
785	D6045	-----	21		-1.47	
825	D6045	33 mm	22		0.79	
840		100 mm	-----		-----	
875	D6045	-----	22		0.79	
922	D6045	100 mm	21		-1.47	
962	D6045	50 mm	22		0.79	
963	D6045	-----	22		0.79	
970		-----	-----		-----	
974	D6045	100 mm	21		-1.47	
1039		100 mm	-----		-----	
1049	D6045	50 mm	20		-3.73	
1059	D6045	50 mm	21		-1.47	
1062	D6045	100 mm	22		0.79	
1064	D6045	50 mm	22		0.79	
1097		-----	-----		-----	
1108		-----	-----		-----	
1109	D6045	100 mm	23		3.05	
1126		-----	-----		-----	
1212		-----	-----		-----	
1284	D6045	-----	22		0.79	
1297		-----	-----		-----	
1299	D6045	100 mm	22		0.79	
1320		-----	-----		-----	
1357	D6045	50 mm	24		5.30	
1429	D6045	50 mm	12	R(0.01)	-21.79	
1483		-----	-----		-----	
1496		-----	-----		-----	
1498		-----	-----		-----	
1531	D6045	-----	22		0.79	
1538		-----	-----		-----	
1564	D6045	50 mm	20		-3.73	
1586	D6045	50 mm	22		0.79	
1587	D6045	50 mm	22.0		0.79	
1610	D6045	-----	23	C	3.05	first reported 18
1631	D6045	-----	22		0.79	
1720	D6045	50 mm	23		3.05	
1730	D6045	-----	21		-1.47	
1740		-----	-----		-----	
1776	D6045	-----	24.0		5.30	
1810	D6045	-----	21		-1.47	

lab	method	cell size	value	mark	z(targ)	remarks
1811	D6045	50 mm	21		-1.47	
1884	D6045	100 mm	21		-1.47	
6075		-----	-----		-----	
6114		-----	-----		-----	
6142		-----	-----		-----	
6192		-----	-----		-----	
6299		-----	-----		-----	
6312		-----	-----		-----	
6376		-----	-----		-----	
6416		-----	-----		-----	

		Only 50 mm cell	Only 100 mm cell
normality	OK	OK	suspect
n	39	15	10
outliers	1	1	0
mean (n)	21.65	21.36	21.50
st.dev. (n)	1.039	1.243	0.707
R(calc.)	2.91	3.48	1.98
st.dev.(D6045:20)	0.443	0.443	0.443
R(D6045:20)	1.24	1.24	1.24



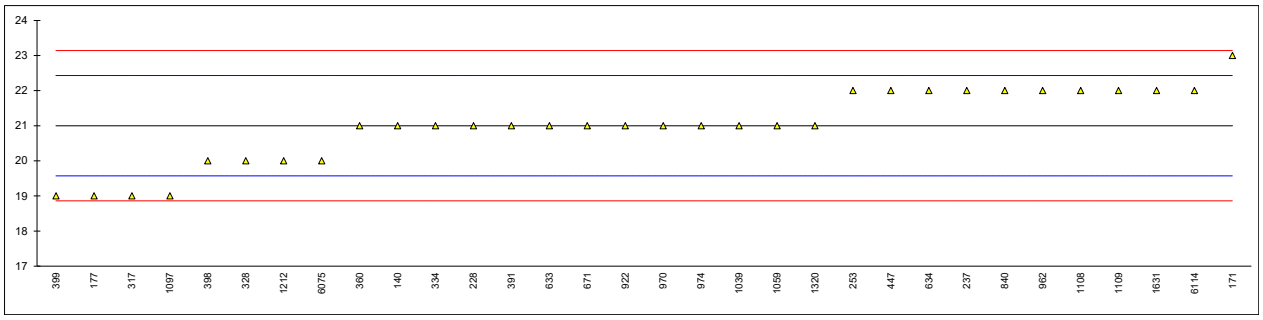


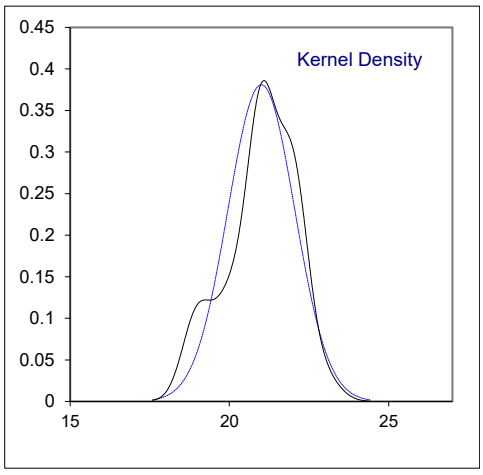
Determination of Color Saybolt (manual) on sample #22035;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140	D156	21	C	0.00	first reported 30
150		-----		-----	
159		-----		-----	
169		-----		-----	
171	D156	23		2.80	
175		-----		-----	
177	D156	19		-2.80	
225		-----		-----	
228	D156	21		0.00	
237	D156	22		1.40	
238		-----		-----	
253	D156	22		1.40	
317	D156	19		-2.80	
323		-----		-----	
328	D156	20		-1.40	
333		-----		-----	
334	D156	21		0.00	
335		-----		-----	
360	D156	21		0.00	
365		-----		-----	
391	D156	21		0.00	
396		-----		-----	
398	D156	20		-1.40	
399	D156	19		-2.80	
447	D156	22		1.40	
594		-----		-----	
631		-----		-----	
633	D156	21		0.00	
634	D156	22		1.40	
663		-----		-----	
671	D156	21		0.00	
759		-----		-----	
781		-----		-----	
782		-----		-----	
785		-----		-----	
825		-----		-----	
840	D156	22		1.40	
875		-----		-----	
922	D156	21		0.00	
962	D156	22		1.40	
963		-----		-----	
970	D156	21		0.00	
974	D156	21		0.00	
1039	D156	21		0.00	
1049		-----		-----	
1059	D156	21		0.00	
1062		-----		-----	
1064		-----		-----	
1097	NF M07-003	19		-2.80	
1108	D156	22		1.40	
1109	D156	22		1.40	
1126		-----		-----	
1212	D156	20		-1.40	
1284		-----		-----	
1297		-----		-----	
1299		-----		-----	
1320	D156	21		0.00	
1357	D156	n.a		-----	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1564		-----		-----	
1586		-----		-----	
1587		-----		-----	
1610		-----		-----	
1631	D156	22		1.40	
1720		-----		-----	
1730		-----		-----	
1740		-----		-----	
1776		-----		-----	
1810		-----		-----	

lab	method	value	mark	z(targ)	remarks
1811		-----		-----	
1884		-----		-----	
6075	D156	20		-1.40	
6114	D156	22		1.40	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	
6376		-----	W	-----	test result withdrawn, reported 27
6416		-----		-----	

normality	OK
n	32
outliers	0
mean (n)	21.00
st.dev. (n)	1.047
R(calc.)	2.93
st.dev.(D156:15)	0.714
R(D156:15)	2





Determination of Copper Corrosion 2 hrs at 100 °C on sample #22035;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150		-----		-----	
159		-----		-----	
169	D130	1a		-----	
171	D130	1a		-----	
175	D130	1a		-----	
177	D130	1b		-----	
225	D130	1a		-----	
228	D130	1A		-----	
237	D130	1A		-----	
238	D130	1A		-----	
253	D130	1A		-----	
317	D130	1A		-----	
323	D130	1A		-----	
328	D130	1		-----	
333	D130	1b		-----	
334	D130	1b		-----	
335	D130	1a		-----	
360	D130	1A		-----	
365	D130	1a		-----	
391	D130	1A		-----	
396	D130	1A		-----	
398	D130	1a		-----	
399	D130	1A		-----	
447	IP154	1A		-----	
594	GOST6321	1A		-----	
631	D130	1a		-----	
633	D130	1a		-----	
634	D130	1a		-----	
663	D130	1a		-----	
671	D130	1A		-----	
759		-----		-----	
781	D130	1a		-----	
782		-----		-----	
785	D130	1A		-----	
825	D130	1a		-----	
840	D130	1a		-----	
875	D130	1a		-----	
922	D130	1A		-----	
962	D130	1A		-----	
963	D130	1a		-----	
970	D130	1a		-----	
974	D130	1a		-----	
1039	ISO2160	1A		-----	
1049	D130	1A		-----	
1059	D130	1a		-----	
1062		1B		-----	
1064	D130	1a		-----	
1097	ISO2160	1a		-----	
1108		-----		-----	
1109	D130	1a		-----	
1126		-----		-----	
1212	D130	1A		-----	
1284		-----		-----	
1297		-----		-----	
1299	D130	1A		-----	
1320	D130	1a		-----	
1357	D130	1a		-----	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531	D130	1a		-----	
1538		-----		-----	
1564	D130	1a		-----	
1586	D130	1A		-----	
1587	D130	1a		-----	
1610	D130	1a		-----	
1631	D130	1A		-----	
1720	D130	1b		-----	
1730		-----		-----	
1740	D130	1A		-----	
1776		-----		-----	
1810		-----		-----	

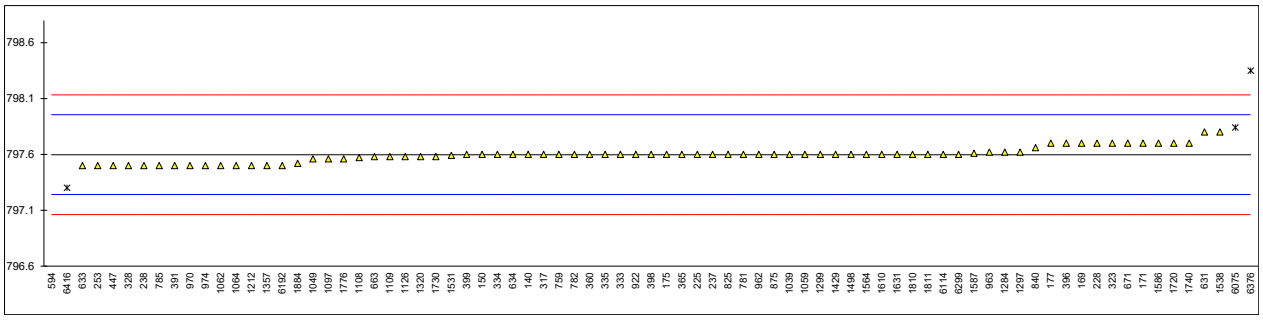
lab	method	value	mark	z(targ)	remarks
1811		-----		-----	
1884	D130	1		-----	
6075	D130	1a		-----	
6114	D130	1a		-----	
6142		-----		-----	
6192	D130	1A		-----	
6299	ISO2160	1a		-----	
6312		-----		-----	
6376	D130	1a		-----	
6416	D130	1a		-----	
	n	64			
	mean (n)	1 (1a/1b)			

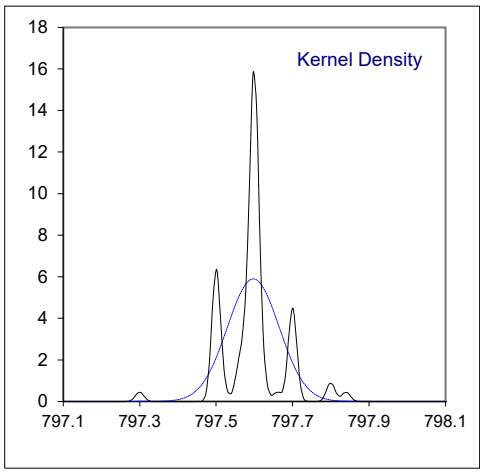
Determination of Density at 15 °C on sample #22035; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140	D4052	797.6		0.01	
150	D4052	797.6	C	0.01	first reported 0.7976 kg/m^3
159		-----		-----	
169	D4052	797.7		0.57	
171	D4052	797.7		0.57	
175	D4052	797.6		0.01	
177	D4052	797.7		0.57	
225	D4052	797.6		0.01	
228	D4052	797.7		0.57	
237	D4052	797.6		0.01	
238	D4052	797.5	C	-0.55	first reported 797.1
253	D4052	797.5		-0.55	
317	D4052	797.6		0.01	
323	D4052	797.7		0.57	
328	D4052	797.5		-0.55	
333	D4052	797.6		0.01	
334	D4052	797.6		0.01	
335	D4052	797.6		0.01	
360	D4052	797.6		0.01	
365	IP365	797.6		0.01	
391	D4052	797.5		-0.55	
396	D4052	797.7		0.57	
398	ISO12185	797.6		0.01	
399	D4052	797.6		0.01	
447	D4052	797.5		-0.55	
594	GOST3900	796.0	R(0.01)	-8.95	
631	D4052	797.80		1.13	
633	D1298	797.5	C	-0.55	first reported 798.22
634	D4052	797.6		0.01	
663	D4052	797.58		-0.10	
671	D4052	797.7		0.57	
759	D4052	797.6		0.01	
781	D4052	797.6		0.01	
782	D4052	797.6		0.01	
785	D4052	797.5		-0.55	
825	D4052	797.6		0.01	
840	D4052	797.66		0.35	
875	D4052	797.6		0.01	
922	D4052	797.6		0.01	
962	D4052	797.6		0.01	
963	D4052	797.62		0.13	
970	D4052	797.5		-0.55	
974	D1298	797.5		-0.55	
1039	ISO12185	797.6		0.01	
1049	D4052	797.56		-0.21	
1059	D4052	797.6		0.01	
1062	D4052	797.5		-0.55	
1064	D4052	797.5		-0.55	
1097	ISO12185	797.56		-0.21	
1108	D4052	797.57		-0.15	
1109	D4052	797.58		-0.10	
1126	D4052	797.58		-0.10	
1212	D4052	797.5		-0.55	
1284	D4052	797.62		0.13	
1297	D4052	797.62		0.13	
1299	D4052	797.6		0.01	
1320	D4052	797.58		-0.10	
1357	D4052	797.5		-0.55	
1429	ISO12185	797.6		0.01	
1483		-----		-----	
1496		-----		-----	
1498	D4052	797.6		0.01	
1531	ISO12185	797.59		-0.04	
1538	D4052	797.80		1.13	
1564	D4052	797.6		0.01	
1586	D4052	797.7		0.57	
1587	D4052	797.61		0.07	
1610	IP365	797.6		0.01	
1631	D4052	797.6		0.01	
1720	D4052	797.7		0.57	
1730	D4052	797.58		-0.10	
1740	ISO3675	797.7		0.57	
1776	ISO12185	797.56		-0.21	
1810	D4052	797.6		0.01	

lab	method	value	mark	z(targ)	remarks
1811	D4052	797.60		0.01	
1884	D4052	797.52		-0.43	
6075	D4052	797.84	R(0.05)	1.36	
6114	D4052	797.6		0.01	
6142		-----		-----	
6192	D1298	797.5		-0.55	
6299	ISO12185	797.60		0.01	
6312		-----		-----	
6376	D4052	798.35	R(0.01)	4.21	
6416	D1298	797.3	R(0.01)	-1.67	

normality	OK
n	75
outliers	4
mean (n)	797.597
st.dev. (n)	0.0676
R(calc.)	0.189
st.dev.(D4052:22)	0.1786
R(D4052:22)	0.5



