

Results of Proficiency Test  
Jet Fuel A1  
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## 1 INTRODUCTION

Since 1995, the Institute for Interlaboratory Studies organises proficiency tests (PT) for Jet Fuel A1 every year. The interlaboratory study on Jet Fuel was extended with PTs for the determination of BOCLE, Particle Size Distribution, FAME and JFTOT. In the annual proficiency testing program of 2017/2018, it was decided to continue the PT on Jet Fuel A1 in accordance with the latest applicable version 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". This is Issue 29 from October 2016. In total 157 laboratories from 73 different countries registered for participation. See appendix 5 for the number of participants per country. Looking at the Jet Fuel PTs, 138 laboratories in 70 countries registered for the main round (iis17J02), 29 laboratories in 18 countries for BOCLE (iis17J02BOCLE), 62 laboratories in 33 countries for Particle Size Distribution (iis17J02PS), 67 laboratories in 36 countries for FAME (iis17J02FAME) and 76 laboratories in 42 countries for JFTOT (iis17J02JF). In this report, the results of the five proficiency tests are presented and discussed. This report is also electronically available through the iis website [www.iisnl.com](http://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 ISO/IEC 17025 accredited laboratory. For the main round Jet Fuel A1, it was decided to send two identical samples (2 x 1 litre bottles, labelled #17160) for the analyses according to the latest version of "Joint Fuelling System Check List for Jet A-1". For the BOCLE determination one sample (100 ml, labelled #17161) was sent, for the Particle Size Distribution determination one sample (0.5 L bottle, labelled #17162), for the FAME determination two samples (both 100 ml, one labelled #17163 and one labelled #17164) and for the JFTOT one sample (1 L bottle, labelled #17165).

The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

### 2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC 17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

### 2.2 PROTOCOL

The protocol followed in the organisation 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 March 2017 (iis-protocol, version 3.4). This protocol can be downloaded from the iis website [www.iisnl.com](http://www.iisnl.com), from the FAQ page.

## 2.3 CONFIDENTIALITY STATEMENT

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

## 2.4 SAMPLES

### 2.4.1 JET FUEL A1 (MAIN)

The necessary bulk material, approximately 400 litres, was obtained from a trader and homogenised in a mixing vessel. From this batch, 310 amber glass bottles of one litre were filled, closed with inner and outer caps and labelled #17160. The remainder of the batch was used for Particle Size Distribution. The homogeneity of the subsamples #17160 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 <sup>3</sup>
Sample #17160-1	791.38
Sample #17160-2	791.38
Sample #17160-3	791.38
Sample #17160-4	791.38
Sample #17160-5	791.38
Sample #17160-6	791.38
Sample #17160-7	791.38
Sample #17160-8	791.38
Sample #17160-9	791.39
Sample #17160-10	791.39

Table 1: homogeneity test results of subsamples #17160

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 <sup>3</sup>
r (observed)	0.00
reference test method	ASTM D4052:16
0.3 x R (ref. test method)	0.15

Table 2: evaluation of repeatability of subsamples #17160

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the target method. Therefore, homogeneity of all subsamples #17160 was assumed.

## 2.4.2 JET FUEL A1 – SAMPLE FOR BOCLE (BALL-ON-CYLINDER LUBRICITY EVALUATOR) DETERMINATION

For this sample, Jet Fuel was used that was obtained from a participating laboratory. Approximately 4 liter was homogenized. From this batch, 40 amber glass bottles of 0.1 liter were filled and labelled #17161. The homogeneity of the subsamples #17161 was checked by the determination of Density in accordance with ASTM D4052 on 8 stratified randomly selected samples.

	Density at 15°C in kg/m <sup>3</sup>
Sample #17161-1	809.32
Sample #17161-2	809.32
Sample #17161-3	809.32
Sample #17161-4	809.31
Sample #17161-5	809.32
Sample #17161-6	809.32
Sample #17161-7	809.32
Sample #17161-8	809.31

Table 3: homogeneity test results of subsamples #17161

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

	Density at 15°C in kg/m <sup>3</sup>
r (observed)	0.01
reference test method	D4052:16
0.3 x R (ref. test method)	0.15

Table 4: evaluation of repeatability of subsamples #17161

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the target method. Therefore, homogeneity of the subsamples #17161 was assumed.

## 2.4.3 JET FUEL PARTICLE SIZE DISTRIBUTION DETERMINATION (PS)

The remainder of the batch used for the main round was used for Particle Size Distribution Determination. Approximately 90 litres bulk material was homogenized. From this material 75 amber glass bottles of 0.5 litres were filled during constant mixing, closed with inner and outer caps and labelled #17162 and fortified with Arizona Dust. The homogeneity of the subsamples #17162 was checked by the determination of Particle Size Distribution in accordance with IP565 on four stratified randomly selected samples.

	≥ 4 µm (c) parts/ml	≥ 6 µm (c) parts/ml	≥ 14 µm (c) parts/ml
Sample #17162-1	25111	10526	684
Sample #17162-2	25106	10656	739
Sample #17162-3	24378	10288	710
Sample #17162-4	25236	10678	708

Table 5: homogeneity test results of subsamples #17162

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

	≥ 4 µm (c) parts/ml	≥ 6 µm (c) parts/ml	≥ 14 µm (c) parts/ml
r (observed)	1095	501	63
reference test method	IP565:13	IP565:13	IP565:13
r (ref. test method)	2119	1705	261

Table 6: evaluation of repeatabilities of subsamples #17162

The calculated repeatabilities for the particle sizes ≥ 4 µm (c), ≥ 6 µm (c) and ≥ 14 µm (c) were in agreement with the target repeatability of the reference test method. Therefore, homogeneity of the subsamples of #17162 was assumed.

#### 2.4.4 JET FUEL A1 – SAMPLE FOR FATTY ACID METHYL ESTER (FAME) DETERMINATION

It was decided to prepare two samples for FAME determination in Jet fuel with low and high level of FAME. Approximately 9 liter Jet fuel bulk material was spiked with 0.125 gram Biodiesel B100 and homogenised. From this batch 80 amber glass bottles of 0.1 liter were filled and labelled #17163. Another 9 litres of Jet fuel bulk material was spiked with 0.451 gram Biodiesel B100 and homogenized. From this batch 80 amber glass bottles of 0.1 liter were filled and labelled #17164.

The homogeneity of the subsamples #17163 and #17164 was checked by the determination of FAME in accordance with method IP585 on 8 stratified randomly selected samples.

	FAME in mg/kg #17163	FAME in mg/kg #17164
Sample 1	14.8	39.6
Sample 2	14.7	38.7
Sample 3	15.4	37.1
Sample 4	16.5	38.6
Sample 5	14.7	36.9
Sample 6	13.9	36.4
Sample 7	14.4	35.5
Sample 8	14.5	35.5

Table 7: homogeneity test results of subsamples #17163 and #17164

From the above test results, the repeatabilities were calculated and compared with the repeatabilities of the reference test method in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	FAME in mg/kg #17163	FAME in mg/kg #17164
r (observed)	2.2	4.3
reference test method	IP585:10	IP585:10
r (reference test method)	2.9	6.6

Table 8: evaluation of repeatabilities of subsamples #17163 and #17164

The calculated repeatabilities were in agreement with the repeatabilities of the reference test method. Therefore, homogeneity of the subsamples of #17163 and #17164 was assumed.

#### 2.4.5 JET FUEL A1 – SAMPLE FOR JFTOT DETERMINATION

A sample of off-spec Jet Fuel was prepared by soaking a copper bar in a batch of Jet Fuel for a certain amount of time. This material was tested for JFTOT and was a clear “Fail” according to ASTM D3241. The material was then used as blend component in a bulk material of Jet Fuel, obtained by third party laboratory. A batch of 110 liter of bulk material was homogenized. From this batch, 80 amber glass bottles of 1 liter were filled and labelled #17165. The homogeneity of the subsamples #17165 was checked by the determination of Density in accordance with ASTM D4052 on 8 stratified randomly selected samples.

	Density at 15°C in kg/m <sup>3</sup>
Sample #17165-1	816.53
Sample #17165-2	816.52
Sample #17165-3	816.52
Sample #17165-4	816.53
Sample #17165-5	816.52
Sample #17165-6	816.52
Sample #17165-7	816.52
Sample #17165-8	816.53

Table 9: homogeneity test results of subsamples #17165

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 <sup>3</sup>
r (observed)	0.01
reference test method	ASTM D4052:16
0.3 x R (ref. test method)	0.15

Table 10: evaluation of repeatability of subsamples #17165

The calculated repeatability was in agreement with 0.3 times the corresponding reproducibility of the target method. Therefore, homogeneity of all subsamples #17165 was assumed.

Depending on the registration of each individual participant the following samples were dispatched on August 23, 2017: 2 bottles Jet Fuel A1 (2\*1 liter, labelled #17160), 1 bottle especially prepared for the BOCLE determination (1\*0.1L, labelled #17161), 1 bottle especially prepared for the Particle Size Distribution determination (1\*0.5L, labelled #17162), 2 bottles especially prepared for the FAME determination (1\*0.1 L, labelled #17163 + 1\*0.1 L, labelled #17164) and 1 bottle especially prepared for the JFTOT determination (1\*1 L, labelled #17165). An SDS of the samples was added to the sample package.

## 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 #17160: Total Acidity, Aromatics by FIA, Aromatics by HPLC (in %M/M and %V/V), Colour Saybolt (automated and manual), Copper Corrosion 2 hrs at 100°C, Density at 15°C, Distillation (IBP, temperature at 10%, 50%, 90% recovered and FBP), Existent Gum (unwashed), Flash Point, Freezing Point, 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 #17161 BOCLE only, on sample #17162 Particle Size Distribution only, on samples #17163 and #17164 FAME only and on #17165 Copper and JFTOT only.

The analyses should be performed according to the "Aviation Fuel Quality Requirements for Jointly Operated Systems (AFQRJOS), version October 2016", also referred to as the "Joint Fuelling System Check List" or simply "Check List".

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

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

## 3 RESULTS

During five weeks after sample dispatch, the test results of the individual laboratories were gathered via the data entry portal [www.kpmd.co.uk/sgs-iis/](http://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 March 2017 (iis-protocol, version 3.4).

For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as '<...' or '>...' were not used in the statistical evaluation.

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

According to ISO 5725 the original test results per determination were submitted to Dixon's, Grubbs' and/or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

For each assigned value, the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. 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:

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

The  $Z_{(\text{target})}$  scores are listed in the test result tables in appendix 1.

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

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

## 4 EVALUATION

In this interlaboratory study, some problems were encountered with sample dispatch to the Philippines, Colombia and Qatar.

For the main round Jet Fuel A1, six participants reported the test results after the final reporting date and another seven participants did not report any test results at all. For the BOCLE round, two participants reported the test results after the final reporting date and seven participants did not report any test results at all. For the Particle Size Distribution round, five participants reported the test results after the final reporting date and another eleven participants did not report any test results at all. For the FAME round, eight participants reported the test results after the final reporting date and twelve did not report any results at all. And for the JFTOT round, five participants reported the test results after the final reporting date and twelve did not report any test results at all.

Finally, 144 participants reported in total 2706 numerical test results. Observed were 83 outlying test results, which is 3.1% of the reported numerical test results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

#### 4.1 EVALUATION PER SAMPLE AND PER TEST

In this section, the reported test results are discussed per sample and per test. The test methods, which were used by the various laboratories, were taken into account for explaining the observed differences where possible and applicable. These test methods are also in the tables together with the reported test results. The abbreviations, used in these tables, are listed in appendix 6.

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 91-091/Issue 9, dated: October 2016” and ASTM D1655:17. One must keep in mind that ISO test methods are not mentioned in the “Checklist”.

##### **Jet Fuel A1: sample #17160**

Acidity, Total: This determination was problematic. Six statistical outliers were observed and one test result was excluded for zero is not a real value. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ASTM D3242:11(2017).

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

Aromatics by HPLC: The determination in %M/M was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with ASTM D6379:11.  
The determination in %V/V may not be problematic. Three statistical outliers were observed. Regretfully, no precision data for the determination in %V/V is mentioned in ASTM D6379:11. However, the calculated reproducibility was smaller than the calculated reproducibility in %V/V of the proficiency tests iis17J01 and iis16J02.

Colour Saybolt: The determination was problematic for the automatic test method ASTM D6045. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D6045:12(2017). Some of the variation may be caused by the fact that almost two thirds of the laboratories reported to have used a different cell than the suggested 100 mm cell in ASTM D6045. The determination for the manual test method ASTM D156 was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D156:15.

Copper corrosion: This determination was not problematic. One-hundred and one participants reported a test result and agreed on a result of 1.

Density: This determination was not problematic. Six statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D4052:16.

Distillation: This determination was not problematic. In total, six statistical outliers were observed. Eighty-two percent of the reported test results were obtained with an automated method. However, the calculated reproducibilities after rejection of the statistical outliers are all in agreement with the automated mode requirements of ASTM D86:17. When compared to the manual mode requirements of ASTM D86:17 only the calculated reproducibilities for IBP and FBP are not in agreement.

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

Flash Point: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the outlier is in 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 (eight in total) reported test methods, which are not equivalent.

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

Kin. Viscosity at -20°C: 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 D445:17a.

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

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

Naphthalenes: This determination was problematic depending on the method used. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1840:07(2013) procedure B, but not in agreement with the requirements of procedure A.  
When the test results from the reported procedures A and B are evaluated separately, the calculated reproducibilities after rejection of the statistical outliers of both procedures are in agreement with the respective requirements of ASTM D1840:07(2013).

Smoke Point: This determination was problematic depending on the method used. Four statistical outliers were observed. Sixty percent of the reported test results were obtained with a manual method. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1322:15e1-Manual.  
When the test results from the reported manual and automated modes are evaluated separately, only the calculated reproducibility of the manual method is in agreement with the respective requirements of ASTM D1322:15e1.

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

Sulphur, Total: This determination was problematic for a number of laboratories. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is almost in agreement with the requirements of ASTM D5453:16e1.

#### **For Jet Fuel BOCLE sample #17161**

BOCLE: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of the ASTM D5001:10(2014) semi-automatic nor with the full-automatic method.  
When the test results from the reported semi-automatic and full-automatic methods were evaluated separately, still the calculated reproducibility of the semi-automatic is not in agreement with the requirements of ASTM D5001:10(2014) semi-automatic. However, for the full-automatic method, the calculated reproducibility is in agreement with the respective requirements of ASTM D5001:10(2014).

**Jet Fuel PS sample #17162:****Particle Size Distribution Determination:**

The Joint Fuelling System Check List for Jet-A1 lists test methods IP564, IP565 and IP577 as the reference test methods to determine the Particle Size Distribution in Jet Fuel A1. Over the last few years, iis has observed and concluded that these methods are biased and not as interchangeable as it appears from the checklist. Although no equipment suppliers are mentioned in the methods, the description of the equipment in the method defines the equipment that should be used. Therefore, the automatic particle counter (APC) in method IP564 is Parker Hannifin, in method IP565 it is Stanhope-Seta and in method IP IP577 it is Pamas.

The participants were requested to specify the brand of the particle counter, along with the method for calibration, the actual test method performed and the test method used for determining ISO code scaling. All participants mentioned the equipment used, sixteen participants used IP564, thirty-two used IP565, one participant used IP577 and one participant used an in-house test. All reported (some after a correction) have used the method that corresponds with the equipment used. Most participants used ISO11171 for the calibration, but for two participants the equipment supplier performs the calibration (see appendix 4). All laboratories used ISO4406 for calculating the scale numbers from the parts per ml. Some laboratories reported the test method for this (IP564/565/577), which in fact also is ISO4406, because these methods refer to ISO4406 for assigning scale numbers. All participants calculated the ISO code from the test results in counts/ml correctly.

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

Seven laboratories had two or more outliers for the six different particle sizes in counts/ml. The other test results in counts/ml for these seven laboratories were excluded. One laboratory reported IP564 with Izbal Telstar as test equipment. Therefore, the test results were put in the results table for IP565, but excluded in the statistical evaluation.

**IP564:** The determination according to IP564 was problematic. In total, ten statistical outliers were observed for the six particle size categories and eleven other test results were excluded. The calculated reproducibilities after rejection of the suspect data are all not in agreement with the requirements of IP564:13. The determination expressed in ISO scale numbers may be problematic. No statistical outliers were observed. The calculated reproducibilities for  $\geq 4 \mu\text{m}$  (c) and  $\geq 14 \mu\text{m}$  (c) are not in agreement and for  $\geq 6 \mu\text{m}$  (c) is in agreement with the indicative requirements of IP564:13 Annex C.

**IP565:** The determination according to IP565 was problematic. In total fifteen statistical outliers were observed for the six particle size categories and twenty-five other test results were excluded. The calculated reproducibilities after rejection of the suspect data are not in agreement with the requirements of IP565:13 for  $\geq 4 \mu\text{m}$  (c),  $\geq 14 \mu\text{m}$  (c),  $\geq 21 \mu\text{m}$  (c),  $\geq 25 \mu\text{m}$  (c) and  $\geq 30 \mu\text{m}$  (c).

The calculated reproducibility for  $\geq 6\mu\text{m}$  (c) was in agreement. The determination expressed in ISO scale numbers may be problematic. Five statistical outliers were observed. The calculated reproducibilities for  $\geq 6\mu\text{m}$  (c) and  $\geq 14\mu\text{m}$  (c) are not in agreement and for  $\geq 4\mu\text{m}$  (c) is in agreement with the indicative requirements of IP565:13 Annex C.

#### **For Jet Fuel FAME sample #17163 and #17164**

FAME (#17163): This sample was spiked with approximately 15 mg FAME per kg. This is well above the lower limit of IP585 and IP590 and just above the lower limit of IP583. This determination was problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of IP585:10. The average recovery of FAME (theoretical increment of 16.1 mg FAME/kg) is satisfactory: "less than 120%" (the actual blank FAME content is unknown). When IP583, IP585 and IP590 were evaluated separately, only the calculated reproducibility of IP583 is in agreement with the requirements of the respective test method.

FAME (#17164): This sample was spiked with approximately 50 mg FAME per kg. 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 IP585:10. The average recovery of FAME (theoretical increment of 58.3 mg FAME/kg) is good: "less than 80%" (the actual blank FAME content is unknown). When the results of IP583, IP585 and IP590 were evaluated separately, both calculated reproducibilities of IP583 and IP590 are in agreement with the respective method requirements, while the calculated reproducibility of IP585 is not in agreement with the requirements of IP585:10.

#### **For Jet Fuel JFTOT sample #17165**

Copper: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of ASTM D6732:04(2015). With this, the presence of Copper in this sample has been proven with high certainty.

JFTOT: The reported test results for tube rating vary over a range from 0 to >4 (visual), 46 to 342 (interferometric) and 16-287 (ellipsometric). The reported Delta P test results vary from 0 to >30. Visual rating is described in ASTM D3241 Annex A1, interferometric rating in ASTM D3241 Annex A2 and ellipsometric in ASTM D3241 Annex A3. The JFTOT test can be rated as a pass according to specification AFQRJOS when the visual tube rating is less than 3, interferometric or ellipsometric rating is less than 85 nm and Delta P is 25 or less after 2.5 hrs at 260°C. Twenty-five laboratories reported a pass and 26 laboratories reported a fail. Five laboratories reported a pass, while the reported test results would give a fail. All five laboratories corrected the test results for the visual tube rating without correcting the Pass/Fail result.

Using the criteria from AFQRJOS on all test results (including the laboratories that did not report a pass or fail), 38 of the reporting laboratories would rate the sample as a fail, while 26 reporting laboratories would rate it a pass. Twenty-six laboratories reported a pass, based on a low visual tube rating. The presence of copper suggests that higher values for the tube rating should have been found.

#### 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 #17160, #17161, #17162, #17163, #17164 and #17165 are compared in the next tables.

Parameter	unit	n	average	2.8 * sd	R (lit)
Acidity, Total	mg KOH/g	75	0.0017	0.0026	0.0017
Aromatics by FIA	%V/V	80	15.9	1.9	2.7
Aromatics by HPLC	%M/M	20	19.0	2.0	2.0
Aromatics by HPLC	%V/V	16	16.8	1.0	n.a.
Colour Saybolt (automated)		57	20.7	2.6	1.2
Colour Saybolt (manual)		66	19.8	3.8	2
Copper Corrosion 2hr at 100°C		101	1	n.a.	n.a.
Density at 15°C	kg/m <sup>3</sup>	123	791.4	0.3	0.5
Initial Boiling Point	°C	122	149.4	6.0	8.2
Temp at 10% recovered	°C	123	166.9	2.9	3.7
Temp at 50% recovered	°C	121	193.6	2.2	3.0
Temp at 90% recovered	°C	121	240.7	3.8	3.6
Final Boiling Point	°C	122	270.5	6.1	7.1
Existent Gum (unwashed)	mg/100mL	80	0.67	1.09	3.13
Flash Point	°C	119	41.7	2.6	3.2
Freezing Point	°C	107	-52.4	1.6	2.5
Kinematic Viscosity at -20°C	mm <sup>2</sup> /s	84	3.680	0.075	0.070
Mercaptan Sulphur as S	%M/M	78	0.0004	0.0002	0.0003
MSEP	rating	97	94.0	6.5	8.9
Naphthalenes	%V/V	70	0.42	0.05	0.06
Smoke Point	mm	93	25.3	2.8	3.9
Specific Energy (Net)	MJ/kg	75	43.384	0.043	0.046
Sulphur, Total	mg/kg	107	311.3	47.5	43.0
BOCLE (#17161)	mm	22	0.64	0.08	0.06

Table 11: comparison of the observed and target reproducibilities of sample #17160 and #17161



Parameter - IP564	unit	n	average	2.8 * sd	R (lit)
Particle Size $\geq 4 \mu\text{m}$ (c)	counts/ml	11	16954	4183	3210
Particle Size $\geq 6 \mu\text{m}$ (c)	counts/ml	12	5997	3431	1811
Particle Size $\geq 14 \mu\text{m}$ (c)	counts/ml	12	172	241	89
Particle Size $\geq 21 \mu\text{m}$ (c)	counts/ml	10	15.7	33.0	19.8
Particle Size $\geq 25 \mu\text{m}$ (c)	counts/ml	10	5.5	13.1	7.3
Particle Size $\geq 30 \mu\text{m}$ (c)	counts/ml	11	1.9	4.3	3.2
Particle Size $\geq 4 \mu\text{m}$ (c)	ISO scale	14	21.1	1.3	1.0
Particle Size $\geq 6 \mu\text{m}$ (c)	ISO scale	14	19.9	0.8	1.4
Particle Size $\geq 14 \mu\text{m}$ (c)	ISO scale	14	14.7	2.8	2.2

Table 12: comparison of the observed and target reproducibilities of sample #17162 according to IP564

Parameter - IP565	unit	n	average	2.8 * sd	R (lit)
Particle Size $\geq 4 \mu\text{m}$ (c)	counts/ml	29	24561	5164	2645
Particle Size $\geq 6 \mu\text{m}$ (c)	counts/ml	28	10025	2256	2098
Particle Size $\geq 14 \mu\text{m}$ (c)	counts/ml	30	489	537	242
Particle Size $\geq 21 \mu\text{m}$ (c)	counts/ml	29	49.9	91.9	40.0
Particle Size $\geq 25 \mu\text{m}$ (c)	counts/ml	29	13.7	31.2	14.2
Particle Size $\geq 30 \mu\text{m}$ (c)	counts/ml	28	3.4	9.4	5.0
Particle Size $\geq 4 \mu\text{m}$ (c)	ISO scale	30	21.9	0.7	1.0
Particle Size $\geq 6 \mu\text{m}$ (c)	ISO scale	30	20.4	1.4	1.0
Particle Size $\geq 14 \mu\text{m}$ (c)	ISO scale	28	16.0	2.2	1.4

Table 13: comparison of the observed and target reproducibilities of sample #17162 according to IP565

Parameter	unit	n	average	2.8 * sd	R (lit)
FAME (#17163)	mg/kg	48	18.0	8.2	5.4
FAME (#17164)	mg/kg	49	46.7	13.4	12.8

Table 14: comparison of the observed and target reproducibilities of sample #17163 and #17164

