Results of Proficiency Test
Jet Fuel A1
March 2019

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1995, the Institute for Interlaboratory Studies organizes proficiency tests (PT) for Jet Fuel A1 twice per year. In the annual proficiency testing program of 2018/2019, it was decided to continue proficiency tests on Jet Fuel A1 and Jet Fuel Particle Size in accordance with the latest applicable version (November 2018) of the "Aviation Fuel Quality Requirements for Jointly Operated Systems (AFQRJOS)", sometimes referred to as the "Joint Fuelling System Check List for Jet A-1".
In total 102 laboratories from 55 different countries registered for participation in the interlaboratory study for Jet Fuel A1. From these participants to the main round, 44 also participated in the interlaboratory study for Particle Size Distribution. See appendix 4 for the number of participants per country.
In this report, the results of the 2019 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. Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. For the main round,
it was decided to send 2 litres of Jet Fuel A1 labelled #19030 for the analyses according to the latest version of "Joint Fuelling System Check List for Jet A-1". For the Particle Size Distribution round, it was decided to send one 0.5L of Jet Fuel A1, labelled #19031.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC 17043:2010 (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

2.4.1 JET FUEL A1 (MAIN)

The necessary bulk material of Jet Fuel A1, approximately 400 litres, was obtained from a local refinery and homogenised in a mixing vessel. From this batch 218 amber glass bottles of one litre were filled, closed with inner and outer caps and labelled #19030. The homogeneity of the subsamples #19030 was checked by the determination of Density at 15°C in accordance with ASTM D4052 on ten stratified randomly selected samples.

	Density at 15°C in kg/m^3
Sample #19030-1	793.29
Sample #19030-2	793.34
Sample #19030-3	793.31
Sample #19030-4	793.34
Sample #19030-5	793.31
Sample #19030-6	793.30
Sample #19030-7	793.36
Sample #19030-8	793.32
Sample #19030-9	793.32
Sample #19030-10	793.33

Table 1: homogeneity test results of subsamples #19030

From the above test results, the repeatability was calculated and compared with 0.3 times the corresponding 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)	0.06
reference test method	ASTM D4052:18a
0.3 x R (ref. test method)	0.15

Table 2: evaluation of repeatability of subsamples #19030

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the reference test method. Therefore, homogeneity of the subsamples #19030 was assumed.

2.4.2 JET FUEL PARTICLE SIZE DISTRIBUTION DETERMINATION (PS)

The bulk material of Jet Fuel A1 for Particle Size Distribution was obtained from a local refinery. Approximately 100 litres bulk material was homogenized. From this material 63 amber glass bottles of 0.5 litres were filled, closed with inner and outer caps and labelled #19031. Each bottle was spiked with 1 ml of Lube oil, enriched with 4 mg/kg Arizona Dust A2.
The homogeneity of the subsamples #19031 was checked by the determination of Particle Size Distribution in accordance with IP565 on eight stratified randomly selected samples.

	> 4 µm (c) counts/ml	> 6 µm (c) counts/ml	> 14 µm (c) counts/ml
Sample #19031-1	15543	4597	173
Sample #19031-2	16273	4806	180
Sample #19031-3	16373	4836	191
Sample #19031-4	15204	4500	171
Sample #19031-5	15912	4725	190
Sample #19031-6	16061	4749	191
Sample #19031-7	16133	4757	173
Sample #19031-8	16439	4848	182

Table 3: homogeneity test results of subsamples #19031

From the above test results, the repeatabilities were calculated and compared with the corresponding repeatabilities of the reference test method in agreement with the procedure of ISO13528, Annex B2 in the next table.

	> 4 µm (c) counts/ml	> 6 µm (c) counts/ml	> 14 µm (c) counts/ml
r (observed)	1196	339	24
reference test method	IP565:13	IP565:13	IP565:13
r (ref. test method)	1414	808	77

Table 4: evaluation of repeatabilities of subsamples #19031

The calculated repeatabilities were in agreement with the corresponding repeatabilities of the reference test method. Therefore, homogeneity of the subsamples #19031 was assumed.

Depending on the registration to each of the participating laboratories 2 x 1 litre bottle of Jet Fuel A1 labelled #19030 and/or an 0.5 litre bottle of Jet Fuel PS labelled #19031 was/were sent on February 27, 2019. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Jet Fuel A1, packed in the amber glass bottles was checked. The type of bottle was chosen in accordance with ASTM D4306:15. The material has been found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were requested to determine on sample #19030: Visual Appearance, Total Acidity, Aromatics by FIA, Aromatics by HPLC (in %M/M and %V/V), Color Saybolt (automated and manual), Copper Corrosion (2 hrs ar 100°C), Density at 15°C, Distillation (IBP, 10%, 50%, 90% recovered and FBP), Existent Gum (unwashed), Flash Point, Freezing Point, Kinematic Viscosity at -20°C, Mercaptan Sulfur, MSEP, Naphthalenes, Smoke Point, Specific Energy Net on Sulfur free basis and Total Sulfur.
The participants were requested to determine Particle Size Distribution only on sample #19031.

The analyses should be performed according to the "Aviation Fuel Quality Requirements for Jointly Operated Systems (AFQRJOS), version November 2018", also referred to as the "Joint Fuelling System Check List" or simply "Check List".

It was requested to report some analytical details, such as the lotnumber of the FIA indicator and the model of the Particle Size equipment.

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 appropriate reference test methods 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 reanalysis). Additional or corrected test results are used for data analysis and original test results are placed under 'Remarks' in the test 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.
According to ISO 5725 the original test results per determination were submitted to Dixon's, Grubbs' and/or Rosner's outlier tests. 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 to 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 visualise the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported 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 was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM or IP reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation of 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 targets values were used. In some cases, a reproducibility based on former iis proficiency tests could be used.

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.
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 interlaboratory study, some problems were encountered with sample dispatch to the participants in Nigeria and the Russian Federation.
For the main round Jet Fuel A1, five participants reported the test results after the final reporting date and another nine participants did not report any test results at all. For the Particle Size Distribution round, two participants reported the test results after the final reporting date and another twelve participants did not report any test results at all. Not all laboratories were able to report all analyses requested.
Finally, 93 participants reported in total 1789 numerical test results. Observed were 53 outlying test results, which is 3.0% of the reported numerical test results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

Not all original 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.

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 where possible and applicable. These test methods are also in the tables together with the reported test results. The abbreviations, used in these tables, are listed in appendix 5.

In the iis PT reports, ASTM test methods are referred to with a number and if appropriate an indication of sub test method (e.g. D1840-B) and an added designation for the year that the test method was adopted or revised (e.g. D1840-B:07). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D1840-B:07(2017)). In the test results tables of appendix 1 only the method number and year of adoption or revision e.g. D1840-B:07 will be used.

Since the Joint Fuelling System Check List for Jet-A1 is continuously updated, the participants are advised to monitor the updates. The latest version at the time of this Round Robin is DEF STAN 91-091/Issue 10, dated: September 2018” and ASTM D1655:18b. One must keep in mind that ISO test methods are not mentioned in the “Checklist”.

Sample #19030

Appearance: All participants agreed that the Visual Appearance of the sample was Clear and Bright.

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

Aromatics by FIA: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with ASTM D1319:18.
The laboratories were requested to report the lotnumber Fluorescent Indicator Dyed Gel, which was used for the test. Twenty of the thirty-two reporting participants shared the lotnumber of the batch used.
In the latest version of ASTM D1655 (March 2019, issued after this PT was started), there is a remark about the lotnumber of the F.I. Dyed Gel. In paragraph 11.4.14.1 it states: "In analyzing Aviation Turbine Fuel by Test Method D1319 or IP 156, users shall not report results obtained using any of the following lot numbers of Fluorescent Indicator Dyed Gel: 3000000975, 3000000976, 3000000977, 3000000978, 3000000979 and 3000000980".
None of the participants reported one of these lotnumbers, the majority reported a lotnumber lower than these, while a few reported a lotnumber in a very different format. When using one of the above mentioned lotnumbers, the

test results may not be comparable to the test results performed with the earlier lotnumbers. In this PT the precision of the test results is well within the precision of the method. iis will continue to request the lotnumber of the Dyed Gel used in future PTs.

Total Aromatics by HPLC: The determination in %M/M was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with ASTM D6379:11.
The determination in %V/V may not be problematic. Two statistical outliers were observed. Regretfully, no precision data for the determination in %V/V is mentioned in ASTM D6379:11. The calculated reproducibility was smaller than the calculated reproducibility in %V/V of the proficiency test iis18J01, but larger that that of iis18J02, both of held in 2018.

Color Saybolt: The determination was very problematic for the automatic test method ASTM D6045. No statistical outliers were observed. However, the calculated reproducibility is not at all in agreement with the requirements of ASTM D6045:12(2017).
The determination for the manual test method ASTM D156 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 D156:15.

Copper Corrosion: This determination was not problematic. Sixty-five participants reported a test result and agreed on a result of 1.

Density: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D4052:18a.

Distillation: This determination was not problematic. In total, one statistical outlier was observed. All calculated reproducibilities after rejection of the statistical outlier, except 90% recovered, are in agreement with the automated mode requirements of ASTM D86:18.
When compared to the manual mode requirements of ASTM D86:18 only the calculated reproducibilities for 10% rec. and 50% rec. are in agreement.

Existent Gum: This determination was not problematic. Two statistical outlier were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with ASTM D381:12(2017).

Flash Point: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with IP170:14.

Freezing Point: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D2386:18.

Kin. Viscosity at -20°C: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ASTM D445:18.

Mercaptan Sulfur: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D3227:16.

MSEP: 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 D3948:14.

Naphthalenes: This determination was not problematic depending on the procedure used. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1840:07(2017) procedure B. When evaluated separately, both calculated reproducibilities are in agreement with the requirements of the respective procedures of ASTM D1840:07.

Smoke Point: This determination was not problematic depending on test mode used of ASTM D1322:18. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of the manual mode of ASTM D1322:18, but not with the strict requirements of the automated mode.

Specific Energy: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D3338:09e2(2014). No calculation errors are observed.

Sulfur, Total: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ASTM D5453:16e1.

Sample #19031

Particle Size Distribution Determination:

The Joint Fuelling System Check List for Jet-A1 lists test methods IP564, IP565 and IP577 as the reference test methods to determine the Particle Size Distribution in Jet Fuel A1. Over the last few years, iis has observed and concluded that these methods are biased and not as interchangeable as it appears from the checklist. Although no equipment suppliers are mentioned in the test methods, the brand of the automatic particle counter (APC) defines the test method. Therefore, the automatic particle counter (APC) in method IP564 is Parker Hannifin, in method IP565 it is Stanhope-Seta and in method IP IP577 it is Pamas.
The participants were requested to specify the brand of the particle counter, along with the method for calibration, the actual test method performed and the test method used for determining ISO code scaling. All reporting participants mentioned the equipment used, seven participants used IP564, twenty-four used IP565, one participant used IP577. All participants reported (some after a correction) to have used the method that corresponds with the equipment used. Most participants used ISO11171 for the calibration. All laboratories used ISO4406 for calculating the scale numbers from the counts per ml. Almost all participants calculated the ISO code from the test results in counts/ml correctly.

Again, it was found that the test results of IP564 were significantly lower than those of IP565. This is generally the case, the same is also documented in an article found on internet (see literature reference 4). Therefore, it was decided to evaluate both methods separately. The results of the participants performing IP577 were evaluated in the group of IP565, because the results were more compatible with the results of IP565 than those of IP564 at the particle size distribution found in this PT sample.

IP564: The determination according to IP564 was problematic. In total four statistical outliers were observed and three other test results were excluded for the six particle size categories. All calculated reproducibilities after rejection of the suspect data are not in agreement with the requirements of IP564:13.
The determination expressed in ISO scale numbers may be problematic. Three statistical outliers were observed. The calculated reproducibilities after rejection of the statistical outliers are in agreement with the indicative requirements of IP564:13 Annex C, except for ≥4 µm (c).

IP565: The determination according to IP565 was problematic. In total twelve statistical outliers were observed and eight other test results were excluded for the six particle size categories. The calculated reproducibilities after rejection of the suspect data are not in agreement with the requirements of IP565:13, except for ≥14 µm (c).
The determination expressed in ISO scale numbers may be problematic. Three statistical outliers were observed and one other test result was excluded. The calculated reproducibilities after rejection of the suspect data are not in agreement with the indicative requirements of IP565:13 Annex C, except for ≥4 µm (c).

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	unit	n	average	2.8 * sd	R (lit)
Visual Appearance		60	C&B	n.a.	n.a.
Acidity, Total	mg KOH/g	52	0.0016	0.0024	0.0016
Aromatics by FIA	%V/V	32	15.59	2.25	2.60
Aromatics by HPLC, Total	%M/M	20	18.42	1.73	1.94
Aromatics by HPLC, Total	%V/V	26	16.43	1.38	n.a.
Color Saybolt (automated)		40	16.8	4.3	1.2
Color Saybolt (manual)		40	16.5	2.5	2
Copper Corrosion 2hr at 100°C		65	1 (1a/1b)	n.a.	n.a.
Density at 15°C	kg/m^3	91	793.30	0.28	0.5
Initial Boiling Point	°C	89	149.8	6.1	8.2
Temp at 10% recovered	°C	89	168.6	3.0	3.7
Temp at 50% recovered	°C	89	195.6	2.5	3.0
Temp at 90% recovered	°C	89	240.3	4.5	3.6
Final Boiling Point	°C	88	270.8	4.9	7.1
Existent Gum (unwashed)	mg/100mL	55	0.78	1.20	3.16
Flash Point	°C	86	42.3	3.4	3.2
Freezing Point	°C	72	-56.4	1.8	2.5
Kinematic Viscosity at -20°C	mm^2/s	47	3.781	0.068	0.072
Mercaptan Sulfur as S	%M/M	49	0.00032	0.00024	0.00032
MSEP	rating	59	83.8	22.7	15.0
Naphthalenes	%V/V	39	0.467	0.052	0.060
Smoke Point	mm	56	25.5	1.7	3.9
Specific Energy (Net)	MJ/kg	43	43.370	0.060	0.046
Sulfur, Total	mg/kg	72	518.2	66.5	65.7

Table 5: reproducibilities of tests on sample #19030

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

Parameter - IP564	unit	n	average	2.8 * sd	R (lit)
Particle Size ≥4 µm (c)	counts/mL	5	11018	4316	2149
Particle Size ≥6 µm (c)	counts/mL	6	2930	1391	929
Particle Size ≥14 µm (c)	counts/mL	6	74.5	70.6	44.8
Particle Size ≥21 µm (c)	counts/mL	5	8.8	16.4	11.2
Particle Size ≥25 µm (c)	counts/mL	5	3.4	7.3	4.6
Particle Size ≥30 µm (c)	counts/mL	5	1.3	3.0	2.1
Particle Size ≥4 µm (c)	ISO scale	5	20.6	1.5	1.0
Particle Size ≥6 µm (c)	ISO scale	5	18.8	1.3	1.4
Particle Size ≥14 µm (c)	ISO scale	5	13.4	1.5	2.2

Table 6: reproducibilities of tests on sample #19031 according to IP564

Parameter - IP565	unit	n	average	2.8 * sd	R (lit)
Particle Size ≥4 µm (c)	counts/mL	22	15571	3214	1750
Particle Size ≥6 µm (c)	counts/mL	22	4650	1232	1026
Particle Size ≥14 µm (c)	counts/mL	21	161	92.2	91.6
Particle Size ≥21 µm (c)	counts/mL	22	26.9	35.6	23.2
Particle Size ≥25 µm (c)	counts/mL	21	9.5	16.0	10.5
Particle Size ≥30 µm (c)	counts/mL	22	3.4	7.0	4.9
Particle Size ≥4 µm (c)	ISO scale	20	21.0	0.0	1.0
Particle Size ≥6 µm (c)	ISO scale	20	19.3	1.2	1.0
Particle Size ≥14 µm (c)	ISO scale	19	14.6	1.7	1.4

Table 7: reproducibilities of tests on sample #19031 according to IP565

Without further statistical calculations, it can be concluded that for Particle Size there is not a good compliance of the group of participants with the relevant reference test methods. Problematic tests have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF MARCH 2019 WITH PREVIOUS PTS

	March 2019	September 2018	March 2018	September 2017	March 2017
Number of reporting labs	93	152	99	144	108
Number of test results reported	1789	2678	1671	2706	2091
Number of statistical outliers	53	57	46	83	63
Percentage outliers	3.0%	2.1%	2.8%	3.1%	3.0%

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 against the requirements of the respective reference test methods. The conclusions are given the following table.

Parameter	March 2019	September 2018	March 2018	September 2017	March 2017
Acidity, Total	-	-	-	-	-
Aromatics by FIA	+	+	+	+	+
Aromatics by HPLC, Total	+	+	+	+/-	+
Color Saybolt (automated)	--	--	--	--	-
Color Saybolt (manual)	-	--	--	-	-
Density at 15°C	+	+	+	+	+
Distillation	+	+	+	+	+
Existent Gum	++	++	++	++	++
Flash Point	+/-	+/-	+/-	+	+
Freezing Point	+	+/-	+/-	+	+
Kinematic Viscosity at -20°C	+/-	+/-	-	+/-	+/-
Mercaptan Sulfur as S	+	+	-	+	+/-
MSEP	-	+	+	+	+/-
Naphthalenes	+	+/-	+/-	-	+/-
Smoke Point	++	++	+	+	+
Specific Energy (Net)	-	+	+	+/-	+/-
Sulfur, Total	+/-	-	+	-	+/-
- IP564 cumulative counts/ml	-	--	--	-	--
- IP564 ISO scale numbers	+/-	-	+	+/-	+
- IP565 cumulative counts/ml	-	--	--	-	-
- IP565 ISO scale numbers	+/-	+/-	-	+/-	+

Table 9: comparison determinations against the reference test methods

The performance of the determinations against the requirements of the respective reference test methods is listed in the above table. 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

APPENDIX 1

Visual Appearance on sample #19030;

lab	method	value	mark	z(targ)	remarks
120	Visual	Clear/Bright		-----	
131		-----		-----	
140	Visual	C&B		-----	
150	Visual	C&B		-----	
159	Visual	Clear		-----	
169	Visual	CBFSM		-----	
171		-----		-----	
175		-----		-----	
177	Visual	C&B		-----	
194	Visual	clear & Bright		-----	
225	Visual	Clear & Bright		-----	
228	Visual	clear and bright		-----	
237		-----		-----	
238		-----		-----	
253	Visual	Clear & Bright		-----	
273	Visual	Pass		-----	
317	LP/LAB/V/001	Br & Cl		-----	
323	Visual	clear&bright liquid		-----	
333		-----		-----	
334	Visual	clear and bright		-----	
335		-----		-----	
336	Visual	C&B		-----	
353	Visual	C+B		-----	
360	Visual	Clear and Bright		-----	
391	Visual	C&B		-----	
398	Visual	Clear & Bright		-----	
399	Visual	Clear and Bright		-----	
447	Visual	Clear & Bright		-----	
468	Visual	B&C		-----	
594	Visual	clear and bright		-----	
604		-----		-----	
631	Visual	clear & bright		-----	
634	Visual	Clear & Bright		-----	
663		-----		-----	
671	Visual	C/B		-----	
759	Visual	C/B		-----	
781	Visual	Clear&Bright		-----	
782		-----		-----	
785		-----		-----	
825	Visual	Clear and Bright		-----	
875		-----		-----	
922	Visual	clear, bright and visually free from solid matter		-----	
962		-----		-----	
963	Visual	Bright & Clear		-----	
970	Visual	Clear & Bright		-----	
974	Visual	C & B		-----	
998	Visual	C&B		-----	
1006		-----		-----	
1023	Visual	Clear and bright		-----	
1039	Visual	clear and bright		-----	
1049	Visual	Br & Cl		-----	
1059	Visual	Clear & Bright		-----	
1062		-----		-----	
1064	Visual	B&C		-----	
1082		-----		-----	
1097	Visual	Clair et limpide		-----	
1105	Visual	c&b		-----	
1108		-----		-----	
1109	Visual	Clear & Bright		-----	
1126		-----		-----	
1191		-----		-----	
1201	Visual	Clear, bright and visually free from solid matter		-----	
1205		-----		-----	
1284		-----		-----	
1297		-----		-----	
1299	Visual	Cl & Br		-----	
1318		-----		-----	
1320		-----		-----	
1372		-----		-----	
1379		-----		-----	
1397		-----		-----	
1399		-----		-----	
1429	Visual	Clear and Bright		-----	
1460	Visual	C&B		-----	
1483		-----		-----	

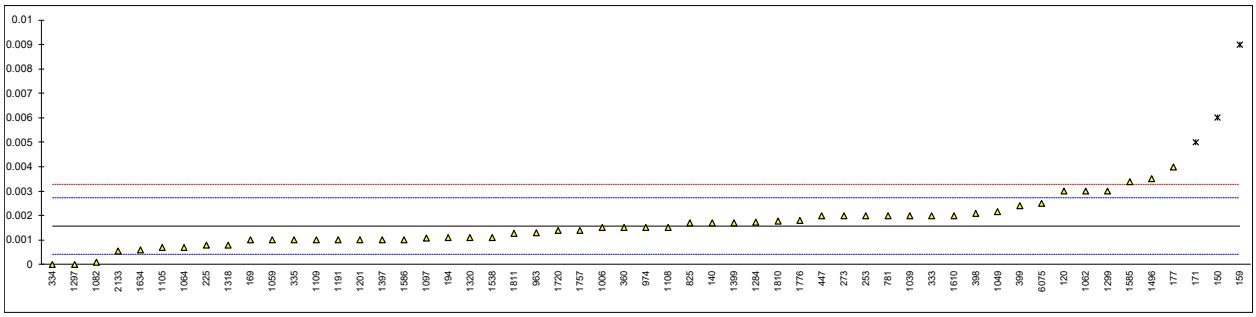
lab	method	value	mark	z(targ)	remarks
1491	Visual	C&B		-----	
1496	Visual	Clear,bright		-----	
1498	Visual	B & C		-----	
1531	Visual	clear, yellowish		-----	
1538		-----		-----	
1585	Visual	clear and bright		-----	
1586	Visual	Clear & Bright		-----	
1587		-----		-----	
1610	Visual	Clear & Bright		-----	
1631		-----		-----	
1634	Visual	clear and bright		-----	
1710	Visual	Clear & Bright		-----	
1720		-----		-----	
1740		-----		-----	
1757		-----		-----	
1776		-----		-----	
1796		-----		-----	
1810		-----		-----	
1811		-----		-----	
1881		-----		-----	
1883	Visual	Clear & Bright		-----	
1979	Visual	C & B		-----	
2133	Visual	Clear & Bright		-----	
6075		-----		-----	
6147		-----		-----	
6174	Visual	Clear, bright and visually free from solid matter.		-----	
6192	Visual	Normal		-----	
	n	60			
	mean (n)	Clear & Bright			