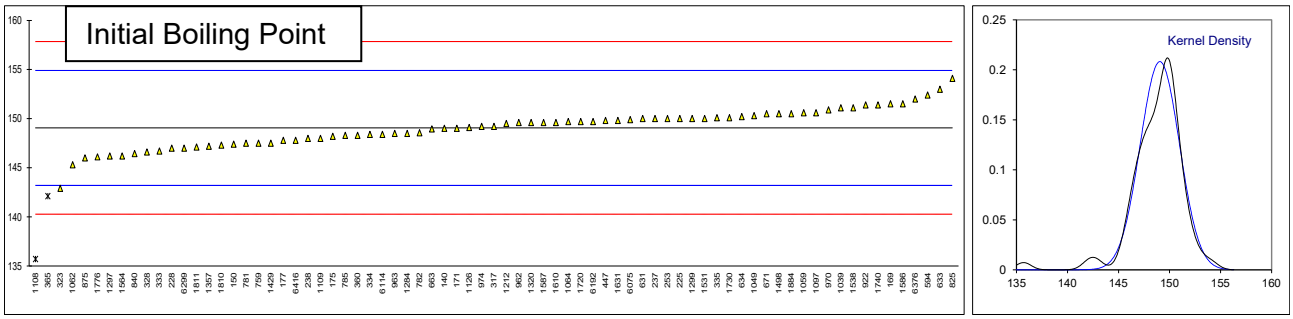


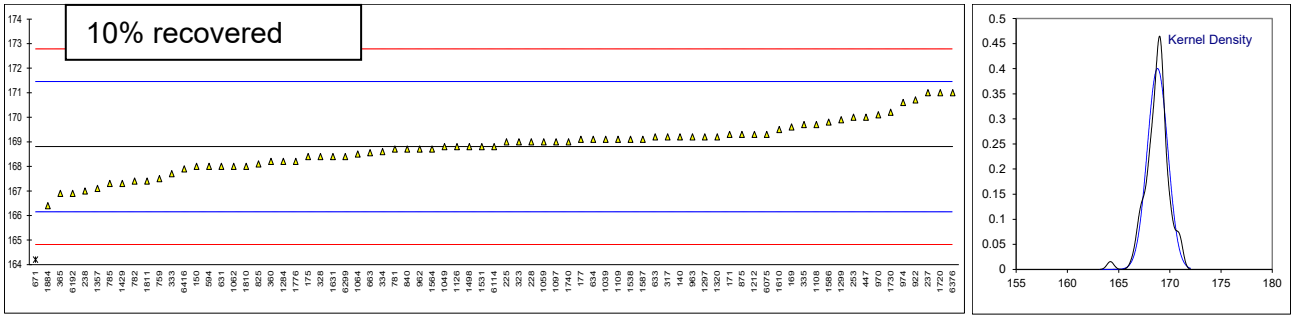
Determination of Distillation at 760 mmHg on sample #22035; results in °C

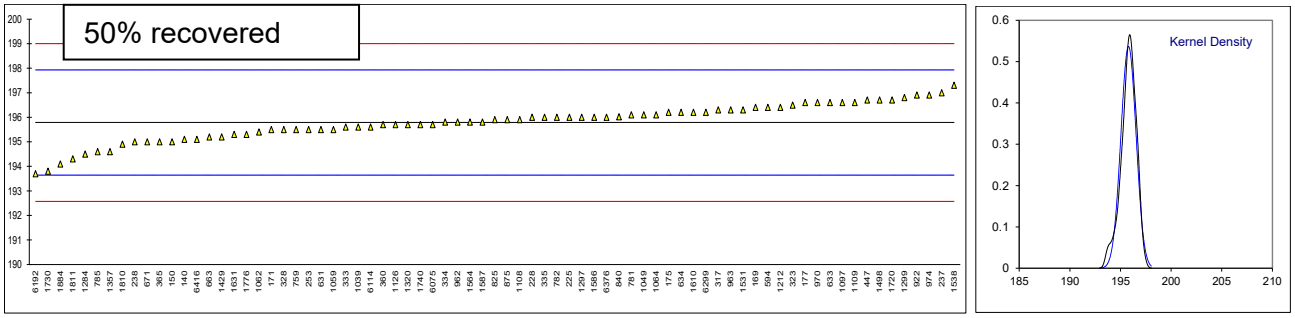
lab	method	IBP	mark	10% rec	mark	50% rec	mark	90% rec	mark	FBP	mark	Res.	Loss
120		-----		-----		-----		-----		-----		-----	-----
140	D86-automated	149.0		169.2		195.1		238.1		267.4		-----	-----
150	D86-automated	147.4		168.0		195.0		238.7		265.5		1.2	0.3
159		-----		-----		-----		-----		-----		-----	-----
169	D86-automated	151.5		169.6		196.4		239.3		268.5		1.2	0.5
171	D86-automated	149.0		169.3	C	195.5	C	236.7	C	264.8		0.6	0.2
175	D86-automated	148.2		168.4		196.2		240.7		268.8		1.1	0.9
177	D86	147.8		169.1		196.6		238.3		267.3		1.0	0.5
225	D86-manual	150.0		169.0		196.0		239.5		269.0		1.4	0.6
228	D86-manual	147.0		169.0		196.0		238.0		267.0		0.70	0.3
237	D86-manual	150.0		171.0		197.0	C	242.0		270.0		1.0	0.5
238	D86-manual	148.0		167.0	C	195.0		238.0		266.0		1.5	0.5
253	D86-manual	150.0		170.0		195.5		239.0		268.0		1.4	1.0
317	D86-automated	149.2		169.2		196.3		240.0		268.8		1.3	0.5
323	D86-automated	142.9		169.0		196.5		240.7		267.1		1.2	0.8
328	D86-automated	146.6		168.4		195.5		237.5		265.2		1.2	0.0
333	D86-automated	146.7		167.7		195.6		237.9		266.2		1.2	0.3
334	D86-automated	148.4		168.6		195.8		237.9		264.8		1.0	0.5
335	D86-automated	150.1		169.7		196.0		239.4		264.0		1.3	0.4
360	D86-automated	148.3	C	168.2		195.7		238.8		265.3		1.2	0.6
365	D86-automated	142.1	R(5)	166.9		195.0		239.6		265.4		1.5	0.8
391		-----		-----		-----		-----		-----		-----	-----
396		-----		-----		-----		-----		-----		-----	-----
398		-----		-----		-----		-----		-----		-----	-----
399		-----		-----		-----		-----		-----		-----	-----
447	D86-automated	149.8		170.0		196.7		240.2		268.6		1.2	0.7
594	GOST2177	152.4		168.0		196.4		239.8		268.4		1.1	0.3
631	D86-manual	150.0		168.0		195.5		240.0		268.0		1.1	0.9
633	D86-automated	153.0		169.2		196.6		240.8		267.4		1.0	0.8
634	D86-automated	150.2		169.1		196.2		239.5		265.4		1.2	0.6
663	D86-automated	148.95		168.55		195.20		238.10		266.45		-----	-----
671	D86-automated	150.5		164.2	C,R(1)	195.0		240.4		265.3	C	1.0	0
759	D86-manual	147.5		167.5		195.5		239.0		268.0		1.5	0.5
781	D86-automated	147.5		168.7		196.1		238.6		267.5		1.0	0.7
782	D86-automated	148.55		167.4		196.0		239.7		268.75		1.15	0.35
785	D86	148.3		167.3		194.6		237.1		264.7		1.2	0.3
825	D86-automated	154.1		168.1		195.9		238.9		267.2		0.5	0.5
840	D86-automated	146.43		168.70		196.02		241.04		268.73		1.2	0.8
875	D86-automated	146.0		169.3		195.9		238.7		268.3		1.2	0.4
922	D86-automated	151.4		170.7		196.9		240.6		266.3		1.2	1.3
962	D86-automated	149.6		168.7		195.8		238.4		264.6		1.2	0.7
963	D86-automated	148.5		169.2		196.3		238.4		266.2		1.2	0.3
970	D86-automated	150.9		170.1		196.6		239.6		265.8		1.0	1.0
974	D86-automated	149.2		170.6		196.9		239.2		265.2		1.0	1.0
1039	ISO3405-automated	151.1		169.1		195.6		238.7		268.7		1.2	0.4
1049	D86-automated	150.3		168.8		196.1		240.0		267.9		1.2	0.7
1059	D86-automated	150.6		169.0		195.5		238.4		267.4		1.2	0.4
1062	D86-automated	145.3		168.0		195.4		237.3		265.9		1.2	0.1
1064	D86-automated	149.7		168.5		196.1		240.3		269.1		1.2	0.7
1097	ISO3405-automated	150.6		169.0		196.6		240.4		267.4		1.2	0.9
1108	D86-automated	135.7	R(1)	169.7		195.9		237.7		267.7		1.2	0.1
1109	D86-automated	148.0		169.1		196.6		239.4		266.6		1.2	0.5
1126		149.1		168.8		195.7		237.8		271.0		1.2	0.1
1212	D86-automated	149.5		169.3		196.4		240.3		267.7		1.3	1.0
1284	D86-automated	148.5		168.2		194.5		237.5		264.5		1.2	0.5
1297		146.2		169.2		196.0		237.6		266.3		1.2	0.1
1299	D86-automated	150.0		169.9		196.8		240.9		270.4		1.2	0.6
1320	D86-automated	149.6		169.2		195.7		237.3		265.7		1.2	0
1357	D86-automated	147.2		167.1		194.6		238.4		264.6		1.2	0.5
1429	D86-automated	147.5		167.3		195.2		239.3		264.9		1.2	1.5
1483		-----		-----		-----		-----		-----		-----	-----
1496		-----		-----		-----		-----		-----		-----	-----
1498	D86-automated	150.5		168.8		196.7		241.7		269.4		1.2	1.2
1531	D86-automated	150.0		168.8		196.3		239.7		267.5		1.3	0.5
1538		151.1		169.1		197.3		240.8		271.3		0.9	n
1564	D86-automated	146.2		168.7		195.8		239.0		268.2		1.2	0.7
1586	D86-automated	151.5		169.8		196.0		239.8		267.0		1.4	0.3
1587	D86-automated	149.6		169.1		195.8		238.3		266.8		1.2	0.1
1610	IP123-automated	149.6	C	169.5		196.2		239.1		268.9		1.1	0.3
1631	D86-automated	149.8		168.4		195.3		237.8		267.9		1.2	1.0
1720		149.7		171.0		196.7	C	237.5		270.7	C	1.2	0.6
1730		150.1		170.2		193.8		239.4		269.0		-----	-----
1740	ISO3405-automated	151.4		169.0		195.7		238.8		265.9		1.2	0.4
1776	ISO3405-automated	146.1		168.2		195.3		239.6		265.2		1.2	1.4
1810	D86-automated	147.3		168		194.9		237.6		263.4		1.2	0.3

