Results of Proficiency Test
Jet Fuel A1
March 2016

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1995, the Institute for Interlaboratory Studies organises every year proficiency tests (PT) for Jet Fuel A1. In the annual proficiency testing program of 2015/2016, it was decided to continue proficiency tests on Jet Fuel A1 and Jet Fuel Particle Size in accordance with the latest applicable version (March 2015) 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 109 laboratories from 50 different countries have registered for participation of the interlaboratory study for Jet Fuel A1 and Particle Size Distribution. See appendix 4 for the number of participants per country. For Jet Fuel A1 (main round) registered 107 participants from 50 countries and for Particle Size Distribution 40 participants from 24 countries.

In this report, the results of the two 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 organiser of this proficiency test. Sample analyses for fit-for-use and homogeneity testing were subcontracted to an accredited laboratory. For the main round Jet Fuel A1, it was decided to send two identical samples (2 x 1 litre bottles, labelled #16030) 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 sample (0.5 L bottle, labelled #16031).

The participants were requested to report the test results using the indicated units and 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 organisation was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3). This protocol can be downloaded from the iis website www.iisnl.com.

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, approximately 400 litres, was obtained from a local supplier and homogenised in a mixing vessel. From this batch 260 amber glass bottles of one litre were filled, closed with inner and outer caps and labelled #16030. The remainder of the batch was stored. The homogeneity of the subsamples #16030 was checked by the determination of Density in accordance with ASTM D4052 on ten stratified randomly selected samples.

	Density at 15°C in kg/m^3
Sample #16030-1	792.00
Sample #16030-2	791.98
Sample #16030-3	791.99
Sample #16030-4	791.99
Sample #16030-5	791.99
Sample #16030-6	791.99
Sample #16030-7	791.97
Sample #16030-8	791.97
Sample #16030-9	791.97
Sample #16030-10	791.98

Table 1: homogeneity test of the test results of sub samples #16030

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

	Density at 15°C in kg/m^3
r (observed)	0.03
reference test method	ASTM D4052:15
0.3 x R (ref. test method)	0.16

Table 2: evaluation of repeatability of subsamples #16030

The calculated repeatability is less than 0.3 times the reproducibility of the reference test method. Therefore, homogeneity of all subsamples #16030 was assumed.

2.4.2 JET FUEL PARTICLE SIZE DISTRIBUTION DETERMINATION (PS)

The bulk material for Particle Size Distribution Determination was obtained from a local supplier. Approximately 90 litres bulk material was homogenized. From this material 68 amber glass bottles of 0.5 litres were filled, closed with inner and outer caps and labelled #16031. The homogeneity of the subsamples #16031 was checked by the determination of Particle Size Distribution in accordance with IP565 on eight stratified randomly selected samples.

	> 4 µm parts/ml	> 6 µm parts/ml	> 14 µm parts/ml
Sample #16031-1	1814	585	60
Sample #16031-2	1786	564	52
Sample #16031-3	1796	579	56
Sample #16031-4	1824	593	60
Sample #16031-5	1766	571	54
Sample #16031-6	1817	589	60
Sample #16031-7	1819	590	65
Sample #16031-8	1920	620	52

Table 3: homogeneity test results of sub samples #16031

From the above test results, the calculated repeatabilities were calculated and compared with the target repeatabilities (r) or with 0.3 times the reproducibilities (R) of the reference test method in agreement with the procedure of ISO13528, Annex B2 in the next table:

	> 4 µm parts/ml	> 6 µm parts/ml	> 14 µm parts/ml
r (observed)	128	47	13
reference test method	IP565:13	IP565:13	IP565:13
0.3 x R (ref. test method)	114	65	13
r (ref. test method)	300	168	34

Table 4: evaluation of repeatabilities of subsamples #16031

The calculated repeatabilities (r) for the particle sizes > 4 µm, > 6 µm and > 14 µm were in agreement with the corresponding target repeatabilities (r) or with 3 times the target reproducibility (R) of the respective reference test methods. Therefore, homogeneity of the subsamples of #16031 was assumed.

Depending on their registration to each of the participating laboratories 2 x 1 litre bottle of Jet Fuel A1 labelled #16030 and/or a 0.5 litre bottle of Jet Fuel PS labelled #16031 was/were sent on March 2, 2016.

2.5 STABILITY OF THE SAMPLES

The stability of Jet Fuel A1, packed in the brown glass bottles was checked. The type of bottle was chosen in accordance with ASTM D4306:15. 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 #16030: Total Acidity, Aromatics by FIA, Aromatics by HPLC (in %M/M and %V/V), Colour Saybolt (ASTM D156 and ASTM 6045), Density at 15°C, Distillation (IBP, 10%, 50%, 90% recovered and FBP), Existent Gum (unwashed), Flash Point, Freezing Point, JFTOT, Kinematic Viscosity at -20°C, Mercaptan Sulphur, MSEP, Naphthalenes, Smoke Point, Specific Energy (on Sulphur free basis) and Total Sulphur. The participants were requested to determine on sample #16031 Particle Size Distribution only.

The analyses should be performed according to the "Aviation Fuel Quality Requirements for Jointly Operated Systems (AFQRJOS), version March 2015", also referred to as the "Joint Fuelling System Check List" or simply "Check List".

To get comparable test results a detailed report form, on which the units were prescribed as well as the reference test methods and a letter of instructions were prepared and made available on the data entry portal www.kpmd.co.uk/sgs-iis/. A SDS and a form to confirm receipt of the samples were added to the sample package.

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 April 2014 (iis-protocol, version 3.3).
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. Not all data sets proved to have a normal distribution, in which cases the statistical evaluation of the test results 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. When the uncertainty passed the evaluation, no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

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

3.2 GRAPHICS

In order to visualise the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported 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 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.

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, problems with sample dispatch were encountered due to several reasons. Some laboratories in Afghanistan, Egypt, Nigeria and Philippines received the sample(s) rather late or the bottles of the samples were broken.
For the main round Jet Fuel A1, three participants reported the test results after the final reporting date and another five 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 six participants did not report any test results at all.
Finally 103 participants reported in total 1809 numerical test results. Observed were 40 outlying test results, which is 2.2% of the reported numerical test results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

4.1 EVALUATION 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(2013)). In the test results tables of Appendix 1 only the test method number and year of adoption or revision e.g. D1840-B:07 will be used.

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.

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 91-91/Issue 7 Amendment 3, dated: February 2015” and ASTM D1655:15de1. One must keep in mind that ISO test methods are not mentioned in the “Checklist”.

Jet Fuel A1: sample #16030

Acidity, Total: This determination was problematic at the low level 0.0021 mg KOH/g. Three statistical outliers were observed. Two participants reported a test method (ASTM D664 and ASTM D974) other than ASTM D3242 or IP354 mentioned in the check list for Jet Fuel A1. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D3242:11. The large spread may partly be explained as some laboratories did not purge with Nitrogen.

Aromatics by FIA: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with ASTM D1319:15.

Aromatics by HPLC: The determination in %M/M was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not 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. However, the calculated reproducibility after rejection of the statistical outliers was comparable to or smaller than the calculated reproducibility in %V/V of the proficiency tests iis15J01 and iis15J02 of 2015.

Colour Saybolt: Over the years the Colour Saybolt determination is very problematic. The requirements of both Automated (ASTM D6045) and Manual (ASTM D156) are very strick compared to the respective observed reproducibilities over the years. A possible part of the explanation for the higher reproducibility could be that the precision data of the test method are based on unrounded test results of the precision study while in practise participants report rounded test results according to the respective test methods. Another explanation for the manual test method is that the R value (R=2 color units) is rounded off too much.
As mentioned above 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. In last year’s proficiency test (iis15J02) it was suggested that some of the variation may be caused by the fact that the majority of the laboratories reported to have used a different cell than the suggested 100 mm cell in ASTM D6045 because the reported test results of nine participants that used a 100 mm cell was in line with the requirements of ASTM D6045:12. Remarkable is that this suggestion is not underpinned in current proficiency test. In contrary, the calculated reproducibility of labs that reported to use a 50

mm cell is smaller (!) than the calculated reproducibility of labs that reported to use a 100 mm cell.
The manual test method ASTM D156 was also very problematic. No statistical outliers were observed. However, the calculated reproducibility is not at all in agreement with the requirements of ASTM D156:15.

Density: This determination was not problematic. No statistical outliers were observed. However, the calculated reproducibility is in good agreement with the requirements of ASTM D4052:15.

Distillation: This determination was not problematic. In total for the five distillation parameters only four statistical outliers were observed. The calculated reproducibilities for IBP, 10% rec, 50% rec and FBP after rejection of the statistical outliers for 50% rec are all in agreement with the automated mode requirements of ASTM D86:15. Only the calculated reproducibility for 90% rec. after rejection of the statistical outlier is not in agreement with the automated mode requirements of ASTM D86:15.
When compared to the manual mode requirements of ASTM D86:15 only the calculated reproducibility for 10% rec is in agreement.

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

Flash Point: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with IP170:14.
In the Joint Fuelling System Checklist both IP170/ISO13736 and ASTM D56 or ASTM D3828 are mentioned as test methods. Still some participants (nine in total) reported test methods which are not equivalent, like D93 and ISO2719.

Freezing Point: This determination was not problematic. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D2386:15e1.

JFTOT: The test results for tube rating are reported mostly as <1 or 1. No statistical analysis can be done on this parameter as this is a qualitative parameter.
For Delta P the majority of the participants reported a value ≤1mmHg. No statistical outliers were observed. Regretfully, no precision data for the Delta P is mentioned in ASTM D3241:16.

Kin. Viscosity at -20°C: This determination was problematic for a number of participants. Four statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D445:15a.

Mercaptan Sulphur: 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 D3227:13.

MSEP: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D3948:14.

Naphthalenes: This determination was not problematic when compared to ASTM D1840-B:07(2013). Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1840-B:07(2013).
When the test results from the reported procedures A and B are evaluated separately, only the calculated reproducibility after rejection of the statistical outliers of procedure B test results is in agreement with the respective requirements of ASTM D1840:07(2013).

Smoke Point: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D1322:15e1-M.
When the test results from the reported Automated and Manual modes are evaluated separately, the calculated reproducibilities after rejection of the statistical outlier (in subgroup Automated) are in agreement with the respective requirements of ASTM D1322:15e1 Automated and Manual.
Two participants reported to use test method IP57. Please note that test method IP57 is not longer part of the Joint Fuelling System Checklist.

Specific Energy: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility is in full agreement with the requirements of ASTM D3338:09e2 (2014).

Sulphur, Total: This determination was problematic for a number of laboratories. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5453:12.

Jet Fuel PS sample #16031: 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 i.i.s has observed and concluded that these methods are biased and less interchangeable than it appears from the checklist. In this PT it is again concluded that test method used is linked to the brand of the automatic particle counter (APC):

- Parker Hannifin is linked to test method IP564
- Stanhope-Seta is linked to test method IP565
- Pamas is linked to test method IP577

And that the test methods showed significant differences in the reported test results. The reported counts per mL from test method IP564 are in general much lower at >4µm, >6µm and >14µm particle size categories than with test method IP565. The same is also documented in an article found on internet (see literature reference 4).
The reported results from test method IP577 also show a deviating pattern in counts per ml, especially at higher particle size categories (>14µm and higher). Therefore, the test results of this participant were excluded from the evaluation.

The evaluation of the particle size distribution test results was very problematic and it was unclear whether all test results were reported with the correct test method. Therefore, all participants that reported test results in current PT were asked what kind of APC was used. Unfortunately, six participants did not reply. Fortunately, the equipment of two participants was mentioned in iis14J01 and the test results were in line with the in 2014 reported test methods. Therefore it was assumed that still the same equipment was used in current PT. For two other participants that did not reply the results indicated that the results were presumable reported under the incorrect test method and therefore the test results were excluded from further evaluation (see appendix 2 for more details).
This means that based on equipment used the test results of three participants were evaluated against a different test method than originally reported.

Two participants reported ISO4406 as test method. However, ISO4406 is not a determination method for particle size but a method how to decode counts per mL to ISO classes. Based on the equipment mentioned the test results were linked to the corresponding test method.

IP564: The determination according to IP564 was very problematic. In total one statistical outlier was observed for the six particle size categories. The calculated reproducibilities after rejection of the suspect data are not at all in agreement with the requirements of IP564:13. The test results varied over a large range, especially at lower particle size categories.

IP565: The determination according to IP565 was problematic for the determinations ≥4µm, ≥6µm and ≥14µm but not problematic for the other three particle size categories. In total three outliers were observed, all test results from the same participant. Therefore the other three test results of this participant were excluded. The calculated reproducibilities, after rejection of the suspect data, are in agreement with the requirements of IP565:13, except for ≥4µm, ≥6µm and ≥14µm particle size categories. The variation in the test results is much smaller with method IP565 than with IP564.

For information only, the determination of particle size distribution was also evaluated tentatively in ISO classes for the ≥4µm, ≥6µm and ≥14µm particle size categories (see appendix 5). Test methods, IP564 and IP565, mentions **provisional** reproducibilities for ISO codes of these categories in Annex C of the test methods. Please note the following quote how to interpret the reproducibilities in ISO codes.

Quote IP564/IP565
Due to the course rounding associated with ISO codes, these behave in a non-Normal (non-Gaussian) manner and so it is not statistically valid to calculate repeatability and reproducibility for these codes. However, ISO codes are widely utilised in industry due to their simplicity and ease of use and so to aid users, indicative precision values are shown below. For the reasons described above, users should exercise caution in using these values and use them only as an indication of the repeatability and reproducibility associated with ISO codes. For detailed assessment of the precision of this method, users should refer to Section 13 of the test method and work with results expressed in cumulative counts per ml.
Unquote

The calculated z-scores over the ISO classes (see appendix 5) are therefore only indicative. The determination of particle size was also (very) problematic in ISO classes. No statistical outliers were observed in the ISO classes from IP564 and seven statistical outliers were observed in the ISO classes from IP565.
The ISO codes from IP564 were on average one class lower than from IP565 which indicated again a bias between IP564 and IP565. Furthermore, the evaluation of the test results from IP565 showed some outliers in test results which were excluded in the evaluation in counts per mL due to uncertainty about used equipment. This underpins again that these values are too low compared to the other test results.
The calculated reproducibilities of IP564 are not at all in agreement with the requirements of IP564:13. The calculated reproducibilities of IP565 of >4 µm and >6µm particle size categories are not in agreement with the respective requirements of IP565:13. The calculated reproducibility of IP565 of >14 µm particle size is in agreement with the respective requirement of IP565:13. Again it is shown that the calculated reproducibility in the test results of IP565 is smaller and much closer to the requirements of the test method.

When the counts per mL from test method IP577 are decoded to ISO classes this method is quite similar at the lower particle size categories (>4 µm, >6µm and >14µm) to IP564 and IP565, see appendix 5 for more details.

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 laboratories that participated. The reproducibilities derived from literature reference test methods (in casu ASTM test methods) and the calculated reproducibilities of samples #16030 and #16031 are compared in the next tables.

Parameter	unit	n	average	2.8 * sd	R (lit)
Acidity, Total	mg KOH/g	58	0.0021	0.0033	0.0019
Aromatics by FIA	%V/V	55	15.1	2.7	2.5

Parameter	unit	n	average	2.8 * sd	R (lit)
Aromatics by HPLC	%M/M	18	18.4	3.0	1.9
Aromatics by HPLC	%V/V	15	16.0	1.4	n.a.
Colour Saybolt (automated)		42	28.7	3.6	1.2
Colour Saybolt (manual)		43	28.3	4.6	2.0
Density at 15°C	kg/m^3	101	792.0	0.4	0.5
Initial Boiling Point	°C	98	149.6	5.5	8.2
Temp at 10% recovered	°C	98	168.5	3.2	3.7
Temp at 50% recovered	°C	95	196.3	2.5	3.0
Temp at 90% recovered	°C	97	242.3	4.6	3.6
Final Boiling Point	°C	98	274.4	5.9	7.1
Existent Gum (unwashed)	mg/100mL	56	0.59	1.07	3.11
Flash Point	°C	90	42.3	3.1	3.2
Freezing Point	°C	76	-56.8	1.7	2.5
JFTOT – Tube Rating		57	≤ 1	n.a.	n.a.
JFTOT – Delta P	mmHg	55	0.1	0.8	n.a.
Kinematic Viscosity at -20°C	mm^2/s	57	3.822	0.064	0.073
Mercaptan Sulphur as S	%M/M	58	0.0004	0.0003	0.0003
MSEP	rating	71	94.6	8.3	8.4
Naphthalenes	%V/V	45	0.40	0.05	0.05
Smoke Point	mm	69	25.5	2.8	3.9
Specific Energy (Net)	MJ/kg	53	43.399	0.046	0.046
Sulphur, Total	mg/kg	74	411.8	55.5	52.2

Table 5: comparison of the observed and target reproducibilities of sample #16030

Parameter	unit	n	average	2.8 * sd	R (lit)
Particle Size >4 µm (IP564)	parts/ml	12	781	1183	319
Particle Size >6 µm (IP564)	parts/ml	12	266	397	163
Particle Size >14 µm (IP564)	parts/ml	12	34	57	27
Particle Size >21 µm (IP564)	parts/ml	12	13	22	16
Particle Size >25 µm (IP564)	parts/ml	12	7.3	14.4	9.7
Particle Size >30 µm (IP564)	parts/ml	11	2.3	4.5	3.8
Particle Size >4 µm (IP565)	parts/ml	18	1499	774	348
Particle Size >6 µm (IP565)	parts/ml	18	473	412	194
Particle Size >14 µm (IP565)	parts/ml	18	45	48	39
Particle Size >21 µm (IP565)	parts/ml	18	13	14	13
Particle Size >25 µm (IP565)	parts/ml	18	6.7	8.4	7.9
Particle Size >30 µm (IP565)	parts/ml	18	3.2	5.1	4.7

Table 6: comparison of the observed and target reproducibilities of sample #16031

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF MARCH 2016 WITH PREVIOUS PTS

	March 2016	September 2015	March 2015	September 2014	March 2014	September 2013
Number of reporting labs	103	129	102	132	100	136
Number of test results reported	1809	2695	1803	2729	1741	2538
Statistical outliers	40	74	44	62	29	69
Percentage outliers	2.2%	2.7%	2.4%	2.3%	1.6%	2.7%

Table 7: Comparison with previous proficiency tests

In proficiency tests outlier percentages of 3% - 7.5% are quite normal.

The performance of the determinations of the proficiency tests was compared against the requirements of the respective reference test methods. The conclusions are given the following table:

Parameter	March 2016	September 2015	March 2015	September 2014	March 2014	September 2013
Acidity, Total	-	--	-	--	--	-
Aromatics by FIA	+/-	++	+	++	+	+
Aromatics by HPLC	-	+	+/-	-	-	++
Colour Saybolt (automated)	--	-	--	-	-	--
Colour Saybolt (manual)	--	-	-	--	--	--
Density at 15°C	+	++	++	++	++	++
Distillation	+	+	+	+	+	n.e.
Existent Gum	++	++	++	++	++	++
Flash Point	+/-	+	+	+	+	+
Freezing Point	+	+	+	+	-	+
Kinematic Viscosity at -20°C	+	+/-	-	+/-	-	+
Mercaptan Sulphur	+/-	+	+/-	++	+	+/-
MSEP	+/-	+/-	+	+	+	+/-
Naphthalenes	+/-	-	+/-	+	+	+
Smoke Point	+	+/-	+	+	+/-	+
Specific Energy (Net)	+/-	-	-	-	-	+
Sulphur, Total	+/-	++	++	+	+/-	+
BOCLE	n.e.	-	n.e.	+	n.e.	+/-
Particle Size Distribution IP564	--	--	--	-	-	n.e.
Particle Size Distribution IP565	-	-	-	--	--	n.e.
FAME	n.e.	-	n.e.	--	n.e.	--

Table 8: comparison determinations against the requirements of 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

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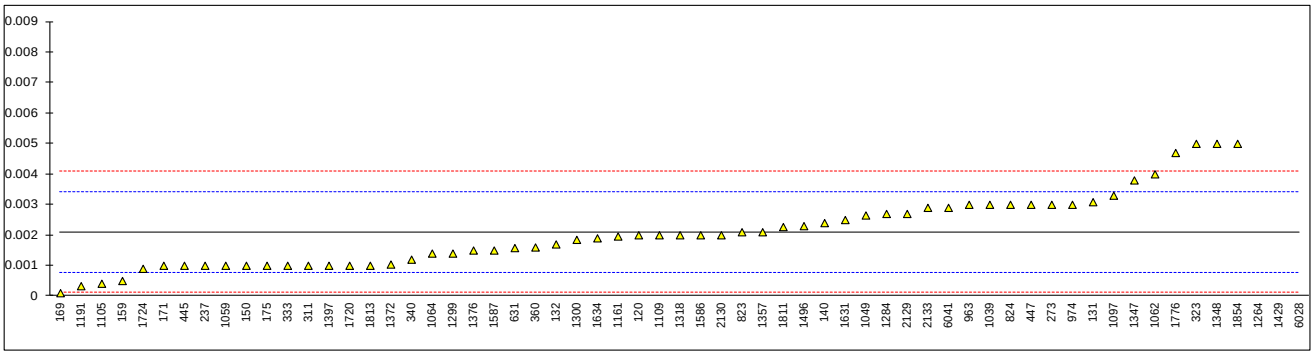
APPENDIX 1

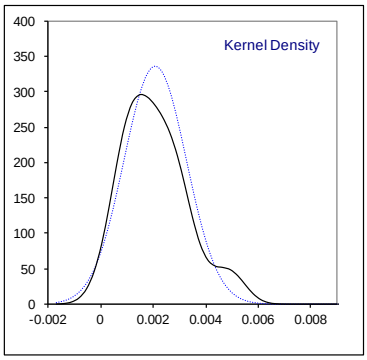
Determination of Acidity, Total on sample #16030; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120	D3242	0.002		-0.14	
131	D3242	0.003086		1.50	
132	D3242	0.0017		-0.59	
140	D3242	0.0024		0.47	
150	D3242	0.001		-1.65	
159	D3242	0.0005		-2.40	
169	D3242	0.0001		-3.00	
171	D3242	0.001		-1.65	
175	D3242	0.001		-1.65	
194		-----		-----	
228		-----		-----	
237	D3242	0.001		-1.65	
238		-----		-----	
253		-----		-----	
273	D974	0.003		1.37	
311	D3242	0.0010		-1.65	
317		-----		-----	
323	D3242	0.005		4.39	
333	D3242	0.001		-1.65	
336		-----		-----	
340	D3242	0.0012		-1.34	
353		-----		-----	
360	D3242	0.0016		-0.74	
391		-----		-----	
398		-----		-----	
399		-----		-----	
445	IP354	0.001		-1.65	
447	D3242	0.003		1.37	
468		-----		-----	
473		-----		-----	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606		-----		-----	
631	D3242	0.00158		-0.77	
633		-----		-----	
634		-----		-----	
671		-----		-----	
784		-----		-----	
785		-----		-----	
823	D3242	0.0021		0.01	
824	D3242	0.003		1.37	
875		-----		-----	
904		-----		-----	
922		-----		-----	
962		-----		-----	
963	D3242	0.003		1.37	
974	D3242	0.003		1.37	
998		-----		-----	
1039	D3242	0.003		1.37	
1049	D3242	0.00265		0.84	
1059	D3242	0.001		-1.65	
1062	D3242	0.004		2.88	
1064	D3242	0.0014		-1.04	
1080		-----		-----	
1097	D3242	0.0033		1.82	
1105	D3242	0.00041		-2.54	
1109	D3242	0.0020		-0.14	
1126		-----		-----	
1146		-----		-----	
1150		-----		-----	
1161	D664	0.00196		-0.20	
1167		-----		-----	
1191	D3242	0.00033		-2.66	
1237		-----		-----	
1264	D3242	0.0111	R(0.01)	13.59	
1284	D3242	0.0027		0.92	
1299	D3242	0.0014		-1.04	
1300	D3242	0.00185		-0.36	
1318	D3242	0.002		-0.14	
1347	D3242	0.0038		2.58	
1348	D3242	0.005		4.39	
1357	D3242	0.0021		0.01	

lab	method	value	mark	z(targ)	remarks
1372	D3242	0.00104		-1.59	
1376	D3242	0.0015		-0.89	
1397	D3242	0.001		-1.65	
1399		-----		-----	
1428		-----		-----	
1429	D3242	0.026	R(0.01)	36.06	
1433		-----		-----	
1496	D3242	0.0023		0.32	
1498		-----		-----	
1531		-----		-----	
1586	D3242	0.002	C	-0.14	first reported 0.02
1587	D3242	0.0015		-0.89	
1610		-----		-----	
1631	D3242	0.0025		0.62	
1634	D3242	0.0019		-0.29	
1678		-----		-----	
1720	D3242	0.001		-1.65	
1724	D3242	0.0009		-1.80	
1740		-----		-----	
1776	D3242	0.0047		3.93	
1784		-----		-----	
1811	D3242	0.00227		0.27	
1813	D3242	0.0010		-1.65	
1854	D3242	0.005		4.39	
1883		-----		-----	
1961		-----		-----	
1979		-----		-----	
2129	D3242	0.0027		0.92	
2130	D3242	0.002		-0.14	
2133	D3242	0.0029		1.22	
6028	D3242	0.07	C,R(0.01)	102.42	first reported 0.1348
6035		-----		-----	
6040		-----		-----	
6041	D3242	0.0029		1.22	

normality	OK
n	58
outliers	3
mean (n)	0.00209
st.dev. (n)	0.001186
R(calc.)	0.00332
R(D3242:11)	0.00186



