Institute for
Interlaboratory Studies

Results of Proficiency Test
Jet Fuel A1
March 2023

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1995 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Jet Fuel A1 twice a year based on 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 2022/2023 it was decided to continue the round robin for the analysis of Jet Fuel A1.

In this interlaboratory study registered for participation:
- 79 laboratories in 38 countries for regular analyzes in Jet Fuel A1 iis23J01
- 36 laboratories in 27 countries on Jet Fuel A1 Particle Size Distribution iis23J01PS

In total 80 laboratories in 39 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.
In this proficiency test the participants received, depending on the registration, one or two different samples of Jet Fuel, see table below.

Sample ID	PT ID	Quantity	Purpose
#23035	iis23J01	2x 1 L	Regular analyzes
#23036	iis23J01PS	1x 0.5 L	Particle Size Distribution

Table 1: Jet Fuel samples used in PT iis23J01

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 240 L of Jet Fuel A1 was obtained from a third party. After homogenization 220 amber glass bottles of 1 L were filled and labelled #23035.
The homogeneity of the subsamples was checked by the determination of Density at 15 °C in accordance with ASTM D4052 on 10 stratified randomly selected subsamples.

	Density at 15 °C in kg/m^3
sample #23035-1	802.59
sample #23035-2	802.58
sample #23035-3	802.58
sample #23035-4	802.59
sample #23035-5	802.59
sample #23035-6	802.59
sample #23035-7	802.59
sample #23035-8	802.60
sample #23035-9	802.59
sample #23035-10	802.60

Table 2: homogeneity test results of subsamples #23035

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 3: evaluation of the repeatability of subsamples #23035

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 30 L of Jet Fuel A1 was obtained from a third party. After homogenization 55 amber glass bottles of 0.5 L were filled and labelled #23036. Each bottle was spiked with 1 mL of Lube Oil which contained suspended Arizona Dust before filling with Jet Fuel A1. 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 #23036-1	14266	3834
sample #23036-2	14359	3691
sample #23036-3	13794	4011
sample #23036-4	15044	4275
sample #23036-5	15382	4464
sample #23036-6	14826	4294
sample #23036-7	14601	4219
sample #23036-8	14442	4085

Table 4: homogeneity test results of subsamples #23036

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 eighteen iis PTs of IP565 test data from 2014 – 2022 in agreement with the procedure of ISO13528, Annex B2 in the next table.

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

Table 5: evaluation of the relative standard deviations of subsamples #23036

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 22, 2023. 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 type of bottle was chosen in accordance with ASTM D4306:20. The material was found sufficiently stable for the period of the proficiency test.

2.6 ANALYZES

The participants were requested to determine on sample #23035: 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 #23036 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.

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 five participants reported test results after the final reporting date and five other participants did not report any test results.
For the Jet Fuel A1 Particle Size PT one participant reported test results after the final reporting date and eight other participants did not report any test results. Not all participants were able to report all tests requested.
In total 74 participants reported 1363 numerical test results. Observed were 36 outlying test results, which is 2.6%. 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). When a method has been reapproved an “R” will be added and the year of approval (e.g. D3242:11R17).

The participants are advised to monitor the updates of the Joint Fuelling System Check List for Jet-A1 because it is continuously updated. The latest version at the time of this round robin is DEF STAN 91-091/Issue 14, March 2022 and ASTM D1655:22a. One must keep in mind that ISO test methods are not mentioned in the “Checklist”.

sample #23035

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 problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D3242:11R17.

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 for a number of particpants. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D6379:21e1.

Di Aromatics (DAH) by HPLC: This determination was problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D6379:21e1.

Total Aromatics by HPLC in %M/M: This determination was not problematic. No statistical outliers were observed but five other test result were excluded. The calculated reproducibility after rejection of the suspect data is in agreement with ASTM D6379:21e1.

Total Aromatics by HPLC in %V/V: This determination was problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with ASTM D6379:21e1.

Color Saybolt (automated): This determination was very problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the requirements of ASTM D6045:20. When the test results were evaluated separately for a 50 mm and 100 mm cell both calculated reproducibilities are still not in agreement.

Color Saybolt (manual): This determination was 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 may be problematic depending on the method used. One statistical outlier was observed over five parameters. The calculated reproducibilities after rejection of the statistical outlier are all in agreement with the requirements of the automated method of ASTM D86:23.

When compared to the manual mode requirements of ASTM D86:23 only the calculated reproducibilities for 10%, 50% and 90% recovered are in agreement.

Existent Gum (unwashed): This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D381:22 and IP540:08R19.

Flash Point: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of IP170:21.

Freezing Point: 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 D2386:19.

Kin. Viscosity at -20 °C: This determination was problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D445:19.
It was decided to evaluate against the requirements of ASTM D445:19 because the requirements of ASTM D445:21 is very strict compared to the requirements from version ASTM D445:19.

Mercaptan Sulfur: 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 D3227:16.

MSEP: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D3948:22.

Naphthalenes: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1840:22.
Unlike previous versions the updated version ASTM D1840:22 does no more distinguish between procedure A and B. Therefore, it was decided not to evaluate the test results separately for procedure A and B because it is not clear from the input of the participants from which year the test method ASTM D1840 has been used.

Smoke Point: This determination may be problematic depending on test mode used. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of the manual mode of ASTM D1322:22 but not with the much stricter requirements of the automated mode.

Specific Energy (Net) on Sulfur free basis: 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 ASTM D3338:20a. No calculation differences were observed.

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

The Joint Fuelling System Check List for Jet-A1 mentions for the Particle Size Distribution Determination the 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. Two participants reported to have used IP577 and one participant reported IP564 which is not mentioned in the Checklist as reference test method since 2020. Therefore, it was decided to exclude the test results determined with IP564 from the statistical evaluation.
In previous iis PTs also the test results of IP577 were excluded as it is known that a (small) bias exsists between IP565 and IP577 (see literature 13). However, in this PT the test results from IP577 were not different from the variation observed from the IP565 test results.
Almost all reporting participants used ISO11171 for the calibration and all reporting participants used ISO4406 for calculating the scale numbers from the counts per mL.

sample #23036

Counts/mL: This determination was problematic. In total eight statistical outliers were observed and nine 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 may be problematic depending on the particle size channel. No statistical outliers were observed but six test results were excluded over three parameters. The calculated reproducibilities after rejection of the suspect data are not in agreement with the indicative requirements of IP565:13 Annex C for particle size channels ≥6 µm (c) and ≥14 µm (c) but it is in agreement for particle size channel ≥14 µm (c).

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		59	C&B (Pass)	n.a.	n.a.
Total Acidity	mg KOH/g	34	0.0015	0.0021	0.0016
Aromatics by FIA	%V/V	27	18.23	2.18	3.04
Mono Aromatics (MAH) by HPLC	%M/M	17	20.78	0.92	1.23
Di Aromatics (DAH) by HPLC	%M/M	17	1.05	0.30	0.16
Total Aromatics by HPLC	%M/M	16	21.81	1.03	1.33
Total Aromatics by HPLC	%V/V	23	19.82	1.49	1.17
Color Saybolt (automated)		34	28.9	3.0	1.2
Color Saybolt (manual)		32	28.6	3.6	2
Copper Corrosion 2 hrs at 100 °C		58	1 (1a/1b)	n.a.	n.a.
Density at 15 °C	kg/m^3	68	802.60	0.14	0.50

Parameter	unit	n	average	2.8 * sd	R(lit)
Initial Boiling Point	°C	70	150.0	6.0	8.3
Temp at 10% recovered	°C	70	170.1	2.5	3.7
Temp at 50% recovered	°C	70	195.6	2.3	3.0
Temp at 90% recovered	°C	69	233.4	3.0	3.5
Final Boiling Point	°C	70	254.9	5.1	7.1
Existent Gum (unwashed)	mg/100 mL	38	0.61	0.95	3.11
Flash Point	°C	70	42.3	2.6	3.2
Freezing Point	°C	59	-54.9	2.0	2.5
Kinematic Viscosity at -20 °C	mm^2/s	43	3.747	0.117	0.071
Mercaptan Sulfur as S	%M/M	40	0.00040	0.00024	0.00033
MSEP		51	95.2	6.6	7.7
Naphthalenes	%V/V	34	0.731	0.056	0.078
Smoke Point	mm	47	22.7	2.4	3.6
Specific Energy (Net)	MJ/kg	36	43.213	0.065	0.046
Total Sulfur	mg/kg	60	363	59	48

Table 6: reproducibilities of tests on sample #23035

Parameter	unit	n	average	2.8 * sd	R(lit)
Particle Size ≥4 µm (c)	counts/mL	24	16257	7654	(1818)
Particle Size ≥6 µm (c)	counts/mL	23	4958	1648	1088
Particle Size ≥14 µm (c)	counts/mL	25	166	148	94
Particle Size ≥21 µm (c)	counts/mL	25	20.0	30.7	18.2
Particle Size ≥25 µm (c)	counts/mL	26	7.9	16.2	9.0
Particle Size ≥30 µm (c)	counts/mL	26	2.5	5.5	3.8
Particle Size ≥4 µm (c)	ISO scale	21	21.1	0.8	1.0
Particle Size ≥6 µm (c)	ISO scale	21	19.4	1.4	1.0
Particle Size ≥14 µm (c)	ISO scale	21	14.4	1.9	1.4

Table 7: reproducibilities of tests on sample #23036

For results between brackets no z-scores are calculated.

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 2023 WITH PREVIOUS PTS

	March 2023	September 2022	March 2022	September 2021	March 2021
Number of reporting laboratories	74	168	80	160	91
Number of test results	1363	2754	1400	3091	1676
Number of statistical outliers	36	48	28	42	58
Percentage of statistical outliers	2.6%	1.7%	2.0%	1.4%	3.5%

Table 8: 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 2023	September 2022	March 2022	September 2021	March 2021
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	-	(--)	-	-	-
Mercaptan Sulfur	+	+	+	+/-	+
MSEP	+	+	+	+	+
Naphthalenes	+	+	+	+/-	+/-
Smoke Point	+	+	++	+	++
Specific Energy (Net)	-	+	+/-	+/-	+/-
Total Sulfur	-	-	-	-	+
Cumulative counts/mL	-	-	-	-	--
ISO scale numbers	-	+	+	+	+

Table 9: comparison of determinations to the reference test methods

For results between brackets no z-scores are calculated.

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 #23035;

lab	method	value	mark	z(targ)	remarks
120	Visual	C&B		-----	
140	Visual	C&B		-----	
150	Visual	Clear, Bright, free from solid matter and undissol		-----	
159		-----		-----	
169	Visual	Pass		-----	
171	Visual	Clear and Bright		-----	
177		-----		-----	
225	Visual	Clear & Bright		-----	
228	Visual	C&B		-----	
237	Visual	C&B		-----	
238	Visual	C & B		-----	
253	Visual	Clear & Bright		-----	
317	Visual	BR & CL		-----	
323	Visual	Clear & Bright		-----	
328	Visual	C&B		-----	
333		-----		-----	
334	Visual	clear and bright		-----	
335	Visual	clear and bright		-----	
360	Visual	Clear and Bright		-----	
365	Visual	C+B		-----	
391	Visual	C&B		-----	
396	Visual	Clear/Bright		-----	
398		-----		-----	
399	Visual	c&b		-----	
447	Visual	Clear & Bright		-----	
467	Visual	clear & bright		-----	
633	Visual	Clear & Bright		-----	
634	Visual	Clear & Bright		-----	
671	Visual	C/B		-----	
759	Visual	C&B		-----	
781	Visual	Clear&Bright		-----	
782	Visual	Clear&Bright		-----	
785		-----		-----	
825	Visual	Clear and Bright		-----	
875		C&B		-----	
922	Visual	Clear & Bright		-----	
963	Visual	Bright &Clear		-----	
970	Visual	Clear&Bright		-----	
974	Visual	Clear & Bright		-----	
1039	Visual	Clear & Bright		-----	
1049	Visual	Br & Cl		-----	
1059	Visual	Clear & Bright		-----	
1064	Visual	C&B		-----	
1097	Visual	Clair et limpide		-----	
1108	Visual	Bright and Clear		-----	
1121	Visual	Clear & Bright		-----	
1126		-----		-----	
1140	Visual	C+B		-----	
1150		-----		-----	
1191		-----		-----	
1212	Visual	C&B		-----	
1297	Visual	clear		-----	
1299	Visual	CL&BR		-----	
1320	Visual	C&B		-----	
1357	Visual	Clear & Bright		-----	
1397		-----		-----	
1399	Visual	clear, bright no sediment.PASS		-----	
1429	Visual	Clear&Bright		-----	
1438		-----		-----	
1498	D4176	B&C		-----	
1531	Visual	clear		-----	
1564		-----		-----	
1587	Visual	C&B		-----	
1610	Visual	Bright and Clear		-----	
1720		-----		-----	
1730		-----		-----	
1755	Visual	Clear,bright,without contaminations and water		-----	
1776		-----		-----	
1810		-----		-----	
1811		-----		-----	
6075	Visual	clear bright		-----	
6142	Visual	C&B		-----	
6192	Visual	B/C		-----	
6299	Visual	Clear & Bright		-----	
6312		-----		-----	

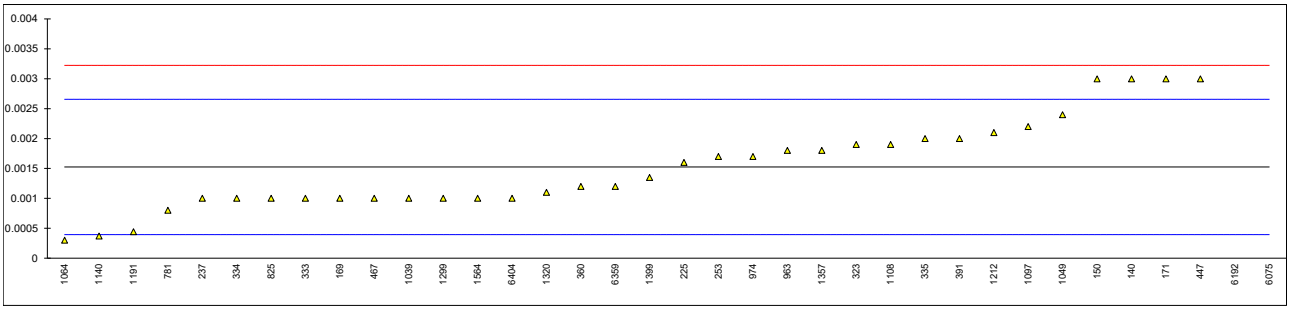
lab	method	value	mark	z(targ)	remarks
6359		-----		-----	
6404		-----		-----	
6490	Visual	Clear & Bright		-----	
6530		-----		-----	
	n	59			
	mean (n)	Clear and Bright (Pass)			

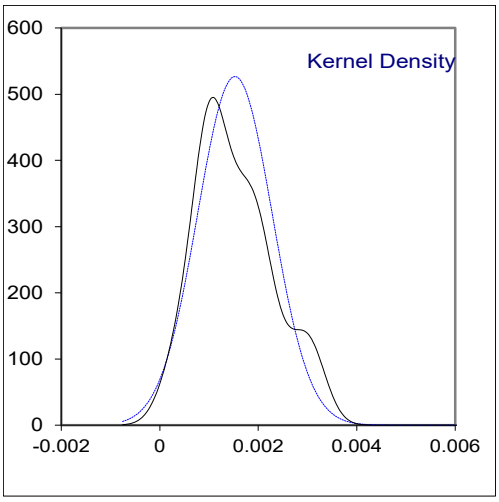
Determination of Total Acidity on sample #23035; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120	D3242	<0.001		-----	
140	D3242	0.003		2.60	
150	D3242	0.003		2.60	
159		-----		-----	
169	D3242	0.001		-0.93	
171	D3242	0.003		2.60	
177	D3242	<0.001		-----	
225	D3242	0.0016		0.13	
228		-----		-----	
237	D3242	0.0010		-0.93	
238		-----		-----	
253	D3242	0.0017		0.31	
317		-----		-----	
323	D3242	0.0019		0.66	
328		-----		-----	
333	D3242	0.001		-0.93	
334	D3242	0.001		-0.93	
335	D3242	0.002		0.84	
360	D3242	0.0012		-0.57	
365		-----		-----	
391	D3242	0.002		0.84	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D3242	0.003		2.60	
467	D3242	0.0010		-0.93	
633		-----		-----	
634		-----		-----	
671		-----		-----	
759		-----		-----	
781	D3242	0.0008		-1.28	
782		-----		-----	
785		-----		-----	
825	D3242	0.001		-0.93	
875		-----		-----	
922		-----		-----	
963	D3242	0.0018		0.49	
970		-----		-----	
974	D3242	0.0017		0.31	
1039	D3242	0.001		-0.93	
1049	D3242	0.00240		1.54	
1059	D3242	<0,001		-----	
1064	D3242	0.0003		-2.16	
1097	D3242	0.0022		1.19	
1108	D3242	0.0019		0.66	
1121		-----		-----	
1126		-----		-----	
1140	D3242	0.00037		-2.04	
1150		-----		-----	
1191	D3242	0.00044		-1.92	
1212	D3242	0.0021		1.01	
1297		-----		-----	
1299	D3242	0.001		-0.93	
1320	D3242	0.0011		-0.75	
1357	D3242	0.0018		0.49	
1397		-----		-----	
1399	D3242	0.00135		-0.31	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564	D3242	0.001		-0.93	
1587		-----		-----	
1610		-----		-----	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776		-----		-----	
1810		-----		-----	
1811		-----		-----	
6075	D3242	0.0117	R(0.01)	17.97	
6142		-----		-----	
6192	D3242	0.01	R(0.01)	14.97	
6299		-----		-----	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D3242	0.0012		-0.57	
6404	D3242	0.001		-0.93	
6490		-----		-----	
6530		-----		-----	

normality	OK
n	34
outliers	2
mean (n)	0.00153
st.dev. (n)	0.000757
R(calc.)	0.00212
st.dev.(D3242:11R17)	0.000566
R(D3242:11R17)	0.00159



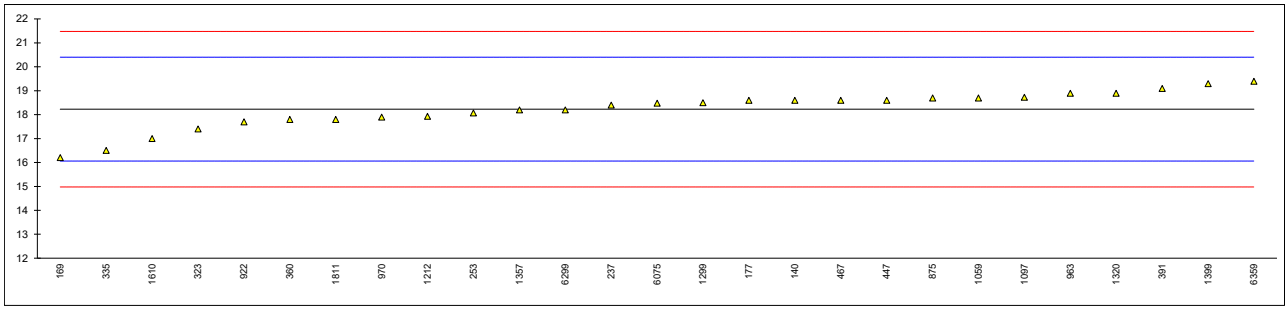


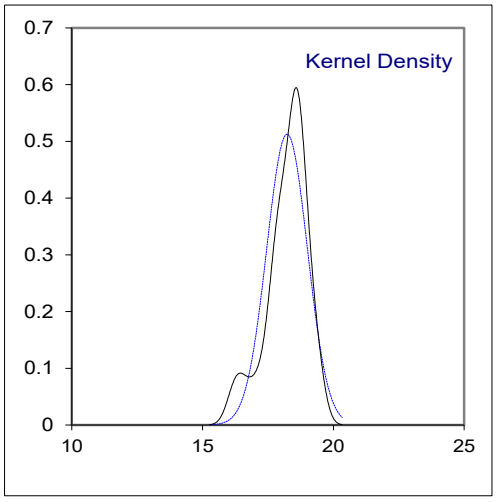
Determination of Aromatics by FIA on sample #23035; results in %V/V