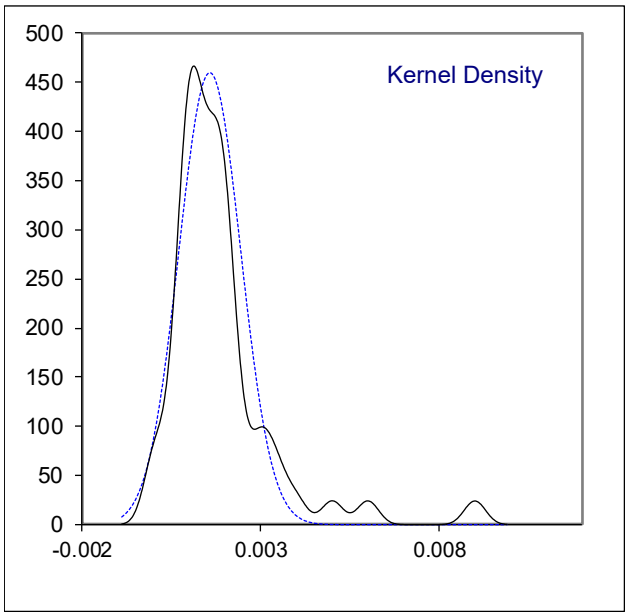
Determination of Acidity, Total on sample #19030; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120	D3242	0.003		2.50	
131		-----		-----	
140	D3242	0.0017		0.23	
150	D3242	0.006	C,R(0.01)	7.72	first reported: 0.008
159	D3242	0.009	R(0.01)	12.95	
169	D3242	0.001		-0.99	
171	D3242	0.005	R(0.05)	5.98	
175		-----		-----	
177	D3242	0.004		4.24	
194	D3242	0.0011		-0.81	
225	D3242	0.0008		-1.34	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253	D3242	0.002		0.75	
273	D3242	0.002		0.75	
317		-----		-----	
323		-----		-----	
333	D3242	0.002		0.75	
334	D3242	0		-2.73	
335	D3242	0.001		-0.99	
336		-----		-----	
353		-----		-----	
360	D3242	0.0015		-0.12	
391		-----		-----	
398	D3242	0.0021		0.93	
399	D3242	0.0024		1.45	
447	D3242	0.002		0.75	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631		-----		-----	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	D3242	0.002		0.75	
782		-----		-----	
785		-----		-----	
825	D3242	0.0017		0.23	
875		-----		-----	
922		-----		-----	
962		-----		-----	
963	D3242	0.0013		-0.47	
970		-----		-----	
974	D3242	0.0015		-0.12	
998		-----		-----	
1006	D3242	0.0015		-0.12	
1023		-----		-----	
1039	D3242	0.002		0.75	
1049	D3242	0.00217		1.05	
1059	D3242	0.001		-0.99	
1062	D3242	0.0030		2.50	
1064	D3242	0.0007		-1.51	
1082	D3242	0.0001		-2.56	
1097	D3242	0.00108		-0.85	
1105	D3242	0.00069		-1.53	
1108	D3242	0.0015		-0.12	
1109	D3242	0.0010		-0.99	
1126		-----		-----	
1191	D3242	0.001		-0.99	
1201	D3242	0.0010		-0.99	
1205		-----		-----	
1284	D3242	0.00173		0.28	
1297	D664-A	0.00	C	-2.73	first reported: 0.04
1299	D3242	0.003		2.50	
1318	D3242	0.0008		-1.34	
1320	D3242	0.0011		-0.81	
1372		-----		-----	
1379		-----		-----	
1397	D3242	0.001		-0.99	
1399	D3242	0.00171		0.25	
1429		-----		-----	
1460		-----		-----	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491		-----		-----	
1496	D3242	0.0035		3.37	
1498		-----		-----	
1531		-----		-----	
1538	D3242	0.0011	C	-0.81	first reported: 0.20
1585	D3242	0.0034		3.19	
1586	D3242	0.001		-0.99	
1587		-----		-----	
1610	IP354	0.002		0.75	
1631		-----		-----	
1634	D3242	0.0006		-1.68	
1710		-----		-----	
1720	D3242	0.0014		-0.29	
1740		-----		-----	
1757	D3242	0.0014		-0.29	
1776	D3242	0.0018		0.41	
1796		-----		-----	
1810	D3242	0.00178		0.37	
1811	D3242	0.00126		-0.53	
1881		-----		-----	
1883		-----		-----	
1979		-----		-----	
2133	D3242	0.00056		-1.75	
6075	D3242	0.0025		1.63	
6147		-----		-----	
6174		-----		-----	
6192		-----		-----	

normality	OK
n	52
outliers	3
mean (n)	0.00157
st.dev. (n)	0.000867
R(calc.)	0.00243
st.dev.(D3242:11)	0.000574
R(D3242:11)	0.00161





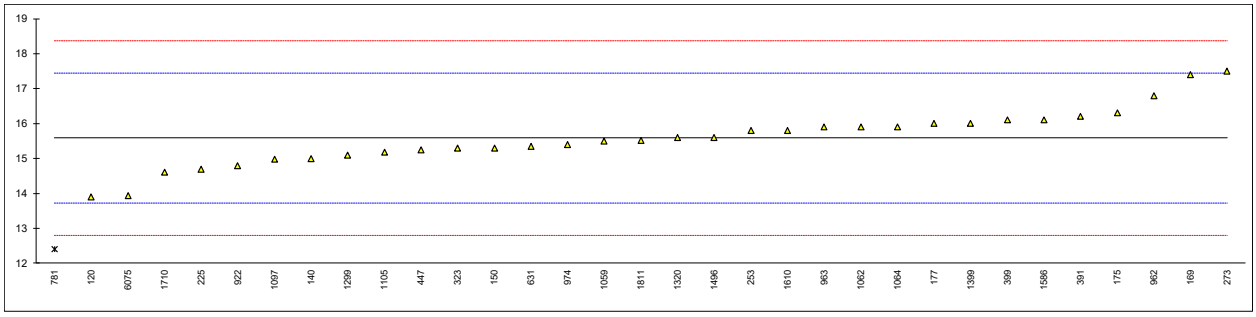
Determination of Aromatics by FIA (without oxygenate correction) on sample #19030; results in %V/V

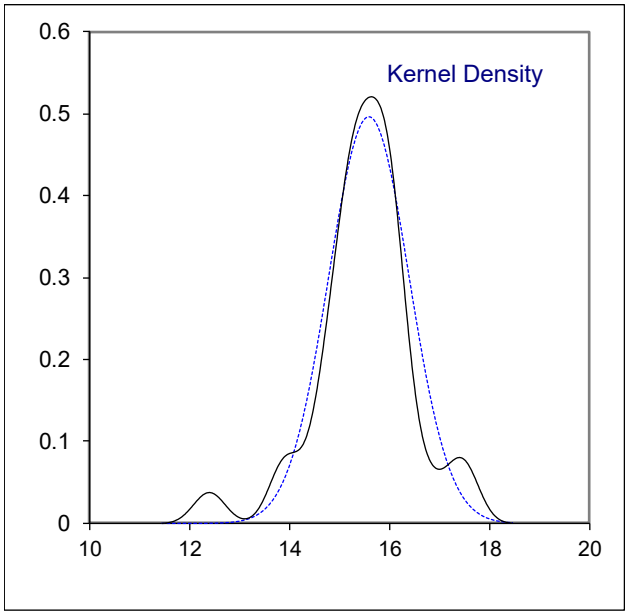
lab	method	value	mark	z(targ)	remarks *)
120	D1319	13.9		-1.82	
131		-----		-----	
140	D1319	15.0		-0.63	
150	D1319	15.3		-0.31	
159		-----		-----	
169	D1319	17.4		1.96	F.I. Dyed Gel lotno. 300000000920
171		-----		-----	
175	D1319	16.3		0.77	F.I. Dyed Gel lotno. 3000000934
177	D1319	16.0		0.45	
194		-----		-----	
225	D1319	14.7		-0.95	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253	D1319	15.80		0.23	F.I. Dyed Gel lotno. 3000000821
273	D1319	17.5		2.06	
317		-----		-----	
323	D1319	15.3		-0.31	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
353		-----		-----	
360		-----		-----	
391	D1319	16.2		0.66	F.I. Dyed Gel lotno. 300000938
398		-----		-----	
399	D1319	16.1		0.56	F.I. Dyed Gel lotno. 3000000808
447	D1319	15.254		-0.36	F.I. Dyed Gel lotno. M1107
468		-----		-----	
594		-----		-----	
604		-----		-----	
631	D1319	15.345		-0.26	F.I. Dyed Gel lotno. 3000000934
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	D1319	12.4	R(0.05)	-3.43	F.I. Dyed Gel lotno. 3000000958
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922	D1319	14.8		-0.85	F.I. Dyed Gel lotno. 3000000855
962	D1319	16.8		1.31	F.I. Dyed Gel lotno. N1007
963	D1319	15.9		0.34	F.I. Dyed Gel lotno. 402, Prod # 675
970		-----		-----	
974	D1319	15.4		-0.20	
998		-----		-----	
1006		-----		-----	
1023		-----		-----	
1039		-----		-----	
1049		-----		-----	
1059	D1319	15.5		-0.09	F.I. Dyed Gel lotno. 3000000933
1062	D1319	15.9		0.34	F.I. Dyed Gel lotno. 3000000957
1064	D1319	15.90		0.34	F.I. Dyed Gel lotno. 3000000962
1082		-----		-----	
1097	D1319	14.98		-0.65	F.I. Dyed Gel lotno. 300000943
1105	D1319	15.18		-0.44	F.I. Dyed Gel lotno. 3000000826
1108		-----		-----	
1109		-----		-----	
1126		-----		-----	
1191		-----		-----	
1201		-----		-----	
1205		-----		-----	
1284		-----		-----	
1297		-----		-----	
1299	D1319	15.1		-0.52	
1318		-----		-----	
1320	D1319	15.6		0.02	F.I. Dyed Gel lotno. 3000000910
1372		-----		-----	
1379		-----		-----	
1397		-----		-----	
1399	D1319	16.0		0.45	F.I. Dyed Gel lotno. 3000000932
1429		-----		-----	
1460		-----		-----	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks *)
1491		-----		-----	
1496	D1319	15.6		0.02	F.I. Dyed Gel lotno. 3000000866
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1585		-----		-----	
1586	D1319	16.1		0.56	
1587		-----		-----	
1610	IP156	15.8		0.23	F.I. Dyed Gel lotno. 3000000930
1631		-----		-----	
1634		-----		-----	
1710	D1319	14.6		-1.06	
1720		-----		-----	
1740		-----		-----	
1757		-----		-----	
1776		-----		-----	
1796		-----		-----	
1810		-----		-----	
1811	D1319	15.52		-0.07	
1881		-----		-----	
1883		-----		-----	
1979		-----		-----	
2133		-----		-----	
6075	D1319	13.94		-1.77	
6147		-----		-----	
6174		-----		-----	
6192		-----		-----	

normality	OK
n	32
outliers	1
mean (n)	15.585
st.dev. (n)	0.8030
R(calc.)	2.248
st.dev.(D1319:18)	0.9277
R(D1319:18)	2.597

*) See paragraph 4.1 for more information on F.I. Dyed Gel lotnumbers.



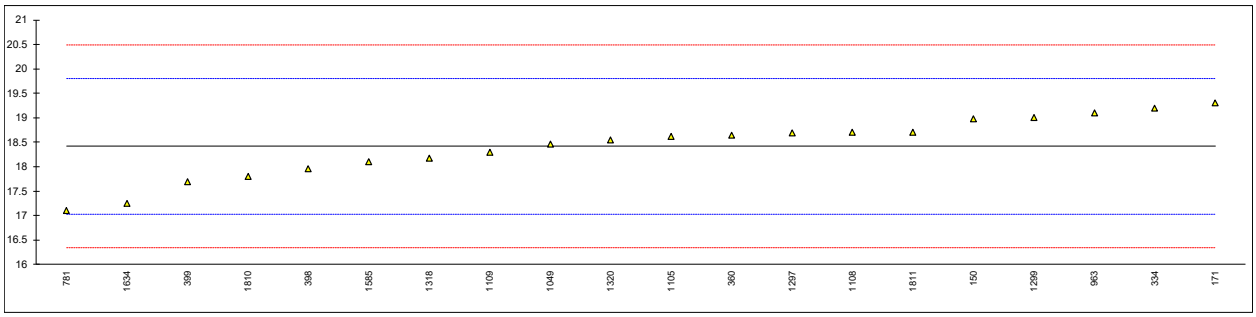


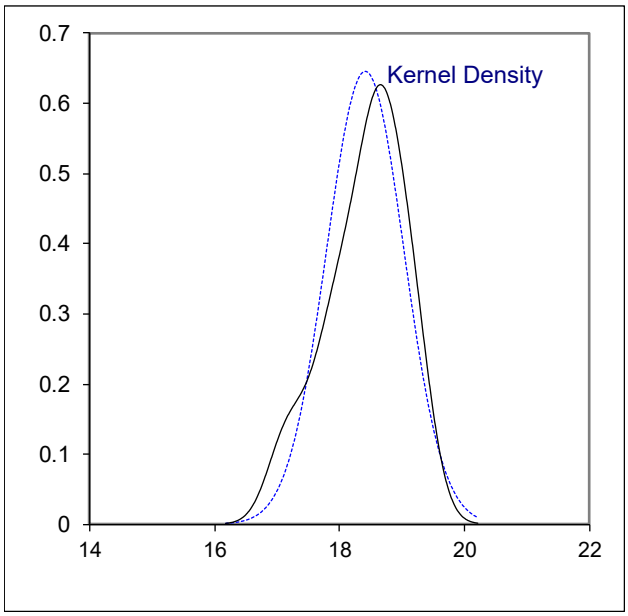
Determination of Total Aromatics by HPLC on sample #19030; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
131		-----		-----	
140		-----		-----	
150	D6379	18.98		0.81	
159		-----		-----	
169		-----		-----	
171	D6379	19.3		1.28	
175		-----		-----	
177		-----		-----	
194		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
273		-----		-----	
317		-----		-----	
323		-----		-----	
333		-----		-----	
334	D6379	19.2		1.13	
335		-----		-----	
336		-----		-----	
353		-----		-----	
360	D6379	18.64		0.32	
391		-----		-----	
398	D6379	17.96		-0.66	
399	D6379	17.69		-1.05	
447		-----		-----	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631		-----		-----	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	D6379	17.1		-1.90	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922		-----		-----	
962		-----		-----	
963	D6379	19.1		0.99	
970		-----		-----	
974		-----		-----	
998		-----		-----	
1006		-----		-----	
1023		-----		-----	
1039		-----		-----	
1049	D6379	18.464		0.07	
1059		-----		-----	
1062		-----		-----	
1064		-----		-----	
1082		-----		-----	
1097		-----		-----	
1105	D6379	18.62		0.29	
1108	D6379	18.7		0.41	
1109	IP391	18.30		-0.17	
1126		-----		-----	
1191		-----		-----	
1201		-----		-----	
1205		-----		-----	
1284		-----		-----	
1297	EN12916	18.69037		0.40	
1299	IP436	19.0	C	0.84	first reported: 21.5
1318	D6379	18.18		-0.34	
1320	D6379	18.55	C	0.19	first reported: 20.56
1372		-----		-----	
1379		-----		-----	
1397		-----		-----	
1399		-----		-----	
1429		-----		-----	
1460		-----		-----	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1585	D6379	18.1		-0.46	
1586		-----		-----	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1634	D6379	17.25		-1.68	
1710		-----		-----	
1720		-----		-----	
1740		-----		-----	
1757		-----		-----	
1776		-----		-----	
1796		-----		-----	
1810	D6379	17.8	C	-0.89	first reported: 16.1
1811	D6379	18.70		0.41	
1881		-----		-----	
1883		-----		-----	
1979		-----		-----	
2133		-----		-----	
6075		-----		-----	
6147		-----		-----	
6174		-----		-----	
6192		-----		-----	

normality	OK
n	20
outliers	0
mean (n)	18.416
st.dev. (n)	0.6176
R(calc.)	1.729
st.dev.(D6379:11)	0.6931
R(D6379:11)	1.941



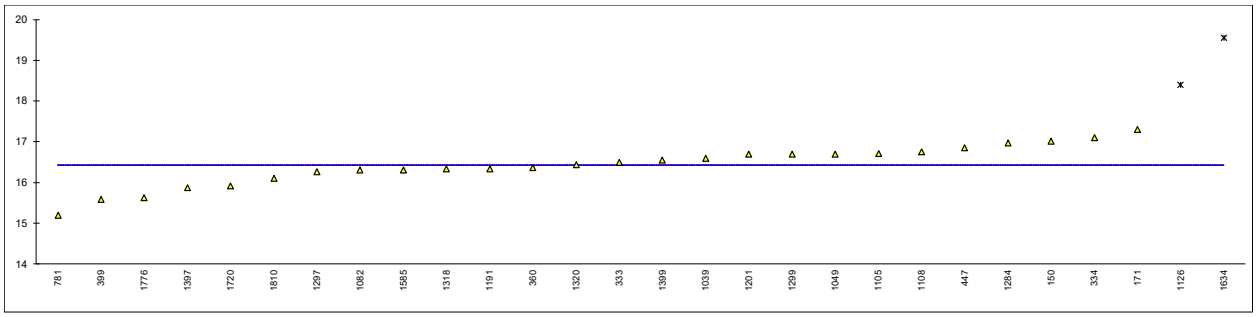


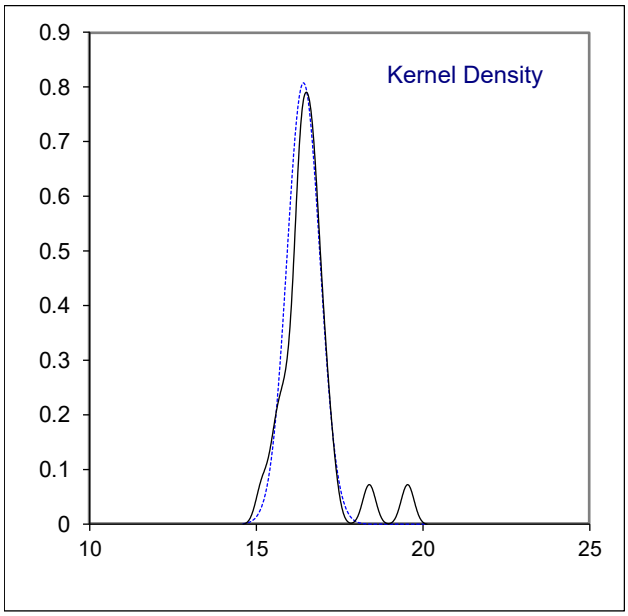
Determination of Total Aromatics by HPLC on sample #19030; results in %V/V

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
131		-----		-----	
140		-----		-----	
150	D6379	17.02		-----	
159		-----		-----	
169		-----		-----	
171	D6379	17.3		-----	
175		-----		-----	
177		-----		-----	
194		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
273		-----		-----	
317		-----		-----	
323		-----		-----	
333	D6379	16.5		-----	
334	D6379	17.1		-----	
335		-----		-----	
336		-----		-----	
353		-----		-----	
360	D6379	16.36		-----	
391		-----		-----	
398		-----		-----	
399	D6379	15.59		-----	
447	IP436	16.86116		-----	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631		-----		-----	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	D6379	15.2		-----	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
970		-----		-----	
974		-----		-----	
998		-----		-----	
1006		-----		-----	
1023		-----		-----	
1039	D6379	16.6		-----	
1049	D6379	16.70190		-----	
1059		-----		-----	
1062		-----		-----	
1064		-----		-----	
1082	D6379	16.3		-----	
1097		-----		-----	
1105	D6379	16.71		-----	
1108	D6379	16.75		-----	
1109		-----		-----	
1126	EN12916	18.4	R(0.05)	-----	
1191	D6379	16.34		-----	
1201	D6379	16.69		-----	
1205		-----		-----	
1284	D6379	16.97		-----	
1297	EN12916	16.25924		-----	
1299	IP436	16.7		-----	
1318	D6379	16.33		-----	
1320	D6379	16.44	C	-----	first reported: 18.19
1372		-----		-----	
1379		-----		-----	
1397	D6379	15.88		-----	
1399	IP436	16.55		-----	
1429		-----		-----	
1460		-----		-----	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1585	D6379	16.3		-----	
1586		-----		-----	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1634	D6379	19.55	R(0.01)	-----	
1710		-----		-----	
1720	D6379	15.92		-----	
1740		-----		-----	
1757		-----		-----	
1776	D6379	15.63		-----	
1796		-----		-----	
1810		16.1		-----	
1811		-----		-----	
1881		-----		-----	
1883		-----		-----	
1979		-----		-----	
2133		-----		-----	
6075		-----		-----	
6147		-----		-----	
6174		-----		-----	
6192		-----		-----	

normality	OK
n	26
outliers	2
mean (n)	16.427
st.dev. (n)	0.4936
R(calc.)	1.382
R(lit)	unknown
Compare R(iis18J01)	1.603
Compare R(iis18J02)	0.968



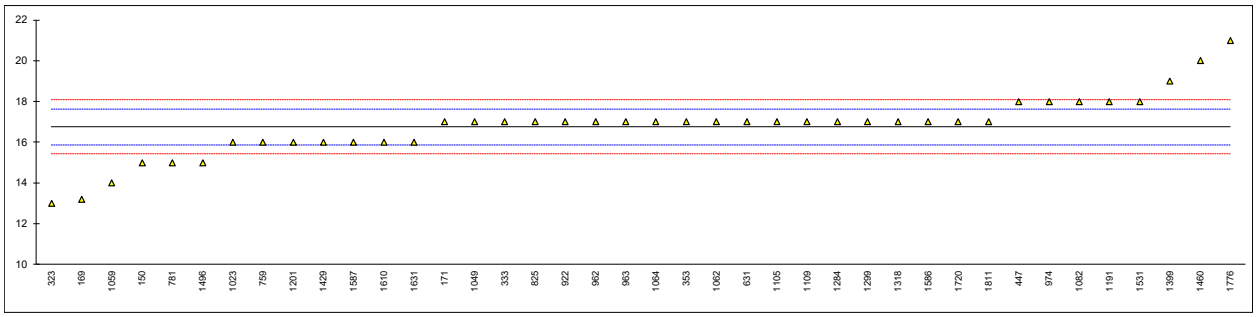


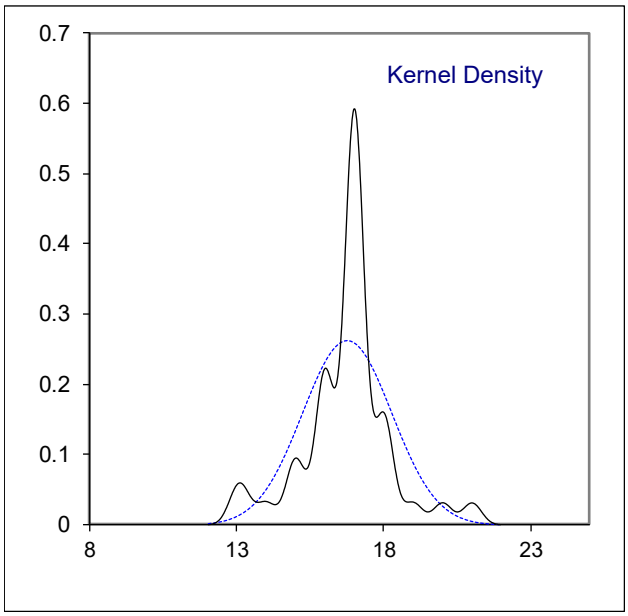
Determination of Color Saybolt (Automated) on sample #19030; cell size in mm;

lab	method	Cell (mm)	value	mark	z(targ)	remarks
120	D6045	-----	>8		-----	
131		-----	-----		-----	
140		-----	-----		-----	
150	D6045	100	15.0		-3.96	
159		-----	-----		-----	
169	D6045	50	13.2		-8.03	
171	D6045	-----	17		0.55	
175		-----	-----		-----	
177		-----	-----		-----	
194		-----	-----		-----	
225		-----	-----		-----	
228		-----	-----		-----	
237		-----	-----		-----	
238		-----	-----		-----	
253		-----	-----		-----	
273		-----	-----		-----	
317		-----	-----		-----	
323	D6045	10	13	C	-8.48	first reported: 12
333	D6045	-----	17		0.55	
334		-----	-----		-----	
335		-----	-----		-----	
336		-----	-----		-----	
353	D6045	50	17		0.55	
360		-----	-----		-----	
391		-----	-----		-----	
398		-----	-----		-----	
399		-----	-----		-----	
447	D6045	100	18		2.81	
468		-----	-----		-----	
594		-----	-----		-----	
604		-----	-----		-----	
631	D6045	100	17		0.55	
634		-----	-----		-----	
663		-----	-----		-----	
671		-----	-----		-----	
759	D6045	50	16		-1.70	
781	D6045	100	15		-3.96	
782		-----	-----		-----	
785		-----	-----		-----	
825	D6045	33	17		0.55	
875		-----	-----		-----	
922	D6045	100	17		0.55	
962	D6045	33	17		0.55	
963	D6045	-----	17		0.55	
970		-----	-----		-----	
974	D6045	100	18		2.81	
998		-----	-----		-----	
1006		-----	-----		-----	
1023	D6045	50	16		-1.70	
1039		-----	-----		-----	
1049	D6045	50	17		0.55	
1059	D6045	50	14		-6.22	
1062	D6045	100	17		0.55	
1064	D6045	50	17		0.55	
1082	D6045	100	18		2.81	
1097		-----	-----		-----	
1105	D6045	50	17		0.55	
1108		-----	-----		-----	
1109	D6045	100	17		0.55	
1126		-----	-----		-----	
1191	D6045	100	18		2.81	
1201	D6045	100	16		-1.70	
1205		-----	-----		-----	
1284	D6045	50	17		0.55	
1297		-----	-----		-----	
1299	D6045	-----	17		0.55	
1318	D6045	100	17		0.55	
1320		-----	-----		-----	
1372		-----	-----		-----	
1379		-----	-----		-----	
1397		-----	-----		-----	
1399	D6045	50	19		5.07	
1429	D6045	50	16		-1.70	
1460		50	20		7.33	
1483		-----	-----		-----	

lab	method	Cell (mm)	value	mark	z(targ)	remarks
1491		-----	-----		-----	
1496	D6045	100	15		-3.96	
1498		-----	-----		-----	
1531	D6045	50	18		2.81	
1538		-----	-----		-----	
1585		-----	-----		-----	
1586	D6045	50	17		0.55	
1587	D6045	50	16		-1.70	
1610	D6045	-----	16		-1.70	
1631	D6045	-----	16		-1.70	
1634		-----	-----		-----	
1710		-----	-----		-----	
1720	D6045	50	17		0.55	
1740		-----	-----		-----	
1757		-----	-----		-----	
1776	D6045	-----	21.0		9.59	
1796		-----	-----		-----	
1810		-----	-----		-----	
1811	D6045	50	17		0.55	
1881		-----	-----		-----	
1883		-----	-----		-----	
1979		-----	-----		-----	
2133		-----	-----		-----	
6075		-----	-----		-----	
6147		-----	-----		-----	
6174		-----	-----		-----	
6192		-----	-----		-----	

			only 50 mL cell	only 100 mL cell
	normality	suspect	not OK	OK
	n	40	16	13
	outliers	0	1	0
	mean (n)	16.76	16.94	16.77
	st.dev. (n)	1.519	1.340	1.166
	R(calc.)	4.25	3.75	3.26
	st.dev.(D6045:12)	0.443	0.443	0.443
	R(D6045:12)	1.24	1.24	1.24