Parameter	unit	n	average	2.8 * sd	R (lit)
Copper as Cu	$\mu\text{g}/\text{kg}$	6	37	14	28
VTR (visual)		56	0 – >4	n.a.	n.a
ITR (interferometric)	nm	11	46 – 342	n.a.	n.a
ETR (elliptometric)	nm	3	16 - 287	n.a.	n.a
Delta P	mm Hg	62	0 – >30	n.a.	n.a
JFTOT Evaluation by iis		38	Fail	n.a.	n.a

Table 15: comparison of the observed and target reproducibilities of sample #17165

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 SEPTEMBER 2017 WITH PREVIOUS PTS

	September 2017	March 2017	September 2016	March 2016	September 2015	March 2015
Number of reporting labs	144	108	137	103	129	102
Number of test results reported	2706	2091	2710	1809	2695	1803
Statistical outliers	83	63	49	40	74	44
Percentage outliers	3.1%	3.0%	1.8%	2.2%	2.7%	2.4%

Table 16: 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	September 2017	March 2017	September 2016	March 2016	September 2015	March 2015
Acidity, Total	-	-	+/-	-	--	-
Aromatics by FIA	+	+	+	+/-	++	+
Aromatics by HPLC	+/-	+	+/-	-	+	+/-
Colour Saybolt (automated)	--	-	-	--	-	--
Colour Saybolt (manual)	-	-	--	--	-	-
Density at 15°C	+	+	+	+	++	++
Distillation	+	+	+	+	+	+
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						
- Cumulative parts/ml	-	--	+	--	--	--
- ISO scale numbers	+/-	+	-	-	n.e.	n.e.
Particle Size Distribution IP565						
- Cumulative parts/ml	-	-	+	-	-	-
- ISO scale numbers	+/-	+	-	-	n.e.	n.e.
FAME	+/-	n.e	--	n.e.	-	n.e.
JFTOT finding correct Pass/Fail *)	-	n.e	n.e	n.e	n.e	n.e

Table 17: comparison determinations against the requirements of the reference test methods

\*) JFTOT evaluation from iis14J02: finding correct Pass/Fail: - (group performed worse)

The performance of the determinations against the requirements of the respective reference test methods is listed in the above table. The following performance categories were used:

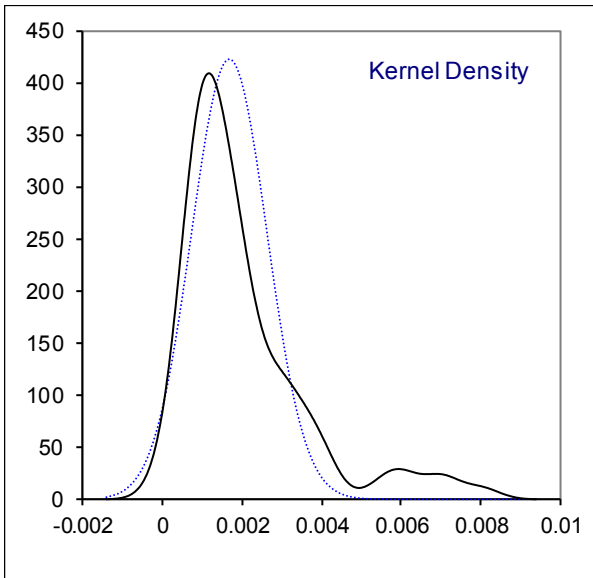
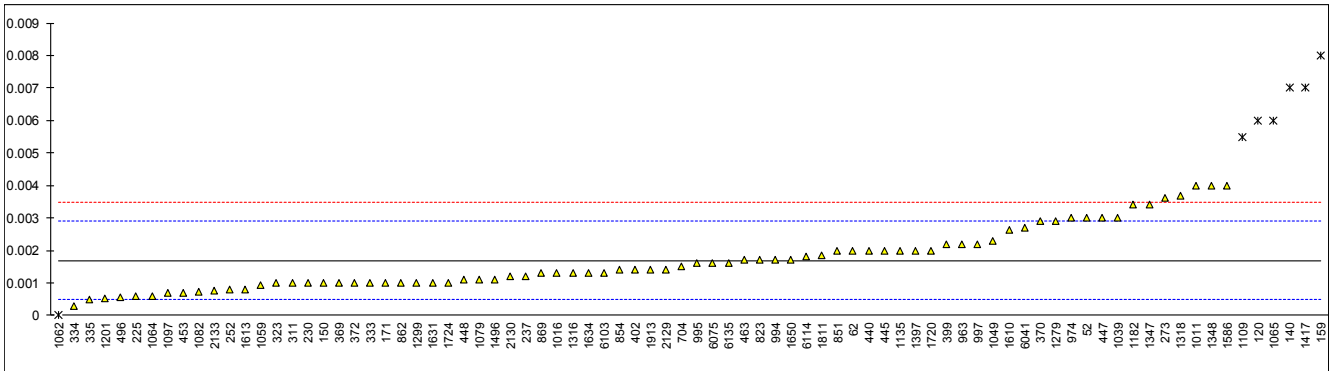
- ++: group performed much better than the reference test method
- + : group performed better than the reference test method
- +/-: group performance equals the reference test method
- : group performed worse than the reference test method
- : group performed much worse than the reference test method

**APPENDIX 1****Determination of Acidity, Total on sample #17160; results in mg KOH/g**

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D3242	0.003		2.18	963	D3242	0.0022		0.84
62	D3242	0.002		0.51	970		----		----
120	D3242	0.006	C,R(0.01)	7.21	974	D3242	0.003		2.18
131		----		----	994	D3242	0.0017		0.01
140	D3242	0.007	R(0.01)	8.88	995	D3242	0.0016		-0.16
150	D3242	0.001		-1.17	996		----		----
159	D3242	0.008	R(0.01)	10.56	997	D3242	0.0022		0.84
169		----		----	1011	D3242	0.004		3.86
171	D3242	0.001		-1.17	1016	D3242	0.0013		-0.66
175		----		----	1026		----		----
177		----		----	1039	D3242	0.003		2.18
194		----		----	1049	D3242	0.00228		0.98
221		----		----	1059	D3242	0.00095		-1.25
224		----		----	1062	D3242	0	ex	-2.84
225	D3242	0.0006		-1.84	1064	D3242	0.0006		-1.84
228		----		----	1065	D3242	0.006	R(0.01)	7.21
230	D3242	0.0010		-1.17	1079	D3242	0.0011		-1.00
237	D3242	0.00121		-0.81	1081		----		----
238		----		----	1082	D3242	0.00074		-1.60
252	D3242	0.00079	C	-1.52	1097	D3242	0.00069		-1.68
253		----		----	1109	D3242	0.0055	R(0.05)	6.37
254		----		----	1135	D3242	0.0020		0.51
256		----		----	1141		----		----
258		----		----	1182	D664-A	0.0034		2.85
273	D974	0.0036	C	3.19	1191		----		----
311	D3242	0.001		-1.17	1201	D3242	0.00051		-1.99
317		----		----	1279	D3242	0.0029		2.02
323	D3242	0.001		-1.17	1284		----		----
333	D3242	0.001		-1.17	1299	D3242	0.001		-1.17
334	D3242	0.0003		-2.34	1316	D3242	0.0013		-0.66
335	D3242	0.0005		-2.00	1318	D3242	0.0037		3.36
336		----		----	1347	D3242	0.0034		2.85
353		----		----	1348	D3242	0.0040		3.86
369	D3242	0.001		-1.17	1357		----		----
370	D3242	0.0029		2.02	1372		----		----
372	D3242	0.001		-1.17	1397	D3242	0.002		0.51
391		----		----	1417	D664-A	0.007	R(0.01)	8.88
399	D3242	0.0022		0.84	1496	D3242	0.0011		-1.00
402	D3242	0.0014		-0.50	1586	D3242	0.004		3.86
440	D3242	0.002	C	0.51	1587		----		----
445	D3242	0.0020		0.51	1610	IP354	0.002638		1.58
447	D3242	0.003	C	2.18	1613	D3242	0.00081		-1.48
448	D3242	0.0011		-1.00	1631	D3242	0.0010		-1.17
453	IP354	0.0007		-1.67	1634	D3242	0.0013		-0.66
463	D3242	0.0017	C	0.01	1650	D3242	0.0017		0.01
468		----		----	1715		----		----
485		----		----	1720	D3242	0.002		0.51
496	D3242	0.00055		-1.92	1724	D3242	0.001		-1.17
594		----		----	1811	D3242	0.00186		0.28
603		----		----	1833		----		----
608		----		----	1881		----		----
631		----		----	1883		----		----
633		----		----	1913	D3242	0.0014		-0.50
634		----		----	1961		----		----
657	D3242	<0.02		----	2129	D3242	0.0014		-0.50
663		----		----	2130	D3242	0.0012		-0.83
671		----		----	2133	D3242	0.00075		-1.58
704	D3242	0.0015		-0.33	6041	D3242	0.0027		1.68
732		----		----	6054		----		----
785		----		----	6075	D3242	0.0016		-0.16
798		----		----	6101		----		----
823	D3242	0.0017		0.01	6103	D3242	0.0013		-0.66
851	D3242	0.002		0.51	6108		----	W	----
854	D3242	0.0014		-0.50	6114	D3242	0.0018		0.17
862	D3242	0.001		-1.17	6135	D3242	0.0016		-0.16
869	D3242	0.0013		-0.66	6136		----		----
875		----		----	6138		----		----
922		----		----	6142		----		----
962		----		----	6147		----		----

normality	OK
n	75
outliers	6 (+1ex)
mean (n)	0.00170
st.dev. (n)	0.000943
R(calc.)	0.00264
R(D3242:11)	0.00167

Lab 62 first reported: 0.005  
 Lab 252 first reported: 0.0079  
 Lab 273 first reported: 0.0082  
 Lab 440 first reported: 0.005  
 Lab 447 first reported: 0.005  
 Lab 463 first reported: 0.0057  
 Lab 1062: test result was excluded for zero is not a real value  
 Lab 6108 first reported: 0.01

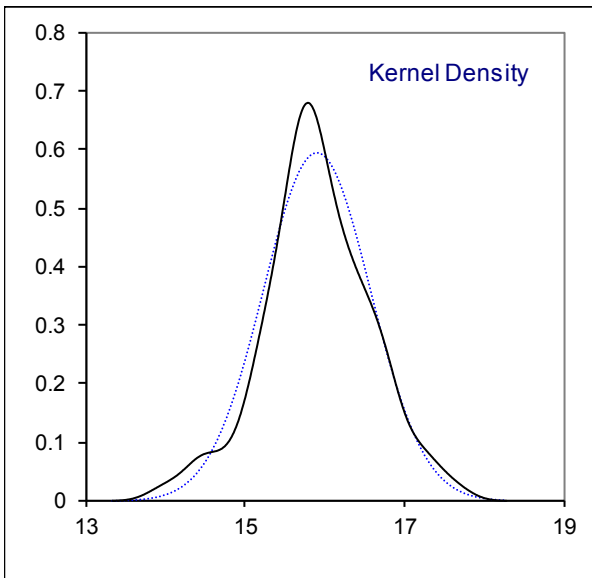
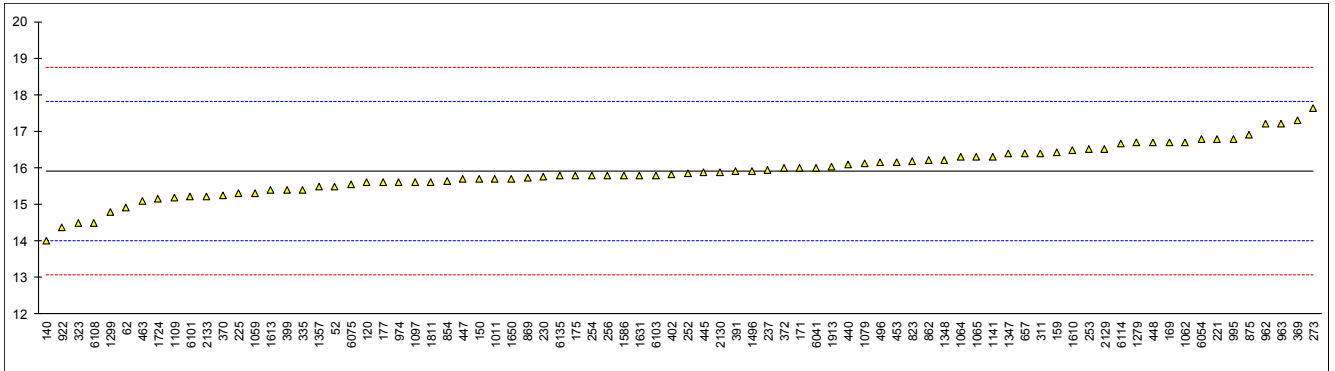


## Determination of Aromatics by FIA (without oxygenate correction) on sample #17160; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D1319	15.5		-0.43	963	D1319	17.2		1.37
62	D1319	14.9		-1.06	970		----		----
120	D1319	15.6		-0.32	974	D1319	15.6		-0.32
131		----		----	994		----		----
140	D1319	14.0		-2.01	995	D1319	16.8		0.95
150	D1319	15.7		-0.22	996		----		----
159	D1319	16.42		0.54	997		----		----
169	D1319	16.7		0.84	1011	D1319	15.7		-0.22
171	D1319	16.0		0.10	1016		----		----
175	D1319	15.8		-0.11	1026		----		----
177	D1319	15.6		-0.32	1039		----		----
194		----		----	1049		----		----
221	D1319	16.8		0.95	1059	D1319	15.3		-0.64
224		----		----	1062	D1319	16.7		0.84
225	D1319	15.3		-0.64	1064	D1319	16.29		0.41
228		----		----	1065	D1319	16.3		0.42
230	D1319	15.75		-0.16	1079	D1319	16.12		0.23
237	D1319	15.93		0.03	1081		----		----
238		----		----	1082		----		----
252	D1319	15.85		-0.06	1097	D1319	15.6		-0.32
253	D1319	16.50		0.63	1109	D1319	15.19		-0.76
254	D1319	15.8		-0.11	1135		----		----
256	D1319	15.8		-0.11	1141	EN15553	16.3		0.42
258		----		----	1182		----		----
273	D1319	17.62		1.81	1191		----		----
311	D1319	16.4		0.52	1201		----		----
317		----		----	1279	D1319	16.68		0.82
323	D1319	14.5		-1.48	1284		----		----
333		----		----	1299	D1319	14.8		-1.17
334		----		----	1316		----		----
335	D1319	15.4	C	-0.53	1318		----		----
336		----		----	1347	D1319	16.39		0.51
353		----		----	1348	D1319	16.2		0.31
369	D1319	17.3		1.47	1357	D1319	15.49		-0.44
370	D1319	15.23		-0.71	1372		----		----
372	D1319	16.0		0.10	1397		----		----
391	D1319	15.9		-0.01	1417		----		----
399	D1319	15.4		-0.53	1496	D1319	15.9		-0.01
402	D1319	15.81		-0.10	1586	D1319	15.8		-0.11
440	D1319	16.08		0.19	1587		----		----
445	D1319	15.89		-0.02	1610	IP156	16.475		0.60
447	D1319	15.7		-0.22	1613	D1319	15.397		-0.54
448	D1319	16.69		0.83	1631	D1319	15.8		-0.11
453	IP156	16.153		0.26	1634		----		----
463	D1319	15.10		-0.85	1650	D1319	15.70		-0.22
468		----		----	1715		----		----
485		----		----	1720		----		----
496	D1319	16.15		0.26	1724	D1319	15.16		-0.79
594		----		----	1811	D1319	15.62		-0.30
603		----		----	1833		----		----
608		----		----	1881		----		----
631		----		----	1883		----		----
633		----		----	1913	D1319	16.03		0.13
634		----		----	1961		----		----
657	D1319	16.4		0.52	2129	D1319	16.5		0.63
663		----		----	2130	D1319	15.89		-0.02
671		----		----	2133	D1319	15.21		-0.73
704		----		----	6041	D1319	16.0		0.10
732		----		----	6054	D1319	16.7926		0.94
785		----		----	6075	D1319	15.56		-0.36
798		----		----	6101	D1319	15.20		-0.74
823	D1319	16.19		0.30	6103	D1319	15.8		-0.11
851		----		----	6108	D1319	14.5		-1.48
854	D1319	15.65		-0.27	6114	D1319	16.666		0.80
862	D1319	16.2		0.31	6135	D1319	15.79375		-0.12
869	D1319	15.74		-0.17	6136		----		----
875	D1319	16.9		1.05	6138		----		----
922	D1319	14.38		-1.61	6142		----		----
962	D1319	17.2		1.37	6147		----		----

normality	OK
n	80
outliers	0
mean (n)	15.905
st.dev. (n)	0.6725
R(calc.)	1.883
R(D1319:15)	2.651

Lab 335 first reported: 9.7



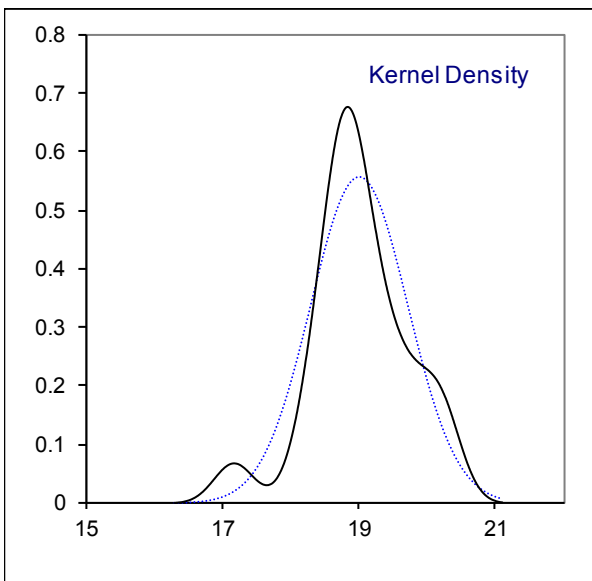
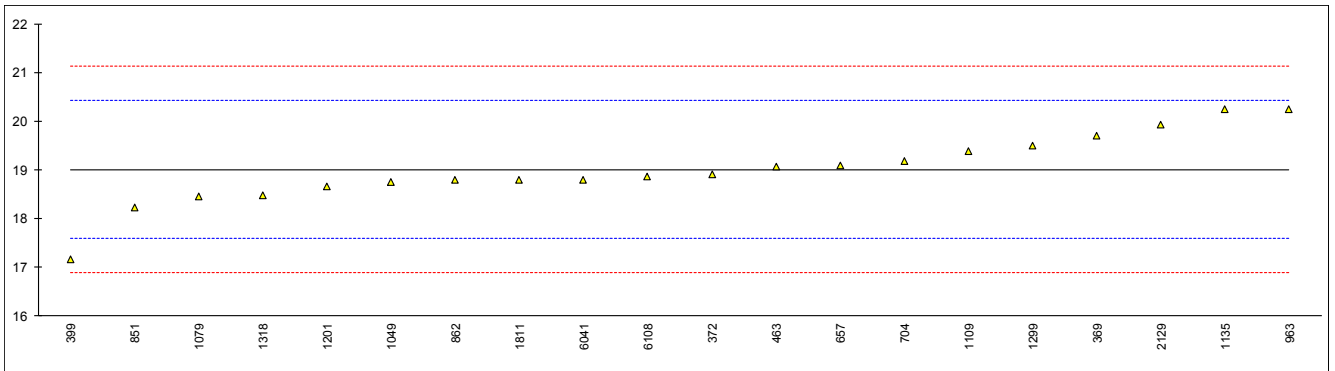
## Determination of Aromatics by HPLC on sample #17160; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		----		----	963	D6379	20.24		1.74
62		----		----	970		----		----
120		----		----	974		----		----
131		----		----	994		----		----
140		----		----	995		----		----
150		----		----	996		----		----
159		----		----	997		----		----
169		----		----	1011		----		----
171		----		----	1016		----		----
175		----		----	1026		----		----
177		----		----	1039		----		----
194		----		----	1049	D6379	18.758		-0.36
221		----		----	1059		----		----
224		----		----	1062		----		----
225		----		----	1064		----		----
228		----		----	1065		----		----
230		----		----	1079	D6379	18.46		-0.78
237		----		----	1081		----		----
238		----		----	1082		----		----
252		----		----	1097		----		----
253		----		----	1109	IP391	19.38		0.52
254		----		----	1135	D6379	20.237	C	1.73
256		----		----	1141		----		----
258		----		----	1182		----		----
273		----		----	1191		----		----
311		----		----	1201	D6379	18.65		-0.51
317		----		----	1279		----		----
323		----		----	1284		----		----
333		----		----	1299	IP436	19.5		0.69
334		----		----	1316		----		----
335		----		----	1318	D6379	18.48		-0.75
336		----		----	1347		----		----
353		----		----	1348		----		----
369	D6379	19.7		0.97	1357		----		----
370		----		----	1372		----		----
372	D6379	18.9		-0.16	1397		----		----
391		----		----	1417		----		----
399	D6379	17.17		-2.60	1496		----		----
402		----		----	1586		----		----
440		----		----	1587		----		----
445		----		----	1610		----		----
447		----		----	1613		----		----
448		----		----	1631		----		----
453		----		----	1634		----		----
463	D6379	19.06		0.07	1650		----		----
468		----		----	1715		----		----
485		----		----	1720		----		----
496		----		----	1724		----		----
594		----		----	1811	D6379	18.8		-0.30
603		----		----	1833		----		----
608		----		----	1881		----		----
631		----		----	1883		----		----
633		----		----	1913		----		----
634		----		----	1961		----		----
657	IP436	19.1		0.13	2129	D6379	19.93	C	1.30
663		----		----	2130		----		----
671		----		----	2133		----		----
704	D6379	19.18		0.24	6041	D6379	18.8	C	-0.30
732		----		----	6054		----		----
785		----		----	6075		----		----
798		----		----	6101		----		----
823		----		----	6103		----		----
851	D6379	18.22		-1.12	6108	D6379	18.86		-0.21
854		----		----	6114		----		----
862	EN12916	18.8		-0.30	6135		----		----
869		----		----	6136		----		----
875		----		----	6138		----		----
922		----		----	6142		----		----
962		----		----	6147		----		----



normality	suspect
n	20
outliers	0
mean (n)	19.011
st.dev. (n)	0.7149
R(calc.)	2.002
R(D6379:11)	1.982

Lab 1135 first reported: 18.451  
 Lab 2129 first reported: 14.57  
 Lab 6041 first reported: 21.5



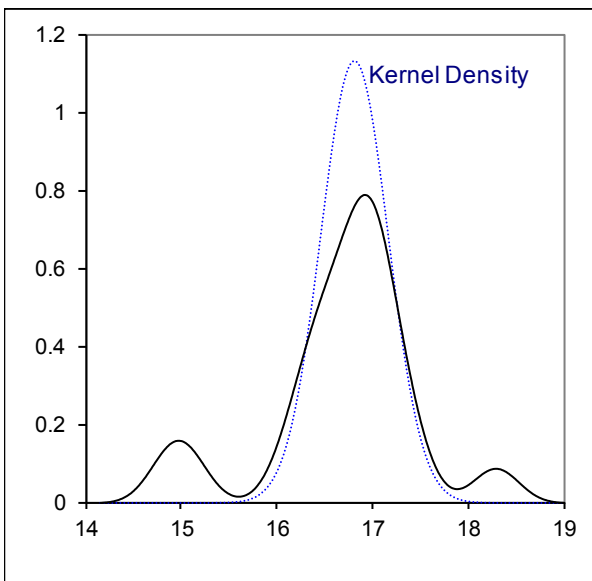
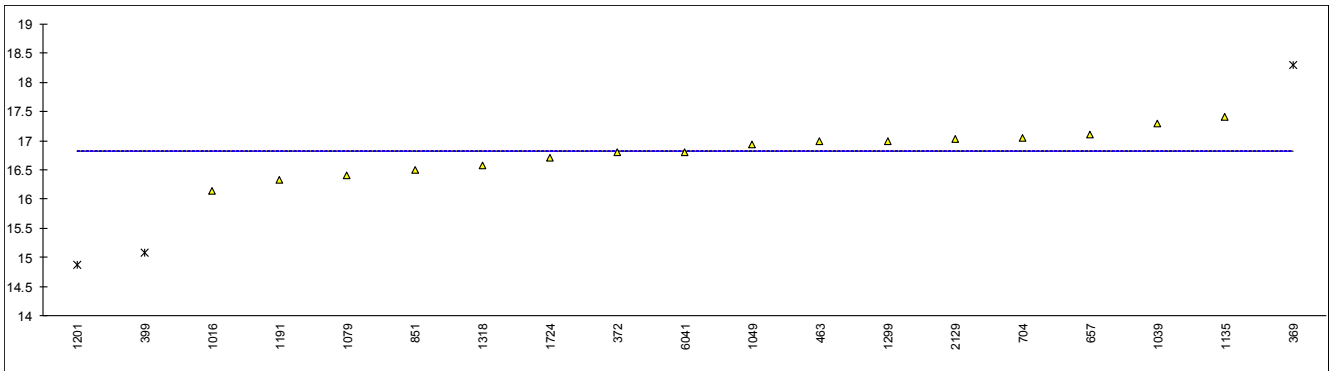
## Determination of Aromatics by HPLC on sample #17160; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		----		----	963		----		----
62		----		----	970		----		----
120		----		----	974		----		----
131		----		----	994		----		----
140		----		----	995		----		----
150		----		----	996		----		----
159		----		----	997		----		----
169		----		----	1011		----		----
171		----		----	1016	IP436	16.142		----
175		----		----	1026		----		----
177		----		----	1039	D6379	17.3		----
194		----		----	1049	D6379	16.93212		----
221		----		----	1059		----		----
224		----		----	1062		----		----
225		----		----	1064		----		----
228		----		----	1065		----		----
230		----		----	1079	D6379	16.41		----
237		----		----	1081		----		----
238		----		----	1082		----		----
252		----		----	1097		----		----
253		----		----	1109		----		----
254		----		----	1135	D6379	17.404	C	----
256		----		----	1141		----		----
258		----		----	1182		----		----
273		----		----	1191	D6379	16.33		----
311		----		----	1201	D6379	14.87	DG(0.05)	----
317		----		----	1279		----		----
323		----		----	1284		----		----
333		----		----	1299	IP436	17.0		----
334		----		----	1316		----		----
335		----		----	1318	D6379	16.57		----
336		----		----	1347		----		----
353		----		----	1348		----		----
369	D6379	18.3	G(0.05)	----	1357		----		----
370		----		----	1372		----		----
372	D6379	16.8		----	1397		----	W	----
391		----		----	1417		----		----
399	D6379	15.08	DG(0.05)	----	1496		----		----
402		----		----	1586		----		----
440		----		----	1587		----		----
445		----		----	1610		----		----
447		----		----	1613		----		----
448		----		----	1631		----		----
453		----		----	1634		----		----
463	D6379	16.99		----	1650		----		----
468		----		----	1715		----		----
485		----		----	1720		----		----
496		----		----	1724	D6379	16.7		----
594		----		----	1811		----		----
603		----		----	1833		----		----
608		----		----	1881		----		----
631		----		----	1883		----		----
633		----		----	1913		----		----
634		----		----	1961		----		----
657	IP436	17.1		----	2129	D6379	17.03		----
663		----		----	2130		----		----
671		----		----	2133		----		----
704	D6379	17.05		----	6041	D6379	16.8	C	----
732		----		----	6054		----		----
785		----		----	6075		----		----
798		----		----	6101		----		----
823		----		----	6103		----		----
851	D6379	16.50		----	6108		----		----
854		----		----	6114		----		----
862		----		----	6135		----		----
869		----		----	6136		----		----
875		----		----	6138		----		----
922		----		----	6142		----		----
962		----		----	6147		----		----

normality	OK
n	16
outliers	3
mean (n)	16.816
st.dev. (n)	0.3529
R(calc.)	0.988
R(lit)	n.a.