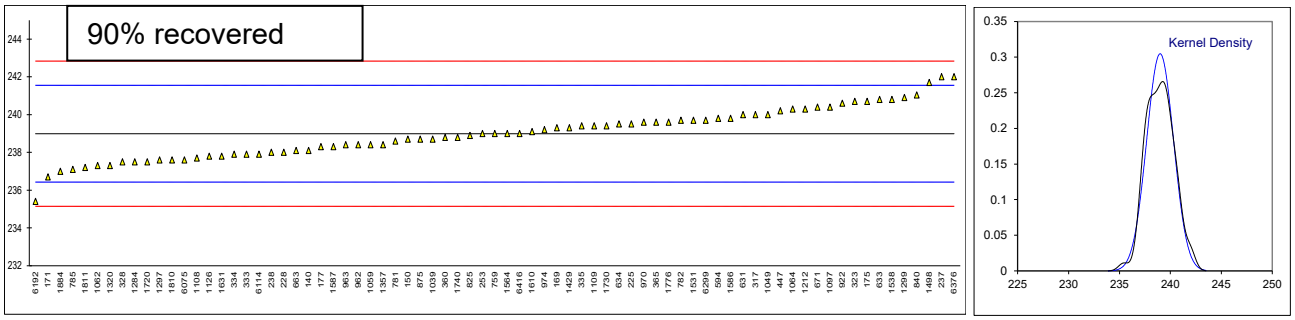
lab	method	IBP	mark	10% rec	mark	50% rec	mark	90% rec	mark	FBP	mark	Res.	Loss
1811	D86-automated	147.1		167.4		194.3		237.2		265.4		1.1	0
1884	ISO3405-automated	150.5		166.4		194.1		237.0		267.2		1.1	0.7
6075	D86-automated	149.9		169.3		195.7		237.6		263.9		1.3	0.0
6114	D86-automated	148.4		168.8		195.6		237.9		265.8		1.2	0.1
6142		-----		-----		-----		-----		-----		-----	-----
6192	D86-automated	149.7		166.9		193.7		235.4		266.1		1.2	0.8
6299	ISO3405-automated	147.0		168.4		196.2		239.7		264.5		1.2	1.0
6312		-----		-----		-----		-----		-----		-----	-----
6376	D86-manual	152.0		171.0		196.0		242.0		271.0		1.0	1.0
6416	D86-automated	147.8		167.9		195.1		239		266		1.2	0.7
	normality	OK		OK		OK		OK		OK			
	n	73		74		75		75		75			
	outliers	2		1		0		0		0			
	mean (n)	149.06		168.80		195.79		238.99		267.02			
	st.dev. (n)	1.915		0.996		0.743		1.310		1.844			
	R(calc.)	5.36		2.79		2.08		3.67		5.16			
	st.dev.(D86-A:20b)	2.928		1.326		1.071		1.280		2.536			
	R(D86-A:20b)	8.20		3.71		3.0		3.58		7.1			
Compare													
	R(D86-M:20b)	4.64		3.04		2.97		3.69		4.28			

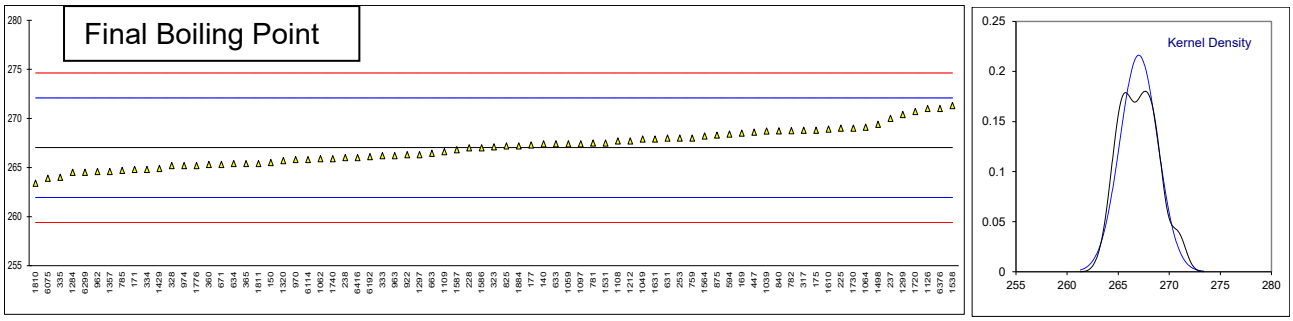
Lab 171 first reported 169.0, 195.4 and 242.4 repectively
Lab 237 first reported 199.0
Lab 238 first reported 165.0
Lab 360 first reported 143.8
Lab 671 first reported 157.1 and 258.0 repectively
Lab 1610 first reported 129.6
Lab 1720 first reported 199.4 and 254.6 repectively


Initial Boiling Point
Kernel Density


10% recovered
Kernel Density


50% recovered
Kernel Density


90% recovered
Kernel Density

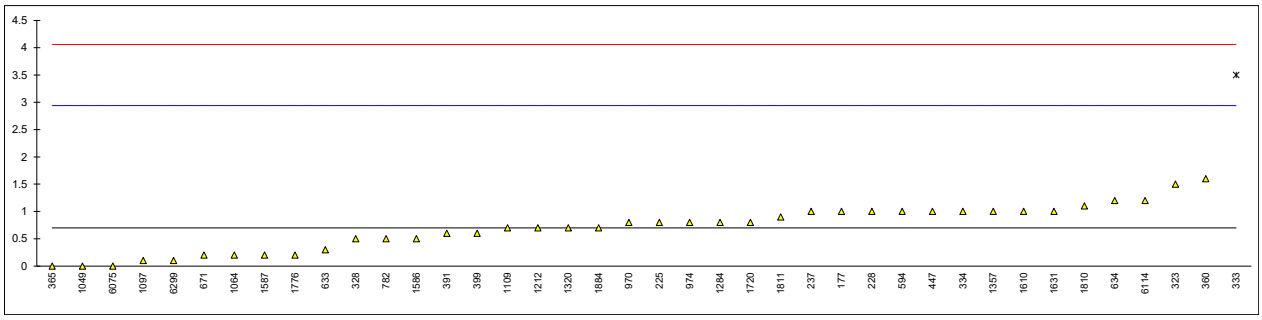

Final Boiling Point
Kernel Density

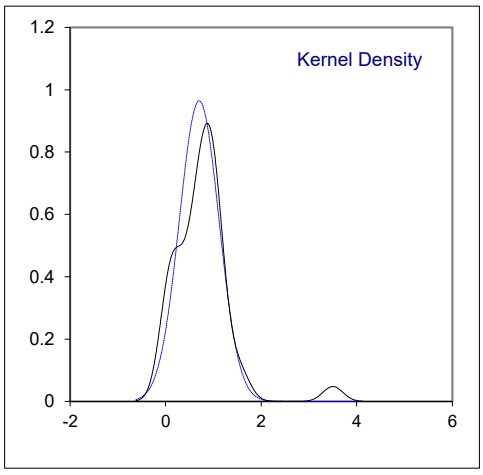
Determination of Existent Gum (unwashed) on sample #22035; results in mg/100 mL

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140	D381	<1	C	-----	first reported 3
150	D381	<1		-----	
159		-----		-----	
169	D381	<1		-----	
171	D381	<1		-----	
175		-----		-----	
177	D381	1.0		0.27	
225	D381	0.8		0.09	
228	D381	1.0		0.27	
237	D381	1.0		0.27	
238		-----		-----	
253	IP540	< 1.0		-----	
317	D381	<1		-----	
323	D381	1.5		0.71	
328	D381	0.5	C	-0.18	first reported 3.5
333	D381	3.5	R(0.01)	2.50	
334	D381	1.0		0.27	
335		-----		-----	
360	D381	1.6		0.80	
365	IP540	0		-0.62	
391	IP540	0.6		-0.09	
396		-----		-----	
398		-----		-----	
399	IP540	0.6		-0.09	
447	D381	1		0.27	
594	GOST1567	1		0.27	
631	IP540	<1		-----	
633	IP540	0.3		-0.36	
634	D381	1.2		0.45	
663	D381	<1		-----	
671	IP540	0.2		-0.45	
759		-----		-----	
781		-----		-----	
782	D381	0.5		-0.18	
785		-----		-----	
825	D381	<1		-----	
840		-----		-----	
875	D381	<0.5		-----	
922	D381	<1.0		-----	
962	D381	<1		-----	
963	D381	<1		-----	
970	D381	0.8		0.09	
974	IP540	0.80		0.09	
1039	ISO6246	<1		-----	
1049	D381	0		-0.62	
1059	D381	<1		-----	
1062	D381	<1		-----	
1064	D381	0.2		-0.45	
1097	IP540	0.1		-0.54	
1108		-----		-----	
1109	IP540	0.7		0.00	
1126		-----		-----	
1212	IP540	0.7		0.00	
1284	IP540	0.8		0.09	
1297		-----		-----	
1299	IP540	<1		-----	
1320	D381	0.7		0.00	
1357	IP540	1.0		0.27	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538	IP540	<1		-----	
1564		-----		-----	
1586	D381	0.50		-0.18	
1587	IP540	0.2		-0.45	
1610	IP540	1		0.27	
1631	IP540	1.0		0.27	
1720	D381	0.8		0.09	
1730		-----		-----	
1740		-----		-----	
1776	IP540	0.2		-0.45	
1810	D381	1.1		0.36	

lab	method	value	mark	z(targ)	remarks
1811	D381	0.9		0.18	
1884	D381	0.7		0.00	
6075	IP540	0		-0.62	
6114	IP540	1.2		0.45	
6142		-----		-----	
6192		-----		-----	
6299	IP540	0.1		-0.54	
6312		-----		-----	
6376		-----		-----	
6416	IP540	<1		-----	

normality	OK
n	39
outliers	1
mean (n)	0.700
st.dev. (n)	0.4136
R(calc.)	1.158
st.dev.(D381:22)	1.1202
R(D381:22)	3.137



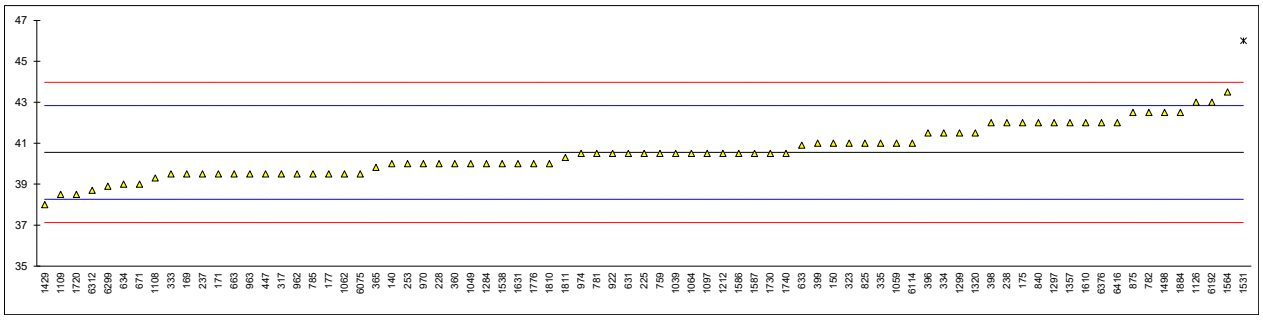


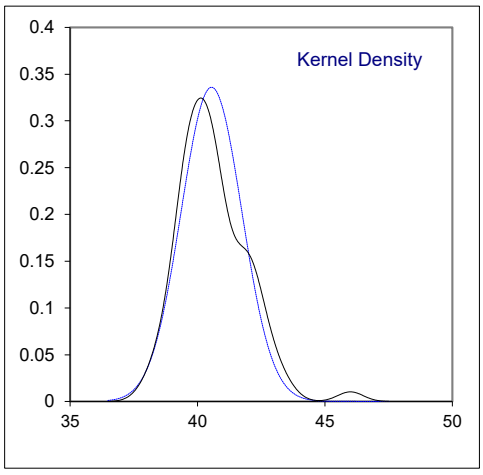
Determination of Flash Point on sample #22035; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140	D56	40		-0.48	
150	D56	41.0		0.39	
159		-----		-----	
169	D56	39.5		-0.92	
171	D56	39.5		-0.92	
175	D93	42		1.27	
177	D56	39.5	C	-0.92	first reported 35.5
225	IP170	40.5		-0.05	
228	IP170	40.0		-0.48	
237	IP170	39.5		-0.92	
238	IP170	42.0		1.27	
253	IP170	40.0		-0.48	
317	IP170	39.5		-0.92	
323	IP170	41.0		0.39	
328		-----		-----	
333	IP170	39.5		-0.92	
334	IP170	41.5		0.83	
335	IP170	41.0		0.39	
360	D56	40.0		-0.48	
365	IP170	39.825		-0.64	
391		-----		-----	
396	IP170	41.5		0.83	
398	D3828	42.0		1.27	
399	IP170	41		0.39	
447	IP170	39.5		-0.92	
594		-----		-----	
631	D93	40.5		-0.05	
633	D56	40.9		0.30	
634	IP170	39.0		-1.36	
663	D56	39.5		-0.92	
671	IP170	39		-1.36	
759	IP170	40.5		-0.05	
781	IP170	40.5		-0.05	
782	ISO2719	42.5		1.70	
785	IP170	39.5		-0.92	
825	IP170	41.0		0.39	
840	D3828	42.0		1.27	
875	D93-A	42.5		1.70	
922	IP170	40.5		-0.05	
962	IP170	39.5		-0.92	
963	IP170	39.5		-0.92	
970	IP170	40.0		-0.48	
974	IP170	40.5		-0.05	
1039	IP170	40.5		-0.05	
1049	ISO13736	40.0		-0.48	
1059	IP170	41.0		0.39	
1062	IP170	39.5		-0.92	
1064	IP170	40.5		-0.05	
1097	ISO13736	40.5		-0.05	
1108	D56	39.3		-1.10	
1109	IP170	38.5		-1.80	
1126	D93	43		2.14	
1212	IP170	40.5		-0.05	
1284	IP170	40.0		-0.48	
1297	D56	42.0		1.27	
1299	IP170	41.5		0.83	
1320	D56	41.5		0.83	
1357	IP170	42.0		1.27	
1429	D56	38.0		-2.23	
1483		-----		-----	
1496		-----		-----	
1498	D56	42.5		1.70	
1531	D93	46	R(0.01)	4.77	
1538	D56	40.0		-0.48	
1564	IP170	43.5		2.58	
1586	IP170	40.5		-0.05	
1587	IP170	40.5		-0.05	
1610	IP170	42.0		1.27	
1631	IP170	40.0		-0.48	
1720	D3828	38.5		-1.80	
1730	D56	40.5		-0.05	
1740	IP170	40.5		-0.05	
1776	IP170	40.0		-0.48	
1810	D56	40.0		-0.48	

lab	method	value	mark	z(targ)	remarks
1811	IP170	40.3		-0.22	
1884	D93	42.5		1.70	
6075	IP170	39.5		-0.92	
6114	IP170	41.0		0.39	
6142		-----		-----	
6192	ISO2719	43		2.14	
6299	ISO13736	38.9		-1.45	
6312	IP170	38.7		-1.62	
6376	ISO13736	42.0		1.27	
6416	D56	42		1.27	

normality	OK
n	76
outliers	1
mean (n)	40.552
st.dev. (n)	1.1871
R(calc.)	3.324
st.dev.(IP170:21)	1.1429
R(IP170:21)	3.2