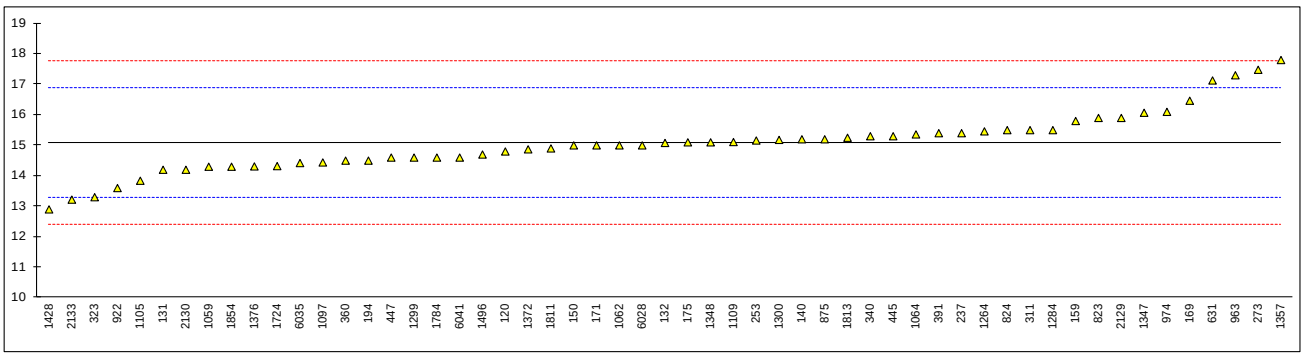


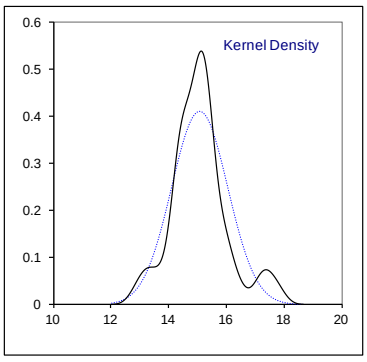
Determination of Aromatics by FIA (without oxygenate correction) on sample #16030; results in %V/V

lab	method	value	mark	z(targ)	remarks
120	D1319	14.8		-0.31	
131	D1319	14.2		-0.97	
132	D1319	15.08		0.01	
140	D1319	15.2		0.14	
150	D1319	15.0		-0.08	
159	D1319	15.8		0.81	
169	D1319	16.465		1.55	
171	D1319	15.0		-0.08	
175	D1319	15.1		0.03	
194	D1319	14.5		-0.64	
228		-----		-----	
237	D1319	15.4		0.36	
238		-----		-----	
253	D1319	15.16		0.10	
273	D1319	17.48		2.68	
311	D1319	15.5		0.47	
317		-----		-----	
323	D1319	13.3		-1.98	
333		-----		-----	
336		-----		-----	
340	D1319	15.3		0.25	
353		-----		-----	
360	D1319	14.5		-0.64	
391	D1319	15.4		0.36	
398		-----		-----	
399		-----		-----	
445	D1319	15.3		0.25	
447	D1319	14.6		-0.53	
468		-----		-----	
473		-----		-----	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606		-----		-----	
631	D1319	17.13		2.29	
633		-----		-----	
634		-----		-----	
671		-----		-----	
784		-----		-----	
785		-----		-----	
823	D1319	15.9		0.92	
824	D1319	15.5		0.47	
875	D1319	15.2		0.14	
904		-----		-----	
922	D1319	13.6		-1.64	
962		-----		-----	
963	D1319	17.3		2.48	
974	D1319	16.1		1.14	
998		-----		-----	
1039		-----		-----	
1049		-----		-----	
1059	D1319	14.3		-0.86	
1062	D1319	15.0		-0.08	
1064	D1319	15.36		0.32	
1080		-----		-----	
1097	D1319	14.44		-0.71	
1105	D1319	13.84		-1.38	
1109	D1319	15.11		0.04	
1126		-----		-----	
1146		-----		-----	
1150		-----		-----	
1161		-----		-----	
1167		-----		-----	
1191		-----		-----	
1237		-----		-----	
1264	D1319	15.46		0.43	
1284	D1319	15.5		0.47	
1299	D1319	14.6		-0.53	
1300	D1319	15.18		0.12	
1318		-----		-----	
1347	D1319	16.07		1.11	
1348	D1319	15.1		0.03	
1357	D1319	17.8		3.04	

lab	method	value	mark	z(targ)	remarks
1372	D1319	14.87		-0.23	
1376	D1319	14.31		-0.85	
1397		-----		-----	
1399		-----		-----	
1428	D1319	12.9		-2.42	
1429		-----		-----	
1433		-----		-----	
1496	D1319	14.7		-0.42	
1498		-----		-----	
1531		-----		-----	
1586		-----		-----	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1634		-----		-----	
1678		-----		-----	
1720		-----		-----	
1724	D1319	14.32		-0.84	
1740		-----		-----	
1776		-----		-----	
1784	D1319	14.6		-0.53	
1811	D1319	14.90		-0.19	
1813	D1319	15.25		0.20	
1854	D1319	14.3		-0.86	
1883		-----		-----	
1961		-----		-----	
1979		-----		-----	
2129	D1319	15.9		0.92	
2130	D1319	14.2		-0.97	
2133	D1319	13.22		-2.07	
6028	D1319	15.0		-0.08	
6035	EN15553	14.42	C	-0.73	first reported 11.36
6040		-----		-----	
6041	D1319	14.6		-0.53	

normality	suspect
n	55
outliers	0
mean (n)	15.074
st.dev. (n)	0.9721
R(calc.)	2.722
R(D1319:15)	2.512



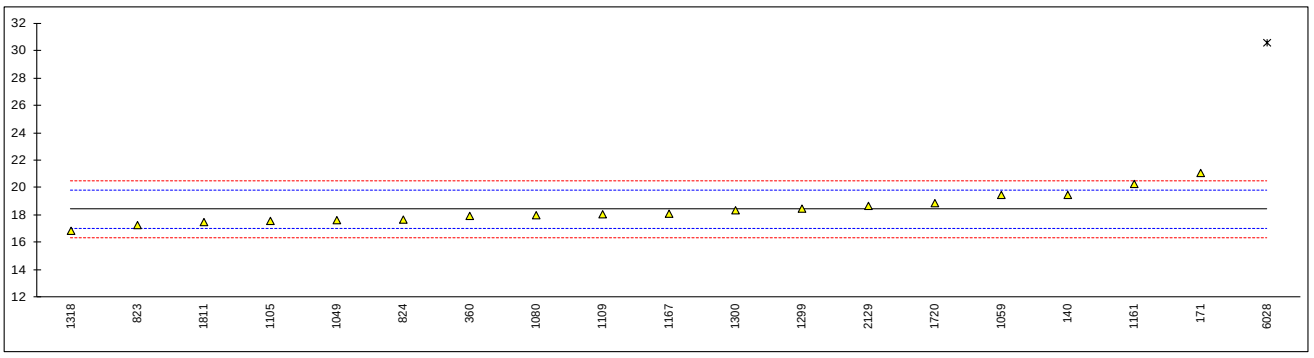


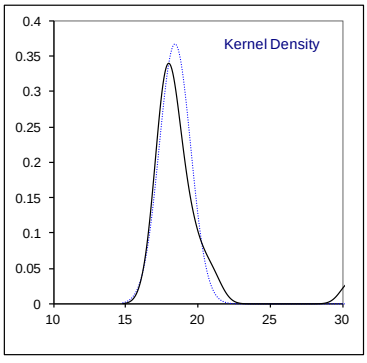
Determination of Aromatics by HPLC on sample #16030; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
131		-----		-----	
132		-----		-----	
140	D6379	19.5		1.54	
150		-----		-----	
159		-----		-----	
169		-----		-----	
171	D6379	21.1		3.85	
175		-----		-----	
194		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
273		-----		-----	
311		-----		-----	
317		-----		-----	
323		-----		-----	
333		-----		-----	
336		-----		-----	
340		-----		-----	
353		-----		-----	
360	D6379	17.97		-0.66	
391		-----		-----	
398		-----		-----	
399		-----		-----	
445		-----		-----	
447		-----		-----	
468		-----		-----	
473		-----		-----	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606		-----		-----	
631		-----		-----	
633		-----		-----	
634		-----		-----	
671		-----		-----	
784		-----		-----	
785		-----		-----	
823	D6379	17.3		-1.63	
824	IP391	17.7		-1.05	
875		-----		-----	
904		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
974		-----		-----	
998		-----		-----	
1039		-----		-----	
1049	D6379	17.660		-1.11	
1059	EN12916	19.5		1.54	
1062		-----		-----	
1064		-----		-----	
1080	D6379	18.02		-0.59	
1097		-----		-----	
1105	IP391	17.605		-1.19	
1109	D6591	18.089		-0.49	
1126		-----		-----	
1146		-----		-----	
1150		-----		-----	
1161	EN12916	20.3		2.70	
1167	EN12916	18.13		-0.43	
1191		-----		-----	
1237		-----		-----	
1264		-----		-----	
1284		-----		-----	
1299	IP436	18.5		0.10	
1300	D6379	18.38		-0.07	
1318	D6379	16.883		-2.23	
1347		-----		-----	
1348		-----		-----	
1357		-----		-----	

lab	method	value	mark	z(targ)	remarks
1372		-----		-----	
1376		-----		-----	
1397		-----		-----	
1399		-----		-----	
1428		-----		-----	
1429		-----		-----	
1433		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1586		-----		-----	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1634		-----		-----	
1678		-----		-----	
1720	D6379	18.9		0.68	
1724		-----		-----	
1740		-----		-----	
1776		-----		-----	
1784		-----		-----	
1811	D6379	17.52		-1.31	
1813		-----		-----	
1854		-----		-----	
1883		-----		-----	
1961		-----		-----	
1979		-----		-----	
2129	IP391	18.7	C	0.39	first reported 14.46
2130		-----		-----	
2133		-----		-----	
6028	EN12916	30.5922	C,G(0.01)	17.54	first reported 31.5388
6035		-----		-----	
6040		-----		-----	
6041		-----		-----	

normality	suspect
n	18
outliers	1
mean (n)	18.431
st.dev. (n)	1.0876
R(calc.)	3.045
R(D6379:11)	1.942

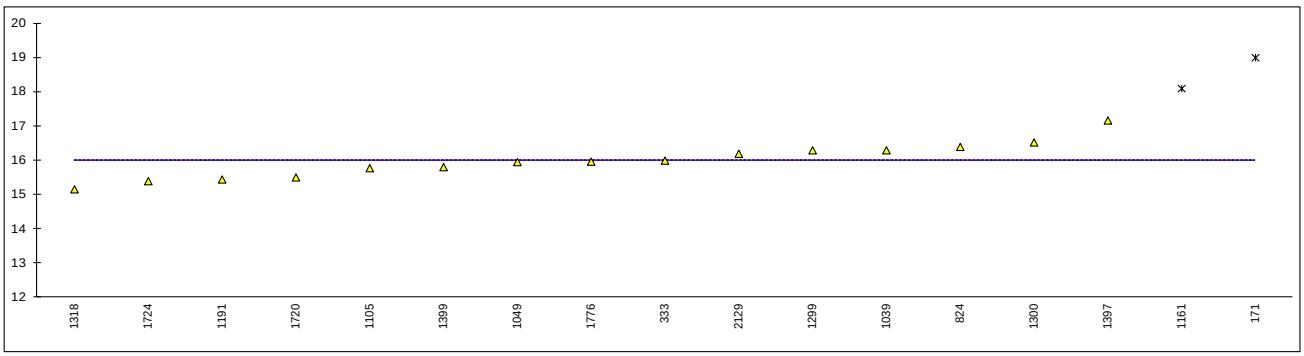


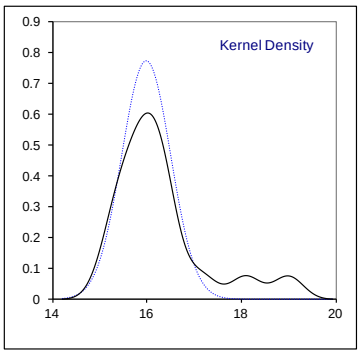


Determination of Aromatics by HPLC on sample #16030; results in %V/V

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
131		-----		-----	
132		-----		-----	
140		-----		-----	
150		-----		-----	
159		-----		-----	
169		-----		-----	
171	D6379	19.0	G(0.05)	-----	
175		-----		-----	
194		-----		-----	
228		-----		-----	
237		-----		-----	
238		-----		-----	
253		-----		-----	
273		-----		-----	
311		-----		-----	
317		-----		-----	
323		-----		-----	
333	D6379	16.0		-----	
336		-----		-----	
340		-----		-----	
353		-----		-----	
360		-----		-----	
391		-----		-----	
398		-----		-----	
399		-----		-----	
445		-----		-----	
447		-----		-----	
468		-----		-----	
473		-----		-----	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606		-----		-----	
631		-----		-----	
633		-----		-----	
634		-----		-----	
671		-----		-----	
784		-----		-----	
785		-----		-----	
823		-----		-----	
824	IP391	16.4		-----	
875		-----		-----	
904		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
974		-----		-----	
998		-----		-----	
1039	D6379	16.3		-----	
1049	D6379	15.95747		-----	
1059		-----		-----	
1062		-----		-----	
1064		-----		-----	
1080		-----		-----	
1097		-----		-----	
1105	IP391	15.78		-----	
1109		-----		-----	
1126		-----		-----	
1146		-----		-----	
1150		-----		-----	
1161	EN12916	18.1	G(0.05)	-----	
1167		-----		-----	
1191	D6379	15.45		-----	
1237		-----		-----	
1264		-----		-----	
1284		-----		-----	
1299	IP436	16.3		-----	
1300	D6379	16.53		-----	
1318	D6379	15.163		-----	
1347		-----		-----	
1348		-----		-----	
1357		-----		-----	

lab	method	value	mark	z(targ)	remarks
1372		-----		-----	
1376		-----		-----	
1397	D6379	17.17		-----	
1399	IP436	15.81		-----	
1428		-----		-----	
1429		-----		-----	
1433		-----		-----	
1496		-----		-----	
1498		-----		-----	
1531		-----		-----	
1586		-----		-----	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1634		-----		-----	
1678		-----		-----	
1720	D6379	15.51		-----	
1724	D6379	15.4		-----	
1740		-----		-----	
1776	D6379	15.97		-----	
1784		-----		-----	
1811		-----		-----	
1813		-----		-----	
1854		-----		-----	
1883		-----		-----	
1961		-----		-----	
1979		-----		-----	
2129	IP391	16.2	C	-----	first reported 12.7
2130		-----		-----	
2133		-----		-----	
6028		-----		-----	
6035		-----		-----	
6040		-----		-----	
6041		-----		-----	
	normality	OK			
	n	15			
	outliers	2			
	mean (n)	15.996			
	st.dev. (n)	0.5155			
	R(calc.)	1.443			
	R(lit)	unknown			Compare R(calc) iis15J01=1.99 / R(calc) iis15J02=1.57



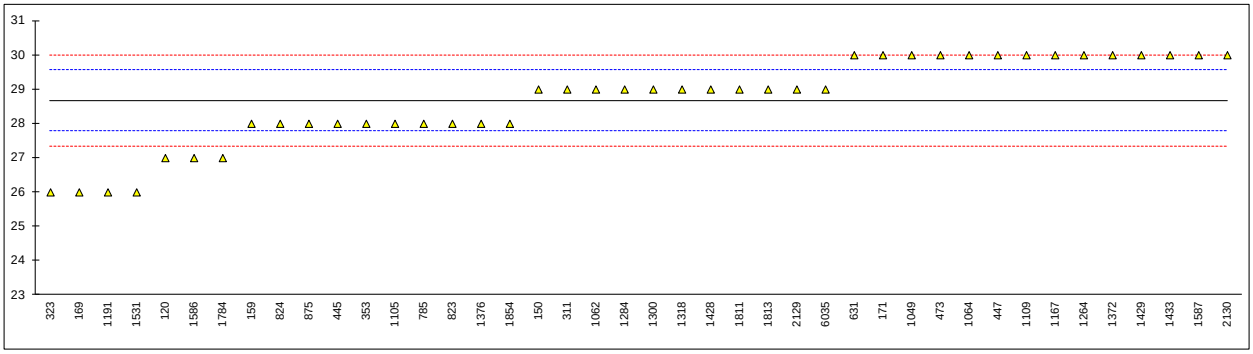


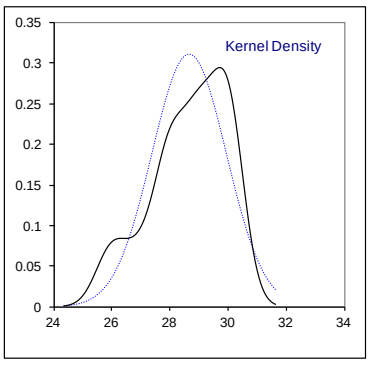
Determination of Colour Saybolt (Automated) on sample #16030; cell size in mm;

lab	method	cell	value	mark	z(targ)	remarks
120	D6045	50	27		-3.76	
131		-----	-----		-----	
132		-----	-----		-----	
140		-----	-----		-----	
150	D6045	-----	29		0.75	
159	D6045	100	28		-1.51	
169	D6045	-----	26		-6.02	
171	D6045	-----	30		3.01	
175		-----	-----		-----	
194		-----	-----		-----	
228		-----	-----		-----	
237		-----	-----		-----	
238		-----	-----		-----	
253		-----	-----		-----	
273		-----	-----		-----	
311	D6045	-----	29		0.75	
317		-----	-----		-----	
323	D6045	10	26		-6.02	
333		-----	-----		-----	
336		-----	-----		-----	
340		-----	-----		-----	
353	D6045	50.00	28		-1.51	
360		-----	-----		-----	
391		-----	-----		-----	
398		-----	-----		-----	
399		-----	-----		-----	
445	D6045	50	28		-1.51	
447	D6045	-----	30		3.01	
468		-----	-----		-----	
473	D6045	-----	30		3.01	
594		-----	-----		-----	
601		-----	-----		-----	
604		-----	-----		-----	
606		-----	-----		-----	
631	D6045	-----	30		3.01	
633		-----	-----		-----	
634		-----	-----		-----	
671		-----	-----		-----	
784		-----	-----		-----	
785	D6045	50.00	28		-1.51	
823	D6045	50	28		-1.51	
824	D6045	50	28		-1.51	
875	D6045	-----	28		-1.51	
904		-----	-----		-----	
922		-----	-----		-----	
962		-----	-----		-----	
963		-----	-----		-----	
974		-----	-----		-----	
998		-----	-----		-----	
1039		-----	-----		-----	
1049	D6045	-----	30		3.01	
1059		-----	-----		-----	
1062	D6045	50	29		0.75	
1064	D6045	50	30		3.01	
1080		-----	-----		-----	
1097		-----	-----		-----	
1105	D6045	50	28		-1.51	
1109	D6045	100	30		3.01	
1126		-----	-----		-----	
1146		-----	-----		-----	
1150		-----	-----		-----	
1161	D6045	-----	>+30		>3.01	possibly a false positive test result
1167		-----	30		3.01	
1191	D6045	100	26		-6.02	
1237		-----	-----		-----	
1264	D6045	-----	30		3.01	
1284	D6045	-----	29		0.75	
1299		-----	-----		-----	
1300	D6045	100	29.0		0.75	
1318	D6045	100	29		0.75	
1347		-----	-----		-----	
1348		-----	-----		-----	
1357		-----	-----		-----	

lab	method	cell	value	mark	z(targ)	remarks
1372	D6045	100	30		3.01	
1376	D6045	10	28		-1.51	
1397		-----	-----		-----	
1399		-----	-----		-----	
1428	D6045	-----	29		0.75	
1429	D6045	50	30		3.01	
1433	D6045	100	30		3.01	
1496		-----	-----		-----	
1498		-----	-----		-----	
1531	D6045	-----	26		-6.02	
1586	D6045	50	27		-3.76	
1587	D6045	5	30		3.01	
1610		-----	-----		-----	
1631		-----	-----		-----	
1634		-----	-----		-----	
1678		-----	-----		-----	
1720		-----	-----		-----	
1724		-----	-----		-----	
1740		-----	-----		-----	
1776		-----	-----		-----	
1784	D6045	50	27		-3.76	
1811	D6045	50	29.0		0.75	
1813	D6045	100	29		0.75	
1854	D6045	50	28		-1.51	
1883		-----	-----		-----	
1961		-----	-----		-----	
1979		-----	-----		-----	
2129	D6045	50	29		0.75	
2130	D6045	-----	30		3.01	
2133		-----	-----		-----	
6028		-----	-----		-----	
6035	D6045	100	29.00		0.75	
6040		-----	-----		-----	
6041		-----	-----		-----	

		Test results of Cell 50 mm only	Test results of Cell 100 mm only
	normality	OK	OK	not OK
	n	42	15	9
	outliers	0	0	0
	mean (n)	28.67	28.27	28.89
	st.dev. (n)	1.282	0.961	1.269
	R(calc.)	3.59	2.69	3.55
	R(D6045:12)	1.24	1.24	1.24



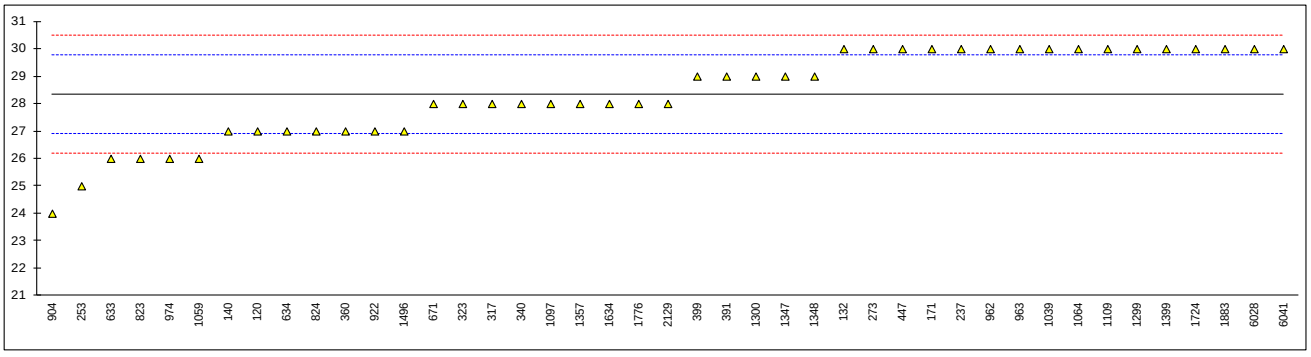


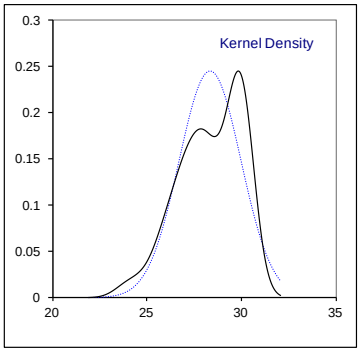
Determination of Colour Saybolt (Manual) on sample #16030;

lab	method	value	mark	z(targ)	remarks
120	D156	27		-1.89	
131		-----		-----	
132	D156	30		2.31	
140	D156	27		-1.89	
150		-----		-----	
159		-----		-----	
169		-----		-----	
171	D156	30		2.31	
175		-----		-----	
194		-----		-----	
228		-----		-----	
237	D156	30		2.31	
238		-----		-----	
253	D156	25		-4.69	
273	D156	30		2.31	
311		-----		-----	
317	D156	28		-0.49	
323	D156	28		-0.49	
333		-----		-----	
336		-----		-----	
340	D156	28		-0.49	
353		-----		-----	
360	D156	27		-1.89	
391	D156	29		0.91	
398		-----		-----	
399	D156	29		0.91	
445		-----		-----	
447	D156	30		2.31	
468		-----		-----	
473		-----		-----	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606		-----		-----	
631		-----		-----	
633	D156	26		-3.29	
634	D156	27		-1.89	
671	D156	28		-0.49	
784		-----		-----	
785		-----		-----	
823	D156	26		-3.29	
824	D156	27		-1.89	
875		-----		-----	
904	D156	24		-6.09	
922	D156	27		-1.89	
962	D156	30		2.31	
963	D156	30		2.31	
974	D156	26		-3.29	
998		-----		-----	
1039	D156	30		2.31	
1049		-----		-----	
1059	D156	26		-3.29	
1062		-----		-----	
1064	D156	30		2.31	
1080		-----		-----	
1097	INH-07	28		-0.49	
1105		-----		-----	
1109	D156	30		2.31	
1126		-----		-----	
1146		-----		-----	
1150		-----		-----	
1161	D1500	<0.5	ex,C	<-39	first reported 0.5; D1500 is not a correct test method for Jet Fuel *)
1167		-----		-----	
1191		-----		-----	
1237		-----		-----	
1264		-----		-----	
1284		-----		-----	
1299	D156	30		2.31	
1300	D156	29.0		0.91	
1318		-----		-----	
1347	D156	29		0.91	
1348	D156	29		0.91	
1357	D156	28		-0.49	

lab	method	value	mark	z(targ)	remarks
1372		-----		-----	
1376		-----		-----	
1397		-----		-----	
1399	D156	30		2.31	
1428		-----		-----	
1429		-----		-----	
1433		-----		-----	
1496	D156	27		-1.89	
1498		-----		-----	
1531		-----		-----	
1586		-----		-----	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1634	D156	28		-0.49	
1678		-----		-----	
1720		-----		-----	
1724	D156	30		2.31	
1740		-----		-----	
1776	D156	28		-0.49	
1784		-----		-----	
1811		-----		-----	
1813		-----		-----	
1854		-----		-----	
1883	D156	30		2.31	
1961		-----		-----	
1979		-----		-----	
2129	D156	28		-0.49	
2130		-----		-----	
2133		-----		-----	
6028	D156	30		2.31	
6035		-----		-----	
6040		-----		-----	
6041	D156	30		2.31	
	normality	OK			
	n	43			
	outliers	0			
	mean (n)	28.349			
	st.dev. (n)	1.6313			
	R(calc.)	4.568			
	R(D156:15)	2.000			

*) D1500 is a different colour test method which direct to D156 when test result is <0.5.