Compare to R(calc) of iis17J01 = 1.231 or R(calc) of iis16J02 = 2.333

Lab 1135 first reported: 21.455  
 Lab 1397 first reported: 20.111  
 Lab 6041 first reported: 19.3



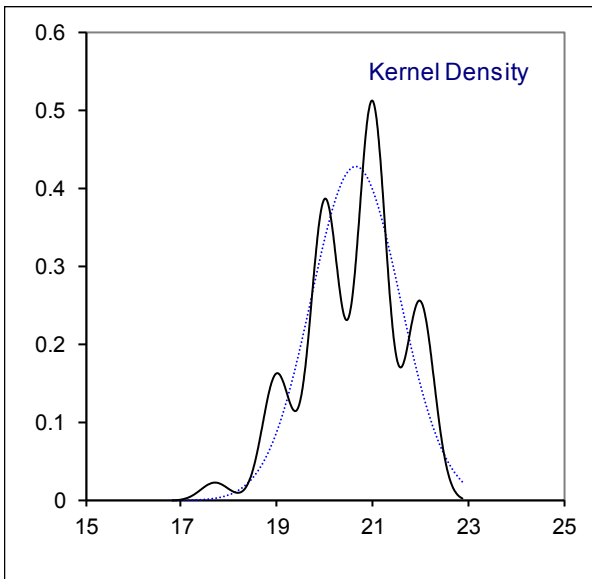
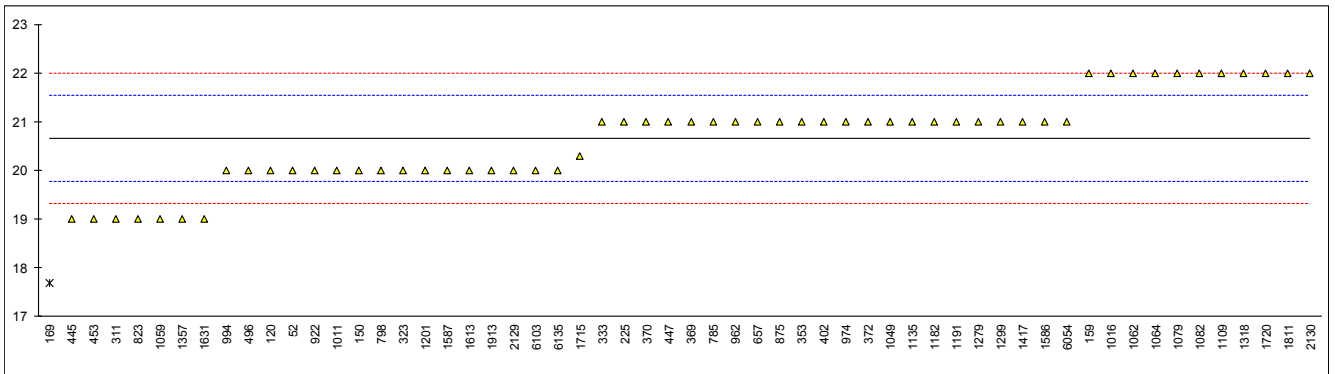
## Determination of Color Saybolt (Automated) on sample #17160; cell size in mm;

lab	method	cell (mm)	value	mark	z(targ)	lab	method	cell (mm)	value	mark	z(targ)
52	D6045	----	20		-1.48	963		----	----		----
62		----	----		----	970		----	----		----
120	D6045	----	20		-1.48	974	D6045	100	21		0.78
131		----	----		----	994	D6045	----	20.0		-1.48
140		----	----		----	995		----	----		----
150	D6045	----	20		-1.48	996		----	----		----
159	D6045	100	22.0		3.04	997		----	----		----
169	D6045	50	17.7	R(0.05)	-6.67	1011	D6045	----	20		-1.48
171		----	----		----	1016	D6045	100	22		3.04
175		----	----		----	1026		----	----		----
177		----	----		----	1039		100	----		----
194		----	----		----	1049	D6045	50	21		0.78
221		----	----		----	1059	D6045	50	19		-3.74
224		----	----		----	1062	D6045	100	22		3.04
225	D6045	----	21		0.78	1064	D6045	50	22		3.04
228		----	----		----	1065		----	----		----
230		----	----		----	1079	D6045	100	22		3.04
237		----	----		----	1081		----	----		----
238		----	----		----	1082	D6045	100	22		3.04
252		----	----		----	1097		----	----		----
253		----	----		----	1109	D6045	----	22		3.04
254		----	----		----	1135	D6045	100	21		0.78
256		----	----		----	1141		----	----		----
258		----	----		----	1182	D6045	50	21.0		0.78
273		----	----		----	1191	D6045	100	21		0.78
311	D6045	50	19		-3.74	1201	D6045	100	20		-1.48
317		----	----		----	1279	D6045	----	21		0.78
323	D6045	50	20		-1.48	1284		----	----		----
333	D6045	----	21		0.78	1299	D6045	50	21		0.78
334		----	----		----	1316		----	----		----
335		----	----		----	1318	D6045	100	22		3.04
336		----	----		----	1347		----	----		----
353	D6045	50	21		0.78	1348		----	----		----
369	D6045	50	21		0.78	1357	D6045	50	19		-3.74
370	D6045	50	21		0.78	1372		----	----		----
372	D6045	50	21		0.78	1397		----	----		----
391		----	----		----	1417	D6045	----	21		0.78
399		----	----		----	1496		----	----		----
402	D6045	50.0	21.0		0.78	1586	D6045	50	21		0.78
440		----	----		----	1587	D6045	50	20.0		-1.48
445	D6045	50	19		-3.74	1610		----	----		----
447	D6045	100	21		0.78	1613	D156	----	20		-1.48
448		----	----		----	1631	D6045	----	19		-3.74
453	D6045	50	19		-3.74	1634		----	----		----
463		----	----		----	1650		----	----		----
468		----	----		----	1715	D6045	100	20.3		-0.80
485		----	----		----	1720	D6045	50	22		3.04
496	D6045	----	20		-1.48	1724		----	----		----
594		----	----		----	1811	D6045	50	22		3.04
603		----	----		----	1833		----	----		----
608		----	----		----	1881		----	----		----
631		----	----		----	1883		----	----		----
633		----	----		----	1913	D6045	50.00	20		-1.48
634		----	----		----	1961		----	----		----
657	D6045	----	21	C	0.78	2129	D6045	50	20.0		-1.48
663		----	----		----	2130	D6045	50	22		3.04
671		----	----		----	2133		----	----		----
704		----	----		----	6041		----	----		----
732		----	----		----	6054	D6045	----	21		0.78
785	D6045	----	21		0.78	6075		----	----		----
798	D6045	----	20		-1.48	6101		----	----		----
823	D6045	30	19		-3.74	6103	D6045	----	20		-1.48
851		----	----		----	6108		----	----		----
854		----	----		----	6114		----	----		----
862		----	----		----	6135	D6045	----	20		-1.48
869		----	----		----	6136		----	----		----
875	D6045	----	21		0.78	6138		----	----		----
922	D6045	100	20		-1.48	6142		----	----		----
962	D6045	----	21		0.78	6147		----	----		----

		<u>Test results of 50 mm cel only</u>	<u>Test results of 100 mm cel only</u>
normality	OK	OK	OK
n	57	22	13
outliers	1	1	0
mean (n)	20.65	20.55	21.25
st.dev. (n)	0.932	1.057	0.799
R(calc.)	2.61	2.96	2.24
R(D6045:12)	1.24	1.24	1.24

Lab 657 first reported: 24

Lab 1613 remarked: Colour Saybolt automated according to ASTM D156

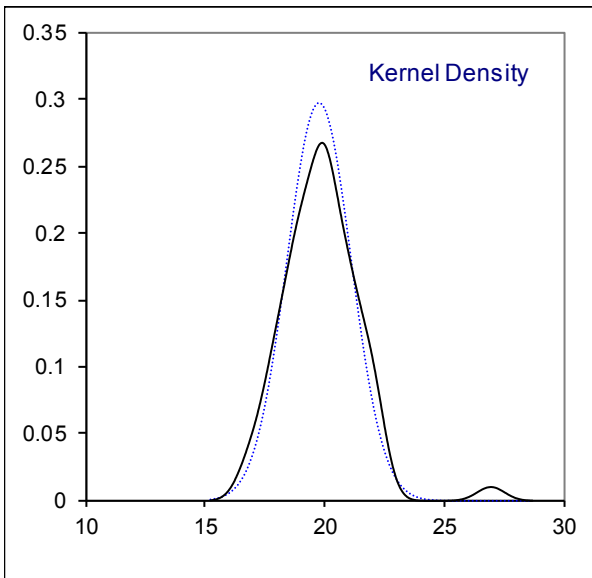
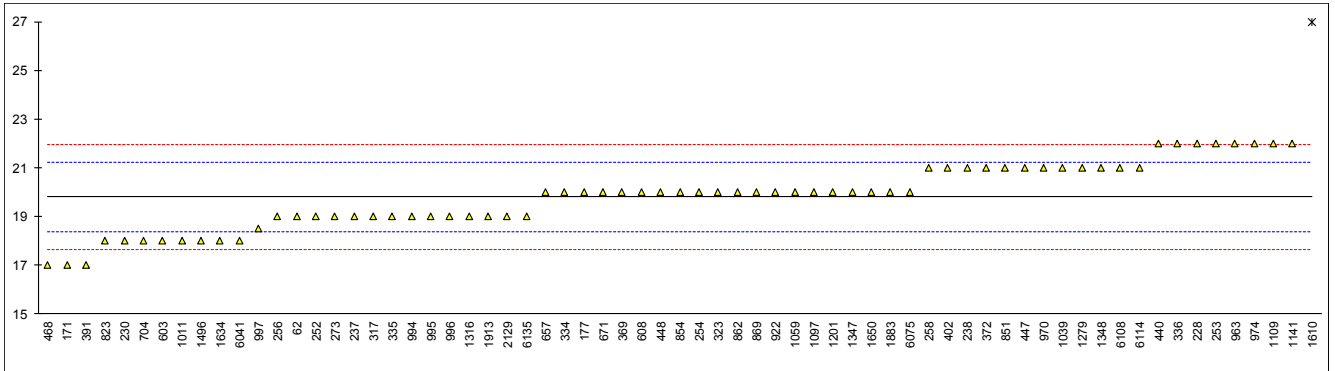


## Determination of Color Saybolt (Manual) on sample #17160;

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52		----		----	963	D156	22		3.07
62	D156	19		-1.13	970	D156	21		1.67
120		----		----	974	D156	22		3.07
131		----		----	994	D156	19.0		-1.13
140		----		----	995	D156	19		-1.13
150		----		----	996	D156	19		-1.13
159		----		----	997	D156	18.5		-1.83
169		----		----	1011	D156	18		-2.53
171	D156	17		-3.93	1016		----		----
175		----		----	1026		----		----
177	D156	20		0.27	1039	D156	21		1.67
194		----		----	1049		----		----
221		----		----	1059	D156	20		0.27
224		----		----	1062		----		----
225		----		----	1064		----		----
228	D156	22		3.07	1065		----		----
230	D156	18		-2.53	1079		----		----
237	D156	19		-1.13	1081		----		----
238	D156	21		1.67	1082		----		----
252	D156	19		-1.13	1097	NF M 07 003	20		0.27
253	D156	22		3.07	1109	D156	22		3.07
254	D156	20		0.27	1135		----		----
256	D156	19		-1.13	1141	D156	22		3.07
258	D156	21		1.67	1182		----		----
273	D156	19		-1.13	1191		----		----
311		----		----	1201	D156	20		0.27
317	D156	19		-1.13	1279	D156	21		1.67
323	D156	20		0.27	1284		----		----
333		----		----	1299		----		----
334	D156	20		0.27	1316	D156	19		-1.13
335	D156	19		-1.13	1318		----		----
336	D156	22		3.07	1347	D156	20		0.27
353		----		----	1348	D156	21		1.67
369	D156	20		0.27	1357		----		----
370		----		----	1372		----		----
372	D156	21		1.67	1397		----		----
391	D156	17		-3.93	1417		----		----
399		----		----	1496	D156	18		-2.53
402	D156	21.0		1.67	1586		----		----
440	D156	22		3.07	1587		----		----
445		----		----	1610	D156	27	R(0.01)	10.07
447	D156	21		1.67	1613		----		----
448	D156	20		0.27	1631		----		----
453		----		----	1634	D156	18		-2.53
463		----		----	1650	D156	20		0.27
468	D156	17		-3.93	1715		----		----
485		----		----	1720		----		----
496		----		----	1724		----		----
594		----		----	1811		----		----
603	D156	18		-2.53	1833		----		----
608	D156	20		0.27	1881		----		----
631		----		----	1883	D156	20		0.27
633		----		----	1913	D156	19		-1.13
634		----		----	1961		----		----
657	D156	20	C	0.27	2129	D156	19		-1.13
663		----		----	2130		----		----
671	D156	20		0.27	2133		----		----
704	D156	18		-2.53	6041	D156	18		-2.53
732		----		----	6054		----		----
785		----		----	6075	D156	20		0.27
798		----		----	6101		----		----
823	D156	18		-2.53	6103		----		----
851	D156	21		1.67	6108	D156	21		1.67
854	D156	20		0.27	6114	D156	21		1.67
862	D156	20		0.27	6135	D156	19		-1.13
869	D156	20		0.27	6136		----		----
875		----		----	6138		----		----
922	D156	20		0.27	6142		----		----
962		----		----	6147		----		----

normality	OK
n	66
outliers	1
mean (n)	19.81
st.dev. (n)	1.341
R(calc.)	3.75
R(D156:15)	2

Lab 657 first reported: 23



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

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D130	1a		----	963	D130	1a		----
62	D130	1a		----	970	D130	1a		----
120	D130	1A		----	974	D130	1a		----
131		----		----	994	D130	1a		----
140		----		----	995	D130	1a		----
150	D130	1a		----	996	D130	1a		----
159	D130	1a		----	997	D130	1a		----
169	D130	1A		----	1011	D130	1a		----
171	D130	1a		----	1016		----		----
175	D130	1a		----	1026		----		----
177	D130	1B		----	1039		----		----
194		----		----	1049	D130	1A		----
221	D130	1		----	1059	D130	1a		----
224		----		----	1062	D130	1A		----
225	D130	1a		----	1064	D130	1a		----
228	D130	1A		----	1065		----		----
230	D130	1a		----	1079	D130	1A		----
237		----		----	1081		----		----
238	D130	1A		----	1082	D130	1a		----
252	D130	1A		----	1097	ISO2160	1a		----
253	D130	1A		----	1109	D130	1a		----
254		----		----	1135	D130	1A		----
256	D130	1A		----	1141	D130	1a		----
258	D130	1a		----	1182		----		----
273	D130	1a		----	1191	D130	1a		----
311	D130	1a		----	1201	D130	1A		----
317	D130	1a		----	1279	D130	1a		----
323	D130	1A		----	1284		----		----
333		----		----	1299	D130	1A		----
334		----		----	1316	D130	1a		----
335	D130	1b		----	1318	D130	1a		----
336		----		----	1347	D130	1A		----
353	D130	1A		----	1348	D130	1A		----
369	D130	1A		----	1357	D130	1a		----
370	D130	1A		----	1372		----		----
372	D130	1A		----	1397	D130	1		----
391	D130	1a		----	1417	D130	1B		----
399		----		----	1496	D130	1a		----
402		----		----	1586	D130	1a		----
440	IP154	1A		----	1587	D130	1a		----
445	D130	1a		----	1610	D130	1b		----
447	IP154	1a		----	1613	D130	1a		----
448	IP154	1a		----	1631	D130	1		----
453	IP154	1A		----	1634	D130	1a		----
463	D130	1A		----	1650	D130	1a		----
468	D130	1A		----	1715		----		----
485		----		----	1720		----		----
496	D130	1a		----	1724	D130	1a		----
594		----		----	1811		----		----
603	D130	1a		----	1833	D130	1		----
608	D130	1a		----	1881		----		----
631		----		----	1883	D130	1a		----
633		----		----	1913	D130	1a		----
634		----		----	1961	D130	1a		----
657	D130	No.1A		----	2129	D130	1a		----
663		----		----	2130	D130	1a		----
671	D130	1A		----	2133	D130	1a		----
704	D130	1A		----	6041	D130	1a		----
732		----		----	6054	D130	1a		----
785		----		----	6075		----		----
798	D130	1a		----	6101	D130	1a		----
823	D130	1a		----	6103		----		----
851	D130	1a		----	6108	D130	1a		----
854	D130	1a		----	6114	D130	1a		----
862	D130	1a		----	6135	D130	1b		----
869	D130	1a		----	6136		----		----
875	D130	1a		----	6138		----		----
922	D130	1A		----	6142		----		----
962	D130	1A		----	6147		----		----

n 101  
mean (n) 1



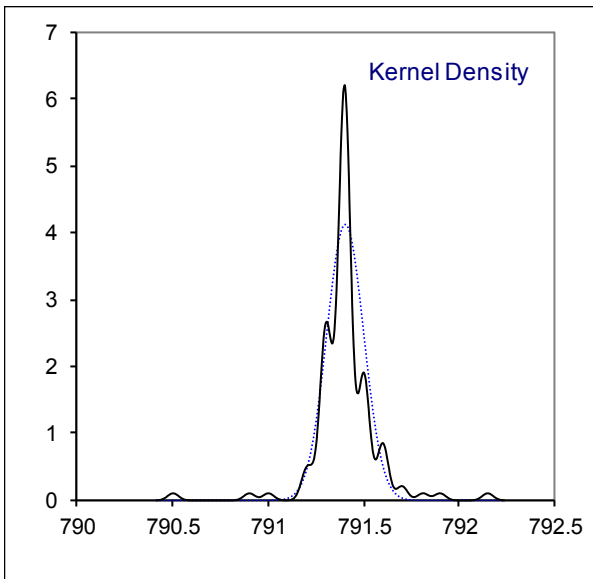
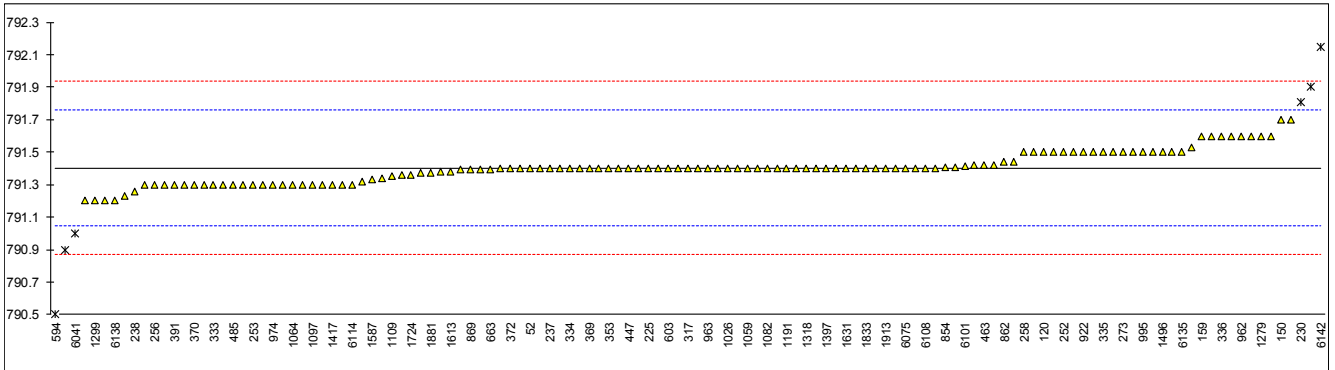
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Determination of Density at 15°C on sample #17160; results in kg/m<sup>3</sup>