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140	D1319	18.6		0.34	
150		-----		-----	
159		-----		-----	
169	D1319	16.2		-1.87	
171		-----		-----	
177	D1319	18.6		0.34	
225		-----		-----	
228		-----		-----	
237	D1319	18.4		0.16	
238		-----		-----	
253	D1319	18.07		-0.15	
317		-----		-----	
323	D1319	17.4		-0.76	
328		-----		-----	
333		-----		-----	
334		-----		-----	
335	D1319	16.5		-1.59	
360	D1319	17.8		-0.40	
365		-----		-----	
391	D1319	19.1		0.80	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D1319	18.6		0.34	
467	D1319	18.6		0.34	
633		-----		-----	
634		-----		-----	
671		-----		-----	
759		-----		-----	
781		-----		-----	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875	D1319	18.7		0.43	
922	D1319	17.7		-0.49	
963	D1319	18.9		0.62	
970	D1319	17.9		-0.30	
974		-----		-----	
1039		-----		-----	
1049		-----		-----	
1059	D1319	18.7		0.43	
1064		-----		-----	
1097	D1319	18.73		0.46	
1108		-----		-----	
1121		-----		-----	
1126		-----		-----	
1140		-----		-----	
1150		-----		-----	
1191		-----		-----	
1212	D1319	17.93		-0.28	
1297		-----		-----	
1299	D1319	18.5		0.25	
1320	D1319	18.9		0.62	
1357	D1319	18.2		-0.03	
1397		-----		-----	
1399	D1319	19.3		0.99	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564		-----		-----	
1587		-----		-----	
1610	IP156	17.0		-1.13	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776		-----		-----	
1810		-----		-----	
1811	D1319	17.80		-0.40	
6075	D1319	18.48		0.23	
6142		-----		-----	
6192		-----		-----	
6299	D1319	18.2		-0.03	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D1319	19.4	C	1.08	first reported 21.0
6404		-----		-----	
6490		-----		-----	
6530		-----		-----	

normality	suspect
n	27
outliers	0
mean (n)	18.230
st.dev. (n)	0.7787
R(calc.)	2.180
st.dev.(D1319:20a)	1.0851
R(D1319:20a)	3.038



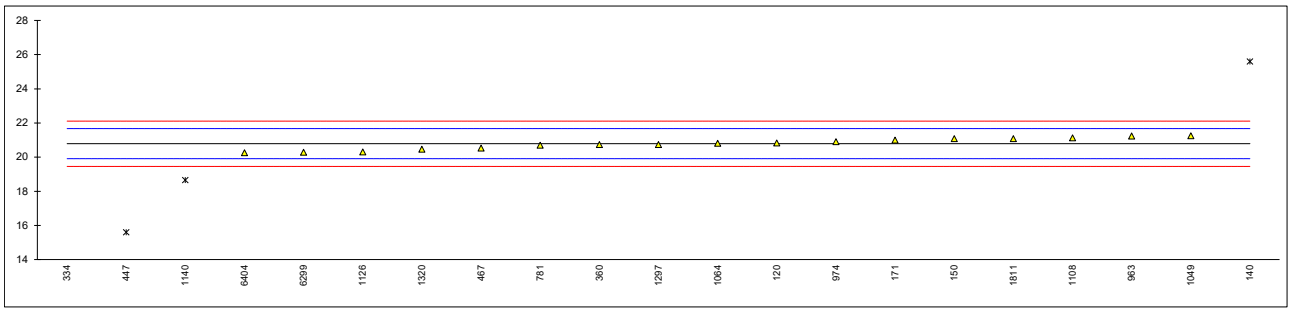


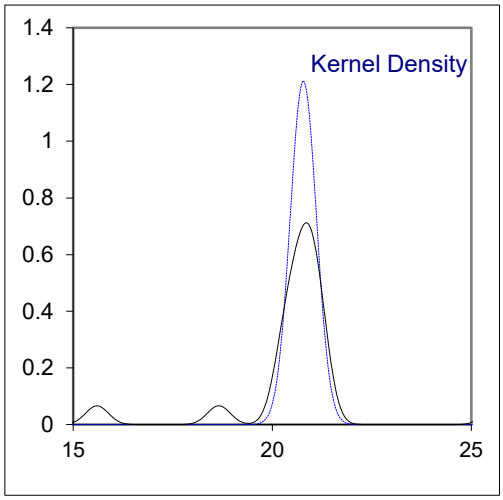
Determination of Mono Aromatics (MAH) by HPLC on sample #23035; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D6379	20.83		0.10	
140	D6379	25.6	C,R(0.01)	10.95	first reported >25
150	D6379	21.08	C	0.67	first reported >25.0
159		-----		-----	
169		-----		-----	
171	D6379	21.0		0.49	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
317		-----		-----	
323		-----		-----	
328		-----		-----	
333		-----		-----	
334	D6379	8.5	R(0.01)	-27.92	
335		-----		-----	
360	D6379	20.73		-0.12	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	IP436	15.6	R(0.01)	-11.78	
467	D6379	20.53		-0.58	
633		-----		-----	
634		-----		-----	
671		-----		-----	
759		-----		-----	
781	D6379	20.7		-0.19	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922		-----		-----	
963	D6379	21.24		1.04	
970		-----		-----	
974	D6379	20.91		0.29	
1039		-----		-----	
1049	D6379	21.251		1.06	
1059		-----		-----	
1064	D6379	20.81		0.06	
1097		-----		-----	
1108	D6379	21.132		0.79	
1121		-----		-----	
1126	EN12916	20.3		-1.10	
1140	D6379	18.66	R(0.01)	-4.83	
1150		-----		-----	
1191		-----		-----	
1212		-----		-----	
1297	EN12916	20.73577		-0.11	
1299		-----		-----	
1320	D6379	20.46		-0.74	
1357	D6379	-----		-----	
1397		-----		-----	
1399		-----		-----	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564		-----		-----	
1587		-----		-----	
1610		-----		-----	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776		-----		-----	
1810		-----		-----	
1811	D6379	21.08		0.67	
6075		-----		-----	
6142		-----		-----	
6192		-----		-----	
6299	D6379	20.29		-1.12	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359		-----		-----	
6404	D6379	20.25		-1.21	
6490		-----		-----	
6530		-----		-----	

normality	OK
n	17
outliers	4
mean (n)	20.784
st.dev. (n)	0.3291
R(calc.)	0.921
st.dev.(D6379:21e1)	0.4400
R(D6379:21e1)	1.232



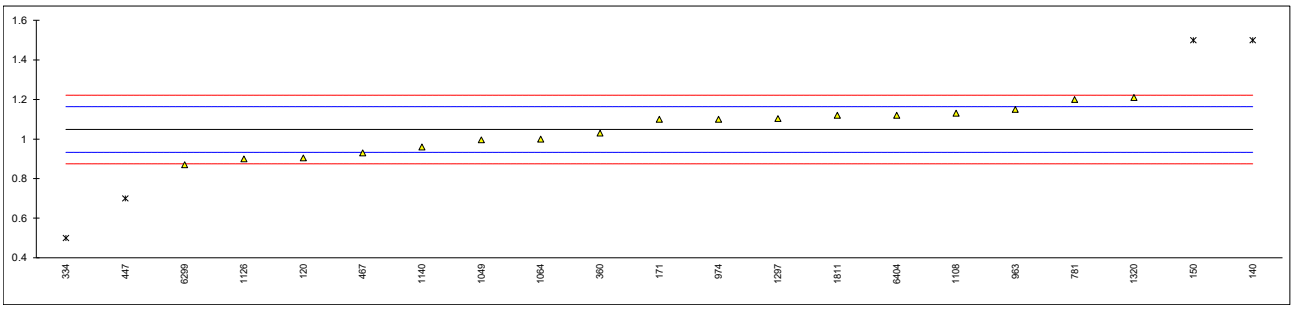


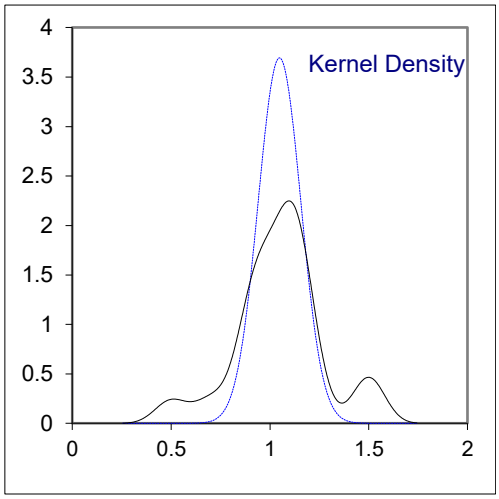
Determination of Di Aromatics (DAH) by HPLC on sample #23035; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D6379	0.905		-2.48	
140	D6379	1.5	DG(0.05)	7.81	
150	D6379	1.5	DG(0.05)	7.81	
159		-----		-----	
169		-----		-----	
171	D6379	1.1		0.89	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
317		-----		-----	
323		-----		-----	
328		-----		-----	
333		-----		-----	
334	D6379	0.5	DG(0.05)	-9.49	
335		-----		-----	
360	D6379	1.03		-0.32	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	IP436	0.7	DG(0.05)	-6.03	
467	D6379	0.93		-2.05	
633		-----		-----	
634		-----		-----	
671		-----		-----	
759		-----		-----	
781	D6379	1.2		2.62	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922		-----		-----	
963	D6379	1.15		1.75	
970		-----		-----	
974	D6379	1.10		0.89	
1039		-----		-----	
1049	D6379	0.996		-0.91	
1059		-----		-----	
1064	D6379	1.00		-0.84	
1097		-----		-----	
1108	D6379	1.131		1.43	
1121		-----		-----	
1126	EN12916	0.9		-2.57	
1140	D6379	0.96		-1.53	
1150		-----		-----	
1191		-----		-----	
1212		-----		-----	
1297	EN12916	1.10402		0.96	
1299		-----		-----	
1320	D6379	1.21		2.79	
1357	D6379	-----		-----	
1397		-----		-----	
1399		-----		-----	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564		-----		-----	
1587		-----		-----	
1610		-----		-----	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776		-----		-----	
1810		-----		-----	
1811	D6379	1.12		1.24	
6075		-----		-----	
6142		-----		-----	
6192		-----		-----	
6299	D6379	0.87		-3.09	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359		-----		-----	
6404	D6379	1.12		1.24	
6490		-----		-----	
6530		-----		-----	

normality	OK
n	17
outliers	4
mean (n)	1.049
st.dev. (n)	0.1080
R(calc.)	0.302
st.dev.(D6379:21e1)	0.0578
R(D6379:21e1)	0.162





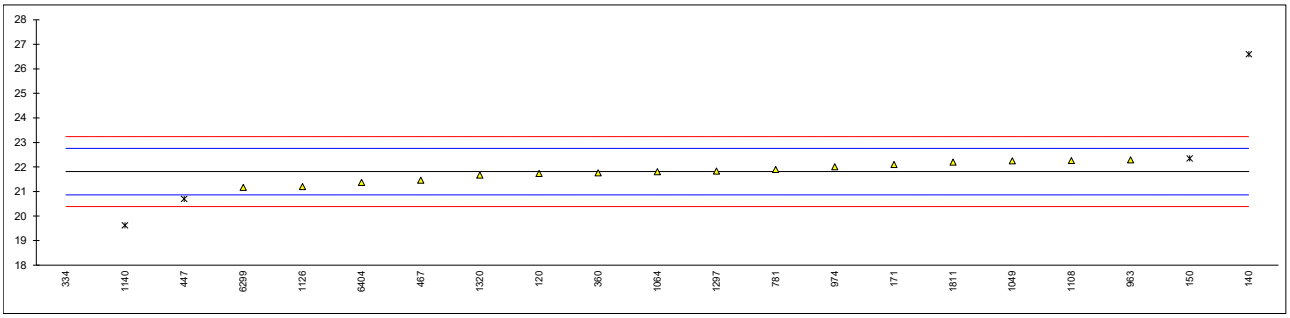
Determination of Total Aromatics by HPLC on sample #23035; results in %M/M

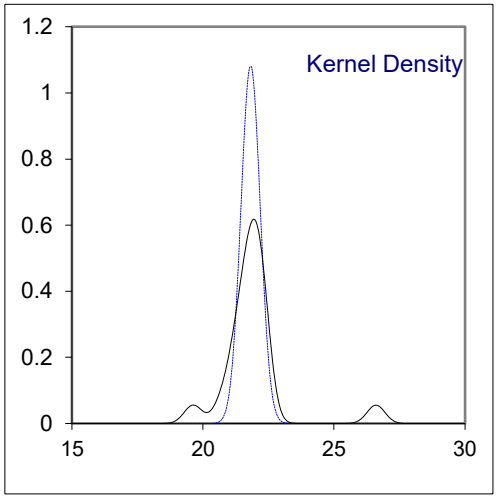
lab	method	value	mark	z(targ)	remarks
120	D6379	21.737		-0.16	
140	D6379	26.6	ex,C,E	10.06	fr. 28.0; calc. difference, iis calculated 27.1; ex see table below
150	D6379	22.35	ex,C,E	1.13	fr. 30.0; calc. difference, iis calculated 22.58; ex see table below
159		-----		-----	
169		-----		-----	
171	D6379	22.1		0.60	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
317		-----		-----	
323		-----		-----	
328		-----		-----	
333		-----		-----	
334	D6379	9.0	ex	-26.93	ex see table below
335		-----		-----	
360	D6379	21.76		-0.11	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	IP436	20.7	ex,E	-2.34	calc. difference, iis calculated 16.3; ex see table below
467	D6379	21.46		-0.74	
633		-----		-----	
634		-----		-----	
671		-----		-----	
759		-----		-----	
781	D6379	21.9		0.18	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922		-----		-----	
963	D6379	22.29		1.00	
970		-----		-----	
974	D6379	22.01		0.41	
1039		-----		-----	
1049	D6379	22.247		0.91	
1059		-----		-----	
1064	D6379	21.81		-0.01	
1097		-----		-----	
1108	D6379	22.26		0.94	
1121		-----		-----	
1126	EN12916	21.2		-1.29	
1140	D6379	19.62	ex	-4.61	ex see table below
1150		-----		-----	
1191		-----		-----	
1212		-----		-----	
1297	EN12916	21.83979		0.05	
1299		-----		-----	
1320	D6379	21.67		-0.30	
1357	D6379	-----		-----	
1397		-----		-----	
1399		-----		-----	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564		-----		-----	
1587		-----		-----	
1610		-----		-----	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776		-----		-----	
1810		-----		-----	
1811	D6379	22.20		0.81	
6075		-----		-----	
6142		-----		-----	
6192		-----		-----	
6299	D6379	21.17		-1.35	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359		-----		-----	
6404	D6379	21.37		-0.93	
6490		-----		-----	
6530		-----		-----	

normality	OK
n	16
outliers	0+5ex
mean (n)	21.814
st.dev. (n)	0.3682
R(calc.)	1.031
st.dev.(D6379:21e1)	0.4757
R(D6379:21e1)	1.332

ex: test result excluded as statistical outlier in 1 or 2 related parameters



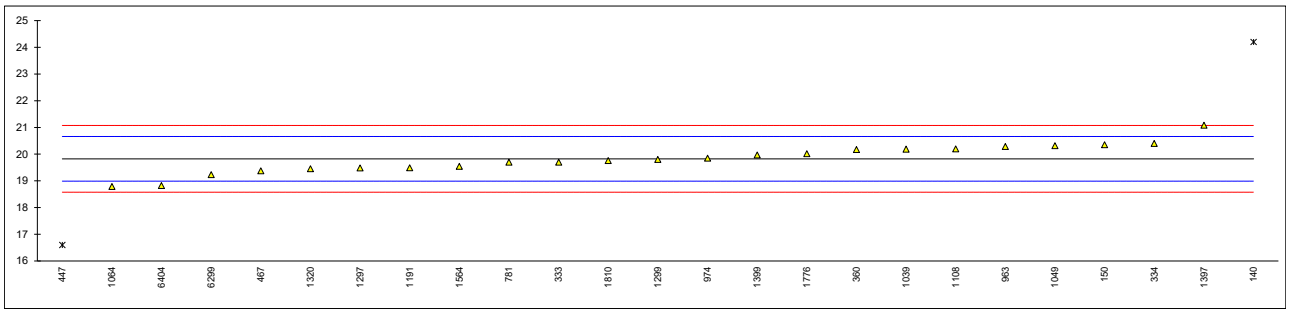


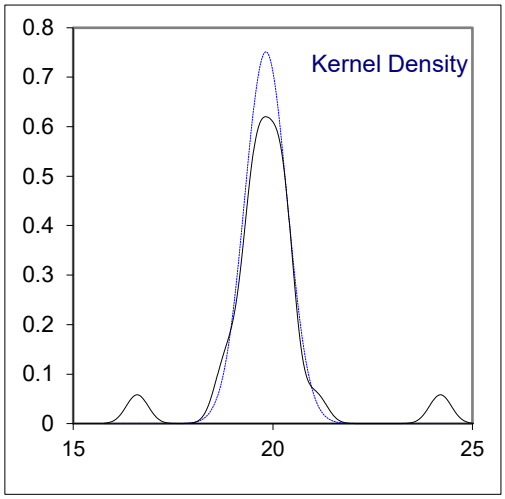
Determination of Total Aromatics by HPLC on sample #23035; results in %V/V