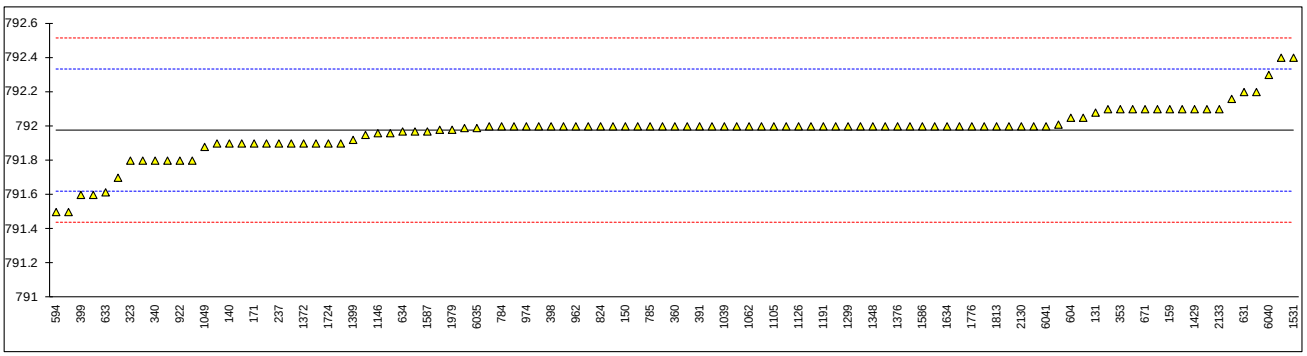


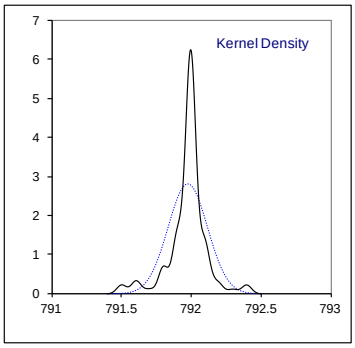
Determination of Density at 15°C on sample #16030; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
120	D4052	791.9		-0.43	
131	D4052	792.08		0.58	
132	D4052	792.01		0.19	
140	D4052	791.9		-0.43	
150	D4052	792.0		0.13	
159	D4052	792.1		0.69	
169	D4052	792.1		0.69	
171	D4052	791.9		-0.43	
175	D4052	792.0		0.13	
194	D4052	791.7		-1.55	
228	D1298	792.4		2.37	
237	D4052	791.9		-0.43	
238		-----		-----	
253	D4052	792.0		0.13	
273	D4052	791.9		-0.43	
311	D4052	792.0		0.13	
317	D4052	792.0		0.13	
323	D4052	791.8		-0.99	
333	D4052	791.8		-0.99	
336		-----		-----	
340	D4052	791.80		-0.99	
353	IP365	792.1		0.69	
360	D4052	792.0		0.13	
391	ISO12185	792.0		0.13	
398	D4052	792.0		0.13	
399	D4052	791.6		-2.11	
445	IP365	792.0		0.13	
447	D4052	792.0		0.13	
468	D4052	792.05		0.41	
473	D4052	791.8		-0.99	
594	GOST3900	791.5		-2.67	
601		-----		-----	
604	D4052	792.05		0.41	
606	D4052	792.0		0.13	
631	D4052	792.2		1.25	
633	D1298	791.6150		-2.02	
634	D4052	791.97		-0.04	
671	D1298	792.1		0.69	
784	D4052	792.0		0.13	
785	D4052	792.0		0.13	
823	D4052	792.0		0.13	
824	D4052	792.0		0.13	
875	D4052	792.0		0.13	
904	D4052	792.1		0.69	
922	D4052	791.8		-0.99	
962	D4052	792.0		0.13	
963	D4052	792.0		0.13	
974	D4052	792.0		0.13	
998		-----		-----	
1039	ISO12185	792.0		0.13	
1049	D4052	791.88		-0.54	
1059	D4052	792.0		0.13	
1062	D4052	792.0		0.13	
1064	D4052	791.90		-0.43	
1080	D4052	792.1		0.69	
1097	ISO12185	792.0		0.13	
1105	D4052	792.0		0.13	
1109	D4052	792.0		0.13	
1126	D4052	792.0		0.13	
1146	ISO12185	791.96		-0.09	
1150	ISO12185	791.96		-0.09	
1161	ISO12185	791.98		0.02	
1167	ISO12185	792.0		0.13	
1191	D4052	792.0		0.13	
1237	ISO12185	791.9		-0.43	
1264	D4052	792.16		1.03	
1284	D4052	792.0		0.13	
1299	D4052	792.0		0.13	
1300	D4052	792.0		0.13	
1318	D4052	791.97		-0.04	
1347	D4052	791.95		-0.15	
1348	D4052	792.0		0.13	
1357	D4052	792.0		0.13	

lab	method	value	mark	z(targ)	remarks
1372	D4052	791.9		-0.43	
1376	D4052	792.0		0.13	
1397	ISO12185	792.1		0.69	
1399	D4052	791.921		-0.31	
1428	D4052	791.9		-0.43	
1429	D4052	792.1		0.69	
1433	D4052	792.0		0.13	
1496	D1298	792.2		1.25	
1498	D1298	791.6		-2.11	
1531	D4052	792.4		2.37	
1586	D4052	792.0		0.13	
1587	D4052	791.97		-0.04	
1610		-----		-----	
1631	D4052	792.0		0.13	
1634	D4052	792.0		0.13	
1678	ISO12185	791.99		0.08	
1720	D4052	791.8		-0.99	
1724	D1298	791.9		-0.43	
1740	D1298	792.0		0.13	
1776	D4052	792.0		0.13	
1784	ISO12185	792.0		0.13	
1811	D4052	792.1		0.69	
1813	D4052	792.0		0.13	
1854	ISO12185	792.0		0.13	
1883	D1298	791.5		-2.67	
1961		-----		-----	
1979	ISO12185	791.98		0.02	
2129	D4052	791.9		-0.43	
2130	D4052	792.0		0.13	
2133	D4052	792.10		0.69	
6028	ISO12185	792.0		0.13	
6035	ISO12185	791.99		0.08	
6040	D4052	792.3		1.81	
6041	D1298	792.0		0.13	

normality	not OK
n	101
outliers	0
mean (n)	791.976
st.dev. (n)	0.1417
R(calc.)	0.397
R(D4052:15)	0.500



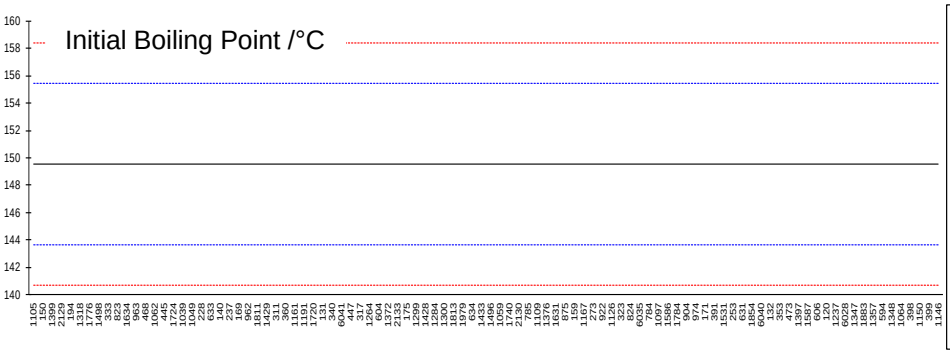


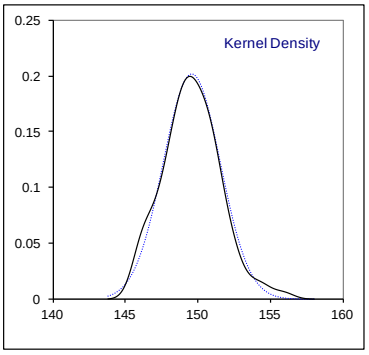
Determination of Distillation ASTM D86 on sample #16030; results in °C

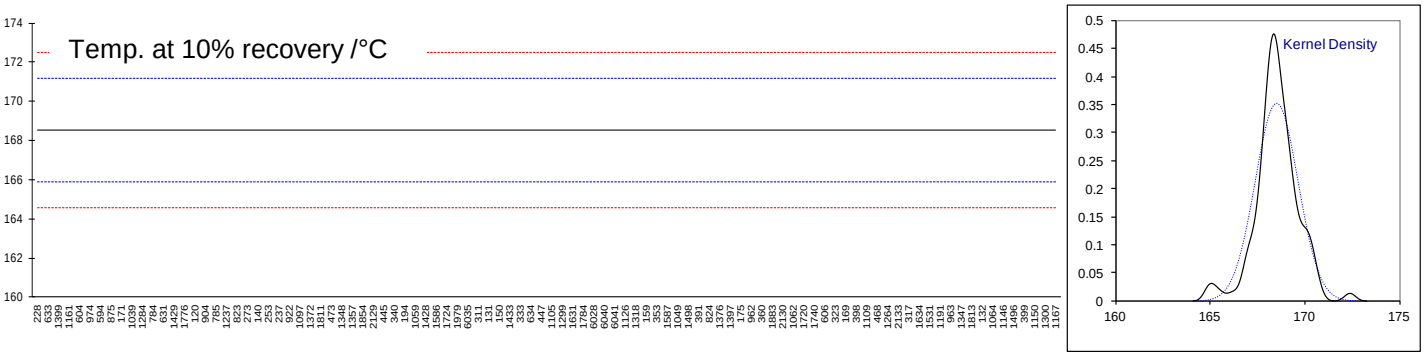
lab	method	Mode	IBP	mark	10% rec	mark	50% rec	mark	90% rec	mark	FBP	mark
120	D86	Automated	151.7		167.7		195.9		242.7		275.6	
131	D86	Automated	148.8		168.4		195.9		241.6		267.8	
132	D86	Automated	151.1		170.2		197.5		242.9		276.3	
140	D86	Automated	148		168		195.8		241.0		273.1	
150	D86	Automated	146.0		168.4		196.1		240.9		274.1	
159	D86	Automated	150.0		168.7		197.1		242.4		274.8	
169	D86	Manual	148.0		169.3		199.1		246.6		276.9	
171	D86	Automated	150.9		167.1		195.5		240.6		273.8	
175	D86	Automated	149.1		169.0		196.8		243.7		275.8	
194	D86	Automated	146.2		168.3		195.8		241.8		274.6	
228	D86	Manual	148.0		165	C	194.0		236	C,R(5)	274.0	
237	D86	Manual	148.0		168.0		196.0		242.0		274.0	
238			-----		-----		-----		-----		-----	
253	D86	Manual	151.0		168.0		197.0		241.0		273.0	
273	D86	Automated	150.1		167.9		196.3		242.0		275.3	
311	D86	Automated	148.5		168.4		196.7		242.9		276.4	
317	D86	Automated	148.9		169.6		197.2		242.8		276.4	
323	D86	Automated	150.2		169.2		197.1		244.2		274.5	
333	D86		146.7		168.5		195.7		239.9		273.7	
336			-----		-----		-----		-----		-----	
340	D86	Automated	148.8		168.3		196.2		243.3		273.8	
353	D86	Automated	151.2		168.7		196.9		246.0		274.6	
360	D86	Automated	148.5		169.0		196.7		241.4		273.7	
391	ISO3405	Automated	150.9		168.9		196.2		242.0		275.6	
398	D86	Automated	153.5		169.3		196.8		243.7		276.4	
399	D86	Automated	154.5		170.5		198.6		244.9		281.0	
445	IP123	Automated	147.5		168.2		195.8		242.8		275.3	
447	D86	Automated	148.9		168.5		197.0		244.6		275.4	
468	D86	Automated	147.4		169.4	C	196.5		243.8		272.3	
473	D86		151.2		168.1		196.5		243.7		276.0	
594	GOST2177	Automated	152.6		167.0		197.0		243.4		275.7	
601			-----		-----		-----		-----		-----	
604	D86	Automated	149.0		166.8		193.9	C	242.5	C	271.0	
606	D86	Automated	151.6		169.2		196.9		242.6		274.7	
631	D86	Automated	151.0		167.6		196.6		244.1		274.9	
633	D86	Manual	148.0		165.0		192.0	R(1)	240.0		273.0	
634	D86	Manual	149.5		168.5		195.5		243.5		278.5	
671			-----		-----		-----		-----		-----	
784	D86	Manual	150.5		167.5		195.0		240.0		273.0	
785	D86	Automated	149.8		167.7		195.5		241.6		272.4	
823	D86	Automated	146.9		167.9		195.8		240.3		271.9	
824	D86	Automated	150.3		168.9		196.4		242.6		271.8	
875	D86	Manual	150.0		167.0		196.0		241.5		276.0	
904	D86	Automated	150.6		167.7		195.6		240.3		272.9	
922	D86	Automated	150.1		168.0		195.5		239.5		273.8	
962	D86		148.0		169.0		196.8		242.2		273.2	
963	D86	Automated	147.1		170.0		196.3		241.1		272.6	
974	D86	Automated	150.8		167.0		195.9		242.4		273.1	
998			-----		-----		-----		-----		-----	
1039	ISO3405	Automated	147.8		167.3		197.0		241.2		274.0	
1049	D86	Automated	147.8		168.8		196.7		241.8		275.0	
1059	D86	Automated	149.6		168.3		196.5		241.9		275.1	
1062	D86	Automated	147.5		169.1		197.1		243.0		274.7	
1064	D86	Automated	152.7		170.2		197.9		244.8		279.0	
1080			-----		-----		-----		-----		-----	
1097	ISO3405	Automated	150.5		168.0		196.6		243.2		274.2	
1105	D86	Automated	145.9		168.5		195.7		240.8		270.8	
1109	D86	Automated	149.8		169.3		196.0		243.3		273.2	
1126	In house	Automated	150.1		168.6		195.2		241.9		272.3	
1146	D86	Automated	155.9		170.2		197.2		242.6		282.2	
1150	ISO3405	Automated	154.23		170.50		198.62		247.06	C	277.24	
1161	ISO3405	Automated	148.6		166.2		196.0		240.3		271.4	
1167	ISO3405	Automated	150.0		172.4		202.7	R(1)	244.1		276.1	
1191	D86	Automated	148.6		169.8		197.1		244.2		274.5	
1237	ISO3405	Manual	151.8		167.8		195.8		239.8		272.8	
1264	D86	Automated	148.9		169.5		196.4		240.3		274.4	
1284	D86	Automated	149.2		167.3		195.2		241.2		272.8	
1299	D86	Automated	149.1		168.5		175.8	R(1)	243.2		275.7	
1300	D86	Automated	149.2		170.7		196.5		240.7		273.3	
1318	D86	Automated	146.2		168.6		196.1		242.6		272.1	
1347	D86	Manual	152.0		170.0		197.0		242.0		277.0	
1348	D86	Automated	152.6		168.1		194.7		242.4		273.9	
1357	D86	Automated	152.3		168.1		195.2		241.0		272.4	

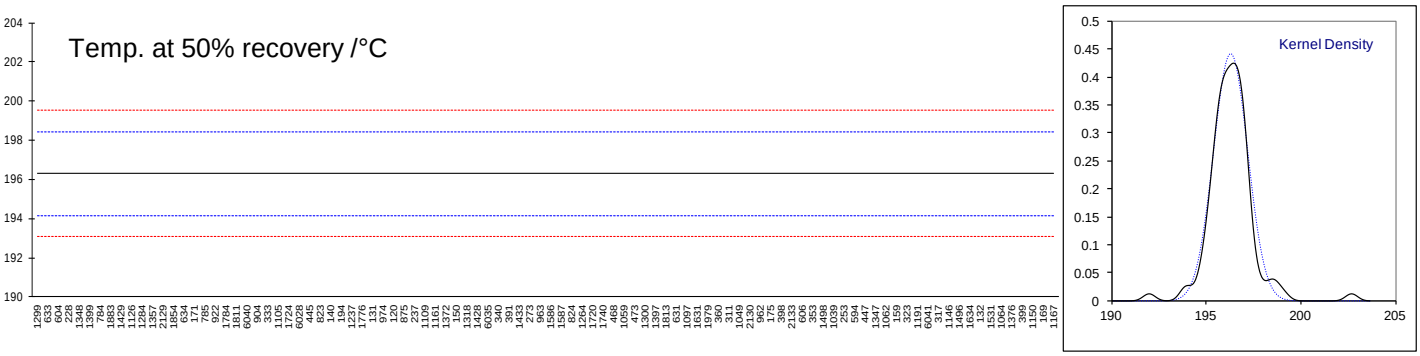
lab	method	Mode	IBP	mark	10% rec	mark	50% rec	mark	90% rec	mark	FBP	mark
1372	D86	Manual	149		168		196		243		273	
1376	D86	Automated	149.8		168.9		198.3		242.0		274.9	
1397	D86	Automated	151.2		168.9		196.5		241.0		276.3	
1399	D86	Automated	146.0		165.5		194.7		239.7		272.8	
1428	D86	Automated	149.1		168.3		196.1		241.5		273.7	
1429	D86	Automated	148.3		167.6		195.1		240.4		273.4	
1433	D86	Automated	149.5		168.4		196.2		241.6		273.5	
1496	D86	Automated	149.5		170.3		197.2		242.7		275.1	
1498	D86	Automated	146.5		168.8		196.9		243.2		272.9	
1531	D86	Automated	150.9		169.7		197.6		242.8		276.2	
1586	D86	Automated	150.5		168.3		196.3		244.1		272.9	
1587	D86	Automated	151.3		168.7		196.3		241.2		273.6	
1610			-----		-----		-----		-----		-----	
1631	D86	Automated	149.8		168.5		196.6		242.1		275.6	
1634	D86	Automated	147.0		169.6		197.4		243.9		277.3	
1678			-----		-----		-----		-----		-----	
1720	D86	Automated	148.6		169.1		196.4		242.6		275.4	
1724	D86	Automated	147.5		168.3		195.7		241.8		276.0	
1740	D86	Automated	149.7		169.1		196.4		244.3		273.0	
1776	D86	Automated	146.4		167.6		195.8		242.8		272.8	
1784	ISO3405	Automated	150.5		168.5		195.5		244.1		272.5	
1811	D86	Automated	148.2		168.0		195.5		239.5		272.5	
1813	D86	Automated	149.20		170.02		196.58		244.16		272.40	
1854	ISO3405	Automated	151		168.1		195.4		244.5		272.2	
1883	D86	Manual	152		169		195		240		277	
1961			-----		-----		-----		-----		-----	
1979	ISO3405	Automated	149.4		168.3		196.6		244.4		277.0	
2129	D86	Automated	146.0		168.1		195.2		239.0		272.9	
2130	D86	Automated	149.7		169.0		196.7		243.4		276.3	
2133	D86	Automated	149.0		169.5		196.8		242.1		276.4	
6028	ISO3405	Automated	151.8		168.5		195.7		240.0		274.4	
6035	ISO3405	Automated	150.30		168.30		196.15		241.55		270.90	
6040	D86	Manual	151.0		168.5		195.5		239.5		273.0	
6041	D86	Automated	148.8		168.5		197.1		244.6		274.8	
	normality	Auto/Man/?	OK		not OK		suspect		OK		not OK	
	n	82/13/3	98		98		95		97		98	
	outliers		0		0		3		1		0	
	mean (n)		149.56		168.52		196.31		242.31		274.36	
	st.dev. (n)		1.974		1.131		0.902		1.643		2.105	
	R(calc.)		5.53		3.17		2.53		4.60		5.89	
	R(D86:15-A)		8.23		3.71		3.00		3.63		7.10	
	Compare to R(D86:15-M)		4.56		3.04		3.03		3.88		4.45	

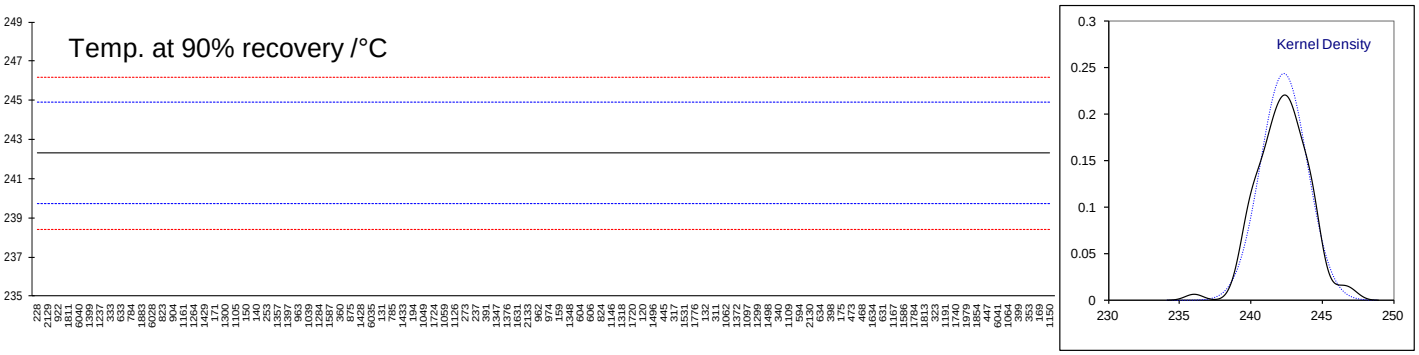
R(1)=R(0.01)
R(5)=R(0.05)
Lab 228 first reported 162 for 10% recovered and 238 for 90% recovered
Lab 468 first reported 20% recovered (176.1°C) for 10% recovered
Lab 604 first reported 192.8 for 50% recovered and 237.6 for 90% recovered
Lab 1150 first reported 247.28 for 90% recovered