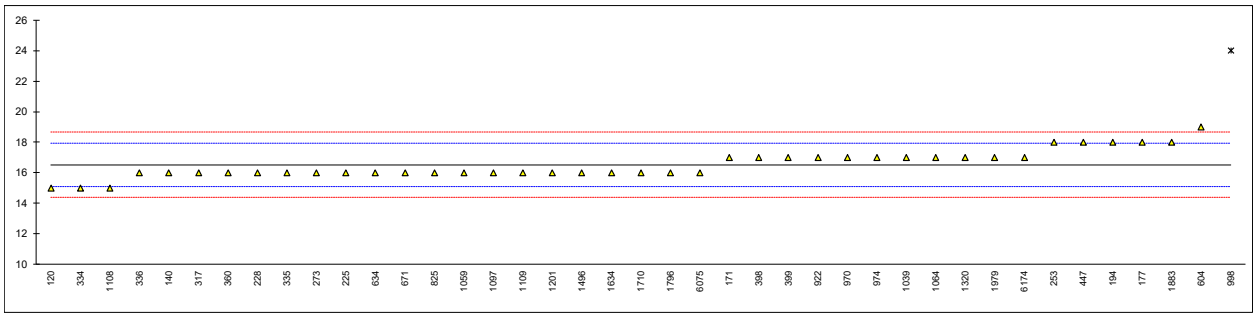


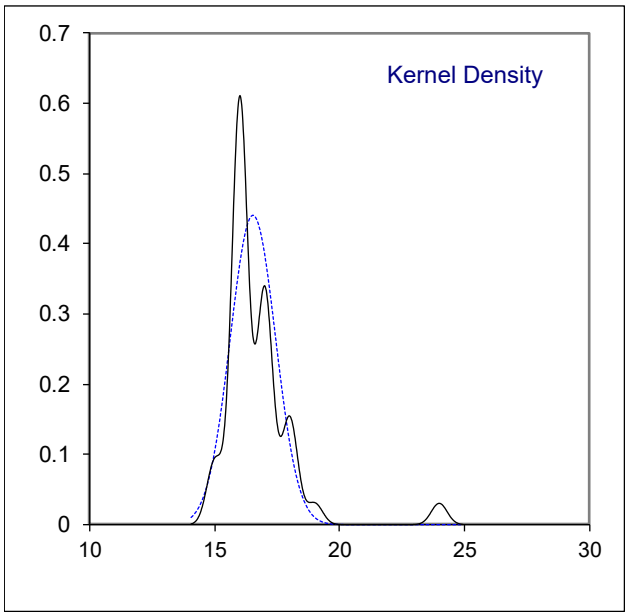
Determination of Color Saybolt (Manual) on sample #19030;

lab	method	value	mark	z(targ)	remarks
120	D156	15		-2.13	
131		-----		-----	
140	D156	16		-0.73	
150		-----		-----	
159		-----		-----	
169		-----		-----	
171	D156	17		0.67	
175		-----		-----	
177	D156	18		2.07	
194	D156	18		2.07	
225	D156	16		-0.73	
228	D156	16.0		-0.73	
237		-----		-----	
238		-----		-----	
253	D156	18		2.07	
273	D156	16		-0.73	
317	D156	16		-0.73	
323		-----		-----	
333		-----		-----	
334	D156	15		-2.13	
335	D156	16		-0.73	
336	D156	16		-0.73	
353		-----		-----	
360	D156	16		-0.73	
391		-----		-----	
398	D156	17		0.67	
399	D156	17		0.67	
447	D156	18		2.07	
468		-----		-----	
594		-----		-----	
604	D156	19		3.47	
631		-----		-----	
634	D156	16		-0.73	
663		-----		-----	
671	D156	16		-0.73	
759		-----		-----	
781		-----		-----	
782		-----		-----	
785		-----		-----	
825	D156	16		-0.73	
875		-----		-----	
922	D156	17		0.67	
962		-----		-----	
963		-----		-----	
970	D156	17		0.67	
974	D156	17		0.67	
998	D156	24	C,R(0.01)	10.47	first reported: 21
1006		-----		-----	
1023		-----		-----	
1039	D156	17		0.67	
1049		-----		-----	
1059	D156	16		-0.73	
1062		-----		-----	
1064	D156	17		0.67	
1082		-----		-----	
1097	NF M 07003	16		-0.73	
1105		-----		-----	
1108	D156	15		-2.13	
1109	D156	16		-0.73	
1126		-----		-----	
1191		-----		-----	
1201	D156	16		-0.73	
1205		-----		-----	
1284		-----		-----	
1297		-----		-----	
1299		-----		-----	
1318		-----		-----	
1320	D156	17		0.67	
1372		-----		-----	
1379		-----		-----	
1397		-----		-----	
1399		-----		-----	
1429		-----		-----	
1460		-----		-----	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491		-----		-----	
1496	D156	16		-0.73	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1585	D156	plus 16.5		-----	
1586		-----		-----	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1634	D156	16		-0.73	
1710	D156	16		-0.73	
1720		-----		-----	
1740		-----		-----	
1757		-----		-----	
1776		-----		-----	
1796	D156	16		-0.73	
1810		-----		-----	
1811		-----		-----	
1881		-----		-----	
1883	D156	18		2.07	
1979	D156	17		0.67	
2133		-----		-----	
6075	D156	16		-0.73	
6147		-----		-----	
6174	D156	17		0.67	
6192		-----		-----	

normality	OK
n	40
outliers	1
mean (n)	16.52
st.dev. (n)	0.905
R(calc.)	2.54
st.dev.(D156:15)	0.714
R(D156:15)	2





Determination of Copper Corrosion 2hr at 100°C on sample #19030;

lab	method	value	mark	z(targ)	remarks
120	D130	1A		-----	
131		-----		-----	
140	D130	1a		-----	
150	D130	1a		-----	
159	D130	1a		-----	
169	D130	1A		-----	
171	D130	1a		-----	
175	D130	1		-----	
177	D130	1a		-----	
194	D130	1A		-----	
225	D130	1a		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253	D130	1A		-----	
273	D130	1a		-----	
317	D130	1a		-----	
323	D130	1A		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
353	IP154	1a		-----	
360	D130	1A		-----	
391	D130	1a		-----	
398		-----		-----	
399		-----		-----	
447	IP154	1a		-----	
468	D130	1A		-----	
594	GOST6321	1a		-----	
604		-----		-----	
631	D130	1A		-----	
634	D130	1a		-----	
663	D130	1b		-----	
671	D130	1a		-----	
759		-----		-----	
781	D130	1A		-----	
782		-----		-----	
785		-----		-----	
825	D130	1b		-----	
875		-----		-----	
922	D130	1A		-----	
962	D130	1A		-----	
963	D130	1a		-----	
970	D130	1a		-----	
974	D130	1a		-----	
998	D130	1A		-----	
1006	D130	1b		-----	
1023	D130	1a		-----	
1039	ISO2160	1A		-----	
1049	D130	1A		-----	
1059	D130	1a		-----	
1062	D130	1B		-----	
1064	D130	1a		-----	
1082		-----		-----	
1097	ISO2160	1a		-----	
1105	D130	1a		-----	
1108		-----		-----	
1109	D130	1a		-----	
1126		-----		-----	
1191		-----		-----	
1201	D130	1A		-----	
1205		-----		-----	
1284		-----		-----	
1297		-----		-----	
1299	D130	1A		-----	
1318	D130	1a		-----	
1320		-----		-----	
1372		-----		-----	
1379		-----		-----	
1397	D130	1		-----	
1399		-----		-----	
1429	D130	1A		-----	
1460		1		-----	
1483		-----		-----	

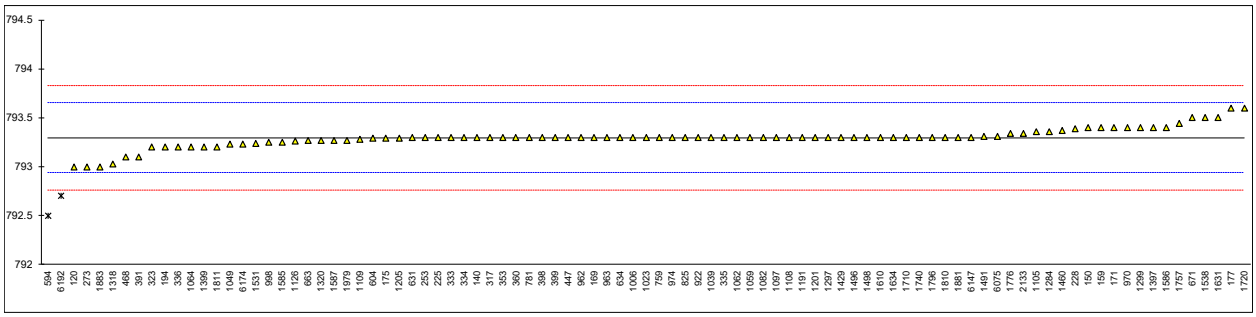
lab	method	value	mark	z(targ)	remarks
1491	D130	1a		-----	
1496	D130	1a		-----	
1498		-----		-----	
1531	D130	1a		-----	
1538		-----		-----	
1585	D130	1a		-----	
1586	D130	1a		-----	
1587	D130	1A		-----	
1610	D130	1a		-----	
1631		-----		-----	
1634	D130	1a		-----	
1710	D130	1A		-----	
1720		-----		-----	
1740	D130	1		-----	
1757	D130	1a		-----	
1776		-----		-----	
1796	D130	1a		-----	
1810		-----		-----	
1811		-----		-----	
1881		-----		-----	
1883	D130	1		-----	
1979	ISO2160	Class 1a		-----	
2133		-----		-----	
6075	D130	1a		-----	
6147		-----		-----	
6174	D130	1A		-----	
6192	D130	1b		-----	
	n	65			
	mean (n)	1 (1a / 1b)			

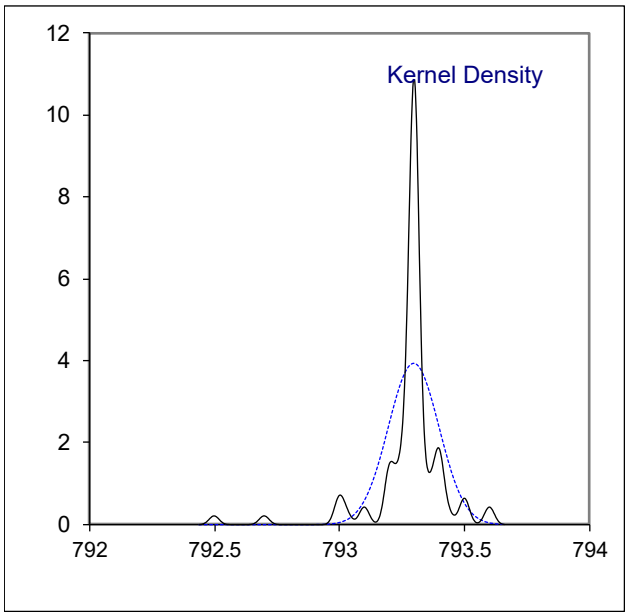
Determination of Density at 15°C on sample #19030; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
120	D4052	793.0		-1.66	
131		-----		-----	
140	D4052	793.3		0.02	
150	D4052	793.4		0.58	
159	D4052	793.4		0.58	
169	D4052	793.3		0.02	
171	D4052	793.4		0.58	
175	D4052	793.29		-0.04	
177	D4052	793.6	C	1.70	first reported: 794.1
194	D4052	793.2		-0.54	
225	D4052	793.3		0.02	
228	D4052	793.39		0.52	
237		-----		-----	
238		-----		-----	
253	D4052	793.3		0.02	
273	D4052	793.0		-1.66	
317	D4052	793.3		0.02	
323	D4052	793.2		-0.54	
333	D4052	793.3		0.02	
334	D4052	793.3		0.02	
335	D4052	793.3		0.02	
336	D4052	793.2		-0.54	
353	IP365	793.3		0.02	
360	D4052	793.3		0.02	
391	D4052	793.1		-1.10	
398	D4052	793.3		0.02	
399	D4052	793.3		0.02	
447	D4052	793.3		0.02	
468	D4052	793.1		-1.10	
594	GOST3900	792.5	R(0.01)	-4.46	
604	D4052	793.29		-0.04	
631	D4052	793.3		0.02	
634	D4052	793.3		0.02	
663	D4052	793.27		-0.15	
671	D4052	793.5		1.14	
759	D4052	793.3		0.02	
781	D4052	793.3		0.02	
782		-----		-----	
785		-----		-----	
825	D4052	793.30		0.02	
875		-----		-----	
922	D4052	793.3		0.02	
962	D4052	793.3		0.02	
963	D4052	793.3		0.02	
970	D4052	793.4		0.58	
974	D4052	793.3		0.02	
998	D4052	793.25		-0.26	
1006	D4052	793.3	C	0.02	first reported: 0.7933 kg/m^3
1023	D4052	793.3		0.02	
1039	ISO12185	793.3		0.02	
1049	D4052	793.23		-0.38	
1059	D4052	793.3		0.02	
1062	D4052	793.3		0.02	
1064	D4052	793.2		-0.54	
1082	D4052	793.3		0.02	
1097	ISO12185	793.3		0.02	
1105	D4052	793.36		0.35	
1108	D4052	793.3		0.02	
1109	D4052	793.28		-0.10	
1126	D4052	793.26		-0.21	
1191	D4052	793.3		0.02	
1201	D4052	793.3		0.02	
1205	ISO12185	793.29		-0.04	
1284	D4052	793.36		0.35	
1297	D4052	793.30		0.02	
1299	D4052	793.4		0.58	
1318	D4052	793.03		-1.50	
1320	ISO12185	793.27		-0.15	
1372		-----		-----	
1379		-----		-----	
1397	D4052	793.4		0.58	
1399	D4052	793.20		-0.54	
1429	D4052	793.3		0.02	
1460		793.37		0.41	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491	D4052	793.31		0.07	
1496	D1298	793.3		0.02	
1498	D4052	793.3		0.02	
1531	ISO12185	793.24		-0.32	
1538	D4052	793.5		1.14	
1585	D4052	793.25		-0.26	
1586	D4052	793.4		0.58	
1587	D4052	793.27		-0.15	
1610	D4052	793.3		0.02	
1631	ISO3675	793.5		1.14	
1634	D4052	793.3		0.02	
1710	D4052	793.3		0.02	
1720	D4052	793.6		1.70	
1740	ISO12185	793.3		0.02	
1757	D4052	793.44		0.80	
1776	ISO12185	793.34		0.24	
1796	D4052	793.3		0.02	
1810	ISO12185	793.3		0.02	
1811	D4052	793.2		-0.54	
1881	ISO12185	793.3		0.02	
1883	D1298	793.0		-1.66	
1979	ISO12185	793.27		-0.15	
2133	D4052	793.34		0.24	
6075	ISO12185	793.31		0.07	
6147	D4052	793.3		0.02	
6174	D4052	793.23		-0.38	
6192	D1298	792.7	R(0.01)	-3.34	

normality	not OK
n	91
outliers	2
mean (n)	793.297
st.dev. (n)	0.1011
R(calc.)	0.283
st.dev.(D4052:18a)	0.1786
R(D4052:18a)	0.5





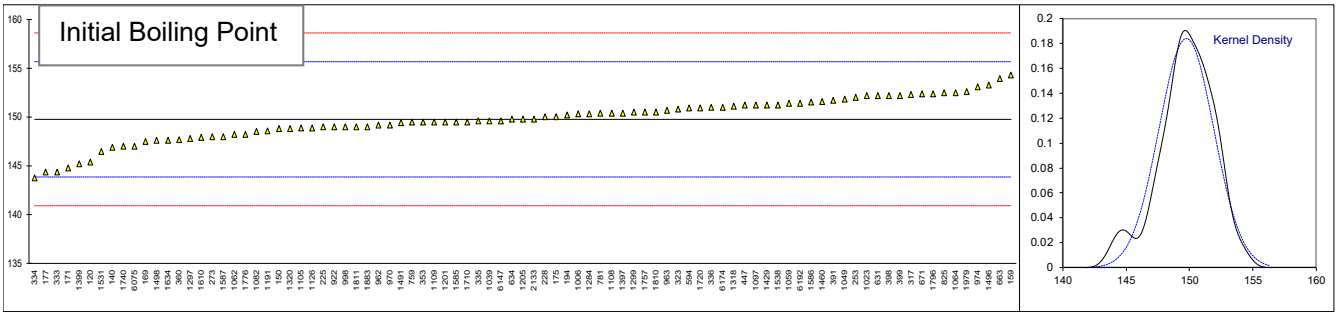
Determination of Distillation ASTM D86 on sample #19030; results in °C

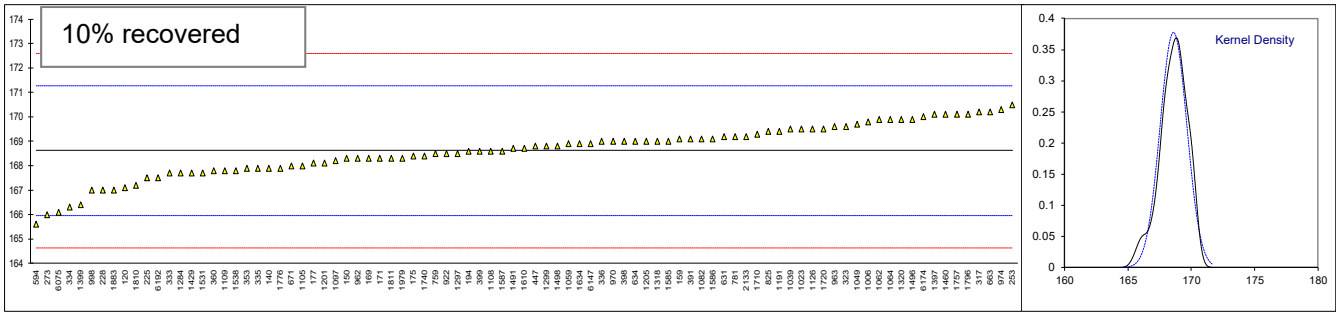
lab	method	IBP	m	10% rec	m	50% rec	m	90% rec	m	FBP	m	Res.	Loss
120	D86-A	145.4		167.1		194.4		239.5		266.3		1.2	1.4
131		-----		-----		-----		-----		-----		-----	-----
140	D86-A	146.9		167.9		195.5		239.5		270.2		1.2	0.6
150	D86-A	148.8		168.3		195.5		239.8		270.2		1.1	0.5
159	D86-A	154.3		169.1		196.2		240.5		274.9		1.0	0.8
169	D86-A	147.5		168.3		195.3		241.4		271.7		1.4	0.9
171	D86-A	144.8		168.3		195.5		241.2		268.9		1.3	1.0
175	D86-A	150.0		168.4		195.8		241.8		272.1		1.1	1.1
177	D86-A	144.4		168.1		196.2		241.4		271.9		1.4	0.5
194	D86-M	150.2		168.6		196.5		240.3		271.0		1.4	0.4
225		149.0		167.5		194.0		238.0		269.0		1.4	0.6
228	D86-M	150.0		167.0		193.0		237.0		267.0		1.0	0.5
237		-----		-----		-----		-----		-----		-----	-----
238		-----		-----		-----		-----		-----		-----	-----
253	D86-M	152.0		170.5		196.5		242.0		272.5		1.1	1.0
273	D86-M	148.0		166.0		193.0		238.0		267.0		1.5	-----
317	D86-A	152.3		170.2		196.8		240.7		269.6		1.4	0.4
323	D86-A	150.8		169.6		196.2		240.1		270.4		1.0	0.5
333	D86-A	144.4		167.7		195.5		239.5		270.3		1.2	0.6
334	D86-A	143.8		166.3		195.1		239.4		268.2		1.2	0.9
335	D86	149.6		167.9		194.8		238.8		266.8		1.1	0.1
336	D86-A	151.0		169.0		195.6		239.1		272.2		1.2	0.1
353	IP123-A	149.5		167.9		195.5		241.8		270.1		1.5	0.9
360	D86-A	147.7		167.8		195.4		239.0		268.8		1.2	0.1
391	D86-A	151.7		169.1		196.0		241.0		272.3		1.2	0.6
398	D86-A	152.2		169.0		196.7		242.0		271.4		1.1	0.6
399	D86-A	152.2		168.6		195.1		238.2		269.4		0.8	0.8
447	D86-A	151.2		168.8		196.0		242.3		271.5		1.2	1.0
468		-----		-----		-----		-----		-----		-----	-----
594	GOST2177	150.9		165.6		194.9		240.5		270.7		1.1	0.3
604		-----		-----		-----		-----		-----		-----	-----
631	D86-A	152.2		169.2		195.1		242.8		271.4		1.2	0.8
634	D86-A	149.8		169.0		196.2		242.0		269.6		1.2	0.8
663	D86-A	153.95		170.20		195.80		240.75		272.95		1.40	0.35
671		152.4		168.0		194.7		238.3		263.6	C,R(0.01)	1.8	0.6
759	D86-A	149.5		168.5		196.5		240.0		273.0		1.0	0.5
781	D86-A	150.4		169.2		196.2		240.0		272.9		1.0	0.7
782		-----		-----		-----		-----		-----		-----	-----
785		-----		-----		-----		-----		-----		-----	-----
825	D86-A	152.5		169.4		195.9		239.1		270.7		0.4	0.4
875		-----		-----		-----		-----		-----		-----	-----
922	D86-M	149.0		168.5		195.0		240.0		273.0		1.2	0.5
962	D86-A	149.2		168.3		195.5		239.9		269.8		1.2	0.6
963	D86-A	150.7		169.6		197.1		241.2		271.9		1.2	0.8
970	D86-A	149.2		169.0		195.8		239.8		270.8		1.2	1.0
974	D86-A	153.1		170.3		197.3		243.1		272.5		1.2	1.1
998	D86-M	149.0		167.0		193.5		238.5		269		1.55	0.45
1006		150.3		169.8		196.5		240.3		271.1		1.2	0.7
1023	D86-A	152.2		169.5		195.4		241.8		271.1		1.3	1.0
1039	ISO3405-A	149.6		169.5		196.3		239.9		271.1		1.2	0.2
1049	D86-A	151.8		169.7		196.6		242.2		272.8		1.2	0.7
1059	D86-A	151.4		168.9		195.3		239.5		270.2		1.2	0.6
1062	D86-A	148.2		169.9		196.3		240.2		268.6		1.2	0.5
1064	D86-A	152.5		169.9		196.9		242.7		273.0		1.0	0.8
1082	D86-A	148.5		169.1		196.0		240.6		271.6		-----	-----
1097	ISO3405-A	151.2		168.2		196.0		241.5		269.0		1.3	0.8
1105	D86-A	148.9		168.0		195.8		240.7		270.2		1.2	0.5
1108	D86-A	150.4		168.6		195.6		240.6		272.5		1.2	0.5
1109	D86-A	149.5		167.8		195.4		240.0		271.4		1.2	0.5
1126	D2887	148.9		169.5		197.9		241.2	C	272.2		-----	-----
1191	D86-A	148.6		169.4		196.1		240.4		270.6		1.3	0.1
1201	D86-A	149.5		168.1		196.0		241.8		271.5		1.2	1.3
1205	D86-A	149.8		169.0		196.6		239.9		271.6		1.2	0.2
1284	D86-A	150.3		167.7		194.6		239.8		270.0		1.2	1.0
1297	D86-A	147.8		168.5		195.8		239.2		270.3		0.8	0.1
1299	D86-A	150.5		168.8		195.8		242.1		273.6		1.2	0.8
1318	D86-A	151.1		169.0		196.0		241.7		271.1		1.2	0.5
1320		148.8		169.9		195.7		238.9		268.9		1.2	0.3
1372		-----		-----		-----		-----		-----		-----	-----
1379		-----		-----		-----		-----		-----		-----	-----
1397	D86-A	150.4		170.1		197.0		241.2		272.0		1.2	0.4
1399	D86-A	145.2		166.4		194.4		237.0		269.8		1.2	1.2
1429	D86-A	151.2		167.7		194.6		239.2		269.8		1.2	0.5
1460	D86-A	151.6		170.1		195.4		237.9		269.0		0.9	0.0
1483		-----		-----		-----		-----		-----		-----	-----