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140	D6379	24.2	C,R(0.01)	10.47	first reported 25.4
150	D6379	20.35	C	1.26	first reported 24.1
159		-----		-----	
169		-----		-----	
171		-----		-----	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
317		-----		-----	
323		-----		-----	
328		-----		-----	
333	D6379	19.7		-0.30	
334	D6379	20.4		1.38	
335		-----		-----	
360	D6379	20.17		0.83	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	IP436	16.6	R(0.01)	-7.72	
467	D6379	19.38		-1.06	
633		-----		-----	
634		-----		-----	
671		-----		-----	
759		-----		-----	
781	D6379	19.7		-0.30	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922		-----		-----	
963	D6379	20.29		1.11	
970		-----		-----	
974	D6379	19.85		0.06	
1039	D6379	20.19		0.87	
1049	D6379	20.313		1.17	
1059		-----		-----	
1064	D6379	18.79		-2.48	
1097		-----		-----	
1108	D6379	20.2		0.90	
1121		-----		-----	
1126		-----		-----	
1140		-----		-----	
1150		-----		-----	
1191	D6379	19.488		-0.81	
1212		-----		-----	
1297	EN12916	19.48237		-0.82	
1299	IP436	19.8		-0.06	
1320	D6379	19.45		-0.90	
1357	D6379	-----		-----	
1397	D6379	21.08		3.00	
1399	IP436	19.97	C	0.35	first reported 22.07
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564	D6379	19.54		-0.68	
1587		-----		-----	
1610		-----		-----	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776	D6379	20.02		0.47	
1810	D6379	19.76		-0.16	
1811		-----		-----	
6075		-----		-----	
6142		-----		-----	
6192		-----		-----	
6299	D6379	19.23		-1.42	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359		-----		-----	
6404	D6379	18.82		-2.40	
6490		-----		-----	
6530		-----		-----	

normality	OK
n	23
outliers	2
mean (n)	19.825
st.dev. (n)	0.5313
R(calc.)	1.488
st.dev.(D6379:21e1)	0.4179
R(D6379:21e1)	1.170



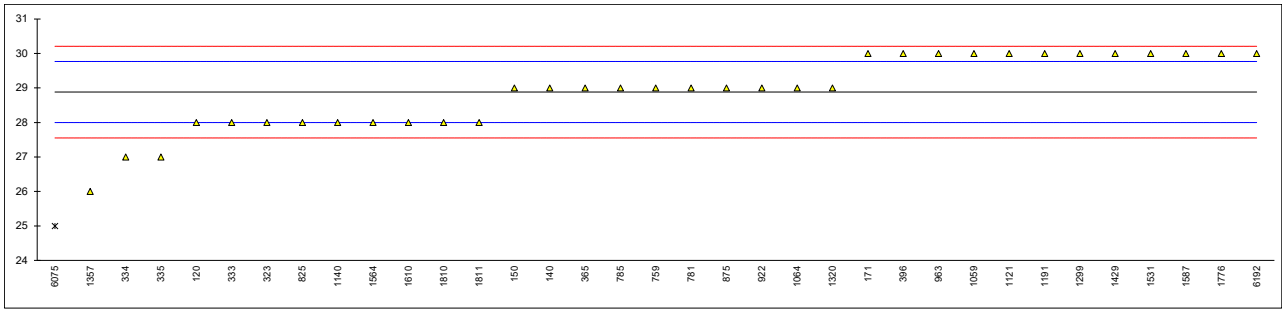


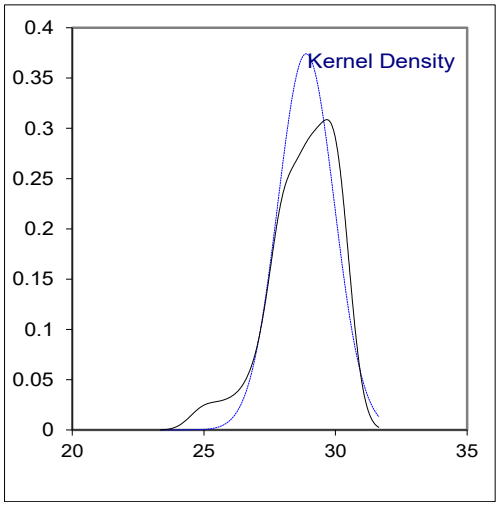
Determination of Color Saybolt (automated) on sample #23035; cell size in mm;

lab	method	cell size	value	mark	z(targ)	remarks
120	D6045	10 mm	28		-1.99	
140	D6045		29		0.27	
150	D6045	100 mm	29		0.27	
159			-----		-----	
169			-----		-----	
171	D6045		30		2.52	
177			-----		-----	
225			-----		-----	
228			-----		-----	
237			-----		-----	
238			-----		-----	
253			-----		-----	
317			-----		-----	
323	D6045	100 mm	28		-1.99	
328			-----		-----	
333	D6045	50 mm	28		-1.99	
334	D6045		27		-4.25	
335	D6045		27		-4.25	
360			-----		-----	
365	D6045		29		0.27	
391			-----		-----	
396	D6045		30		2.52	
398			-----		-----	
399			-----		-----	
447			-----		-----	
467			-----		-----	
633			-----		-----	
634			-----		-----	
671			-----		-----	
759	D6045		29		0.27	
781	D6045	100 mm	29		0.27	
782			-----		-----	
785	D6045		29		0.27	
825	D6045	33 mm	28		-1.99	
875	D6045		29		0.27	
922	D6045	100 mm	29		0.27	
963	D6045		30		2.52	
970			-----		-----	
974			-----		-----	
1039			-----		-----	
1049	D6045	50 mm	>30	C	-----	first reported 40
1059	D6045	50 mm	30		2.52	
1064	D6045	50 mm	29		0.27	
1097			-----		-----	
1108			-----		-----	
1121	D6045	100 mm	30		2.52	
1126			-----		-----	
1140	D6045	50 mm	28		-1.99	
1150			-----		-----	
1191	D6045		30		2.52	
1212			-----		-----	
1297			-----		-----	
1299	D6045	100 mm	30		2.52	
1320	D6045		29		0.27	
1357	D6045	50 mm	26		-6.51	
1397			-----		-----	
1399	D6045	50 mm	>+30		-----	
1429	D6045	50 mm	30		2.52	
1438			-----		-----	
1498			-----		-----	
1531	D6045	50 mm	30		2.52	
1564	D6045	50 mm	28		-1.99	
1587	D6045	50 mm	30		2.52	
1610	D6045	50 mm	28		-1.99	
1720			-----		-----	
1730			-----		-----	
1755			-----		-----	
1776	D6045		30		2.52	
1810	D6045		28		-1.99	
1811	D6045		28		-1.99	
6075	D6045		25	R(0.05)	-8.77	
6142			-----		-----	
6192	D6045	33 mm	30		2.52	
6299			-----		-----	
6312			-----		-----	

lab	method	cell size	value	mark	z(targ)	remarks
6359			-----		-----	
6404			-----		-----	
6490			-----		-----	
6530			-----		-----	

			Only 50 mm cell	Only 100 mm cell
	normality	OK	OK	OK
	n	34	10	6
	outliers	1	0	0
	mean (n)	28.88	28.70	29.17
	st.dev. (n)	1.066	1.337	0.753
	R(calc.)	2.99	3.74	2.11
	st.dev.(D6045:20)	0.443	0.443	0.443
	R(D6045:20)	1.24	1.24	1.24



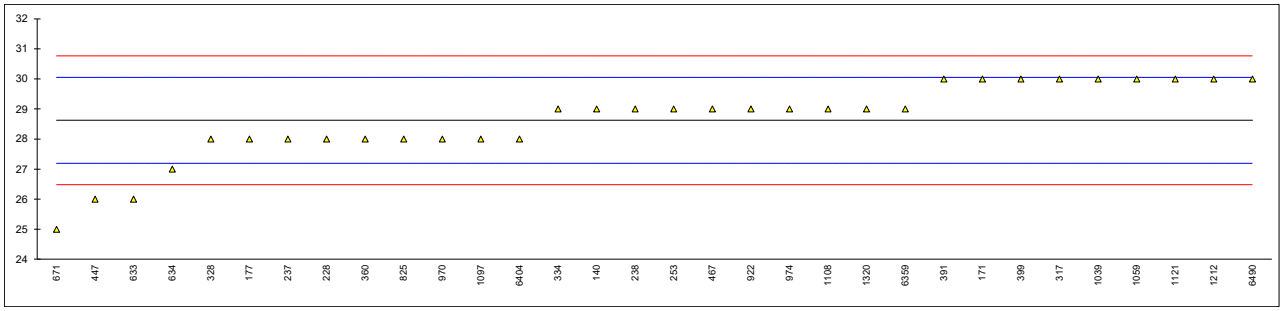


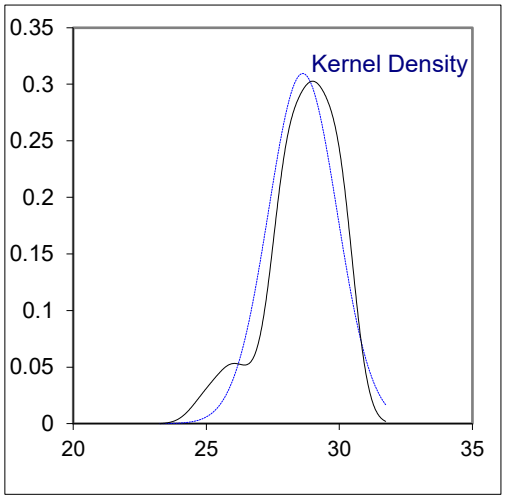
Determination of Color Saybolt (manual) on sample #23035;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140	D156	29		0.53	
150		-----		-----	
159		-----		-----	
169		-----		-----	
171	D156	30		1.93	
177	D156	28		-0.88	
225		-----		-----	
228	D156	28		-0.88	
237	D156	28		-0.88	
238	D156	29		0.53	
253	D156	29		0.53	
317	D156	30		1.93	
323		-----		-----	
328	D156	28		-0.88	
333		-----		-----	
334	D156	29		0.53	
335		-----		-----	
360	D156	28		-0.88	
365		-----		-----	
391	D156	30		1.93	
396		-----		-----	
398		-----		-----	
399	D156	30		1.93	
447	D156	26		-3.68	
467	D156	29		0.53	
633	D156	26		-3.68	
634	D156	27		-2.28	
671	D156	25		-5.08	
759		-----		-----	
781		-----		-----	
782		-----		-----	
785		-----		-----	
825	D156	28		-0.88	
875		-----		-----	
922	D156	29		0.53	
963		-----		-----	
970	D156	28		-0.88	
974	D156	29		0.53	
1039	D156	30		1.93	
1049		-----		-----	
1059	D156	30		1.93	
1064		-----		-----	
1097	NF M07-003	28		-0.88	
1108	D156	29		0.53	
1121	D156	30		1.93	
1126		-----		-----	
1140		-----		-----	
1150		-----		-----	
1191		-----		-----	
1212	D156	30		1.93	
1297		-----		-----	
1299		-----		-----	
1320	D156	29		0.53	
1357		-----		-----	
1397		-----		-----	
1399	D156	>+30		-----	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564		-----		-----	
1587		-----		-----	
1610		-----		-----	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776		-----		-----	
1810		-----		-----	
1811		-----		-----	
6075		-----		-----	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D156	29		0.53	
6404	D156	28		-0.88	
6490	D156	30		1.93	
6530		-----		-----	

normality	suspect
n	32
outliers	0
mean (n)	28.63
st.dev. (n)	1.289
R(calc.)	3.61
st.dev.(D156:15)	0.714
R(D156:15)	2





Determination of Copper Corrosion 2 hrs at 100 °C on sample #23035;

lab	method	value	mark	z(targ)	remarks
120	D130	1A		-----	
140	D130	1b		-----	
150		-----		-----	
159		-----		-----	
169	D130	1a		-----	
171	D130	1a		-----	
177	D130	1a		-----	
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	1a		-----	
334	D130	1		-----	
335	D130	1b		-----	
360	D130	1A		-----	
365	IP154	1a		-----	
391	D130	1a		-----	
396		1A		-----	
398		-----		-----	
399	D130	1a		-----	
447	IP154	1A		-----	
467	D130	1A		-----	
633	D130	1a		-----	
634	D130	1a		-----	
671	D130	1A		-----	
759		-----		-----	
781	D130	1a		-----	
782		-----		-----	
785	D130	1a		-----	
825	D130	1a		-----	
875	D130	1a		-----	
922	D130	1a		-----	
963	D130	1a		-----	
970	D130	1a		-----	
974	D130	1a		-----	
1039	ISO2160	1A		-----	
1049	D130	1A		-----	
1059	D130	1b		-----	
1064	D130	1a		-----	
1097	ISO2160	1a		-----	
1108		-----		-----	
1121	IP154	1a		-----	
1126		-----		-----	
1140	IP154	1A		-----	
1150	ISO2160	1a		-----	
1191		-----		-----	
1212	D130	1A		-----	
1297	D130	1A		-----	
1299	D130	1A		-----	
1320	D130	1a		-----	
1357	D130	1a		-----	
1397		-----		-----	
1399	D130	1A		-----	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531	D130	1a		-----	
1564	D130	1a		-----	
1587	D130	1A		-----	
1610	D130	1A		-----	
1720		-----		-----	
1730		-----		-----	
1755	D130	1a		-----	
1776		-----		-----	
1810		-----		-----	
1811		-----		-----	
6075	D130	1A		-----	
6142		-----		-----	
6192	D130	1A		-----	
6299	ISO2160	1A		-----	
6312		-----		-----	

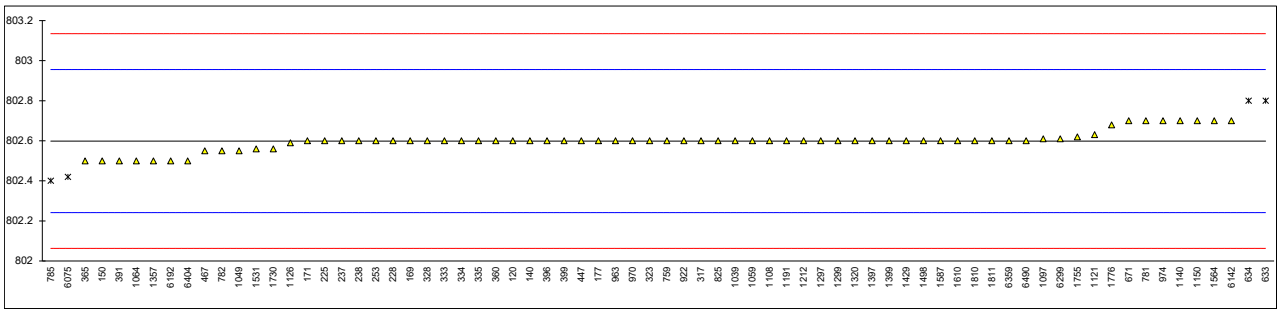
lab	method	value	mark	z(targ)	remarks
6359		-----		-----	
6404	D130	1a		-----	
6490	D130	1A		-----	
6530		-----		-----	
	n	58			
	mean (n)	1 (1a/1b)			

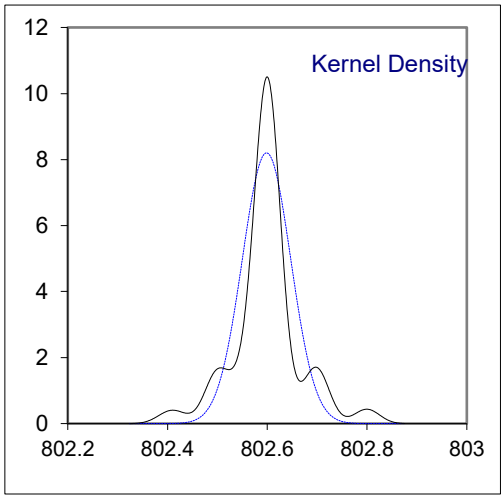
Determination of Density at 15 °C on sample #23035; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
120	D4052	802.6		0.01	
140	D4052	802.6		0.01	
150	D4052	802.5		-0.55	
159		-----		-----	
169	D4052	802.6		0.01	
171	D4052	802.6		0.01	
177	D4052	802.6		0.01	
225	D4052	802.6		0.01	
228	D4052	802.6		0.01	
237	D4052	802.6		0.01	
238	D4052	802.6		0.01	
253	D4052	802.6		0.01	
317	D4052	802.6		0.01	
323	D4052	802.6		0.01	
328	D4052	802.6		0.01	
333	D4052	802.6		0.01	
334	D4052	802.6		0.01	
335	D4052	802.6		0.01	
360	D4052	802.6		0.01	
365	IP365	802.5		-0.55	
391	ISO12185	802.5		-0.55	
396	D4052	802.6		0.01	
398		-----		-----	
399	D4052	802.6		0.01	
447	D4052	802.6		0.01	
467	D4052	802.55		-0.27	
633	D4052	802.8	C,R(0.05)	1.13	first reported 802.9
634	D4052	802.8	R(0.05)	1.13	
671	D4052	802.7		0.57	
759	D4052	802.6		0.01	
781	D4052	802.7		0.57	
782	D4052	802.55		-0.27	
785	D4052	802.4	R(0.05)	-1.11	
825	D4052	802.6		0.01	
875		-----		-----	
922	D4052	802.6		0.01	
963	D4052	802.6		0.01	
970	D4052	802.6		0.01	
974	D4052	802.7		0.57	
1039	ISO12185	802.6		0.01	
1049	D4052	802.55		-0.27	
1059	D4052	802.6		0.01	
1064	D4052	802.5		-0.55	
1097	ISO12185	802.61		0.06	
1108	D4052	802.60		0.01	
1121	IP365	802.63		0.17	
1126	D4052	802.59		-0.05	
1140	D4052	802.7		0.57	
1150	ISO12185	802.7		0.57	
1191	ISO12185	802.6		0.01	
1212	D4052	802.6		0.01	
1297	D4052	802.60		0.01	
1299	D4052	802.6		0.01	
1320	D4052	802.6		0.01	
1357	D4052	802.5		-0.55	
1397	D4052	802.6		0.01	
1399	D4052	802.6		0.01	
1429	D4052	802.6		0.01	
1438		-----		-----	
1498	D4052	802.6		0.01	
1531	ISO12185	802.56		-0.22	
1564	D4052	802.7		0.57	
1587	D4052	802.60		0.01	
1610	IP365	802.6		0.01	
1720		-----		-----	
1730	D4052	802.56		-0.22	
1755	D4052	802.62		0.12	
1776	ISO12185	802.68		0.45	
1810	D4052	802.6		0.01	
1811	D4052	802.6		0.01	
6075	D4052	802.42	R(0.05)	-1.00	
6142	ISO12185	802.7		0.57	
6192	D1298	802.5		-0.55	
6299	ISO12185	802.61		0.06	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D4052	802.6		0.01	
6404	D4052	802.5		-0.55	
6490	D4052	802.6		0.01	
6530		-----		-----	

normality	suspect
n	68
outliers	4
mean (n)	802.599
st.dev. (n)	0.0487
R(calc.)	0.136
st.dev.(D4052:22)	0.1786
R(D4052:22)	0.50



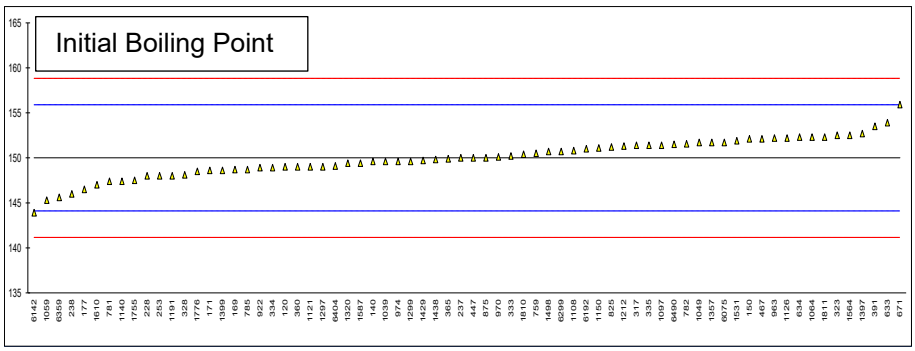


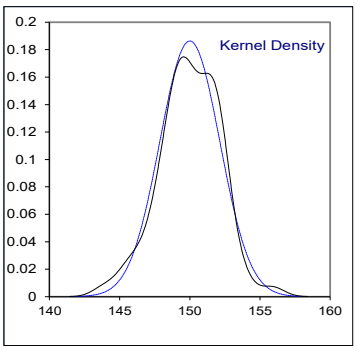
Determination of Distillation at 760 mmHg on sample #23035; results in °C