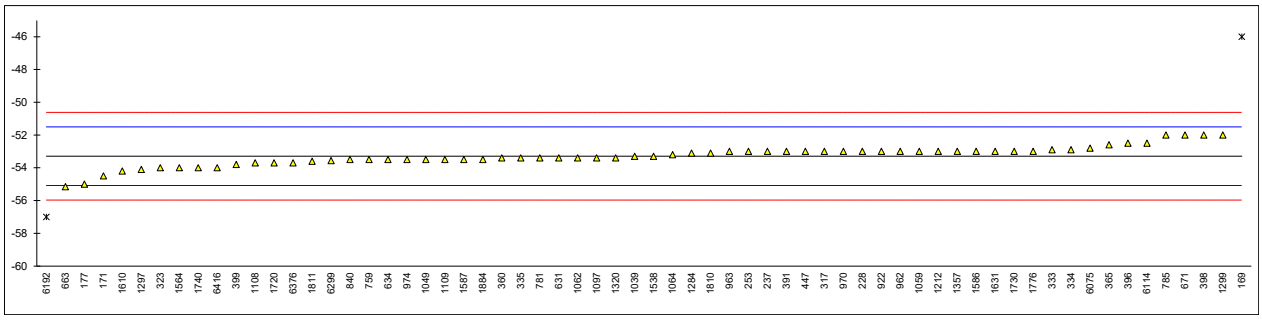


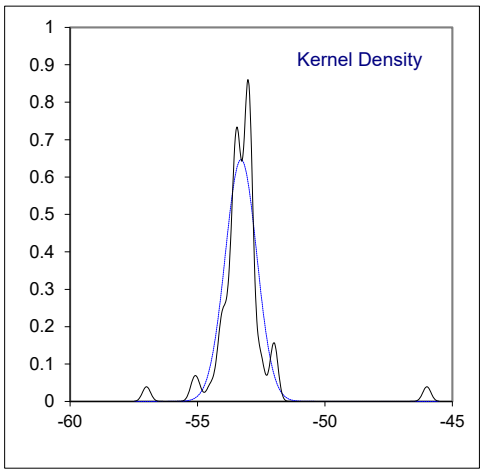
Determination of Freezing Point on sample #22035; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150		-----		-----	
159		-----		-----	
169	D2386	-46.0	C,R(0.01)	8.17	first reported -49.0
171	D2386	-54.5		-1.35	
175		-----		-----	
177	D2386	-55.0		-1.91	
225		-----		-----	
228	D2386	-53.0		0.33	
237	D2386	-53.0		0.33	
238		-----		-----	
253	D7153	-53.0		0.33	
317	D2386	-53.0		0.33	
323	D2386	-54.0		-0.79	
328		-----		-----	
333	IP529	-52.9		0.44	
334	D2386	-52.9		0.44	
335	IP529	-53.4		-0.12	
360	D7153	-53.4		-0.12	
365	IP16	-52.59		0.78	
391	D2386	-53.0		0.33	
396	D2386	-52.5	C	0.89	first reported -51.5
398	D2386	-52.0		1.45	
399	D7153	-53.8		-0.57	
447	D2386	-53.0		0.33	
594		-----		-----	
631	D5972	-53.4		-0.12	
633		-----		-----	
634	D2386	-53.5		-0.23	
663	D2386	-55.16		-2.09	
671	D2386	-52.0		1.45	
759	D2386	-53.5		-0.23	
781	D2386	-53.4		-0.12	
782		-----		-----	
785	D2386	-52		1.45	
825		-----		-----	
840	D2386	-53.5		-0.23	
875		-----		-----	
922	D2386	-53.0		0.33	
962	D2386	-53.0		0.33	
963	D2386	-53.0		0.33	
970	D2386	-53.0		0.33	
974	D2386	-53.5		-0.23	
1039	IP529	-53.3		-0.01	
1049	D7153	-53.5		-0.23	
1059	D2386	-53.0		0.33	
1062	D2386	-53.4		-0.12	
1064	D7153	-53.2		0.10	
1097	IP529	-53.4		-0.12	
1108	D5972	-53.7	C	-0.46	first reported 53.7
1109	D5972	-53.5		-0.23	
1126		-----		-----	
1212	D2386	-53.0		0.33	
1284	D7153	-53.1		0.21	
1297	D5972	-54.1		-0.91	
1299	D2386	-52.0		1.45	
1320	D5972	-53.4		-0.12	
1357	D5972	-53.0		0.33	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538	D2386	-53.3		-0.01	
1564	D5972	-54		-0.79	
1586	D7153	-53.0		0.33	
1587	IP529	-53.5		-0.23	
1610	IP435	-54.2		-1.02	
1631	D2386	-53		0.33	
1720	D7153	-53.7		-0.46	
1730	D2386	-53.0		0.33	
1740	D2386	-54.0		-0.79	
1776	IP529	-53.0		0.33	
1810	D2386	-53.1		0.21	

lab	method	value	mark	z(targ)	remarks
1811	D2386	-53.6		-0.35	
1884	GOST5066	-53.5		-0.23	
6075	IP529	-52.8		0.55	
6114	D2386	-52.5		0.89	
6142		-----		-----	
6192	D2386	-57	R(0.01)	-4.15	
6299	IP529	-53.56		-0.30	
6312		-----		-----	
6376	D7153	-53.7		-0.46	
6416	D2386	-54		-0.79	

normality	suspect
n	62
outliers	2
mean (n)	-53.29
st.dev. (n)	0.617
R(calc.)	1.73
st.dev.(D2386:19)	0.893
R(D2386:19)	2.5



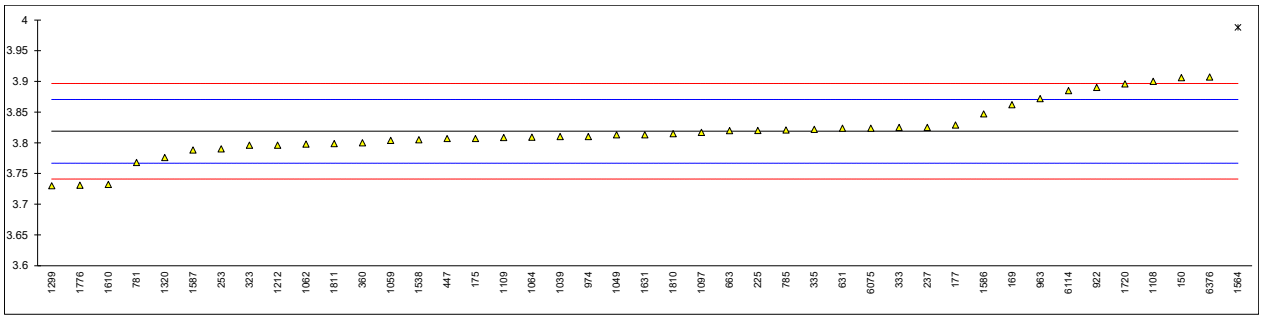


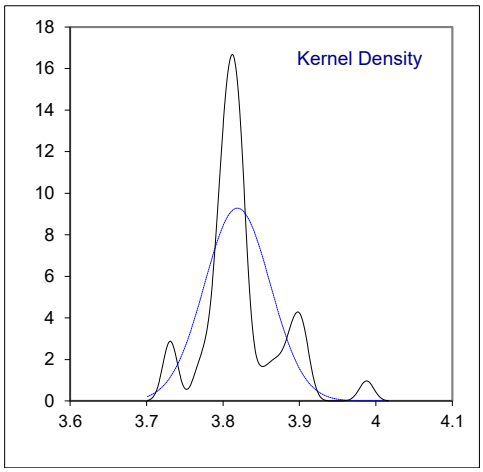
Determination of Kinematic Viscosity at -20 °C on sample #22035; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D445	3.906		3.36	
159		-----		-----	
169	D445	3.862		1.66	
171		-----		-----	
175	D445	3.807		-0.46	
177	D445	3.829		0.39	
225	D445	3.820		0.04	
228		-----		-----	
237	D445	3.825		0.23	
238		-----		-----	
253	D445	3.79		-1.12	
317		-----		-----	
323	D445	3.796		-0.89	
328		-----		-----	
333	D445	3.825		0.23	
334		-----		-----	
335	D445	3.822		0.12	
360	D445	3.800		-0.73	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D445	3.807		-0.46	
594		-----		-----	
631	D445	3.8238	C	0.19	first reported 3.6319
633		-----		-----	
634		-----		-----	
663	D445	3.8198		0.03	
671		-----		-----	
759		-----		-----	
781	D445	3.768	C	-1.97	first reported 3.668
782		-----		-----	
785	D445	3.821		0.08	
825		-----		-----	
840		-----		-----	
875		-----		-----	
922	D445	3.890		2.74	
962		-----		-----	
963	D445	3.872	C	2.05	first reported 2.946
970		-----		-----	
974	D445	3.810		-0.35	
1039	D7945	3.810		-0.35	
1049	D445	3.813		-0.23	
1059	D445	3.804		-0.58	
1062	D445	3.798		-0.81	
1064	D445	3.809		-0.39	
1097	ISO3104	3.8172		-0.07	
1108	D445	3.9		3.13	
1109	D445	3.8086		-0.40	
1126		-----		-----	
1212	D7042	3.796		-0.89	
1284		-----		-----	
1297		-----		-----	
1299	D445	3.730		-3.43	
1320	D445	3.776		-1.66	
1357	D445	n.a		-----	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538	D445	3.805		-0.54	
1564	D445	3.988	C,R(0.05)	6.52	first reported 3.9764
1586	D445	3.847		1.08	
1587	D445	3.78831		-1.18	
1610	D7042	3.7323		-3.35	
1631	D7945	3.813		-0.23	
1720	D445	3.896		2.97	
1730		-----		-----	
1740		-----		-----	
1776	D445	3.7309		-3.40	
1810	D445	3.8150		-0.15	

lab	method	value	mark	z(targ)	remarks
1811	D445	3.7986		-0.79	
1884		-----		-----	
6075	D445	3.8239		0.19	
6114	D445	3.8850		2.55	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	
6376	D445	3.9070		3.40	
6416		-----		-----	

	normality	OK
	n	42
	outliers	1
	mean (n)	3.81899
	st.dev. (n)	0.042985
	R(calc.)	0.12036
	st.dev.(IP71-1:96)	0.025915
	R(IP71-1:96)	0.07256
Compare		
	R(D445:19)	0.07256
	R(D445:21)	0.01892



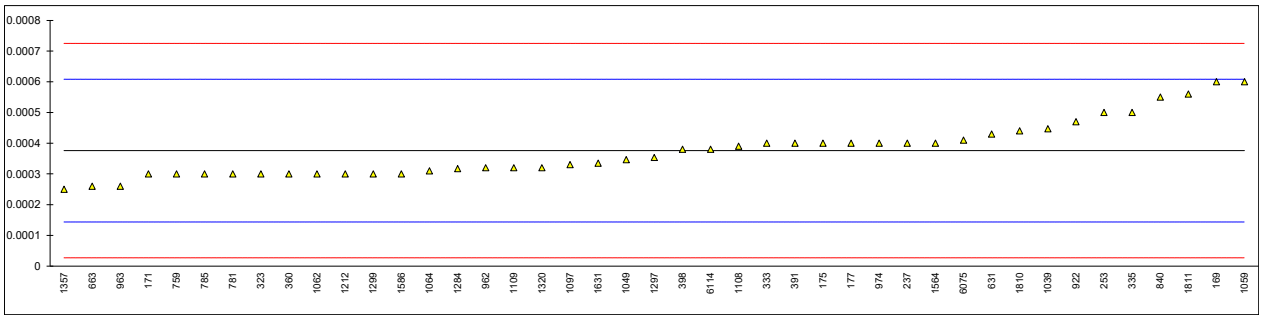


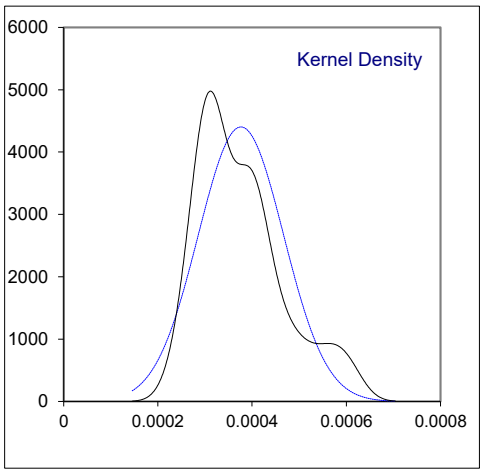
Determination of Mercaptan Sulfur as S on sample #22035; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150		-----		-----	
159		-----		-----	
169	D3227	0.0006		1.92	
171	D3227	0.0003		-0.66	
175	D3227	0.0004		0.20	
177	D3227	0.0004		0.20	
225		-----		-----	
228		-----		-----	
237	D3227	0.0004		0.20	
238		-----		-----	
253	D3227	0.0005		1.06	
317		-----		-----	
323	D3227	0.0003		-0.66	
328		-----		-----	
333	D3227	0.0004		0.20	
334	D3227	<0.0003		-----	
335	D3227	0.0005		1.06	
360	D3227	0.00030		-0.66	
365		-----		-----	
391	D3227	0.0004		0.20	
396		-----		-----	
398	D3227	0.00038		0.03	
399		-----		-----	
447	D3227	<0.0003		-----	
594		-----		-----	
631	D3227	0.00043		0.46	
633		-----		-----	
634		-----		-----	
663	D3227	0.00026		-1.00	
671		-----		-----	
759	UOP163	0.0003		-0.66	
781	D3227	0.0003		-0.66	
782		-----		-----	
785	UOP163	0.0003		-0.66	
825		-----		-----	
840	D3227	0.00055		1.49	
875		-----		-----	
922	D3227	0.00047		0.81	
962	D3227	0.00032		-0.48	
963	D3227	0.00026		-1.00	
970		-----		-----	
974	D3227	0.0004		0.20	
1039	IP342	0.000447		0.61	
1049	D3227	0.000346		-0.26	
1059	D3227	0.0006		1.92	
1062	D3227	0.0003		-0.66	
1064	D3227	0.00031		-0.57	
1097	ISO3012	0.00033		-0.40	
1108	D3227	0.00039		0.12	
1109	D3227	0.00032		-0.48	
1126		-----		-----	
1212	D3227	0.0003		-0.66	
1284	D3227	0.000317		-0.51	
1297	D3227	0.0003535		-0.20	
1299	D3227	0.0003		-0.66	
1320	D3227	0.00032		-0.48	
1357	D3227	0.00025		-1.08	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1564	D3227	0.0004		0.20	
1586	D3227	0.0003		-0.66	
1587		-----		-----	
1610		-----		-----	
1631	D3227	0.000335		-0.35	
1720		-----		-----	
1730		-----		-----	
1740		-----		-----	
1776		-----		-----	
1810	D3227	0.00044		0.55	