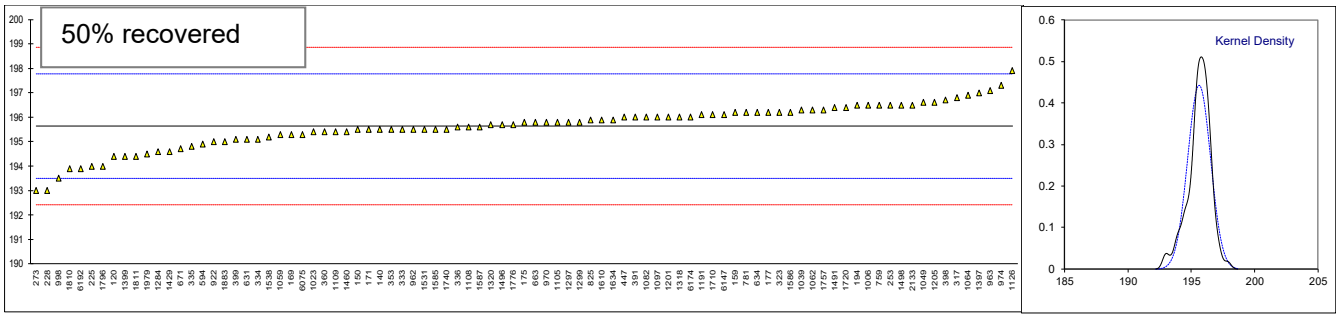
lab	method	IBP	m	10% rec	m	50% rec	m	90% rec	m	FBP	m	Res.	Loss
1491	D86-A	149.4		168.7		196.4		241.2		271.3		1.2	0.5
1496	D86-A	153.3		169.9		195.7		241.6		270.7		1.2	0.6
1498		147.6		168.8		196.5		242.3		271.6		1.2	1.0
1531	D86-A	146.5		167.7		195.5		240.1		273		1.0	0.22
1538	D86-A	151.2		167.8		195.2		242.0		269.5		1.0	0.5
1585	D86-M	149.5		169.0		195.5		240.0		270.5		1.0	0.5
1586	D86-A	151.5		169.1		196.2		242.4		271.7		1.3	0.5
1587	D86-A	148.0		168.6		195.6		239.8		271.4		1.2	0.4
1610	D86-A	147.9		168.7		195.9		242.0		272.9		1.2	0.8
1631		-----		-----		-----		-----		-----		-----	-----
1634	D86-A	147.6		168.9		195.9		241.0		271.7		1.0	0.5
1710	D86-A	149.5		169.3		196.1		241.5		272.7		1.0	0.6
1720	D86-A	150.9		169.5		196.4		242.3		273.0		-----	-----
1740	D86-A	147		168.4		195.5		240		269.7		0.9	0.5
1757	D86-A	150.5		170.1		196.3		243.9		268.5		1.4	0.6
1776	ISO3405-A	148.2		167.9		195.7		242.4		269.2		-----	-----
1796	D86-A	152.4		170.1	C	194.0		238.2		276.2		0.6	0.4
1810	D86-M	150.5		167.2		193.9		238.8		269.6		1.2	0.8
1811	D86-A	149.0		168.3		194.4		235.6		269.0		1.2	0.5
1881		-----		-----		-----		-----		-----		-----	-----
1883	D86-M	149		167		195		238		269		1.2	0.8
1979	ISO3405-A	152.6		168.3		194.5		238.9		273.6		1.4	0.2
2133	D86-A	149.8		169.2		196.5		241.1		271.4		1.2	0.7
6075	D86-A	147.0		166.1		195.3		238.4		270.2		1.4	0.0
6147		149.6		168.9		196.1		238.5		270.3		1.1	-0.1
6174	D86-M	151.0		170.0		196.0		241.0		272.0		0.5	0.5
6192		151.4		167.5		193.9		236.7		269.6		0.8	0.2
	normality	OK		OK		OK		OK		OK			
	n	89		89		89		89		88			
	outliers	0		0		0		0		1			
	mean (n)	149.76		168.62		195.64		240.29		270.83			
	st.dev. (n)	2.170		1.056		0.900		1.589		1.759			
	R(calc.)	6.07		2.96		2.52		4.45		4.93			
	st.dev.(D86-A:18)	2.942		1.325		1.071		1.287		2.536			
	R(D86-A:18)	8.24		3.71		3.0		3.60		7.1			
Compare													
	R(D86-M:18)	4.55		3.02		2.99		3.80		4.38			

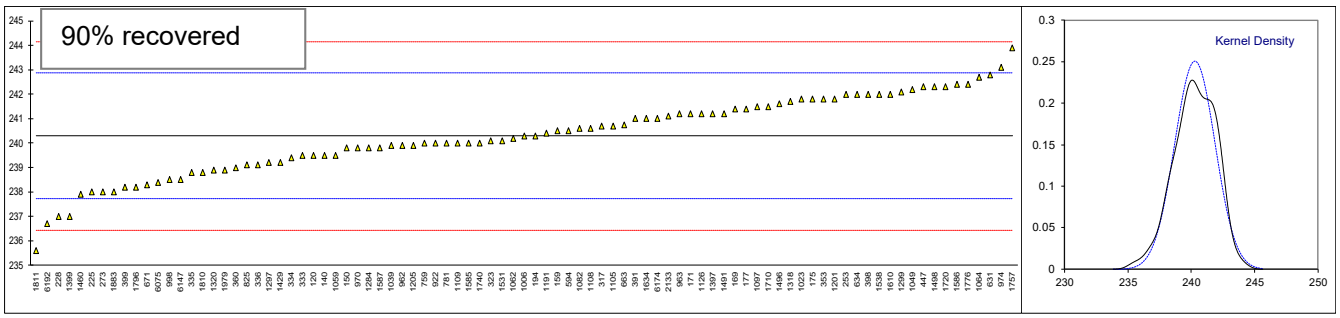
Lab 671 first reported: 260.8 for FBP
Lab 1126 first reported: 214.2 for 90% recovered
Lab 1796 first reported: 173.1 for 10% recovered

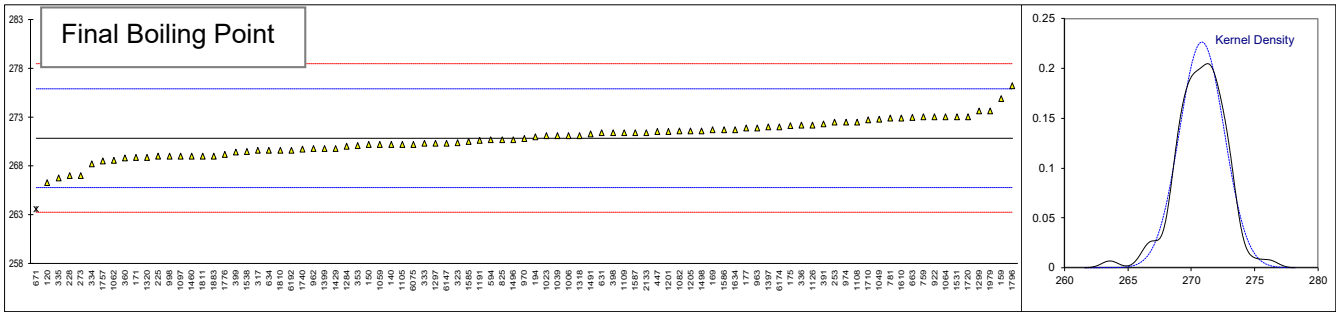
D86-A: automatic mode
D86-M: manual mode


Initial Boiling Point
Kernel Density


10% recovered
Kernel Density


50% recovered
Kernel Density


90% recovered
Kernel Density


Final Boiling Point
Kernel Density

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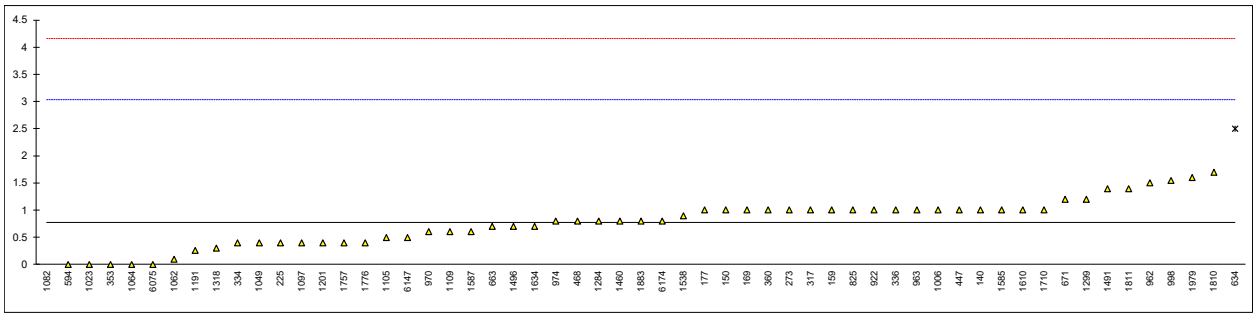
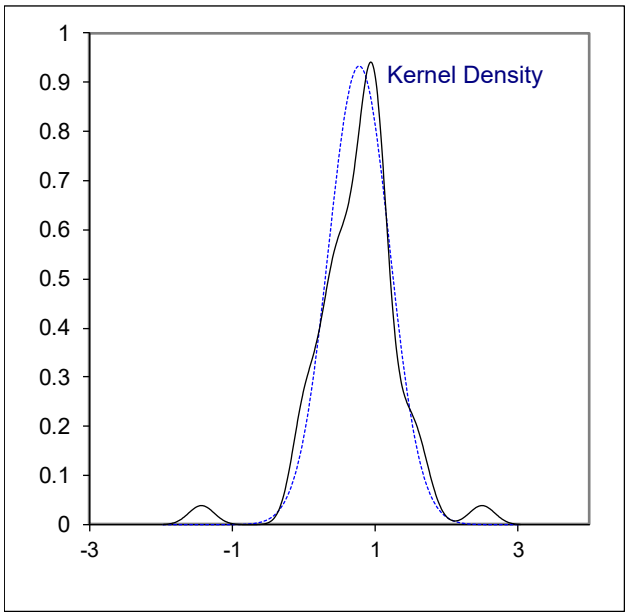
Determination of Existent Gum (unwashed) on sample #19030; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
120	D381	<1		-----	
131		-----		-----	
140	D381	1		0.20	
150	D381	1		0.20	
159	D381	1		0.20	
169	D381	1		0.20	
171	D381	<1		-----	
175		-----		-----	
177	D381	1		0.20	
194		-----		-----	
225	D381	0.4		-0.33	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253	IP540	< 1		-----	
273	D381	1.0		0.20	
317	D381	1.0		0.20	
323	D381	<1		-----	
333		-----		-----	
334	D381	0.4		-0.33	
335		-----		-----	
336	D381	1.0		0.20	
353	IP540	0		-0.69	
360	D381	1.0		0.20	
391	D381	<1		-----	
398		-----		-----	
399		-----		-----	
447	D381	1		0.20	
468	IP540	0.8		0.02	
594	GOST1567	0		-0.69	
604		-----		-----	
631		-----		-----	
634	D381	2.5	R(0.05)	1.53	
663	D381	0.7		-0.07	
671	IP540	1.2		0.38	
759		-----		-----	
781		-----		-----	
782		-----		-----	
785		-----		-----	
825	D381	1		0.20	
875		-----		-----	
922	D381	1.0		0.20	
962	D381	1.5		0.64	
963	D381	1.0		0.20	
970	D381	0.6		-0.15	
974	D381	0.8		0.02	
998	D381	1.55		0.69	
1006	D381	1.0		0.20	
1023	IP540	0.0		-0.69	
1039	ISO6246	<1		-----	
1049	D381	0.4		-0.33	
1059	D381	<1		-----	
1062	D381	0.1		-0.60	
1064	D381	0.0		-0.69	
1082	IP540	-1.44	R(0.01)	-1.96	
1097	IP540	0.4		-0.33	
1105	D381	0.5		-0.24	
1108	D381	<1		-----	
1109	D381	0.6		-0.15	
1126		-----		-----	
1191	IP540	0.26		-0.46	
1201	D381	0.4		-0.33	
1205		-----		-----	
1284	IP540	0.8		0.02	
1297		-----		-----	
1299	IP540	1.2		0.38	
1318	IP540	0.3		-0.42	
1320		-----		-----	
1372		-----		-----	
1379		-----		-----	
1397		-----		-----	
1399		-----		-----	
1429		-----		-----	
1460		0.80		0.02	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491	D381	1.4		0.55	
1496	D381	0.7		-0.07	
1498		-----		-----	
1531		-----		-----	
1538	IP540	0.9		0.11	
1585	D381	1.0		0.20	
1586		-----		-----	
1587	IP540	0.6		-0.15	
1610	IP540	1		0.20	
1631		-----		-----	
1634	D381	0.7		-0.07	
1710	IP540	1.0		0.20	
1720		-----		-----	
1740		-----		-----	
1757	D381	0.4		-0.33	
1776	IP540	0.4		-0.33	
1796		-----		-----	
1810	D381	1.7		0.82	
1811	D381	1.4		0.55	
1881		-----		-----	
1883	D381	0.8		0.02	
1979	D381	1.6		0.73	
2133		-----		-----	
6075	ISO6246	0		-0.69	
6147	IP540	0.50		-0.24	
6174	D381	0.8		0.02	
6192		-----		-----	

normality	OK
n	55
outliers	2
mean (n)	0.775
st.dev. (n)	0.4277
R(calc.)	1.198
st.dev.(D381:12)	1.1277
R(D381:12)	3.157



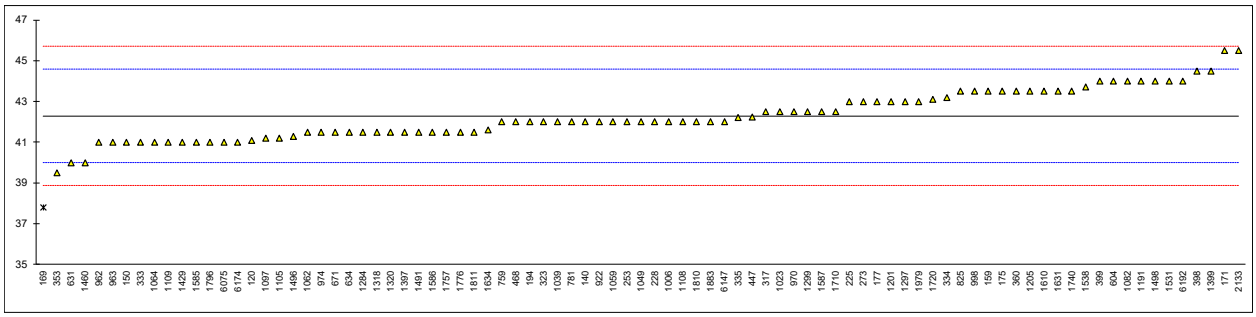


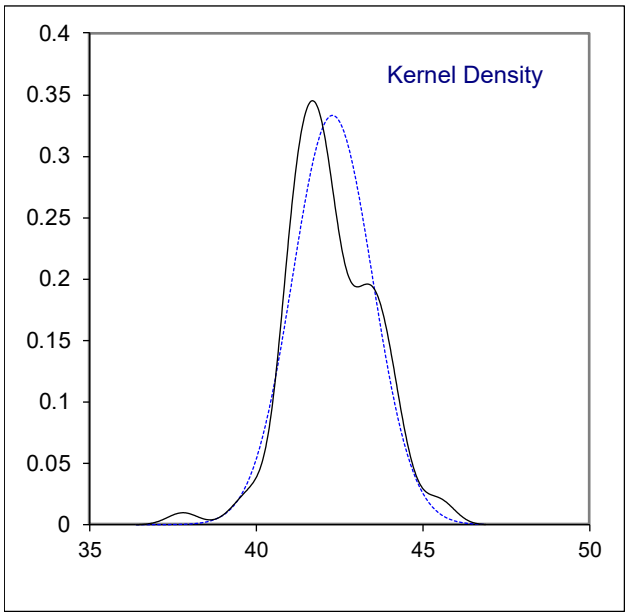
Determination of Flash Point on sample #19030; results in °C

lab	method	value	mark	z(targ)	remarks
120	D56	41.1		-1.05	
131		-----		-----	
140	D56	42		-0.26	
150	D56	41.0	C	-1.13	first reported: 70.5
159	D56	43.5		1.05	
169	D3828	37.8	R(0.05)	-3.93	
171	D56	45.5		2.80	
175	D56	43.5		1.05	
177	D56	43.0		0.62	
194	D93	42.0		-0.26	
225	IP170	43.0		0.62	
228	IP170	42.0		-0.26	
237		-----		-----	
238		-----		-----	
253	IP170	42.0		-0.26	
273	IP170	43.0		0.62	
317	IP170	42.5		0.18	
323	IP170	42.0		-0.26	
333	IP170	41.0		-1.13	
334	IP170	43.2		0.79	
335	IP170	42.2		-0.08	
336		-----		-----	
353	IP170	39.500		-2.45	
360	D56	43.5		1.05	
391		-----		-----	
398	D3828	44.5		1.93	
399	IP170	44.0		1.49	
447	IP170	42.25		-0.04	
468	IP170	42.0		-0.26	
594		-----		-----	
604	IP170	44.0		1.49	
631	D56	40.0		-2.01	
634	IP170	41.5		-0.70	
663		-----		-----	
671	D93	41.5		-0.70	
759	IP170	42.0		-0.26	
781	IP170	42.0		-0.26	
782		-----		-----	
785		-----		-----	
825	IP170	43.5		1.05	
875		-----		-----	
922	IP170	42.0		-0.26	
962	D56	41.0		-1.13	
963	IP170	41.0		-1.13	
970	IP170	42.5		0.18	
974	IP170	41.5		-0.70	
998	D93	43.5		1.05	
1006	D56	42.0		-0.26	
1023	ISO13736	42.5		0.18	
1039	IP170	42.0		-0.26	
1049	ISO13736	42.0		-0.26	
1059	IP170	42.0		-0.26	
1062	IP170	41.5		-0.70	
1064	IP170	41.0		-1.13	
1082	IP170	44.0		1.49	
1097	ISO13736	41.2		-0.96	
1105	IP170	41.2		-0.96	
1108	D56	42.0		-0.26	
1109	IP170	41.0		-1.13	
1126		-----		-----	
1191	IP170	44.0		1.49	
1201	IP170	43.0		0.62	
1205	D93	43.5		1.05	
1284	IP170	41.5		-0.70	
1297	D93	43		0.62	
1299	IP170	42.5		0.18	
1318	IP170	41.5		-0.70	
1320	D56	41.5		-0.70	
1372		-----		-----	
1379		-----		-----	
1397	D56	41.5		-0.70	
1399	IP170	44.5		1.93	
1429	D56	41.0		-1.13	
1460	D56	40.0		-2.01	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491	IP170	41.5		-0.70	
1496	IP170	41.3		-0.87	
1498	D56	44.0		1.49	
1531	D93	44		1.49	
1538	D56	43.7		1.23	
1585	IP170	41.0		-1.13	
1586	IP170	41.5		-0.70	
1587	IP170	42.5		0.18	
1610	IP170	43.5		1.05	
1631	IP170	43.5		1.05	
1634	IP170	41.6		-0.61	
1710	D56	42.5		0.18	
1720	D3828	43.1		0.70	
1740	IP170	43.5		1.05	
1757	D56	41.5		-0.70	
1776	IP170	41.5		-0.70	
1796	D93	41.0		-1.13	
1810	D56	42.0		-0.26	
1811	D56	41.5		-0.70	
1881		-----		-----	
1883	D3828	42		-0.26	
1979	D56	43.0		0.62	
2133	D93	45.5		2.80	
6075	IP170	41		-1.13	
6147	ISO13736	42.0		-0.26	
6174	IP170	41.0		-1.13	
6192	D93	44		1.49	

normality	OK
n	86
outliers	1
mean (n)	42.29
st.dev. (n)	1.199
R(calc.)	3.36
st.dev.(IP170:14)	1.143
R(IP170:14)	3.2



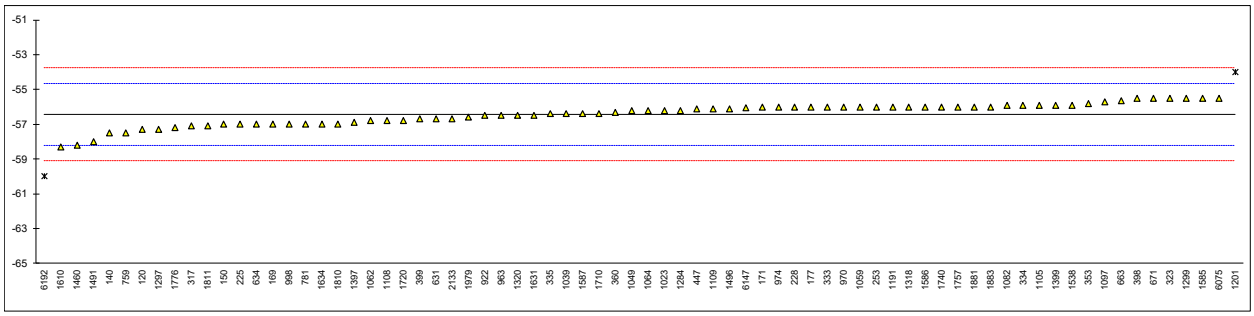


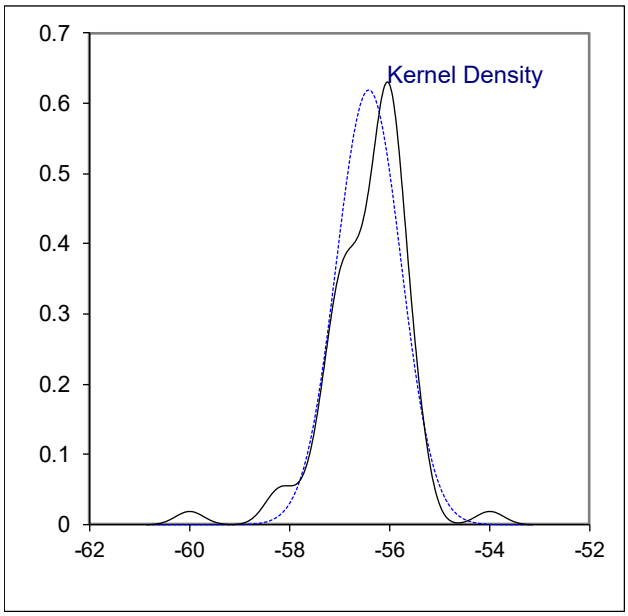
Determination of Freezing Point on sample #19030; results in °C

lab	method	value	mark	z(targ)	remarks
120	D5972	-57.3		-0.99	
131		-----		-----	
140	D5972	-57.5		-1.21	
150	D7153	-57.0		-0.65	
159		-----		-----	
169	D2386	-57		-0.65	
171	D2386	-56.0		0.47	
175		-----		-----	
177	D2386	-56		0.47	
194		-----		-----	
225	D2386	-57.0		-0.65	
228	D2386	-56.0		0.47	
237		-----		-----	
238		-----		-----	
253	D2386	-56.0		0.47	
273		-----		-----	
317	D5972	-57.1		-0.76	
323	D2386	-55.5		1.03	
333	D2386	-56.0		0.47	
334	IP529	-55.9		0.58	
335	IP529	-56.4		0.02	
336		-----		-----	
353	IP16	-55.80		0.69	
360	D7153	-56.3		0.13	
391		-----		-----	
398	D2386	-55.5		1.03	
399	D7153	-56.7		-0.31	
447	D2386	-56.1		0.36	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631	D5972	-56.7		-0.31	
634	D2386	-57.0		-0.65	
663	D2386	-55.65		0.86	
671	D2386	-55.5		1.03	
759	D2386	-57.5		-1.21	
781	D2386	-57.0		-0.65	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922	D2386	-56.5		-0.09	
962		-----		-----	
963	D2386	-56.5		-0.09	
970	D2386	-56.0		0.47	
974	D2386	-56.0		0.47	
998	D2386	-57		-0.65	
1006		-----		-----	
1023	D7153	-56.2		0.25	
1039	IP529	-56.4		0.02	
1049	D7153	-56.2		0.25	
1059	D2386	-56.0		0.47	
1062	D7153	-56.8		-0.43	
1064	D7153	-56.2		0.25	
1082	IP529	-55.9		0.58	
1097	IP529	-55.7		0.81	
1105	D7153	-55.9		0.58	
1108	D5972	-56.8	C	-0.43	first reported: -53.6
1109	D5972	-56.1		0.36	
1126		-----		-----	
1191	IP529	-56		0.47	
1201	D5972	-54.0	R(0.05)	2.71	
1205		-----		-----	
1284	D7153	-56.2		0.25	
1297	D5972	-57.3		-0.99	
1299	D7153	-55.5		1.03	
1318	D7153	-56.0		0.47	
1320	D2386	-56.5		-0.09	
1372		-----		-----	
1379		-----		-----	
1397	D7153	-56.9		-0.54	
1399	D7153	-55.9		0.58	
1429		-----		-----	
1460	D5972	-58.2		-1.99	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491	D2386	-58		-1.77	
1496	D5972	-56.1		0.36	
1498		-----		-----	
1531		-----		-----	
1538	D5972	-55.9		0.58	
1585	D2386	-55.5		1.03	
1586	D2386	-56.0		0.47	
1587	IP529	-56.4		0.02	
1610	D5972	-58.3		-2.11	
1631	D5972	-56.5		-0.09	
1634	D2386	-57.0		-0.65	
1710	D7153	-56.4		0.02	
1720	D7153	-56.8		-0.43	
1740	D2386	-56		0.47	
1757	D2386	-56.0		0.47	
1776	IP529	-57.2		-0.87	
1796		-----		-----	
1810	D5972	-57.0	C	-0.65	first reported: 56.7
1811	D2386	-57.1		-0.76	
1881	D2386	-56.00		0.47	
1883	D2386	-56		0.47	
1979	D7153	-56.6		-0.20	
2133	D7153	-56.7		-0.31	
6075	IP529	-55.5		1.03	
6147	D7153	-56.05	C	0.41	first reported: 56.05
6174	D2386	< - 55.0		-----	
6192	D2386	-60	R(0.01)	-4.01	

normality	OK
n	72
outliers	2
mean (n)	-56.42
st.dev. (n)	0.644
R(calc.)	1.80
st.dev.(D2386:18)	0.893
R(D2386:18)	2.5