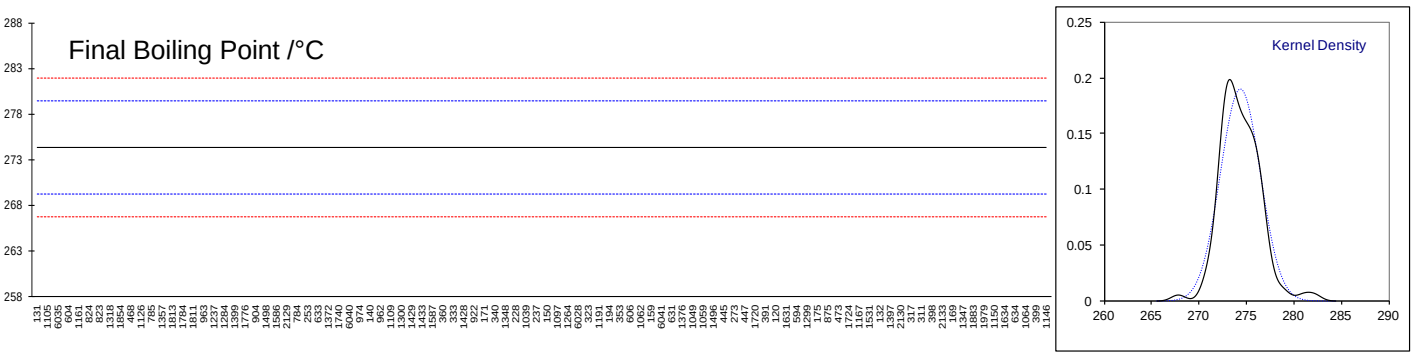





Temp. at 10% recovery /°C
Kernel Density


Temp. at 50% recovery /°C
Kernel Density


Temp. at 90% recovery /°C
Kernel Density


Final Boiling Point /°C
Kernel Density

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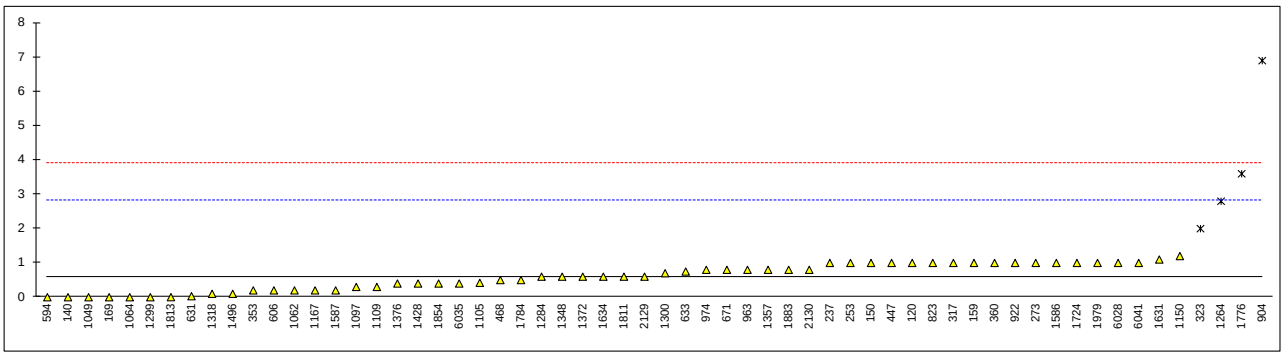
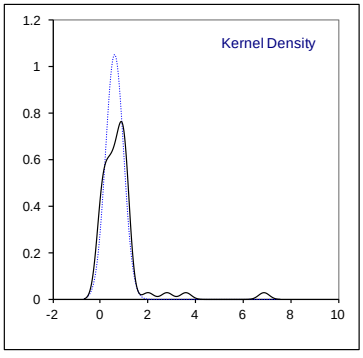
Determination of Existent Gum (unwashed) on sample #16030; results in mg/100mL

lab	method	value	mark	z(targ)	remarks
120	D381	1.0		0.37	
131		-----		-----	
132	D381	<1		-----	
140	D381	0		-0.53	
150	D381	1		0.37	
159	D381	1		0.37	
169	D381	0.0		-0.53	
171	D381	<1		-----	
175	D381	<1		-----	
194		-----		-----	
228		-----		-----	
237	D381	1.0		0.37	
238		-----		-----	
253	IP540	1.0		0.37	
273	D381	1		0.37	
311	IP540	<1		-----	
317	D381	1		0.37	
323	D381	2	R(0.05)	1.27	
333		-----		-----	
336		-----		-----	
340	D381	<0.5		-----	
353	IP540	0.2		-0.35	
360	D381	1.0		0.37	
391		-----		-----	
398		-----		-----	
399		-----		-----	
445	IP540	<1		-----	
447	IP540	1		0.37	
468	IP540	0.5		-0.08	
473	IP540	<1		-----	
594	GOST1567	0		-0.53	
601		-----		-----	
604		-----		-----	
606	IP540	0.2		-0.35	
631	IP540	0.03		-0.50	
633	IP540	0.75		0.14	
634		-----		-----	
671	D381	0.8		0.19	
784		-----		-----	
785		-----		-----	
823	D381	1.0		0.37	
824	IP540	<1		-----	
875		-----		-----	
904	D381	6.9	R(0.01)	5.69	
922	D381	1.0		0.37	
962		-----		-----	
963	D381	0.8		0.19	
974	D381	0.8		0.19	
998		-----		-----	
1039	ISO6246	<1		-----	
1049	D381	0		-0.53	
1059	D381Mod.	<1		-----	
1062	D381	0.2		-0.35	
1064	D381	0.0		-0.53	
1080		-----		-----	
1097	IP540	0.3		-0.26	
1105	D381	0.42		-0.15	
1109	IP540	0.3		-0.26	
1126		-----		-----	
1146		-----		-----	
1150	ISO6246	1.2		0.55	
1161		-----		-----	
1167	ISO6246	0.2		-0.35	
1191		-----		-----	
1237		-----		-----	
1264	D381	2.8	R(0.01)	1.99	
1284	IP540	0.6	C	0.01	first reported 1.6
1299	D381	0		-0.53	
1300	D381	0.7		0.10	
1318	IP540	0.1		-0.44	
1347	D381	< 0.1	-----		
1348	D381	0.6		0.01	
1357	D381	0.8		0.19	

lab	method	value	mark	z(targ)	remarks
1372	IP540	0.6		0.01	
1376	D381	0.4		-0.17	
1397		-----		-----	
1399		-----		-----	
1428	D381	0.4		-0.17	
1429		-----		-----	
1433		-----		-----	
1496	D381	0.1		-0.44	
1498		-----		-----	
1531		-----		-----	
1586	ISO6246	1.0		0.37	
1587	IP540	0.2		-0.35	
1610		-----		-----	
1631	IP540	1.1		0.46	
1634	D381	0.6		0.01	
1678		-----		-----	
1720		-----		-----	
1724	D381	1.0		0.37	
1740		-----		-----	
1776	IP540	3.6	R(0.01)	2.71	
1784	D381	0.5		-0.08	
1811	D381	0.6		0.01	
1813	IP540	0.002		-0.53	
1854	D381	0.4		-0.17	
1883	D381	0.8		0.19	
1961		-----		-----	
1979	D381	1.0		0.37	
2129	D381	0.6		0.01	
2130	D381	0.8		0.19	
2133	D381	<0,01		-----	
6028	ISO6246	1		0.37	
6035	ISO6246	0.40		-0.17	
6040		-----		-----	
6041	D381	1.0		0.37	

normality	OK
n	56
outliers	4
mean (n)	0.589
st.dev. (n)	0.3807
R(calc.)	1.066
R(D381:12)	3.106



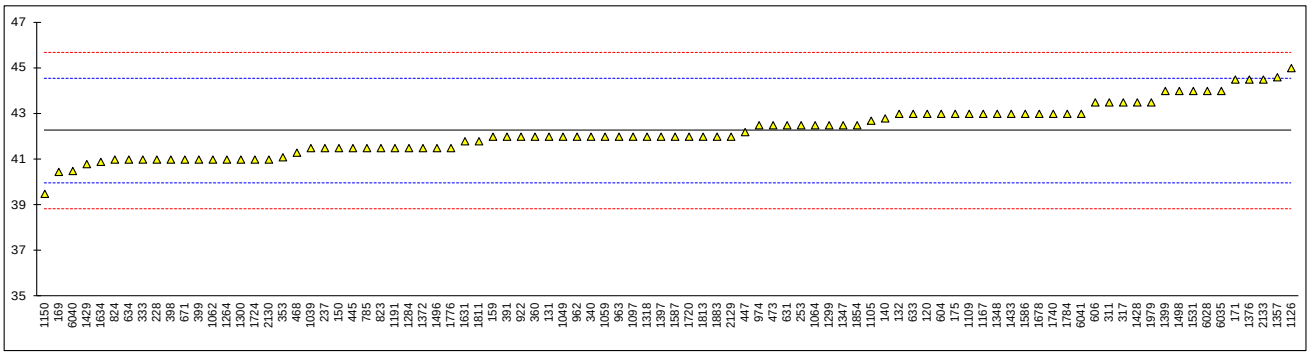


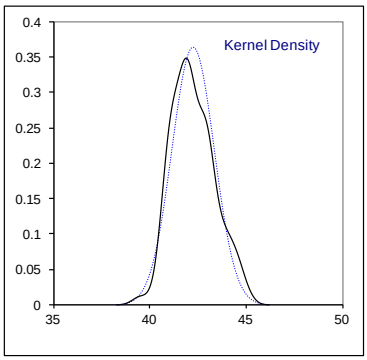
Determination of Flash Point on sample #16030; results in °C

lab	method	value	mark	z(targ)	remarks
120	D56	43.0		0.65	
131	D56	42.0		-0.22	
132	D56	43.0		0.65	
140	D56	42.8		0.48	
150	IP170	41.5		-0.66	
159	D56	42		-0.22	
169	D56	40.46		-1.57	
171	D93	44.5		1.96	
175	D56	43.0		0.65	
194		-----		-----	
228	IP523	41.0		-1.10	
237	IP170	41.5		-0.66	
238		-----		-----	
253	IP170	42.5		0.21	
273		-----		-----	
311	IP170	43.5		1.09	
317	IP170	43.5		1.09	
323		-----		-----	
333	IP170	41.0		-1.10	
336		-----		-----	
340	IP170	42.0		-0.22	
353	IP170	41.10		-1.01	
360	D56	42.0		-0.22	
391	IP170	42.0		-0.22	
398	D3828	41.0		-1.10	
399	IP170	41.0		-1.10	
445	IP170	41.5		-0.66	
447	IP170	42.2		-0.05	
468	IP170	41.3		-0.84	
473	IP170	42.5		0.21	
594		-----		-----	
601		-----		-----	
604	IP170	43.0		0.65	
606	IP170	43.5		1.09	
631	IP170	42.5		0.21	
633	D56	43.0		0.65	
634	D56	41.0		-1.10	
671	IP170	41.0		-1.10	
784		-----		-----	
785	ISO13736	41.5		-0.66	
823	IP170	41.5		-0.66	
824	IP170	41.0		-1.10	
875		-----		-----	
904		-----		-----	
922	IP170	42.0		-0.22	
962	D56	42.0		-0.22	
963	IP170	42.0		-0.22	
974	IP170	42.5		0.21	
998		-----		-----	
1039	IP170	41.5		-0.66	
1049	ISO13736	42.0		-0.22	
1059	IP170	42.0		-0.22	
1062	IP170	41.0		-1.10	
1064	IP170	42.5		0.21	
1080		-----		-----	
1097	ISO13736	42.0		-0.22	
1105	IP170	42.7		0.39	
1109	IP170	43.0		0.65	
1126	ISO2719	45.0		2.40	
1146		-----		-----	
1150	D56	39.5		-2.41	
1161		-----		-----	
1167	ISO2719	43.0		0.65	
1191	IP170	41.5		-0.66	
1237		-----		-----	
1264	IP170	41.0		-1.10	
1284	IP170	41.5		-0.66	
1299	IP170	42.5		0.21	
1300	ISO13736	41.0		-1.10	
1318	IP170	42.0		-0.22	
1347	IP170	42.5		0.21	
1348	IP170	43.0		0.65	
1357	D93	44.6		2.05	

lab	method	value	mark	z(targ)	remarks
1372	IP170	41.5		-0.66	
1376	D56	44.5		1.96	
1397	D56	42.0		-0.22	
1399	IP170	44.0	C	1.53	reported -44.0
1428	D93	43.5		1.09	
1429	D56	40.8		-1.27	
1433	D93	43.0		0.65	reported also D7094: 42.0
1496	IP170	41.5		-0.66	
1498	D56	44.0		1.53	
1531	D93	44		1.53	
1586	IP170	43.0		0.65	
1587	IP170	42.0		-0.22	
1610		-----		-----	
1631	IP170	41.8		-0.40	
1634	IP170	40.9		-1.19	
1678	D7094	43		0.65	
1720	D3828	42.0		-0.22	
1724	IP170	41		-1.10	
1740	IP170	43.0		0.65	
1776	IP170	41.5		-0.66	
1784	IP170	43.0		0.65	
1811	D56	41.8		-0.40	
1813	IP170	42.0		-0.22	
1854	IP170	42.5		0.21	
1883	D56	42		-0.22	
1961		-----		-----	
1979	D56	43.5		1.09	
2129	IP170	42.0		-0.22	
2130	IP170	41.0		-1.10	
2133	D93	44.5		1.96	
6028	ISO2719	44.0		1.53	
6035	ISO2719	44.0	C	1.53	first reported 45.00
6040	D56	40.5		-1.54	
6041	IP170	43.0		0.65	

normality	OK
n	90
outliers	0
mean (n)	42.26
st.dev. (n)	1.095
R(calc.)	3.07
R(IP170:14)	3.20



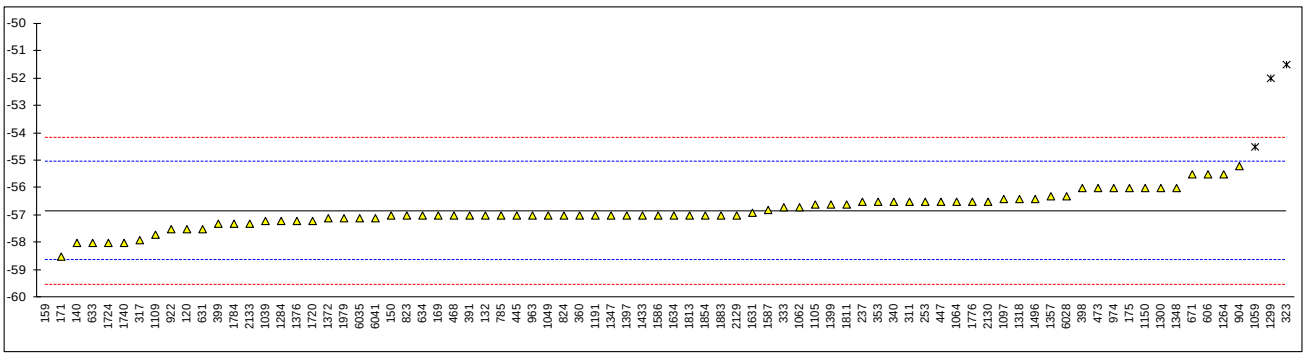


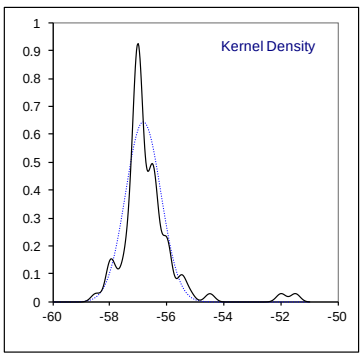
Determination of Freezing Point on sample #16030; results in °C

lab	method	value	mark	z(targ)	remarks
120	D2386	-57.5		-0.74	
131		-----		-----	
132	D2386	-57.0		-0.18	
140	D2386	-58		-1.30	
150	D7153	-57.0		-0.18	
159	D2386	-61.0	R(0.01)	-4.66	
169	D2386	-57.0		-0.18	
171	D2386	-58.5		-1.86	
175	D2386	-56		0.94	
194		-----		-----	
228		-----		-----	
237	D2386	-56.5		0.38	
238		-----		-----	
253	D2386	-56.5		0.38	
273		-----		-----	
311	D2386	-56.5		0.38	
317	D5972	-57.9		-1.19	
323	D2386	-51.5	R(0.01)	5.98	
333	IP529	-56.7		0.15	
336		-----		-----	
340	D2386	-56.5		0.38	
353	IP16	-56.5		0.38	
360	D7153	-57.0		-0.18	
391	D2386	-57.0		-0.18	
398	D2386	-56		0.94	
399	D7153	-57.3		-0.52	
445	IP529	-57.0		-0.18	
447	IP529	-56.5		0.38	reported also: IP16: -56.5
468	D2386	-57.0		-0.18	
473	D2386	-56.0		0.94	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606	D2386	-55.5		1.50	
631	D2386	-57.5		-0.74	
633	D2386	-58.0		-1.30	
634	D2386	-57.0		-0.18	
671	D2386	-55.5		1.50	
784		-----		-----	
785	D2386	-57		-0.18	
823	D2386	-57.0		-0.18	
824	D2386	-57.0		-0.18	
875		-----		-----	
904	D2386	-55.2		1.83	
922	D2386	-57.5		-0.74	
962		-----		-----	
963	D2386	-57.0		-0.18	
974	D2386	-56.0		0.94	
998		-----		-----	
1039	IP529	-57.2		-0.41	
1049	D7153	-57.0		-0.18	
1059	D2386	-54.5	R(0.05)	2.62	
1062	D7153	-56.7		0.15	
1064	D7153	-56.5		0.38	
1080		-----		-----	
1097	IP529	-56.4		0.49	
1105	D7153	-56.6		0.27	
1109	D5972	-57.7		-0.97	
1126		-----		-----	
1146		-----		-----	
1150	D2386	-56		0.94	
1161		-----		-----	
1167		-----		-----	
1191	IP529	-57		-0.18	
1237		-----		-----	
1264	D2386	-55.5		1.50	
1284	D7153	-57.2		-0.41	
1299	D2386	-52.0	R(0.01)	5.42	
1300	D2386	-56		0.94	
1318	D7153	-56.4		0.49	
1347	D2386	-57.0		-0.18	
1348	D2386	-56.0		0.94	
1357	D2386	-56.3		0.60	

lab	method	value	mark	z(targ)	remarks
1372	D7153	-57.1		-0.29	
1376	D7153	-57.2		-0.41	
1397	D7153	-57.0		-0.18	
1399	D7153	-56.6		0.27	
1428		-----		-----	
1429		-----		-----	
1433	D7153	-57		-0.18	
1496	D5972	-56.4		0.49	
1498		-----		-----	
1531		-----		-----	
1586	D2386	-57		-0.18	
1587	IP529	-56.8		0.04	
1610		-----		-----	
1631	D7153	-56.9		-0.07	
1634	D2386	-57.0		-0.18	
1678		-----		-----	
1720	D5972	-57.2		-0.41	
1724	D5972	-58		-1.30	
1740	D2386	-58		-1.30	
1776	IP529	-56.5		0.38	
1784	D2386	-57.3		-0.52	
1811	D2386	-56.6		0.27	
1813	D5972	-57.0		-0.18	
1854	D2386	-57		-0.18	
1883	D2386	-57		-0.18	
1961		-----		-----	
1979	D7153	-57.1		-0.29	
2129	D2386	-57.0		-0.18	
2130	D2386	-56.5		0.38	
2133	D7153	-57.3		-0.52	
6028	D7153	-56.3		0.60	
6035	D7153	-57.10		-0.29	
6040		-----		-----	
6041	D7153	-57.1		-0.29	

normality	OK
n	76
outliers	4
mean (n)	-56.84
st.dev. (n)	0.619
R(calc.)	1.73
R(D2386:15e1)	2.50





Determination of JFTOT at 260 °C; Tube Rating, Delta P in mmHg, Pumped Vol. in mL, Temp. in °C

lab	method	Tube rating	mark	Delta P	mark	Volume	mark	Temp	mark	remarks
120	D3241	<1		0		475		260		
131		-----		-----		-----		-----		
132	D3241	<1		0.0		450		260		
140	D3241	1		0		450		260		
150	D3241	<1		0		475		260		
159	D3241	1		0		450		260		
169	D3241	1		0		450		260		
171	D3241	<1		0		450		260		
175	D3241	<1		0		440		260		
194	D3241	1		0		450		260		
228		-----		-----		-----		-----		
237	D3241	1		0		460		260		
238		-----		-----		-----		-----		
253	D3241	<1		0		450		260		
273		-----		-----		-----		-----		
311	D3241	1		1		460		260		
317		-----		-----		-----		-----		
323		-----		-----		-----		-----		
333		-----		-----		-----		-----		
336		-----		-----		-----		-----		
340	D3241	1		0		450		260		
353		-----		-----		-----		-----		
360	D3241	0		0		450		260		
391	D3241	0		0		450		260		
398		-----		-----		-----		-----		
399	D3241	1		0		450		260		
445	IP323	1		<1		480		260		
447	D3241	1		<1		450		260		
468		-----		-----		-----		-----		
473		-----		-----		-----		-----		
594		-----		-----		-----		-----		
601		-----		-----		-----		-----		
604		-----		-----		-----		-----		
606		-----		-----		-----		-----		
631	D3241	<1		<1.0		500		260		
633		-----		-----		-----		-----		
634		-----		-----		-----		-----		
671	D3241	<1		0		450		260		
784		-----		-----		-----		-----		
785		-----		-----		-----		-----		
823	D3241	1		0.0		450		260		
824	D3241	1		0		450		260		
875		-----		-----		-----		-----		
904		-----		-----		-----		-----		
922		-----		-----		-----		-----		
962		-----		-----		-----		-----		
963	D3241	<1		0		450		260		
974	D3241	<1		0		470		260		
998		-----		-----		-----		-----		
1039	D3241	0		0.1		450		260		
1049	D3241	1		0.0		450		260		
1059		-----		-----		-----		-----		
1062	D3241	1		0		520		260		
1064	D3241	1		0		510		260		
1080		-----		-----		-----		-----		
1097	D3241	1		0.0		455		260		
1105	D3241	1		zero		454		260		
1109	D3241	<1		0.1		450		260		
1126		-----		-----		-----		-----		
1146	D3241	1		0		450		260		
1150		-----		-----		-----		-----		
1161		-----		-----		-----		-----		
1167		-----		-----		-----		-----		
1191		-----		-----		-----		-----		
1237	D3241	1		0.0		455		260		
1264	D3241	1		0		460		260		
1284		-----		-----		-----		-----		
1299	D3241	1		0		450		260		
1300		-----		-----		-----		-----		
1318	D3241	<1		0.1		450		260		
1347	D3241	1		0		450		260		
1348	D3241	1		0		500		260		
1357	D3241	<1		0		480		260		
1372	D3241	<3		0.0		460		260		

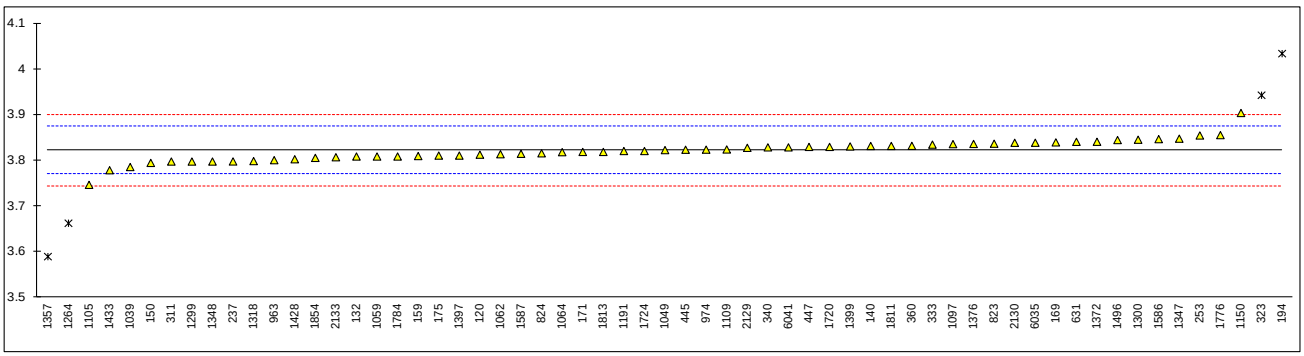
lab	method	Tube rating	mark	Delta P	mark	Volume	mark	Temp	mark	remarks
1376	D3241	<1		1		450		260		
1397		-----		-----		-----		-----		
1399		-----		-----		-----		-----		
1428	D3241	<1		0		460		260		
1429		-----		-----		-----		-----		
1433	D3241	1		0		450		260		
1496	D3241	0		0.0		450		260		
1498		-----		-----		-----		-----		
1531		-----		-----		-----		-----		
1586		-----		-----		-----		-----		
1587	D3241	<1		0.1		450		260		
1610		-----		-----		-----		-----		
1631	D3241	<1.0		0.0		-----		260		
1634	D3241	1		0		-----		-----		
1678		-----		-----		-----		-----		
1720	D3241	0.0		0.0		459.0		260		
1724	D3241	1		0		510		-----		
1740		-----		-----		-----		-----		
1776		-----		-----		-----		-----		
1784	D3241	<1		1		460		260		
1811		-----		-----		-----		-----		
1813	D3241	1		1.0		450.0		260.0		
1854	D3241	<1		1		460		260		
1883		-----		-----		-----		-----		
1961	D3241	<1		0.0		455		260		
1979		-----		-----		-----		-----		
2129	IP323	1		0		445		260		
2130	D3241	<1		0.1		510		260		
2133	D3241	<1		0.0		510		260		
6028	D3241	-----		0.0		474.0		260		
6035	D3241	1		0.0		-----		260.0		
6040		-----		-----		-----		-----		
6041	D3241	1		0.1		469		260		
	normality	not OK		not OK						
	n	57		55						
	outliers	0		0						
	mean (n)	≤ 1		0.10						
	st.dev. (n)	n.a.		0.288						
	R(calc.)	n.a.		0.81						
	R(D3241:16)	n.a.		n.a.						