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D4052	791.4		-0.02	963	D4052	791.4		-0.02
62	D4052	791.4		-0.02	970	D4052	791.3		-0.58
120	D4052	791.5		0.54	974	D4052	791.3		-0.58
131	D4052	791.39		-0.07	994	D4052	791.5		0.54
140	D4052	791.5		0.54	995	D4052	791.5		0.54
150	D4052	791.7		1.66	996	D1298	791.3		-0.58
159	D4052	791.6		1.10	997	D4052	791.5		0.54
169	D4052	791.4		-0.02	1011	D4052	791.4		-0.02
171	D4052	791.3		-0.58	1016		-----		-----
175	D4052	791.4		-0.02	1026	D4052	791.4		-0.02
177	D4052	791.9	C,R(0.01)	2.78	1039	ISO12185	791.4		-0.02
194		-----		-----	1049	D4052	791.23		-0.97
221	D4052	791.4		-0.02	1059	D4052	791.4		-0.02
224	D1298	791.5		0.54	1062	D4052	791.6	C	1.10
225	D4052	791.4		-0.02	1064	D4052	791.3		-0.58
228	D4052	791.53		0.71	1065	D4052	791.3		-0.58
230	D1298	791.81	C,R(0.01)	2.28	1079	D4052	791.4		-0.02
237	D4052	791.4		-0.02	1081		-----		-----
238	D4052	791.26		-0.80	1082	D4052	791.4		-0.02
252	D1298	791.5		0.54	1097	ISO12185	791.3		-0.58
253	D4052	791.3		-0.58	1109	D4052	791.35		-0.30
254	D4052	791.3		-0.58	1135	D4052	791.4		-0.02
256	D4052	791.3		-0.58	1141	D4052	791.32		-0.46
258	D4052	791.5		0.54	1182	ISO12185	791.356		-0.26
273	D4052	791.5		0.54	1191	D4052	791.4		-0.02
311	D4052	791.4		-0.02	1201	D4052	791.4		-0.02
317	D4052	791.4		-0.02	1279	D4052	791.6		1.10
323	D4052	791.2		-1.14	1284		-----		-----
333	D4052	791.3		-0.58	1299	D4052	791.2		-1.14
334	D4052	791.4		-0.02	1316	D4052	791.3		-0.58
335	D4052	791.5		0.54	1318	D4052	791.40		-0.02
336	D4052	791.6		1.10	1347	D4052	791.44		0.21
353	IP365	791.4		-0.02	1348	D4052	791.4		-0.02
369	D4052	791.4		-0.02	1357	D4052	791.2		-1.14
370	D4052	791.3		-0.58	1372		-----		-----
372	D4052	791.4		-0.02	1397	D4052	791.4		-0.02
391	D4052	791.3		-0.58	1417	IP365	791.3		-0.58
399	D4052	790.9	R(0.01)	-2.82	1496	D1298	791.5		0.54
402	D4052	791.4		-0.02	1586	D4052	791.4		-0.02
440	D4052	791.6		1.10	1587	D4052	791.33		-0.41
445	D4052	791.4		-0.02	1610	IP365	791.34		-0.35
447	D4052	791.4		-0.02	1613	D4052	791.38		-0.13
448	D4052	791.4		-0.02	1631	D4052	791.4		-0.02
453	IP365	791.3		-0.58	1634	D4052	791.397		-0.03
463	D4052	791.42		0.10	1650	D4052	791.37		-0.18
468	D4052	791.3		-0.58	1715	ISO12185	791.5		0.54
485	D4052	791.30		-0.58	1720	D4052	791.6		1.10
496	D4052	791.38		-0.13	1724	D4052	791.36		-0.24
594	GOST3900	790.5	R(0.01)	-5.06	1811	D4052	791.4		-0.02
603	D4052	791.4		-0.02	1833	D4052	791.4		-0.02
608	D4052	791.5		0.54	1881	D4052	791.37		-0.18
631		-----		-----	1883	D1298	791.4		-0.02
633		-----		-----	1913	D4052	791.4		-0.02
634		-----		-----	1961		-----		-----
657	D4052	791.4	C	-0.02	2129	D4052	791.3		-0.58
663	D4052	791.39		-0.07	2130	D4052	791.4		-0.02
671	D4052	791.6		1.10	2133	D4052	791.41		0.04
704	D4052	791.42		0.10	6041	D1298	791.0	R(0.01)	-2.26
732	ISO12185	791.5		0.54	6054	D4052	791.42		0.10
785	D4052	791.3		-0.58	6075	ISO12185	791.40		-0.02
798	D4052	791.3		-0.58	6101	D4052	791.413		0.06
823	D4052	791.39		-0.07	6103	ISO12185	791.4		-0.02
851	D4052	791.5		0.54	6108	D4052	791.4		-0.02
854	D4052	791.41		0.04	6114	D4052	791.3		-0.58
862	D4052	791.44		0.21	6135	D4052	791.5		0.54
869	D4052	791.39		-0.07	6136	D1298	791.7		1.66
875	D4052	791.4		-0.02	6138	EN16986	791.2		-1.14
922	D4052	791.5		0.54	6142	IP365	792.15	R(0.01)	4.18
962	D4052	791.6		1.10	6147	D4052	791.4		-0.02

normality OK  
n 123  
outliers 6  
mean (n) 791.403  
st.dev. (n) 0.0968  
R(calc.) 0.271  
R(D4052:16) 0.5

Lab 177 first reported: 0.7919  
Lab 230 first reported: 792.5  
Lab 657 first reported: 0.7914  
Lab 1062 first reported: 0.7196



## Determination of Distillation ASTM D86 on sample #17160; results in °C

lab	method	IBP	mark	10% rec	mark	50% rec	mark	90% rec	mark	FBP	mark
52	D86-automated	146.3		167.2		193.9		241.2		270.6	
62	D86-automated	147.5		166.6		193.9		243.0		269.3	
120	D86-automated	152.7		166.5		193.4		240.8		272.1	
131		----		----		----		----		----	
140	D86-automated	147.2		164.0		193.5		239.8		268.7	
150		147.7		166.3		192.9		239.9		269.4	
159	D86-automated	150.7		167.1		194.4		241.2		271.8	
169	D86-automated	148.2		168.8		193.9	C	239.0	C	273.7	
171	D86-automated	149.8		166.9		193.0		240.7		268.3	
175	D86-automated	148.6		166.3		194.0		241.8		272.0	
177	D86-automated	143.0		166.2		194.1		242.0		273.0	
194		----		----		----		----		----	
221	D86-manual	150.0		168.0		194.0		239.0		271.0	
224	D86-manual	150.05		167.72		193.02		238.03		268.07	
225	D86-manual	150.0		167.0		193.0		239.0		267.0	
228	D86-manual	145.0		164.0		189.0	C,R(0.01)	235.0	C,R(0.01)	267.0	
230	D86-automated	151.1		166.3		192.5		239.3		269.9	
237	D86-manual	148.0		166.0		195.0		241.0	C	269.0	
238	D86-manual	148.0		166.0		191.0		238.5	C	266.0	
252	D86-manual	151.0		167.0		194.0		240.0		273.0	
253	D86-manual	150.0		167.0		193.5		241.0		270.0	
254	D86-manual	150.0		168.0		194.0		240.0		272.0	
256		151.0		167.0		193.0		240.0		270.0	
258	D86-automated	155.5		169.1		196.0		242.9		272.4	
273	D86-automated	151.5		167.2		193.8		242.0		272.8	
311	D86-automated	147.5		166.8		193.3		241.1		271.1	
317	D86-automated	146.3		167.1		193.6		240.3		271.9	
323	D86-automated	149.2		167.4		193.9		241.0		269.5	
333	D86-automated	146.8		168.1		194.3		240.3		271.2	
334		149.6		166.1		193.4		241.3		272.7	
335	D86-automated	149.3		166.2		193.6		241.8		267.9	
336		150.8		166.2		193.4		240.2		268.7	
353		151.2		167.7		193.7		241.3		270.0	
369	D86-automated	150.8		166.8		193.2		240.5		264.0	
370	D86-automated	152.0		167.2		193.2		240.2		271.0	
372	D86-automated	149.6		166.4		193.6		239.0		270.5	
391	D86-automated	150.9		167.0		193.9		240.9		272.8	
399		----		----		----		----		----	
402	D86-automated	150.7		167.2		194.7		243.5		272.6	
440	IP123-manual	151.0		167.0		194.0		239.0		272.0	
445	D86-automated	146.8		165.9		193.1		240.6		270.8	
447	D86-automated	149.9		167.2		194.6		242.8		272.7	
448		148.6		167.7		194.3		243.9		273.0	
453	IP123-automated	148.7		167.2		194.4		241.7		271.1	
463	D86-automated	152.6		167.8		193.7		240.0		271.5	
468	D86-automated	148.5		168.7		194.5		242.0		269.6	
485	D86-automated	147.60		167.30		193.45		239.85		268.20	
496	D86-automated	151.1		167.4		194.0		239.9		272.6	
594	GOST2177	152.9		167.9		196.7	R(0.05)	247.6	R(0.01)	279.4	R(0.05)
603	D86-automated	150.3		168.3		194.1		240.3		273.5	
608		148.4		166.0		193.4		239.1		268.8	
631		----		----		----		----		----	
633		----		----		----		----		----	
634		----		----		----		----		----	
657	D86-automated	151.4		167.4		194.1		241.6		275.3	
663	D86-automated	151.1		167.1		193.1		240.8		273.0	
671		----		----		----		----		----	
704	D86-manual	150.0		165.0		191.5		237.5	C	265.0	
732	D86-manual	150.5		168.0		194.0		238.0		268.5	
785	D86-automated	150.2		166.6		193.1		241.4		271.2	
798	D86-manual	150.0		168.0		195.0		241.0		273.0	
823	D86-automated	145.3		166.6		192.9		239.4		268.9	
851	D86-automated	150.8		167.7		194.3		242.4		270.6	
854	D86-automated	149.3		167.0		194.0		241.1		271.7	
862	D86-automated	149.8		166.8		193.9		241.2		271.5	
869	D86-manual	151.0		168.0		195.0		242.5		272.0	
875	D86-automated	151.2		167.7		194.3		241.5		272.2	
922	D86-automated	147.3		165.3		191.5		237.1		268.5	
962	D86-automated	151.0		167.9		193.8		240.1		269.7	
963	D86-automated	149.28		168.20		194.26		240.46		271.85	
970	D86-automated	150.4		168.0		193.8		240.4		269.9	
974	D86-automated	150.4		168.0		193.8		240.4		269.3	
994	D86-manual	150.0		165.0		192.0		238.0		266.0	
995	D86-manual	147.0		165.0		192.0		240.5		267.5	
996	D86-manual	149.5		165.0		193.0		241.0		270.0	

lab	method	IBP	mark	10% rec	mark	50% rec	mark	90% rec	mark	FBP	mark
997		147.5		164.0		193.0		240.5		268.5	
1011	D86-automated	149.0		167.2		193.6		240.8		271.2	
1016		----		----		----		----		----	
1026		----		----		----		----		----	
1039	D86-automated	151.1		163.9		193.7		240.2		271.0	
1049	D86-automated	148.3		167.6		194.3		242.3		270.4	
1059	D86-automated	151.4		167.6		194.2		240.3		272.6	
1062		149.5		167.3		193.8		242.7		264.2	
1064	D86-automated	148.7		167.7		194.5		242.7		274.1	
1065	D86-automated	149.5		166.8		192.5		240.8		264.9	
1079	D86-automated	153.8		167.9		194.3		242.1		274.0	
1081		----		----		----		----		----	
1082	D86-automated	151.8		167.4		193.5		240.7		271.8	
1097	ISO3405-automated	153.3		167.7		194.1		241.3		270.1	
1109	D86-automated	150.3		166.4		193.3		240.6		270.3	
1135	D86-automated	148.5		167.1		193.5		241.3		271.3	
1141	D86-automated	148.8		166.5		192.3		240.9		271.0	
1182	D86-automated	152.4	C	166.1		193.7		242.1		267.6	
1191	D86-automated	145.9		168.2		194.4		241.0		270.6	
1201	D86-automated	145.5		166.9		195.0		244.4		270.4	
1279	D86-automated	147.9		167.8		193.4		239.4		268.6	
1284		----		----		----		----		----	
1299	D86-automated	146.7		165.8		193.3		241.1		269.6	
1316	D86-automated	147.6		166.7		194.3		242.1		271.6	
1318	D86-automated	146.8		166.5		192.7		239.7		270.1	
1347	D86-manual	152		168		194.5		239		272	
1348	D86-automated	150.8		167.2		193.2		240.5		269.6	
1357	D86-automated	149.0		168.1		193.6		238.1		269.8	
1372		----		----		----		----		----	
1397	D86-automated	150.8		167.0		193.6		239.9		271.3	
1417	IP123-automated	150.2		167.1		194.8		243.1		271.7	
1496	D86-automated	152.0		168.5		194.2		241.7		270.7	
1586	D86-automated	151.7		167.7		193.9		242.3		272.1	
1587	D86-automated	147.5		167.3		193.7		240.0		270.9	
1610	IP123-automated	149.2		166.1		193.4		240.8		269.7	
1613	D86-manual	148.26		166.57		192.72		240.0		268.16	
1631	D86-automated	149.6		166.1		193.9		240.8		273.3	
1634	D86-automated	148.6		167.7		194.2		242.2		272.6	
1650	D86-automated	146.5		166.0		193.0		239.6		269.6	
1715	ISO3405-automated	152.6		167.8		193.9		242.2		272.5	
1720	D86-automated	148.3		167.5		194.0		241.1		272.4	
1724	D86-automated	147.7		167.5		193.2		240.6		271.4	
1811	D86-automated	147.2		166.2		191.9		237.6		267.6	
1833		----		----		----		----		----	
1881		----		----		----		----		----	
1883	D86-manual	149		165	C	193	C	239	C	271	C
1913	D86-automated	148.6		168.1		193.8		241.9		269.1	
1961		----		----		----		----		----	
2129	D86-automated	143.3		166.3		192.7		240.2		268.9	
2130	D86-automated	150.4		166.9		194.0		241.2		274.5	
2133	D86-automated	149.9		167.3		194.1		240.8		272.1	
6041	D86-automated	149.2		167.8		194.5		241.0		272.2	
6054	D86-automated	141.4	R(0.05)	167.4		193.1		239.8		269.3	
6075	D86-automated	145.4		165.3		193.0		239.9		270.5	
6101		150.23		166.77		193.67		241.00		272.07	
6103	ISO3405-automated	146.4		165.2		192.2		239.3		264.1	
6108		150.5		167.1		193.5		240.6		272.2	
6114	D86-automated	152.1		167.6		193.9		242.4		271.7	
6135	D86-automated	147.9		167.5		193.9		238.9		270.2	
6136	D86-manual	151.4		165.7		192.4		239.2		271.8	
6138	ISO3405-automated	152.8		168.1		194		239.5		270.7	
6142	D86-automated	146.2		165.8		192.8		240.4		269.4	
6147	D86-automated	149.9		167.2		194.0		240.4		272.0	
	normality	OK		OK		suspect		OK		OK	
	n	122		123		121		121		122	
	outliers	1		0		2		2		1	
	mean (n)	149.42		166.94		193.62		240.65		270.50	
	st.dev. (n)	2.132		1.025		0.776		1.345		2.188	
	R(calc.)	5.97		2.87		2.17		3.76		6.13	
	R(D86:17-Auto)	8.22		3.67		3		3.61		7.1	
	R(D86:17-Man)	4.43		2.98		3.03		3.85		4.35	

Lab 169 first reported for 50% recovered: 197.7 and for 90% recovered: 247.0

Lab 228 first reported for 50% recovered: 190.0 and for 90% recovered: 227.0

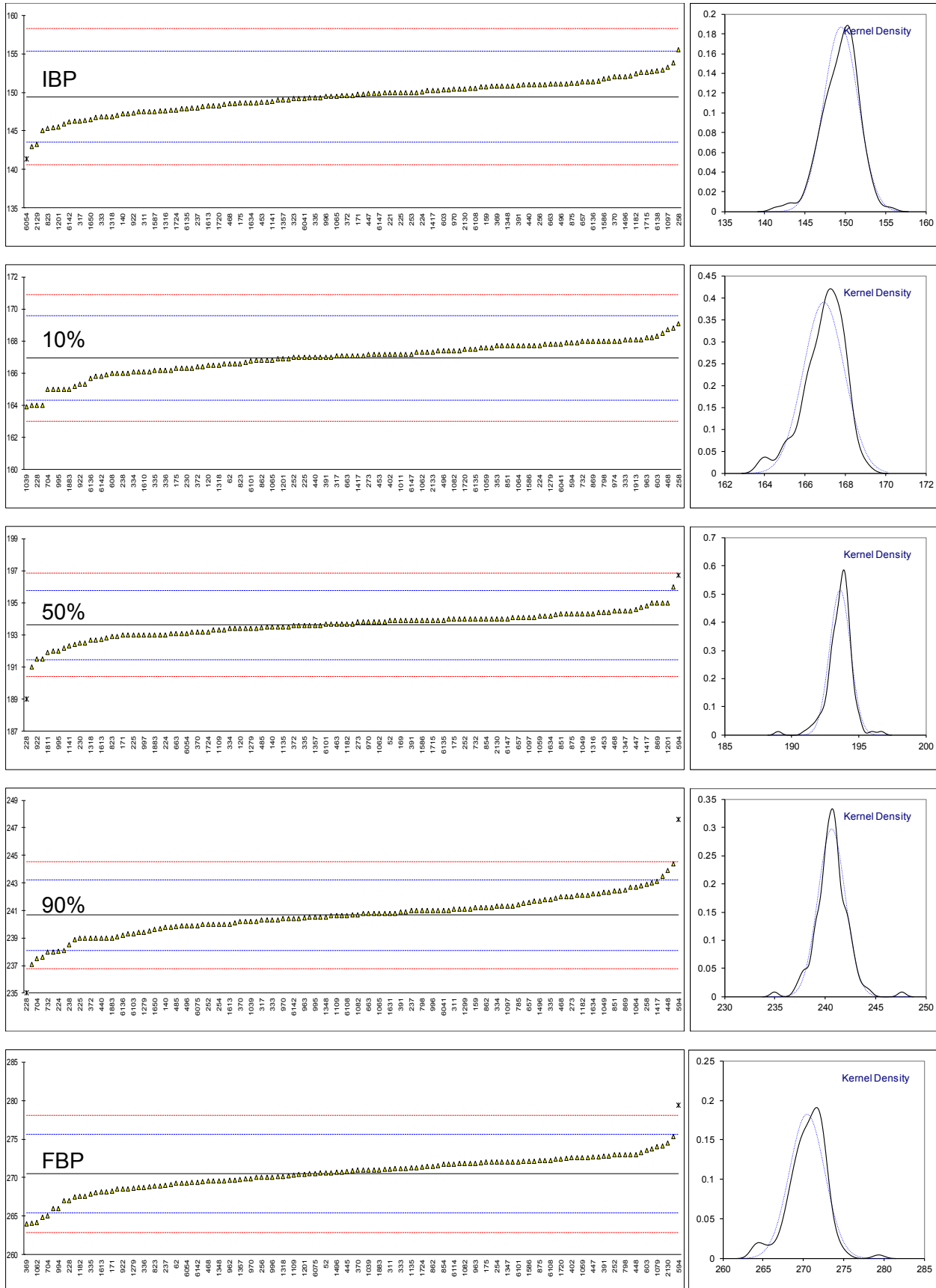
Lab 237 first reported for 90% recovered: 255.0

Lab 238 first reported for 90% recovered: 235.0

Lab 704 first reported for 90% recovered: 235.0

Lab 1182 first reported for IBP:159.3

Lab 1883 first reported for 10% recovered: 162, for 50% recovered: 190, for 90% recovered: 236 and for FBP: 267



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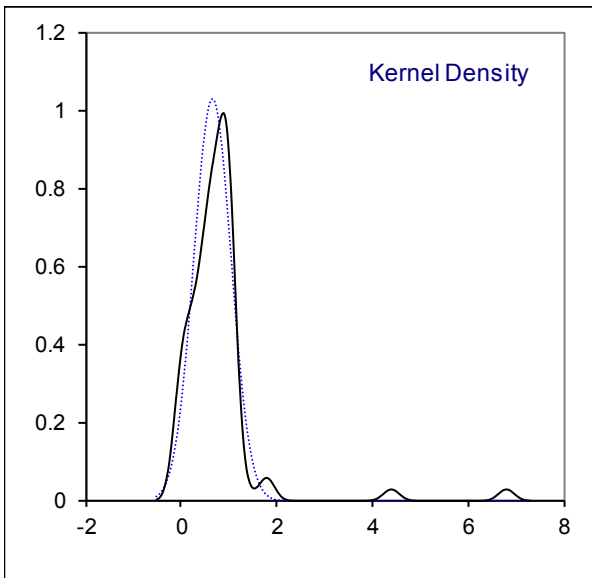
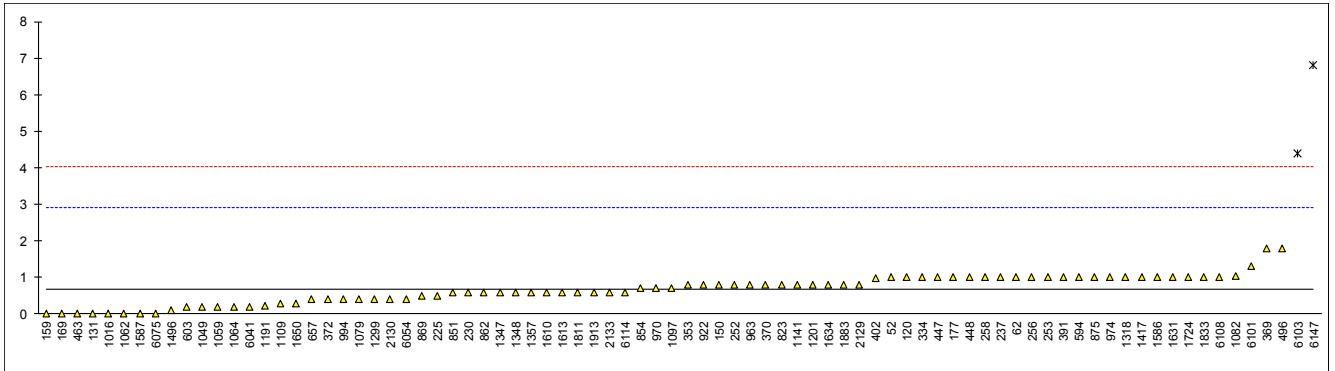
## Determination of Existent Gum (unwashed) on sample #17160; results in mg/100mL

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	IP540	1		0.30	963	D381	0.8		0.12
62	IP540	1		0.30	970	D381	0.7		0.03
120	D381	1		0.30	974	D381	1.0		0.30
131	D381	0		-0.60	994	D381	0.4		-0.24
140	D381	<1		----	995		----		----
150	D381	0.8		0.12	996		----		----
159	D381	0		-0.60	997		----		----
169	D381	0.0		-0.60	1011	D381	<1		----
171	D381	<1		----	1016	D381	0		-0.60
175	D381	<1.0		----	1026		----		----
177		1.0		0.30	1039	ISO6246	<1		----
194		----		----	1049	D381	0.2		-0.42
221		----		----	1059	D381Mod.	0.2		-0.42
224		----		----	1062	D381	0		-0.60
225	D381	0.5		-0.15	1064	D381	0.20		-0.42
228		----		----	1065		----		----
230	IP540	0.6		-0.06	1079	IP540	0.4		-0.24
237	D381	1.0		0.30	1081		----		----
238		----		----	1082	IP540	1.04		0.33
252	D381	0.8		0.12	1097	IP540	0.7		0.03
253	IP540	1		0.30	1109	IP540	0.3		-0.33
254		----		----	1135	D381	<1		----
256	IP540	1		0.30	1141	D381	0.8		0.12
258	D381	1.0		0.30	1182		----		----
273	D381	<0.5		----	1191	IP540	0.22		-0.40
311	D381	<1		----	1201	D381	0.8		0.12
317	D381	<1		----	1279	D381	£1/41		----
323	D381	<1		----	1284		----		----
333		----		----	1299	D381	0.4		-0.24
334	D381	1.0		0.30	1316	D381	<1		----
335	IP540	<1		----	1318	IP540	1.0		0.30
336		----		----	1347	D381	0.6		-0.06
353	IP540	0.8		0.12	1348	D381	0.6		-0.06
369	IP540	1.8		1.01	1357	IP540	0.6		-0.06
370	IP540	0.8		0.12	1372		----		----
372	IP540	0.4		-0.24	1397		----		----
391	D381	1		0.30	1417	IP540	1		0.30
399		----		----	1496	D381	0.1		-0.51
402	D381	0.98		0.28	1586	D381	1		0.30
440	IP540	<1		----	1587	IP540	0.0		-0.60
445	IP540	<1		----	1610	IP540	0.6		-0.06
447	IP540	1		0.30	1613	D381	0.6		-0.06
448	IP540	1		0.30	1631	IP540	1.0		0.30
453	IP540	<1		----	1634	D381	0.8		0.12
463	IP540	0.0		-0.60	1650	IP540	0.3		-0.33
468	IP540	<1,0		----	1715		----		----
485		----		----	1720		----		----
496	D381	1.8		1.01	1724	IP540	1.0		0.30
594	GOST1567	1		0.30	1811	D381	0.6		-0.06
603	D381	0.2		-0.42	1833	IP540	1		0.30
608	D381	<1.0		----	1881		----		----
631		----		----	1883	D381	0.8		0.12
633		----		----	1913	D381	0.60		-0.06
634		----		----	1961		----		----
657	D381	0.4		-0.24	2129	D381	0.8		0.12
663		----		----	2130	D381	0.4		-0.24
671	D381	<0.5		----	2133	D381	0.6		-0.06
704	GOST1567	<1		----	6041	D381	0.2		-0.42
732		----		----	6054	D381	0.4		-0.24
785		----		----	6075	IP540	0		-0.60
798		----		----	6101	D381	1.3		0.56
823	D381	0.8		0.12	6103	ISO6246	4.40	R(0.01)	3.34
851	IP540	0.6		-0.06	6108	D381	1.0		0.30
854	IP540	0.7		0.03	6114	IP540	0.6		-0.06
862	D381	0.6		-0.06	6135		----		----
869	IP540	0.5		-0.15	6136		----		----
875	D381	1.0		0.30	6138		----		----
922	D381	0.8		0.12	6142		----		----
962		----		----	6147	IP540	6.8	C,R(0.01)	5.49



normality	OK
n	80
outliers	2
mean (n)	0.669
st.dev. (n)	0.3883
R(calc.)	1.087
R(D381:12)	3.128