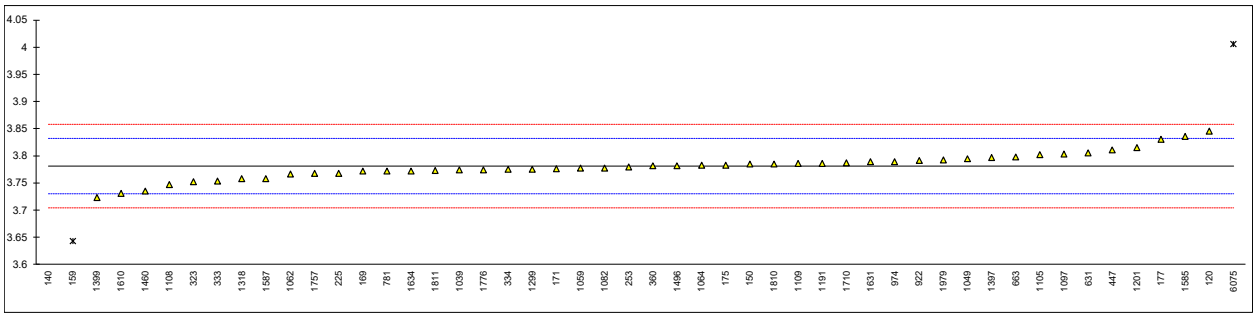


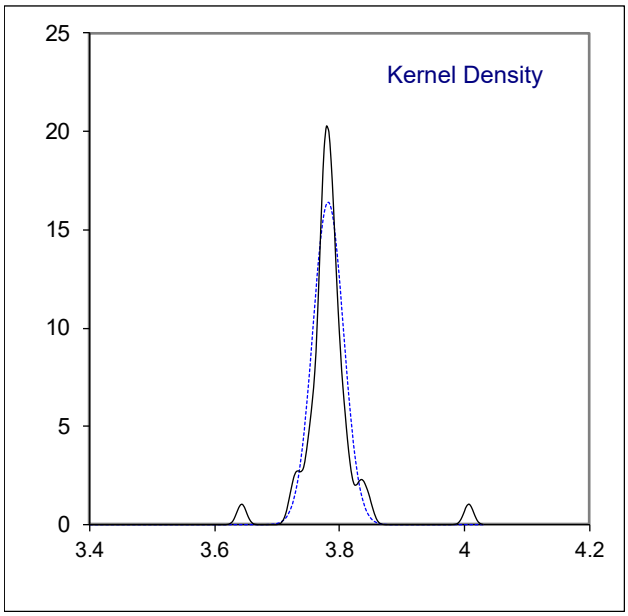
Determination of Kinematic Viscosity at -20°C on sample #19030; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	D445	3.846	C	2.53	first reported: 3.485
131		-----		-----	
140	D445	3.0993	R(0.01)	-26.58	
150	D445	3.785		0.15	
159	D445	3.643	R(0.01)	-5.38	
169	D445	3.7715		-0.38	
171	D445	3.776		-0.20	
175	D445	3.783		0.07	
177	D445	3.830		1.90	
194		-----		-----	
225	D445	3.768		-0.51	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253	D445	3.78		-0.05	
273		-----		-----	
317		-----		-----	
323	D445	3.752		-1.14	
333	D445	3.754		-1.06	
334	D445	3.775		-0.24	
335		-----		-----	
336		-----		-----	
353		-----		-----	
360	D445	3.7816		0.02	
391		-----		-----	
398		-----		-----	
399		-----		-----	
447	D445	3.811		1.16	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631	D445	3.806		0.97	
634		-----		-----	
663	D445	3.7974		0.63	
671		-----		-----	
759		-----		-----	
781	D445	3.772		-0.36	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922	D445	3.791		0.38	
962		-----		-----	
963		-----		-----	
970		-----		-----	
974	D445	3.7897		0.33	
998		-----		-----	
1006		-----		-----	
1023		-----		-----	
1039	ISO3104	3.774		-0.28	
1049	D445	3.795		0.54	
1059	D445	3.777		-0.16	
1062	D445	3.766		-0.59	
1064	D445	3.7829		0.07	
1082	D445	3.7770		-0.16	
1097	ISO3104	3.803		0.85	
1105	D445	3.8027		0.84	
1108	D445	3.747		-1.33	
1109	D445	3.7857		0.18	
1126		-----		-----	
1191	D445	3.7858		0.18	
1201	D7042	3.815		1.32	
1205		-----		-----	
1284		-----		-----	
1297		-----		-----	
1299	D445	3.775		-0.24	
1318	D7042	3.7578		-0.91	
1320		-----		-----	
1372		-----		-----	
1379		-----		-----	
1397	D7042	3.797		0.62	
1399	D445	3.723		-2.27	
1429		-----		-----	
1460		3.7348		-1.81	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491		-----		-----	
1496	D445	3.782		0.03	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1585	D445	3.8354		2.11	
1586		-----		-----	
1587	D445	3.75808		-0.90	
1610	D7042	3.731		-1.96	
1631	D7945	3.789		0.31	
1634	D445	3.772		-0.36	
1710	D445	3.787		0.23	
1720		-----		-----	
1740		-----		-----	
1757	D7042	3.7678		-0.52	
1776	D445	3.7746		-0.26	
1796		-----		-----	
1810	D445	3.785		0.15	
1811	D445	3.773		-0.32	
1881		-----		-----	
1883		-----		-----	
1979	D445	3.7921		0.43	
2133		-----		-----	
6075	D445	4.0058	R(0.01)	8.75	
6147		-----		-----	
6174		-----		-----	
6192		-----		-----	

normality	suspect
n	47
outliers	3
mean (n)	3.7812
st.dev. (n)	0.02437
R(calc.)	0.0682
st.dev.(D445:18)	0.02566
R(D445:18)	0.0718



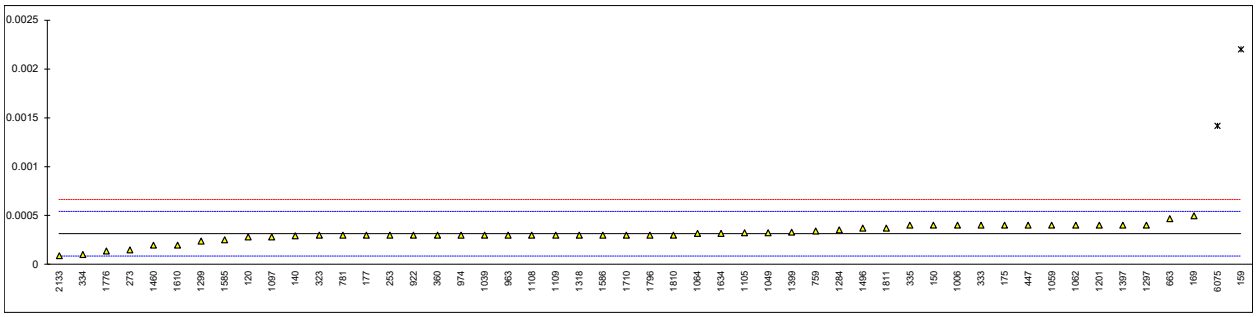


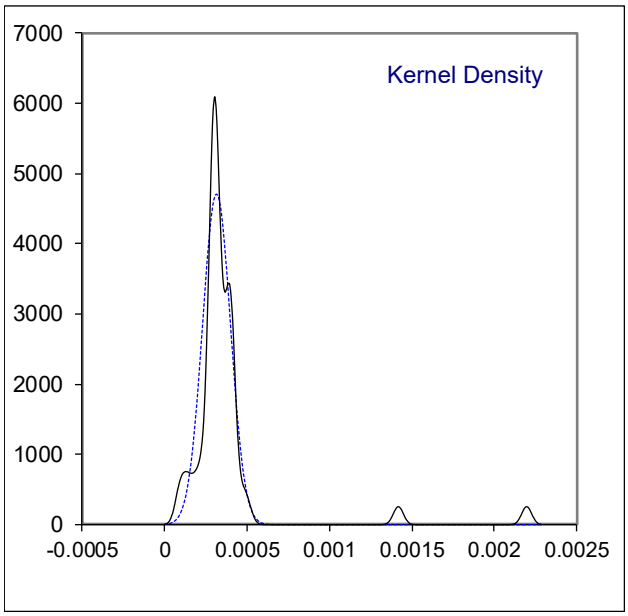
Determination of Mercaptan Sulfur as S on sample #19030; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D3227	0.00028		-0.31	
131		-----		-----	
140	D3227	0.000295		-0.18	
150	D3227	0.0004		0.73	
159	D3227	0.0022	R(0.01)	16.33	
169	D3227	0.0005		1.60	
171	D3227	<0.0003		-----	
175	D3227	0.0004		0.73	
177	D3227	0.0003		-0.13	
194		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253	D3227	0.0003		-0.13	
273	D3227	0.00015		-1.43	
317		-----		-----	
323	D3227	0.0003		-0.13	
333	D3227	0.0004		0.73	
334	UOP163	0.0001	C	-1.86	first reported: 0.001
335	D3227	0.0004		0.73	
336		-----		-----	
353		-----		-----	
360	D3227	0.0003		-0.13	
391		-----		-----	
398		-----		-----	
399		-----		-----	
447	D3227	0.0004		0.73	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631		-----		-----	
634		-----		-----	
663	D3227	0.00047		1.34	
671		-----		-----	
759		0.00034		0.21	
781	D3227	0.0003		-0.13	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922	D3227	0.0003		-0.13	
962		-----		-----	
963	D3227	0.0003		-0.13	
970		-----		-----	
974	D3227	0.0003		-0.13	
998		-----		-----	
1006	D3227	0.0004		0.73	
1023		-----		-----	
1039	IP342	0.0003		-0.13	
1049	D3227	0.000323		0.07	
1059	D3227	0.0004		0.73	
1062	D3227	0.0004		0.73	
1064	D3227	0.00032		0.04	
1082		-----		-----	
1097	ISO3012	0.00028		-0.31	
1105	D3227	0.000322		0.06	
1108	D3227	0.0003		-0.13	
1109	D3227	0.00030		-0.13	
1126		-----		-----	
1191		-----		-----	
1201	D3227	0.0004		0.73	
1205		-----		-----	
1284	D3227	0.000354		0.34	
1297	D3227	0.000404		0.77	
1299	D3227	0.00024		-0.65	
1318	D3227	0.0003		-0.13	
1320		-----		-----	
1372		-----		-----	
1379		-----		-----	
1397	D3227	0.0004		0.73	
1399	D3227	0.000327		0.10	
1429		-----		-----	
1460		0.0002		-1.00	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491		-----		-----	
1496	D3227	0.00037		0.47	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1585	D3227	0.00025		-0.56	
1586	D3227	0.0003		-0.13	
1587		-----		-----	
1610	IP342	0.0002		-1.00	
1631		-----		-----	
1634	D3227	0.00032		0.04	
1710	D3227	0.0003		-0.13	
1720		-----		-----	
1740		-----		-----	
1757		-----		-----	
1776	D3227	0.0001394		-1.52	
1796	UOP163	0.0003		-0.13	
1810	D3227	0.0003		-0.13	
1811	D3227	0.000371		0.48	
1881		-----		-----	
1883		-----		-----	
1979		-----		-----	
2133	D3227	0.00009		-1.95	
6075	D3227	0.00142	R(0.01)	9.57	
6147		-----		-----	
6174		-----		-----	
6192		-----		-----	

normality	OK
n	49
outliers	2
mean (n)	0.000315
st.dev. (n)	0.0000847
R(calc.)	0.000237
st.dev.(D3227:16)	0.0001154
R(D3227:16)	0.000323



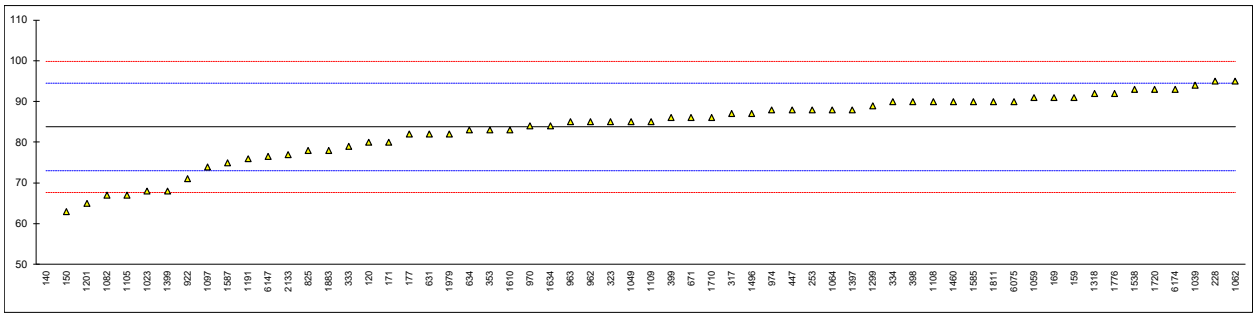


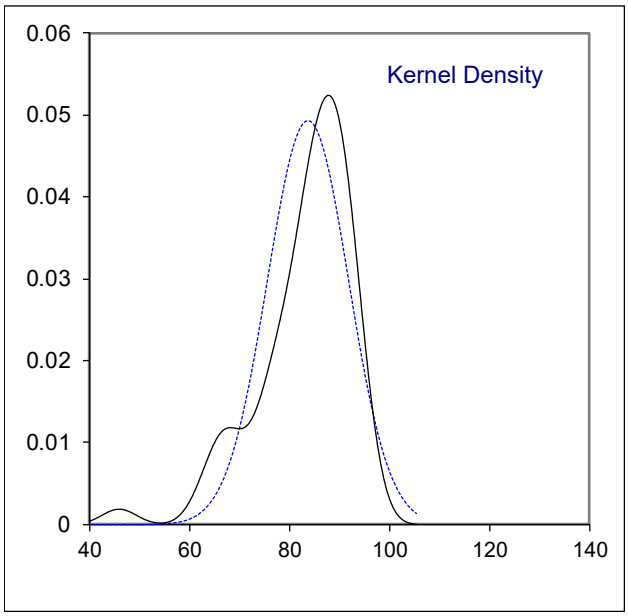
Determination of MSEP on sample #19030;

lab	method	value	mark	z(targ)	remarks
120	D3948	80		-0.70	
131		-----		-----	
140	D3948	46	R(0.01)	-7.04	
150	D3948	63		-3.87	
159	D3948	91		1.35	
169	D3948	91		1.35	
171	D3948	80		-0.70	
175		-----		-----	
177	D3948	82		-0.33	
194		-----		-----	
225		-----		-----	
228	D3948	95.0		2.10	
237		-----		-----	
238		-----		-----	
253	D3948	88		0.79	
273		-----		-----	
317	D3948	87		0.61	
323	D3948	85		0.23	
333	D3948	79		-0.89	
334	D3948	90		1.16	
335		-----		-----	
336		-----		-----	
353	D3948	83		-0.14	
360		-----		-----	
391		-----		-----	
398	D3948	90		1.16	
399	D3948	86		0.42	
447	D3948	88		0.79	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631	D3948	82		-0.33	
634	D3948	83		-0.14	
663		-----		-----	
671	D3948	86.0		0.42	
759		-----		-----	
781		-----		-----	
782		-----		-----	
785		-----		-----	
825	D3948	78		-1.07	
875		-----		-----	
922	D3948	71		-2.38	
962	D3948	85		0.23	
963	D3948	85		0.23	
970	D3948	84		0.05	
974	D3948	88		0.79	
998		-----		-----	
1006		-----		-----	
1023	D3948	68		-2.94	
1039	D3948	94		1.91	
1049	D3948	85		0.23	
1059	D3948	91		1.35	
1062	D3948	95		2.10	
1064	D3948	88		0.79	
1082	D3948	67		-3.12	
1097	D3948	74		-1.82	
1105	D3948	67	C	-3.12	first reported: 60
1108	D3948	90		1.16	
1109	D3948	85		0.23	
1126		-----		-----	
1191	D3948	76		-1.45	
1201	D3948	65		-3.50	
1205		-----		-----	
1284		-----		-----	
1297		-----		-----	
1299	D3948	89		0.98	
1318	D3948	92		1.54	
1320		-----		-----	
1372		-----		-----	
1379		-----		-----	
1397	D3948	88		0.79	
1399	D3948	68		-2.94	
1429		-----		-----	
1460		90		1.16	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491		-----		-----	
1496	D3948	87		0.61	
1498		-----		-----	
1531		-----		-----	
1538	D3948	93		1.72	
1585	D3948	90		1.16	
1586		-----		-----	
1587	D3948	75		-1.63	
1610	D3948	83		-0.14	
1631		-----		-----	
1634	D3948	84		0.05	
1710	D3948	86		0.42	
1720	D3948	93		1.72	
1740		-----		-----	
1757		-----		-----	
1776	D3948	92		1.54	
1796		-----		-----	
1810		-----		-----	
1811	D3948	90		1.16	
1881		-----		-----	
1883	D3948	78		-1.07	
1979	D3948	82		-0.33	
2133	D3948	77		-1.26	
6075	D3948	90.0		1.16	
6147	D3948	76.5		-1.35	
6174	D3948	93		1.72	
6192		-----		-----	

normality	OK
n	59
outliers	1
mean (n)	83.75
st.dev. (n)	8.098
R(calc.)	22.67
st.dev.(D3948:14)	5.364
R(D3948:14)	15.02



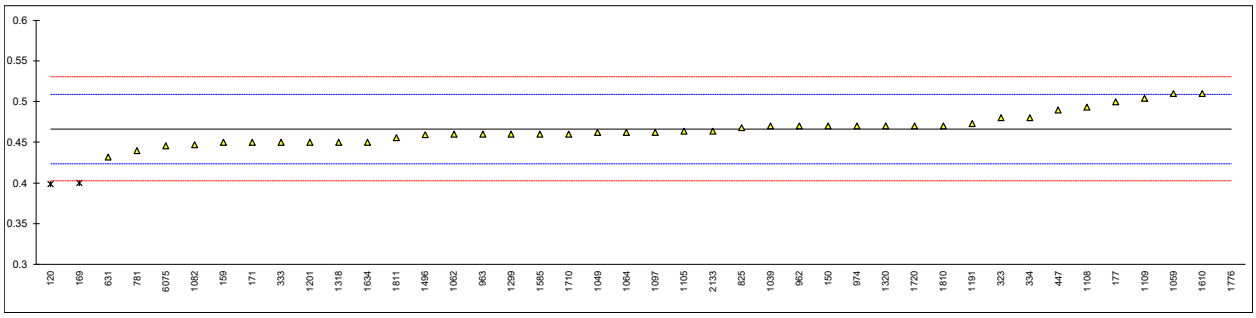


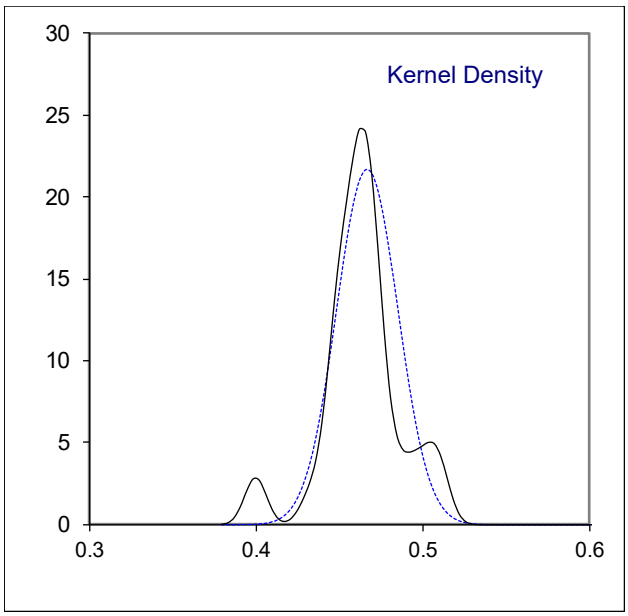
Determination of Naphthalenes on sample #19030; results in %V/V

lab	method	value	mark	z(targ)	remarks
120	D1840-B	0.399	R(0.05)	-3.18	
131		-----		-----	
140		-----		-----	
150	D1840-B	0.47		0.17	
159	D1840-B	0.45		-0.77	
169	D1840-B	0.40	R(0.05)	-3.13	
171	D1840-B	0.45		-0.77	
175		-----		-----	
177	D1840-B	0.50		1.58	
194		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
273		-----		-----	
317		-----		-----	
323	D1840-A	0.48		0.64	
333	D1840-B	0.45		-0.77	
334	D1840-A	0.48		0.64	
335		-----		-----	
336		-----		-----	
353		-----		-----	
360		-----		-----	
391		-----		-----	
398		-----		-----	
399		-----		-----	
447	D1840-B	0.49		1.11	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631	D1840-A	0.432		-1.62	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	D1840-B	0.44		-1.25	
782		-----		-----	
785		-----		-----	
825	D1840-B	0.468		0.07	
875		-----		-----	
922		-----		-----	
962	D1840-A	0.47		0.17	
963	D1840-A	0.46		-0.30	
970		-----		-----	
974	D1840-A	0.47		0.17	
998		-----		-----	
1006		-----		-----	
1023		-----		-----	
1039	D1840-B	0.47		0.17	
1049	D1840-A	0.462		-0.21	
1059	D1840-B	0.51		2.05	
1062	D1840-B	0.46		-0.30	
1064	D1840-A	0.462		-0.21	
1082	D1840-B	0.447		-0.92	
1097	D1840-A	0.462		-0.21	
1105	D1840-A	0.464		-0.12	
1108	D1840-B	0.493		1.25	
1109	D1840-B	0.504		1.77	
1126		-----		-----	
1191	D1840-B	0.473		0.31	
1201	D1840-B	0.45		-0.77	
1205		-----		-----	
1284		-----		-----	
1297		-----		-----	
1299	D1840-B	0.46		-0.30	
1318	D1840-B	0.45		-0.77	
1320	D1840-B	0.47		0.17	
1372		-----		-----	
1379		-----		-----	
1397		-----		-----	
1399		-----		-----	
1429		-----		-----	
1460		-----		-----	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491		-----		-----	
1496	D1840-B	0.4594		-0.33	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1585	D1840-B	0.460		-0.30	
1586		-----		-----	
1587		-----		-----	
1610	D1840-B	0.51		2.05	
1631		-----		-----	
1634	D1840-B	0.45		-0.77	
1710	D1840-A	0.46		-0.30	
1720	D1840-B	0.47		0.17	
1740		-----		-----	
1757		-----		-----	
1776	D1840-A	1.316	R(0.01)	39.99	
1796		-----		-----	
1810	D1840-A	0.47		0.17	
1811	D1840-A	0.4557		-0.51	
1881		-----		-----	
1883		-----		-----	
1979		-----		-----	
2133	D1840-A	0.464		-0.12	
6075	D1840-A	0.446		-0.96	
6147		-----		-----	
6174		-----		-----	
6192		-----		-----	

			only D1840-A	only D1840-B
	normality	OK	not OK	OK
	n	39	15	24
	outliers	3	1	2
	mean (n)	0.4665	0.4625	0.4689
	st.dev. (n)	0.01838	0.01209	0.02128
	R(calc.)	0.0515	0.0339	0.0596
	st.dev.(D1840-B:07)	0.02125	-----	0.02125
	R(D1840-B:07)	0.0595	-----	0.0595
Compare				
	R(D1840-A:07)	0.0438	0.0437	-----