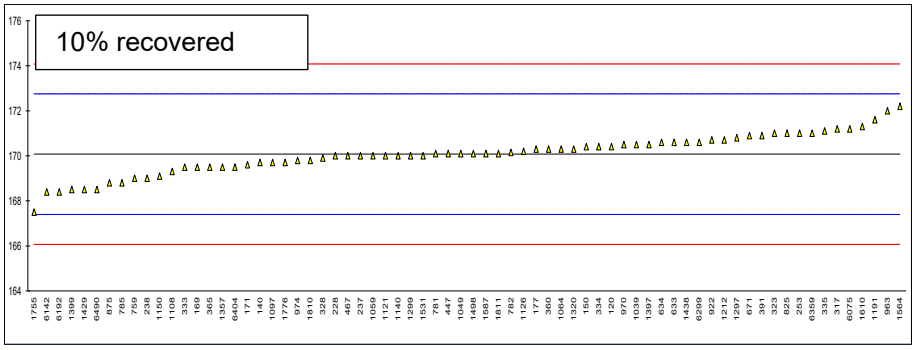
lab	method	IBP	mark	10% rec	mark	50% rec	mark	90% rec	mark	FBP	mark	Res.	Loss
120	D86-automated	149.0		170.4		195.8		233.0		255.1		1.2 C	0.4
140	D86-automated	149.6		169.7		195.1		232.0		255.0		1.0	0.0
150	D86-automated	152.1		170.4		194.6		231.4		249.6		1.3	0.1
159		-----		-----		-----		-----		-----		-----	-----
169	D86-automated	148.7		169.5		195.9		233.3		255.4		1.2	0.7
171	D86-automated	148.6		169.6		194.8		232.3		255.2		1.2	0.1
177	D86-automated	146.5		170.3		196.1		232.9		251.9		1.4	0.5
225		-----		-----		-----		-----		-----		-----	-----
228	D86-manual	148.0		170.0		196.0		233.0		256.0		1.0	0.5
237	D86-manual	150.0		170.0		196.0		233.0		257.0		1.0	0.5
238	D86-manual	146		169		194		231		252		1.0	0.5
253	D86-manual	148.0		171.0		196.0		232.0		254.0		0.9	0.8
317	D86-automated	151.4		171.2		196.3		234.2		256.6		1.0	0.7
323	D86-automated	152.5		171.0		196.6		235.3		255.2		1.2	1.0
328	D86-automated	148.1		169.9		195.6		233.2		252.7		0.5	1.1
333	D86-automated	150.2		169.5		195.3		232.0		254.0		1.0	98.8
334	D86-automated	148.9		170.4		195.8		233.1		254.7		1.1	0.2
335	D86-automated	151.4		171.1		196.3		234.7		256.5		1.3	0.2
360	D86-automated	149.0		170.3		195.6		232.7		253.8		1.0	0.3
365	IP123-automated	149.9		169.5		195.2		234.5		254.1		1.4	1.0
391	D86-automated	153.5		170.9		196.3		235.6		255.0		1.0	1.0
396		-----		-----		-----		-----		-----		-----	-----
398		-----		-----		-----		-----		-----		-----	-----
399		-----		-----		-----		-----		-----		-----	-----
447	D86-automated	150.0		170.1		196.0		234.7		255.6		1.2	0.8
467	D86-automated	152.1		170.0		196.1		234.0		256.4		1.3	0.4
633	D86-automated	153.9		170.6		196.3		234.9		257.1		1.2	0.4
634	D86-automated	152.3		170.6		196.0		233.9		255.8		1.2	0.3
671	D86-automated	155.9		170.9		196.4		233.9		260.5		1.0	0.1
759	D86-manual	150.5		169.0		195.5		233.0		255.5		1.2	0.5
781	D86-automated	147.4		170.1		195.5		233.0		255.2		1.0	0.7
782	ISO3405-automated	151.55		170.15		196.90		234.90		257.50		1.1	0.7
785	D86-automated	148.7		168.8		194.7		233.4		253.9		1.2	1.5
825	D86-automated	151.2		171.0		196.1		233.2		255.3		1.2	0.4
875	D86-automated	150.0		168.8		194.7		233.1		254.9		1.2	0.8
922	D86-automated	148.9		170.7		196.4		234.8		252.6		1.2	1.7
963	D86-automated	152.2		172.0		196.4		232.2		252.1		1.0	1.0
970	D86-automated	150.1		170.5		195.9		234.4		253.9		1.4	0.5
974	D86-automated	149.6		169.8		195.0		233.5		253.0		1.0	1.0
1039	D86-automated	149.6		170.5		195.5		233.6		254.6		1.2	0.6
1049	D86-automated	151.7		170.1		196.3		234.5		255.9		1.2	0.8
1059	D86-automated	145.3		170.0		195.2		233.4		254.8		1.2	0.5
1064		152.3		170.3		196.0		234.8		256.5		1.2	0.6
1097	ISO3405-automated	151.4		169.7		195.5		234.2		256.2		1.2	0.7
1108	D86-automated	150.8		169.3		195.8		234.1		256.3		1.2	0.3
1121	IP123-manual	149.0		170.0		195.5		234.0		254.0	C	0.5	0.5
1126	D86-automated	152.2		170.2		195.3		232.4		257.3		1.2	0.2
1140	D86-automated	147.4		170.0		195.7		234.0		255.4		1.2	0.2
1150	ISO3405-automated	151.1		169.1		194.9		233.0		254.75		1.2	0.5
1191	ISO3405-automated	148.0		171.6		196.5		233.9		255.4		1.3 C	0 C
1212	D86-automated	151.3		170.7		196.0		234.5		255.9		1.4	0.5
1297	D86-automated	149.0		170.8		196.1		233.4		254.9		1.2	0.3
1299	D86-automated	149.6		170.0		195.4		234.5		255.8		1.2	0.6
1320	D86-automated	149.4		170.3		195.2		232.4		254.8		1.1	0.2
1357	D86-automated	151.7		169.5		194.6		232.8		251.2		1.2	1.2
1397		152.7		170.5		195.9		233.7		255.9		1.2	0.6
1399	D86-automated	148.6		168.5		194.5		234.3		255.1		1.2	0.7
1429	D86-automated	149.7		168.5		194.2		232.3		251.9		1.2	0.8
1438	D86-automated	149.8		170.6		195.3		232.2		252.9		1.2	0.3
1498	D86-automated	150.7		170.1		196.0		233.3		255.1		1.2	0.4
1531	D86-automated	151.9		170.0		195.6		233.8		254.9		1.2	0.3
1564	D86-automated	152.5		172.2		197.2		234.4		253.7		1.2	0.4
1587	D86-automated	149.4		170.1		195.5		232.3		254.9		1.0	0.0
1610	IP123-automated	147.0		171.3		197.5		239.2	R(1)	257.8		1.2	0.1
1720		-----		-----		-----		-----		-----		-----	-----
1730		-----		-----		-----		-----		-----		-----	-----
1755	D86-automated	147.5		167.5		193.6	C	232.0		251.9		1.1	1.0
1776	ISO3405-automated	148.5		169.7		195.2		234.3		254.1		1.5	0.8
1810	D86-automated	150.4		169.8		195.5		233.5		256.7		1.0	-----
1811	D86-automated	152.3		170.1		195.5		233.0		254.6		1.1	0
6075		151.7		171.2		197.6		235.9		256.2		1.3	1.1
6142	ISO3405-automated	143.9		168.4		194.1		232		252.5		1.1	0.6
6192	D86-automated	151.0		168.4		193.3		231.1	C	258.7		0.4	0.2
6299	ISO3405-automated	150.7		170.6		196.7		234.6		254.9		1.2	0.9
6312		-----		-----		-----		-----		-----		-----	-----

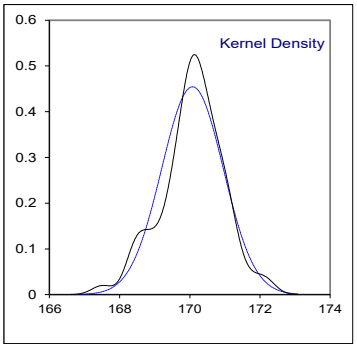
lab	method	IBP	mark	10% rec	mark	50% rec	mark	90% rec	mark	FBP	mark	Res.	Loss
6359		145.6		171.0		195.6		233.7		256.5		1.2	0.6
6404	D86-automated	149.1		169.5		195.5		233		253.5		1.2	0.7
6490	D86-manual	151.5		168.5		195.0		233.0		257.0		0.7	0.3
6530		-----		-----		-----		-----		-----		-----	-----
	normality	OK		OK		OK		OK		suspect			
	n	70		70		70		69		70			
	outliers	0		0		0		1		0			
	mean (n)	150.00		170.08		195.63		233.45		254.94			
	st.dev. (n)	2.141		0.878		0.816		1.060		1.821			
	R(calc.)	5.99		2.46		2.28		2.97		5.10			
	st.dev.(D86-A:23)	2.946		1.336		1.071		1.251		2.536			
	R(D86-A:23)	8.25		3.74		3.00		3.50		7.10			
Compare													
	R(D86-M:23)	4.67		3.01		2.85		3.38		4.00			

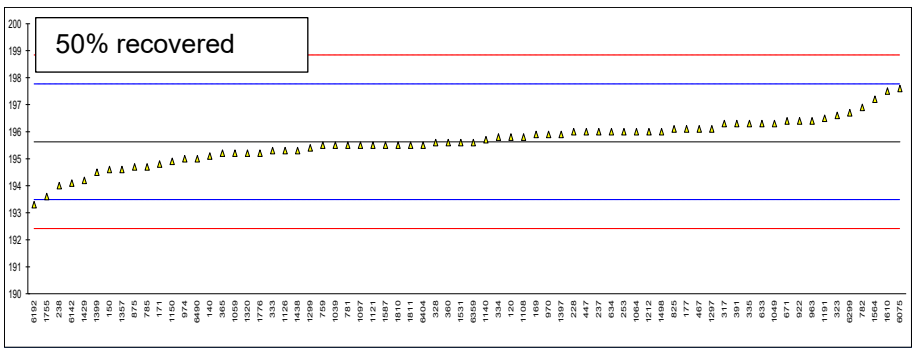
Lab 120 first reported 98.4
Lab 1121 first reported 273.9
Lab 1191 first reported 98.7 and 1.3 respectively
Lab 1755 first reported 193.3
Lab 6192 first reported 2311

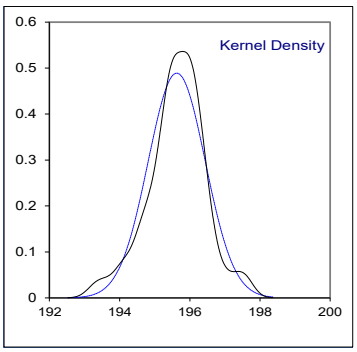

Initial Boiling Point

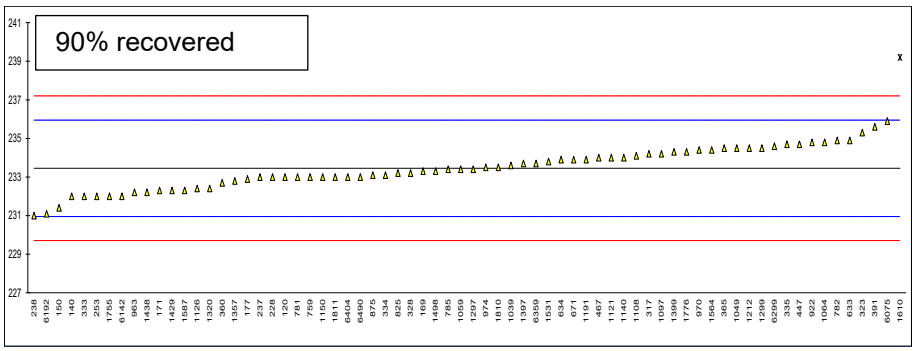

Kernel Density

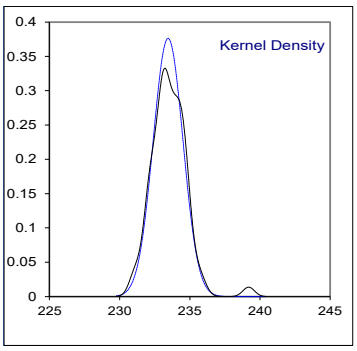

10% recovered

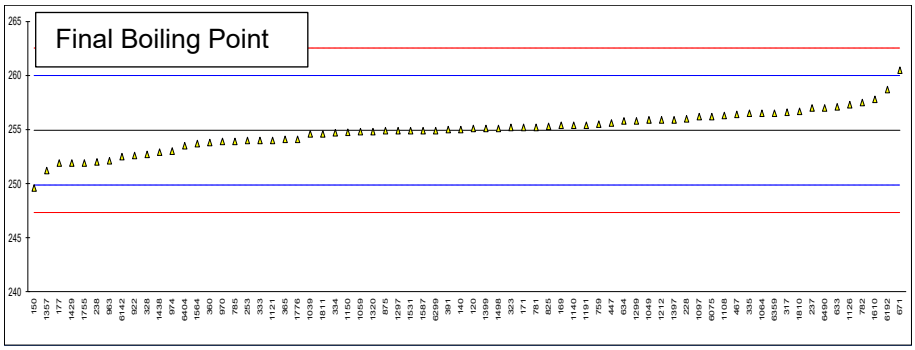

Kernel Density

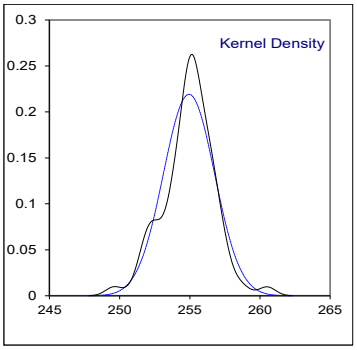

50% recovered


Kernel Density


90% recovered


Kernel Density


Final Boiling Point

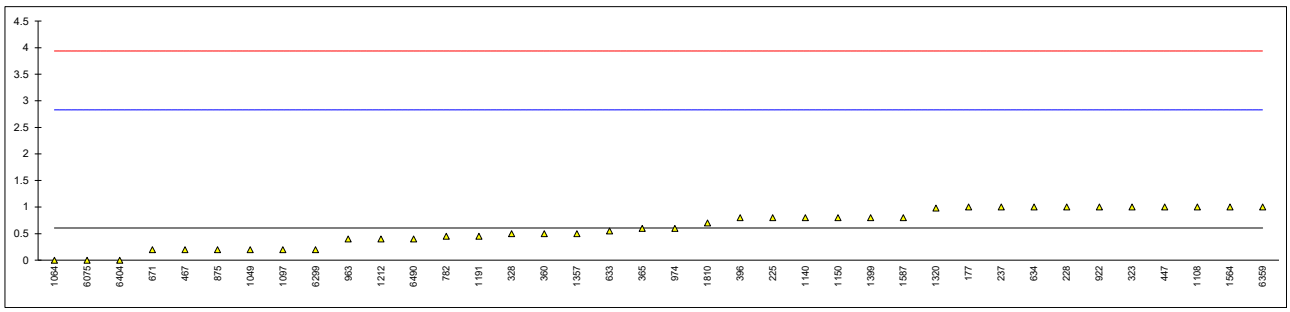

Kernel Density

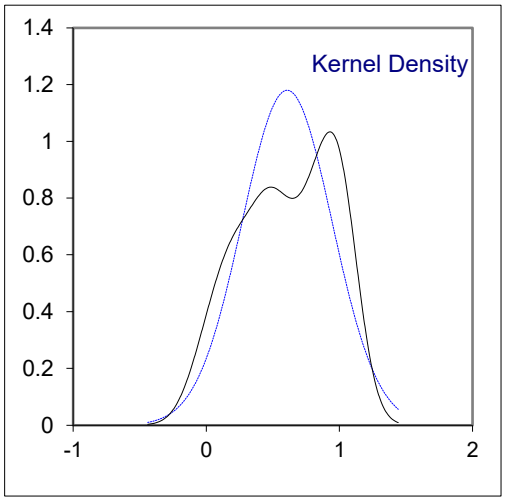
Determination of Existent Gum (unwashed) on sample #23035; results in mg/100 mL

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140		-----		-----	
150	D381	<1		-----	
159		-----		-----	
169	D381	<1		-----	
171	D381	<1		-----	
177	D381	1		0.35	
225	D381	0.8		0.17	
228	D381	1.0		0.35	
237	D381	1.0		0.35	
238		-----		-----	
253	IP540	<1.0		-----	
317	IP540	<1		-----	
323	IP540	1.0		0.35	
328	D381	0.5		-0.10	
333	D381	<0.5		-----	
334	D381	<0.5		-----	
335	D381	< 0.5		-----	
360	D381	0.5		-0.10	
365	IP540	0.6		-0.01	
391		-----		-----	
396	D381	0.8		0.17	
398		-----		-----	
399		-----		-----	
447	D381	1		0.35	
467	IP540	0.2		-0.37	
633	IP540	0.55		-0.05	
634	IP540	1		0.35	
671	IP540	0.2		-0.37	
759		-----		-----	
781		-----		-----	
782	D381	0.45		-0.14	
785		-----		-----	
825	D381	<1		-----	
875	IP540	0.20		-0.37	
922	D381	1.0		0.35	
963	D381	0.4		-0.19	
970		-----		-----	
974	IP540	0.60		-0.01	
1039	ISO6246	<1		-----	
1049	D381	0.2		-0.37	
1059	D381	<1		-----	
1064	D381	0		-0.55	
1097	IP540	0.2		-0.37	
1108	D381	1.0		0.35	
1121		-----		-----	
1126		-----		-----	
1140	IP540	0.8		0.17	
1150	ISO6246	0.8		0.17	
1191	IP540	0.45		-0.14	
1212	IP540	0.4		-0.19	
1297		-----		-----	
1299	IP540	<1		-----	
1320	D381	0.98		0.34	
1357	D381	0.5		-0.10	
1397		-----		-----	
1399	D381	0.8		0.17	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564	IP540	1		0.35	
1587	IP540	0.8		0.17	
1610		-----		-----	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776		-----		-----	
1810	D381	0.7		0.08	
1811		-----		-----	
6075	IP540	0		-0.55	
6142		-----		-----	
6192		-----		-----	
6299	IP540	0.2		-0.37	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D381	1		0.35	
6404	D381	0		-0.55	
6490	D381	0.4		-0.19	
6530		-----		-----	

	normality	OK
	n	38
	outliers	0
	mean (n)	0.61
	st.dev. (n)	0.338
	R(calc.)	0.95
	st.dev.(D381:22)	1.111
	R(D381:22)	3.11
Compare		
	R(IP540:08R19)	1.85