Lab 6147 first reported: 11.4

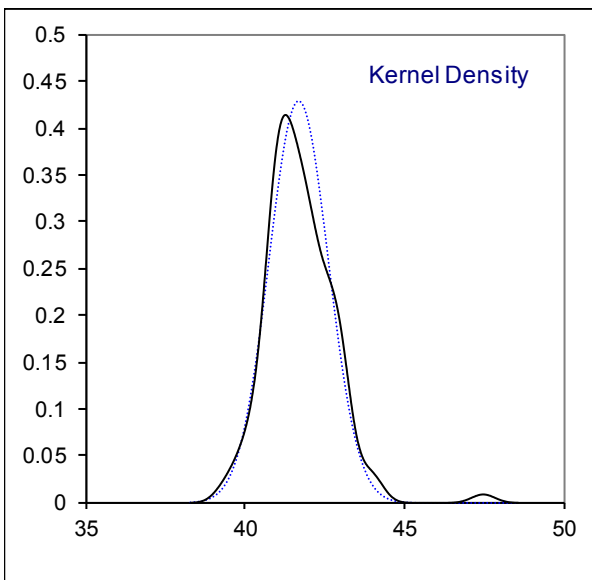
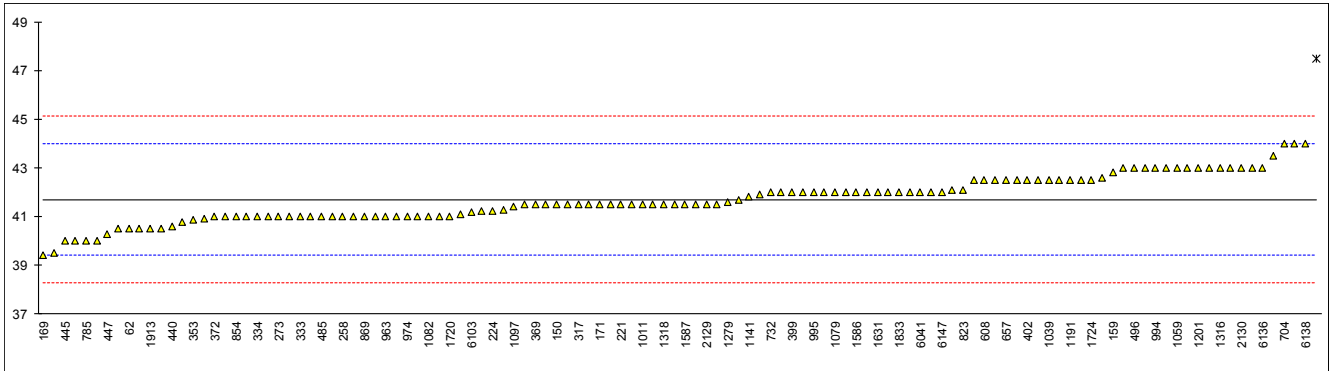


## Determination of Flash Point on sample #17160; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D56	42.5		0.70	963	IP170	41.0		-0.61
62	D56	40.5		-1.05	970		----		----
120	D56	43.5		1.58	974	IP170	41.0		-0.61
131	D56	40.		-1.48	994	D93	43.0		1.14
140	D56	41.5		-0.17	995	IP170	42.0		0.27
150	D56	41.5		-0.17	996	D56	43.0		1.14
159	D56	42.8		0.97	997	IP170	42.0		0.27
169	D56	39.4		-2.01	1011	IP170	41.5		-0.17
171	D56	41.5		-0.17	1016	IP170	42.5		0.70
175	D56	42.5		0.70	1026		----		----
177		42.0		0.27	1039	IP170	42.5		0.70
194		----		----	1049	ISO13736	41.5		-0.17
221	IP170	41.5		-0.17	1059	IP170	43.0		1.14
224	IP170	41.25		-0.39	1062	IP170	41.0		-0.61
225	IP170	41.5		-0.17	1064	IP170	42.5		0.70
228	IP170	41.0		-0.61	1065		----		----
230	D56	41.5		-0.17	1079	IP170	42.0		0.27
237	IP170	41.5		-0.17	1081		----		----
238		----		----	1082	IP170	41.0		-0.61
252	IP170	41.5		-0.17	1097	ISO13736	41.4		-0.26
253	IP170	41.0		-0.61	1109	IP170	42.0		0.27
254	IP170	41.0		-0.61	1135	IP170	43.0		1.14
256	IP170	41		-0.61	1141	IP170	41.8		0.09
258	IP170	41.0		-0.61	1182	D93	44.0		2.02
273	IP170	41.0		-0.61	1191	IP170	42.5		0.70
311	IP170	43.0		1.14	1201	IP170	43.0		1.14
317	IP170	41.5		-0.17	1279	D56	41.6		-0.08
323	IP170	43.0		1.14	1284		----		----
333	IP170	41.0		-0.61	1299	IP170	43.0		1.14
334	IP170	41.0		-0.61	1316	IP170	43.0		1.14
335	IP170	40.8		-0.78	1318	IP170	41.5		-0.17
336		----		----	1347	IP170	41.5		-0.17
353	IP170	40.875		-0.72	1348	IP170	40		-1.48
369	IP170	41.5		-0.17	1357	IP170	41.0		-0.61
370	IP170	41.3		-0.35	1372		----		----
372	IP170	41.0		-0.61	1397	D56	39.5		-1.92
391	D93	41.0		-0.61	1417	IP170	43.0		1.14
399	IP170	42	C	0.27	1496	IP170	40.5		-1.05
402	D56	42.5		0.70	1586	IP170	42.0		0.27
440	IP170	40.6		-0.96	1587	IP170	41.5		-0.17
445	IP170	40.0		-1.48	1610	IP170	41.5		-0.17
447	IP170	40.3		-1.22	1613	D56	42.0		0.27
448	IP170	42.1		0.35	1631	IP170	42.0		0.27
453	IP170	41.0		-0.61	1634	IP170	41.1		-0.52
463	IP170	40.9		-0.70	1650	IP170	42.5		0.70
468	IP170	42.0		0.27	1715	D56	42.0		0.27
485	D56	41.0		-0.61	1720	D3828	41.0		-0.61
496	ISO13736	43.0		1.14	1724	IP170	42.5		0.70
594		----		----	1811	D56	42.6		0.79
603	IP170	42.5		0.70	1833	IP170	42		0.27
608	IP170	42.5		0.70	1881		----		----
631		----		----	1883	D3828	42		0.27
633		----		----	1913	IP170	40.5		-1.05
634		----		----	1961		----		----
657	IP170	42.5		0.70	2129	IP170	41.5		-0.17
663		----		----	2130	IP170	43.0		1.14
671	IP170	41.0		-0.61	2133	D93	47.5	R(0.01)	5.08
704	GOST6356	44.0		2.02	6041	IP170	42.0		0.27
732	ISO2719	42		0.27	6054	ISO13736	41.7		0.00
785	IP170	40.0		-1.48	6075	IP170	40.5		-1.05
798		----		----	6101	IP170	41.9		0.18
823	IP170	42.1		0.35	6103	ISO13736	41.2		-0.43
851	IP170	40.5		-1.05	6108	D3828	42.0		0.27
854	IP170	41.0		-0.61	6114	IP170	41.23		-0.41
862	IP170	41.0		-0.61	6135	D93	43.0		1.14
869	IP170	41.0		-0.61	6136	D56	43		1.14
875		----		----	6138	ISO2719	44.0		2.02
922	IP170	41.0		-0.61	6142	IP170	41.5		-0.17
962	D56	41.5		-0.17	6147	ISO13736	42.0		0.27

normality	OK
n	119
outliers	1
mean (n)	41.70
st.dev. (n)	0.929
R(calc.)	2.60
R(IP170:14)	3.2

Lab 399 first reported: 45

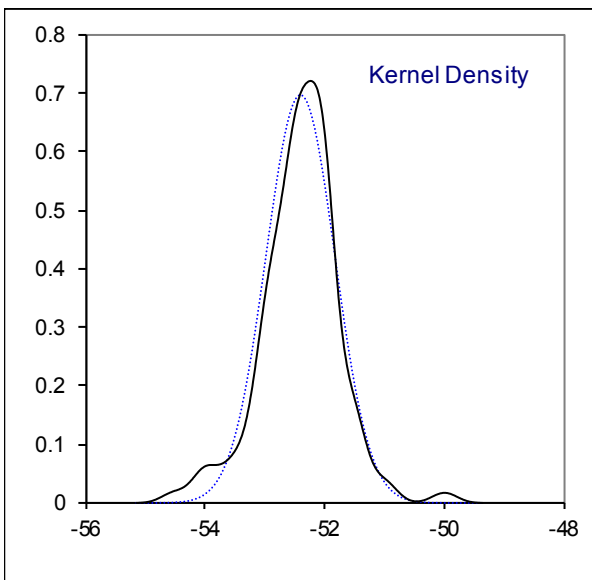
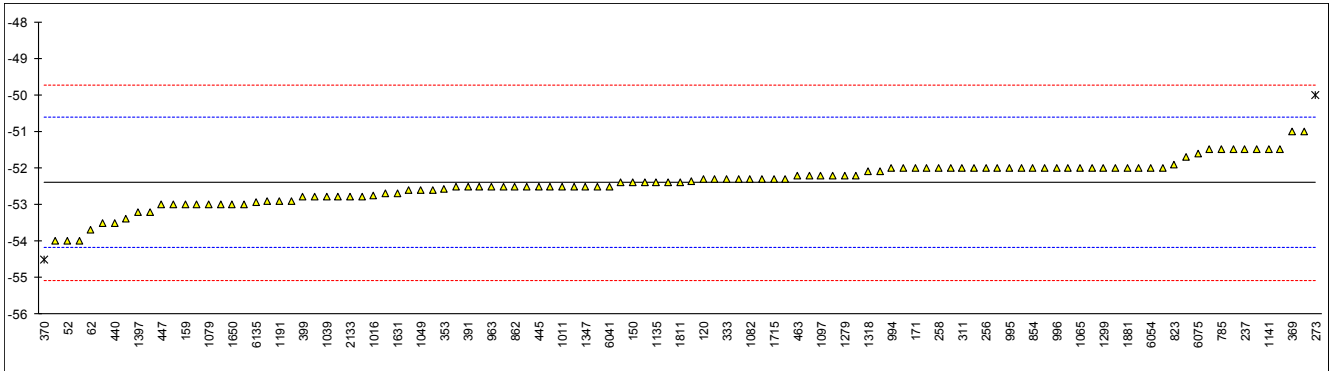


## Determination of Freezing Point on sample #17160; results in °C

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5972	-54.0		-1.79	963	D2386	-52.5		-0.11
62	D5972	-53.7		-1.46	970		----		----
120	D5972	-52.3		0.11	974	D2386	-53.0		-0.67
131		----		----	994	D2386	-52		0.45
140	D5972	-53.4		-1.12	995	D2386	-52		0.45
150	D7153	-52.4		0.00	996	D2386	-52.0		0.45
159	D2386	-53		-0.67	997	D2386	-52		0.45
169	D2386	-53.5		-1.23	1011	D2386	-52.5		-0.11
171	D2386	-52.0		0.45	1016	D5972	-52.75		-0.39
175	D2386	-52.5		-0.11	1026		----		----
177		-53.0		-0.67	1039	IP529	-52.8		-0.45
194		----		----	1049	D7153	-52.6		-0.22
221	D2386	-54		-1.79	1059	D2386	-51.5		1.01
224		----		----	1062	D7153	-52.4		0.00
225	D2386	-52.5		-0.11	1064	D7153	-52.3		0.11
228		----		----	1065	D7153	-52.0		0.45
230	D2386	-52.35		0.06	1079	D5972	-53.0		-0.67
237	D2386	-51.5		1.01	1081		----		----
238		----		----	1082	IP529	-52.3		0.11
252	D2386	-52.0		0.45	1097	IP529	-52.2		0.22
253	D2386	-52.5		-0.11	1109	D5972	-53.0		-0.67
254		----		----	1135	D7153	-52.4		0.00
256	D2386	-52		0.45	1141	D2386	-51.5		1.01
258	D2386	-52.0		0.45	1182	D5972	-52		0.45
273	D2386	-50.0	C,R(0.05)	2.69	1191	IP529	-52.9		-0.56
311	D2386	-52.0		0.45	1201	D5972	-52.2		0.22
317	D5972	-52.8		-0.45	1279	D7153	-52.2		0.22
323	D2386	-52.0		0.45	1284		----		----
333	IP529	-52.3		0.11	1299	D2386	-52.0		0.45
334	IP529	-52.2		0.22	1316	D7153	-52.5		-0.11
335	IP529	-52.3		0.11	1318	D7153	-52.1		0.34
336		----		----	1347	D2386	-52.5		-0.11
353	IP16	-52.57		-0.19	1348	D2386	-52		0.45
369	D2386	-51.0		1.57	1357	D2386	-52.8		-0.45
370	D2386	-54.5	R(0.05)	-2.35	1372		----		----
372	D2386	-51.5		1.01	1397	D7153	-53.2		-0.90
391	D2386	-52.5		-0.11	1417		----		----
399	D7153	-52.8		-0.45	1496	D2386	-51.0		1.57
402	D2386	-52.5		-0.11	1586	IP16	-52.5		-0.11
440	IP16	-53.5		-1.23	1587	IP529	-52.2		0.22
445	D7153	-52.5		-0.11	1610	IP435	-53.2		-0.90
447	D2386	-53.0		-0.67	1613	D7153	-52.7		-0.34
448	IP529	-52.4		0.00	1631	D2386	-52.7		-0.34
453	D5972	-52.6		-0.22	1634	D2386	-52.3		0.11
463	D2386	-52.2		0.22	1650	D2386	-53.0		-0.67
468	D2386	-52.0		0.45	1715	D5972	-52.3		0.11
485		----		----	1720	D7153	-52.9		-0.56
496	D2386	-52.0		0.45	1724	IP435	-52.4		0.00
594		----		----	1811	D2386	-52.4		0.00
603	D2386	-51.5		1.01	1833		----		----
608	D2386	-52.0		0.45	1881	D2386	-52.0		0.45
631		----		----	1883	D2386	-53		-0.67
633		----		----	1913	D5972	-52.6		-0.22
634		----		----	1961		----		----
657	D7153	-52.9		-0.56	2129	D2386	-52.0		0.45
663		----		----	2130	D7153	-51.7		0.78
671	D2386	-52.0		0.45	2133	D7153	-52.8		-0.45
704		----		----	6041	D2386	-52.5		-0.11
732		----		----	6054	D7153	-52.0		0.45
785	D2386	-51.5		1.01	6075	IP529	-51.6		0.90
798		----		----	6101	D7153	-52.3		0.11
823	D5972	-51.9		0.56	6103	D7153	-52.8		-0.45
851	D2386	-52.0		0.45	6108	D2386	-52.0		0.45
854	D2386	-52.0		0.45	6114	D2386	-51.5		1.01
862	D2386	-52.5		-0.11	6135	D5972	-52.95		-0.62
869	D2386	-52.5		-0.11	6136		----		----
875		----		----	6138		----		----
922	D2386	-54.0		-1.79	6142		----		----
962		----		----	6147	D7153	-52.1		0.34

normality	OK
n	107
outliers	2
mean (n)	-52.40
st.dev. (n)	0.574
R(calc.)	1.61
R(D2386:15e1)	2.5

Lab 273 first reported: -56.4

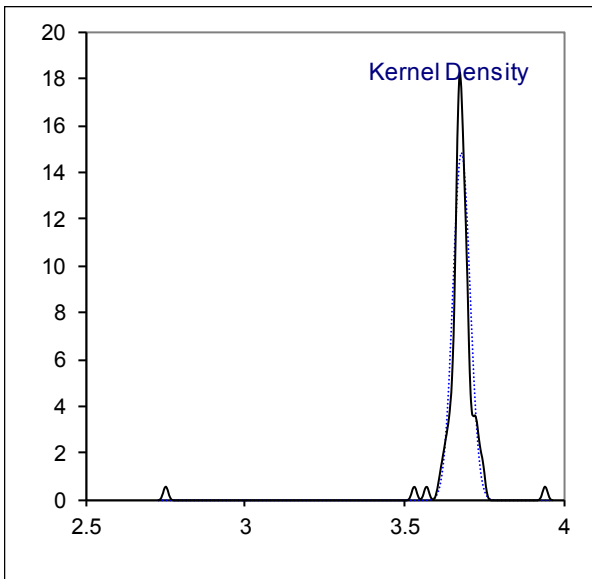
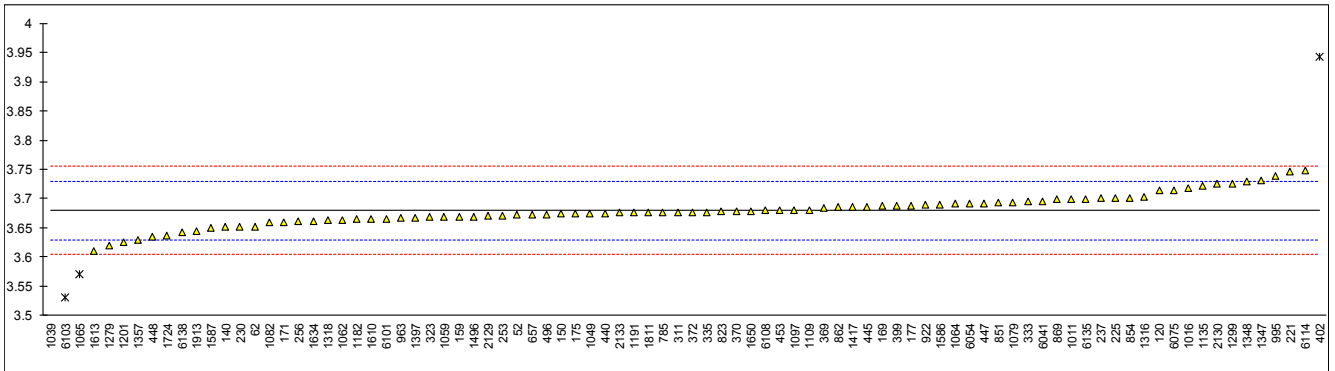


Determination of Kinematic Viscosity at -20°C on sample #17160; results in mm<sup>2</sup>/s

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D445	3.672		-0.32	963	D445	3.667		-0.52
62	D445	3.652		-1.12	970		----		----
120	D445	3.714		1.36	974		----		----
131		----		----	994		----		----
140	D445	3.651		-1.16	995	D445	3.73886		2.36
150	D445	3.674		-0.24	996		----		----
159	D445	3.669		-0.44	997		----		----
169	D445	3.6868		0.27	1011	D445	3.699		0.76
171	D445	3.660		-0.80	1016	D445	3.7172		1.49
175	D445	3.674		-0.24	1026		----		----
177		3.688		0.32	1039	D445	2.753	R(0.01)	-37.12
194		----		----	1049	D445	3.674		-0.24
221	D445	3.746		2.64	1059	D445	3.668		-0.48
224		----		----	1062	D445	3.664		-0.64
225	D445	3.701		0.84	1064	D445	3.691		0.44
228		----		----	1065	D445	3.5704	C,R(0.01)	-4.39
230	D445	3.6514		-1.14	1079	D445	3.694	C	0.56
237	D445	3.7000		0.80	1081		----		----
238		----		----	1082	D445	3.6585		-0.86
252		----		----	1097	ISO3104	3.681		0.04
253	D445	3.6709		-0.36	1109	D445	3.6810		0.04
254		----		----	1135	D445	3.721		1.64
256	D445	3.661		-0.76	1141		----		----
258		----		----	1182	D7042	3.6659	C	-0.56
273		----		----	1191	D445	3.676		-0.16
311	D445	3.677		-0.12	1201	D7042	3.625		-2.20
317		----		----	1279	D445	3.620		-2.40
323	D445	3.668		-0.48	1284		----		----
333	D445	3.695		0.60	1299	D445	3.726		1.84
334		----		----	1316	D445	3.703		0.92
335	D445	3.677		-0.12	1318	D7042	3.6624		-0.70
336		----		----	1347	D445	3.732		2.08
353		----		----	1348	D445	3.7294		1.98
369	D445	3.6847		0.19	1357	D445	3.630		-2.00
370	D445	3.6791		-0.03	1372		----		----
372	D445	3.677		-0.12	1397	D7042	3.667		-0.52
391		----		----	1417	D445	3.685		0.20
399	D445	3.688	C	0.32	1496	D445	3.669		-0.44
402	D445	3.942	C,R(0.01)	10.49	1586	D445	3.689		0.36
440	D445	3.675		-0.20	1587	D445	3.6491		-1.24
445	D445	3.686		0.24	1610	D445	3.666		-0.56
447	D445	3.692		0.48	1613	D445	3.6108		-2.77
448	D445	3.635		-1.80	1631		----		----
453	IP71	3.68019		0.01	1634	D445	3.661		-0.76
463		----		----	1650	D445	3.6791		-0.03
468		----		----	1715		----		----
485		----		----	1720		----		----
496	D445	3.6723		-0.31	1724	D445	3.637		-1.72
594		----		----	1811	D445	3.6762		-0.15
603		----		----	1833		----		----
608		----		----	1881		----		----
631		----		----	1883		----		----
633		----		----	1913	D445	3.644		-1.44
634		----		----	1961		----		----
657	D445	3.672		-0.32	2129	D445	3.670		-0.40
663		----		----	2130	D445	3.725		1.80
671		----		----	2133	D445	3.6755		-0.18
704		----		----	6041	D445	3.695		0.60
732		----		----	6054	D445	3.69166		0.47
785	D445	3.6764		-0.14	6075	D445	3.715		1.40
798		----		----	6101	D445	3.666		-0.56
823	D445	3.6786		-0.05	6103	ISO3104	3.532	R(0.01)	-5.93
851	D445	3.694		0.56	6108	D445	3.680		0.00
854	D445	3.7016		0.87	6114	D445	3.7484		2.74
862	D445	3.685		0.20	6135	D445	3.699	C	0.76
869	D445	3.699		0.76	6136		----		----
875		----		----	6138	EN16986	3.6417		-1.53
922	D445	3.689		0.36	6142		----		----
962		----		----	6147		----		----

normality	OK
n	84
outliers	4
mean (n)	3.6800
st.dev. (n)	0.02689
R(calc.)	0.0753
R(D445:17a)	0.0699

Lab 399 first reported: 3.527  
 Lab 402 first reported: 3.842  
 Lab 1065 first reported: 3.899  
 Lab 1079 first reported: 3.146  
 Lab 1182 first reported: 3.8998  
 Lab 6135 first reported: 3.794