lab	method	value	mark	z(targ)	remarks
1811	D3227	0.00056		1.58	
1884		-----		-----	
6075	D3227	0.00041	C	0.29	first reported 0.00082
6114	D3227	0.00038		0.03	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	
6376		-----		-----	
6416		-----		-----	

normality	OK
n	43
outliers	0
mean (n)	0.000376
st.dev. (n)	0.0000906
R(calc.)	0.000254
st.dev.(D3227:16)	0.0001164
R(D3227:16)	0.000326



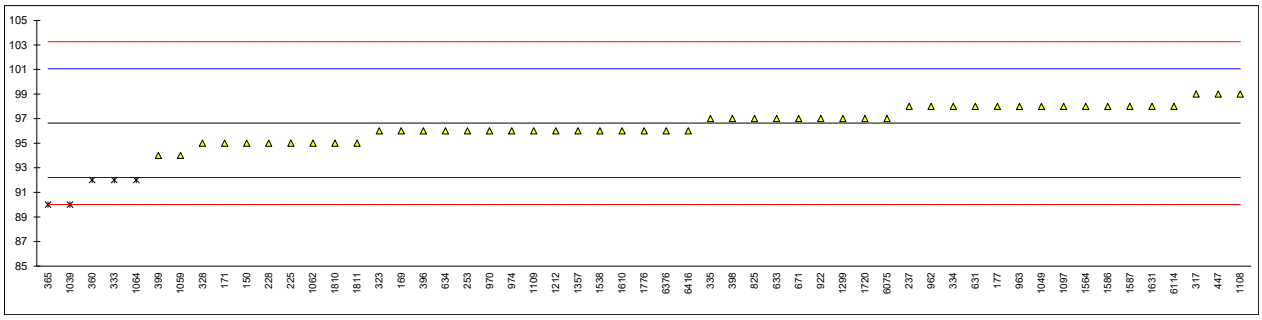


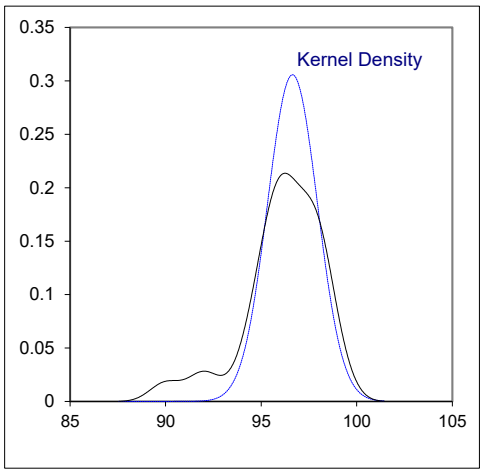
Determination of MSEP on sample #22035;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D3948	95	C	-0.74	first reported 91
159		-----		-----	
169	D3948	96		-0.29	
171	D3948	95		-0.74	
175		-----		-----	
177	D3948	98		0.62	
225	D3948	95		-0.74	
228	D3948	95.0		-0.74	
237	D3948	98		0.62	
238		-----		-----	
253	D3948	96		-0.29	
317	D7224	99		1.07	
323	D7224	96		-0.29	
328	D7224	95		-0.74	
333	D7224	92	R(0.05)	-2.10	
334	D7224	98		0.62	
335	D7224	97		0.16	
360	D3948	92	R(0.05)	-2.10	
365	D7224	90	R(0.05)	-3.00	
391		-----		-----	
396	D3948	96		-0.29	
398	D3948	97		0.16	
399	D3948	94		-1.19	
447	D3948	99		1.07	
594		-----		-----	
631	D7224	98		0.62	
633	D3948	97		0.16	
634	D7224	96		-0.29	
663		-----		-----	
671	D3948	97		0.16	
759		-----		-----	
781		-----		-----	
782		-----		-----	
785		-----		-----	
825	D3948	97		0.16	
840		-----		-----	
875		-----		-----	
922	D3948	97		0.16	
962	D3948	98		0.62	
963	D3948	98		0.62	
970	D3948	96		-0.29	
974	D3948	96		-0.29	
1039	D3948	90	R(0.05)	-3.00	
1049	D7224	98		0.62	
1059	D3948	94		-1.19	
1062	D3948	95		-0.74	
1064	D7224	92	R(0.05)	-2.10	
1097	D7224	98		0.62	
1108	D3948	99		1.07	
1109	D3948	96		-0.29	
1126		-----		-----	
1212	D7224	96		-0.29	
1284		-----		-----	
1297		-----		-----	
1299	D3948	97		0.16	
1320		-----		-----	
1357	D3948	96		-0.29	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538	D3948	96		-0.29	
1564	D3948	98	C	0.62	first reported 91
1586	D3948	98		0.62	
1587	D7224	98	C	0.62	first reported 91
1610	D3948	96		-0.29	
1631	D3948	98		0.62	
1720	D3948	97		0.16	
1730		-----		-----	
1740		-----		-----	
1776	D3948	96		-0.29	
1810	D3948	95		-0.74	

lab	method	value	mark	z(targ)	remarks
1811	D3948	95		-0.74	
1884		-----		-----	
6075	D3948	97.0		0.16	
6114	D7224	98		0.62	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	
6376	D3948	96		-0.29	
6416	D3948	96		-0.29	

normality	OK
n	50
outliers	5
mean (n)	96.64
st.dev. (n)	1.306
R(calc.)	3.66
st.dev.(D3948:20)	2.210
R(D3948:20)	6.19



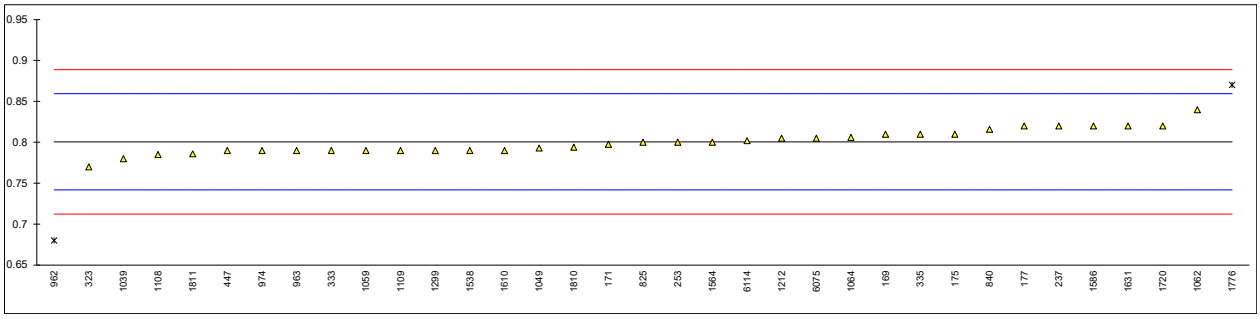


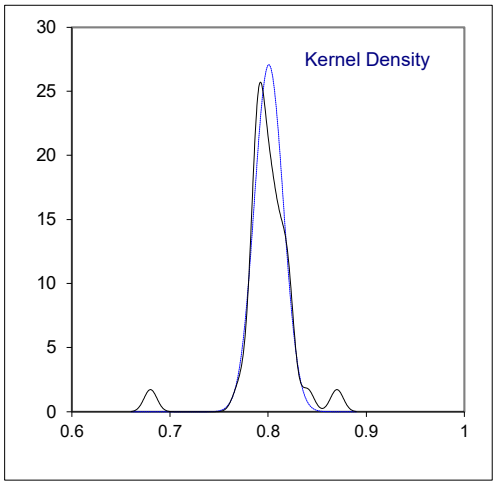
Determination of Naphthalenes on sample #22035; results in %V/V

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150		-----		-----	
159		-----		-----	
169	D1840-B	0.81	C	0.32	first reported 0.94
171	D1840-A	0.7976	C	-0.10	first reported 1.32
175	D1840-B	0.81		0.32	
177	D1840-B	0.82		0.66	
225		-----		-----	
228		-----		-----	
237	D1840-B	0.82		0.66	
238		-----		-----	
253	D1840-A	0.80		-0.02	
317		-----		-----	
323	D1840-A	0.77		-1.04	
328		-----		-----	
333	D1840-B	0.79		-0.36	
334		-----		-----	
335	D1840-B	0.81		0.32	
360		-----		-----	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D1840-B	0.79		-0.36	
594		-----		-----	
631		-----		-----	
633		-----		-----	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781		-----		-----	
782		-----		-----	
785		-----		-----	
825	D1840-B	0.80		-0.02	
840	D1840-A	0.816		0.52	
875		-----		-----	
922		-----		-----	
962	D1840-A	0.68	R(0.01)	-4.10	
963	D1840-A	0.79		-0.36	
970		-----		-----	
974	D1840-A	0.79		-0.36	
1039	D1840-B	0.78		-0.70	
1049	D1840-A	0.793		-0.26	
1059	D1840-B	0.79		-0.36	
1062	D1840-A	0.84		1.34	
1064	D1840-A	0.806		0.18	
1097		-----		-----	
1108	D1840-B	0.785		-0.53	
1109	D1840-B	0.790		-0.36	
1126		-----		-----	
1212	D1840-B	0.805		0.15	
1284		-----		-----	
1297		-----		-----	
1299	D1840-A	0.79		-0.36	
1320		-----		-----	
1357	D1840-A	n.a		-----	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538	D1840-B	0.79		-0.36	
1564	D1840-A	0.80		-0.02	
1586	D1840-A	0.82		0.66	
1587		-----		-----	
1610	D1840-A	0.79		-0.36	
1631	D1840-B	0.82		0.66	
1720	D1840-B	0.82		0.66	
1730		-----		-----	
1740		-----		-----	
1776	D1840-A	0.870	R(0.01)	2.36	
1810	D1840-A	0.794		-0.22	

lab	method	value	mark	z(targ)	remarks
1811	D1840-A	0.7860		-0.50	
1884		-----		-----	
6075	D1840-B	0.805		0.15	
6114	D1840-A	0.802		0.05	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	
6376		-----		-----	
6416		-----		-----	

	normality	OK
	n	33
	outliers	2
	mean (n)	0.8006
	st.dev. (n)	0.01473
	R(calc.)	0.0413
	st.dev.(D1840-B:07)	0.02938
	R(D1840-B:07)	0.0823
Compare		
	R(D1840-A:07)	0.0538



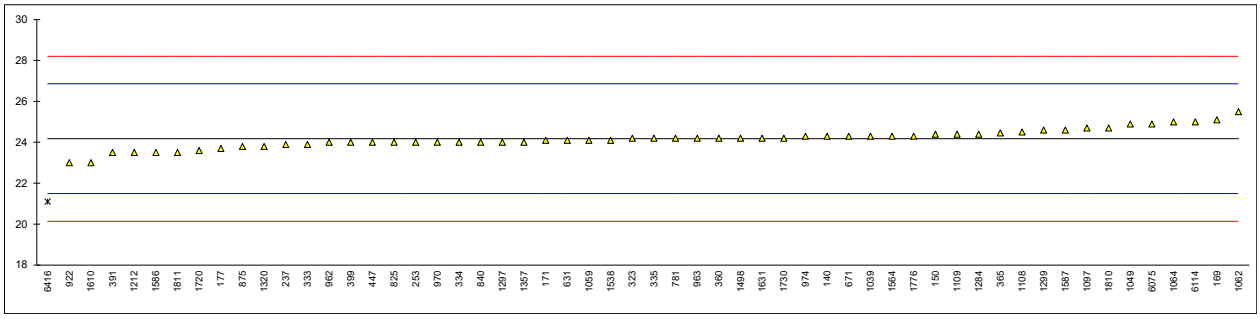


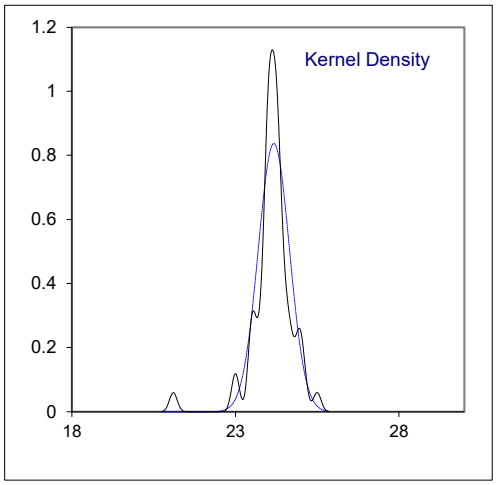
Determination of Smoke Point on sample #22035; results in mm