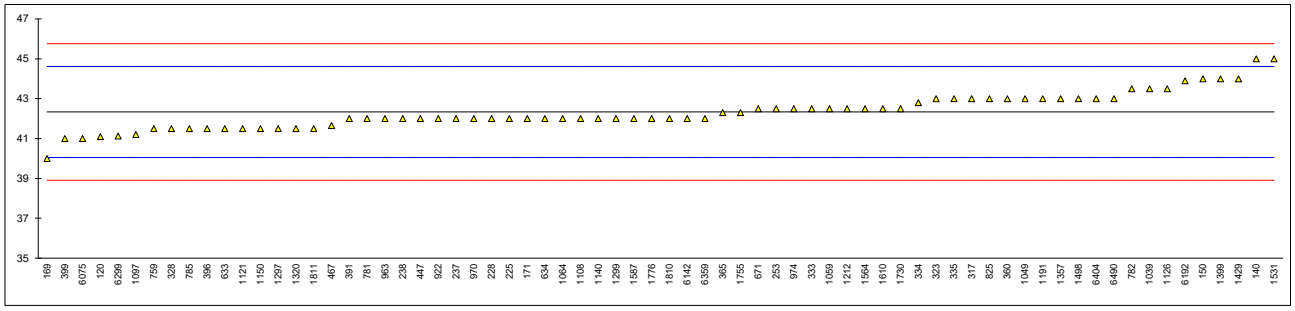


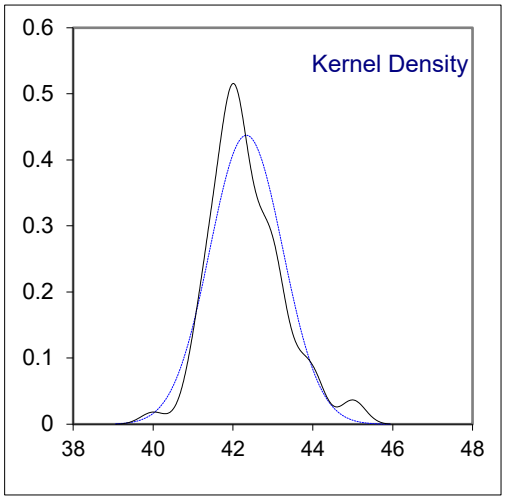
Determination of Flash Point on sample #23035; results in °C

lab	method	value	mark	z(targ)	remarks
120	D56	41.1		-1.08	
140	D56	45.0		2.33	
150	D56	44.0		1.46	
159		-----		-----	
169	D56	40.0		-2.04	
171	D56	42.0		-0.29	
177		-----		-----	
225	IP170	42.0		-0.29	
228	IP170	42.0		-0.29	
237	IP170	42.0		-0.29	
238	IP170	42.0		-0.29	
253	IP170	42.5		0.15	
317	IP170	43.0		0.58	
323	IP170	43.0		0.58	
328	IP170	41.5		-0.73	
333	IP170	42.5		0.15	
334	IP170	42.8		0.41	
335	IP170	43.0		0.58	
360	D56	43.0		0.58	
365	IP170	42.300		-0.03	
391	IP170	42.0		-0.29	
396	IP170	41.5		-0.73	
398		-----		-----	
399	IP170	41		-1.17	
447	IP170	42.0		-0.29	
467	IP170	41.65		-0.60	
633	D56	41.5		-0.73	
634	IP170	42.0		-0.29	
671	IP170	42.5		0.15	
759	IP170	41.5		-0.73	
781	IP170	42.0		-0.29	
782	D93	43.5		1.02	
785	IP170	41.5		-0.73	
825	IP170	43.0		0.58	
875		-----		-----	
922	IP170	42.0		-0.29	
963	IP170	42.0		-0.29	
970	IP170	42.0		-0.29	
974	IP170	42.5		0.15	
1039	IP170	43.5		1.02	
1049	ISO13736	43.0		0.58	
1059	IP170	42.5		0.15	
1064	IP170	42.0		-0.29	
1097	ISO13736	41.2		-0.99	
1108	D56	42.0		-0.29	
1121	IP170	41.50		-0.73	
1126	ISO2719	43.5		1.02	
1140	IP170	42.0		-0.29	
1150	D56	41.5		-0.73	
1191	ISO13736	43.0		0.58	
1212	IP170	42.5		0.15	
1297	D56	41.5		-0.73	
1299	IP170	42.0		-0.29	
1320	D56	41.5		-0.73	
1357	IP170	43.0		0.58	
1397		-----		-----	
1399	IP170	44.0		1.46	
1429	D93	44.0		1.46	
1438		-----		-----	
1498	D56	43.0		0.58	
1531	D93	45		2.33	
1564	IP170	42.5		0.15	
1587	IP170	42.0		-0.29	
1610	IP170	42.5		0.15	
1720		-----		-----	
1730	D56	42.5		0.15	
1755	D56	42.3		-0.03	
1776	IP170	42.0		-0.29	
1810	D56	42.0		-0.29	
1811	IP170	41.5		-0.73	
6075	IP170	41.0		-1.17	
6142	ISO13736	42		-0.29	
6192	ISO2719	43.9		1.37	
6299	ISO13736	41.135		-1.05	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D56	42.0		-0.29	
6404	D3828	43		0.58	
6490	IP170	43.0		0.58	
6530		-----		-----	

normality	suspect
n	70
outliers	0
mean (n)	42.33
st.dev. (n)	0.912
R(calc.)	2.55
st.dev.(IP170:21)	1.143
R(IP170:21)	3.2



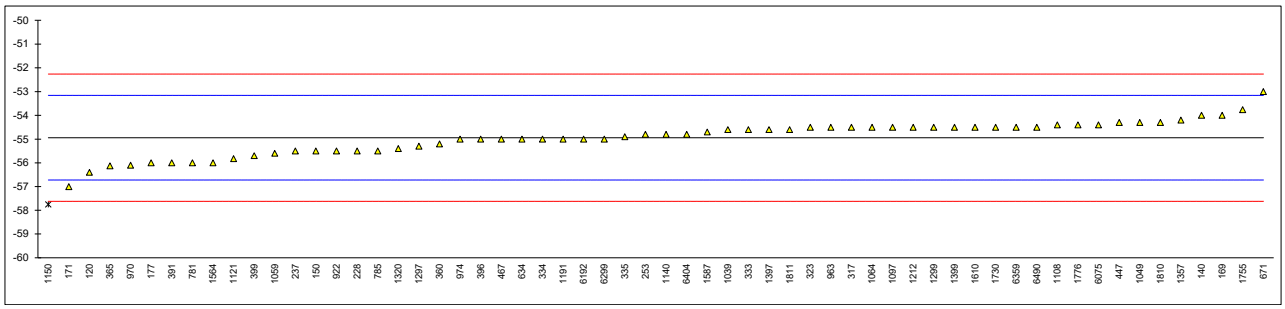


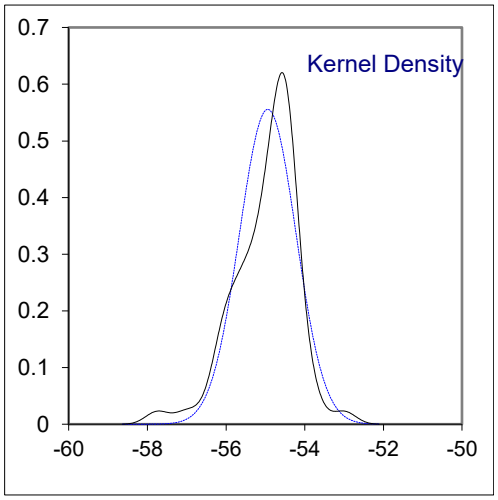
Determination of Freezing Point on sample #23035; results in °C

lab	method	value	mark	z(targ)	remarks
120	D5972	-56.4		-1.63	
140	D5972	-54.0		1.06	
150	D7153	-55.5		-0.62	
159		-----		-----	
169	D2386	-54		1.06	
171	D2386	-57.0		-2.30	
177	D2386	-56.0		-1.18	
225		-----		-----	
228	D2386	-55.5		-0.62	
237	D2386	-55.5		-0.62	
238		-----		-----	
253	D7153	-54.8		0.16	
317	D2386	-54.5		0.50	
323	D2386	-54.5		0.50	
328		-----		-----	
333	IP529	-54.6		0.38	
334	D2386	-55.0		-0.06	
335	IP529	-54.9		0.05	
360	D7153	-55.2		-0.29	
365	IP16	-56.13		-1.33	
391	D2386	-56.0		-1.18	
396	D2386	-55.0		-0.06	
398		-----		-----	
399	D7153	-55.7		-0.85	
447	D2386	-54.3		0.72	
467	D2386	-55.0		-0.06	
633		-----		-----	
634	D2386	-55.0		-0.06	
671	D2386	-53.0		2.18	
759		-----		-----	
781	D2386	-56.0		-1.18	
782		-----		-----	
785	D2386	-55.5		-0.62	
825		-----		-----	
875		-----		-----	
922	D2386	-55.5		-0.62	
963	D2386	-54.5		0.50	
970	D5972	-56.1		-1.30	
974	D2386	-55.0		-0.06	
1039	IP529	-54.6		0.38	
1049	D7153	-54.3		0.72	
1059	D5972	-55.6		-0.74	
1064	D7153	-54.5		0.50	
1097	IP529	-54.5		0.50	
1108	D7153	-54.4		0.61	
1121	IP16	-55.82		-0.98	
1126		-----		-----	
1140	D7153	-54.8		0.16	
1150	D2386	-57.75	R(0.05)	-3.14	
1191	IP529	-55		-0.06	
1212	D2386	-54.5		0.50	
1297	D5972	-55.3		-0.40	
1299	D2386	-54.5		0.50	
1320	D5972	-55.4		-0.51	
1357	D5972	-54.2		0.83	
1397	D7153	-54.6		0.38	
1399	D7153	-54.5		0.50	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564	D2386	-56		-1.18	
1587	IP529	-54.7		0.27	
1610	D2386	-54.5		0.50	
1720		-----		-----	
1730	D2386	-54.5		0.50	
1755	D2386	-53.76		1.32	
1776	IP529	-54.4		0.61	
1810	D2386	-54.3		0.72	
1811	D2386	-54.6		0.38	
6075	IP529	-54.4		0.61	
6142		-----		-----	
6192	D2386	-55		-0.06	
6299	IP529	-55.0		-0.06	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D2386	-54.5		0.50	
6404	D7153	-54.8		0.16	
6490	D2386	-54.5		0.50	
6530		-----		-----	

normality	OK
n	59
outliers	1
mean (n)	-54.94
st.dev. (n)	0.718
R(calc.)	2.01
st.dev.(D2386:19)	0.893
R(D2386:19)	2.5



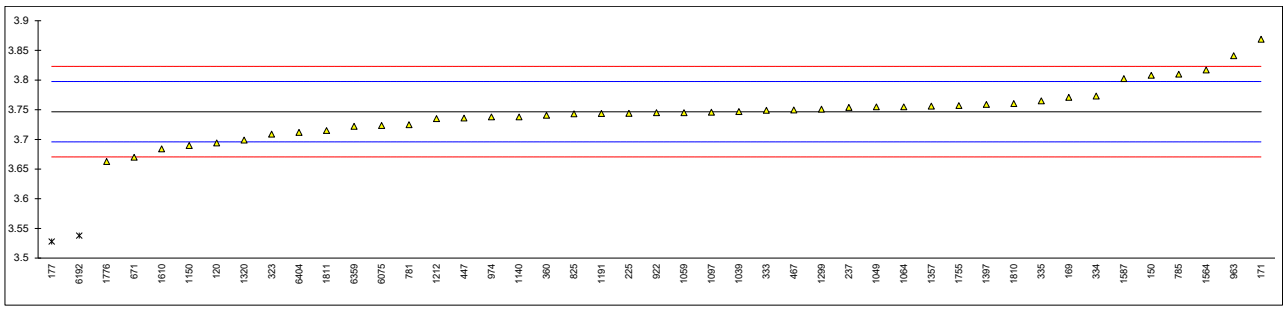


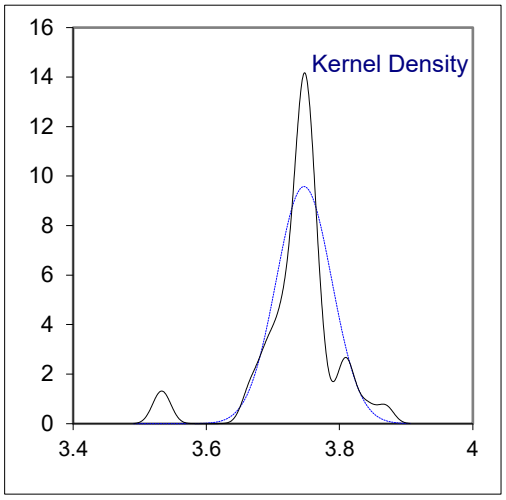
Determination of Kinematic Viscosity at -20 °C on sample #23035; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	D445	3.694		-2.08	
140		-----		-----	
150	D445	3.808	C	2.41	first reported 3.888
159		-----		-----	
169	D445	3.771		0.95	
171	D445	3.869		4.81	
177	D445	3.528	R(0.01)	-8.60	
225	D445	3.744		-0.11	
228		-----		-----	
237	D445	3.754		0.28	
238		-----		-----	
253		-----		-----	
317		-----		-----	
323	D445	3.709		-1.49	
328		-----		-----	
333	D445	3.749		0.09	
334	D445	3.773		1.03	
335	D445	3.765		0.72	
360	D445	3.7408		-0.23	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D445	3.736		-0.42	
467	D7042	3.7498		0.12	
633		-----		-----	
634		-----		-----	
671	D445	3.67	C	-3.02	first reported 10.14
759		-----		-----	
781	D445	3.725		-0.86	
782		-----		-----	
785	D445	3.81		2.49	
825	D445	3.743		-0.15	
875		-----		-----	
922	D445	3.745		-0.07	
963	D445	3.841		3.71	
970		-----		-----	
974	D445	3.738		-0.34	
1039	D7945	3.747		0.01	
1049	D445	3.755		0.32	
1059	D445	3.745		-0.07	
1064	D445	3.755		0.32	
1097	ISO3104	3.7460		-0.03	
1108		-----		-----	
1121		-----		-----	
1126		-----		-----	
1140	D445	3.738		-0.34	
1150	ISO3104	3.6897		-2.24	
1191	ISO3104	3.74376		-0.12	
1212	D7042	3.735		-0.46	
1297		-----		-----	
1299	D445	3.751		0.17	
1320	D445	3.699		-1.88	
1357	D445	3.756		0.36	
1397	D7042	3.759		0.48	
1399		-----		-----	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564	D445	3.8170		2.76	
1587	D445	3.80254		2.19	
1610	D7042	3.6842		-2.46	
1720		-----		-----	
1730		-----		-----	
1755	D7042	3.7571		0.41	
1776	ISO3104	3.6628		-3.30	
1810	D445	3.7604		0.54	
1811	D445	3.7151		-1.25	
6075	D445	3.72341351		-0.92	
6142		-----		-----	
6192	D445	3.538	R(0.01)	-8.21	
6299		-----		-----	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D445	3.722		-0.97	
6404	D445	3.712	C	-1.37	first reported 3.909
6490		-----		-----	
6530		-----		-----	

	normality	suspect
	n	43
	outliers	2
	mean (n)	3.74676
	st.dev. (n)	0.041662
	R(calc.)	0.11665
	st.dev.(D445:19)	0.025424
	R(D445:19)	0.07119
Compare		
	R(D445:21e2)	0.01842



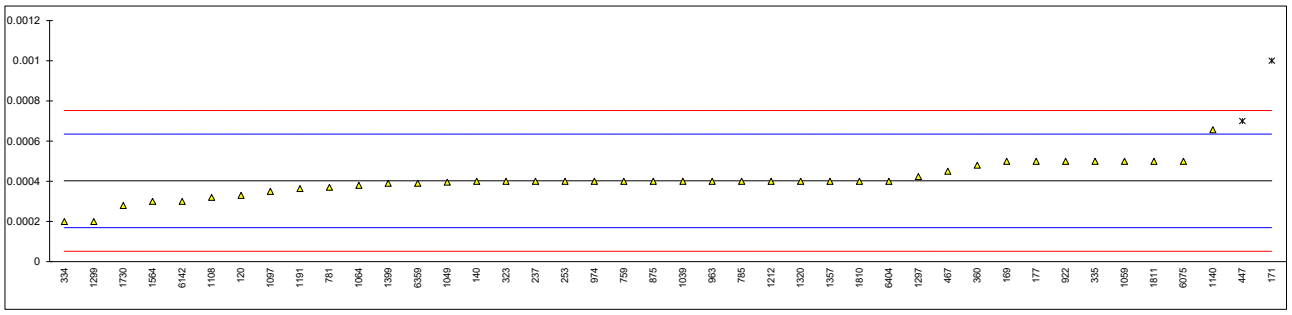


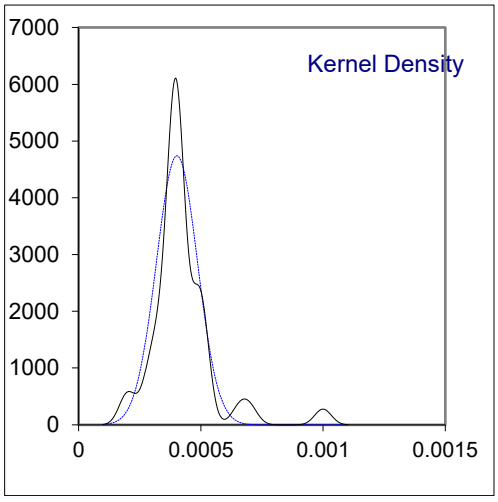
Determination of Mercaptan Sulfur as S on sample #23035; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D3227	0.00033		-0.62	
140	D3227	0.0004		-0.02	
150		-----		-----	
159		-----		-----	
169	D3227	0.0005		0.84	
171	D3227	0.0010	R(0.01)	5.12	
177	D3227	0.0005		0.84	
225		-----		-----	
228		-----		-----	
237	D3227	0.0004		-0.02	
238		-----		-----	
253	D3227	0.0004		-0.02	
317		-----		-----	
323	D3227	0.0004		-0.02	
328		-----		-----	
333	D3227	<0.0003		-----	
334	D3227	0.0002		-1.73	
335	D3227	0.0005		0.84	
360	D3227	0.00048		0.67	
365		-----		-----	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D3227	0.0007	R(0.05)	2.55	
467	D3227	0.00045		0.41	
633		-----		-----	
634		-----		-----	
671		-----		-----	
759	UOP163	0.0004		-0.02	
781	D3227	0.00037		-0.27	
782		-----		-----	
785	D3227	0.0004		-0.02	
825		-----		-----	
875	UOP163	0.0004		-0.02	
922	D3227	0.00050		0.84	
963	D3227	0.0004		-0.02	
970		-----		-----	
974	D3227	0.0004		-0.02	
1039	IP342	0.0004		-0.02	
1049	D3227	0.0003956		-0.05	
1059	D3227	0.0005		0.84	
1064	D3227	0.00038		-0.19	
1097	ISO3012	0.00035		-0.45	
1108	D3227	0.00032		-0.70	
1121		-----		-----	
1126		-----		-----	
1140	D3227	0.000657		2.18	
1150		-----		-----	
1191	ISO3012	0.000364		-0.33	
1212	D3227	0.0004		-0.02	
1297	D3227	0.000423		0.18	
1299	D3227	0.0002		-1.73	
1320	D3227	0.0004		-0.02	
1357	D3227	0.0004		-0.02	
1397		-----		-----	
1399	D3227	0.00039		-0.10	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564	D3227	0.0003		-0.87	
1587		-----		-----	
1610		-----		-----	
1720		-----		-----	
1730	D3227	0.00028		-1.04	
1755		-----		-----	
1776		-----		-----	
1810	D3227	0.0004		-0.02	
1811	D3227	0.0005		0.84	
6075	D3227	0.0005		0.84	
6142	IP342	0.0003		-0.87	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D3227	0.00039		-0.10	
6404	D3227	0.0004		-0.02	
6490		-----		-----	
6530		-----		-----	

normality	suspect
n	40
outliers	2
mean (n)	0.000402
st.dev. (n)	0.0000842
R(calc.)	0.000236
st.dev.(D3227:16)	0.0001167
R(D3227:16)	0.000327