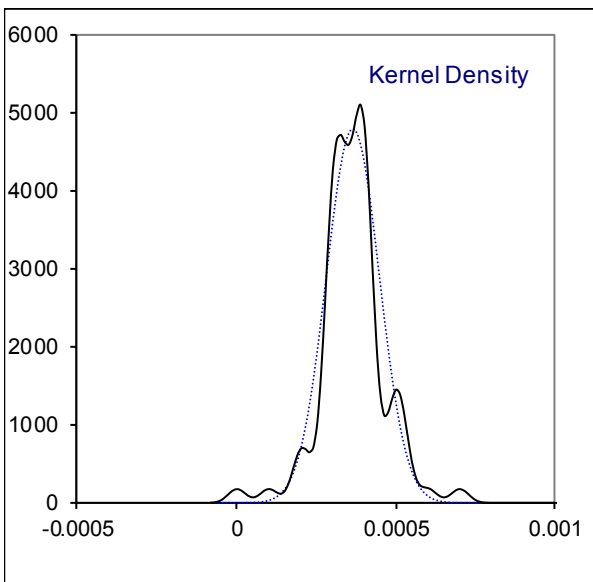
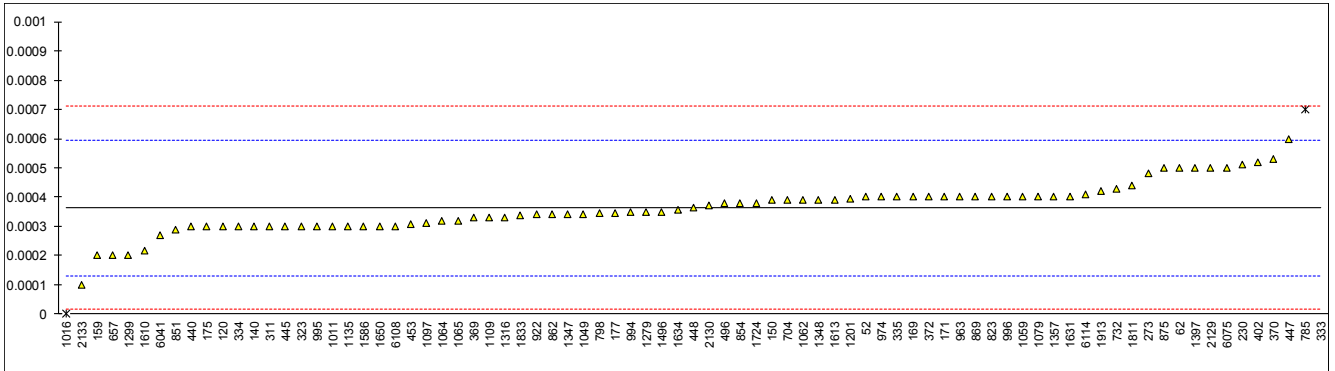


## Determination of Mercaptan Sulphur as S on sample #17160; results in %M/M

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D3227	0.0004		0.31	963	D3227	0.0004		0.31
62	D3227	0.0005		1.17	970		----		----
120	D3227	0.0003		-0.55	974	D3227	0.0004		0.31
131		----		----	994	UOP163	0.00035		-0.12
140	D3227	0.0003		-0.55	995	D3227	0.0003		-0.55
150	D3227	0.00039		0.22	996	D3227	0.0004		0.31
159	D3227	0.0002		-1.41	997		----		----
169	D3227	0.0004		0.31	1011	D3227	0.0003		-0.55
171	D3227	0.0004		0.31	1016	D3227	0	R(0.05)	-3.13
175	D3227	0.0003		-0.55	1026		----		----
177		0.000347		-0.15	1039		----		----
194		----		----	1049	D3227	0.000341		-0.20
221		----		----	1059	D3227	0.0004		0.31
224		----		----	1062	D3227	0.00039		0.22
225		----		----	1064	D3227	0.00032		-0.38
228		----		----	1065	D3227	0.00032		-0.38
230	D3227	0.00051		1.26	1079	D3227	0.0004		0.31
237		----		----	1081		----		----
238		----		----	1082		----		----
252		----		----	1097	ISO3012	0.00031		-0.46
253		----		----	1109	D3227	0.00033		-0.29
254		----		----	1135	D3227	0.0003		-0.55
256		----		----	1141		----		----
258		----		----	1182		----		----
273	D3227	0.00048		1.00	1191		----		----
311	D3227	0.0003		-0.55	1201	D3227	0.000395		0.27
317		----		----	1279	D3227	0.00035		-0.12
323	D3227	0.0003		-0.55	1284		----		----
333	D3227	0.003	R(0.01)	22.69	1299	D3227	0.0002		-1.41
334	D3227	0.0003		-0.55	1316	D3227	0.00033		-0.29
335	D3227	0.0004		0.31	1318		----		----
336		----		----	1347	D3227	0.00034		-0.21
353		----		----	1348	D3227	0.00039		0.22
369	D3227	0.00033		-0.29	1357	D3227	0.0004		0.31
370	D3227	0.00053		1.43	1372		----		----
372	D3227	0.0004		0.31	1397	D3227	0.0005		1.17
391	D3227	<0.0001		----	1417		----		----
399		----		----	1496	D3227	0.00035		-0.12
402	D3227	0.00052		1.34	1586	D3227	0.0003		-0.55
440	D3227	0.0003		-0.55	1587		----		----
445	D3227	0.0003		-0.55	1610	IP342	0.000216		-1.27
447	D3227	0.0006		2.03	1613	D3227	0.00039		0.22
448	D3227	0.000366		0.02	1631	D3227	0.00040		0.31
453	IP342	0.000308		-0.48	1634	D3227	0.000355		-0.08
463		----		----	1650	D3227	0.0003		-0.55
468		----		----	1715		----		----
485		----		----	1720		----		----
496	D3227	0.00038		0.14	1724	D3227	0.00038		0.14
594		----		----	1811	D3227	0.00044		0.66
603		----		----	1833	D3227	0.000339		-0.21
608		----		----	1881		----		----
631		----		----	1883		----		----
633		----		----	1913	D3227	0.00042		0.48
634		----		----	1961		----		----
657	D3227	0.0002		-1.41	2129	D3227	0.00050		1.17
663		----		----	2130	D3227	0.00037		0.05
671		----		----	2133	D3227	0.00010		-2.27
704	D3227	0.00039		0.22	6041	D3227	0.00027		-0.81
732	D3227	0.00043		0.57	6054		----		----
785	D3227	0.0007	R(0.05)	2.89	6075	D3227	0.0005		1.17
798	UOP163	0.0003453		-0.16	6101		----		----
823	D3227	0.0004		0.31	6103		----		----
851	D3227	0.00029		-0.64	6108	D3227	0.0003		-0.55
854	D3227	0.00038		0.14	6114	D3227	0.00041		0.40
862	D3227	0.00034		-0.21	6135		----		----
869	D3227	0.0004		0.31	6136		----		----
875	D3227	0.0005		1.17	6138		----		----
922	D3227	0.00034		-0.21	6142		----		----
962		----		----	6147		----		----



normality	suspect
n	78
outliers	3
mean (n)	0.000364
st.dev. (n)	0.0000834
R(calc.)	0.000233
R(D3227:16)	0.000325

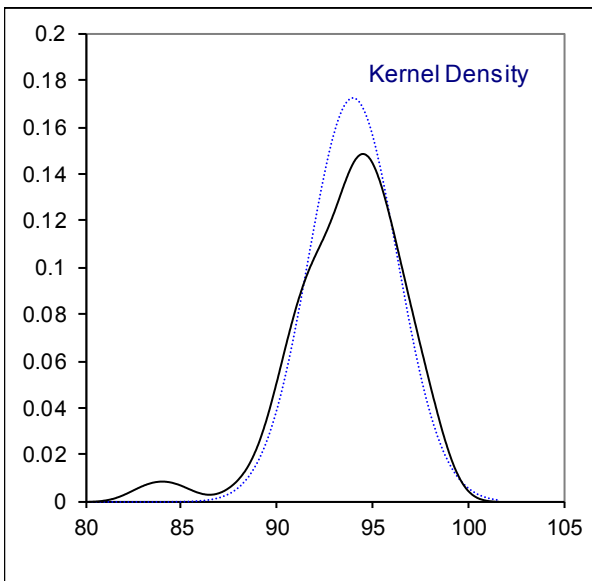
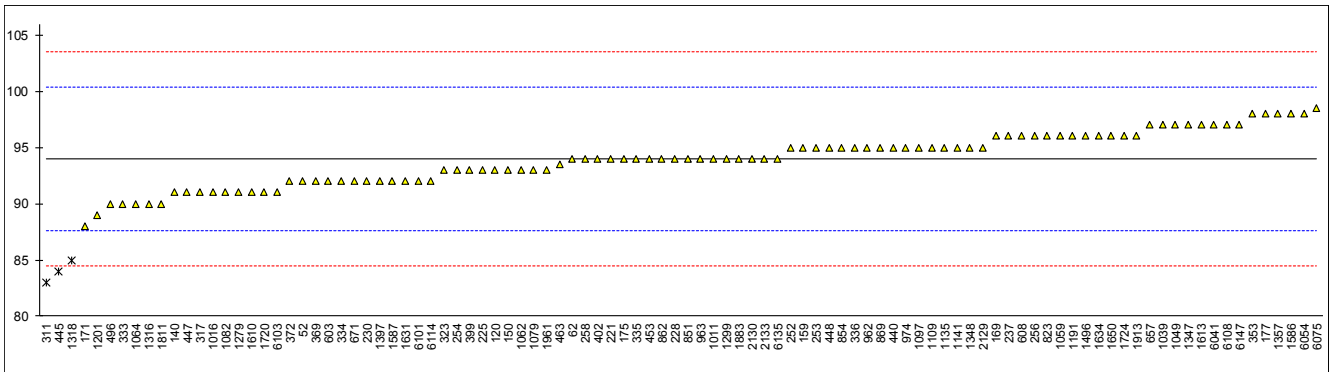


## Determination of MSEP on sample #17160;

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D3948	92		-0.62	963	D3948	94		0.01
62	D3948	94		0.01	970		----		----
120	D3948	93		-0.31	974	D3948	95		0.32
131		----		----	994		----		----
140	D3948	91		-0.93	995		----		----
150	D3948	93		-0.31	996		----		----
159	D3948	95		0.32	997		----		----
169	D3948	96		0.64	1011	D3948	94		0.01
171	D3948	88		-1.88	1016	D3948	91		-0.93
175	D3948	94		0.01	1026		----		----
177		98		1.27	1039	D3948	97		0.95
194		----		----	1049	D3948	97		0.95
221	D3948	94		0.01	1059	D3948	96		0.64
224		----		----	1062	D3948	93		-0.31
225	D3948	93		-0.31	1064	D3948	90		-1.25
228	D3948	94		0.01	1065		----		----
230	D3948	92		-0.62	1079	D3948	93		-0.31
237	D3948	96		0.64	1081		----		----
238		----		----	1082	D3948	91		-0.93
252	D3948	95		0.32	1097	D3948	95		0.32
253	D3948	95		0.32	1109	D3948	95		0.32
254	D3948	93		-0.31	1135	D3948	95		0.32
256	D3948	96		0.64	1141	D3948	95		0.32
258	D3948	94		0.01	1182		----		----
273		----		----	1191	D3948	96		0.64
311	D3948	83	C,R(0.05)	-3.45	1201	D3948	89		-1.56
317	D3948	91		-0.93	1279	D3948	91		-0.93
323	D3948	93		-0.31	1284		----		----
333	D3948	90		-1.25	1299	D3948	94		0.01
334	D3948	92		-0.62	1316	D7224	90		-1.25
335	D3948	94		0.01	1318	D3948	85	R(0.05)	-2.82
336	D3948	95		0.32	1347	D3948	97		0.95
353	D3948	98		1.27	1348	D3948	95		0.32
369	D3948	92		-0.62	1357	D3948	98		1.27
370		----		----	1372		----		----
372	D3948	92		-0.62	1397	D3948	92		-0.62
391		----		----	1417		----		----
399	D3948	93	C	-0.31	1496	D3948	96		0.64
402	D3948	94		0.01	1586	D3948	98		1.27
440	D3948	95		0.32	1587	D3948	92		-0.62
445	D3948	84	R(0.05)	-3.14	1610	D3948	91		-0.93
447	D3948	91		-0.93	1613	D3948	97		0.95
448	D3948	95		0.32	1631	D3948	92		-0.62
453	D3948	94		0.01	1634	D3948	96		0.64
463	D3948	93.5		-0.15	1650	D3948	96		0.64
468		----		----	1715		----		----
485		----		----	1720	D3948	91		-0.93
496	D3948	90		-1.25	1724	D3948	96		0.64
594		----		----	1811	D3948	90		-1.25
603	D3948	92		-0.62	1833		----		----
608	D3948	96		0.64	1881		----		----
631		----		----	1883	D3948	94		0.01
633		----		----	1913	D3948	96		0.64
634		----		----	1961	D3948	93		-0.31
657	D3948	97		0.95	2129	D3948	95		0.32
663		----		----	2130	D3948	94		0.01
671	D3948	92		-0.62	2133	D3948	94		0.01
704		----		----	6041	D3948	97		0.95
732		----		----	6054	D3948	98		1.27
785		----		----	6075	D3948	98.5		1.43
798		----		----	6101	D3948	92		-0.62
823	D3948	96		0.64	6103	D3948	91		-0.93
851	D3948	94		0.01	6108	D3948	97		0.95
854	D3948	95		0.32	6114	D3948	92	C	-0.62
862	D3948	94		0.01	6135	D3948	94		0.01
869	D3948	95		0.32	6136		----		----
875		----		----	6138		----		----
922		----		----	6142		----		----
962	D3948	95		0.32	6147	D3948	97		0.95

normality OK  
 n 97  
 outliers 3  
 mean (n) 93.97  
 st.dev. (n) 2.317  
 R(calc.) 6.49  
 R(D3948:14) 8.89

Lab 311 first reported: 82  
 Lab 399 first reported: 80  
 Lab 6114 first reported: 81

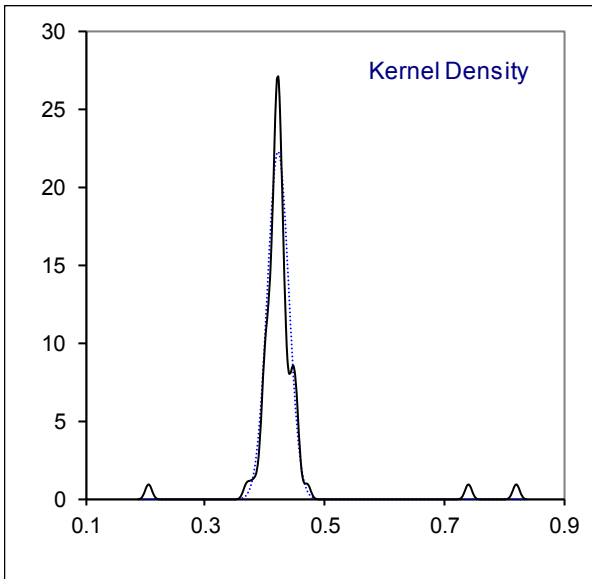
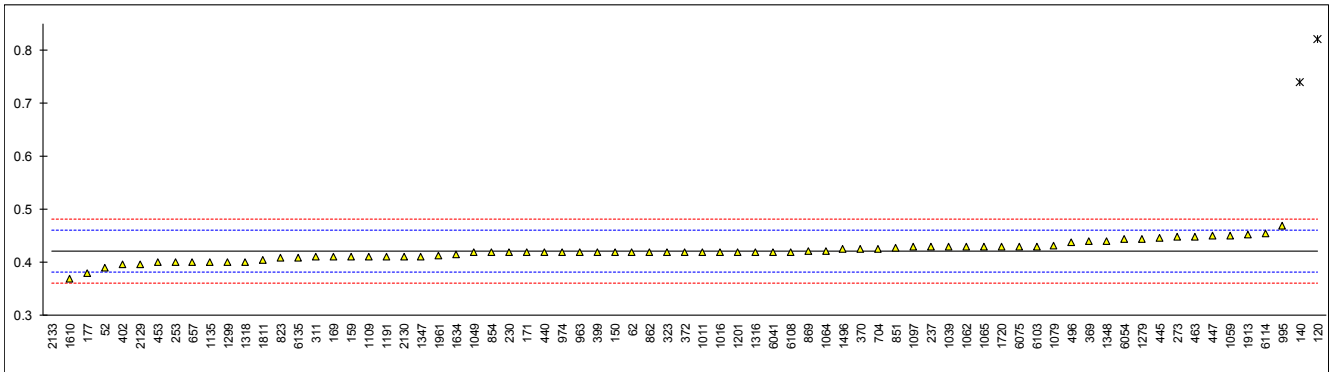


## Determination of Naphthalenes on sample #17160; results in %V/V

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D1840-meth.B	0.39		-1.56	963	D1840-meth.A	0.42		-0.06
62	D1840-meth.A	0.42		-0.06	970		----		----
120	D1840-meth.B	0.82	R(0.01)	19.96	974	D1840-meth.A	0.42		-0.06
131		----		----	994		----		----
140	D1840-meth.A	0.74	R(0.01)	15.96	995	D1840-meth.B	0.47		2.45
150	D1840-meth.A	0.42		-0.06	996		----		----
159	D1840-meth.B	0.41		-0.56	997		----		----
169	D1840-meth.B	0.41		-0.56	1011	D1840-meth.A	0.42		-0.06
171	D1840-meth.B	0.42		-0.06	1016	D1840-meth.B	0.42		-0.06
175		----		----	1026		----		----
177		0.38	C	-2.06	1039	D1840-meth.A	0.43		0.44
194		----		----	1049	D1840-meth.A	0.419		-0.11
221		----		----	1059	D1840-meth.B	0.45		1.45
224		----		----	1062	D1840-meth.B	0.43		0.44
225		----		----	1064	D1840-meth.A	0.421		-0.01
228		----		----	1065	D1840-meth.A	0.43		0.44
230	D1840-meth.B	0.42		-0.06	1079	D1840-meth.A	0.431		0.49
237	D1840-meth.B	0.43		0.44	1081		----		----
238		----		----	1082		----		----
252		----		----	1097	D1840-meth.A	0.429		0.39
253	D1840-meth.B	0.40		-1.06	1109	D1840-meth.B	0.410		-0.56
254		----		----	1135	D1840-meth.A	0.40		-1.06
256		----		----	1141		----		----
258		----		----	1182		----		----
273	D1840-meth.A	0.448		1.35	1191	D1840-meth.B	0.41		-0.56
311	D1840-meth.B	0.41		-0.56	1201	D1840-meth.A	0.42		-0.06
317		----		----	1279	D1840-meth.B	0.445		1.19
323	D1840-meth.A	0.42		-0.06	1284		----		----
333		----		----	1299	D1840-meth.B	0.40		-1.06
334		----		----	1316	D1840-meth.B	0.42		-0.06
335		----		----	1318	D1840-meth.B	0.40		-1.06
336		----		----	1347	D1840-meth.B	0.411		-0.51
353		----		----	1348	D1840-meth.B	0.44		0.94
369	D1840-meth.B	0.44		0.94	1357		----		----
370	D1840-meth.A	0.426		0.24	1372		----		----
372	D1840-meth.B	0.42		-0.06	1397		----	W	----
391		----		----	1417		----		----
399	D1840-meth.B	0.42		-0.06	1496	D1840-meth.B	0.4247		0.18
402	D1840-meth.B	0.396		-1.26	1586		----		----
440	D1840-meth.B	0.42		-0.06	1587		----		----
445	D1840-meth.B	0.447		1.30	1610	D1840-meth.B	0.36874		-2.62
447	D1840-meth.B	0.45		1.45	1613		----		----
448		----		----	1631		----		----
453	D1840-meth.B	0.40	C	-1.06	1634	D1840-meth.A	0.415		-0.31
463	D1840-meth.B	0.448		1.35	1650		----		----
468		----		----	1715		----		----
485		----		----	1720	D1840-meth.B	0.43	C	0.44
496	D1840-meth.B	0.439		0.89	1724		----		----
594		----		----	1811	D1840-meth.A	0.4039		-0.86
603		----		----	1833		----		----
608		----		----	1881		----		----
631		----		----	1883		----		----
633		----		----	1913	D1840-meth.B	0.453		1.60
634		----		----	1961	D1840-meth.B	0.414		-0.36
657	D1840-meth.A	0.40		-1.06	2129	D1840-meth.B	0.3972		-1.20
663		----		----	2130	D1840-meth.B	0.41		-0.56
671		----		----	2133	D1840-meth.A	0.2043	C,R(0.01)	-10.85
704	D1840-meth.A	0.426		0.24	6041	D1840-meth.B	0.42		-0.06
732		----		----	6054	D1840-meth.A	0.444427		1.17
785		----		----	6075	D1840-meth.A	0.43		0.44
798		----		----	6101		----		----
823	D1840-meth.A	0.409		-0.61	6103	D1840-meth.B	0.4302		0.45
851	D1840-meth.B	0.427		0.29	6108	D1840-meth.A	0.42		-0.06
854	D1840-meth.A	0.420		-0.06	6114	D1840-meth.A	0.455		1.70
862	D1840-meth.B	0.42		-0.06	6135	D1840-meth.B	0.4094498		-0.58
869	D1840-meth.A	0.421		-0.01	6136		----		----
875		----		----	6138		----		----
922		----		----	6142		----		----
962		----		----	6147		----		----

		<u>D1840 method A only</u>	<u>D1840 method B only</u>
normality	OK		
n	70	suspect 27	OK 42
outliers	3	2	1
mean (n)	0.4211	0.4229	0.4210
st.dev. (n)	0.01790	0.01265	0.01986
R(calc.)	0.0501	0.0354	0.0556
R(D1840B:07)	0.0559	-----	0.0559
R(D1840A:07)	0.0425	0.0425	-----

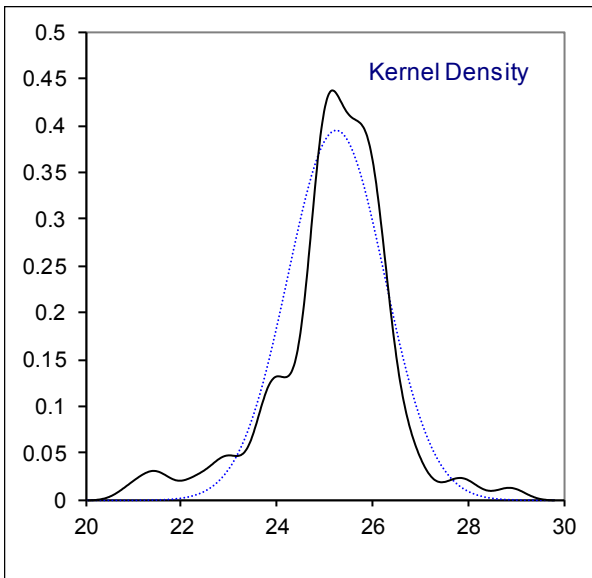
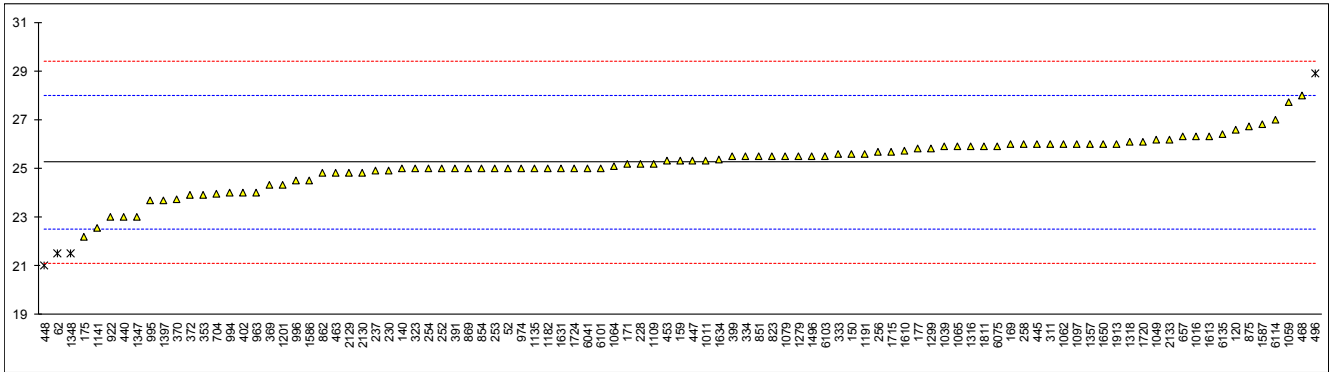
Lab 177 first reported: 0.34  
 Lab 453 first reported: 0.49  
 Lab 1397 first reported: 0.545 according to ASTM D6379  
 Lab 1720 first reported: 0.53  
 Lab 2133 first reported: 2.042