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140	D1322-automated	24.3		0.09	
150	D1322-automated	24.4		0.17	
159		-----		-----	
169	D1322-automated	25.1		0.69	
171	D1322-automated	24.1		-0.06	
175		-----		-----	
177	D1322-automated	23.7		-0.35	
225		-----		-----	
228		-----		-----	
237	D1322-automated	23.9		-0.21	
238		-----		-----	
253	D1322-manual	24		-0.13	
317		-----		-----	
323	D1322-automated	24.2		0.02	
328		-----		-----	
333	D1322-automated	23.9		-0.21	
334	D1322-automated	24.0		-0.13	
335	D1322-automated	24.2		0.02	
360	D1322-manual	24.2		0.02	
365	IP57-manual	24.46		0.21	
391	D1322-manual	23.5		-0.50	
396		-----		-----	
398		-----		-----	
399	D1322-manual	24		-0.13	
447	D1322-manual	24		-0.13	
594		-----		-----	
631	D1322-automated	24.1		-0.06	
633		-----		-----	
634		-----		-----	
663		-----		-----	
671	D1322-automated	24.3		0.09	
759		-----		-----	
781	D1322-manual	24.2		0.02	
782		-----		-----	
785		-----		-----	
825	D1322-manual	24.0		-0.13	
840	D1322-manual	24.0		-0.13	
875	D1322-manual	23.8		-0.28	
922	D1322-manual	23		-0.88	
962	D1322-manual	24.0		-0.13	
963	D1322-manual	24.2		0.02	
970	D1322-manual	24		-0.13	
974	D1322-automated	24.3		0.09	
1039	D1322-automated	24.3		0.09	
1049	D1322-automated	24.9		0.54	
1059	D1322-automated	24.1		-0.06	
1062	D1322-manual	25.5		0.99	
1064	D1322-automated	25.0		0.61	
1097	D1322-automated	24.7		0.39	
1108	D1322-automated	24.5		0.24	
1109	D1322-automated	24.4		0.17	
1126		-----		-----	
1212	D1322-manual	23.5		-0.50	
1284	D1322-automated	24.4		0.17	
1297	D1322-manual	24		-0.13	
1299	D1322-automated	24.6		0.32	
1320	D1322-automated	23.8		-0.28	
1357	D1322-manual	24		-0.13	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498	D1322-manual	24.2		0.02	
1531		-----		-----	
1538	D1322-manual	24.1		-0.06	
1564	D1322-automated	24.3		0.09	
1586	D1322-manual	23.5		-0.50	
1587	D1322-automated	24.6		0.32	
1610	IP598-manual	23.0		-0.88	
1631	D1322-automated	24.2		0.02	
1720	D1322-automated	23.6		-0.43	
1730	D1322-automated	24.2		0.02	
1740		-----		-----	
1776	D1322-automated	24.3		0.09	
1810	D1322-automated	24.7		0.39	

lab	method	value	mark	z(targ)	remarks
1811	D1322-automated	23.5		-0.50	
1884		-----		-----	
6075	D1322-automated	24.9		0.54	
6114	D1322-manual	25.0		0.61	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	
6376		-----		-----	
6416	D1322-manual	21.1	R(0.01)	-2.29	

	normality	OK
	n	55
	outliers	1
	mean (n)	24.18
	st.dev. (n)	0.477
	R(calc.)	1.33
	st.dev.(D1322-M:19)	1.343
	R(D1322-M:19)	3.76
Compare		
	R(D1322-A:19)	0.89



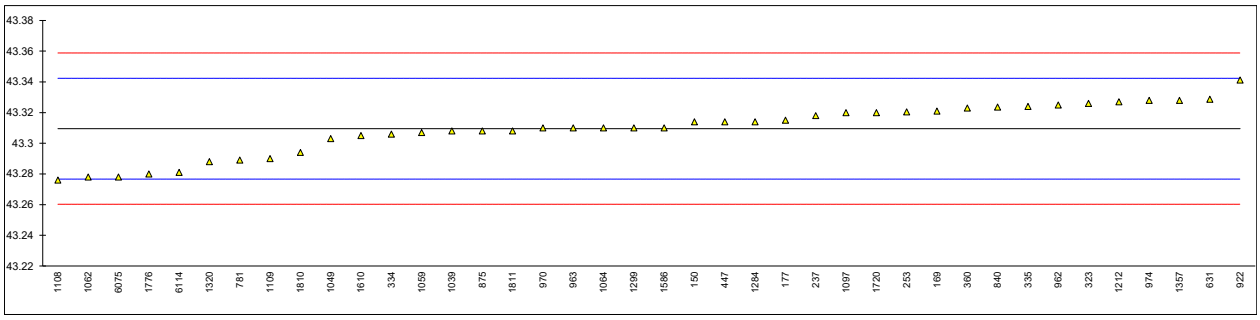


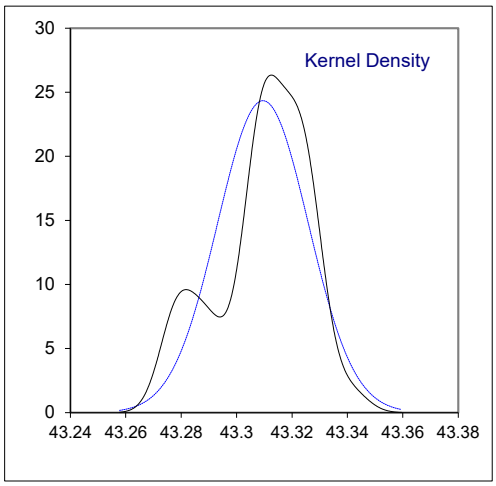
Determination of Specific Energy (Net) on Sulfur free basis on sample #22035; results in MJ/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D3338	43.314		0.27	
159		-----		-----	
169	D3338	43.321		0.70	
171		-----		-----	
175		-----		-----	
177	D3338	43.315		0.34	
225		-----		-----	
228		-----		-----	
237	D3338	43.318		0.52	
238		-----		-----	
253	D3338	43.3204		0.66	
317		-----		-----	
323	D3338	43.326		1.00	
328		-----		-----	
333		-----		-----	
334	D3338	43.306	C	-0.21	first reported 43.153
335	D3338	43.324	C	0.88	first reported 43.358
360	D3338	43.323		0.82	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D3338	43.314		0.27	
594		-----		-----	
631	D3338	43.3287		1.17	
633		-----		-----	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	D3338	43.289		-1.25	
782		-----		-----	
785		-----		-----	
825		-----		-----	
840	D3338	43.3235		0.85	
875	D3338	43.308		-0.09	
922	D3338	43.3412		1.93	
962	D3338	43.325		0.94	
963	D3338	43.31		0.03	
970	D3338	43.31		0.03	
974	D3338	43.328		1.13	
1039	D3338	43.308		-0.09	
1049	D3338	43.303		-0.40	
1059	D3338	43.307		-0.15	
1062	D3338	43.278		-1.92	
1064	D3338	43.310		0.03	
1097	D3338	43.320		0.64	
1108	D3338	43.276		-2.04	
1109	D3338	43.29		-1.19	
1126		-----		-----	
1212	D3338	43.327	C	1.07	first reported 43.383
1284	D3338	43.314		0.27	
1297		-----		-----	
1299	D3338	43.31		0.03	
1320	D3338	43.288		-1.31	
1357	D3338	43.328		1.13	
1429		-----		-----	
1483		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1564		-----		-----	
1586	D3338	43.310		0.03	
1587		-----		-----	
1610	D3338	43.305		-0.27	
1631		-----		-----	
1720	D3338	43.32		0.64	
1730		-----		-----	
1740		-----		-----	
1776	D3338	43.28		-1.80	
1810	D3338	43.294		-0.94	

lab	method	value	mark	z(targ)	remarks
1811	D3338	43.308		-0.09	
1884		-----		-----	
6075	D3338	43.2780		-1.92	
6114	D3338	43.281		-1.73	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	
6376		-----		-----	
6416		-----		-----	

normality	OK
n	40
outliers	0
mean (n)	43.3095
st.dev. (n)	0.01639
R(calc.)	0.0459
st.dev.(D3338:20a)	0.01643
R(D3338:20a)	0.0460



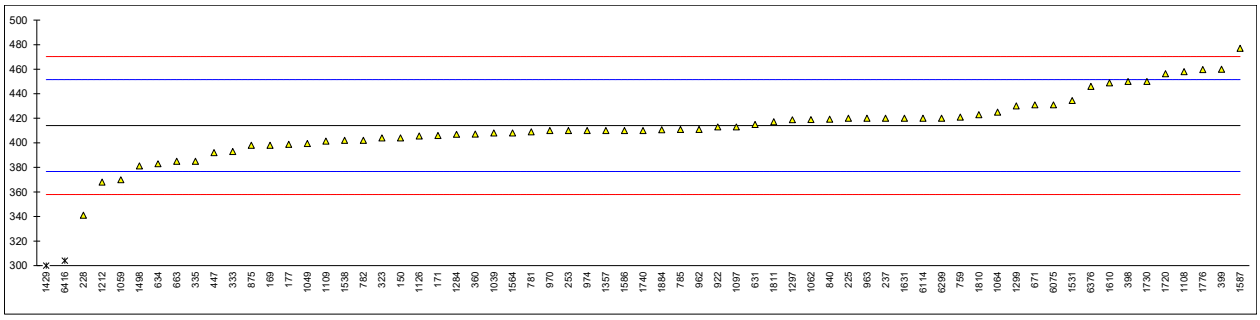


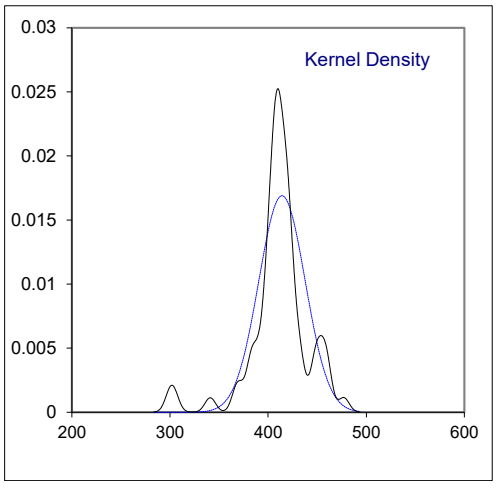
Determination of Total Sulfur on sample #22035; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D5453	404		-0.54	
159		-----		-----	
169	D4294	398		-0.86	
171	D5453	406		-0.43	
175		-----		-----	
177	D4294	398.9	C	-0.81	first reported 0.0399 mg/kg
225	D4294	420		0.32	
228	D4294	341		-3.90	
237	D4294	420		0.32	
238		-----		-----	
253	D4294	410		-0.22	
317		-----		-----	
323	D5453	404		-0.54	
328		-----		-----	
333	D5453	393		-1.12	
334		-----		-----	
335	D4294	385		-1.55	
360	D5453	407.2		-0.37	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398	D5453	450		1.92	
399	D4294	460		2.45	
447	IP336	392	C	-1.18	first reported 0.04 mg/kg
594		-----		-----	
631	D4294	415		0.05	
633		-----		-----	
634	D4294	383		-1.66	
663	D5453	385.0		-1.55	
671	D7039	431.0	C	0.90	first reported 354.2
759	D4294	421		0.37	
781	D4294	409		-0.27	
782	D2622	402.05		-0.64	
785	D4294	411		-0.16	
825		-----		-----	
840	D5453	419.3		0.28	
875	D4294	398		-0.86	
922	D4294	413		-0.06	
962	D4294	411		-0.16	
963	D4294	420		0.32	
970	D4294	410		-0.22	
974	D4294	410		-0.22	
1039	D2622	408		-0.32	
1049	D5453	399.5		-0.78	
1059	ISO14596	370	C	-2.35	first reported 350
1062	D5453	419		0.26	
1064	D5453	425.1		0.59	
1097	ISO8754	413		-0.06	
1108	D4294	458		2.34	
1109	D2622	401.4		-0.68	
1126	D5453	405.6		-0.45	
1212	D5453	368.1		-2.45	
1284	D2622	407		-0.38	
1297	D4294	418.8		0.25	
1299	D2622	430.1		0.86	
1320		-----		-----	
1357	D5453	410		-0.22	
1429	D5453	300	R(0.01)	-6.09	
1483		-----		-----	
1496		-----		-----	
1498	D5453	381.2		-1.75	
1531	ISO20846	434.5		1.09	
1538	D4294	402		-0.64	
1564	ISO20846	408		-0.32	
1586	D5453	410		-0.22	
1587	D4294	477		3.36	
1610	IP336	449		1.86	
1631	ISO8754	420		0.32	
1720	D5453	456.41		2.26	
1730	D4294	450		1.92	
1740	ISO8754	410		-0.22	
1776	ISO20846	459.8		2.44	
1810	D4294	423.0		0.48	

lab	method	value	mark	z(targ)	remarks
1811	D5453	417.2		0.17	
1884	D5453	410.7		-0.18	
6075	D4294	431		0.90	
6114	D4294	420		0.32	
6142		-----		-----	
6192		-----		-----	
6299	D5453	420		0.32	
6312		-----		-----	
6376	D4294	446		1.70	
6416	D5453	304	R(0.01)	-5.87	

	normality	suspect
	n	63
	outliers	2
	mean (n)	414.08
	st.dev. (n)	23.636
	R(calc.)	66.18
	st.dev.(D5453:19a)	18.737
	R(D5453:19a)	52.46
Compare		
	R(D4294:21)	93.30
	R(D2622:21)	53.50