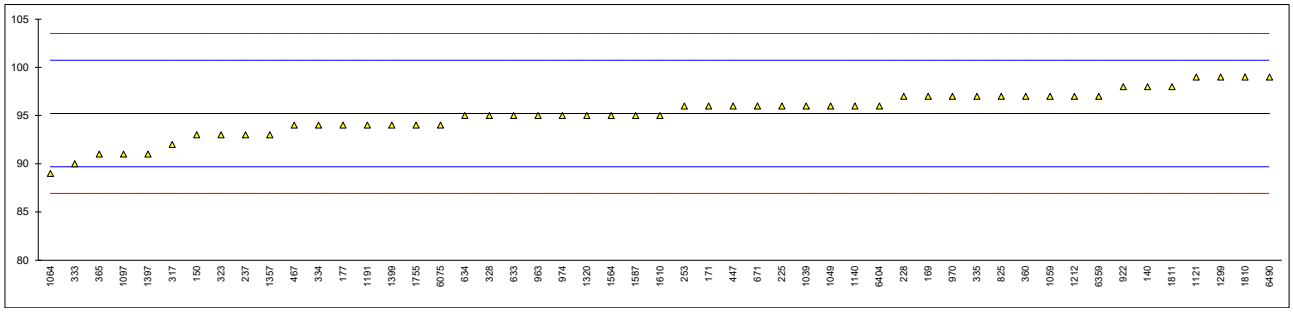


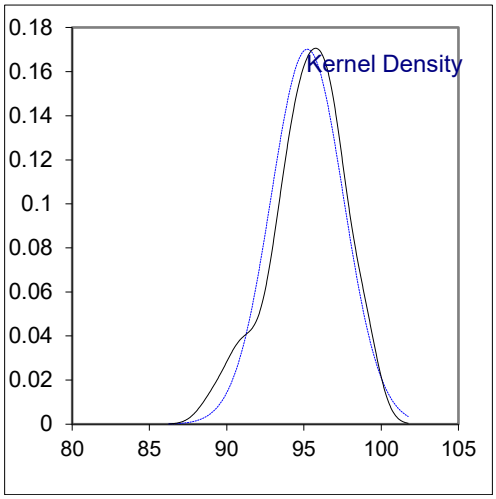
Determination of MSEP on sample #23035;

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
140	D3948	98		1.01	
150	D3948	93		-0.80	
159		-----		-----	
169	D3948	97		0.65	
171	D3948	96		0.28	
177	D7224	94		-0.44	
225	D3948	96		0.28	
228	D3948	97.0		0.65	
237	D7224	93		-0.80	
238		-----		-----	
253	D3948	96		0.28	
317	D7224	92		-1.16	
323	D7224	93		-0.80	
328	D7224	95		-0.08	
333	D7224	90		-1.89	
334	D7224	94		-0.44	
335	D7224	97		0.65	
360	D3948	97		0.65	
365	D7224	91		-1.53	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D3948	96		0.28	
467	D3948	94		-0.44	
633	D7224	95		-0.08	
634	D7224	95		-0.08	
671	D3948	96		0.28	
759		-----		-----	
781		-----		-----	
782		-----		-----	
785		-----		-----	
825	D3948	97		0.65	
875		-----		-----	
922	D3948	98		1.01	
963	D3948	95.0		-0.08	
970	D3948	97		0.65	
974	D7224	95		-0.08	
1039	D3948	96		0.28	
1049	D7224	96		0.28	
1059	D3948	97		0.65	
1064	D7224	89		-2.25	
1097	D7224	91		-1.53	
1108		-----		-----	
1121	D3948	99		1.37	
1126		-----		-----	
1140	D3948	96		0.28	
1150		-----		-----	
1191	D3948	94		-0.44	
1212	D7224	97		0.65	
1297		-----		-----	
1299	D3948	99		1.37	
1320	D3948	95		-0.08	
1357	D3948	93		-0.80	
1397	D7224	91		-1.53	
1399	D3948	94	C	-0.44	first reported 78
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564	D3948	95	C	-0.08	first reported 86
1587	D3948	95		-0.08	
1610	D3948	95		-0.08	
1720		-----		-----	
1730		-----		-----	
1755	D7224	94		-0.44	
1776		-----		-----	
1810	D3948	99		1.37	
1811	D3948	98		1.01	
6075	D3948	94		-0.44	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D3948	97		0.65	
6404	D3948	96		0.28	
6490	D3948	99		1.37	
6530		-----		-----	

normality	OK
n	51
outliers	0
mean (n)	95.22
st.dev. (n)	2.344
R(calc.)	6.56
st.dev.(D3948:22)	2.763
R(D3948:22)	7.74



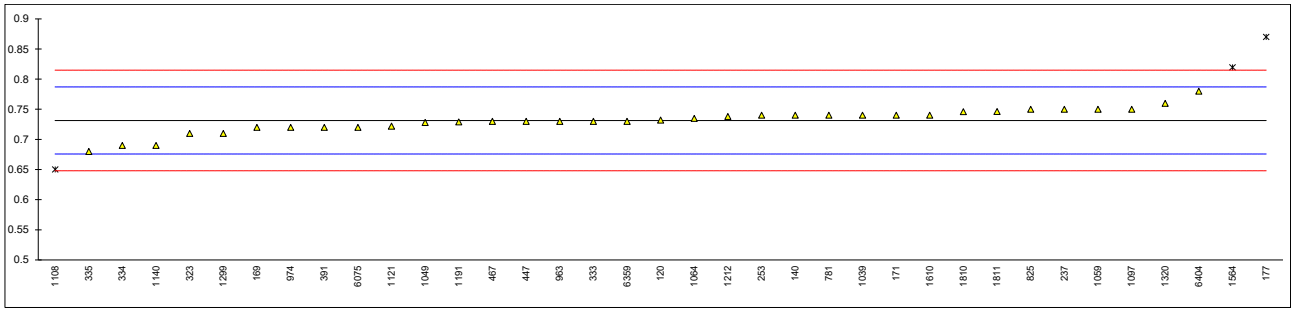


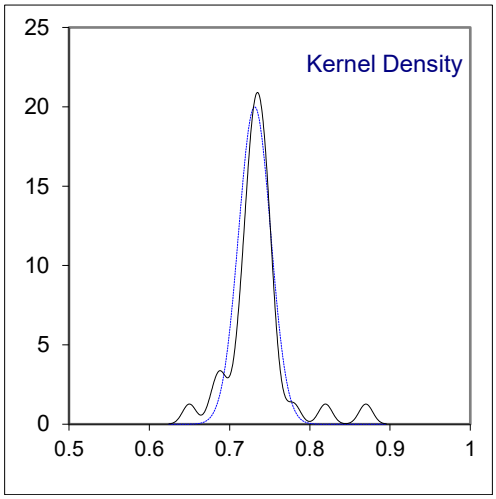
Determination of Naphthalenes on sample #23035; results in %V/V

lab	method	value	mark	z(targ)	remarks
120	D1840-B	0.732		0.02	
140	D1840-B	0.74		0.31	
150		-----		-----	
159		-----		-----	
169	D1840-B	0.72		-0.41	
171	D1840-A	0.74		0.31	
177	D1840-B	0.87	R(0.01)	4.98	
225		-----		-----	
228		-----		-----	
237	D1840-B	0.75		0.67	
238		-----		-----	
253	D1840-B	0.74		0.31	
317		-----		-----	
323	D1840	0.71		-0.77	
328		-----		-----	
333	D1840-B	0.73		-0.05	
334	D1840-A	0.69		-1.49	
335	D1840-B	0.68		-1.85	
360		-----		-----	
365		-----		-----	
391	D1840-B	0.72		-0.41	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D1840-B	0.73		-0.05	
467	D1840-B	0.730		-0.05	
633		-----		-----	
634		-----		-----	
671		-----		-----	
759		-----		-----	
781	D1840-B	0.74	C	0.31	first reported 0.84
782		-----		-----	
785		-----		-----	
825	D1840-B	0.75		0.67	
875		-----		-----	
922		-----		-----	
963	D1840-A	0.73		-0.05	
970		-----		-----	
974	D1840-A	0.72		-0.41	
1039	D1840-B	0.74		0.31	
1049	D1840-A	0.728		-0.12	
1059	D1840-B	0.75	C	0.67	first reported 0.52
1064	D1840-A	0.7350		0.13	
1097	D1840-A	0.750		0.67	
1108	D1840-B	0.65	R(0.01)	-2.92	
1121	D1840-B	0.722		-0.34	
1126		-----		-----	
1140	D1840-A	0.69		-1.49	
1150		-----		-----	
1191	D1840-A	0.729		-0.08	
1212	D1840-B	0.738		0.24	
1297		-----		-----	
1299	D1840-B	0.71		-0.77	
1320	D1840-B	0.76		1.03	
1357		-----		-----	
1397		-----		-----	
1399		-----		-----	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564	D1840-A	0.8196	R(0.01)	3.17	
1587		-----		-----	
1610	D1840-B	0.74		0.31	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776		-----		-----	
1810	D1840-A	0.7460		0.53	
1811	D1840-A	0.7463		0.54	
6075	D1840	0.72		-0.41	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359		0.73		-0.05	
6404	D1840-B	0.78	C	1.75	first reported 1.13
6490		-----		-----	
6530		-----		-----	

normality	suspect
n	34
outliers	3
mean (n)	0.7314
st.dev. (n)	0.01994
R(calc.)	0.0558
st.dev.(D1840:22)	0.02783
R(D1840:22)	0.0779



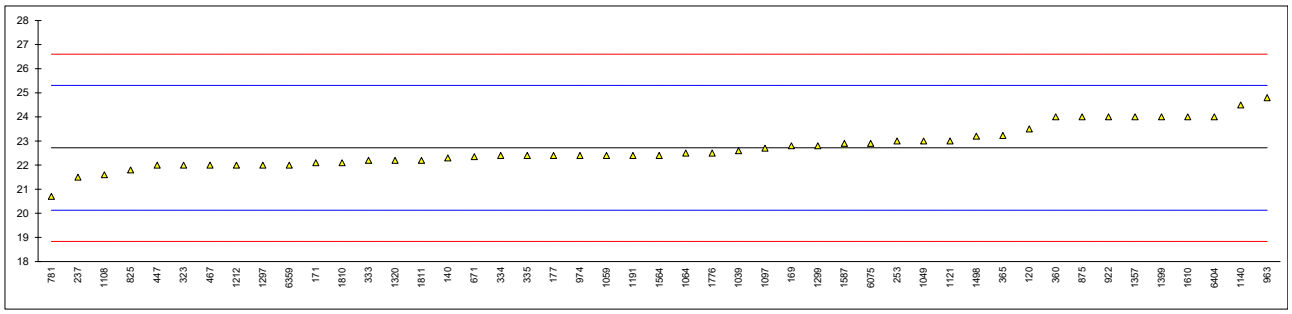


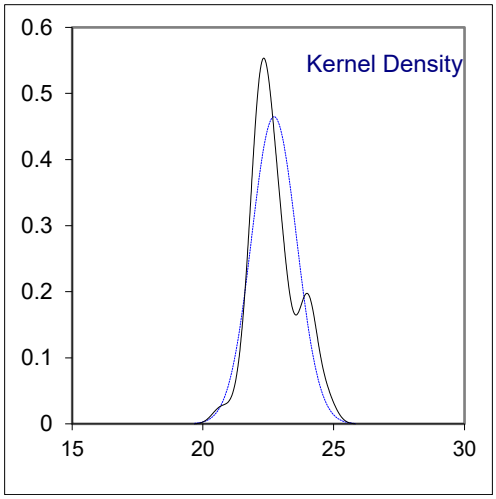
Determination of Smoke Point on sample #23035; results in mm

lab	method	value	mark	z(targ)	remarks
120	D1322-automated	23.5		0.60	
140	D1322-automated	22.3		-0.32	
150		-----		-----	
159		-----		-----	
169	D1322-automated	22.8		0.06	
171	D1322-automated	22.1		-0.48	
177	D1322-automated	22.4		-0.25	
225		-----		-----	
228		-----		-----	
237	D1322-automated	21.5		-0.94	
238		-----		-----	
253	D1322-manual	23		0.22	
317		-----		-----	
323	D1322-automated	22.0		-0.56	
328		-----		-----	
333	D1322-automated	22.2		-0.40	
334	D1322-automated	22.4		-0.25	
335	D1322-automated	22.4		-0.25	
360	D1322-manual	24.0		0.99	
365	IP57-manual	23.23		0.39	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D1322-manual	22		-0.56	
467	D1322-manual	22.0		-0.56	
633		-----		-----	
634		-----		-----	
671	D1322-automated	22.35		-0.28	
759		-----		-----	
781	D1322-manual	20.7		-1.56	
782		-----		-----	
785		-----		-----	
825	D1322-manual	21.8		-0.71	
875	D1322-manual	24.0		0.99	
922	D1322-manual	24		0.99	
963	D1322-manual	24.8		1.61	
970		-----		-----	
974	D1322-automated	22.4		-0.25	
1039	D1322-automated	22.6		-0.09	
1049	D1322-automated	23.0		0.22	
1059	D1322-automated	22.4		-0.25	
1064	D1322-automated	22.5		-0.17	
1097	D1322-automated	22.7		-0.01	
1108	D1322-automated	21.6		-0.86	
1121	D1322-manual	23.0		0.22	
1126		-----		-----	
1140	D1322-manual	24.5		1.38	
1150		-----		-----	
1191	D1322-automated	22.4		-0.25	
1212	D1322-automated	22.0		-0.56	
1297	D1322-manual	22		-0.56	
1299	D1322-automated	22.8		0.06	
1320	D1322-automated	22.2		-0.40	
1357	D1322-manual	24		0.99	
1397		-----		-----	
1399	D1322-automated	24		0.99	
1429		-----		-----	
1438		-----		-----	
1498	D1322-manual	23.2		0.37	
1531		-----		-----	
1564	D1322-automated	22.4		-0.25	
1587	D1322-automated	22.9		0.14	
1610	IP598-manual	24.0		0.99	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776	D1322-automated	22.5		-0.17	
1810	D1322-automated	22.1		-0.48	
1811	D1322-automated	22.2		-0.40	
6075	D1322-automated	22.9		0.14	
6142		-----		-----	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D1322-manual	22		-0.56	
6404	D1322-manual	24		0.99	
6490		-----		-----	
6530		-----		-----	

			only D1322-manual	only D1322-auto
	normality	OK	OK	not OK
	n	47	16	29
	outliers	0	0	0
	mean (n)	22.72	23.06	22.47
	st.dev. (n)	0.858	1.189	0.502
	R(calc.)	2.40	3.33	1.41
	st.dev.(D1322-M:22)	1.295	1.306	0.309
	R(D1322-M:22)	3.63	3.66	---
Compare				
	R(D1322-A:22)	0.87	---	0.87



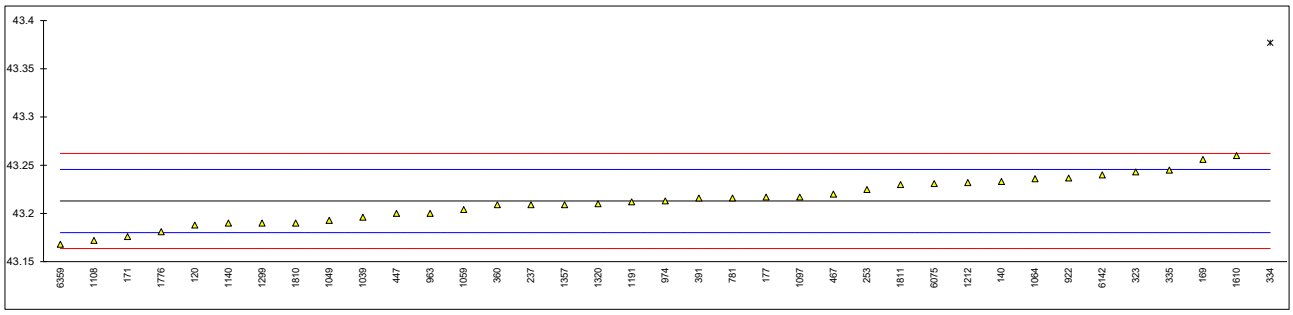


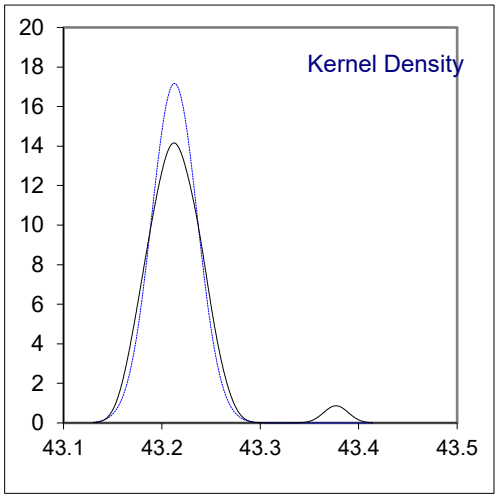
Determination of Specific Energy (Net) on Sulfur free basis on sample #23035; results in MJ/kg

lab	method	value	mark	z(targ)	remarks
120	D3338	43.188		-1.51	
140	D3338	43.233		1.23	
150		-----		-----	
159		-----		-----	
169	D3338	43.256		2.63	
171	D3338	43.176		-2.24	
177	D3338	43.217		0.25	
225		-----		-----	
228		-----		-----	
237	D3338	43.209		-0.24	
238		-----		-----	
253	D3338	43.2248		0.73	
317		-----		-----	
323	D3338	43.243		1.83	
328		-----		-----	
333		-----		-----	
334	D3338	43.377	R(0.01)	9.99	
335	D3338	43.245		1.96	
360	D3338	43.209		-0.24	
365		-----		-----	
391	D3338	43.216		0.19	
396		-----		-----	
398		-----		-----	
399		-----		-----	
447	D3338	43.2		-0.78	
467	D3338	43.220		0.43	
633		-----		-----	
634		-----		-----	
671		-----		-----	
759		-----		-----	
781	D3338	43.216		0.19	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922	D3338	43.2367		1.45	
963	D3338	43.20		-0.78	
970		-----		-----	
974	D3338	43.213		0.01	
1039	D3338	43.196		-1.03	
1049	D3338	43.19282		-1.22	
1059	D3338	43.204		-0.54	
1064	D3338	43.236		1.41	
1097	D3338	43.217		0.25	
1108	D3338	43.172		-2.49	
1121		-----		-----	
1126		-----		-----	
1140	D3338	43.19		-1.39	
1150		-----		-----	
1191	D3338	43.212		-0.05	
1212	D3338	43.232		1.16	
1297		-----		-----	
1299	D3338	43.19		-1.39	
1320	D3338	43.21		-0.17	
1357	D3338	43.209		-0.24	
1397		-----		-----	
1399		-----		-----	
1429		-----		-----	
1438		-----		-----	
1498		-----		-----	
1531		-----		-----	
1564		-----		-----	
1587		-----		-----	
1610	D3338	43.26		2.87	
1720		-----		-----	
1730		-----		-----	
1755		-----		-----	
1776	D3338	43.181		-1.94	
1810	D3338	43.19		-1.39	
1811	D3338	43.230		1.04	
6075	D3338	43.231		1.10	
6142		43.24		1.65	
6192		-----		-----	
6299		-----		-----	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D3338	43.168		-2.73	
6404		-----		-----	
6490		-----		-----	
6530		-----		-----	

normality	OK
n	36
outliers	1
mean (n)	43.2129
st.dev. (n)	0.02324
R(calc.)	0.0651
st.dev.(D3338:20a)	0.01643
R(D3338:20a)	0.0460