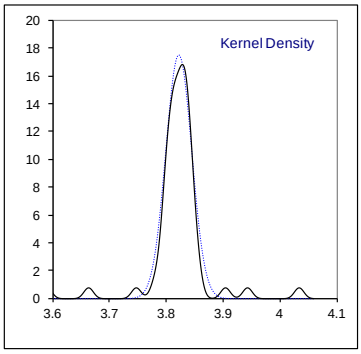
Determination of Kinematic Viscosity at -20°C on sample #16030; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	D445	3.813		-0.34	
131		-----		-----	
132	D445	3.8090		-0.50	
140	D445	3.832		0.39	
150	D445	3.795		-1.04	
159	D445	3.810		-0.46	
169	D445	3.8399		0.70	
171	D445	3.819		-0.11	
175	D445	3.811		-0.42	
194	D445	4.034	R(0.01)	8.18	
228		-----		-----	
237	D445	3.79821		-0.91	
238		-----		-----	
253	D445	3.855		1.28	
273		-----		-----	
311	D445	3.798		-0.92	
317		-----		-----	
323	D445	3.943	R(0.01)	4.67	
333	D445	3.835		0.51	
336		-----		-----	
340	D445	3.8290		0.28	
353		-----		-----	
360	D445	3.8323		0.40	
391		-----		-----	
398		-----		-----	
399		-----		-----	
445	IP71	3.8238		0.08	
447	D445	3.830		0.31	
468		-----		-----	
473		-----		-----	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606		-----		-----	
631	D445	3.8411		0.74	
633		-----		-----	
634		-----		-----	
671		-----		-----	
784		-----		-----	
785		-----		-----	
823	D445	3.837		0.58	
824	D445	3.816		-0.23	
875		-----		-----	
904		-----		-----	
922		-----		-----	
962		-----		-----	
963	D445	3.801		-0.80	
974	D445	3.824		0.08	
998		-----		-----	
1039	ISO3104	3.786		-1.38	
1049	D445	3.823	C	0.04	first reported 4.132
1059	D445	3.809		-0.50	
1062	D445	3.814		-0.30	
1064	D445	3.8185		-0.13	
1080		-----		-----	
1097	ISO3104	3.8361		0.55	
1105	D445	3.747	C	-2.89	first reported 3.9947
1109	D445	3.8244		0.10	
1126		-----		-----	
1146		-----		-----	
1150	ISO3104	3.9042		3.18	
1161		-----		-----	
1167		-----		-----	
1191	D445	3.821		-0.03	
1237		-----		-----	
1264	D445	3.663	R(0.01)	-6.13	
1284		-----		-----	
1299	D445	3.798		-0.92	
1300	D7042	3.8457		0.92	
1318	D7042	3.7990		-0.88	
1347	D445	3.848		1.01	
1348	D445	3.798		-0.92	
1357	D445	3.590	R(0.01)	-8.94	

lab	method	value	mark	z(targ)	remarks
1372	D445	3.8412		0.75	
1376	D445	3.8365		0.57	
1397	D7042	3.811		-0.42	
1399	D445	3.831		0.35	
1428	D445	3.803	C	-0.73	first reported 2.803
1429		-----		-----	
1433	D445	3.779		-1.65	
1496	D445	3.845		0.89	
1498		-----		-----	
1531		-----		-----	
1586	D445	3.847	C	0.97	first reported 2.824
1587	D445	3.8149		-0.27	
1610		-----		-----	
1631		-----		-----	
1634		-----		-----	
1678		-----		-----	
1720	D7042	3.830		0.31	
1724	D445	3.821		-0.03	
1740		-----		-----	
1776	D445	3.8558		1.31	
1784	D445	3.809		-0.50	
1811	D445	3.8321		0.40	
1813	D445	3.819		-0.11	
1854	D445	3.806		-0.61	
1883		-----		-----	
1961		-----		-----	
1979		-----		-----	
2129	D445	3.828		0.24	
2130	D445	3.839		0.66	
2133	D445	3.8074		-0.56	
6028		-----		-----	
6035	ISO3104	3.8391		0.67	
6040		-----		-----	
6041	D445	3.829		0.28	

normality	not OK
n	57
outliers	4
mean (n)	3.8218
st.dev. (n)	0.02285
R(calc.)	0.0640
R(D445:15a)	0.0726



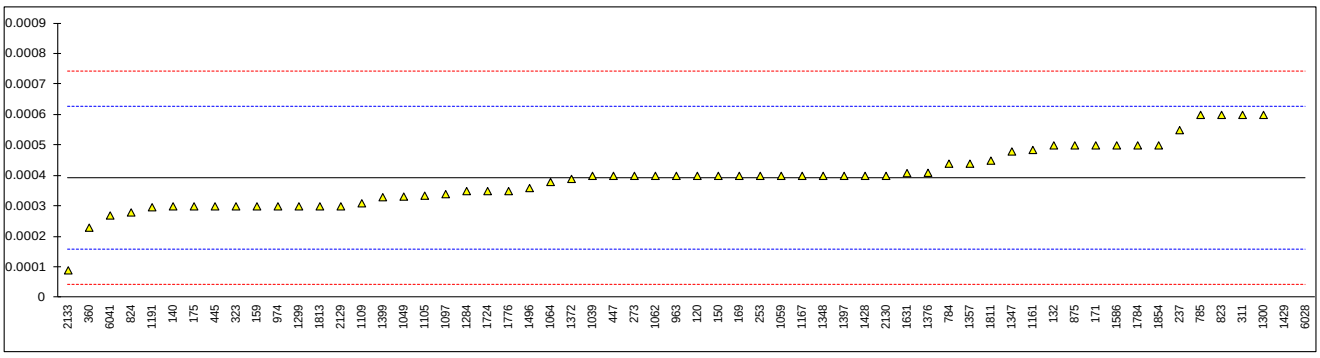


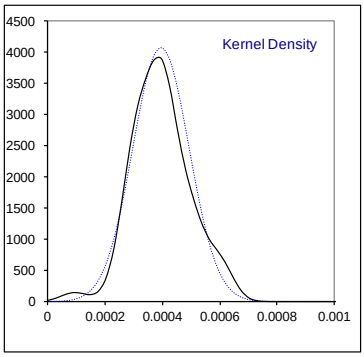
Determination of Mercaptan Sulphur as S on sample #16030; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D3227	0.0004		0.07	
131		-----		-----	
132	D3227	0.0005		0.92	
140	D3227	0.0003		-0.79	
150	D3227	0.0004		0.07	
159	D3227	0.0003		-0.79	
169	D3227	0.0004		0.07	
171	D3227	0.0005		0.92	
175	D3227	0.0003		-0.79	
194		-----		-----	
228		-----		-----	
237	D3227	0.00055		1.35	
238		-----		-----	
253	D3227	0.0004		0.07	
273	D3227	0.0004		0.07	
311	D3227	0.0006		1.78	
317		-----		-----	
323	D3227	0.0003		-0.79	
333		-----		-----	
336		-----		-----	
340	D3227	<0.0003		-----	
353		-----		-----	
360	D3227	0.00023		-1.39	
391		-----		-----	
398		-----		-----	
399		-----		-----	
445	IP342	0.0003	C	-0.79	reported 0.0003 mg/kg
447	D3227	0.0004		0.07	
468		-----		-----	
473		-----		-----	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606		-----		-----	
631		-----		-----	
633		-----		-----	
634		-----		-----	
671		-----		-----	
784	D3227	0.00044		0.41	
785	D3227	0.0006		1.78	
823	D3227	0.0006		1.78	
824	D3227	0.00028		-0.96	
875	D3227	0.0005		0.92	
904		-----		-----	
922	D3227	<0.0003		-----	
962		-----		-----	
963	D3227	0.0004		0.07	
974	D3227	0.0003		-0.79	
998		-----		-----	
1039	IP342	0.0004		0.07	
1049	D3227	0.000332		-0.52	
1059	D3227	0.0004		0.07	
1062	D3227	0.0004		0.07	
1064	D3227	0.00038		-0.11	
1080		-----		-----	
1097	ISO3012	0.00034		-0.45	
1105	D3227	0.0003350		-0.49	
1109	D3227	0.00031		-0.71	
1126		-----		-----	
1146		-----		-----	
1150		-----		-----	
1161	ISO3012	0.000485		0.79	
1167	ISO3012	0.0004		0.07	
1191	ISO3012	0.000297		-0.82	
1237		-----		-----	
1264	D3227	<0.0003		-----	
1284	D3227	0.00035		-0.36	
1299	D3227	0.0003		-0.79	
1300	D3227	0.0006		1.78	
1318		-----		-----	
1347	D3227	0.00048		0.75	
1348	D3227	0.0004		0.07	
1357	D3227	0.00044		0.41	

lab	method	value	mark	z(targ)	remarks
1372	D3227	0.00039		-0.02	
1376	D3227	0.00041		0.15	
1397	D3227	0.0004		0.07	
1399	D3227	0.00033		-0.53	
1428	D3227	0.0004		0.07	
1429	D3227	0.0013	R(0.01)	7.78	
1433		-----		-----	
1496	D3227	0.00036		-0.28	
1498		-----		-----	
1531		-----		-----	
1586	D3227	0.0005		0.92	
1587		-----		-----	
1610		-----		-----	
1631	D3227	0.000409		0.14	
1634		-----		-----	
1678		-----		-----	
1720		-----		-----	
1724	D3227	0.00035		-0.36	
1740		-----		-----	
1776	UOP163	0.00035		-0.36	
1784	D3227	0.0005		0.92	
1811	D3227	0.00045		0.49	
1813	D3227	0.00030		-0.79	
1854	D3227	0.0005		0.92	
1883		-----		-----	
1961		-----		-----	
1979		-----		-----	
2129	D3227	0.0003		-0.79	
2130	D3227	0.0004		0.07	
2133	D3227	0.00009		-2.59	
6028	UOP163	0.0069	C,R(0.01)	55.81	first reported 0.0007898
6035		-----		-----	
6040		-----		-----	
6041	D3227	0.00027		-1.05	

normality	OK
n	58
outliers	2
mean (n)	0.000392
st.dev. (n)	0.0000983
R(calc.)	0.000275
R(D3227:13)	0.000326



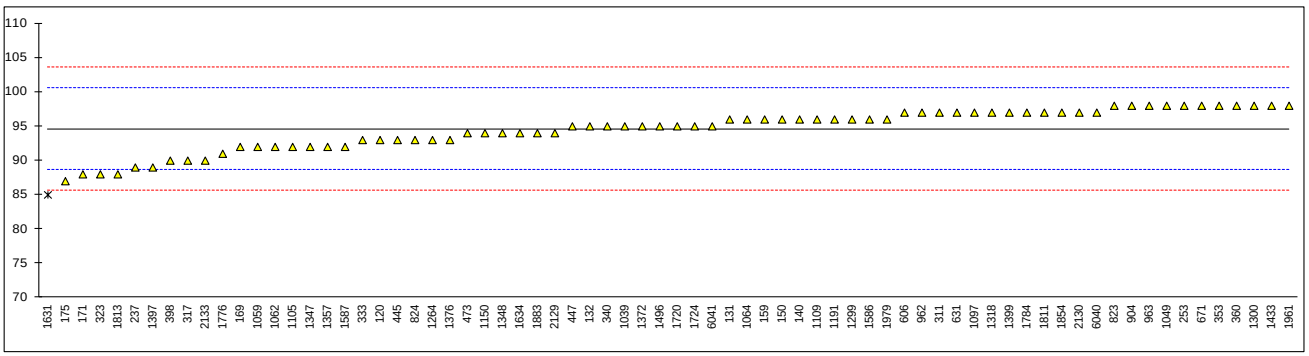


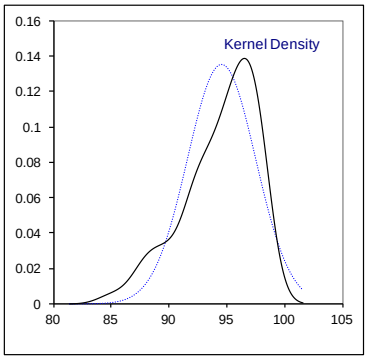
Determination of MSEP on sample #16030;

lab	method	value	mark	z(targ)	remarks
120	D3948	93		-0.52	
131	D3948	96		0.49	
132	D3948	95		0.15	
140	D3948	96		0.49	
150	D3948	96		0.49	
159	D3948	96		0.49	
169	D3948	92		-0.85	
171	D3948	88		-2.19	
175	D3948	87		-2.52	
194		-----		-----	
228		-----		-----	
237	D3948	89		-1.86	
238		-----		-----	
253	D3948	98		1.15	
273		-----		-----	
311	D3948	97		0.82	
317	D3948	90		-1.52	
323	D3948	88		-2.19	
333	D3948	93		-0.52	
336		-----		-----	
340	D3948	95		0.15	
353	D3948	98		1.15	
360	D3948	98		1.15	
391		-----		-----	
398	D3948	90		-1.52	
399		-----		-----	
445	D3948	93		-0.52	
447	D3948	95		0.15	
468		-----		-----	
473	D3948	94		-0.18	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606	D3948	97		0.82	
631	D3948	97		0.82	
633		-----		-----	
634		-----		-----	
671	D3948	98		1.15	
784		-----		-----	
785		-----		-----	
823	D3948	98		1.15	
824	D3948	93		-0.52	
875		-----		-----	
904	D3948	98		1.15	
922		-----		-----	
962	D3948	97		0.82	
963	D3948	98		1.15	
974		-----		-----	
998		-----		-----	
1039	D3948	95		0.15	
1049	D3948	98		1.15	
1059	D3948	92		-0.85	
1062	D3948	92		-0.85	
1064	D3948	96		0.49	
1080		-----		-----	
1097	D3948	97		0.82	
1105	D3948	92		-0.85	
1109	D3948	96		0.49	
1126		-----		-----	
1146		-----		-----	
1150	D3948	94		-0.18	
1161		-----		-----	
1167		-----		-----	
1191	D3948	96		0.49	
1237		-----		-----	
1264	D3948	93		-0.52	
1284		-----		-----	
1299	D3948	96		0.49	
1300	D3948	98		1.15	
1318	D3948	97		0.82	
1347	D3948	92		-0.85	
1348	D3948	94		-0.18	
1357	D3948	92		-0.85	

lab	method	value	mark	z(targ)	remarks
1372	D3948	95		0.15	
1376	D3948	93		-0.52	
1397	D3948	89		-1.86	
1399	D3948	97		0.82	
1428		-----		-----	
1429		-----		-----	
1433	D3948	98		1.15	
1496	D3948	95		0.15	
1498		-----		-----	
1531		-----		-----	
1586	D3948	96.0		0.49	
1587	D3948	92		-0.85	
1610		-----		-----	
1631	D3948	85	R(0.05)	-3.19	
1634	D3948	94		-0.18	
1678		-----		-----	
1720	D3948	95		0.15	
1724	D3948	95		0.15	
1740		-----		-----	
1776	D3948	91		-1.19	
1784	D3948	97		0.82	
1811	D3948	97		0.82	
1813	D3948	88		-2.19	
1854	D3948	97		0.82	
1883	D3948	94		-0.18	
1961	D3948	98		1.15	
1979	D3948	96		0.49	
2129	D3948	94		-0.18	
2130	D3948	97		0.82	
2133	D3948	90		-1.52	
6028		-----		-----	
6035		-----		-----	
6040	D3948	97		0.82	
6041	D3948	95		0.15	

normality	OK
n	71
outliers	1
mean (n)	94.55
st.dev. (n)	2.951
R(calc.)	8.26
R(D3948:14)	8.37



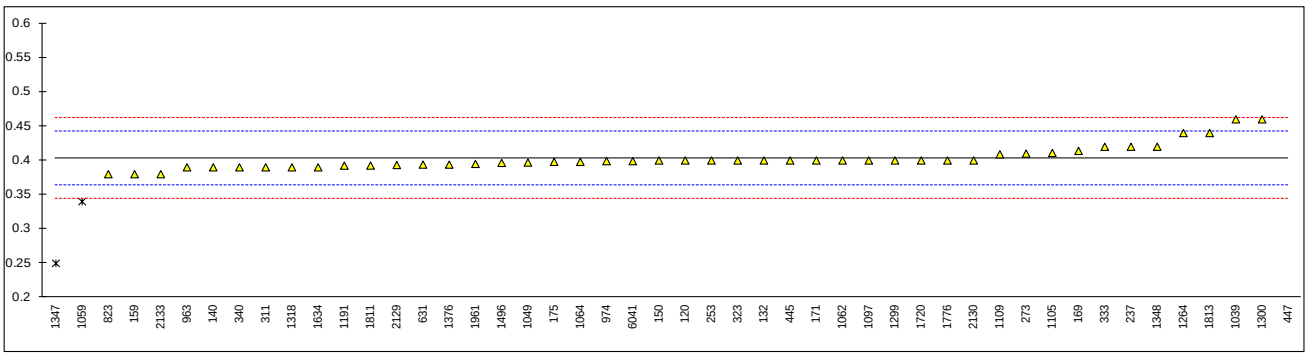


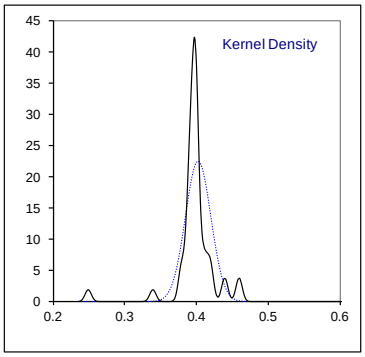
Determination of Naphthalenes on sample #16030; results in %V/V

lab	method	value	mark	z(targ)	remarks
120	D1840 - meth.B	0.40		-0.15	
131		-----		-----	
132	D1840 - meth.B	0.40		-0.15	
140	D1840 - meth.A	0.39	C	-0.67	first reported 0.77
150	D1840 - meth.A	0.40		-0.15	
159	D1840 - meth.B	0.38		-1.18	
169	D1840 - meth.B	0.414		0.57	
171	D1840 - meth.B	0.40		-0.15	
175	D1840 - meth.B	0.398		-0.25	
194		-----		-----	
228		-----		-----	
237	D1840 - meth.B	0.42		0.88	
238		-----		-----	
253	D1840 - meth.B	0.40	C	-0.15	first reported 0.16
273	D1840 - meth.B	0.41		0.36	
311	D1840 - meth.B	0.39		-0.67	
317		-----		-----	
323	D1840 - meth.A	0.40		-0.15	
333	D1840 - meth.B	0.42		0.88	
336		-----		-----	
340	D1840 - meth.B	0.39		-0.67	
353		-----		-----	
360		-----		-----	
391		-----		-----	
398		-----		-----	
399		-----		-----	
445	D1840 - meth.B	0.40		-0.15	
447	D1840 - meth.B	0.92	R(0.01)	26.57	
468		-----		-----	
473		-----		-----	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606		-----		-----	
631	D1840 - meth.A	0.394		-0.46	
633		-----		-----	
634		-----		-----	
671		-----		-----	
784		-----		-----	
785		-----		-----	
823	D1840 - meth.B	0.38		-1.18	
824		-----		-----	
875		-----		-----	
904		-----		-----	
922		-----		-----	
962		-----		-----	
963	D1840 - meth.B	0.39		-0.67	
974	D1840 - meth.A	0.399		-0.20	
998		-----		-----	
1039	D1840 - meth.A	0.46		2.93	
1049	D1840 - meth.A	0.397		-0.31	
1059	D1840 - meth.B	0.34	R(0.05)	-3.24	
1062	D1840 - meth.A	0.40		-0.15	
1064	D1840 - meth.A	0.398		-0.25	
1080		-----		-----	
1097	D1840 - meth.A	0.400		-0.15	
1105	D1840 - meth.A	0.411		0.41	
1109	D1840 - meth.A	0.409		0.31	
1126		-----		-----	
1146		-----		-----	
1150		-----		-----	
1161		-----		-----	
1167		-----		-----	
1191	D1840 - meth.A	0.3925		-0.54	
1237		-----		-----	
1264	D1840 - meth.A	0.44		1.90	
1284		-----		-----	
1299	D1840 - meth.A	0.40		-0.15	
1300	D1840 - meth.B	0.460		2.93	
1318	D1840 - meth.B	0.39		-0.67	
1347	D1840 - meth.B	0.25	R(0.01)	-7.86	
1348	D1840 - meth.B	0.42		0.88	
1357		-----		-----	

lab	method	value	mark	z(targ)	remarks
1372		-----		-----	
1376	D1840 - meth.A	0.394		-0.46	
1397		-----		-----	
1399		-----		-----	
1428		-----		-----	
1429		-----		-----	
1433		-----		-----	
1496	D1840 - meth.B	0.3965		-0.33	
1498		-----		-----	
1531		-----		-----	
1586		-----		-----	
1587		-----		-----	
1610		-----		-----	
1631		-----		-----	
1634	D1840 - meth.B	0.39		-0.67	
1678		-----		-----	
1720	D1840 - meth.B	0.40		-0.15	
1724		-----		-----	
1740		-----		-----	
1776	D1840 - meth.A	0.40	C	-0.15	first reported 0.78
1784		-----		-----	
1811	D1840 - meth.A	0.3926		-0.53	
1813	D1840 - meth.A	0.44		1.90	
1854		-----		-----	
1883		-----		-----	
1961	D1840 - meth.B	0.395		-0.41	
1979		-----		-----	
2129	D1840 - meth.B	0.3934		-0.49	
2130	D1840 - meth.B	0.40		-0.15	
2133	D1840 - meth.A	0.380		-1.18	
6028		-----		-----	
6035		-----		-----	
6040		-----		-----	
6041	D1840 - meth.B	0.399		-0.20	

			Test results D1840-A only	**Test results D1840-B only**
	normality	not OK	not OK	not OK
	n	45	20	25
	outliers	3	0	3
	mean (n)	0.40296	0.40486	0.40144
	st.dev. (n)	0.017702	0.019504	0.016369
	R(calc.)	0.04957	0.05461	0.04583
	R(D1840:07-B)	0.05449	0.04201 (sub A)	0.05436 (sub B)