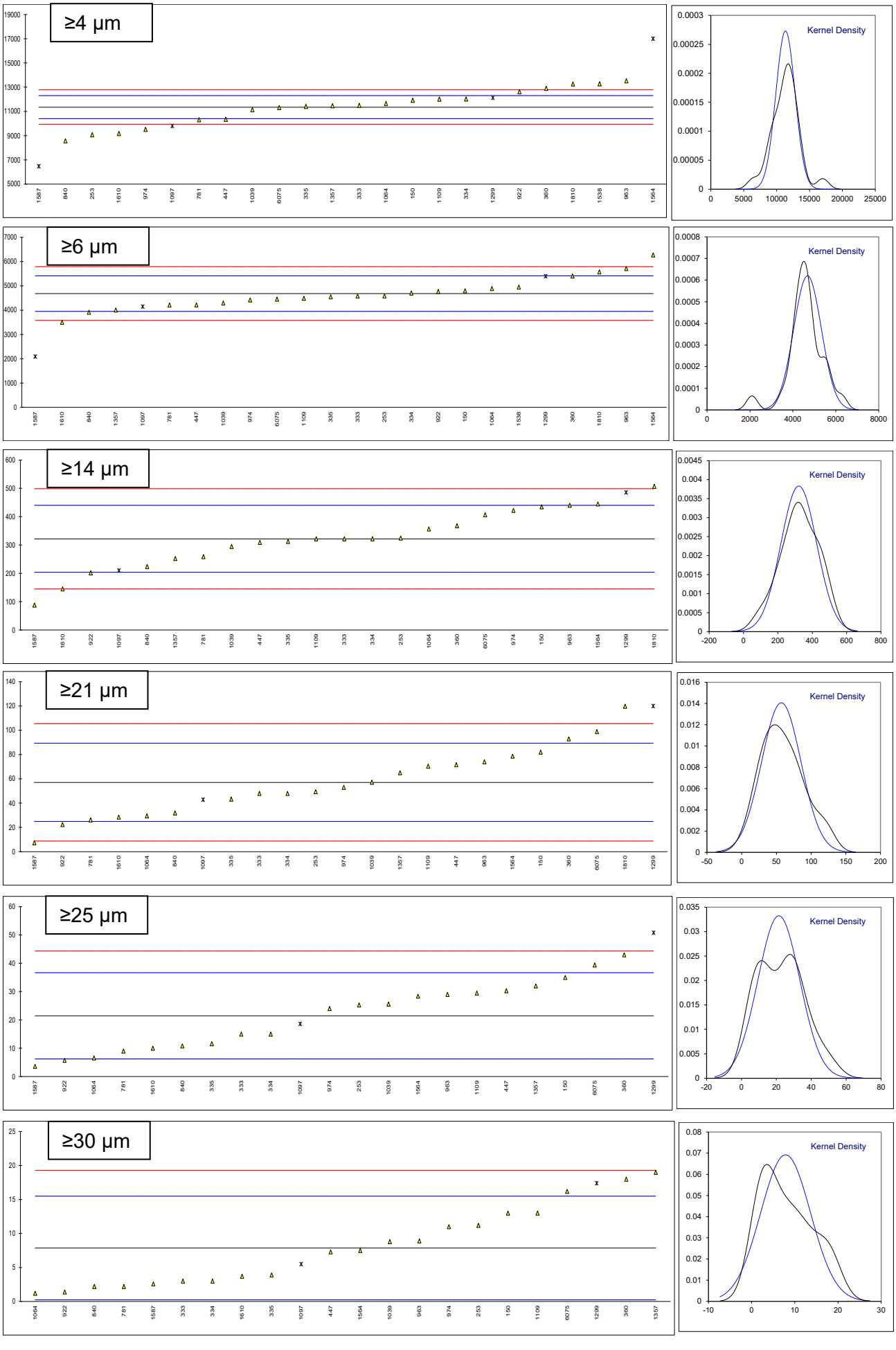




Determination of Particle Size Distribution on sample #22036 acc. to IP565, results in counts/mL

lab	method	≥4 µm (c)	m	≥6 µm(c)	m	≥14 µm (c)	m	≥21 µm (c)	m	≥25 µm (c)	m	≥30 µm (c)	m
140		-----		-----		-----		-----		-----		-----	
150	IP565	11920		4803		435		82		35		13	
171		-----		-----		-----		-----		-----		-----	
225		-----		-----		-----		-----		-----		-----	
237		-----		-----		-----		-----		-----		-----	
253	IP565	9073.4	C	4583.7	C	324.5		49.4		25.3		11.2	
323		-----		-----		-----		-----		-----		-----	
333	IP565	11496		4581		322		48		15		3	
334	IP565	12022		4705		322		48		15		3	
335	IP565	11404.8		4550.7		312.6		43.3		11.6		3.9	
360	IP565	12897		5407		368		93		43		18	
447	IP565	10348.8		4215.7		309.3		71.6		30.3		7.3	
781	IP565	10312.8		4214.2		258.8		26.2		9.0		2.2	
825		-----		-----		-----		-----		-----		-----	
840	IP565	8563.1		3915.5		224.0		31.9		10.8		2.2	
922	IP565	12612.7		4767.6		201.8		22.3		5.7		1.4	
963	IP565	13524.1		5716.5		440.3		74.0		29.0		8.9	
974	IP565	9520	C	4424	C	422		53		24		11	
1039	IP565	11132.0		4294.1		294.7		57.2		25.6		8.8	
1064	IP565	11638.0		4891.5		356.5		29.5		6.6		1.2	
1097	IP564	9796.9	ex	4148.3	ex	210.0	ex	42.9	ex	18.6	ex	5.5	ex
1108		-----		-----		-----		-----		-----		-----	
1109	IP565	12010.7		4488.5		321.9		70.4		29.5		13	
1299	IP577	12115.5	ex	5397.3	ex	485.5	ex	120.0	ex	50.8	ex	17.4	ex
1320		-----		-----		-----		-----		-----		-----	
1357	IP565	11468		4009		252		65		32		19	
1496		-----		-----		-----		-----		-----		-----	
1538	IP565	13276.6		4948.1		-----		-----		-----		-----	
1564	IP565	16998.8	R(5)	6276.1		445.2		78.7		28.4		7.5	
1587	IP565	6473.1	R(5)	2092.0	R(5)	87.8		7.3		3.6		2.6	
1610	IP565	9175.6		3501.5		144.8		28.5		10.0		3.7	
1810	IP565	13265.5		5574.7		507.3		119.8		-----	W	-----	W
6075	IP565	11311.6		4452.8		406.6		98.9		39.4		16.2	
normality		OK		OK		OK		OK		OK		OK	
n		20		21		21		21		20		20	
outliers		2 +2ex		1 +2ex		0 +2ex		0 +2ex		0 +2ex		0 +2ex	
mean (n)		11348.63		4681.91		321.77		57.05		21.44		7.85	
st.dev. (n)		1461.492		643.642		104.148		28.357		11.999		5.762	
R(calc.)		4092.18		1802.20		291.62		79.40		33.60		16.13	
st.dev.(IP565:13)		474.782		368.841		59.007		16.115		7.615		3.814	
R(IP565:13)		1329.39		1032.76		165.22		45.12		21.32		10.68	

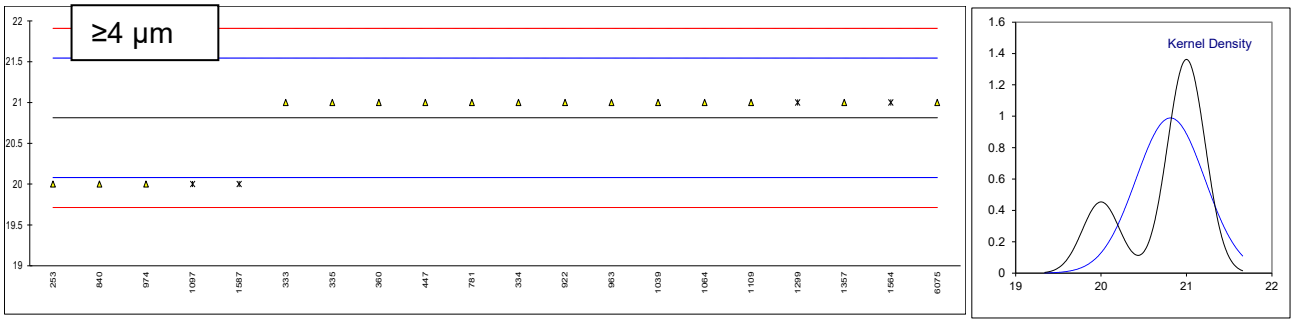
Lab 253 first reported 5463.5 and 1540.0 respectively
Lab 974 first reported 5202 and 1022 respectively
Lab 1097 test results excluded as test method IP564 was used for the determination, see also §4.1
Lab 1299 test results excluded as test method IP577 was used for the determination, see also §4.1
Lab 1810 test results withdrawn, reported 61.9 and 27.8 respectively

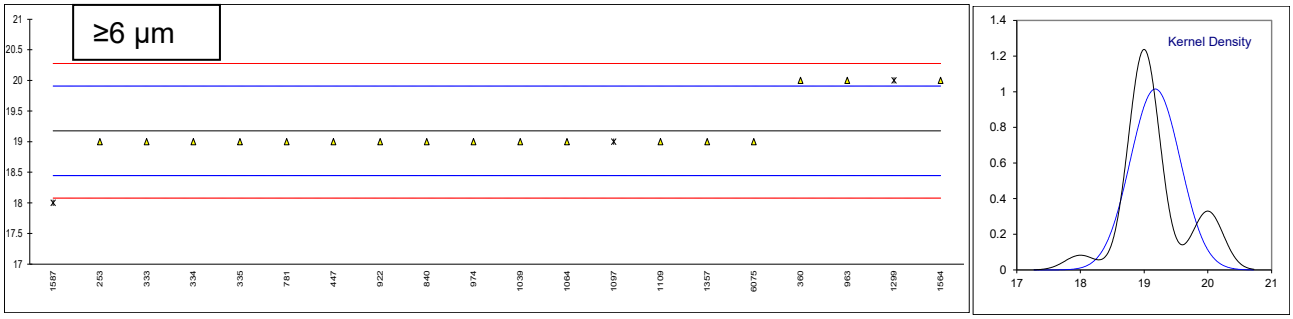

≥4 µm
Kernel Density
≥6 µm
Kernel Density
≥14 µm
Kernel Density
≥21 µm
Kernel Density
≥25 µm
Kernel Density
≥30 µm
Kernel Density

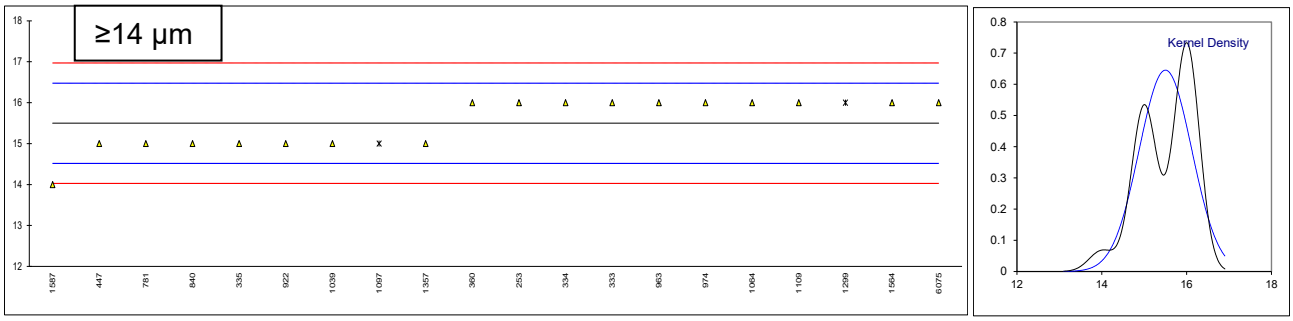
Determination of Particle Size Distribution by IP565 on sample #22036, results in ISO scale numbers