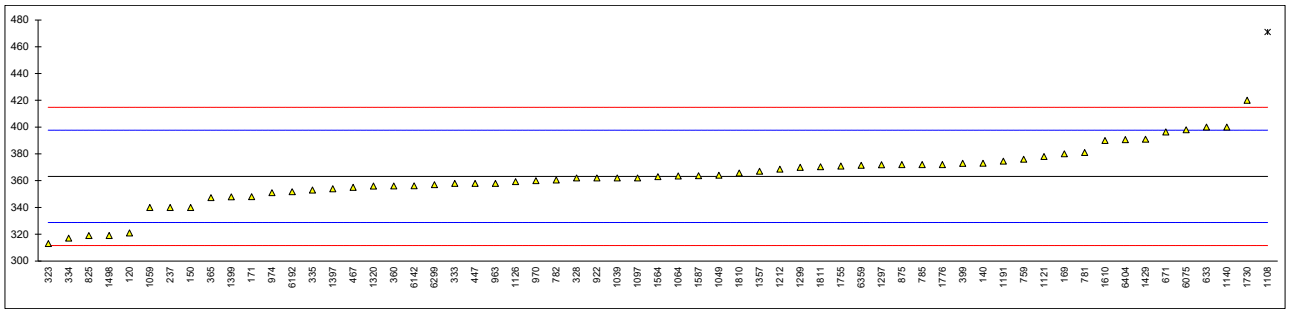


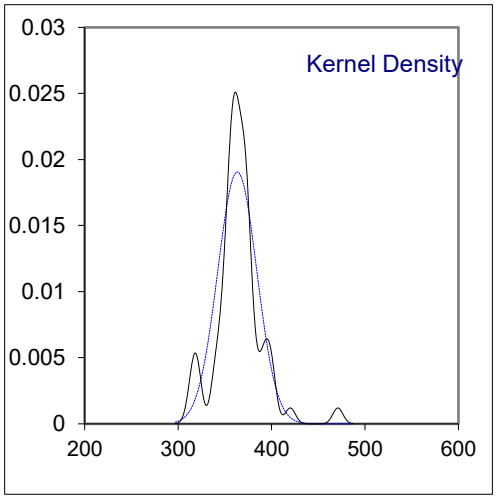
Determination of Total Sulfur on sample #23035; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D4294	321		-2.45	
140	D2622	373		0.57	
150	D4294	340		-1.35	
159		-----		-----	
169	D4294	380		0.98	
171	D5453	348		-0.88	
177		-----		-----	
225		-----		-----	
228		-----		-----	
237	D4294	340		-1.35	
238		-----		-----	
253		-----		-----	
317		-----		-----	
323	D5453	313		-2.91	
328	D5453	362		-0.07	
333	D4294	358		-0.30	
334	D5453	317	C	-2.68	reported 0.0317 mg/kg
335	D4294	353		-0.59	
360	D4294	356.1		-0.41	
365	IP490	347.25		-0.93	
391		-----		-----	
396		-----		-----	
398		-----		-----	
399	D4294	372.9		0.56	
447	IP336	358		-0.30	
467	D4294	355		-0.48	
633	D4294	400		2.14	
634		-----		-----	
671	D4294	396.33	C	1.92	first reported 446.45
759	D4294	376		0.74	
781	D4294	381		1.03	
782	ISO20884	360.5		-0.16	
785	D4294	372		0.51	
825	D5453	319		-2.57	
875	D4294	372		0.51	
922	D4294	362		-0.07	
963	D4294	358		-0.30	
970	D5453	360		-0.19	
974	D4294	351		-0.71	
1039	D2622	362		-0.07	
1049	D5453	364.0		0.05	
1059	ISO14596	340	C	-1.35	first reported 0.034 mg/kg
1064	D5453	363.45		0.02	
1097	ISO8754	362		-0.07	
1108	D4294	471	C,R(0.01)	6.26	first reported 534.4
1121	IP336	378		0.86	
1126	ISO20846	359.3		-0.23	
1140	IP336	400	C	2.14	first reported 0.040 mg/kg
1150		-----		-----	
1191	ISO8754	374.56		0.66	
1212	D5453	368.6		0.31	
1297	D4294	371.9		0.51	
1299	D2622	370	C	0.40	first reported 0.037 mg/kg
1320	ISO20884	356		-0.42	
1357	D5453	367		0.22	
1397	D2622	354		-0.53	
1399	D5453	347.88		-0.89	
1429	D5453	391		1.61	
1438		-----		-----	
1498	D5453	319.1		-2.56	
1531		-----		-----	
1564	ISO20846	363		-0.01	
1587	D4294	363.7		0.03	
1610	IP336	390		1.56	
1720		-----		-----	
1730	D4294	420	C	3.30	first reported 418.8
1755	D2622	370.95		0.45	
1776	ISO20884	372		0.51	
1810	D4294	365.7		0.15	
1811	D5453	370.4		0.42	
6075	D4294	398	C	2.02	reported 0.0398 mg/kg
6142	ISO20846	356.13		-0.41	
6192	ISO8754	351.7		-0.67	
6299	D5453	357		-0.36	
6312		-----		-----	

lab	method	value	mark	z(targ)	remarks
6359	D2622	371.4		0.48	
6404	D5453	390.6		1.59	
6490		-----		-----	
6530		-----		-----	

	normality	OK
	n	60
	outliers	1
	mean (n)	363.19
	st.dev. (n)	20.946
	R(calc.)	58.65
	st.dev.(D5453:19a)	17.224
	R(D5453:19a)	48.23
Compare		
	R(D4294:21)	85.73
	R(D2622:21)	48.16

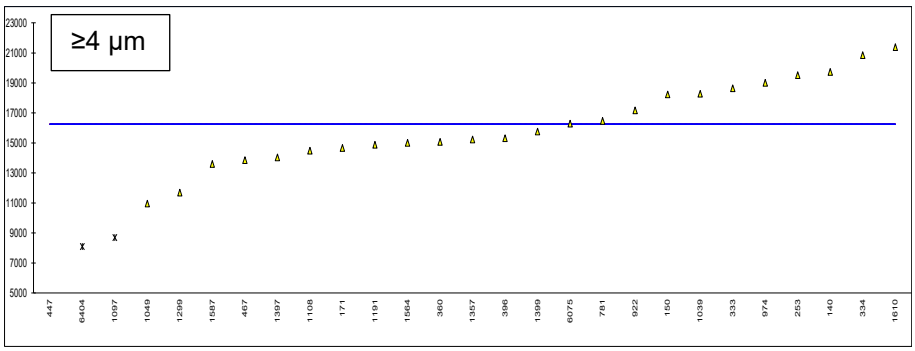


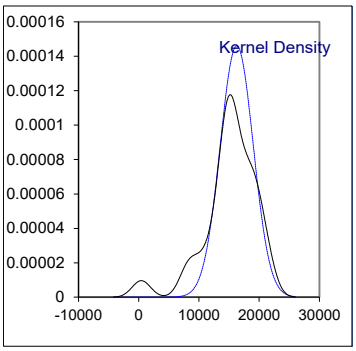


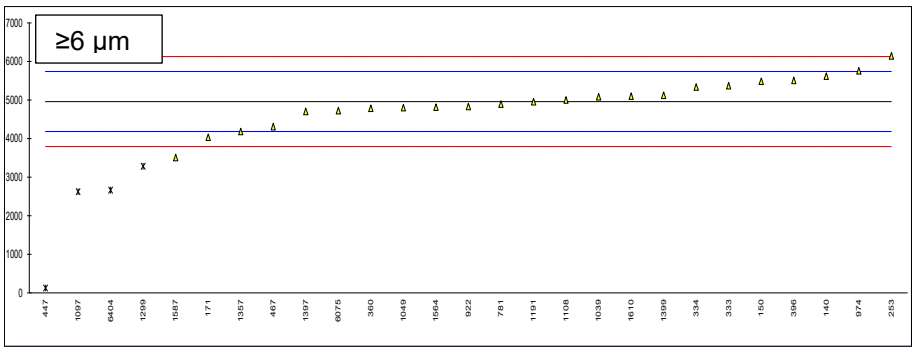
Determination of Particle Size Distribution on sample #23036 acc. to IP565, results in counts/mL

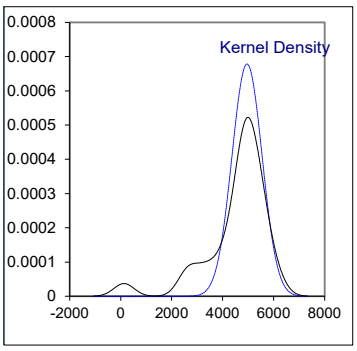
lab	method	≥4 µm (c)	m	≥6 µm (c)	m	≥14 µm (c)	m	≥21 µm (c)	m	≥25 µm (c)	m	≥30 µm (c)	m
140	IP565	19730		5616		201		25		6		2	
150	IP565	18232		5485		176		14		3		1	
171	IP565	14665		4031		131		13		5		2	
225		-----		-----		-----		-----		-----		-----	
237		-----		-----		-----		-----		-----		-----	
253	IP565	19521.8		6141.8		265.9		34.8		19.2		5.8	C
323		-----		-----		-----		-----		-----		-----	
333	IP565	18649		5369		143		9		3		1	
334	IP565	20863		5335		160		19		7		2	
335		-----		-----		-----		-----		-----		-----	
360	IP565	15073		4783		176		36		14		5	
396	IP565	15318		5506		200		28		8		2	
447	IP565	429.3	G1	128.1	G1	14.0	DG5	4.3	ex	2.0	ex	0.9	ex
467	IP565	13859.1		4306.6		77.4		4.1		1.0		0.1	
781	IP565	16470.2		4891.4		154.2		16.4		5.1		1.2	
825		-----		-----		-----		-----		-----		-----	
922	IP565	17173.6		4828.7		132.9		23.6		9.2		3.3	
963		-----		-----		-----		-----		-----		-----	
974	IP565	19012		5754		245		26		13		6	
1039	IP565	18272.3		5079.4		213.0		37.9		16.9		4.7	
1049	IP577	10953.9		4800		281.2		56.6	G1	20.3		5.5	
1097	IP564	8690.9	ex	2620.4	ex	43.9	ex	25.1	ex	23.1	ex	22.2	ex
1108	IP565	14486.1		4998.2		147.3		29.8		7.4		1.2	
1191		14879.7		4955.5		145.3		15.0		3.6		0.3	
1299	IP577	11691.9		3280.3	C,DG5	73.6		13.6		5.2		2.0	
1320		-----		-----		-----		-----		-----		-----	
1357	IP565	15224		4184		204		27		14		5	
1397	IP565	14039.9	C	4704.2	C	129.5	C	4.0		2.2		0.8	
1399	IP565	15761.4		5119.5		203.8		30.2		8.8		2.0	
1564	IP565	15008.6		4813.3		176.0		22.8		7.2		1.9	
1587	IP565	13605.2		3509.0		133.3		12.5		3.6		1.2	
1610	IP565	21392.8		5095.0		87.8		2.7		0.1		0.0	
1636		-----		-----		-----		-----		-----		-----	
6075	D7619	16287.2		4721.0		151.9		21.8		7.2		2.5	
6359		-----	W	-----	W	2.1	DG5	0.8		0.4		0.3	
6404	IP565	8090.5	G5	2663.8	DG5	140.6		33.4		15.9		5.8	
	normality	OK		OK		OK		OK		OK		OK	
	n	24		23		25		25		26		26	
	outliers	2+1ex		3+1ex		2+1ex		1+2ex		0+2ex		0+2ex	
	mean (n)	16257.07		4957.68		165.99		20.02		7.93		2.48	
	st.dev. (n)	2733.491		588.482		52.760		10.977		5.799		1.970	
	R(calc.)	7653.78		1647.75		147.73		30.74		16.24		5.52	
	st.dev.(IP565:13)	(649.365)		388.470		33.598		6.497		3.227		1.362	
	R(IP565:13)	(1818.22)		1087.72		94.07		18.19		9.04		3.81	

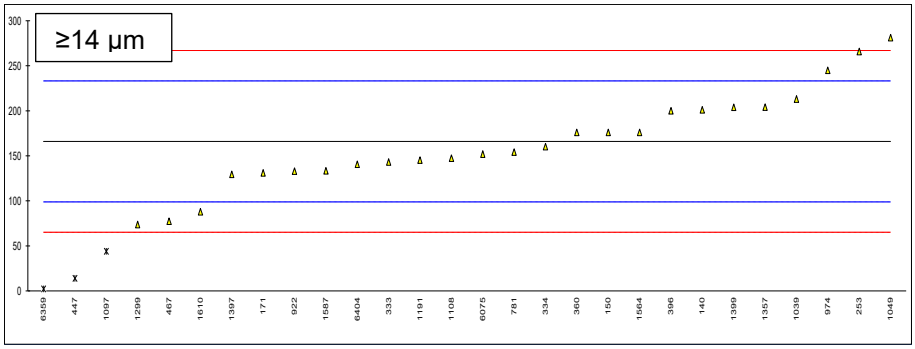
Lab 253 first reported 8.5
Lab 447 test results excluded as statistical outliers in related parameters
Lab 1097 test results excluded as test method IP564 was used, see also §4.1
Lab 1299 first reported 32803.0
Lab 1397 first reported 328.1, 116.2 and 13.2 respectively
Lab 6359 test results withdrawn, reported 165.5 and 28.2 respectively