## Determination of Smoke Point on sample #17160; results in mm

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D1322-manual	25.0		-0.18	963	D1322-manual	24		-0.91
62	D1322-manual	21.5	R(0.05)	-2.72	970		----		----
120	D1322-automated	26.6		0.98	974	D1322-automated	25.0		-0.18
131		----		----	994	D1322-manual	24.0		-0.91
140	D1322-automated	25		-0.18	995	D1322-manual	23.7		-1.12
150	D1322-automated	25.6		0.25	996	D1322-manual	24.5		-0.54
159	D1322-automated	25.3		0.04	997		----		----
169	D1322-automated	26.0		0.54	1011	D1322-automated	25.3		0.04
171	D1322-automated	25.2		-0.04	1016	IP598-automated	26.3		0.76
175	D1322-manual	22.2		-2.21	1026		----		----
177		25.8		0.40	1039	D1322-automated	25.9		0.47
194		----		----	1049	D1322-automated	26.2		0.69
221		----		----	1059	D1322-manual	27.7		1.78
224		----		----	1062	D1322-manual	26		0.54
225		----		----	1064	D1322-automated	25.1		-0.11
228	D1322-automated	25.2		-0.04	1065	D1322-automated	25.9		0.47
230	D1322-manual	24.9		-0.25	1079	D1322-automated	25.5		0.18
237	D1322-automated	24.9		-0.25	1081		----		----
238		----		----	1082		----		----
252	D1322-manual	25.0		-0.18	1097	D1322-manual	26.0		0.54
253	D1322-manual	25		-0.18	1109	D1322-automated	25.2		-0.04
254	D1322-manual	25.0		-0.18	1135	D1322-manual	25		-0.18
256	D1322-manual	25.7		0.33	1141	D1322-manual	22.54		-1.96
258	D1322-manual	26.0		0.54	1182	D1322-manual	25		-0.18
273		----		----	1191	D1322-automated	25.6		0.25
311	D1322-manual	26.0		0.54	1201	D1322-manual	24.3		-0.69
317		----		----	1279	D1322-automated	25.5		0.18
323	D1322-manual	25		-0.18	1284		----		----
333	D1322-automated	25.6		0.25	1299	D1322-automated	25.8		0.40
334	D1322-automated	25.5		0.18	1316	D1322-automated	25.9		0.47
335		----		----	1318	D1322-automated	26.1		0.62
336		----		----	1347	D1322-manual	23		-1.63
353	IP57-manual	23.92		-0.96	1348	D1322-manual	21.5	R(0.05)	-2.72
369	D1322-manual	24.3		-0.69	1357	D1322-manual	26		0.54
370	D1322-manual	23.75		-1.09	1372		----		----
372	D1322-manual	23.9		-0.98	1397	D1322-automated	23.7		-1.12
391	D1322-manual	25.0		-0.18	1417		----		----
399	D1322-manual	25.5		0.18	1496	D1322-automated	25.5		0.18
402	D1322-manual	24.0		-0.91	1586	D1322-manual	24.5		-0.54
440	D1322-manual	23.0		-1.63	1587	D1322-automated	26.8		1.12
445	IP598-manual	26.0		0.54	1610	IP598-manual	25.74		0.35
447	D1322-manual	25.3		0.04	1613	D1322-automated	26.3		0.76
448	D1322-manual	21	R(0.05)	-3.08	1631	D1322-manual	25		-0.18
453	D1322-automated	25.3		0.04	1634	D1322-automated	25.35		0.07
463	D1322-manual	24.8		-0.33	1650	D1322-manual	26.0		0.54
468	D1322-manual	28.0		1.99	1715	D1322-manual	25.7		0.33
485		----		----	1720	D1322-automated	26.1		0.62
496	D1322-manual	28.88	R(0.05)	2.63	1724	D1322-manual	25		-0.18
594		----		----	1811	D1322-automated	25.9		0.47
603		----		----	1833		----		----
608		----		----	1881		----		----
631		----		----	1883		----		----
633		----		----	1913	D1322-automated	26.0		0.54
634		----		----	1961		----		----
657	D1322-manual	26.3		0.76	2129	D1322-manual	24.8		-0.33
663		----		----	2130	D1322-automated	24.8		-0.33
671		----		----	2133	D1322-manual	26.20		0.69
704	D1322-manual	23.98		-0.92	6041	D1322-automated	25.0		-0.18
732		----		----	6054		----		----
785		----		----	6075	D1322-automated	25.9		0.47
798		----		----	6101	D1322-manual	25.0		-0.18
823	D1322-automated	25.5		0.18	6103	D1322-automated	25.5		0.18
851	D1322-manual	25.5		0.18	6108		----		----
854	D1322-manual	25.0		-0.18	6114	D1322-manual	27		1.27
862	D1322-manual	24.8		-0.33	6135	D1322-automated	26.4		0.83
869	D1322-manual	25.0		-0.18	6136		----		----
875	D1322-manual	26.7		1.05	6138		----		----
922	D1322-manual	23		-1.63	6142		----		----
962		----		----	6147		----		----

normality	suspect	<u>D1322 Manual only:</u>	<u>D1322 Automated only:</u>
n	93	OK	suspect
outliers	4	53	39
mean (n)	25.25	24.99	25.60
st.dev. (n)	1.011	1.182	0.578
R(calc.)	2.83	3.31	1.62
R(D1322:15e1-M)	3.86	3.84	-----
R(D1322:15e1-A)	0.91	-----	0.92



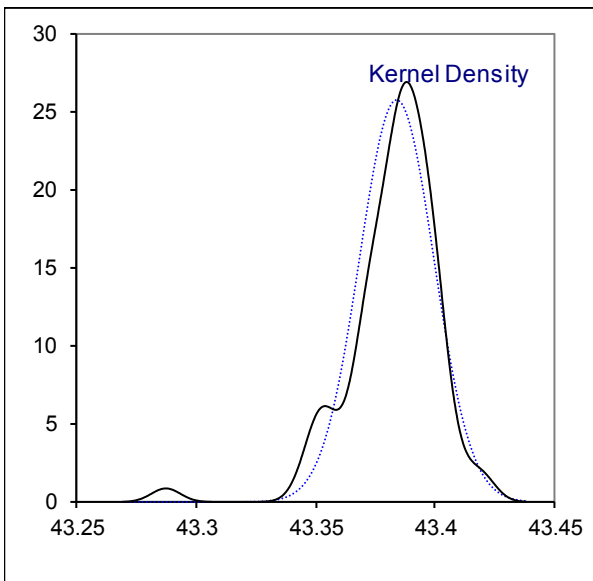
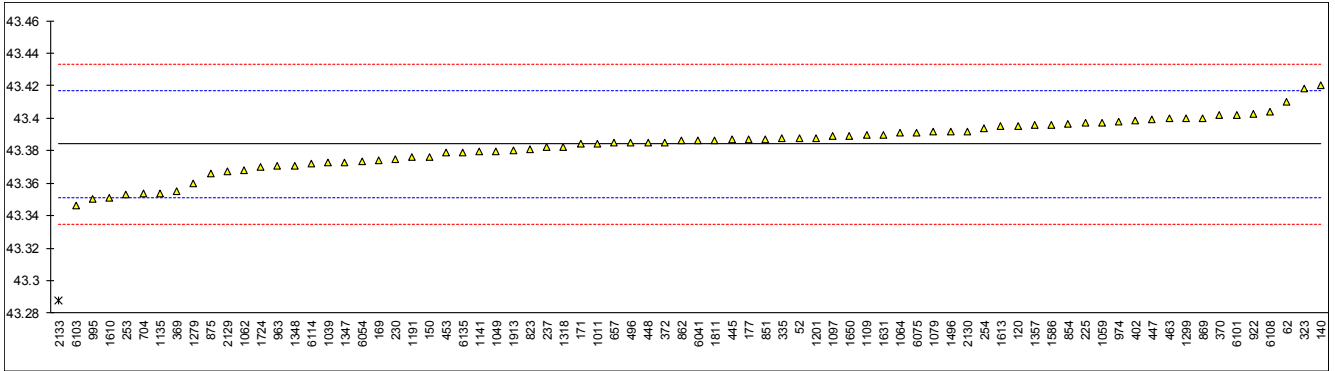
## Determination of Specific Energy (Net, on Sulphur free basis) on sample #17160; results in MJ/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D3338	43.388		0.24	963	D3338	43.371		-0.79
62	D3338	43.410		1.58	970		----		----
120	D3338	43.395		0.67	974	D3338	43.398		0.85
131		----		----	994		----		----
140	D3338	43.42		2.19	995	D3338	43.350	C	-2.07
150	D3338	43.376		-0.49	996		----		----
159		----		----	997		----		----
169	D3338	43.374	C	-0.61	1011	D3338	43.384		0.00
171	D3338	43.384		0.00	1016		----		----
175		----		----	1026		----		----
177		43.387		0.18	1039	D3338	43.373		-0.67
194		----		----	1049	D3338	43.3798		-0.25
221		----		----	1059	D3338	43.397		0.79
224		----		----	1062	D3338	43.368		-0.97
225	D3338	43.397		0.79	1064	D3338	43.3910		0.43
228		----		----	1065		----		----
230	D3338	43.375		-0.55	1079	D3338	43.392		0.49
237	D3338	43.382		-0.12	1081		----		----
238		----		----	1082		----		----
252		----		----	1097	D3338	43.389		0.31
253	D3338	43.3530		-1.89	1109	D3338	43.39		0.37
254	D3338	43.394		0.61	1135	D3338	43.354		-1.82
256		----		----	1141	ISO3648	43.3795		-0.27
258		----		----	1182		----		----
273		----		----	1191	D3338	43.3758		-0.50
311		----		----	1201	D3338	43.388		0.24
317		----		----	1279	D3338	43.36		-1.46
323	D3338	43.418		2.07	1284		----		----
333		----		----	1299	D3338	43.40		0.98
334		----		----	1316		----		----
335	D3338	43.388	C	0.24	1318	D3338	43.382		-0.12
336		----		----	1347	D3338	43.373		-0.67
353		----		----	1348	D3338	43.371		-0.79
369	D3338	43.355		-1.76	1357	D3338	43.396		0.73
370	D3338	43.4021		1.10	1372		----		----
372	D3338	43.385		0.06	1397		----	W	----
391		----		----	1417		----		----
399		----		----	1496	D3338	43.392		0.49
402	D3338	43.3984		0.88	1586	D3338	43.396		0.73
440		----		----	1587		----		----
445	D3338	43.387		0.18	1610	D3338	43.35074		-2.02
447	D3338	43.399		0.91	1613	D3338	43.3949		0.66
448	D3338	43.385		0.06	1631	D3338	43.390		0.37
453	D3338	43.379		-0.30	1634		----		----
463	D3338	43.40		0.98	1650	D3338	43.389		0.31
468		----		----	1715		----		----
485		----		----	1720		----		----
496	D3338	43.385		0.06	1724	D3338	43.37		-0.85
594		----		----	1811	D3338	43.3862		0.14
603		----		----	1833		----		----
608		----		----	1881		----		----
631		----		----	1883		----		----
633		----		----	1913	D3338	43.38		-0.24
634		----		----	1961		----		----
657	D3338	43.385		0.06	2129	D3338	43.367		-1.03
663		----		----	2130	D3338	43.392		0.49
671		----		----	2133	D3338	43.2876	C,R(0.01),E	-5.87
704	D3338	43.3540		-1.82	6041	D3338	43.386		0.12
732		----		----	6054	D3338	43.37338		-0.64
785		----		----	6075	D3338	43.391		0.43
798		----		----	6101	D3338	43.40221		1.11
823	D3338	43.381		-0.18	6103	D4809	43.346		-2.31
851	D3338	43.387		0.18	6108	D3338	43.404		1.22
854	D3338	43.3967		0.77	6114	D3338	43.372		-0.73
862	D3338	43.386		0.12	6135	D3338	43.379		-0.30
869	D3338	43.4001		0.98	6136		----		----
875	D3338	43.366		-1.09	6138		----		----
922	D3338	43.4028		1.15	6142		----		----
962		----		----	6147		----		----



normality OK  
 n 75  
 outliers 1  
 mean (n) 43.3840  
 st.dev. (n) 0.01551  
 R(calc.) 0.0434  
 R(D3338:09e2) 0.046

Lab 169 first reported: 44.3  
 Lab 335 first reported: 43.484  
 Lab 995 first reported: 43.487  
 Lab 1397 first reported: 43.34  
 Lab 2133 first reported: 43.2614, iis calculated: 43.403

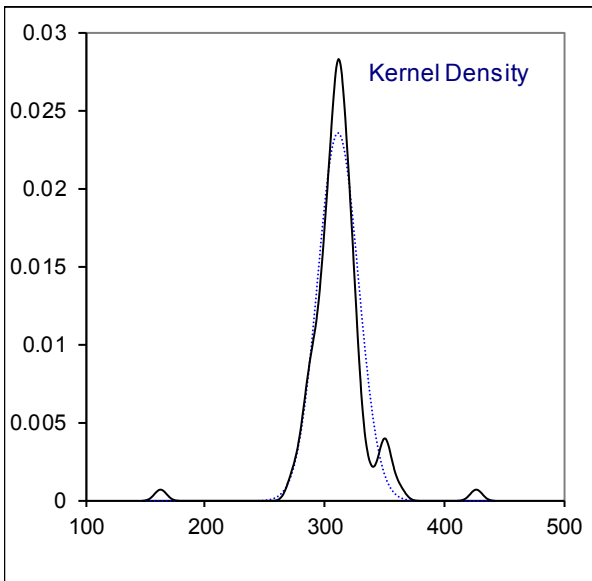
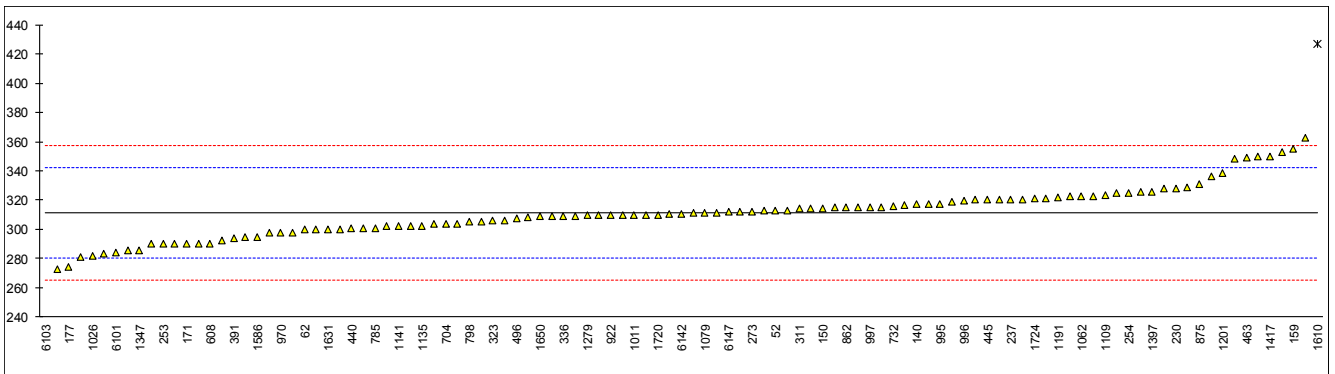


## Determination of Sulphur, Total on sample #17160; results in mg/kg

lab	method	value	mark	z(targ)	lab	method	value	mark	z(targ)
52	D5453	313		0.11	963	D4294	328		1.09
62	D5453	300		-0.74	970	D4294	298		-0.87
120	D4294	348		2.39	974	D4294	290		-1.39
131		----		----	994	D5453	317.0		0.37
140	D2622	317		0.37	995	D4294	317		0.37
150	D5453	314.2		0.19	996	D5453	319.3		0.52
159	D4294	355		2.85	997	D4294	315		0.24
169		----		----	1011	D4294	310		-0.09
171	D5453	290		-1.39	1016		----		----
175		----		----	1026	D5453	281.65		-1.93
177	D4294	274	C	-2.43	1039	ISO20884	315	C	0.24
194		----		----	1049	D5453	302.1		-0.60
221		----		----	1059	ISO14596	290		-1.39
224	D4294	336.0		1.61	1062	D4294	323		0.76
225	D4294	281		-1.98	1064	D5453	303.90		-0.48
228		----		----	1065	IP336	323		0.76
230	D4294	328		1.09	1079	D2622	311		-0.02
237	D5453	320.1		0.57	1081		----		----
238	D4294	329		1.15	1082	D4294	302		-0.61
252		----		----	1097	D5453	309.31		-0.13
253	D4294	290		-1.39	1109	D2622	323.5		0.79
254	D4294	325		0.89	1135	D5453	302.35		-0.58
256	D4294	326		0.96	1141	D5453	302		-0.61
258	D5453	320.60		0.61	1182	D4294	350		2.52
273	D5453	312.2		0.06	1191	D4294	322		0.70
311	D2622	314		0.18	1201	D5453	338.6		1.78
317		----		----	1279	D4294	309.5	C	-0.12
323	D2622	306		-0.35	1284		----		----
333	D5453	323		0.76	1299	D2622	300	C	-0.74
334		----		----	1316	D4294	310	C	-0.09
335	D4294	312		0.04	1318	D5453	273.02		-2.50
336	ISO20847	309		-0.15	1347	D4294	286	C	-1.65
353	IP336	325	C	0.89	1348	D5453	295	C	-1.06
369	D5453	298		-0.87	1357	D5453	304.1		-0.47
370	IP336	320		0.57	1372		----		----
372	D5453	310		-0.09	1397	D2622	326		0.96
391	D5453	294		-1.13	1417	INH-183	350		2.52
399	D4294	319		0.50	1496	D4294	362.9		3.36
402	D5453	352.6		2.69	1586	D5453	295		-1.06
440	D5453	300.695		-0.69	1587	D4294	297.5		-0.90
445	D4294	320		0.57	1610	IP336	427	R(0.01)	7.54
447	IP336	290	C	-1.39	1613		----		----
448	D4294	311	C	-0.02	1631	D5453	300		-0.74
453	IP336	310		-0.09	1634	D5453	283.5		-1.81
463	D4294	348.9		2.45	1650	D5453	308.96		-0.15
468		----		----	1715		----		----
485	D4294	312.5		0.08	1720	D5453	310	C	-0.09
496	D2622	307.3		-0.26	1724	IP336	321	C	0.63
594		----		----	1811	D5453	300.8		-0.69
603		----		----	1833		----		----
608	D5453	290.26		-1.37	1881		----		----
631		----		----	1883		----		----
633		----		----	1913	D4294	285.6		-1.68
634		----		----	1961		----		----
657	D5453	292.072		-1.25	2129	IP496	316.6		0.34
663	D5453	310.5		-0.05	2130	D5453	305		-0.41
671		----		----	2133	D4294	311.6		0.02
704	D5453	304		-0.48	6041	D5453	308.0		-0.22
732	D4294	316		0.31	6054	D4294	320		0.57
785	D4294	301		-0.67	6075	ISO8754	300		-0.74
798	D4294	305		-0.41	6101	D4294	284.0		-1.78
823	D5453	309		-0.15	6103	ISO8754	162.8	R(0.01)	-9.68
851	D4294	315		0.24	6108	D5453	306.06		-0.34
854	D4294	314		0.18	6114	D4294	321		0.63
862	D2622	315		0.24	6135	D5453	313.2		0.12
869	D4294	315		0.24	6136		----		----
875	D4294	331		1.28	6138		----	W	----
922	D5453	310		-0.09	6142	D2622	310.5		-0.05
962		----		----	6147	D5453	311.96		0.04

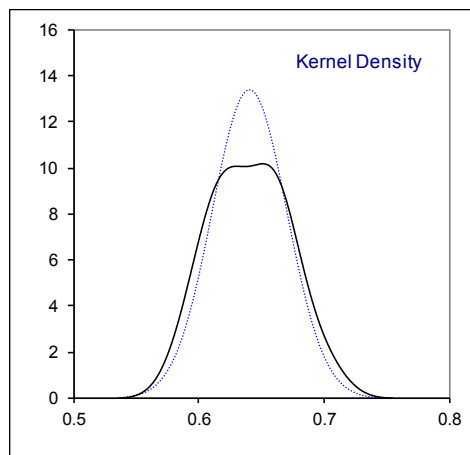
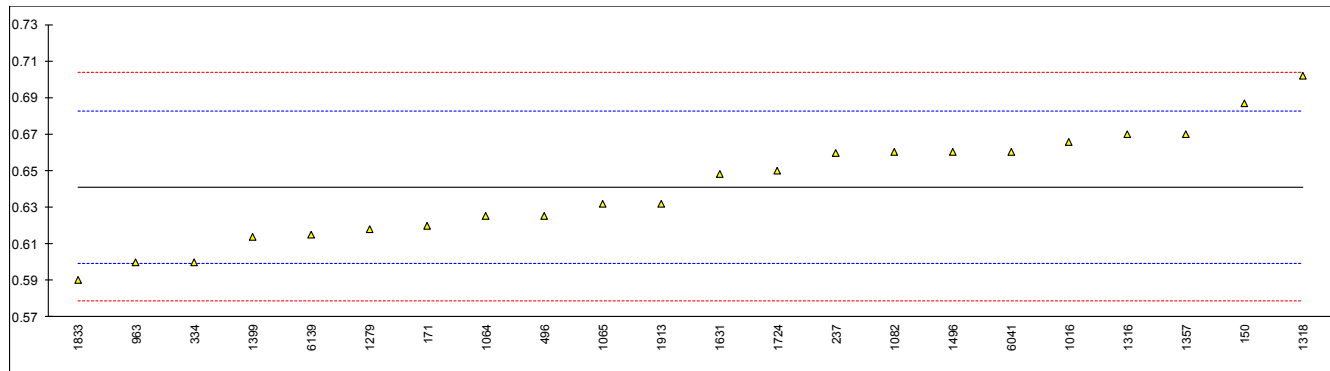
normality OK  
 n 107  
 outliers 2  
 mean (n) 311.31  
 st.dev. (n) 16.975  
 R(calc.) 47.53  
 R(D5453:16e1) 42.96

Lab 177 first reported: 0.0274	Lab 1316 first reported: 0.031
Lab 353 first reported: 0.0325	Lab 1347 first reported: 286
Lab 447 first reported: 0.029	Lab 1348 first reported: 372.9
Lab 448 first reported: 0.0311	Lab 1720 first reported: 386.25
Lab 1039 first reported: 0.0315	Lab 1724 first reported: 0.0321
Lab 1279 first reported: 0.03095	Lab 6103 first reported as D4294
Lab 1299 first reported: 0.03	Lab 6138 first reported: 247.5



Determination of BOCLE on sample #17161; results in mm

lab	method	value	mark	z(targ)	remarks
140		----		----	
150	D5001-semi-automatic	0.687		2.21	
171	D5001-semi-automatic	0.62		-1.01	
237	D5001-semi-automatic	0.6595		0.89	
323		----		----	
334	D5001-semi-automatic	0.60		-1.97	
496	D5001-full-automatic	0.62535		-0.76	
963	D5001-semi-automatic	0.600		-1.97	
1016	D5001-semi-automatic	0.666		1.20	
1064	D5001-full-automatic	0.625		-0.77	
1065	D5001-semi-automatic	0.632		-0.44	
1081		----		----	
1082	D5001-semi-automatic	0.66		0.91	
1191		----		----	
1279	D5001-semi-automatic	0.618		-1.11	
1316	D5001-semi-automatic	0.67		1.39	
1318	D5001-semi-automatic	0.702		2.93	
1357	D5001-semi-automatic	0.67		1.39	
1399	D5001-full-automatic	0.6135		-1.33	
1496	D5001-semi-automatic	0.660		0.91	
1631	D5001-semi-automatic	0.648	C	0.33	first reported: 648
1724	D5001-semi-automatic	0.65		0.43	
1833	D5001-semi-automatic	0.59		-2.46	
1913	D5001-full-automatic	0.632		-0.44	
6041	D5001-semi-automatic	0.66		0.91	
6103		----		----	
6108		----		----	
6139	D5001-full-automatic	0.615		-1.25	
9090		----		----	
	normality	OK		<u>Only semi-automatic</u>	<u>Only full-automatic</u>
	n	22		OK	OK
	outliers	0		17	5
	mean (n)	0.6411		0	0
	st.dev. (n)	0.02986		0.6491	0.6222
	R(calc.)	0.0836		0.02859	0.00777
	R(D5001:10 (semi-automatic))	0.0582		0.0801	0.0217
	R(D5001:10 (full-automatic))	0.0323		0.0594	----
				----	0.0300