lab	method	≥4µm(c)	mark	z(targ)	≥6µm(c)	mark	z(targ)	≥14 µm (c)	mark	z(targ)
140		-----		-----	-----		-----	-----		-----
150		-----		-----	-----		-----	-----		-----
171		-----		-----	-----		-----	-----		-----
225		-----		-----	-----		-----	-----		-----
237		-----		-----	-----		-----	-----		-----
253	ISO4406 acc. to IP565	20		-2.22	19		-0.48	16		1.02
323		-----		-----	-----		-----	-----		-----
333	ISO4406 acc. to IP565	21		0.51	19		-0.48	16		1.02
334	ISO4406 acc. to IP565	21		0.51	19		-0.48	16		1.02
335	ISO4406 acc. to IP565	21		0.51	19		-0.48	15		-1.02
360	ISO4406 acc. to IP565	21		0.51	20		2.25	16		1.02
447	ISO4406 acc. to IP565	21		0.51	19		-0.48	15		-1.02
781	ISO4406 acc. to IP565	21		0.51	19		-0.48	15		-1.02
825		-----		-----	-----		-----	-----		-----
840	ISO4406 acc. to IP565	20		-2.22	19		-0.48	15		-1.02
922	ISO4406 acc. to IP565	21		0.51	19		-0.48	15		-1.02
963	ISO4406 acc. to IP565	21		0.51	20		2.25	16		1.02
974	ISO4406 acc. to IP565	20		-2.22	19	C	-0.48	16		1.02
1039	ISO4406 acc. to IP565	21		0.51	19		-0.48	15		-1.02
1064	ISO4406 acc. to IP565	21		0.51	19		-0.48	16		1.02
1097	ISO4406 acc. to IP564	20	ex	-2.22	19	ex	-0.48	15	ex	-1.02
1108		-----		-----	-----		-----	-----		-----
1109	ISO4406 acc. to IP565	21		0.51	19		-0.48	16		1.02
1299	ISO4406 acc. to IP577	21	ex	0.51	20	ex	2.25	16	ex	1.02
1320		-----		-----	-----		-----	-----		-----
1357	ISO4406 acc. to IP565	21		0.51	19		-0.48	15		-1.02
1496		-----		-----	-----		-----	-----		-----
1538		-----		-----	-----		-----	-----		-----
1564	ISO4406 acc. to IP565	21	ex	0.51	20		2.25	16		1.02
1587	ISO4406 acc. to IP565	20	ex	-2.22	18	ex	-3.21	14		-3.06
1610		-----		-----	-----		-----	-----		-----
1810		-----		-----	-----		-----	-----		-----
6075	ISO4406 acc. to IP565	21		0.51	19		-0.48	16		1.02
	normality	suspect			not OK			OK		
	n	16			17			18		
	outliers	0 +4ex			0 +3ex			0 +2ex		
	mean (n)	20.81			19.18			15.50		
	st.dev. (n)	0.403			0.393			0.618		
	R(calc.)	1.13			1.10			1.73		
	st.dev.(IP565:13)	0.366			0.366			0.490		
	R(IP565:13)	1.03			1.03			1.37		

Lab 974 first reported 17
Lab 1097 test results excluded as test method IP564 was used for the determination, see also §4.1
Lab 1299 test results excluded as test method IP577 was used for the determination, see also §4.1
Lab 1564 test result at ≥4 µm excluded as statistical outlier in relating parameter at counts/mL
Lab 1587 test results at ≥4 and ≥6 µm excluded as statistical outliers in relating parameters at counts/mL


≥4 µm
Kernel Density


≥6 µm
Kernel Density


≥14 µm
Kernel Density

APPENDIX 2

z-scores of Distillation

lab	IBP	10% rec	50% rec	90% rec	FBP
120	-----	-----	-----	-----	-----
140	-0.02	0.30	-0.64	-0.70	0.15
150	-0.57	-0.60	-0.73	-0.23	-0.60
159	-----	-----	-----	-----	-----
169	0.83	0.60	0.57	0.24	0.58
171	-0.02	0.38	-0.27	-1.79	-0.88
175	-0.29	-0.30	0.39	1.33	0.70
177	-0.43	0.22	0.76	-0.54	0.11
225	0.32	0.15	0.20	0.40	0.78
228	-0.70	0.15	0.20	-0.77	-0.01
237	0.32	1.66	1.13	2.35	1.17
238	-0.36	-1.36	-0.73	-0.77	-0.40
253	0.32	0.90	-0.27	0.01	0.38
317	0.05	0.30	0.48	0.79	0.70
323	-2.10	0.15	0.67	1.33	0.03
328	-0.84	-0.30	-0.27	-1.16	-0.72
333	-0.81	-0.83	-0.17	-0.85	-0.33
334	-0.23	-0.15	0.01	-0.85	-0.88
335	0.35	0.68	0.20	0.32	-1.19
360	-0.26	-0.45	-0.08	-0.15	-0.68
365	-2.38	-1.43	-0.73	0.48	-0.64
391	-----	-----	-----	-----	-----
396	-----	-----	-----	-----	-----
398	-----	-----	-----	-----	-----
399	-----	-----	-----	-----	-----
447	0.25	0.90	0.85	0.94	0.62
594	1.14	-0.60	0.57	0.63	0.54
631	0.32	-0.60	-0.27	0.79	0.38
633	1.35	0.30	0.76	1.41	0.15
634	0.39	0.22	0.39	0.40	-0.64
663	-0.04	-0.19	-0.55	-0.70	-0.23
671	0.49	-3.47	-0.73	1.10	-0.68
759	-0.53	-0.98	-0.27	0.01	0.38
781	-0.53	-0.08	0.29	-0.31	0.19
782	-0.17	-1.06	0.20	0.55	0.68
785	-0.26	-1.13	-1.11	-1.48	-0.92
825	1.72	-0.53	0.11	-0.07	0.07
840	-0.90	-0.08	0.22	1.60	0.67
875	-1.05	0.38	0.11	-0.23	0.50
922	0.80	1.43	1.04	1.26	-0.29
962	0.18	-0.08	0.01	-0.46	-0.96
963	-0.19	0.30	0.48	-0.46	-0.33
970	0.63	0.98	0.76	0.48	-0.48
974	0.05	1.36	1.04	0.16	-0.72
1039	0.70	0.22	-0.17	-0.23	0.66
1049	0.42	0.00	0.29	0.79	0.35
1059	0.53	0.15	-0.27	-0.46	0.15
1062	-1.28	-0.60	-0.36	-1.32	-0.44
1064	0.22	-0.23	0.29	1.02	0.82
1097	0.53	0.15	0.76	1.10	0.15
1108	-4.56	0.68	0.11	-1.01	0.27
1109	-0.36	0.22	0.76	0.32	-0.17
1126	0.01	0.00	-0.08	-0.93	1.57
1212	0.15	0.38	0.57	1.02	0.27
1284	-0.19	-0.45	-1.20	-1.16	-1.00
1297	-0.98	0.30	0.20	-1.09	-0.29
1299	0.32	0.83	0.95	1.49	1.33
1320	0.18	0.30	-0.08	-1.32	-0.52
1357	-0.64	-1.28	-1.11	-0.46	-0.96
1429	-0.53	-1.13	-0.55	0.24	-0.84
1483	-----	-----	-----	-----	-----
1496	-----	-----	-----	-----	-----
1498	0.49	0.00	0.85	2.12	0.94
1531	0.32	0.00	0.48	0.55	0.19
1538	0.70	0.22	1.41	1.41	1.69
1564	-0.98	-0.08	0.01	0.01	0.46
1586	0.83	0.75	0.20	0.63	-0.01
1587	0.18	0.22	0.01	-0.54	-0.09
1610	0.18	0.53	0.39	0.08	0.74
1631	0.25	-0.30	-0.45	-0.93	0.35
1720	0.22	1.66	0.85	-1.16	1.45
1730	0.35	1.05	-1.85	0.32	0.78
1740	0.80	0.15	-0.08	-0.15	-0.44
1776	-1.01	-0.45	-0.45	0.48	-0.72
1810	-0.60	-0.60	-0.83	-1.09	-1.43

lab	IBP	10% rec	50% rec	90% rec	FBP
1811	-0.67	-1.06	-1.39	-1.40	-0.64
1884	0.49	-1.81	-1.57	-1.56	0.07
6075	0.29	0.38	-0.08	-1.09	-1.23
6114	-0.23	0.00	-0.17	-0.85	-0.48
6142	-----	-----	-----	-----	-----
6192	0.22	-1.43	-1.95	-2.80	-0.36
6299	-0.70	-0.30	0.39	0.55	-1.00
6312	-----	-----	-----	-----	-----
6376	1.00	1.66	0.20	2.35	1.57
6416	-0.43	-0.68	-0.64	0.01	-0.40

z-scores of Particle Size Distribution

on sample #22036 acc. to IP565, in counts/mL

lab	≥4 µm	≥6 µm	≥14 µm	≥21 µm	≥25 µm	≥30 µm
140	-----	-----	-----	-----	-----	-----
150	1.20	0.33	1.92	1.55	1.78	1.35
171	-----	-----	-----	-----	-----	-----
225	-----	-----	-----	-----	-----	-----
237	-----	-----	-----	-----	-----	-----
253	-4.79	-0.27	0.05	-0.47	0.51	0.88
323	-----	-----	-----	-----	-----	-----
333	0.31	-0.27	0.00	-0.56	-0.85	-1.27
334	1.42	0.06	0.00	-0.56	-0.85	-1.27
335	0.12	-0.36	-0.16	-0.85	-1.29	-1.04
360	3.26	1.97	0.78	2.23	2.83	2.66
447	-2.11	-1.26	-0.21	0.90	1.16	-0.15
781	-2.18	-1.27	-1.07	-1.91	-1.63	-1.48
825	-----	-----	-----	-----	-----	-----
840	-5.87	-2.08	-1.66	-1.56	-1.40	-1.48
922	2.66	0.23	-2.03	-2.16	-2.07	-1.69
963	4.58	2.80	2.01	1.05	0.99	0.27
974	-3.85	-0.70	1.70	-0.25	0.34	0.82
1039	-0.46	-1.05	-0.46	0.01	0.55	0.25
1064	0.61	0.57	0.59	-1.71	-1.95	-1.74
1097	-3.27	-1.45	-1.89	-0.88	-0.37	-0.62
1108	-----	-----	-----	-----	-----	-----
1109	1.39	-0.52	0.00	0.83	1.06	1.35
1299	1.62	1.94	2.77	3.91	3.86	2.50
1320	-----	-----	-----	-----	-----	-----
1357	0.25	-1.82	-1.18	0.49	1.39	2.92
1496	-----	-----	-----	-----	-----	-----
1538	4.06	0.72	-----	-----	-----	-----
1564	11.90	4.32	2.09	1.34	0.91	-0.09
1587	-10.27	-7.02	-3.97	-3.09	-2.34	-1.38
1610	-4.58	-3.20	-3.00	-1.77	-1.50	-1.09
1810	4.04	2.42	3.14	3.89	-----	-----
6075	-0.08	-0.62	1.44	2.60	2.36	2.19

APPENDIX 3

Equipment used in Particle Size Distribution

lab	Equipment	Test Method based on equipment	Test Method reported	Calibration method reported
140				
150	Stanhope-Seta	IP565	IP565	ISO11171
171				
225				
237				
253	Stanhope-Seta	IP565	IP565	
323				
333	Stanhope-Seta	IP565	IP565	ISO11171
334	Stanhope-Seta	IP565	IP565	ISO11171
335	Stanhope-Seta	IP565	IP565	ISO11171
360	Stanhope-Seta	IP565	IP565	ISO11171
447	Stanhope-Seta	IP565	IP565	ISO11171
781	Stanhope-Seta	IP565	IP565	ISO11171
825				
840	Stanhope-Seta	IP565	IP565	ISO11171
922	Stanhope-Seta	IP565	IP565	ISO11171
963	Stanhope-Seta	IP565	IP565	ISO11171
974	Stanhope-Seta	IP565	IP565	ISO11171
1039	Stanhope-Seta	IP565	IP565	ISO11171
1064	Stanhope-Seta	IP565	IP565	ISO11171
1097	Parker Hannifin	IP564	IP564	ISO11171
1108				
1109	Stanhope-Seta	IP565	IP565	ISO11171
1299	Pamas	IP577	IP577	ISO11171
1320				
1357	Stanhope-Seta	IP565	IP565	
1496				
1538	Stanhope-Seta	IP565	IP565	ISO11171
1564	Stanhope-Seta	IP565	IP565	ISO11171
1587	Stanhope-Seta	IP565	IP565	ISO11171
1610	Stanhope-Seta	IP565	IP565	ISO11171
1810	Stanhope-Seta	IP565	IP565	ISO11171
6075	Stanhope-Seta	IP565	IP565	ISO11171

APPENDIX 4

Number of participants per country

1 lab in ALGERIA
1 lab in AUSTRALIA
3 labs in BELGIUM
1 lab in BULGARIA
2 labs in CHILE
1 lab in CHINA, People's Republic
1 lab in COTE D'IVOIRE
2 labs in CZECH REPUBLIC
1 lab in DENMARK
1 lab in DJIBOUTI
6 labs in FRANCE
1 lab in FRENCH GUIANA
1 lab in GEORGIA
1 lab in GERMANY
6 labs in GREECE
1 lab in GUAM
2 labs in IRELAND
4 labs in ITALY
1 lab in KOREA, Republic of
1 lab in MALTA
1 lab in MARTINIQUE
1 lab in MAURITIUS
4 labs in NETHERLANDS
2 labs in NIGERIA
2 labs in OMAN
1 lab in PAKISTAN
3 labs in PHILIPPINES
1 lab in POLAND
1 lab in QATAR
5 labs in RUSSIAN FEDERATION
2 labs in SAUDI ARABIA
1 lab in SLOVAKIA
1 lab in SLOVENIA
2 labs in SPAIN
1 lab in SUDAN
2 labs in SWEDEN
1 lab in THAILAND
1 lab in TOGO
1 lab in TURKEY
1 lab in UNITED ARAB EMIRATES
4 labs in UNITED KINGDOM
8 labs in UNITED STATES OF AMERICA
1 lab in VIETNAM

APPENDIX 5

Abbreviations

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01) or R(1)	= outlier in Rosner's outlier test
R(0.05) or R(5)	= straggler in Rosner's outlier test
E	= calculation difference between reported test result and result calculated by iis
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

Literature

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