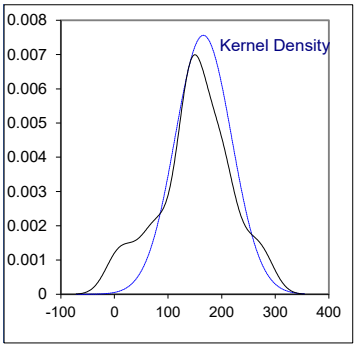


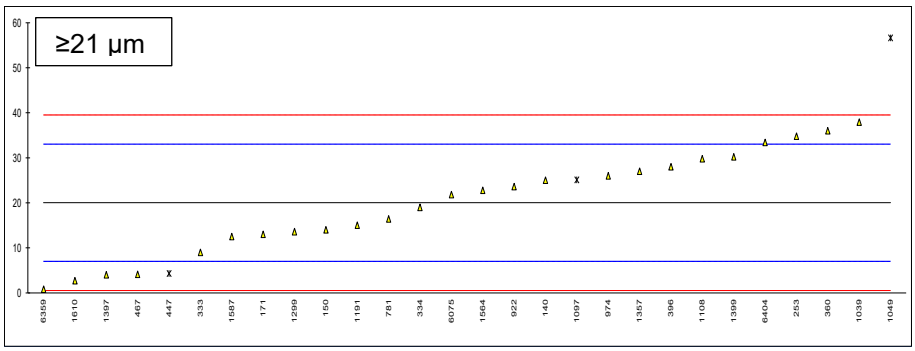


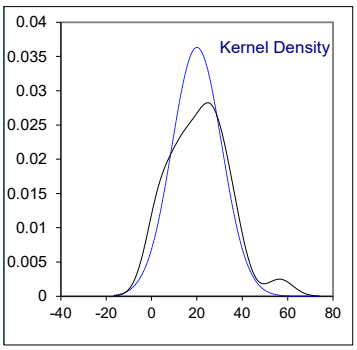

≥6 µm

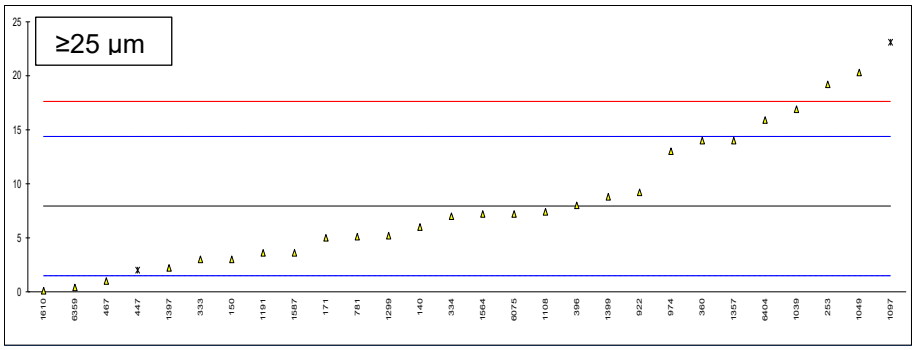

Kernel Density

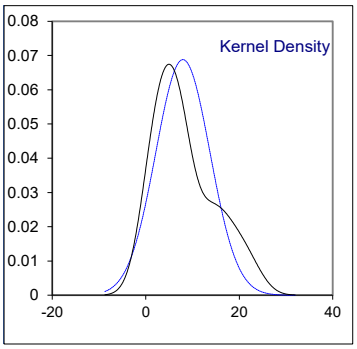

≥14 µm

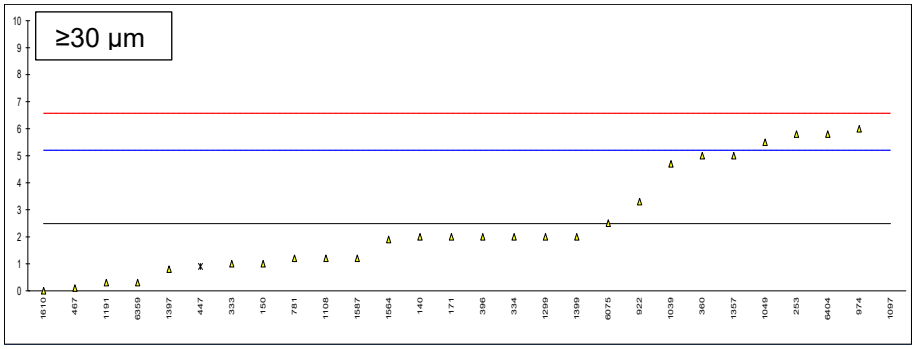

Kernel Density

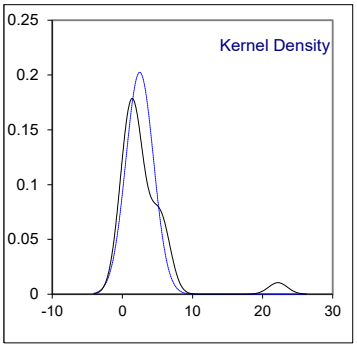

≥21 µm


Kernel Density


≥25 µm


Kernel Density

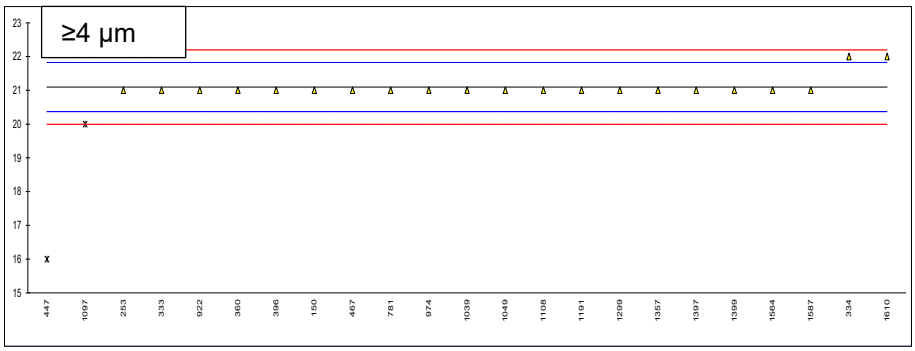

≥30 µm

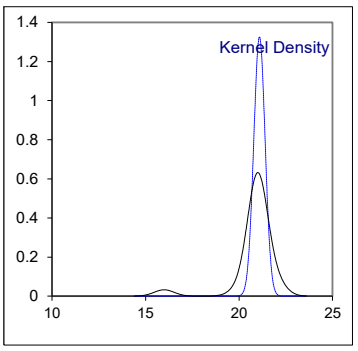

Kernel Density

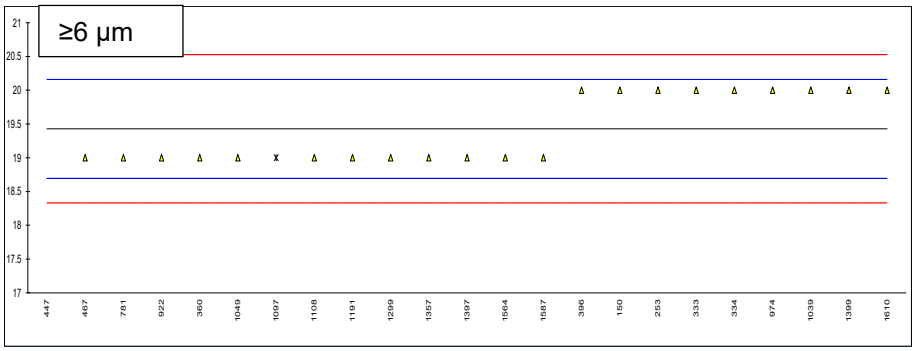
Determination of Particle Size Distribution on sample #23036 acc. to IP565, in ISO scale numbers

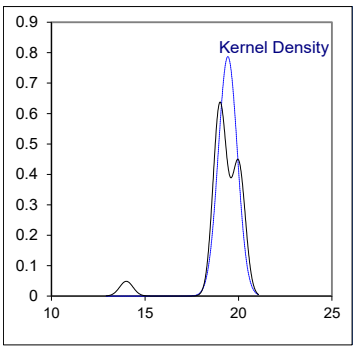
lab	method	≥4µm(c)	mark	z(targ)	≥6µm(c)	mark	z(targ)	≥14 µm (c)	mark	z(targ)
140		-----		-----	-----		-----	-----		-----
150	ISO4406	21		-0.26	20		1.56	15		1.17
171		-----		-----	-----		-----	-----		-----
225		-----		-----	-----		-----	-----		-----
237		-----		-----	-----		-----	-----		-----
253	ISO4406 acc. to IP565	21		-0.26	20		1.56	15		1.17
323		-----		-----	-----		-----	-----		-----
333	ISO4406 acc. to IP565	21		-0.26	20		1.56	14		-0.87
334	ISO4406 acc. to IP565	22		2.47	20		1.56	15		1.17
335		-----		-----	-----		-----	-----		-----
360	ISO4406 acc. to IP565	21		-0.26	19		-1.17	15		1.17
396	ISO4406 acc. to IP565	21		-0.26	20		1.56	15		1.17
447	ISO4406 acc. to IP565	16	ex	-13.92	14	ex	-14.83	11	ex	-6.99
467	ISO4406 acc. to IP565	21		-0.26	19		-1.17	13		-2.91
781	ISO4406 acc. to IP565	21		-0.26	19		-1.17	14		-0.87
825		-----		-----	-----		-----	-----		-----
922	ISO4406 acc. to IP565	21		-0.26	19		-1.17	14		-0.87
963		-----		-----	-----		-----	-----		-----
974	ISO4406 acc. to IP565	21		-0.26	20		1.56	15		1.17
1039	ISO4406 acc. to IP565	21		-0.26	20		1.56	15		1.17
1049	ISO4406 acc. to IP577	21		-0.26	19		-1.17	15		1.17
1097	ISO4406 acc. to IP564	20	ex	-2.99	19	ex	-1.17	13	ex	-2.91
1108	ISO4406 acc. to IP565	21		-0.26	19		-1.17	14		-0.87
1191	ISO4406 acc. to IP565	21		-0.26	19		-1.17	14		-0.87
1299	ISO4406 acc. to IP577	21		-0.26	19		-1.17	13		-2.91
1320		-----		-----	-----		-----	-----		-----
1357	ISO4406 acc. to IP565	21		-0.26	19		-1.17	15		1.17
1397	ISO4406 acc. to IP565	21	C	-0.26	19	C	-1.17	14	C	-0.87
1399		21		-0.26	20		1.56	15		1.17
1564	ISO4406 acc. to IP565	21		-0.26	19		-1.17	15		1.17
1587	ISO4406 acc. to IP565	21		-0.26	19		-1.17	14		-0.87
1610	ISO4406 acc. to IP565	22		2.47	20		1.56	14		-0.87
1636		-----		-----	-----		-----	-----		-----
6075		-----		-----	-----		-----	-----		-----
6359		-----	W	-----	-----	W	-----	-----	W	-----
6404		-----		-----	-----		-----	-----		-----
	normality	not OK			OK			OK		
	n	21			21			21		
	outliers	0+2ex			0+2ex			0+2ex		
	mean (n)	21.1			19.4			14.4		
	st.dev. (n)	0.30			0.51			0.68		
	R(calc.)	0.8			1.4			1.9		
	st.dev.(IP565:13)	0.37			0.37			0.49		
	R(IP565:13)	1.0			1.0			1.4		

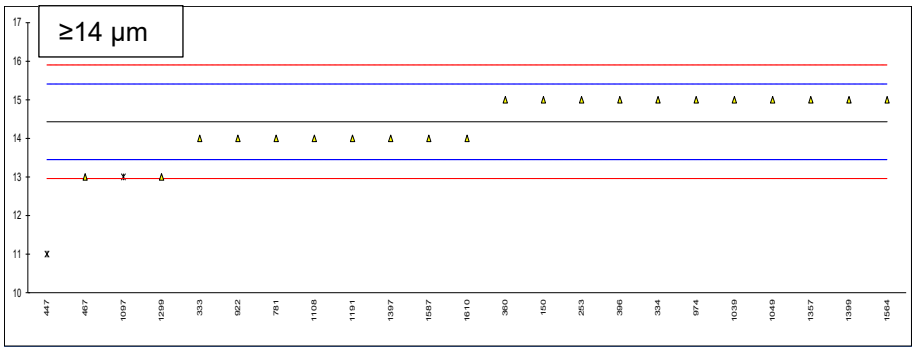
Lab 447 test results excluded as statistical outliers in related parameters counts/mL
Lab 1097 test results excluded as test method IP564 was used, see also §4.1
Lab 1397 first reported 16, 14 and 11 respectively
Lab 6359 test results withdrawn, reported 15, 12 and 8 respectively

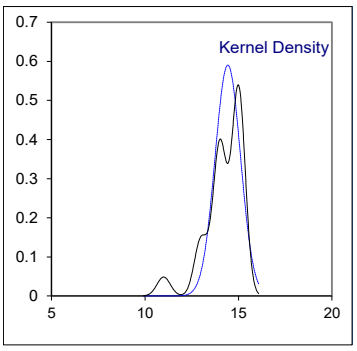

≥4 µm


Kernel Density


≥6 µm


Kernel Density


≥14 µm


Kernel Density

APPENDIX 2 z-scores of Distillation at 760 mmHg

lab	IBP	10% rec	50% rec	90% rec	FBP
120	-0.34	0.24	0.16	-0.36	0.06
140	-0.14	-0.28	-0.49	-1.16	0.02
150	0.71	0.24	-0.96	-1.64	-2.11
159	-----	-----	-----	-----	-----
169	-0.44	-0.43	0.25	-0.12	0.18
171	-0.48	-0.36	-0.77	-0.92	0.10
177	-1.19	0.17	0.44	-0.44	-1.20
225	-----	-----	-----	-----	-----
228	-0.68	-0.06	0.35	-0.36	0.42
237	0.00	-0.06	0.35	-0.36	0.81
238	-1.36	-0.81	-1.52	-1.96	-1.16
253	-0.68	0.69	0.35	-1.16	-0.37
317	0.47	0.84	0.63	0.60	0.66
323	0.85	0.69	0.91	1.48	0.10
328	-0.65	-0.13	-0.03	-0.20	-0.88
333	0.07	-0.43	-0.31	-1.16	-0.37
334	-0.37	0.24	0.16	-0.28	-0.09
335	0.47	0.77	0.63	1.00	0.62
360	-0.34	0.17	-0.03	-0.60	-0.45
365	-0.03	-0.43	-0.40	0.84	-0.33
391	1.19	0.62	0.63	1.72	0.02
396	-----	-----	-----	-----	-----
398	-----	-----	-----	-----	-----
399	-----	-----	-----	-----	-----
447	0.00	0.02	0.35	1.00	0.26
467	0.71	-0.06	0.44	0.44	0.58
633	1.32	0.39	0.63	1.16	0.85
634	0.78	0.39	0.35	0.36	0.34
671	2.00	0.62	0.72	0.36	2.19
759	0.17	-0.81	-0.12	-0.36	0.22
781	-0.88	0.02	-0.12	-0.36	0.10
782	0.53	0.06	1.19	1.16	1.01
785	-0.44	-0.96	-0.87	-0.04	-0.41
825	0.41	0.69	0.44	-0.20	0.14
875	0.00	-0.96	-0.87	-0.28	-0.01
922	-0.37	0.47	0.72	1.08	-0.92
963	0.75	1.44	0.72	-1.00	-1.12
970	0.03	0.32	0.25	0.76	-0.41
974	-0.14	-0.21	-0.59	0.04	-0.76
1039	-0.14	0.32	-0.12	0.12	-0.13
1049	0.58	0.02	0.63	0.84	0.38
1059	-1.60	-0.06	-0.40	-0.04	-0.05
1064	0.78	0.17	0.35	1.08	0.62
1097	0.47	-0.28	-0.12	0.60	0.50
1108	0.27	-0.58	0.16	0.52	0.54
1121	-0.34	-0.06	-0.12	0.44	-0.37
1126	0.75	0.09	-0.31	-0.84	0.93
1140	-0.88	-0.06	0.07	0.44	0.18
1150	0.37	-0.73	-0.68	-0.36	-0.07
1191	-0.68	1.14	0.81	0.36	0.18
1212	0.44	0.47	0.35	0.84	0.38
1297	-0.34	0.54	0.44	-0.04	-0.01
1299	-0.14	-0.06	-0.21	0.84	0.34
1320	-0.20	0.17	-0.40	-0.84	-0.05
1357	0.58	-0.43	-0.96	-0.52	-1.47
1397	0.92	0.32	0.25	0.20	0.38
1399	-0.48	-1.18	-1.05	0.68	0.06
1429	-0.10	-1.18	-1.33	-0.92	-1.20
1438	-0.07	0.39	-0.31	-1.00	-0.80
1498	0.24	0.02	0.35	-0.12	0.06
1531	0.64	-0.06	-0.03	0.28	-0.01
1564	0.85	1.59	1.47	0.76	-0.49
1587	-0.20	0.02	-0.12	-0.92	-0.01
1610	-1.02	0.92	1.75	4.60	1.13
1720	-----	-----	-----	-----	-----
1730	-----	-----	-----	-----	-----
1755	-0.85	-1.93	-1.89	-1.16	-1.20
1776	-0.51	-0.28	-0.40	0.68	-0.33
1810	0.14	-0.21	-0.12	0.04	0.69
1811	0.78	0.02	-0.12	-0.36	-0.13
6075	0.58	0.84	1.84	1.96	0.50
6142	-2.07	-1.25	-1.43	-1.16	-0.96
6192	0.34	-1.25	-2.17	-1.88	1.48
6299	0.24	0.39	1.00	0.92	-0.01
6312	-----	-----	-----	-----	-----

lab	IBP	10% rec	50% rec	90% rec	FBP
6359	-1.49	0.69	-0.03	0.20	0.62
6404	-0.31	-0.43	-0.12	-0.36	-0.57
6490	0.51	-1.18	-0.59	-0.36	0.81
6530	-----	-----	-----	-----	-----

z-scores of Particle Size Distribution, counts/mL

lab	≥4 µm	≥6 µm	≥14 µm	≥21 µm	≥25 µm	≥30 µm
140	-----	1.69	1.04	0.77	-0.60	-0.36
150	-----	1.36	0.30	-0.93	-1.53	-1.09
171	-----	-2.39	-1.04	-1.08	-0.91	-0.36
225	-----	-----	-----	-----	-----	-----
237	-----	-----	-----	-----	-----	-----
253	-----	3.05	2.97	2.28	3.49	2.43
323	-----	-----	-----	-----	-----	-----
333	-----	1.06	-0.68	-1.70	-1.53	-1.09
334	-----	0.97	-0.18	-0.16	-0.29	-0.36
335	-----	-----	-----	-----	-----	-----
360	-----	-0.45	0.30	2.46	1.88	1.85
396	-----	1.41	1.01	1.23	0.02	-0.36
447	-----	-12.43	-4.52	-2.42	-1.84	-1.16
467	-----	-1.68	-2.64	-2.45	-2.15	-1.75
781	-----	-0.17	-0.35	-0.56	-0.88	-0.94
825	-----	-----	-----	-----	-----	-----
922	-----	-0.33	-0.98	0.55	0.39	0.60
963	-----	-----	-----	-----	-----	-----
974	-----	2.05	2.35	0.92	1.57	2.58
1039	-----	0.31	1.40	2.75	2.78	1.63
1049	-----	-0.41	3.43	5.63	3.83	2.21
1097	-----	-6.02	-3.63	0.78	4.70	14.47
1108	-----	0.10	-0.56	1.51	-0.17	-0.94
1191	-----	-0.01	-0.62	-0.77	-1.34	-1.60
1299	-----	-4.32	-2.75	-0.99	-0.85	-0.36
1320	-----	-----	-----	-----	-----	-----
1357	-----	-1.99	1.13	1.07	1.88	1.85
1397	-----	-0.65	-1.09	-2.47	-1.78	-1.24
1399	-----	0.42	1.13	1.57	0.27	-0.36
1564	-----	-0.37	0.30	0.43	-0.23	-0.43
1587	-----	-3.73	-0.97	-1.16	-1.34	-0.94
1610	-----	0.35	-2.33	-2.67	-2.43	-1.82
1636	-----	-----	-----	-----	-----	-----
6075	-----	-0.61	-0.42	0.27	-0.23	0.01
6359	-----	-----	-4.88	-2.96	-2.33	-1.60
6404	-----	-5.90	-0.76	2.06	2.47	2.43

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	Stanhope-Seta	IP565	IP565	
225				
237				
253	Stanhope-Seta	IP565	IP565	
323				
333	Stanhope-Seta	IP565	IP565	ISO11171
334	Stanhope-Seta	IP565	IP565	ISO11171
335				
360	Stanhope-Seta	IP565	IP565	ISO11171
396			IP565	
447	Stanhope-Seta	IP565	IP565	ISO11171
467	Stanhope-Seta	IP565	IP565	ISO11171
781	Stanhope-Seta	IP565	IP565	ISO11171
825				
922	Stanhope-Seta	IP565	IP565	ISO11171
963				
974	Stanhope-Seta	IP565	IP565	ISO11171
1039	Stanhope-Seta	IP565	IP565	ISO11171
1049	Pamas	IP577	IP577	ISO11171
1097	Parker Hannifin	IP564	IP564	ISO11171
1108	Stanhope-Seta	IP565	IP565	ISO11171
1191				ISO11171
1299	Pamas	IP577	IP577	ISO11171
1320				
1357	Stanhope-Seta	IP565	IP565	External Calibration
1397	Stanhope-Seta	IP565	IP565	ISO11171
1399	Stanhope-Seta	IP565	IP565	
1564	Stanhope-Seta	IP565	IP565	ISO11171
1587	Stanhope-Seta	IP565	IP565	ISO11171
1610	Stanhope-Seta	IP565	IP565	ISO11171
1636				
6075	Stanhope-Seta	IP565	D7619	
6359	Parker Hannifin		IP565	
6404	Stanhope-Seta	IP565	IP565	ISO11171

APPENDIX 4

Number of participants per country

1 lab in AUSTRIA
2 labs in BELGIUM
3 labs in BULGARIA
1 lab in CHILE
1 lab in COTE D'IVOIRE
1 lab in CROATIA
2 labs in CZECH REPUBLIC
1 lab in DJIBOUTI
1 lab in FINLAND
6 labs in FRANCE
1 lab in GERMANY
5 labs in GREECE
1 lab in GUAM
2 labs in IRELAND
1 lab in ISRAEL
4 labs in ITALY
1 lab in KINGDOM OF BAHRAIN
1 lab in KOREA, Republic of
1 lab in MALAYSIA
1 lab in MARTINIQUE
4 labs in NETHERLANDS
2 labs in NIGERIA
1 lab in NORTH MACEDONIA, Republic of
2 labs in OMAN
1 lab in PAKISTAN
2 labs in PHILIPPINES
1 lab in POLAND
5 labs in RUSSIAN FEDERATION
1 lab in SAUDI ARABIA
1 lab in SLOVAKIA
1 lab in SLOVENIA
1 lab in SOUTH AFRICA
2 labs in SPAIN
1 lab in SUDAN
3 labs in SWEDEN
1 lab in TOGO
1 lab in UNITED ARAB EMIRATES
6 labs in UNITED KINGDOM
7 labs in UNITED STATES OF AMERICA

APPENDIX 5

Abbreviations

C	= final test result after checking of first reported suspect test result
D(0.01) / D1	= outlier in Dixon's outlier test
D(0.05) / D5	= straggler in Dixon's outlier test
G(0.01) /G1	= outlier in Grubbs' outlier test
G(0.05) / G5	= straggler in Grubbs' outlier test
DG(0.01) / DG1	= outlier in Double Grubbs' outlier test
DG(0.05) / DG5	= straggler in Double Grubbs' outlier test
R(0.01) / R(1)	= outlier in Rosner's outlier test
R(0.05) / 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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