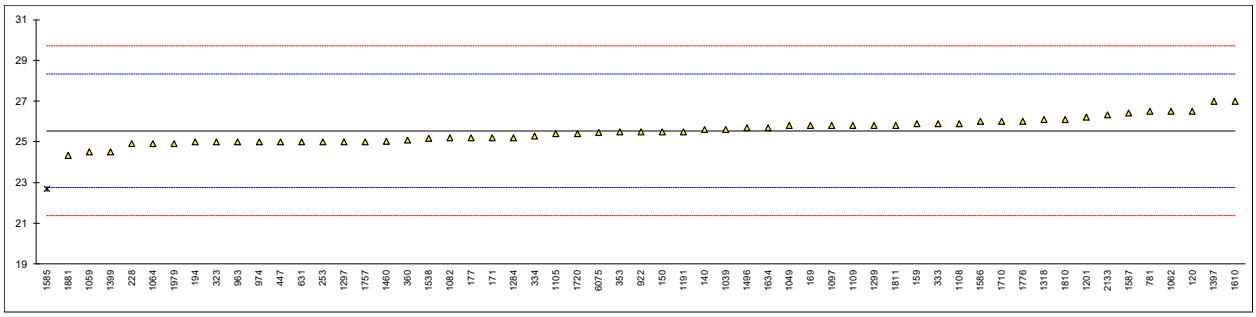


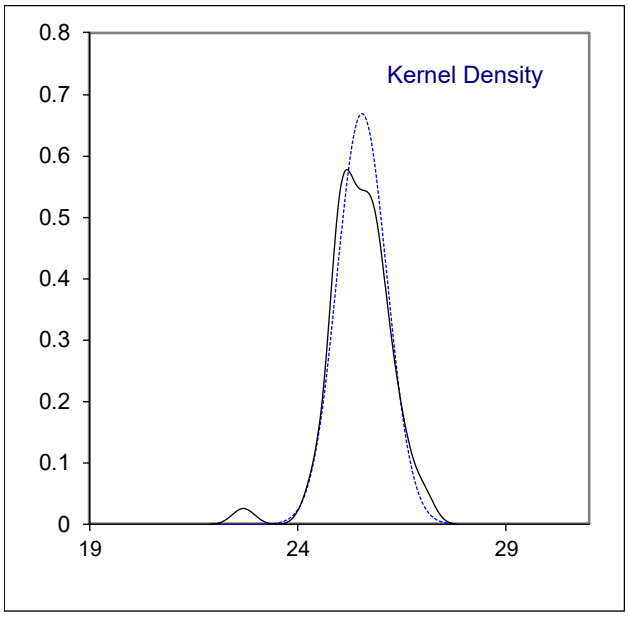
Determination of Smoke Point on sample #19030; results in mm

lab	method	value	mark	z(targ)	remarks
120	D1322-automated	26.5		0.69	
131		-----		-----	
140	D1322-automated	25.6		0.04	
150	D1322-automated	25.5		-0.03	
159	D1322-automated	25.9		0.26	
169	D1322-automated	25.8		0.19	
171	D1322-manual	25.2		-0.25	
175		-----		-----	
177	D1322-manual	25.2		-0.25	
194	D1322-manual	25.0		-0.39	
225		-----		-----	
228	D1322-automated	24.9		-0.46	
237		-----		-----	
238		-----		-----	
253	D1322-manual	25		-0.39	
273		-----		-----	
317		-----		-----	
323	D1322-automated	25.0		-0.39	
333	D1322-automated	25.9		0.26	
334	D1322-automated	25.3		-0.17	
335		-----		-----	
336		-----		-----	
353	IP57-manual	25.48		-0.05	
360	D1322-manual	25.1		-0.32	
391		-----		-----	
398		-----		-----	
399		-----		-----	
447	D1322-manual	25.0		-0.39	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631	D1322-automated	25		-0.39	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	ISO3014-manual	26.5		0.69	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922	D1322-manual	25.5		-0.03	
962		-----		-----	
963	D1322-manual	25.0		-0.39	
970		-----		-----	
974	D1322-automated	25.0		-0.39	
998		-----		-----	
1006		-----		-----	
1023		-----		-----	
1039	D1322-automated	25.6		0.04	
1049	D1322-automated	25.8		0.19	
1059	D1322-manual	24.5		-0.75	
1062	D1322-manual	26.5		0.69	
1064	D1322-automated	24.9		-0.46	
1082	D1322-automated	25.2		-0.25	
1097	D1322-automated	25.8		0.19	
1105	D1322-automated	25.4		-0.10	
1108	D1322-automated	25.9		0.26	
1109	D1322-automated	25.8		0.19	
1126		-----		-----	
1191	D1322-automated	25.5		-0.03	
1201	IP598-automated	26.2		0.47	
1205		-----		-----	
1284	D1322-automated	25.2		-0.25	
1297	D1322-manual	25		-0.39	
1299	D1322-automated	25.8		0.19	
1318	D1322-automated	26.1		0.40	
1320		-----		-----	
1372		-----		-----	
1379		-----		-----	
1397	D1322-manual	27.0		1.05	
1399	D1322-automated	24.5		-0.75	
1429		-----		-----	
1460	manual	25.02		-0.38	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491		-----		-----	
1496	D1322-automated	25.7		0.11	
1498		-----		-----	
1531		-----		-----	
1538	D1322-automated	25.17		-0.27	
1585	D1322-manual	22.7	R(0.01)	-2.05	
1586	D1322-manual	26.0		0.33	
1587	D1322-automated	26.4		0.62	
1610	IP598-manual	27.0		1.05	
1631		-----		-----	
1634	D1322-automated	25.7		0.11	
1710	D1322-manual	26		0.33	
1720	D1322-automated	25.4		-0.10	
1740		-----		-----	
1757	D1322-manual	25.0		-0.39	
1776	D1322-automated	26.0		0.33	
1796		-----		-----	
1810	D1322-automated	26.1		0.40	
1811	D1322-automated	25.8		0.19	
1881	D1322-manual	24.33		-0.87	
1883		-----		-----	
1979	IP598-automated	24.9		-0.46	
2133	D1322-manual	26.33		0.57	
6075	D1322-automated	25.46		-0.06	
6147		-----		-----	
6174		-----		-----	
6192		-----		-----	

			only Manual	only Automated
	normality	OK	OK	OK
	n	56	21	35
	outliers	1	1	0
	mean (n)	25.54	25.51	25.56
	st.dev. (n)	0.597	0.779	0.467
	R(calc.)	1.67	2.18	1.31
	st.dev.(D1322-M:18)	1.389	1.389	-----
	R(D1322-M:18)	3.89	3.89	-----
Compare				
	R(D1322-A:18)	0.92	-----	0.92



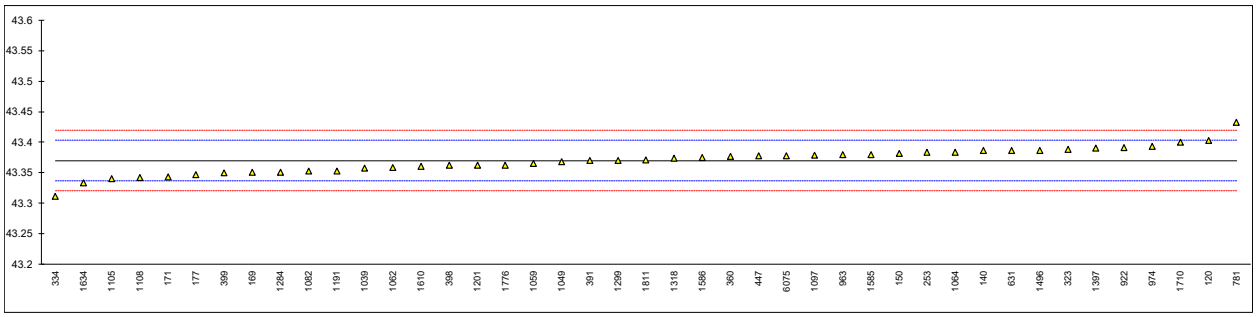


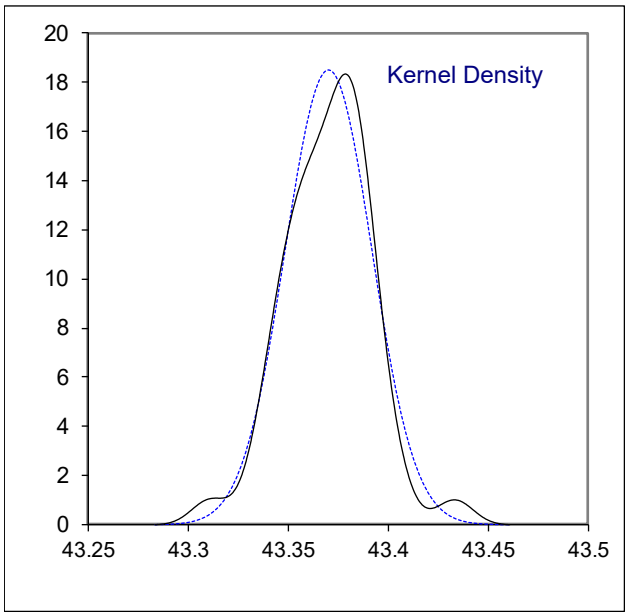
Determination of Specific Energy (Net, on Sulfur free basis) on sample #19030; results in MJ/kg

lab	method	value	mark	z(targ)	remarks
120	D3338	43.403		2.00	
131		-----		-----	
140	D3338	43.387		1.03	
150	D3338	43.382		0.73	
159		-----		-----	
169	D3338	43.351		-1.16	
171	D3338	43.343		-1.65	
175		-----		-----	
177	D3338	43.347		-1.40	
194		-----		-----	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253	D3338	43.3833		0.81	
273		-----		-----	
317		-----		-----	
323	D3338	43.388		1.09	
333		-----		-----	
334	D3338	43.311	C	-3.60	first reported: 43.294
335		-----		-----	
336		-----		-----	
353		-----		-----	
360	D3338	43.377		0.42	
391	D3338	43.37		0.00	
398	D3338	43.362		-0.49	
399	D3338	43.350		-1.22	
447	D3338	43.378		0.48	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631	D3338	43.387		1.03	
634		-----		-----	
663		-----		-----	
671		-----		-----	
759		-----		-----	
781	D3338	43.433		3.83	
782		-----		-----	
785		-----		-----	
825		-----		-----	
875		-----		-----	
922	D3338	43.3909		1.27	
962		-----		-----	
963	D3338	43.380		0.60	
970		-----		-----	
974	D3338	43.393		1.40	
998		-----		-----	
1006		-----		-----	
1023		-----		-----	
1039	D3338	43.358		-0.73	
1049	D3338	43.36837		-0.10	
1059	D3338	43.365		-0.31	
1062	D3338	43.359		-0.67	
1064	D3338	43.384		0.85	
1082	D3338	43.3529		-1.04	
1097	D3338	43.379		0.54	
1105	D3338	43.34		-1.83	
1108	D3338	43.342	C	-1.71	first reported: 43342 MJ/kg
1109		-----		-----	
1126		-----		-----	
1191	D3338	43.3532		-1.03	
1201	D3338	43.362		-0.49	
1205		-----		-----	
1284	D3338	43.3510		-1.16	
1297		-----		-----	
1299	D3338	43.37		0.00	
1318	D3338	43.374		0.24	
1320		-----		-----	
1372		-----		-----	
1379		-----		-----	
1397	D3338	43.39		1.21	
1399		-----		-----	
1429		-----		-----	
1460		-----		-----	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491		-----		-----	
1496	D3338	43.387		1.03	
1498		-----		-----	
1531		-----		-----	
1538		-----		-----	
1585	D3338	43.380		0.60	
1586	D3338	43.375	C	0.30	first reported: 44.375
1587		-----		-----	
1610	D3338	43.361		-0.55	
1631		-----		-----	
1634	D3338	43.334		-2.20	
1710	D3338	43.400		1.82	
1720		-----		-----	
1740		-----		-----	
1757		-----		-----	
1776	D3338	43.362		-0.49	
1796		-----		-----	
1810		-----		-----	
1811	D3338	43.3714		0.08	
1881		-----		-----	
1883		-----		-----	
1979		-----		-----	
2133		-----		-----	
6075	D3338	43.3781		0.49	
6147		-----		-----	
6174		-----		-----	
6192		-----		-----	

normality	suspect
n	43
outliers	0
mean (n)	43.3701
st.dev. (n)	0.02156
R(calc.)	0.0604
st.dev.(D3338:09e2)	0.01643
R(D3338:09e2)	0.046



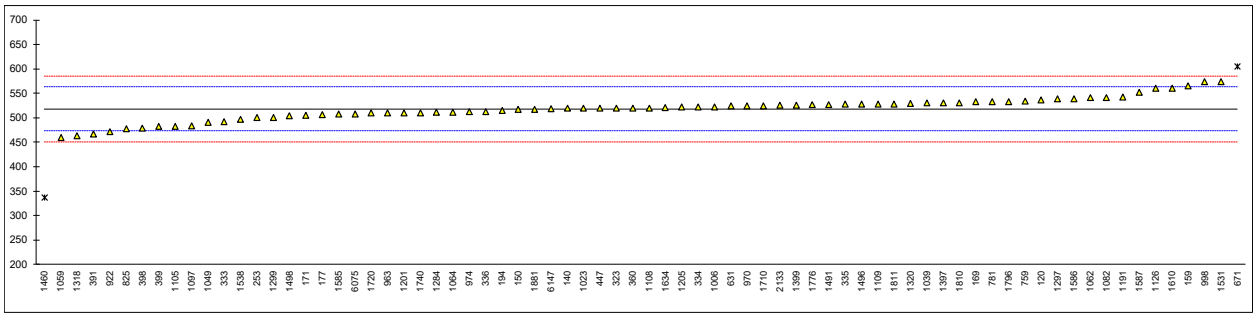


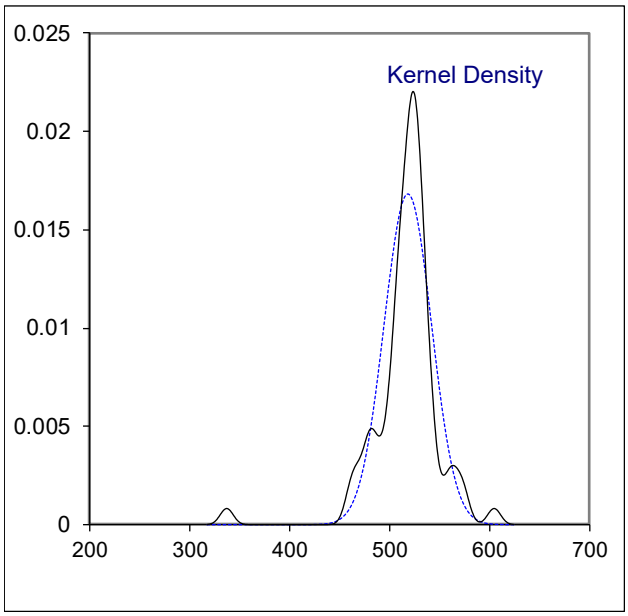
Determination of Sulfur, Total on sample #19030; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D2622	537		0.84	
131		-----		-----	
140	D2622	519.46		0.06	
150	D5453	517		-0.05	
159	D4294	565		2.08	
169	D5453	533		0.66	
171	D5453	505		-0.59	
175		-----		-----	
177	D4294	506		-0.54	
194	D2622	515		-0.14	
225		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253	D4294	500	C	-0.81	first reported: 0.05 mg/kg
273		-----		-----	
317		-----		-----	
323	IP336	520		0.08	
333	D4294	492		-1.16	
334	D5453	522		0.17	
335	D5453	528	C	0.44	first reported: 0.0528 mg/kg
336	ISO8754	513		-0.23	
353		-----		-----	
360	D4294	520		0.08	
391	ISO8754	467		-2.28	
398	D4294	479		-1.74	
399	D4294	482		-1.61	
447	IP336	520		0.08	
468		-----		-----	
594		-----		-----	
604		-----		-----	
631	D4294	524		0.26	
634		-----		-----	
663		-----		-----	
671	D5453	604.7	C,R(0.05)	3.85	first reported: 629.53
759	D4294	534		0.70	
781	D4294	533		0.66	
782		-----		-----	
785		-----		-----	
825	D4294	478		-1.79	
875		-----		-----	
922	D5453	472		-2.05	
962		-----		-----	
963	D5453	510		-0.36	
970	D4294	524		0.26	
974	D4294	513		-0.23	
998	D4294	573.5		2.46	
1006	D2622	522.1		0.17	
1023	ISO14596	520		0.08	
1039	ISO20884	530		0.53	
1049	D5453	490.7		-1.22	
1059	ISO14596	460		-2.59	
1062	D5453	541		1.01	
1064	D5453	511.57		-0.29	
1082	D4294	541		1.01	
1097	D5453	483.82		-1.53	
1105	D5453	482		-1.61	
1108	D4294	520		0.08	
1109	D2622	528.4		0.45	
1126	D5453	560.7		1.89	
1191	D4294	542		1.06	
1201	IP336	510		-0.36	
1205	ISO20846	521.65		0.15	
1284	D2622	511.3		-0.31	
1297	D4294	538.6		0.91	
1299	D2622	500		-0.81	
1318	D5453	463.3		-2.44	
1320	ISO20884	529		0.48	
1372		-----		-----	
1379		-----		-----	
1397	D2622	530		0.53	
1399	D5453	526		0.35	
1429		-----		-----	
1460		336.625	R(0.01)	-8.07	
1483		-----		-----	

lab	method	value	mark	z(targ)	remarks
1491	ISO8754	527.2		0.40	
1496	D4294	528.2		0.45	
1498	D5453	504.5		-0.61	
1531	ISO20846	573.62		2.47	
1538	ISO20884	497.28		-0.93	
1585	D4294	507.5		-0.47	
1586	D5453	539	C	0.93	first reported: 5391
1587	D4294	552.0		1.50	
1610	IP336	561		1.90	
1631		-----		-----	
1634	D5453	521.5		0.15	
1710	D5453	524		0.26	
1720	D5453	509.898		-0.37	
1740	D4294	510		-0.36	
1757		-----		-----	
1776	D5453	527		0.39	
1796	D4294	533		0.66	
1810	D4294	531		0.57	
1811	D5453	528.5		0.46	
1881	D5453	517.2		-0.04	
1883		-----		-----	
1979		-----		-----	
2133	D7183	525.4		0.32	
6075	ISO8754	507.5		-0.47	
6147	D5453	518.5		0.01	
6174		-----		-----	
6192		-----		-----	

normality	OK
n	72
outliers	2
mean (n)	518.18
st.dev. (n)	23.750
R(calc.)	66.50
st.dev.(D5453:16e1)	23.448
R(D5453:16e1)	65.65

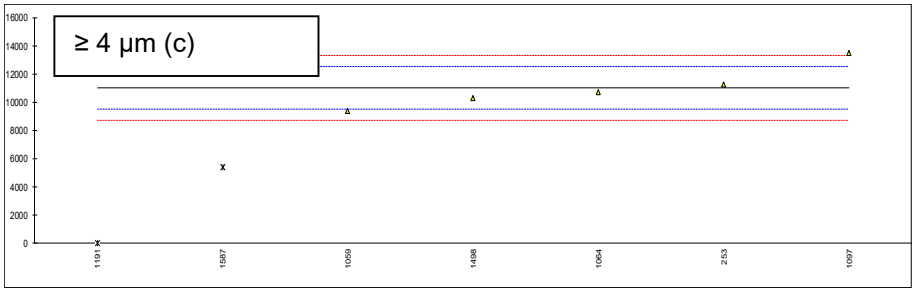


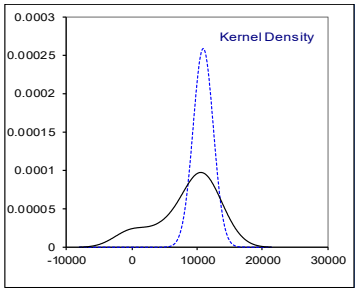


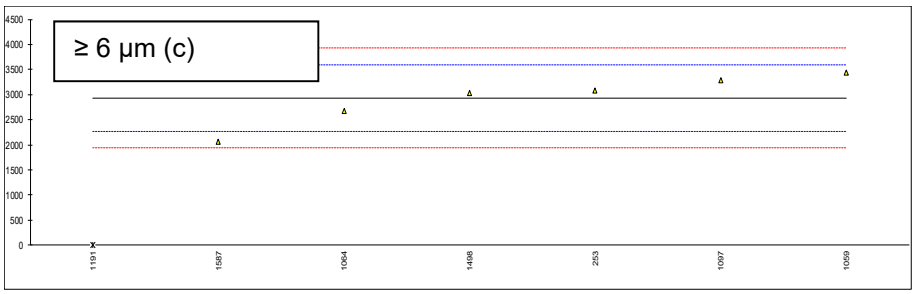
Determination of Particle Size Distribution on sample #19031 acc. to IP564, results in counts/mL

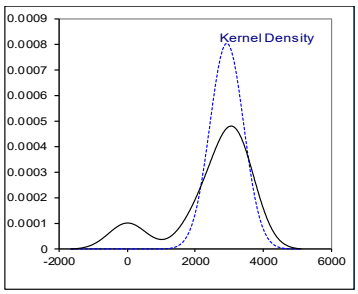
lab	method	≥4 µm (c)	m	≥6 µm (c)	m	≥14 µm (c)	m	≥21 µm (c)	m	≥25 µm (c)	m	≥30 µm (c)	m
140		-----		-----		-----		-----		-----		-----	
150		-----		-----		-----		-----		-----		-----	
171		-----		-----		-----		-----		-----		-----	
225		-----		-----		-----		-----		-----		-----	
237		-----		-----		-----		-----		-----		-----	
253	IP564	11260.1		3073.8		61.6		4.5		1.3		0.1	
323		-----		-----		-----		-----		-----		-----	
333		-----		-----		-----		-----		-----		-----	
334		-----		-----		-----		-----		-----		-----	
335		-----		-----		-----		-----		-----		-----	
360		-----		-----		-----		-----		-----		-----	
447		-----		-----		-----		-----		-----		-----	
781		-----		-----		-----		-----		-----		-----	
825		-----		-----		-----		-----		-----		-----	
922		-----		-----		-----		-----		-----		-----	
963		-----		-----		-----		-----		-----		-----	
970		-----		-----		-----		-----		-----		-----	
974		-----		-----		-----		-----		-----		-----	
1039		-----		-----		-----		-----		-----		-----	
1049		-----		-----		-----		-----		-----		-----	
1059	IP564	9354		3445		102		-----		-----		-----	
1062		-----		-----		-----		-----		-----		-----	
1064	IP564	10721.1		2675.2		49.1		5.1		1.1		0.3	
1097	IP564	13475.8		3285.9		59.4		5.1		2.4		1.4	
1105		-----		-----		-----		-----		-----		-----	
1108		-----		-----		-----		-----		-----		-----	
1109		-----		-----		-----		-----		-----		-----	
1191	IP564	20.2	G5	9.2	G5	1.1	G5	0.4	ex	0.3	ex	0.1	ex
1201		-----		-----		-----		-----		-----		-----	
1299		-----		-----		-----		-----		-----		-----	
1320		-----		-----		-----		-----		-----		-----	
1397		-----		-----		-----		-----		-----		-----	
1496		-----		-----		-----		-----		-----		-----	
1498	IP564	10279.1		3031.4		110.3		18.0		7.1		2.6	
1538		-----		-----		-----		-----		-----		-----	
1585		-----		-----		-----		-----		-----		-----	
1587	IP564	5413.8	G5	2066.0		64.6		11.4		5.1		1.9	
1610		-----		-----		-----		-----		-----		-----	
1631		-----		-----		-----		-----		-----		-----	
1634		-----		-----		-----		-----		-----		-----	
1710		-----		-----		-----		-----		-----		-----	
1810		-----		-----		-----		-----		-----		-----	
1811		-----		-----		-----		-----		-----		-----	
6075		-----		-----		-----		-----		-----		-----	
normality		unknown		unknown		unknown		unknown		unknown		unknown	
n		5		6		6		5		5		5	
outliers		2		1		1		0 (+1ex)		0 (+1ex)		0 (+1ex)	
mean (n)		11018		2929.6		74.50		8.82		3.40		1.26	
st.dev. (n)		1541.3		496.84		25.201		5.858		2.612		1.060	
R(calc.)		4316		1391.2		70.56		16.40		7.31		2.97	
st.dev.(IP564:13)		767.4		331.84		16.009		3.994		1.626		0.745	
R(IP564:13)		2149		929.1		44.82		11.18		4.55		2.09	