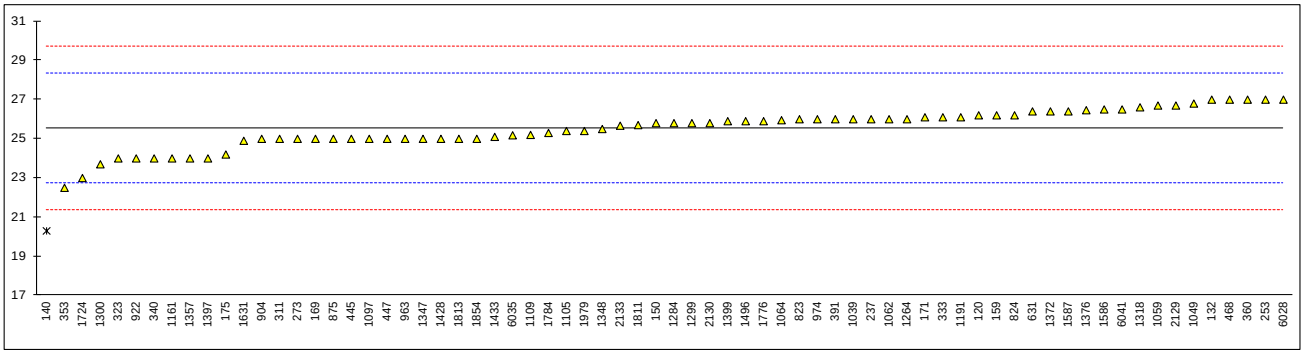


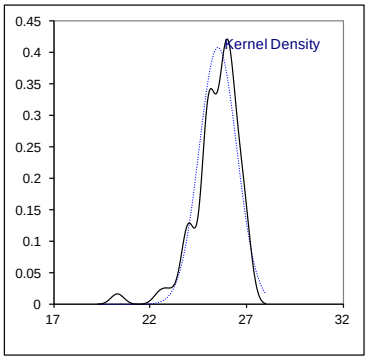


Determination of Smoke Point on sample #16030; results in mm

lab	method	mode	value	mark	z(targ)	remarks
120	D1322	Automated	26.2		0.48	
131			-----		-----	
132	D1322	Manual	27.0		1.05	
140	D1322	Automated	20.3	R(0.01)	-3.77	
150		Automated	25.8		0.19	
159	D1322	Automated	26.2		0.48	
169	D1322	Manual	25.0		-0.39	
171	D1322	Automated	26.1		0.41	
175	D1322	Manual	24.2		-0.96	
194			-----		-----	
228			-----		-----	
237	D1322	Automated	26.0		0.33	
238			-----		-----	
253	D1322	Manual	27		1.05	
273	D1322		25		-0.39	
311	D1322	Manual	25.0		-0.39	
317			-----		-----	
323	D1322	Manual	24.0		-1.11	
333	D1322	Automated	26.1		0.41	
336			-----		-----	
340	D1322	Manual	24.0		-1.11	
353	IP57	Manual	22.5		-2.19	
360	D1322	Manual	27.0		1.05	
391	D1322	Manual	26.0		0.33	
398			-----		-----	
399			-----		-----	
445	IP598	Manual	25.0		-0.39	
447	D1322	Manual	25.0		-0.39	
468	D1322	Manual	27.0		1.05	
473			-----		-----	
594			-----		-----	
601			-----		-----	
604			-----		-----	
606			-----		-----	
631	D1322	Automated	26.4		0.62	
633			-----		-----	
634			-----		-----	
671			-----		-----	
784			-----		-----	
785			-----		-----	
823	D1322	Automated	26.0		0.33	
824	D1322	Automated	26.2		0.48	
875	D1322	Manual	25.0		-0.39	
904	D1322	Manual	25		-0.39	
922	D1322	Manual	24		-1.11	
962			-----		-----	
963	D1322	Manual	25		-0.39	
974	D1322	Manual	26		0.33	
998			-----		-----	
1039	D1322	Manual	26.0		0.33	
1049	D1322	Automated	26.8		0.91	
1059	D1322	Manual	26.7		0.84	
1062	D1322	Manual	26.0		0.33	
1064	D1322	Automated	25.95		0.30	
1080			-----		-----	
1097	D1322	Manual	25.0		-0.39	
1105	IP57	Automated	25.4		-0.10	
1109	D1322	Manual	25.2		-0.24	
1126			-----		-----	
1146			-----		-----	
1150			-----		-----	
1161	ISO3014	Manual	24.0		-1.11	
1167			-----		-----	
1191	D1322	Automated	26.1		0.41	
1237			-----		-----	
1264	D1322	Manual	26		0.33	
1284	D1322	Automated	25.8		0.19	
1299	D1322	Automated	25.8		0.19	
1300	D1322	Manual	23.7		-1.32	
1318	D1322	Manual	26.608		0.77	
1347	D1322	Manual	25.0		-0.39	
1348	D1322	Manual	25.5		-0.03	
1357	D1322		24		-1.11	

lab	method	mode	value	mark	z(targ)	remarks		
1372	D1322	Automated	26.4		0.62			
1376	D1322	Manual	26.46		0.67			
1397	D1322		24		-1.11			
1399	D1322	Automated	25.9		0.26			
1428	D1322	Manual	25		-0.39			
1429			-----		-----			
1433	D1322	Manual	25.1		-0.31			
1496	D1322	Automated	25.9		0.26			
1498			-----		-----			
1531			-----		-----			
1586	D1322	Manual	26.5		0.69			
1587	D1322	Automated	26.4		0.62			
1610			-----		-----			
1631	D1322	Manual	24.9		-0.46			
1634			-----		-----			
1678			-----		-----			
1720			-----		-----			
1724	D1322		23		-1.83			
1740			-----		-----			
1776	D1322	Automated	25.9		0.26			
1784	D1322	Manual	25.3		-0.17			
1811	D1322	Automated	25.70		0.12			
1813	D1322	Manual	25.0		-0.39			
1854		Manual	25.0		-0.39			
1883			-----		-----			
1961			-----		-----			
1979	IP598	Automated	25.4		-0.10			
2129	D1322	Manual	26.7		0.84			
2130	D1322	Automated	25.8		0.19			
2133	D1322	Manual	25.67		0.10			
6028	ISO3014		27.0		1.05			
6035	ISO3014	Manual	25.18		-0.26			
6040			-----		-----		**Test results D1322 Automated only**	**Test results D1322 Manual only**
6041	D1322	Automated	26.5		0.69			
	normality	Auto/Man/?	OK				OK	OK
	n	25/40/5	69				21	35
	outliers		1				1	0
	mean (n)		25.54				26.10	25.50
	st.dev. (n)		0.981				0.278	0.957
	R(calc.)		2.75				0.78	2.68
	R(D1322:15e1-M)		3.89	Compare R(D1322:15e1-A) = 0.92			0.93 (Auto)	3.89 (Man)



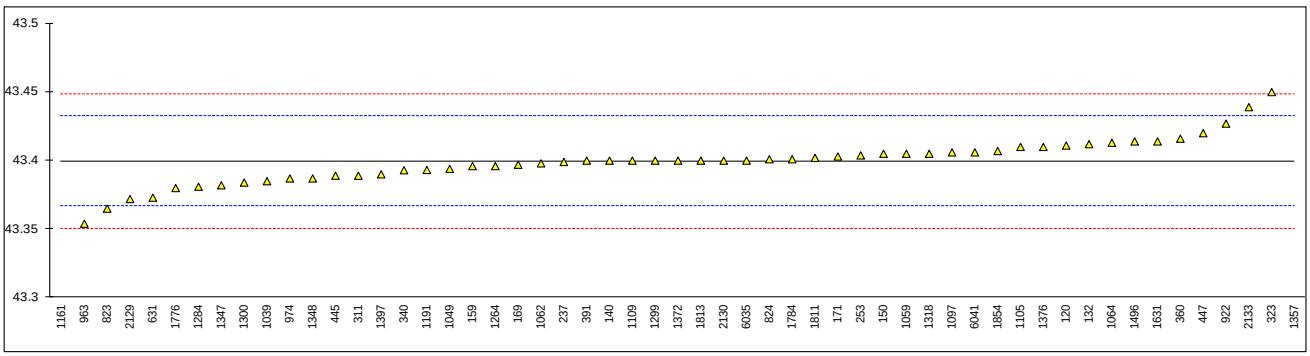


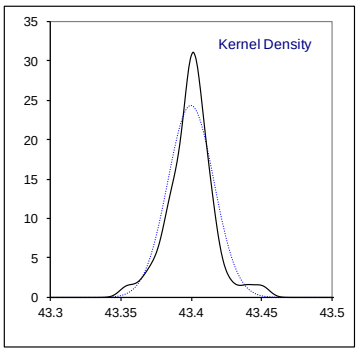
Determination of Specific Energy (Net, on Sulphur free basis) on sample #16030; results in MJ/kg

lab	method	value	mark	z(targ)	remarks
120	D3338	43.411		0.71	
131		-----		-----	
132	D3338	43.412		0.77	
140	D3338	43.4		0.04	
150	D3338	43.405		0.34	
159	D3338	43.396		-0.20	
169	D3338	43.397		-0.14	
171	D3338	43.403		0.22	
175		-----		-----	
194		-----		-----	
228		-----		-----	
237	D3338	43.399		-0.02	
238		-----		-----	
253	D3338	43.4038		0.27	
273		-----		-----	
311	D3338	43.389		-0.63	
317		-----		-----	
323	D3338	43.45		3.08	
333		-----		-----	
336		-----		-----	
340	D3338	43.393		-0.39	
353		-----		-----	
360	D3338	43.416		1.01	
391	D3338	43.40		0.04	
398		-----		-----	
399		-----		-----	
445	D3338	43.389		-0.63	
447	D3338	43.420		1.26	
468		-----		-----	
473		-----		-----	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606		-----		-----	
631	D3338	43.3730		-1.60	
633		-----		-----	
634		-----		-----	
671		-----		-----	
784		-----		-----	
785		-----		-----	
823	D3338	43.365		-2.09	
824	D3338	43.401		0.10	
875		-----		-----	
904		-----		-----	
922	D3338	43.427		1.68	
962		-----		-----	
963	D3338	43.354		-2.76	
974	D3338	43.387		-0.75	
998		-----		-----	
1039	D3338	43.385		-0.87	
1049	D3338	43.3940		-0.33	
1059	D3338	43.405		0.34	
1062	D3338	43.398		-0.08	
1064	D3338	43.4130		0.83	
1080		-----		-----	
1097	D3338	43.406		0.41	
1105	D3338	43.41		0.65	
1109	D3338	43.40		0.04	
1126		-----		-----	
1146		-----		-----	
1150		-----		-----	
1161	D3338	43.216	C,R(0.01)	-11.16	first reported 43.349
1167		-----		-----	
1191	D3338	43.3932	C	-0.37	first reported 49.3932
1237		-----		-----	
1264	D3338	43.396		-0.20	
1284	D3338	43.381		-1.12	
1299	D3338	43.40		0.04	
1300	D3338	43.384		-0.93	
1318	D3338	43.405		0.34	
1347	D3338	43.382		-1.06	
1348	D3338	43.387		-0.75	
1357	D3338	43.718	R(0.01)	19.40	

lab	method	value	mark	z(targ)	remarks
1372	D3338	43.400		0.04	
1376	D3338	43.4100		0.65	
1397	D3338	43.39	C	-0.57	first reported 43.25
1399		-----		-----	
1428		-----		-----	
1429		-----		-----	
1433		-----		-----	
1496	D3338	43.414		0.89	
1498		-----		-----	
1531		-----		-----	
1586		-----		-----	
1587		-----		-----	
1610		-----		-----	
1631	D3338	43.414		0.89	
1634		-----		-----	
1678		-----		-----	
1720		-----		-----	
1724		-----		-----	
1740		-----		-----	
1776	D3338	43.38		-1.18	
1784	D3338	43.401		0.10	without correction: 43.415
1811	D3338	43.4020		0.16	
1813	D3338	43.40		0.04	
1854	D3338	43.407		0.47	without correction: 43.421
1883		-----		-----	
1961		-----		-----	
1979		-----		-----	
2129	D3338	43.372		-1.66	
2130	D3338	43.4		0.04	
2133	D3338	43.439		2.41	
6028		-----		-----	
6035	D3338	43.40	C	0.04	first reported 43.45
6040		-----		-----	
6041	D3338	43.406		0.41	

normality	not OK
n	53
outliers	2
mean (n)	43.3993
st.dev. (n)	0.01636
R(calc.)	0.0458
R(D3338:09e2)	0.0460



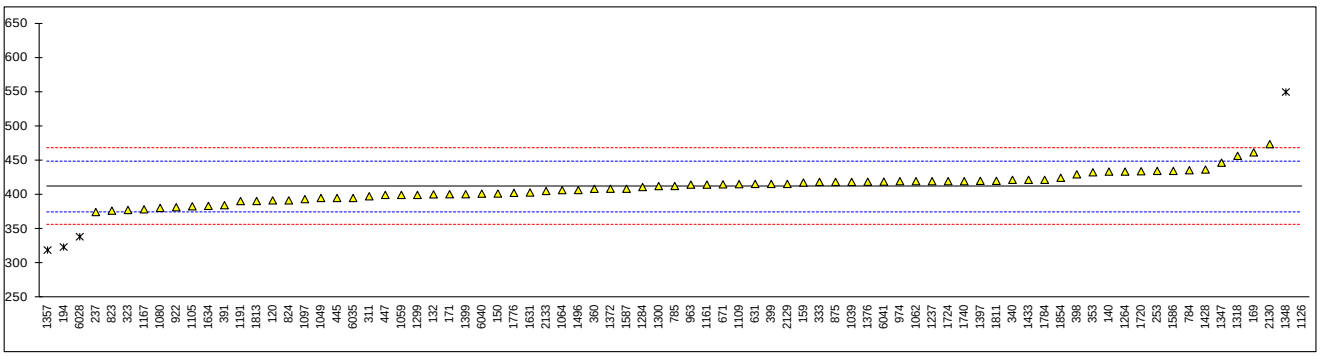


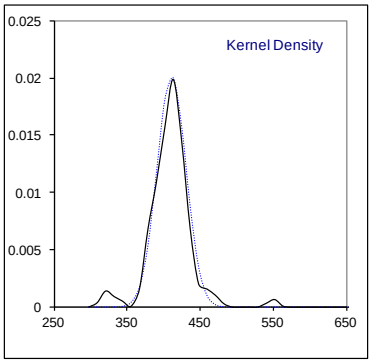
Determination of Sulphur, Total on sample #16030; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D4294	392		-1.06	
131		-----		-----	
132	D2622	400.8		-0.59	
140	D2622	434		1.19	
150	D5453	402		-0.52	
159	D4294	418		0.34	
169	D4294	462		2.70	
171	D5453	401		-0.58	
175		-----		-----	
194	D5453	324	R(0.01)	-4.71	
228		-----		-----	
237	D4294	375		-1.97	
238		-----		-----	
253	D4294	435		1.25	
273		-----		-----	
311	D2622	398		-0.74	
317		-----		-----	
323	D5453	378		-1.81	
333	D4294	419		0.39	
336		-----		-----	
340	D5453	422		0.55	
353	IP336	433		1.14	
360	D5453	408.9		-0.15	
391	ISO8754	385		-1.44	
398	D4294	430		0.98	
399	D4294	416		0.23	
445	D5453	395.5		-0.87	
447	IP336	400		-0.63	reported also: IP336 0.040 %M/M
468		-----		-----	
473		-----		-----	
594		-----		-----	
601		-----		-----	
604		-----		-----	
606		-----		-----	
631	D4294	416.0		0.23	
633		-----		-----	
634		-----		-----	
671	D5453	415.42		0.20	
784	D4294	436		1.30	
785	D4294	413		0.07	
823	D5453	377		-1.86	
824	D5453	392		-1.06	
875	D4294	419		0.39	
904		-----		-----	
922	D5453	382		-1.60	
962		-----		-----	
963	D4294	415		0.17	
974	D4294	420		0.44	
998		-----		-----	
1039	ISO20884	419.0		0.39	
1049	D5453	395.5		-0.87	
1059	ISO14596Mod.	400		-0.63	
1062	D4294	420		0.44	
1064	D5453	407.0		-0.25	
1080	D5453	381		-1.65	
1097	D5453	393.85		-0.96	
1105	D4294	383.4		-1.52	
1109	D2622	415.66		0.21	
1126	ISO20846	3226	R(0.01)	151.05	
1146		-----		-----	
1150		-----		-----	
1161	ISO20846	415.0		0.17	
1167	ISO20846	379		-1.76	
1191	D4294	391		-1.11	
1237	ISO8754	420		0.44	
1264	D5453	434		1.19	
1284	D2622	411.5		-0.01	
1299	D2622	400.0		-0.63	
1300	D4294	412.88		0.06	
1318	D5453	457.0		2.43	
1347	D4294	447		1.89	
1348	D4294	550	R(0.01)	7.42	
1357	D5453	319.54	R(0.01)	-4.95	

lab	method	value	mark	z(targ)	remarks
1372	D4294	409		-0.15	
1376	D5453	419.2		0.40	
1397	ISO20884	420.5		0.47	
1399	D5453	401		-0.58	
1428	ISO20846	437		1.36	
1429		-----		-----	
1433	ISO20846	422		0.55	
1496	D4294	407.1		-0.25	
1498		-----		-----	
1531		-----		-----	
1586	ISO20846	435		1.25	
1587	D4294	409		-0.15	
1610		-----		-----	
1631	D5453	403.5		-0.44	
1634	D5453	384		-1.49	
1678		-----		-----	
1720	D5453	434.5		1.22	
1724	IP336	420	C	0.44	first reported 0.042 mg/kg
1740	D4294	420		0.44	
1776	ISO8754	403		-0.47	
1784	D4294	422		0.55	
1811	D5453	420.50		0.47	
1813	D2622	391.1		-1.11	
1854	D4294	425	C	0.71	first reported 0.0425 mg/kg
1883		-----		-----	
1961		-----		-----	
1979		-----		-----	
2129	IP336	416	C	0.23	first reported 0.0416 mg/kg
2130	IP336	474		3.34	
2133	D5453	405.7		-0.32	
6028	ISO8754	339	C,R(0.01)	-3.90	first reported 250
6035	ISO20846	395.5		-0.87	
6040	D4294	401.85		-0.53	
6041	D4294	419.4		0.41	

normality	OK
n	74
outliers	5
mean (n)	411.75
st.dev. (n)	19.837
R(calc.)	55.54
R(D5453:12)	52.17





Determination of Particle Size Distribution on sample #16031 acc. to IP564, results in parts/ml

lab	method	>4 µm	m	>6 µm	m	>14 µm	m	>21 µm	m	>25 µm	m	>30 µm	m
140		-----		-----		-----		-----		-----		-----	
150		-----		-----		-----		-----		-----		-----	
171		-----		-----		-----		-----		-----		-----	
237		-----		-----		-----		-----		-----		-----	
253	IP564	995.0		317.2		27.0		9.1		5.5		2.3	
311		-----		-----		-----		-----		-----		-----	
323	IP564	1574		523		56		16		8		2	
333		-----		-----		-----		-----		-----		-----	
360		-----		-----		-----		-----		-----		-----	
445	IP564	428.5		160.2		12.6		3.3		2.2		1.0	
447	IP564	989.9		338.8		42.0		9.7		4.0		1.0	
823		-----		-----		-----		-----		-----		-----	
824		-----		-----		-----		-----		-----		-----	
922		-----		-----		-----		-----		-----		-----	
963		-----		-----		-----		-----		-----		-----	
974	IP564	1514		526		66		27		16		3	
1039		-----		-----		-----		-----		-----		-----	
1059	IP564	564.25		190.43		37.28		21.23		15.68		12.28	D(1)
1062		-----		-----		-----		-----		-----		-----	
1064		-----		-----		-----		-----		-----		-----	
1097	IP564	791.9		233.2		9.2		1.5		0.5		0.2	
1105	IP564	575.9		312.4		67.5		22.4		12.6		5.9	
1109		-----		-----		-----		-----		-----		-----	
1200		-----		-----		-----		-----		-----		-----	
1264	IP565	1848.0	ex	644.8	ex	66.1	ex	26.2	ex	16.5	ex	10.3	ex
1299	IP577	1280.1	ex	439.5	ex	90.7	ex	43.4	ex	31.2	ex	19.2	ex
1357		-----		-----		-----		-----		-----		-----	
1586		-----		-----		-----		-----		-----		-----	
1587	IP564	808.0		182.2		17.9		9.4		6.6		3.6	
1610		-----		-----		-----		-----		-----		-----	
1631		-----		-----		-----		-----		-----		-----	
1634		-----		-----		-----		-----		-----		-----	
1724		-----		-----		-----		-----		-----		-----	
1776	IP564	456.0		175.5		35.1		15.7		8.3		3.2	
1811		-----		-----		-----		-----		-----		-----	
1813		-----		-----		-----		-----		-----		-----	
1961	IP564	342.7		113.8		18.8		5.2		2.5		0.8	
1979		-----		-----		-----		-----		-----		-----	
2130	IP564	337.2		119.7		21.1		9.2		5.3		2.3	
9090		-----		-----		-----		-----		-----		-----	
normality		OK		OK		OK		OK		OK		suspect	
n		12		12		12		12		12		11	
outliers		0+2ex		0+2ex		0+2ex		0+2ex		0+2ex		1+2ex	
mean (n)		781.45		266.04		34.21		12.48		7.26		2.30	
st.dev. (n)		422.591		141.898		20.191		8.010		5.129		1.615	
R(calc.)		1183.25		397.31		56.53		22.43		14.36		4.52	
R(IP564:13)		318.52		162.85		26.67		15.82		9.73		3.81	

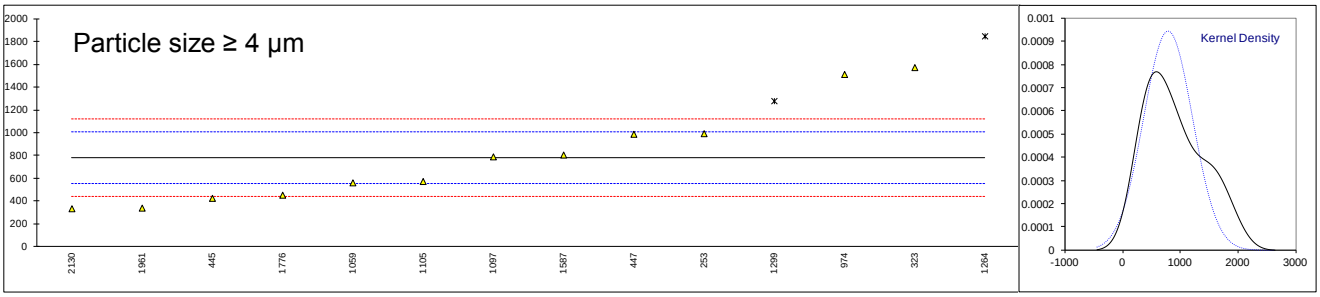
Legenda: m=mark / D(1)=D(0.01)

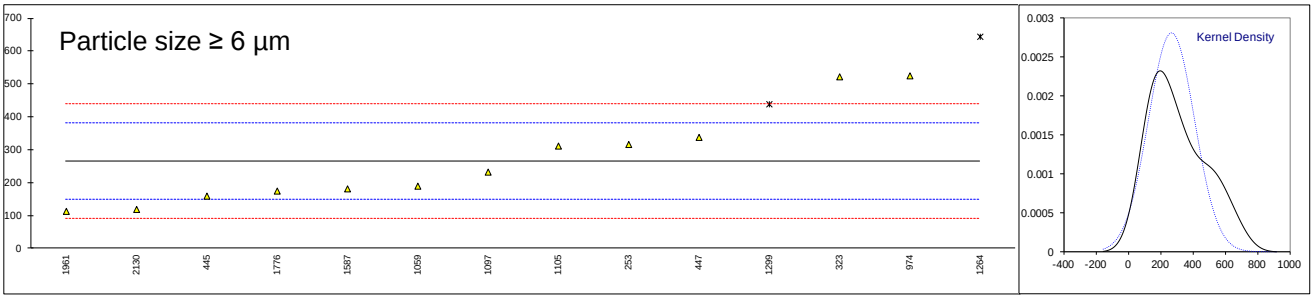
Lab 445 reported test results under IP565 as test method. Acc. to the equipment (see appendix 4) this lab had used test method IP564, therefore test results are placed in table IP564.

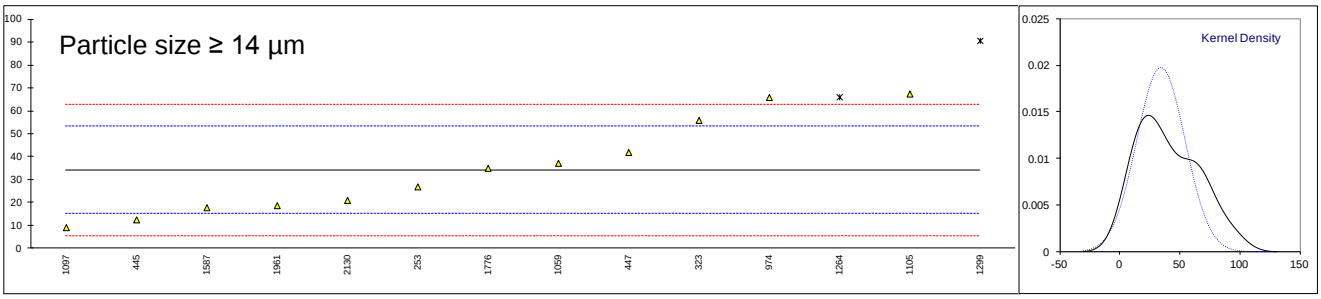
Lab 1264 reported method ISO4406 which is not a PS determination but a classification method. Lab reported two sets of test results. The test results reported in IP564 table are excluded as equipment used in this PT indicated method 565 (see appendix 4).

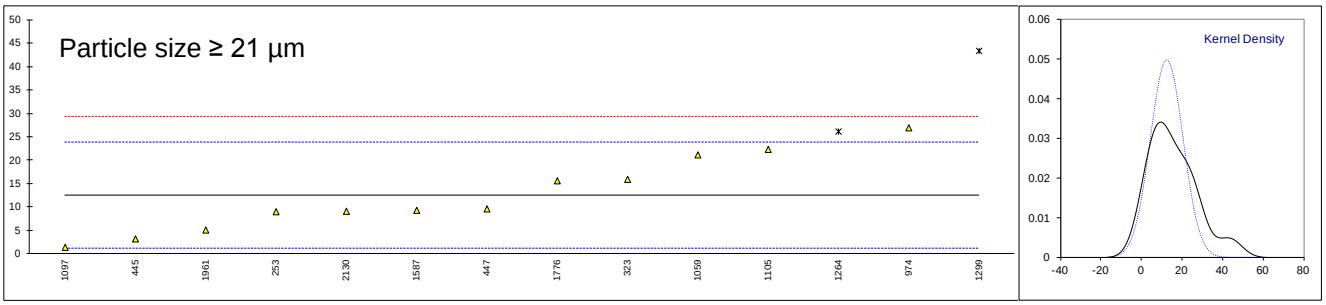
Lab 1299 reported two sets of test results with IP577 as test method. The test results are excluded as the test results and test method are not equivalent to IP564.

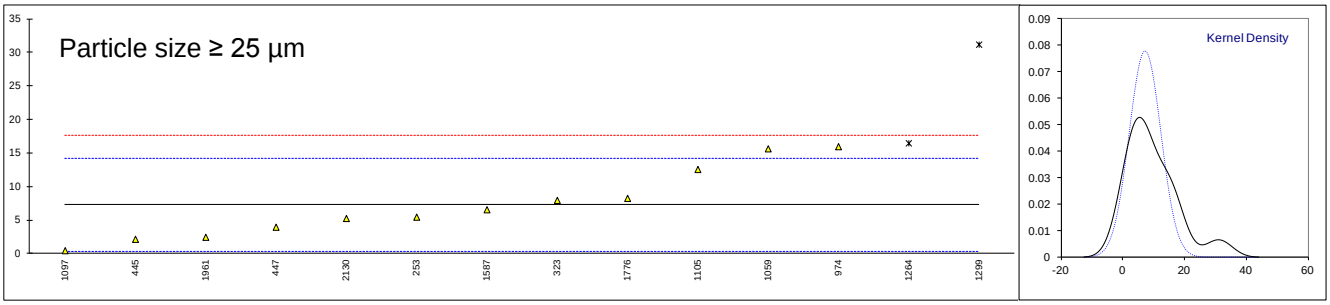
Lab 1587 reported to use Annex B

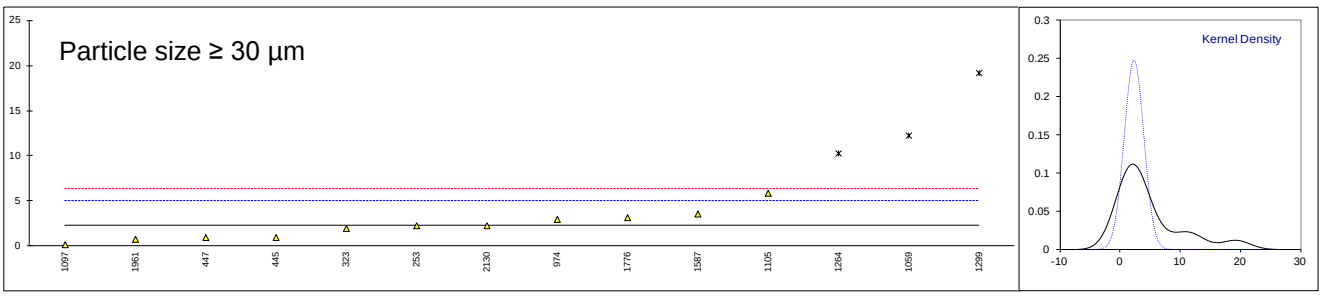

Particle size ≥ 4 µm
Kernel Density


Particle size ≥ 6 µm
Kernel Density


Particle size ≥ 14 µm
Kernel Density


Particle size ≥ 21 µm
Kernel Density


Particle size ≥ 25 µm
Kernel Density


Particle size ≥ 30 µm
Kernel Density

Determination of Particle Size Distribution on sample #16031 acc. to IP565, results in parts/ml

lab	method	>4 µm	m	>6 µm	m	>14 µm	m	>21 µm	m	>25 µm	m	>30 µm	m
140	IP565	404	ex	216	ex	21	ex	4	ex	1	ex	1	ex
150	IP565	1437		536		61		21		12		6	
171	IP565	1624		560		58		15		7		2	
237	IP565	1616.3		553.6		42.0		9.1		4.3		2.2	
253		-----		-----		-----		-----		-----		-----	
311	IP565	1846		637		60		21		12		7	
323		-----		-----		-----		-----		-----		-----	
333	IP565	1625		532		46		11		5		2	
360		-----		-----		-----		-----		-----		-----	
445		-----		-----		-----		-----		-----		-----	
447		-----		-----		-----		-----		-----		-----	
823	IP565	1862.1		616.7		79.2		21.2		8.7		3.7	
824	IP565	1112		317		29		12		8		5	
922	IP565	1524.6		491.8		40.1		12.2		5.6		2.4	
963	IP565	1556.3		528.3		56.1		15.2		7.1		3.1	
974		-----		-----		-----		-----		-----		-----	
1039	IP565	1710		594		51		16		8		4	
1059		-----		-----		-----		-----		-----		-----	
1062	IP565	1391		353		13		2.2		1.0		0.2	
1064	IP565	1270.7		395.0		52.5		12.1		4.4		1.3	
1097		-----		-----		-----		-----		-----		-----	
1105		-----		-----		-----		-----		-----		-----	
1109	IP565	1909.6		670.5		50.5		13.9		6.4		2.4	
1200		-----		-----		-----		-----		-----		-----	
1264	IP565	1881.0	ex	642.8	ex	69.9	ex	28.5	D(5)	17.9	G(5)	11.3	D(5)
1299	IP577	1280.1	ex	439.5	ex	90.7	ex	43.4	ex	31.2	ex	19.2	ex
1357	IP565	853		95		7		5		4		4	
1586		-----		-----		-----		-----		-----		-----	
1587		-----		-----		-----		-----		-----		-----	
1610		-----		-----		-----		-----		-----		-----	
1631	IP565	379.6	ex	59.1	ex	5.8	ex	2.3	ex	1.3	ex	0.7	ex
1634		-----		-----		-----		-----		-----		-----	
1724	IP565	1273.8		320.5		38.9		11		5.1		1.5	
1776		-----		-----		-----		-----		-----		-----	
1811	IP565	1399.7		426.6		40.5		10.1		3.8		2.1	
1813	IP565	1691.5		563.7		50.1		13.3		6.0		2.5	
1961		-----		-----		-----		-----		-----		-----	
1979		-----		-----		-----		-----		-----		-----	
2130		-----		-----		-----		-----		-----		-----	
9090	IP565	1273.1		328.5		38.4		16.8		11.4		5.9	
normality		OK		OK		suspect		OK		OK		OK	
n		18		18		18		18		18		18	
outliers		0+4ex		0+4ex		0+4ex		1+3ex		1+3ex		1+3ex	
mean (n)		1498.65		473.29		45.18		13.23		6.66		3.18	
st.dev. (n)		276.314		147.197		17.064		5.100		2.994		1.826	
R(calc.)		773.68		412.15		47.78		14.28		8.38		5.11	
R(IP565:13)		348.43		193.98		38.90		13.26		7.87		4.71	

Legenda: m = mark / D(5) = D(0.05) / G(5) = G(0.05)

Labs 140 and 1631 are excluded as the cumulative counts at >4µm are very low compared to other test results. Possibly they had used a Parker Hannifin apparatus (test method IP564).

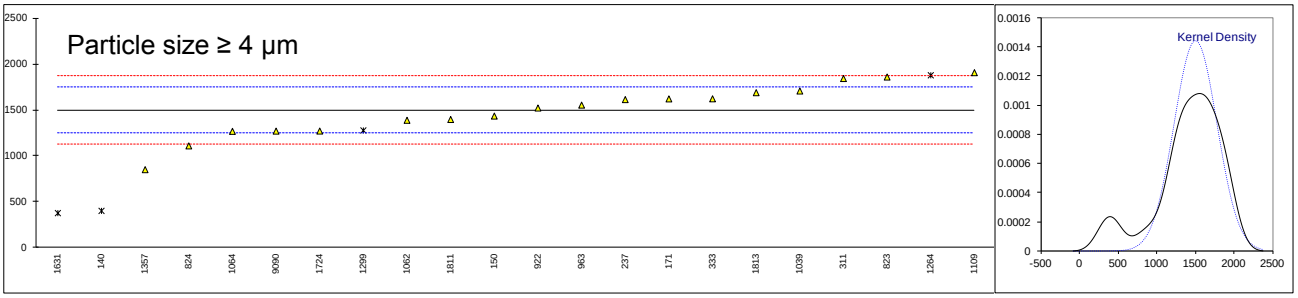
Lab 150 reported test results under IP564 as test method. Acc. to the equipment (see appendix 4) this lab had used test method IP565, therefore test results are placed in table IP565.

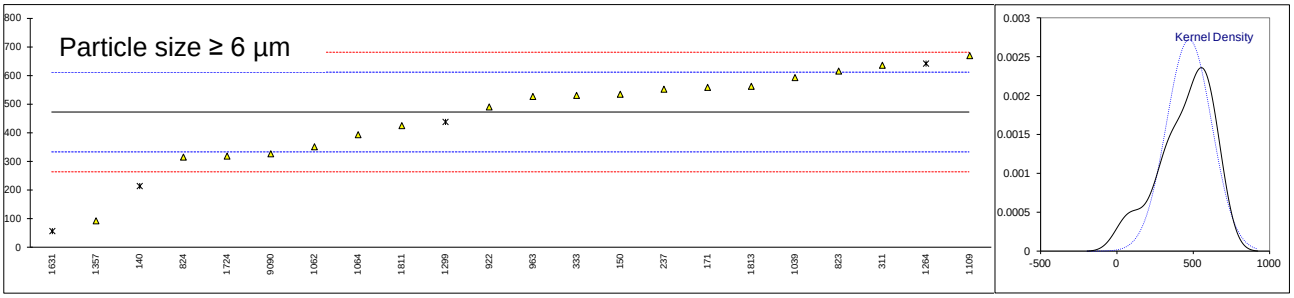
Lab 237 reported test method ISO4406 which is not a PS determination test method but a classification method. The equipment used in this PT indicated test method IP565 (see appendix 4).

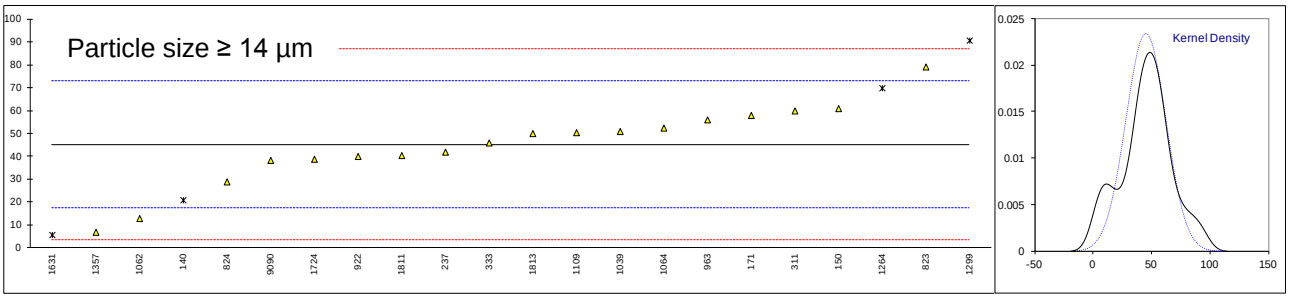
Lab 1264 reported test method ISO4406, which is not a PS determination test method but a classification method. Lab reported two sets of test results, equipment used indicated test method IP565 (see appendix 4). Test results at lower counts classes are excluded as test results are outliers in last three test result categories and test results are not independent.

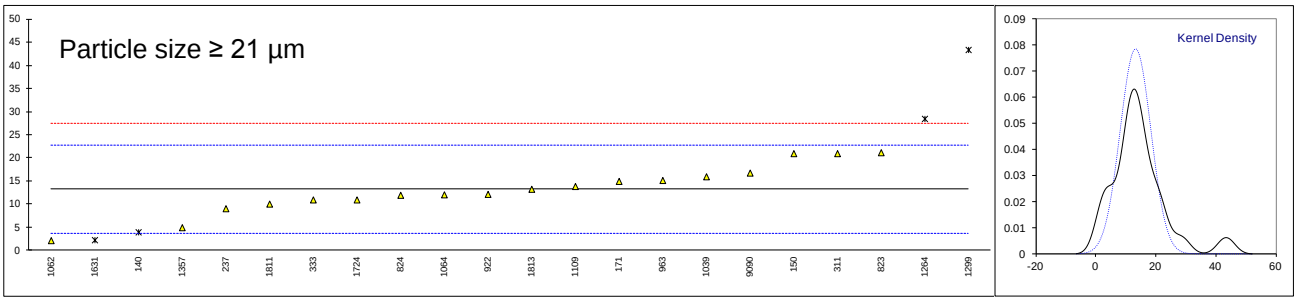
Lab 1299 reported two sets of test results with IP577 as test method. The test results are excluded as the test results at higher particle size categories and test method are not equivalent to IP565.

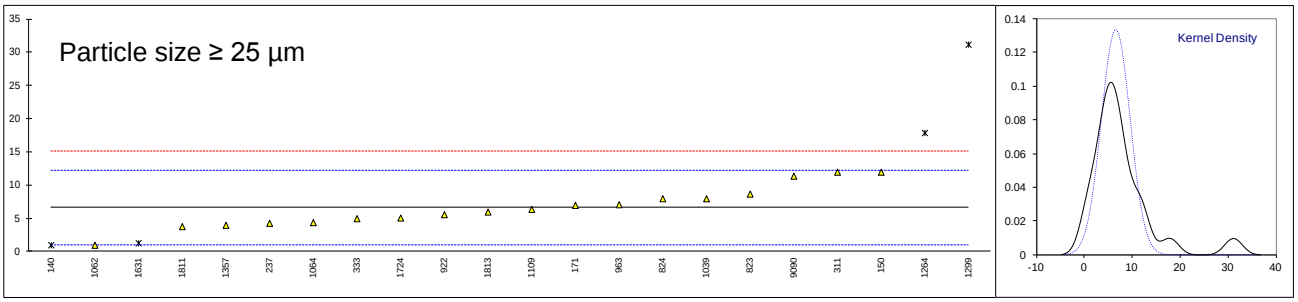
Lab 1811 reported test results under IP564 as test method. Acc. to the equipment reported in iis14J01 (see appendix 4) and reported test results it is assumed that this lab still used test method IP565, therefore test results are placed in table IP565.

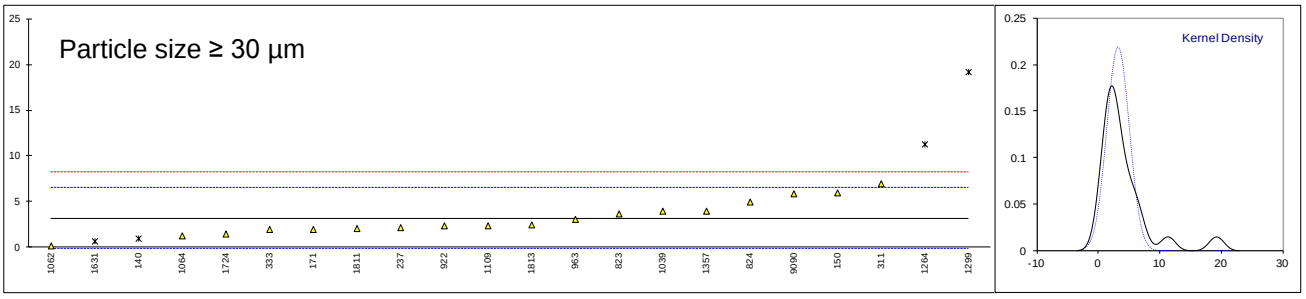

Particle size ≥ 4 µm
Kernel Density


Particle size ≥ 6 µm
Kernel Density


Particle size ≥ 14 µm
Kernel Density


Particle size ≥ 21 µm
Kernel Density


Particle size ≥ 25 µm
Kernel Density


Particle size ≥ 30 µm
Kernel Density

APPENDIX 2

z-scores distillation ASTM D86.

lab	method	IBP	10% rec.	50% rec.	90%rec.	FBP
120	D86	0.73	-0.62	-0.38	0.30	0.49
131	D86	-0.26	-0.09	-0.38	-0.54	-2.59
132	D86	0.52	1.27	1.11	0.46	0.76
140	D86	-0.53	-0.39	-0.47	-1.01	-0.50
150	D86	-1.21	-0.09	-0.19	-1.08	-0.10
159	D86	0.15	0.13	0.74	0.07	0.17
169	D86	-0.53	0.59	2.61	3.31	1.00
171	D86	0.45	-1.07	-0.75	-1.31	-0.22
175	D86	-0.16	0.36	0.46	1.07	0.57
194	D86	-1.14	-0.17	-0.47	-0.39	0.09
228	D86	-0.53	-2.66	-2.15	**-4.86**	-0.14
237	D86	-0.53	-0.39	-0.29	-0.24	-0.14
238		-----	-----	-----	-----	-----
253	D86	0.49	-0.39	0.65	-1.01	-0.54
273	D86	0.18	-0.47	-0.01	-0.24	0.37
311	D86	-0.36	-0.09	0.37	0.46	0.80
317	D86	-0.23	0.81	0.83	0.38	0.80
323	D86	0.22	0.51	0.74	1.46	0.05
333	D86	-0.97	-0.02	-0.57	-1.85	-0.26
336		-----	-----	-----	-----	-----
340	D86	-0.26	-0.17	-0.10	0.77	-0.22
353	D86	0.56	0.13	0.55	2.85	0.09
360	D86	-0.36	0.36	0.37	-0.70	-0.26
391	ISO3405	0.45	0.29	-0.10	-0.24	0.49
398	D86	1.34	0.59	0.46	1.07	0.80
399	D86	1.68	1.49	2.14	2.00	2.62
445	IP123	-0.70	-0.24	-0.47	0.38	0.37
447	D86	-0.23	-0.02	0.65	1.77	0.41
468	D86	-0.74	0.66	0.18	1.15	-0.81
473	D86	0.56	-0.32	0.18	1.07	0.65
594	GOST2177	1.03	-1.15	0.65	0.84	0.53
601		-----	-----	-----	-----	-----
604	D86	-0.19	-1.30	-2.25	0.15	-1.33
606	D86	0.69	0.51	0.55	0.23	0.13
631	D86	0.49	-0.70	0.27	1.38	0.21
633	D86	-0.53	-2.66	**-4.02**	-1.78	-0.54
634	D86	-0.02	-0.02	-0.75	0.92	1.63
671		-----	-----	-----	-----	-----
784	D86	0.32	-0.77	-1.22	-1.78	-0.54
785	D86	0.08	-0.62	-0.75	-0.54	-0.77
823	D86	-0.91	-0.47	-0.47	-1.55	-0.97
824	D86	0.25	0.29	0.09	0.23	-1.01
875	D86	0.15	-1.15	-0.29	-0.62	0.65
904	D86	0.35	-0.62	-0.66	-1.55	-0.58
922	D86	0.18	-0.39	-0.75	-2.16	-0.22
962	D86	-0.53	0.36	0.46	-0.08	-0.46
963	D86	-0.84	1.12	-0.01	-0.93	-0.70
974	D86	0.42	-1.15	-0.38	0.07	-0.50
998		-----	-----	-----	-----	-----
1039	ISO3405	-0.60	-0.92	0.65	-0.85	-0.14
1049	D86	-0.60	0.21	0.37	-0.39	0.25
1059	D86	0.01	-0.17	0.18	-0.31	0.29
1062	D86	-0.70	0.44	0.74	0.53	0.13
1064	D86	1.07	1.27	1.49	1.92	1.83
1080		-----	-----	-----	-----	-----
1097	ISO3405	0.32	-0.39	0.27	0.69	-0.06
1105	D86	-1.25	-0.02	-0.57	-1.16	-1.40
1109	D86	0.08	0.59	-0.29	0.77	-0.46
1126	In house	0.18	0.06	-1.03	-0.31	-0.81
1146	D86	2.16	1.27	0.83	0.23	3.09
1150	ISO3405	1.59	1.49	2.16	3.66	1.13
1161	ISO3405	-0.33	-1.75	-0.29	-1.55	-1.17
1167	ISO3405	0.15	2.93	**5.97**	1.38	0.69
1191	D86	-0.33	0.97	0.74	1.46	0.05
1237	ISO3405	0.76	-0.54	-0.47	-1.93	-0.62
1264	D86	-0.23	0.74	0.09	-1.55	0.01
1284	D86	-0.12	-0.92	-1.03	-0.85	-0.62
1299	D86	-0.16	-0.02	**-19.14**	0.69	0.53
1300	D86	-0.12	1.65	0.18	-1.24	-0.42
1318	D86	-1.14	0.06	-0.19	0.23	-0.89
1347	D86	0.83	1.12	0.65	-0.24	1.04
1348	D86	1.03	-0.32	-1.50	0.07	-0.18

lab	method	IBP	10% rec.	50% rec.	90%rec.	FBP
1357	D86	0.93	-0.32	-1.03	-1.01	-0.77
1372	D86	-0.19	-0.39	-0.29	0.53	-0.54
1376	D86	0.08	0.29	1.86	-0.24	0.21
1397	D86	0.56	0.29	0.18	-1.01	0.76
1399	D86	-1.21	-2.28	-1.50	-2.01	-0.62
1428	D86	-0.16	-0.17	-0.19	-0.62	-0.26
1429	D86	-0.43	-0.70	-1.13	-1.47	-0.38
1433	D86	-0.02	-0.09	-0.10	-0.54	-0.34
1496	D86	-0.02	1.34	0.83	0.30	0.29
1498	D86	-1.04	0.21	0.55	0.69	-0.58
1531	D86	0.45	0.89	1.21	0.38	0.72
1586	D86	0.32	-0.17	-0.01	1.38	-0.58
1587	D86	0.59	0.13	-0.01	-0.85	-0.30
1610		-----	-----	-----	-----	-----
1631	D86	0.08	-0.02	0.27	-0.16	0.49
1634	D86	-0.87	0.81	1.02	1.23	1.16
1678		-----	-----	-----	-----	-----
1720	D86	-0.33	0.44	0.09	0.23	0.41
1724	D86	-0.70	-0.17	-0.57	-0.39	0.65
1740	D86	0.05	0.44	0.09	1.54	-0.54
1776	D86	-1.08	-0.70	-0.47	0.38	-0.62
1784	ISO3405	0.32	-0.02	-0.75	1.38	-0.73
1811	D86	-0.46	-0.39	-0.75	-2.16	-0.73
1813	D86	-0.12	1.13	0.25	1.43	-0.77
1854	ISO3405	0.49	-0.32	-0.85	1.69	-0.85
1883	D86	0.83	0.36	-1.22	-1.78	1.04
1961		-----	-----	-----	-----	-----
1979	ISO3405	-0.06	-0.17	0.27	1.61	1.04
2129	D86	-1.21	-0.32	-1.03	-2.55	-0.58
2130	D86	0.05	0.36	0.37	0.84	0.76
2133	D86	-0.19	0.74	0.46	-0.16	0.80
6028	ISO3405	0.76	-0.02	-0.57	-1.78	0.01
6035	ISO3405	0.25	-0.17	-0.15	-0.58	-1.37
6040	D86	0.49	-0.02	-0.75	-2.16	-0.54
6041	D86	-0.26	-0.02	0.74	1.77	0.17

Z-scores underlined and bold test results: assigned by the statistical Rosner outlier test.