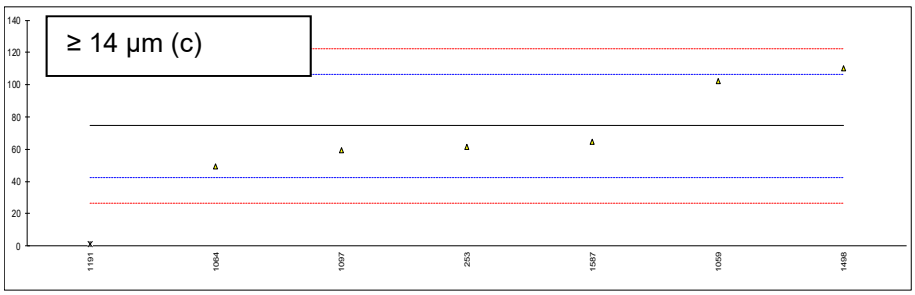
Lab 1191: test results excluded for there were three or more outliers in both counts/ml and ISO scale numbers

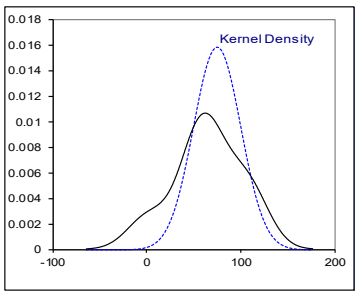

≥ 4 µm (c)
16000
14000
12000
10000
8000
6000
4000
2000
0
1191
1587
1059
1498
1064
253
1097

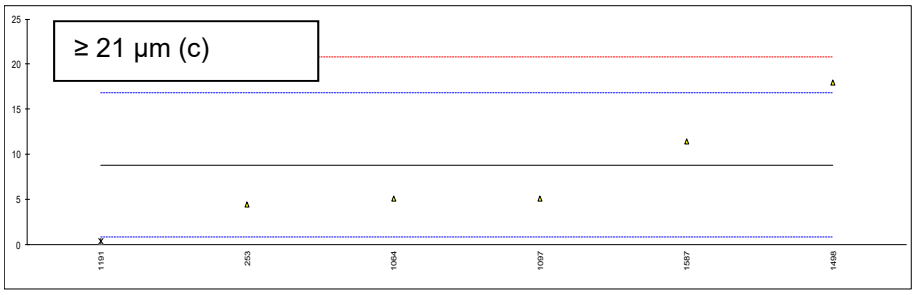

Kernel Density
0.0003
0.00025
0.0002
0.00015
0.0001
0.00005
0
-10000
0
10000
20000
30000

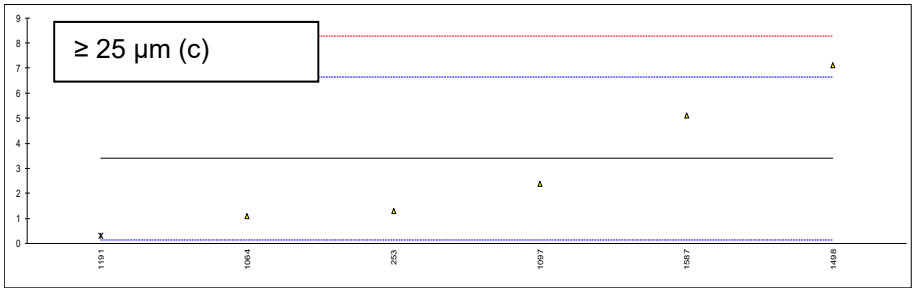

≥ 6 µm (c)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1191
1587
1064
1498
253
1097
1059

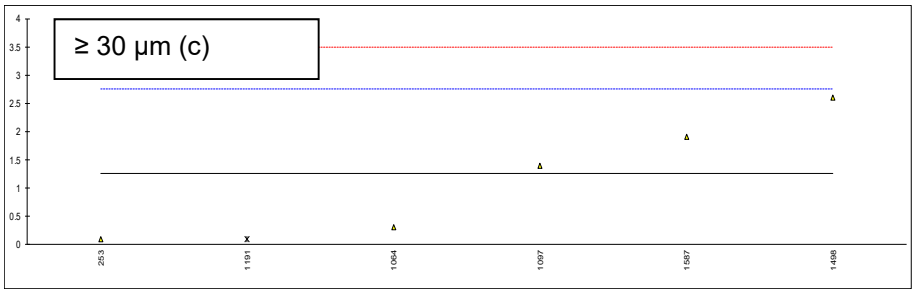

Kernel Density
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0
-2000
0
2000
4000
6000


≥ 14 µm (c)
140
120
100
80
60
40
20
0
1191
1064
1097
253
1587
1059
1498


Kernel Density
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-100
0
100
200

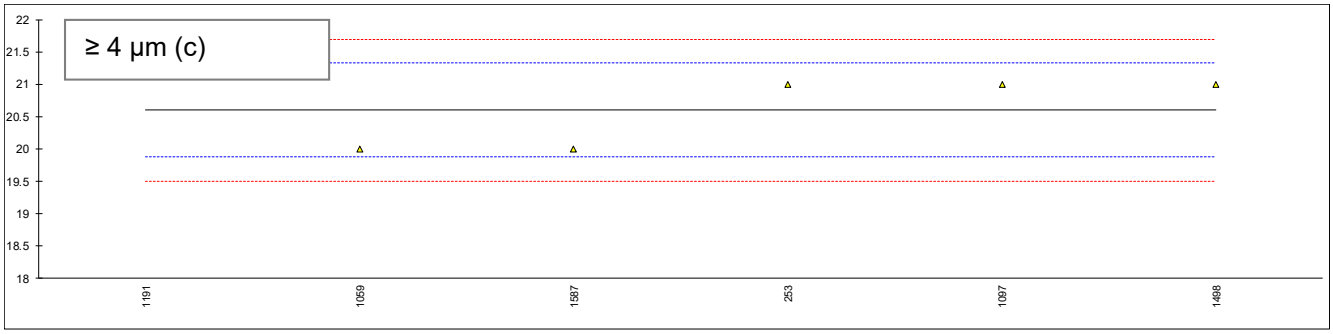

≥ 21 µm (c)
25
20
15
10
5
0
1191
253
1064
1097
1587
1498

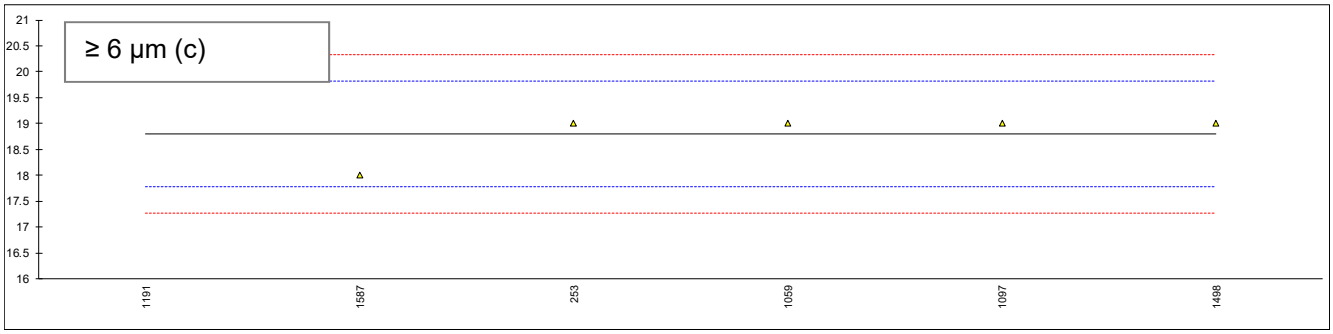

≥ 25 µm (c)
9
8
7
6
5
4
3
2
1
0
1191
1064
253
1097
1587
1498

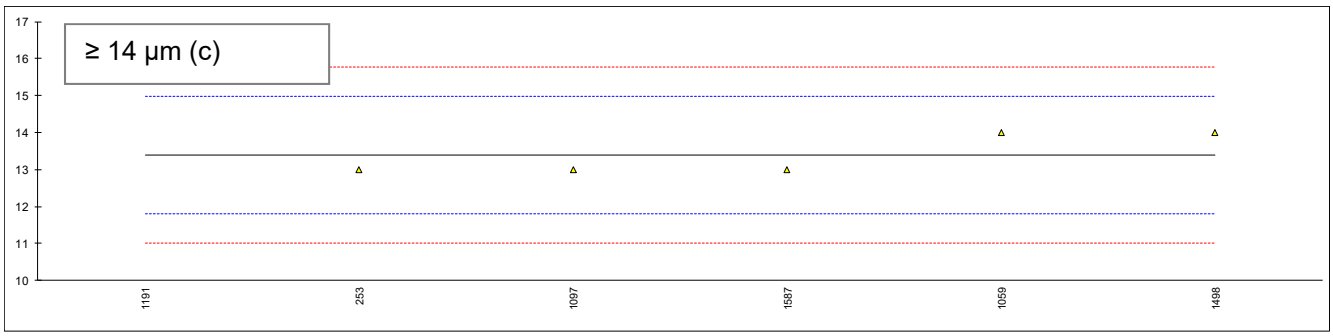

≥ 30 µm (c)
4
3.5
3
2.5
2
1.5
1
0.5
0
253
1191
1064
1097
1587
1498

Determination of Particle Size Distribution by IP564 on sample #19031, results in ISO scale numbers

lab	method	≥4 µm (c)	mark	z(targ)	≥6 µm (c)	mark	z(targ)	≥14 µm (c)	mark	z(targ)
140		-----		-----	-----		-----	-----		-----
150		-----		-----	-----		-----	-----		-----
171		-----		-----	-----		-----	-----		-----
225		-----		-----	-----		-----	-----		-----
237		-----		-----	-----		-----	-----		-----
253	ISO4406 acc. to IP564	21		1.10	19		0.39	13		-0.50
323		-----		-----	-----		-----	-----		-----
333		-----		-----	-----		-----	-----		-----
334		-----		-----	-----		-----	-----		-----
335		-----		-----	-----		-----	-----		-----
360		-----		-----	-----		-----	-----		-----
447		-----		-----	-----		-----	-----		-----
781		-----		-----	-----		-----	-----		-----
825		-----		-----	-----		-----	-----		-----
922		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
970		-----		-----	-----		-----	-----		-----
974		-----		-----	-----		-----	-----		-----
1039		-----		-----	-----		-----	-----		-----
1049		-----		-----	-----		-----	-----		-----
1059	ISO4406 acc. to IP564	20		-1.64	19		0.39	14		0.76
1062		-----		-----	-----		-----	-----		-----
1064		-----		-----	-----		-----	-----		-----
1097	ISO4406 acc. to IP564	21		1.10	19		0.39	13		-0.50
1105		-----		-----	-----		-----	-----		-----
1108		-----		-----	-----		-----	-----		-----
1109		-----		-----	-----		-----	-----		-----
1191	ISO4406	12	G(0.01)	-23.58	10	G(0.01)	-17.24	7	G(0.01)	-8.06
1201		-----		-----	-----		-----	-----		-----
1299		-----		-----	-----		-----	-----		-----
1320		-----		-----	-----		-----	-----		-----
1397		-----		-----	-----		-----	-----		-----
1496		-----		-----	-----		-----	-----		-----
1498	ISO4406 acc. to IP564	21		1.10	19		0.39	14		0.76
1538		-----		-----	-----		-----	-----		-----
1585		-----		-----	-----		-----	-----		-----
1587	ISO4406 acc. to IP564	20		-1.64	18		-1.57	13		-0.50
1610		-----		-----	-----		-----	-----		-----
1631		-----		-----	-----		-----	-----		-----
1634		-----		-----	-----		-----	-----		-----
1710		-----		-----	-----		-----	-----		-----
1810		-----		-----	-----		-----	-----		-----
1811		-----		-----	-----		-----	-----		-----
6075		-----		-----	-----		-----	-----		-----
	normality	unknown			unknown			unknown		
	n	5			5			5		
	outliers	1			1			1		
	mean (n)	20.60			18.80			13.40		
	st.dev. (n)	0.548			0.447			0.548		
	R(calc.)	1.53			1.25			1.53		
	st.dev.(IP564:13)	0.365			0.510			0.794		
	R(IP564:13)	1.02			1.43			2.22		


≥ 4 µm (c)
22
21.5
21
20.5
20
19.5
19
18.5
18
1191
1059
1587
253
1097
1498

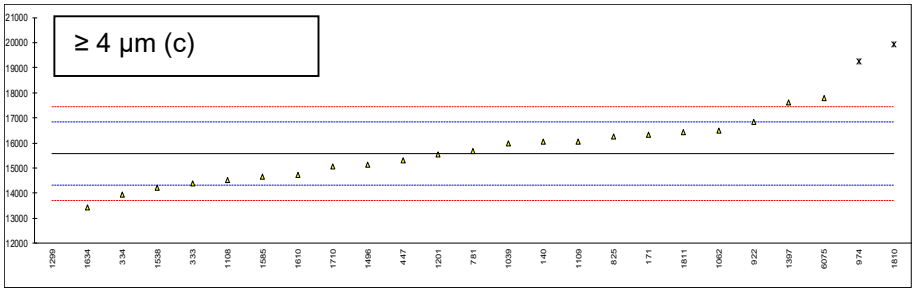

≥ 6 µm (c)
21
20.5
20
19.5
19
18.5
18
17.5
17
16.5
16
1191
1587
253
1059
1097
1498

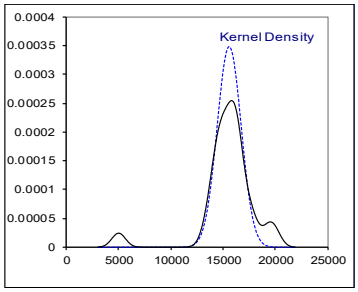

≥ 14 µm (c)
17
16
15
14
13
12
11
10
1191
253
1097
1587
1059
1498

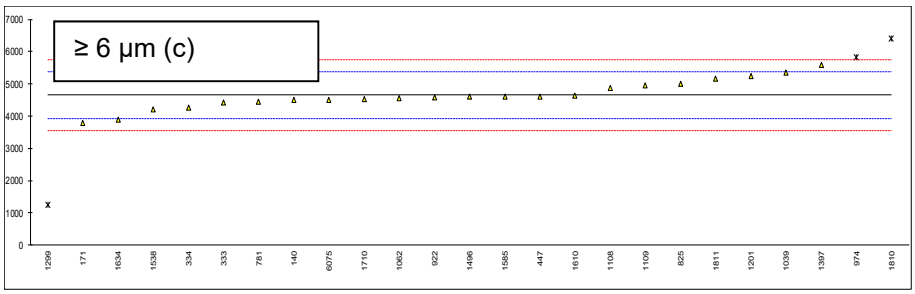
Determination of Particle Size Distribution on sample #19031 acc. to IP565, results in counts/mL

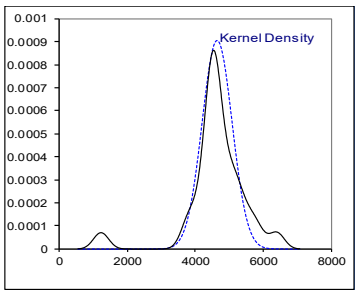
lab	method	≥4 µm (c)	m	≥6 µm(c)	m	≥14 µm (c)	m	≥21 µm (c)	m	≥25 µm (c)	m	≥30 µm (c)	m
140	IP565	16038.6		4505.4		143.8		19.5		8.0		3.2	
150		-----		-----		-----		-----		-----		-----	
171	IP565	16331		3779	C	201		32		8		3	
225		-----		-----		-----		-----		-----		-----	
237		-----		-----		-----		-----		-----		-----	
253		-----		-----		-----		-----		-----		-----	
323		-----		-----		-----		-----		-----		-----	
333	IP565	14392		4432		121		10		4		2	
334	IP565	13949.8		4263.8		136.7		21.5		9.0		3.0	
335		-----		-----		-----		-----		-----		-----	
360		-----		-----		-----		-----		-----		-----	
447	IP565	15295.5		4616.7		137.5		13.1		3.2		0.9	
781	IP565	15667.6		4452.7		133.5		11.9		2.8		0.5	
825	IP565	16265		5004		194		34		12		3	
922	IP565	16841		4568		152		37		18		8	
963		-----		-----		-----		-----		-----		-----	
970		-----		-----		-----		-----		-----		-----	
974	IP565	19263	DG5	5830	DG5	306	DG5	30	ex	11	ex	4	ex
1039	IP565	15995		5344		209		42		15		3	
1049		-----		-----		-----		-----		-----		-----	
1059		-----		-----		-----		-----		-----		-----	
1062	IP565	16508.3		4541.2		99.6		5.7		1.0		0.2	
1064		-----		-----		-----		-----		-----		-----	
1097		-----		-----		-----		-----		-----		-----	
1105		-----		-----		-----		-----		-----		-----	
1108	IP565	14532.1		4859.1		190.7		29.8		10.0		3.2	
1109	IP565	16062.7		4942.3		178.7		30.7		9.7		2.6	
1191		-----		-----		-----		-----		-----		-----	
1201	IP565	15559		5245		209		52		28	DG5	9	
1299	IP577	4961.9	G1	1245.9	G1	127.8	ex	53.2	ex	34.0	DG5	17.4	G1
1320		-----		-----		-----		-----		-----		-----	
1397	IP565	17627.7		5598.0		328.4	DG5	48.3		21.8		8.0	
1496	IP565	15139.2		4599.6		172.8		32.5		10.2		3.2	
1498		-----		-----		-----		-----		-----		-----	
1538	IP565	14203.0		4221.0		144.5		24.3		8.5		3.2	
1585	IP565	14672		4610		163		32		15		5	
1587		-----		-----		-----		-----		-----		-----	
1610	IP565	14732.3		4626.4		170.4		22.5		7.6		2.3	
1631		-----		-----		-----		-----		-----		-----	
1634	IP565	13434		3901		104		14		4		1	
1710	IP565	15083.2		4530.2		138.2		10.6		2.2		0.4	
1810	IP565	19916	DG5	6399	DG5	281	G5	50	ex	24	ex	8	ex
1811	IP565	16428.1		5155.1		188.6		36.5		18.1		6.4	
6075	IP565	17799.0		4509.3		184.2		32.0		12.2		3.0	
normality		OK		OK		OK		OK		OK		suspect	
n		22		22		21		22		21		22	
outliers		3		3		3 (+1ex)		0 (+3ex)		2 (+2ex)		1 (+2ex)	
mean (n)		15571		4650		160.6		26.90		9.54		3.37	
st.dev. (n)		1148.0		439.8		32.94		12.697		5.711		2.485	
R(calc.)		3214		1232		92.2		35.55		15.99		6.96	
st.dev.(IP565:13)		625.0		366.6		32.72		8.286		3.748		1.766	
R(IP565:13)		1750		1026		91.6		23.20		10.50		4.94	

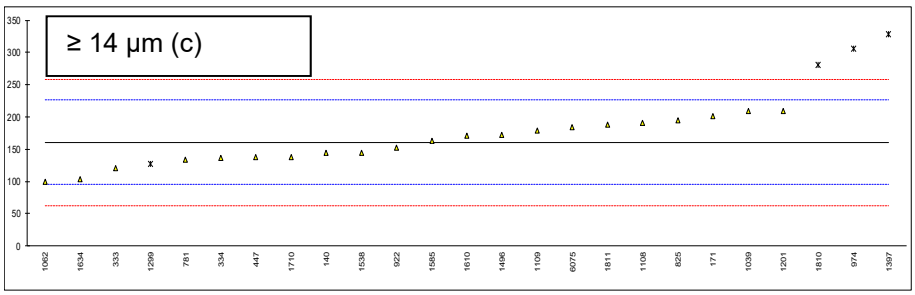
Lab 171 first reported: 4976
Lab 974, 1299 and 1810: test results excluded for there were three or more outliers in both counts/ml and ISO scale numbers

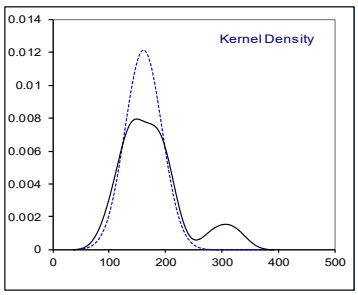

≥ 4 µm (c)

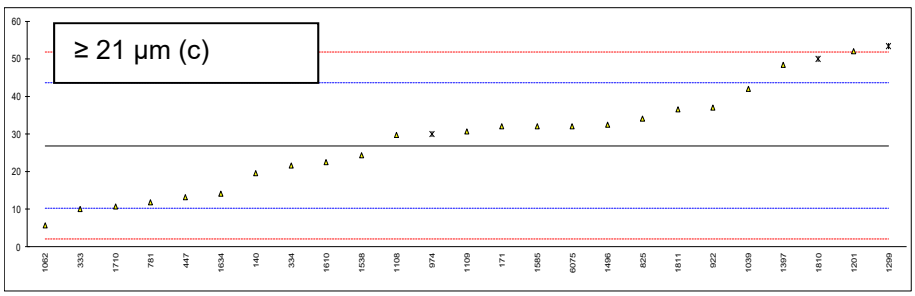

Kernel Density

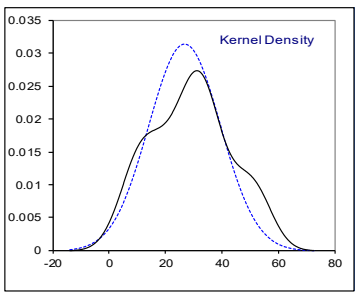

≥ 6 µm (c)

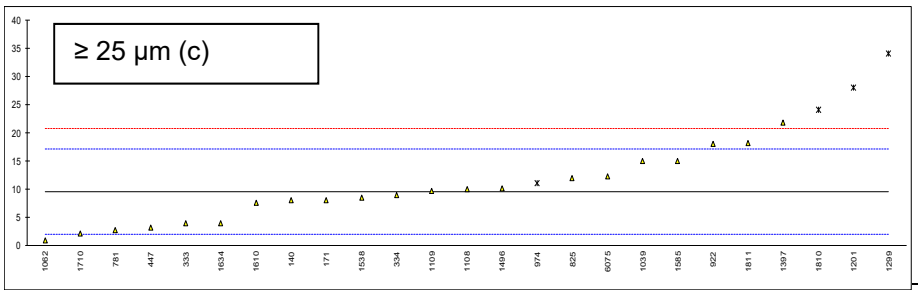

Kernel Density

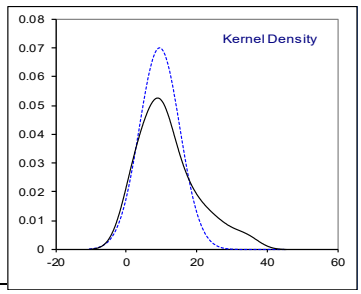

≥ 14 µm (c)