APPENDIX 3

z-scores Particle Size Distribution on sample #16031 acc. to IP564 and IP565, results in parts/ml

	IP 564							IP565					
lab	method	>4 µm	>6 µm	>14 µm	>21 µm	>25 µm	>30 µm	method	>4 µm	>6 µm	>14 µm	>21 µm	>25 µm	>30 µm
140		-----	-----	-----	-----	-----	-----	IP565	***-8.80***	***-3.71***	***-1.74***	***-1.95***	***-2.01***	***-1.30***
150		-----	-----	-----	-----	-----	-----	IP565	-0.50	0.91	1.14	1.64	1.90	1.68
171		-----	-----	-----	-----	-----	-----	IP565	1.01	1.25	0.92	0.37	0.12	-0.70
237		-----	-----	-----	-----	-----	-----	IP565	0.95	1.16	-0.23	-0.87	-0.84	-0.58
253	IP564	1.88	0.88	-0.76	-0.60	-0.51	0.00		-----	-----	-----	-----	-----	-----
311		-----	-----	-----	-----	-----	-----	IP565	2.79	2.36	1.07	1.64	1.90	2.27
323	IP564	6.97	4.42	2.29	0.62	0.21	-0.22		-----	-----	-----	-----	-----	-----
333		-----	-----	-----	-----	-----	-----	IP565	1.02	0.85	0.06	-0.47	-0.59	-0.70
360		-----	-----	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----
445	IP564	-3.10	-1.82	-2.27	-1.62	-1.46	-0.96		-----	-----	-----	-----	-----	-----
447	IP564	1.83	1.25	0.82	-0.49	-0.94	-0.96		-----	-----	-----	-----	-----	-----
823		-----	-----	-----	-----	-----	-----	IP565	2.92	2.07	2.45	1.68	0.73	0.31
824		-----	-----	-----	-----	-----	-----	IP565	-3.11	-2.26	-1.16	-0.26	0.48	1.08
922		-----	-----	-----	-----	-----	-----	IP565	0.21	0.27	-0.37	-0.22	-0.38	-0.47
963		-----	-----	-----	-----	-----	-----	IP565	0.46	0.79	0.79	0.42	0.16	-0.05
974	IP564	6.44	4.47	3.34	2.57	2.51	0.51		-----	-----	-----	-----	-----	-----
1039		-----	-----	-----	-----	-----	-----	IP565	1.70	1.74	0.42	0.59	0.48	0.49
1059	IP564	-1.91	-1.30	0.32	1.55	2.42	**7.34**		-----	-----	-----	-----	-----	-----
1062		-----	-----	-----	-----	-----	-----	IP565	-0.87	-1.74	-2.32	-2.33	-2.01	-1.77
1064		-----	-----	-----	-----	-----	-----	IP565	-1.83	-1.13	0.53	-0.24	-0.80	-1.12
1097	IP564	0.09	-0.56	-2.63	-1.94	-1.95	-1.54		-----	-----	-----	-----	-----	-----
1105	IP564	-1.81	0.80	3.50	1.76	1.54	2.65		-----	-----	-----	-----	-----	-----
1109		-----	-----	-----	-----	-----	-----	IP565	3.30	2.85	0.38	0.14	-0.09	-0.47
1200		-----	-----	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----
1264	IP565	***9.38***	***6.51***	***3.35***	***2.43***	***2.66***	***5.88***	IP565	***3.07***	***2.45***	***1.78***	**3.23**	**4.00**	**4.83**
1299	IP577	***4.38***	***2.98***	***5.93***	***5.47***	***6.89***	***12.43***	IP577	***-1.76***	***-0.49***	***3.28***	***6.37***	***8.73***	***9.53***
1357		-----	-----	-----	-----	-----	-----	IP565	-5.19	-5.46	-2.75	-1.74	-0.94	0.49
1586		-----	-----	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----
1587	IP564	0.23	-1.44	-1.71	-0.54	-0.19	0.96		-----	-----	-----	-----	-----	-----
1610		-----	-----	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----
1631		-----	-----	-----	-----	-----	-----	IP565	***-8.99***	***-5.98***	***-2.83***	***-2.31***	***-1.90***	***-1.48***
1634		-----	-----	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----
1724		-----	-----	-----	-----	-----	-----	IP565	-1.81	-2.21	-0.45	-0.47	-0.55	-1.00
1776	IP564	-2.86	-1.56	0.09	0.57	0.30	0.66		-----	-----	-----	-----	-----	-----
1811		-----	-----	-----	-----	-----	-----	IP565	-0.80	-0.67	-0.34	-0.66	-1.02	-0.64
1813		-----	-----	-----	-----	-----	-----	IP565	1.55	1.31	0.35	0.02	-0.23	-0.41
1961	IP564	-3.86	-2.62	-1.62	-1.29	-1.37	-1.10		-----	-----	-----	-----	-----	-----
1979		-----	-----	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----
2130	IP564	-3.91	-2.52	-1.38	-0.58	-0.57	0.00		-----	-----	-----	-----	-----	-----
9090		-----	-----	-----	-----	-----	-----	IP565	-1.81	-2.09	-0.49	0.75	1.69	1.62

Z-score underlined and bold: test result is assigned by the statistical Dixon's or Grubb's outlier tests.

Z-scores bold and Italic test result: excluded

APPENDIX 4

Equipment used in Particle Size distribution

lab	Equipment	Test Method based on equipment	Test Method reported
140	*no answer*		IP565
150	Stanhope-Seta	IP565	**IP564**
171	Stanhope-Seta	IP565	IP565
237	Stanhope-Seta	IP565	ISO4406
253	Parker Hannifin ACM 20	IP564	IP564
311	Stanhope-Seta	IP565	IP565
323	Parker Hannifin ACM 20	IP564	IP564
333	Stanhope-Seta	IP565	IP565
445	Parker Hannifin	IP564	**IP565**
447	Parker Hannifin	IP564	IP564
823	Stanhope-Seta	IP565	IP565
824	Stanhope-Seta	IP565	IP565
922	Stanhope-Seta (Model: SA 1000-2 U)	IP565	IP565
963	Stanhope-Seta Avcount (Model: SA 1000-0 US)	IP565	IP565
974	*no answer*		IP564
1039	Stanhope-Seta Avcount	IP565	IP565
1059	Parker Hannifin ACM 20	IP564	IP564
1062	Stanhope-Seta	IP565	IP565
1064	Stanhope-Seta Avcount	IP565	IP565
1097	Parker Hannifin	IP564	IP564
1105	Parker Hannifin ACM 20	IP564	IP564
1109	Stanhope-Seta	IP565	IP565
1264	Stanhope-Seta	IP565	ISO4406
1299	PAMAS S4031	IP577	IP577
1357	*no answer*		IP565
1587	Parker Hannifin	IP564	IP564
1631	*no answer*		IP565
1724	*no answer; Stanhope Seta (acc. to iis14J01)*	IP565	IP565
1776	Parker Hannifin	IP564	IP564
1811	*no answer; Stanhope Seta (acc. to iis14J01)*	IP565	**IP564**
1813	Stanhope-Seta	IP565	IP565
1961	Parker Hannifin	IP564	IP564
2130	Parker Hannifin	IP564	IP564
9090	Stanhope-Seta	IP565	IP565

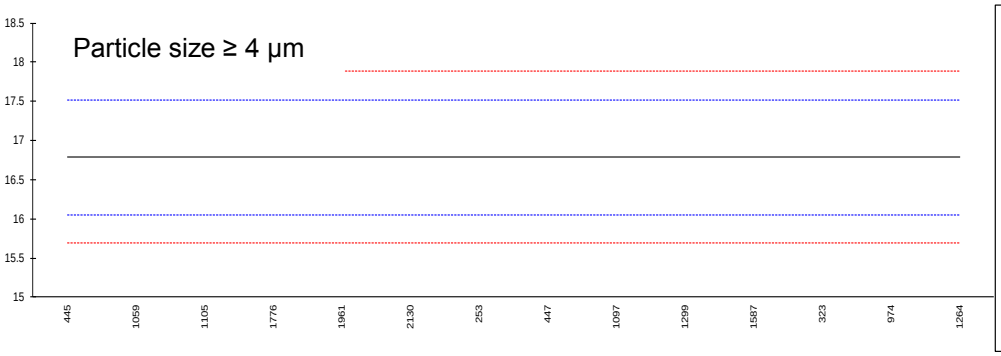
APPENDIX 5

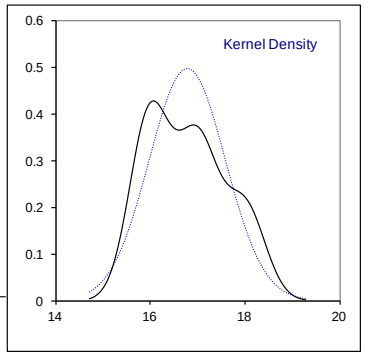
Determination of Particle Size on sample #16031 acc. to IP564, results in ISO codes acc to ISO4406

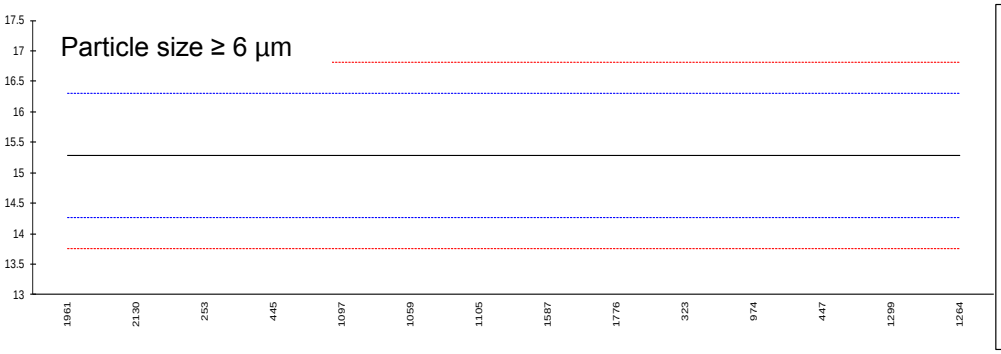
lab	method	>4 µm	mark	z(targ)	>6 µm	mark	z(targ)	>14 µm	mark	z(targ)
140		-----		-----	-----		-----	-----		-----
150		-----		-----	-----		-----	-----		-----
171		-----		-----	-----		-----	-----		-----
237		-----		-----	-----		-----	-----		-----
253	IP564	17		0.59	15		-0.56	12		-0.18
311		-----		-----	-----		-----	-----		-----
323	IP564	18		3.33	16		1.40	13		1.08
333		-----		-----	-----		-----	-----		-----
360		-----		-----	-----		-----	-----		-----
445	IP564	16		-2.15	15		-0.56	11		-1.44
447	IP564	17		0.59	16		1.40	13		1.08
823		-----		-----	-----		-----	-----		-----
824		-----		-----	-----		-----	-----		-----
922		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
974	IP564	18		3.33	16		1.40	13		1.08
1039		-----		-----	-----		-----	-----		-----
1059	IP564	16		-2.15	15		-0.56	12		-0.18
1062		-----		-----	-----		-----	-----		-----
1064		-----		-----	-----		-----	-----		-----
1097	IP564	17		0.59	15		-0.56	10		-2.70
1105	IP564	16		-2.15	15		-0.56	13		1.08
1109		-----		-----	-----		-----	-----		-----
1200		-----		-----	-----		-----	-----		-----
1264	IP565	18		3.33	17		3.36	13		1.08
1299	IP577	17		0.59	16		1.40	14		2.34
1357		-----		-----	-----		-----	-----		-----
1586		-----		-----	-----		-----	-----		-----
1587	IP564	17		0.59	15		-0.56	11		-1.44
1610		-----		-----	-----		-----	-----		-----
1631		-----		-----	-----		-----	-----		-----
1634		-----		-----	-----		-----	-----		-----
1724		-----		-----	-----		-----	-----		-----
1776	IP564	16		-2.15	15		-0.56	12		-0.18
1811		-----		-----	-----		-----	-----		-----
1813		-----		-----	-----		-----	-----		-----
1961	IP564	16		-2.15	14		-2.52	11		-1.44
1979		-----		-----	-----		-----	-----		-----
2130	IP564	16		-2.15	14		-2.52	12		-0.18
9090		-----		-----	-----		-----	-----		-----
normality		OK			OK			OK		
n		14			14			14		
outliers		0			0			0		
mean (n)		16.79			15.29			12.14		
st.dev. (n)		0.802			0.825			1.099		
R(calc.)		2.24			2.31			3.08		
R(IP564:13)		1.02			1.43			2.22		

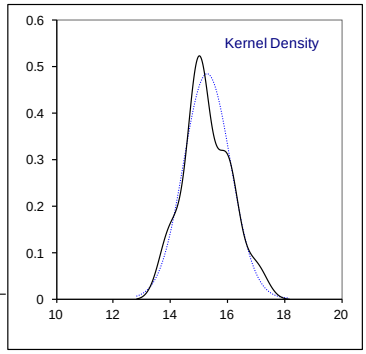
Please note:

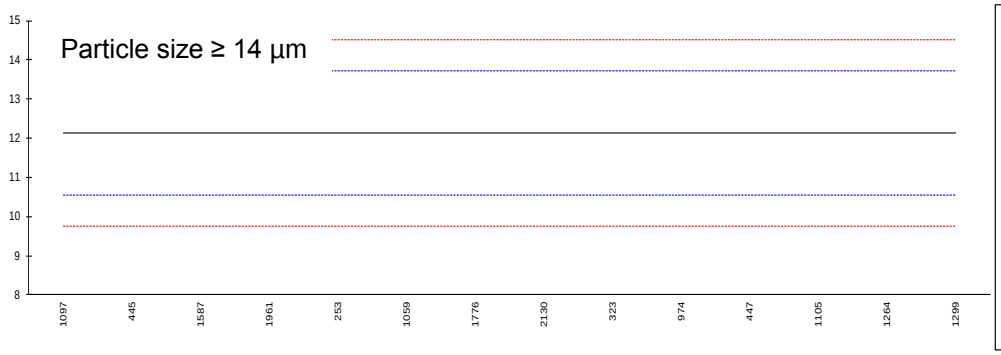
1. Above calculated z-scores are only indicative as the reference method reported provisional reproducibility values for ISO scores in Annex C of IP564.
2. The evalution in ISO codes was done with all reported data converted to ISO codes, regardless reported test methods and excluded test results in the evaluation in counts per mL.

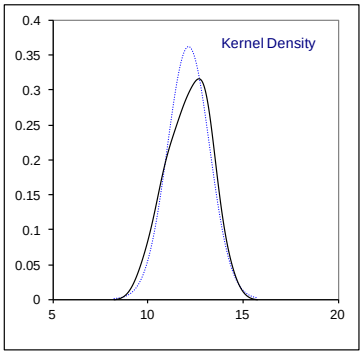

Particle size ≥ 4 µm
18.5
18
17.5
17
16.5
16
15.5
15
445
1059
1105
1776
1961
2130
253
447
1097
1299
1587
323
974
1264


Kernel Density
0.6
0.5
0.4
0.3
0.2
0.1
0
14
16
18
20


Particle size ≥ 6 µm
17.5
17
16.5
16
15.5
15
14.5
14
13.5
13
1961
2130
253
445
1097
1059
1105
1587
1776
323
974
447
1299
1264


Kernel Density
0.6
0.5
0.4
0.3
0.2
0.1
0
10
12
14
16
18
20


Particle size ≥ 14 µm
15
14
13
12
11
10
9
8
1097
445
1587
1961
253
1059
1776
2130
323
974
447
1105
1264
1299


Kernel Density
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
5
10
15
20

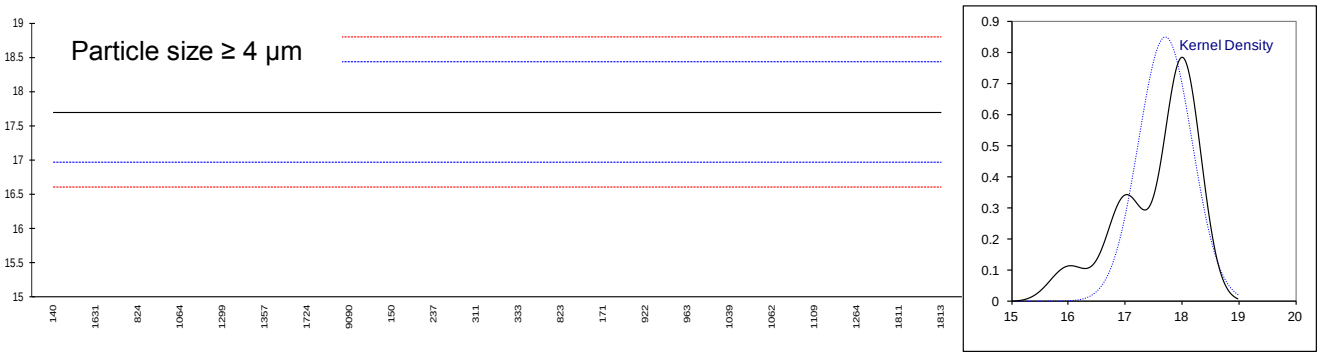
Determination of Particle Size on sample #16031 acc. to IP565, results in ISO codes acc to ISO4406

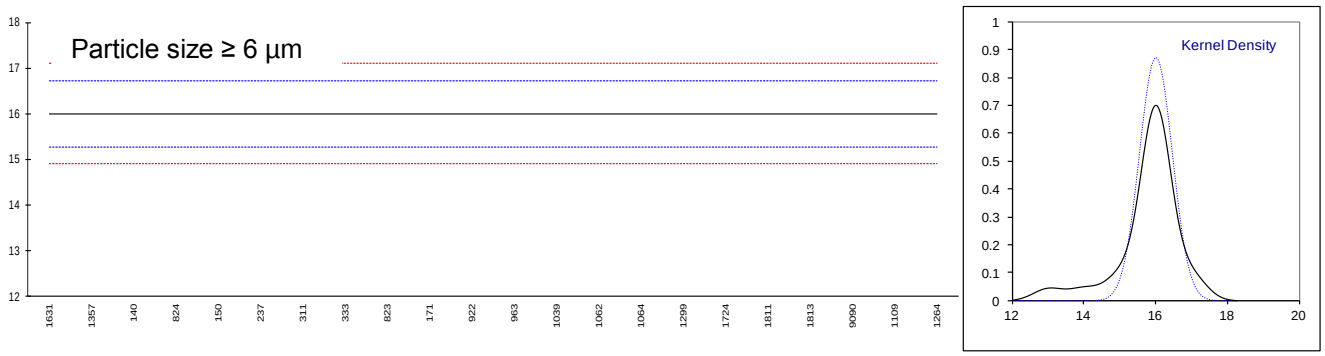
lab	method	>4 µm	mark	z(targ)	>6 µm	mark	z(targ)	>14 µm	mark	z(targ)
140	IP565	16	D(0.05)	-4.64	15		-2.73	12		-1.72
150	IP565	18		0.82	16		0.00	13		0.32
171	IP565	18		0.82	16		0.00	13		0.32
237	IP565	18		0.82	16		0.00	13		0.32
253		-----		-----	-----		-----	-----		-----
311	IP565	18		0.82	16		0.00	13		0.32
323		-----		-----	-----		-----	-----		-----
333	IP565	18		0.82	16		0.00	13		0.32
360		-----		-----	-----		-----	-----		-----
445		-----		-----	-----		-----	-----		-----
447		-----		-----	-----		-----	-----		-----
823	IP565	18		0.82	16		0.00	13		0.32
824	IP565	17		-1.91	15		-2.73	12		-1.72
922	IP565	18		0.82	16		0.00	13		0.32
963	IP565	18		0.82	16		0.00	13		0.32
974		-----		-----	-----		-----	-----		-----
1039	IP565	18		0.82	16		0.00	13		0.32
1059		-----		-----	-----		-----	-----		-----
1062	IP565	18		0.82	16		0.00	11	G(0.05)	-3.76
1064	IP565	17		-1.91	16		0.00	13		0.32
1097		-----		-----	-----		-----	-----		-----
1105		-----		-----	-----		-----	-----		-----
1109	IP565	18		0.82	17		2.73	13		0.32
1200		-----		-----	-----		-----	-----		-----
1264	IP565	18		0.82	17		2.73	13		0.32
1299	IP577	17		-1.91	16		0.00	14		2.36
1357	IP565	17		-1.91	14	G(0.01)	-5.46	10	DG(0.01)	-5.80
1586		-----		-----	-----		-----	-----		-----
1587		-----		-----	-----		-----	-----		-----
1610		-----		-----	-----		-----	-----		-----
1631	IP565	16	D(0.05)	-4.64	13	G(0.01)	-8.20	10	DG(0.01)	-5.80
1634		-----		-----	-----		-----	-----		-----
1724	IP565	17		-1.91	16		0.00	12		-1.72
1776		-----		-----	-----		-----	-----		-----
1811	IP565	18		0.82	16		0.00	13		0.32
1813	IP565	18		0.82	16		0.00	13		0.32
1961		-----		-----	-----		-----	-----		-----
1979		-----		-----	-----		-----	-----		-----
2130		-----		-----	-----		-----	-----		-----
9090	IP565	17		-1.91	16		0.00	12		-1.72

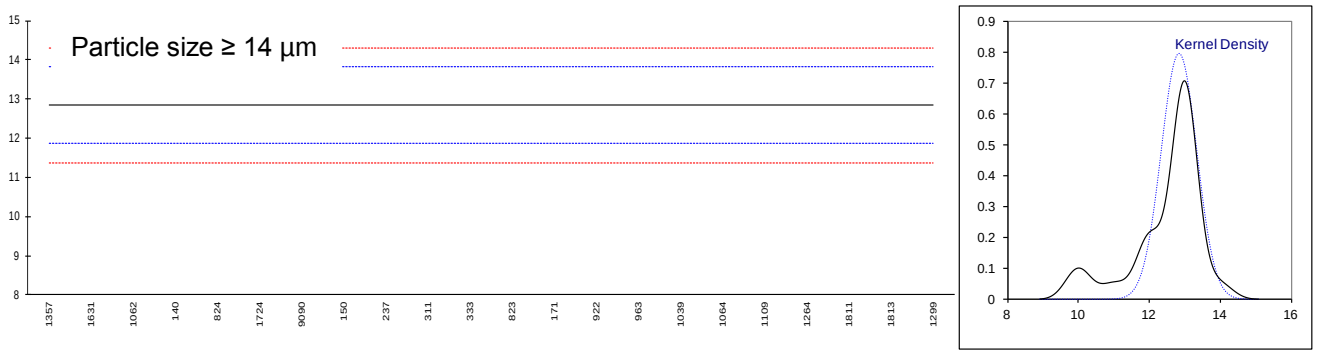
normality	OK	not OK	suspect
n	20	20	19
outliers	2	2	3
mean (n)	17.70	16.00	12.84
st.dev. (n)	0.470	0.459	0.501
R(calc.)	1.32	1.28	1.40
R(IP565:13)	1.03	1.03	1.37

Please note:

1. Above calculated z-scores are only indicative as the reference method reported provisional reproducibility values for ISO scores in Annex C of IP564.
2. The evalution in ISO codes was done with all reported data converted to ISO codes, regardless reported test methods and excluded test results in the evaluation in counts per mL.


Particle size ≥ 4 µm
Kernel Density


Particle size ≥ 6 µm
Kernel Density


Particle size ≥ 14 µm
Kernel Density

APPENDIX 6

Number of participants per country

1 lab in	AFGHANISTAN
2 labs in	AUSTRALIA
3 labs in	BELGIUM
2 labs in	BULGARIA
1 lab in	CHILE
2 labs in	CHINA, People's Republic
1 lab in	CROATIA
2 labs in	CYPRUS
1 lab in	CZECH REPUBLIC
1 lab in	DENMARK
1 lab in	DJIBOUTI
1 lab in	EGYPT
1 lab in	ESTONIA
1 lab in	FINLAND
4 labs in	FRANCE
1 lab in	FRENCH GUIANA
1 lab in	GERMANY
3 labs in	GREECE
1 lab in	GUAM
1 lab in	HUNGARY
1 lab in	IRELAND
3 labs in	ITALY
3 labs in	LEBANON
3 labs in	MALAYSIA
1 lab in	MALTA
6 labs in	NETHERLANDS
2 labs in	NIGERIA
2 labs in	NORWAY
1 lab in	OMAN
1 lab in	PAKISTAN
1 lab in	PERU
3 labs in	PHILIPPINES
2 labs in	POLAND
1 lab in	PORTUGAL
2 labs in	QATAR
3 labs in	RUSSIAN FEDERATION
3 labs in	SAUDI ARABIA
2 labs in	SLOVENIA
2 labs in	SOUTH AFRICA
2 labs in	SOUTH KOREA
1 lab in	SPAIN
1 lab in	SUDAN
3 labs in	SWEDEN
1 lab in	TOGO
1 lab in	TUNISIA
6 labs in	TURKEY
4 labs in	UNITED ARAB EMIRATES
6 labs in	UNITED KINGDOM
10 labs in	UNITED STATES OF AMERICA
1 lab in	URUGUAY

APPENDIX 7

Abbreviations:

C = final test result after checking of first reported suspect test result
D(0.01) = outlier in Dixon's outlier test
D(0.05) = straggler in Dixon's outlier test
G(0.01) = outlier in Grubbs' outlier test
G(0.05) = straggler in Grubbs' outlier test
DG(0.01) = outlier in Double Grubbs' outlier test
DG(0.05) = straggler in Double Grubbs' outlier test
R(0.01) = outlier in Rosner outlier test
R(0.05) = straggler in Rosner outlier test
E = probably an error in calculations
W = test result withdrawn on request of participant
ex = test result excluded from calculations
U = probably reported in wrong unit
fr. = first reported
n.a. = not applicable
n.d. = not detected
SDS = Safety Data Sheet

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