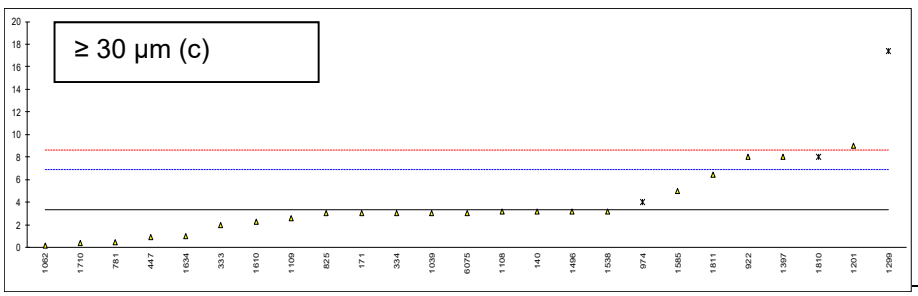

Kernel Density

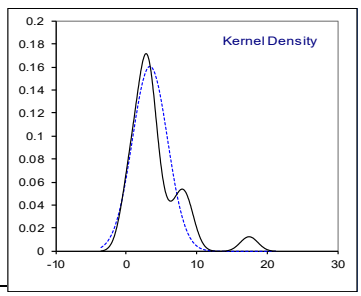

≥ 21 µm (c)


Kernel Density


≥ 25 µm (c)


Kernel Density

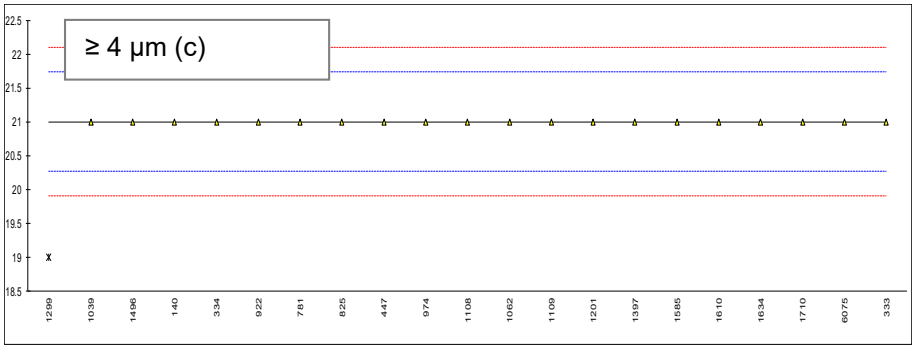

≥ 30 µm (c)

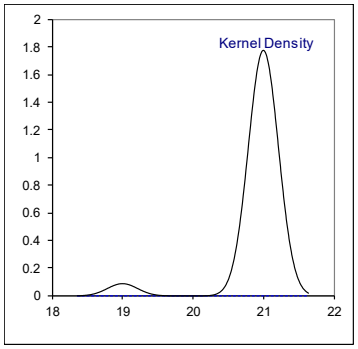

Kernel Density

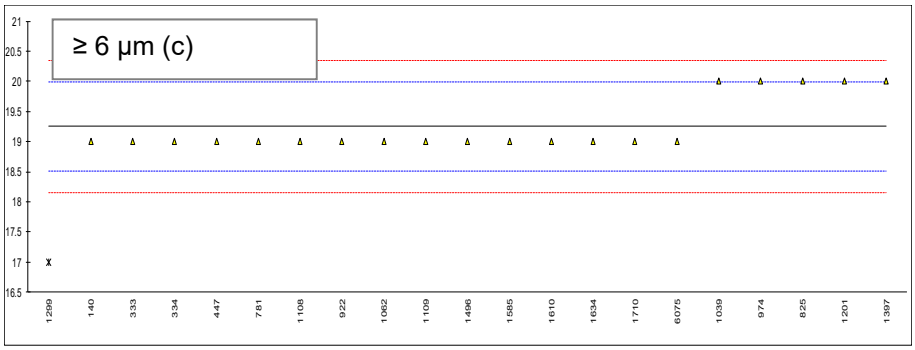
Determination of Particle Size Distribution by IP565 on sample #19031, results in ISO scale numbers

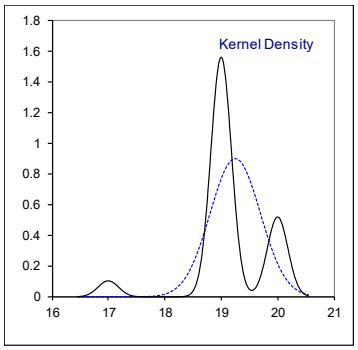
lab	method	≥4 µm (c)	mark	z(targ)	≥6 µm (c)	mark	z(targ)	≥14 µm (c)	mark	z(targ)
140	ISO4406	21		0.00	19		-0.68	11	R(0.01),E	-7.41
150		-----		-----	-----		-----	-----		-----
171		-----		-----	-----		-----	-----		-----
225		-----		-----	-----		-----	-----		-----
237		-----		-----	-----		-----	-----		-----
253		-----		-----	-----		-----	-----		-----
323		-----		-----	-----		-----	-----		-----
333	ISO4406 acc. to IP565	21		0.00	19		-0.68	14		-1.29
334	ISO4406 acc. to IP565	21	C	0.00	19	C	-0.68	14	C	-1.29
335		-----		-----	-----		-----	-----		-----
360		-----		-----	-----		-----	-----		-----
447	ISO4406 acc. to IP565	21		0.00	19		-0.68	14		-1.29
781	ISO4406 acc. to IP565	21		0.00	19		-0.68	14		-1.29
825	ISO4406 acc. to IP565	21		0.00	20		2.05	15		0.75
922	ISO4406 acc. to IP565	21		0.00	19		-0.68	14		-1.29
963		-----		-----	-----		-----	-----		-----
970		-----		-----	-----		-----	-----		-----
974	ISO4406 acc. to IP565	21		0.00	20		2.05	15		0.75
1039	ISO4406 acc. to IP565	21	C	0.00	20	C	2.05	15	C	0.75
1049		-----		-----	-----		-----	-----		-----
1059		-----		-----	-----		-----	-----		-----
1062	ISO4406 acc. to IP565	21		0.00	19		-0.68	14		-1.29
1064		-----		-----	-----		-----	-----		-----
1097		-----		-----	-----		-----	-----		-----
1105		-----		-----	-----		-----	-----		-----
1108	ISO4406 acc. to IP565	21		0.00	19		-0.68	15		0.75
1109	ISO4406 acc. to IP565	21		0.00	19		-0.68	15		0.75
1191		-----		-----	-----		-----	-----		-----
1201	ISO4406	21		0.00	20		2.05	15		0.75
1299	ISO4406 acc. to IP577	19	R(0.01)	-5.46	17	R(0.01)	-6.15	14	ex	-1.29
1320		-----		-----	-----		-----	-----		-----
1397	ISO4406 acc. to IP565	21		0.00	20		2.05	16		2.79
1496	ISO4406 acc. to IP565	21		0.00	19		-0.68	15		0.75
1498		-----		-----	-----		-----	-----		-----
1538		-----		-----	-----		-----	-----		-----
1585	ISO4406 acc. to IP565	21		0.00	19		-0.68	15		0.75
1587		-----		-----	-----		-----	-----		-----
1610	ISO4406	21		0.00	19		-0.68	15		0.75
1631		-----		-----	-----		-----	-----		-----
1634	ISO4406 acc. to IP565	21		0.00	19		-0.68	14		-1.29
1710	ISO4406 acc. to IP565	21		0.00	19		-0.68	14		-1.29
1810		-----		-----	-----		-----	-----		-----
1811		-----		-----	-----		-----	-----		-----
6075	ISO4406 acc. to IP565	21		0.00	19		-0.68	15		0.75
	normality	not OK			suspect			OK		
	n	20			20			19		
	outliers	1			1			1 (+1ex)		
	mean (n)	21.00			19.25			14.63		
	st.dev. (n)	0.000			0.444			0.597		
	R(calc.)	0.00			1.24			1.67		
	st.dev.(IP565:13)	0.366			0.366			0.490		
	R(IP565:13)	1.03			1.03			1.37		

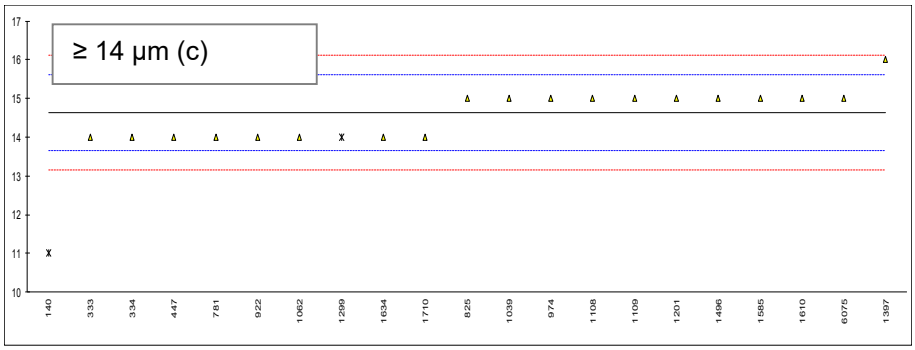
Lab 140: calculation error, iis calculated for particle size ≥14 µm (c): 14
Lab 334 first reported for particle size ≥4 µm (c): 19, for particle size ≥6 µm (c): 14, for particle size ≥14 µm (c): 12
Lab 1039 first reported for particle size ≥4 µm (c): 14, for particle size ≥6 µm (c): 6, for particle size ≥14 µm (c): 4
Lab 1299: test results excluded for there were three or more outliers in both counts/ml and ISO scale numbers

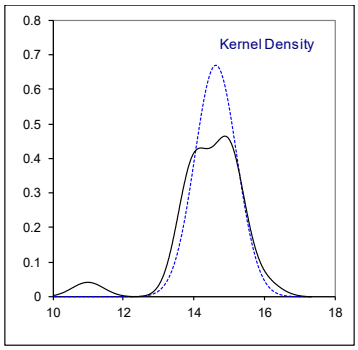

≥ 4 µm (c)


Kernel Density


≥ 6 µm (c)


Kernel Density


≥ 14 µm (c)


Kernel Density

APPENDIX 2 z-scores of the distillation determination

lab	IBP	10% rec.	50% rec.	90% rec.	FBP
120	-1.48	-1.14	-1.15	-0.62	-1.79
131	-----	-----	-----	-----	-----
140	-0.97	-0.54	-0.13	-0.62	-0.25
150	-0.33	-0.24	-0.13	-0.38	-0.25
159	1.54	0.36	0.53	0.16	1.60
169	-0.77	-0.24	-0.31	0.86	0.34
171	-1.69	-0.24	-0.13	0.70	-0.76
175	0.08	-0.16	0.15	1.17	0.50
177	-1.82	-0.39	0.53	0.86	0.42
194	0.15	-0.01	0.81	0.00	0.07
225	-0.26	-0.84	-1.53	-1.78	-0.72
228	0.08	-1.22	-2.46	-2.56	-1.51
237	-----	-----	-----	-----	-----
238	-----	-----	-----	-----	-----
253	0.76	1.42	0.81	1.32	0.66
273	-0.60	-1.98	-2.46	-1.78	-1.51
317	0.86	1.19	1.09	0.31	-0.49
323	0.35	0.74	0.53	-0.15	-0.17
333	-1.82	-0.69	-0.13	-0.62	-0.21
334	-2.03	-1.75	-0.50	-0.70	-1.04
335	-0.05	-0.54	-0.78	-1.16	-1.59
336	0.42	0.29	-0.03	-0.93	0.54
353	-0.09	-0.54	-0.13	1.17	-0.29
360	-0.70	-0.62	-0.22	-1.01	-0.80
391	0.66	0.36	0.34	0.55	0.58
398	0.83	0.29	0.99	1.32	0.22
399	0.83	-0.01	-0.50	-1.63	-0.56
447	0.49	0.14	0.34	1.56	0.26
468	-----	-----	-----	-----	-----
594	0.39	-2.28	-0.69	0.16	-0.05
604	-----	-----	-----	-----	-----
631	0.83	0.44	-0.50	1.95	0.22
634	0.01	0.29	0.53	1.32	-0.49
663	1.42	1.19	0.15	0.35	0.84
671	0.90	-0.47	-0.87	-1.55	-2.85
759	-0.09	-0.09	0.81	-0.23	0.85
781	0.22	0.44	0.53	-0.23	0.82
782	-----	-----	-----	-----	-----
785	-----	-----	-----	-----	-----
825	0.93	0.59	0.25	-0.93	-0.05
875	-----	-----	-----	-----	-----
922	-0.26	-0.09	-0.59	-0.23	0.85
962	-0.19	-0.24	-0.13	-0.31	-0.41
963	0.32	0.74	1.37	0.70	0.42
970	-0.19	0.29	0.15	-0.38	-0.01
974	1.14	1.27	1.55	2.18	0.66
998	-0.26	-1.22	-1.99	-1.39	-0.72
1006	0.18	0.89	0.81	0.00	0.11
1023	0.83	0.67	-0.22	1.17	0.11
1039	-0.05	0.67	0.62	-0.31	0.11
1049	0.69	0.82	0.90	1.48	0.78
1059	0.56	0.21	-0.31	-0.62	-0.25
1062	-0.53	0.97	0.62	-0.07	-0.88
1064	0.93	0.97	1.18	1.87	0.85
1082	-0.43	0.36	0.34	0.24	0.30
1097	0.49	-0.31	0.34	0.94	-0.72
1105	-0.29	-0.47	0.15	0.31	-0.25
1108	0.22	-0.01	-0.03	0.24	0.66
1109	-0.09	-0.62	-0.22	-0.23	0.22
1126	-0.29	0.67	2.11	0.70	0.54
1191	-0.39	0.59	0.43	0.08	-0.09
1201	-0.09	-0.39	0.34	1.17	0.26
1205	0.01	0.29	0.90	-0.31	0.30
1284	0.18	-0.69	-0.97	-0.38	-0.33
1297	-0.67	-0.09	0.15	-0.85	-0.21
1299	0.25	0.14	0.15	1.40	1.09
1318	0.46	0.29	0.34	1.09	0.11
1320	-0.33	0.97	0.06	-1.08	-0.76
1372	-----	-----	-----	-----	-----
1379	-----	-----	-----	-----	-----
1397	0.22	1.12	1.27	0.70	0.46
1399	-1.55	-1.67	-1.15	-2.56	-0.41
1429	0.49	-0.69	-0.97	-0.85	-0.41
1460	0.63	1.12	-0.22	-1.86	-0.72
1483	-----	-----	-----	-----	-----

lab	IBP	10% rec.	50% rec.	90% rec.	FBP
1491	-0.12	0.06	0.71	0.70	0.18
1496	1.20	0.97	0.06	1.01	-0.05
1498	-0.73	0.14	0.81	1.56	0.30
1531	-1.11	-0.69	-0.13	-0.15	0.85
1538	0.49	-0.62	-0.41	1.32	-0.53
1585	-0.09	0.29	-0.13	-0.23	-0.13
1586	0.59	0.36	0.53	1.64	0.34
1587	-0.60	-0.01	-0.03	-0.38	0.22
1610	-0.63	0.06	0.25	1.32	0.82
1631	-----	-----	-----	-----	-----
1634	-0.73	0.21	0.25	0.55	0.34
1710	-0.09	0.52	0.43	0.94	0.74
1720	0.39	0.67	0.71	1.56	0.85
1740	-0.94	-0.16	-0.13	-0.23	-0.45
1757	0.25	1.12	0.62	2.80	-0.92
1776	-0.53	-0.54	0.06	1.64	-0.64
1796	0.90	1.12	-1.53	-1.63	2.12
1810	0.25	-1.07	-1.62	-1.16	-0.49
1811	-0.26	-0.24	-1.15	-3.65	-0.72
1881	-----	-----	-----	-----	-----
1883	-0.26	-1.22	-0.59	-1.78	-0.72
1979	0.97	-0.24	-1.06	-1.08	1.09
2133	0.01	0.44	0.81	0.63	0.22
6075	-0.94	-1.90	-0.31	-1.47	-0.25
6147	-0.05	0.21	0.43	-1.39	-0.21
6174	0.42	1.04	0.34	0.55	0.46
6192	0.56	-0.84	-1.62	-2.79	-0.49

z-scores Particle Size Distribution on sample #19031 acc. to IP564 results in counts/ml

	IP 564 (µm (c))						IP 565 (µm (c))					
lab	>4	>6	>14	>21	>25	>30	>4	>6	>14	>21	>25	>30
140	-----	-----	-----	-----	-----	-----	0.75	-0.39	-0.51	-0.89	-0.41	-0.10
150	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
171	-----	-----	-----	-----	-----	-----	1.22	-2.38	1.24	0.61	-0.41	-0.21
225	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
237	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
253	0.32	0.43	-0.81	-1.08	-1.29	-1.56	-----	-----	-----	-----	-----	-----
323	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
333	-----	-----	-----	-----	-----	-----	-1.89	-0.60	-1.21	-2.04	-1.48	-0.77
334	-----	-----	-----	-----	-----	-----	-2.59	-1.05	-0.73	-0.65	-0.14	-0.21
335	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
360	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
447	-----	-----	-----	-----	-----	-----	-0.44	-0.09	-0.71	-1.67	-1.69	-1.40
781	-----	-----	-----	-----	-----	-----	0.16	-0.54	-0.83	-1.81	-1.80	-1.62
825	-----	-----	-----	-----	-----	-----	1.11	0.97	1.02	0.86	0.66	-0.21
922	-----	-----	-----	-----	-----	-----	2.03	-0.22	-0.26	1.22	2.26	2.62
963	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
970	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
974	-----	-----	-----	-----	-----	-----	5.91	3.22	4.44	0.37	0.39	0.36
1039	-----	-----	-----	-----	-----	-----	0.68	1.89	1.48	1.82	1.46	-0.21
1049	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1059	-2.17	1.55	1.72	-----	-----	-----	-----	-----	-----	-----	-----	-----
1062	-----	-----	-----	-----	-----	-----	1.50	-0.30	-1.86	-2.56	-2.28	-1.79
1064	-0.39	-0.77	-1.59	-0.93	-1.41	-1.29	-----	-----	-----	-----	-----	-----
1097	3.20	1.07	-0.94	-0.93	-0.62	0.19	-----	-----	-----	-----	-----	-----
1105	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1108	-----	-----	-----	-----	-----	-----	-1.66	0.57	0.92	0.35	0.12	-0.10
1109	-----	-----	-----	-----	-----	-----	0.79	0.80	0.55	0.46	0.04	-0.44
1191	-14.33	-8.80	-4.58	-2.11	-1.91	-1.56	-----	-----	-----	-----	-----	-----
1201	-----	-----	-----	-----	-----	-----	-0.02	1.62	1.48	3.03	4.93	3.19
1299	-----	-----	-----	-----	-----	-----	-16.98	-9.29	-1.00	3.17	6.53	7.95
1320	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1397	-----	-----	-----	-----	-----	-----	3.29	2.59	5.13	2.58	3.27	2.62
1496	-----	-----	-----	-----	-----	-----	-0.69	-0.14	0.37	0.68	0.18	-0.10
1498	-0.96	0.31	2.24	2.30	2.28	1.80	-----	-----	-----	-----	-----	-----
1538	-----	-----	-----	-----	-----	-----	-2.19	-1.17	-0.49	-0.31	-0.28	-0.10
1585	-----	-----	-----	-----	-----	-----	-1.44	-0.11	0.07	0.61	1.46	0.92
1587	-7.30	-2.60	-0.62	0.65	1.05	0.86	-----	-----	-----	-----	-----	-----
1610	-----	-----	-----	-----	-----	-----	-1.34	-0.06	0.30	-0.53	-0.52	-0.60
1631	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1634	-----	-----	-----	-----	-----	-----	-3.42	-2.04	-1.73	-1.56	-1.48	-1.34
1710	-----	-----	-----	-----	-----	-----	-0.78	-0.33	-0.68	-1.97	-1.96	-1.68
1810	-----	-----	-----	-----	-----	-----	6.95	4.77	3.68	2.79	3.86	2.62
1811	-----	-----	-----	-----	-----	-----	1.37	1.38	0.86	1.16	2.28	1.72
6075	-----	-----	-----	-----	-----	-----	3.57	-0.38	0.72	0.61	0.71	-0.21

APPENDIX 3

Equipment used in Particle Size distribution

lab	Equipment	Test Method based on equipment	Test Method reported	Calibration method reported	Remark
140	Stanhope-Seta	IP565	IP564	-----	Evaluated as IP565
150	-----		-----	-----	
171	-----		IP565	-----	
225	-----		-----	-----	
237	-----		-----	-----	
253	Parker Hannifin	IP564	IP564	-----	
323	-----		-----	-----	
333	Stanhope-Seta	IP565	IP565	ISO11171	
334	Stanhope-Seta	IP565	IP565	IP565	
335	-----		-----	-----	
360	-----		-----	-----	
447	Stanhope-Seta	IP565	IP565	ISO11171	
781	Stanhope-Seta	IP565	IP565	ISO11171	
825	Stanhope-Seta	IP565	IP565	ISO11171	
922	Stanhope-Seta	IP565	IP565	ISO11171	
963	-----		-----	-----	
970	-----		-----	-----	
974	Stanhope-Seta	IP565	IP565	ISO11171	
1039	Stanhope-Seta	IP565	IP565	ISO11171	
1049	-----		-----	-----	
1059	Parker Hannifin	IP564	IP564	-----	
1062	Stanhope-Seta	IP565	IP565	ISO11171	
1064	Parker Hannifin	IP564	IP564	ISO11171	
1097	Parker Hannifin	IP564	IP564	ISO11171	
1105	-----		-----	-----	
1108	Stanhope-Seta	IP565	IP565	ISO11171	
1109	Stanhope-Seta	IP565	IP565	ISO11171	
1191	Parker Hannifin	IP564	IP564	-----	
1201	Pamas	IP577	IP565	ISO11171	
1299	Pamas	IP577	IP577	ISO11171	
1320	-----		-----	-----	
1397	Stanhope-Seta	IP565	IP565	ISO11171	
1496	Stanhope-Seta	IP565	IP565	ISO11171	
1498	Parker Hannifin	IP564	IP564	ISO11171	
1538	Stanhope-Seta	IP565	IP565	ISO11171	
1585	Stanhope-Seta	IP565	IP565	ISO11171	
1587	Parker Hannifin	IP564	IP564	ISO11171	
1610	Stanhope-Seta	IP565	IP565	ISO11171	
1631	-----		-----	-----	
1634	Stanhope-Seta	IP565	IP565	ISO11171	
1710	Stanhope-Seta	IP565	IP565	ISO11171	
1810	Stanhope-Seta	IP565	IP565	-----	
1811	Stanhope-Seta	IP565	IP565	ISO11171	
6075	Stanhope-Seta	IP565	IP565	ISO11171	

APPENDIX 4

Number of participants per country

1	AFGHANISTAN	1	MAURITIUS
1	AUSTRALIA	5	NETHERLANDS
4	BELGIUM	2	NIGERIA
2	BULGARIA	2	NORWAY
1	CHILE	1	OMAN
1	CHINA, People's Republic	1	PAKISTAN
1	COTE D'IVOIRE	2	PHILIPPINES
1	CROATIA	1	POLAND
1	CYPRUS	2	PORTUGAL
2	CZECH REPUBLIC	1	QATAR
1	DENMARK	7	RUSSIAN FEDERATION
1	DJIBOUTI	3	SAUDI ARABIA
1	EGYPT	1	SLOVAKIA
2	FINLAND	1	SLOVENIA
6	FRANCE	1	SOMALIA
1	FRENCH GUIANA	2	SOUTH AFRICA
1	GEORGIA	1	SOUTH KOREA
1	GERMANY	1	SPAIN
5	GREECE	1	SUDAN
1	GUAM	2	SWEDEN
1	HUNGARY	1	TAIWAN
1	IRELAND	1	THAILAND
3	ITALY	1	TOGO
1	LEBANON	1	TURKEY
1	LITHUANIA	2	UNITED ARAB EMIRATES
1	MALAYSIA	3	UNITED KINGDOM
1	MALTA	10	UNITED STATES OF AMERICA
1	MARTINIQUE		

APPENDIX 5

Abbreviations:

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01), G(1)	= outlier in Grubbs' outlier test
G(0.05), G(5)	= straggler in Grubbs' outlier test
DG(0.01), DG(1)	= outlier in Double Grubbs' outlier test
DG(0.05), DG(5)	= 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	= possibly an error in calculations
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
fr.	= first reported
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
SDS	= Safety Data Sheet

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