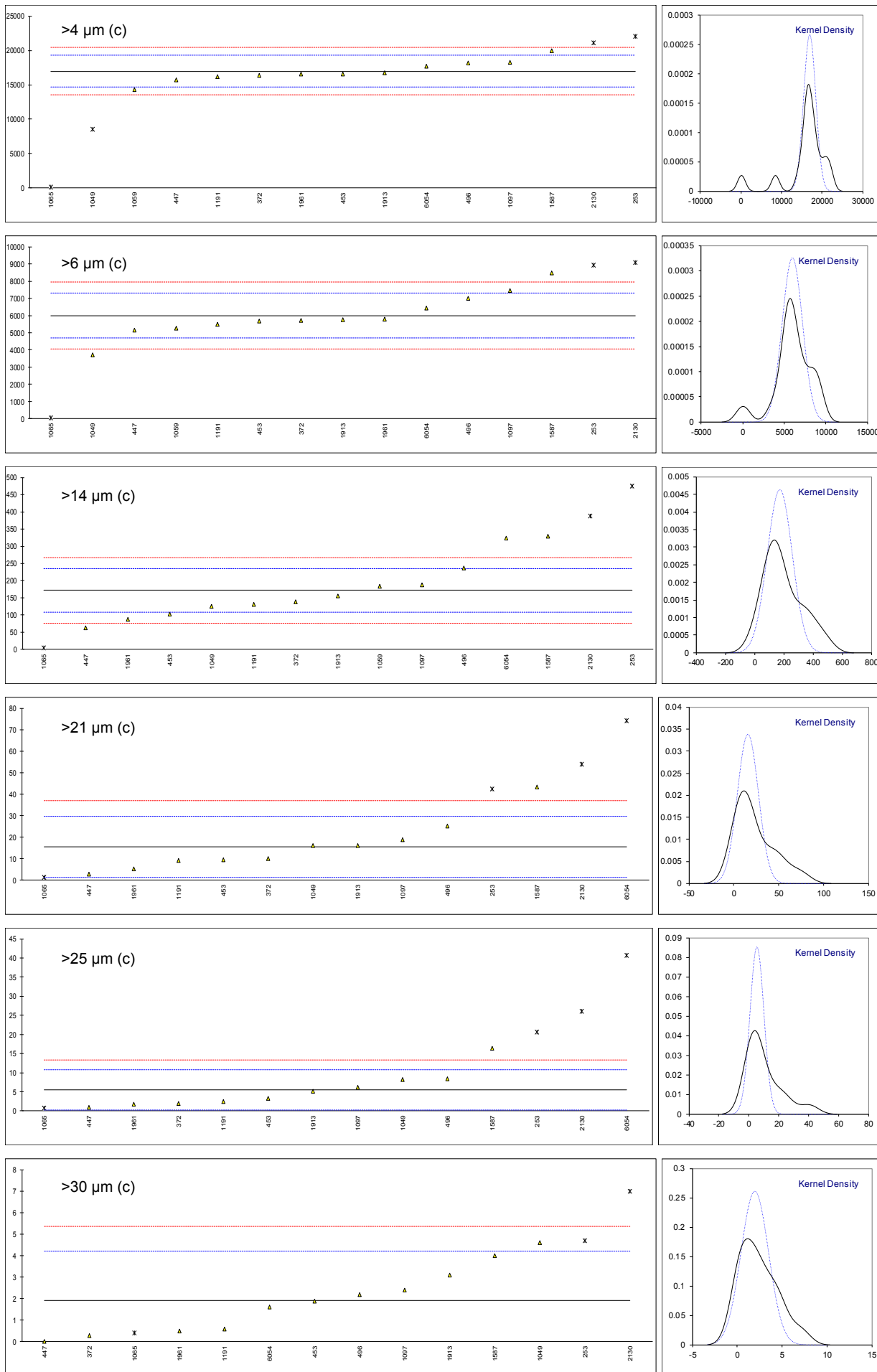


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Determination of Particle Size Distribution on sample #17162 acc. to IP564, in (cumulative) counts/ml

lab	method	≥4 μm	m	≥6 μm	m	≥14 μm	m	≥21 μm	m	≥25 μm	m	≥30 μm	m
140		----		----		----		----		----		----	
150		----		----		----		----		----		----	
171		----		----		----		----		----		----	
230		----		----		----		----		----		----	
237		----		----		----		----		----		----	
253	IP564	22030.3	ex	8916.7	G(5)	475.3	ex	42.3	ex	20.7	DG(5)	4.7	ex
311		----		----		----		----		----		----	
323		----		----		----		----		----		----	
334		----		----		----		----		----		----	
335		----		----		----		----		----		----	
372	IP564	16366		5721		138		10		1.9		0.3	
447	IP564	15704		5157		64		3		1		0	
453	IP564	16586.7		5696.0		102.4		9.5		3.3		1.9	
496	IP564	18124.8		7013.0		237.1		25.1		8.4		2.2	
657		----		----		----		----		----		----	
823		----		----		----		----		----		----	
854		----		----		----		----		----		----	
869		----		----		----		----		----		----	
922		----		----		----		----		----		----	
963		----		----		----		----		----		----	
974		----		----		----		----		----		----	
1011		----		----		----		----		----		----	
1016		----		----		----		----		----		----	
1026		----		----		----		----		----		----	
1039		----		----		----		----		----		----	
1049	IP564	8509.5	G(5)	3698.8		125.0		16.1		8.3		4.6	
1059	IP564	14306		5275		184		----		----		----	
1062		----		----		----		----		----		----	
1064		----		----		----		----		----		----	
1065	IP564	133.2	G(1)	49.2	G(5)	4.8	ex	1.5	ex	0.8	ex	0.4	ex
1081		----		----		----		----		----		----	
1082		----		----		----		----		----		----	
1095		----		----		----		----		----		----	
1097	IP564	18242.5		7450.5		188.1		18.8		6.2		2.4	
1109		----		----		----		----		----		----	
1135		----		----		----		----		----		----	
1141		----		----		----		----		----		----	
1191	IP564	16219		5479		131		9.1		2.5		0.6	
1201		----		----		----		----		----		----	
1279		----		----		----		----		----		----	
1299		----		----		----		----		----		----	
1316		----		----		----		----		----		----	
1357		----		----		----		----		----		----	
1402		----		----		----		----		----		----	
1587	IP564	19953.4		8471.4		330.1		43.4		16.4		4.0	
1610		----		----		----		----		----		----	
1613		----		----		----		----		----		----	
1631		----		----		----		----		----		----	
1634		----		----		----		----		----		----	
1720		----		----		----		----		----		----	
1724		----		----		----		----		----		----	
1811		----		----		----		----		----		----	
1833		----		----		----		----		----		----	
1913	IP564	16732.5		5772.0		155.0		16.1		5.1		3.1	
1961	IP564	16583.9		5779.2		87.7		5.4		1.7		0.5	
2130	IP564	21047	ex	9086	G(5)	388	ex	54	ex	26	DG(5)	7	G(5)
6041		----		----		----		----		----		----	
6054	IP564	17671.1		6448.9		323.4		74.1	G(5)	40.7	G(5)	1.6	C
6075		----		----		----		----		----		----	
6108		----		----		----		----		----		----	
6147		----		----		----		----		----		----	
9090		----		----		----		----		----		----	
	normality	OK		OK		OK		not OK		not OK		OK	
	n	11		12		12		10		10		11	
	outliers	2 (+2ex)		3		0 (+3ex)		1 (+3ex)		3 (+1ex)		1 (+2ex)	
	mean (n)	16954		5997		172.2		15.65		5.48		1.93	
	st.dev. (n)	1494.1		1225.2		86.08		11.773		4.681		1.529	
	R(calc.)	4183		3431		241.0		32.96		13.11		4.28	
	R(IP564:13)	3210		1811		88.8		19.84		7.34		3.19	

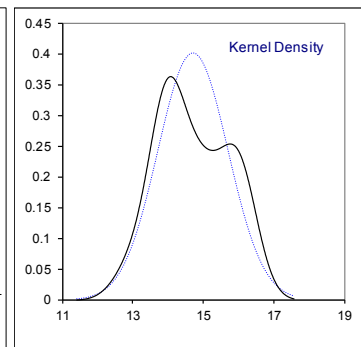
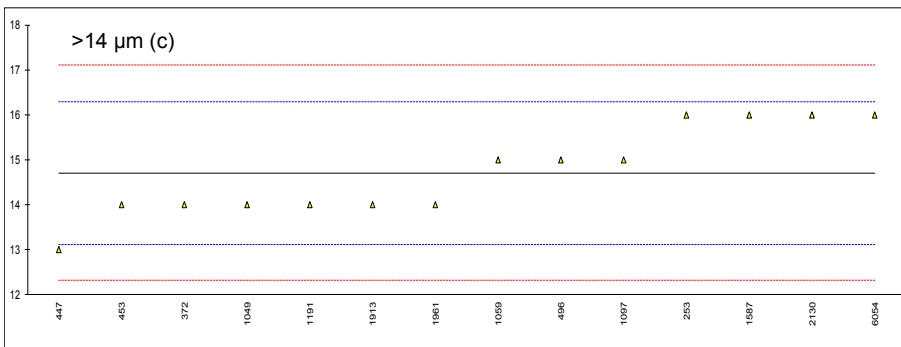
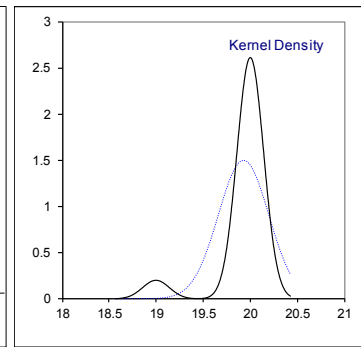
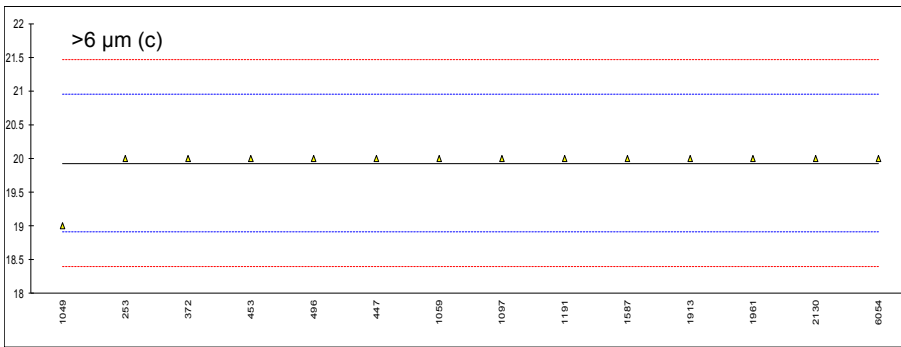
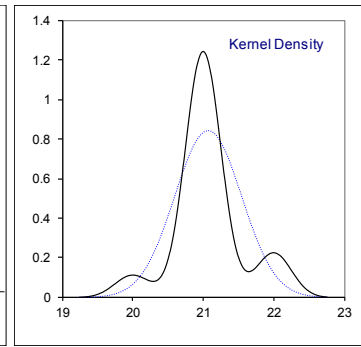
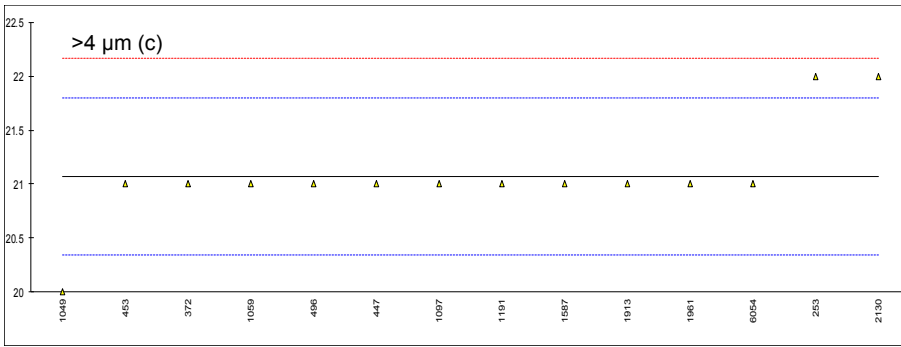
m =mark, G(1) = G(0.01), G(5) = G(0.05) and DG(5) = DG(0.05)  
 Lab 6054 first reported: 26.3



Determination of Particle Size Distribution on sample #17162 acc. to IP564, in ISO scale numbers

lab	method	≥4 µm	mark	z(targ)	≥6 µm	mark	z(targ)	≥14 µm	mark	z(targ)
140		----		----	----		----	----		----
150		----		----	----		----	----		----
171		----		----	----		----	----		----
230		----		----	----		----	----		----
237		----		----	----		----	----		----
253	ISO4406 acc. to IP564	22		2.55	20		0.14	16		1.62
311		----		----	----		----	----		----
323		----		----	----		----	----		----
334		----		----	----		----	----		----
335		----		----	----		----	----		----
372	ISO4406	21		-0.20	20		0.14	14		-0.90
447	ISO4406 acc. to IP564	21		-0.20	20		0.14	13		-2.16
453	ISO4406 acc. to IP564	21		-0.20	20		0.14	14		-0.90
496	ISO4406 acc. to IP564	21		-0.20	20		0.14	15		0.36
657		----		----	----		----	----		----
823		----		----	----		----	----		----
854		----		----	----		----	----		----
869		----		----	----		----	----		----
922		----		----	----		----	----		----
963		----		----	----		----	----		----
974		----		----	----		----	----		----
1011		----		----	----		----	----		----
1016		----		----	----		----	----		----
1026		----		----	----		----	----		----
1039		----		----	----		----	----		----
1049	ISO4406	20		-2.94	19		-1.82	14		-0.90
1059	ISO4406 acc. to IP564	21		-0.20	20		0.14	15		0.36
1062		----		----	----		----	----		----
1064		----		----	----		----	----		----
1065		----		----	----		----	----		----
1081		----		----	----		----	----		----
1082		----		----	----		----	----		----
1095		----		----	----		----	----		----
1097	ISO4406 acc. to IP564	21		-0.20	20		0.14	15		0.36
1109		----		----	----		----	----		----
1135		----		----	----		----	----		----
1141		----		----	----		----	----		----
1191	ISO4406	21		-0.20	20		0.14	14		-0.90
1201		----		----	----		----	----		----
1279		----		----	----		----	----		----
1299		----		----	----		----	----		----
1316		----		----	----		----	----		----
1357		----		----	----		----	----		----
1402		----		----	----		----	----		----
1587	ISO4406 acc. to IP564	21		-0.20	20		0.14	16		1.62
1610		----		----	----		----	----		----
1613		----		----	----		----	----		----
1631		----		----	----		----	----		----
1634		----		----	----		----	----		----
1720		----		----	----		----	----		----
1724		----		----	----		----	----		----
1811		----		----	----		----	----		----
1833		----		----	----		----	----		----
1913		21		-0.20	20		0.14	14		-0.90
1961	ISO4406 acc. to IP564	21		-0.20	20		0.14	14		-0.90
2130		22		2.55	20		0.14	16		1.62
6041		----		----	----		----	----		----
6054	ISO4406	21		-0.20	20		0.14	16		1.62
6075		----		----	----		----	----		----
6108		----		----	----		----	----		----
6147		----		----	----		----	----		----
9090		----		----	----		----	----		----
normality		not OK			not OK			OK		
n		14			14			14		
outliers		0			0			0		
mean (n)		21.07			19.93			14.71		
st.dev. (n)		0.475			0.267			0.994		
R(calc.)		1.33			0.75			2.78		
R(IP564:13)		1.02			1.43			2.22		





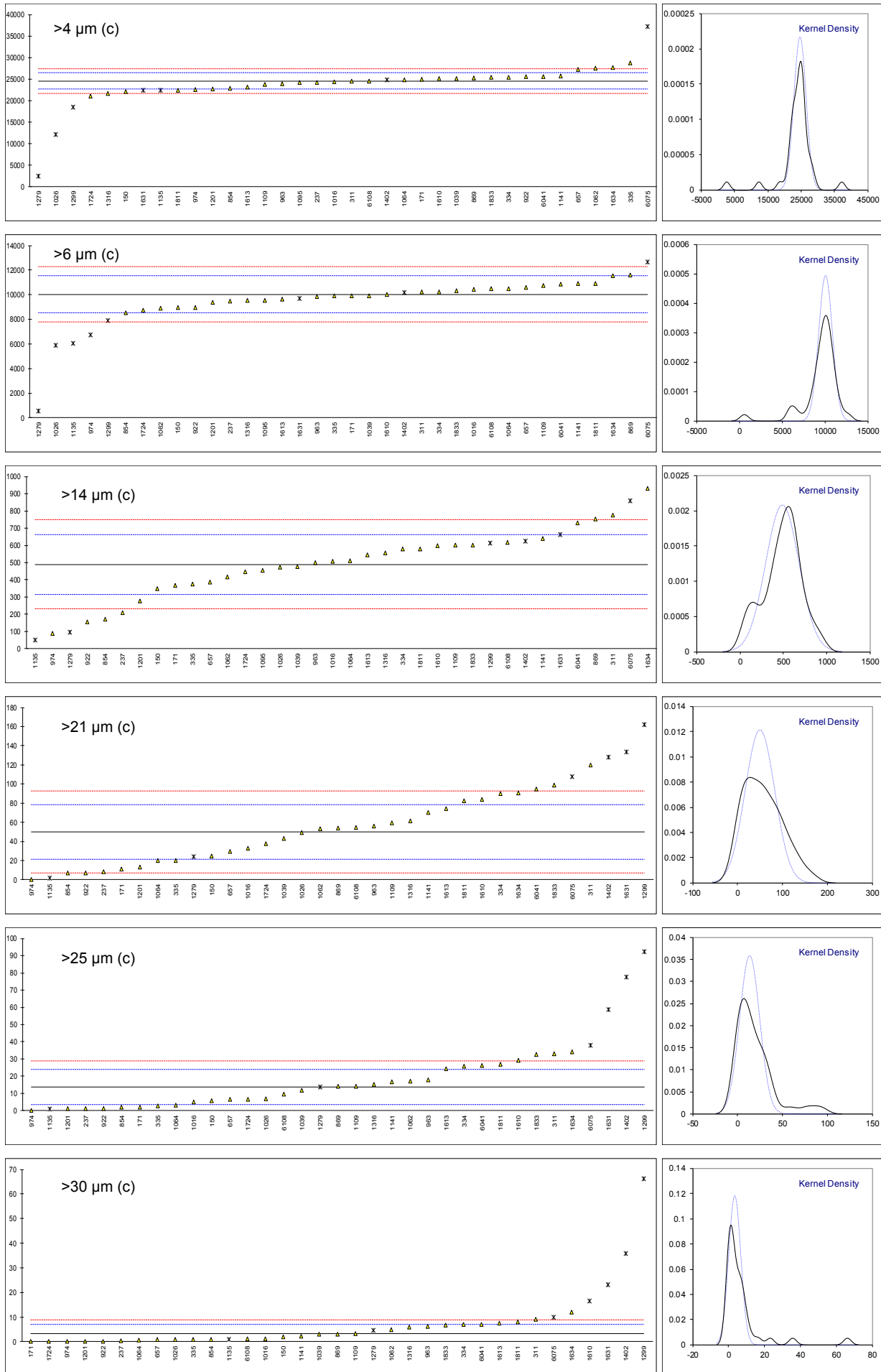
Determination of Particle Size Distribution on sample #17162 acc. to IP565, in (cumulative) counts/ml

lab	method	≥4 μm	m	≥6 μm	m	≥14 μm	m	≥21 μm	m	≥25 μm	m	≥30 μm	m
140		----		----		----		----		----		----	
150	IP565	22127.5		8942.2		350.0		24.6		5.7		1.9	
171	IP565	24934		9930		368		11		2		0	
230		----		----		----		----		----		----	
237	IP565	24261.1		9468.4		209.5		8.6		1.5		0.4	
253		----		----		----		----		----		----	
311	IP565	24530		10241		774		120		33		9	
323		----		----		----		----		----		----	
334	IP565	25410		10245		579		90		26		7	
335	IP565	28758		9901		375		20		3		1	
372		----		----		----		----		----		----	
447		----		----		----		----		----		----	
453		----		----		----		----		----		----	
496		----		----		----		----		----		----	
657	IP565	27186.4	C	10575.6	C	385.7	C	29.3	C	6.7	C	0.9	C
823		----		----		----		----		----		----	
854	IP565	22907	C	8510	C	170	C	7	C	2	C	1	C
869	IP565	25289.3	C	11590.9	C	752.3	C	53.9	C	14.2	C	3.1	C
922	IP565	25564.1		8957.4		156.9		7.2		1.5		0.2	
963	IP565	23965.1		9839.7		500.1		55.7		18.0		6.1	
974	IP565	22505		6745	R(5)	87		0.5		0.2		0.1	
1011		----		----		----		----		----		----	
1016	IP565	24372.4		10432.8		507.2		33.0		4.9		1.2	
1026	IP565	12223.5	R(1)	5912.4	R(5)	474		49		7		1	
1039	IP565	25181		9931		477		43		12		3	
1049		----		----		----		----		----		----	
1059		----		----		----		----		----		----	
1062	IP565	27546		8927		416		53		17		5	
1064	IP565	24869.1		10503.0		512.2		19.8		3.2		0.7	
1065		----		----		----		----		----		----	
1081		----		----		----		----		----		----	
1082		----		----		----		----		----		----	
1095	IP565	24165		9536		454		<40		<40		<40	
1097		----		----		----		----		----		----	
1109	IP565	23699.5		10741.9		600.3		59.5		14.3		3.3	
1135	IP564	22433	ex	6024	R(5)	49	ex	2	ex	1	ex	1	ex
1141	IP565	25778.2		10917.8		638.4		70.4		16.9		2.2	
1191		----		----		----		----		----		----	
1201	IP565	22675		9401		278		13		1.4		0.1	
1279	IP565	2523.5	R(1)	532.7	R(1)	97.9	ex	23.9	ex	13.6	ex	4.7	ex
1299	IP577	18509.3	ex	7885.0	ex	614.2	ex	162.3	ex	92.3	R(1)	66.2	R(1)
1316	in house	21599		9524		557		61.67		15.23		5.87	
1357		----		----		----		----		----		----	
1402	IP565	24836.6	ex	10148.5	ex	625.2	ex	128.1	ex	77.6	R(1)	35.7	R(1)
1587		----		----		----		----		----		----	
1610	IP565	25121.5		10014.9		596.7		83.7		29.2		16.5	R(5)
1613		23186.6		9658.0		543.6		74.6		24.5		7.5	
1631	IP565	22396.5	ex	9709.2	ex	662.7	ex	133.5	ex	58.5	R(5)	23.2	R(1)
1634	IP565	27671		11566		930		91		34		12	
1720		----		----		----		----		----		----	
1724	IP565	20999.3		8765.9		448.6		38.0		6.7		0	
1811		22435.3		10918.2		581.1		82.8		27.0		8.1	
1833	IP565	25370.5		10308.4		602.3		98.7		32.7		6.7	
1913		----		----		----		----		----		----	
1961		----		----		----		----		----		----	
2130		----		----		----		----		----		----	
6041	IP565	25619.3		10872.6		729.9		94.6		26.4		7.0	
6054		----		----		----		----		----		----	
6075	IP565	37148.1	R(1)	12673.3	R(5)	860.3	ex	107.4	ex	37.8	ex	9.8	ex
6108	IP565	24545.5		10482.7		616.7		54.4		9.7		1.1	
6147		----		----		----		----		----		----	
9090		----		----		----		----		----		----	
	normality	OK		OK		OK		OK		OK		OK	
	n	29		28		30		29		29		28	
	outliers	3 (+4ex)		5 (+3ex)		0 (+6ex)		0 (+6ex)		3 (+3ex)		4 (+3ex)	
	mean (n)	24561		10025		489.0		49.93		13.65		3.41	
	st.dev. (n)	1844.2		805.7		191.74		32.831		11.128		3.367	
	R(calc.)	5164		2256		536.9		91.93		31.16		9.43	
	R(IP565:13)	2645		2098		241.6		39.95		14.24		5.00	

m =mark, R(1) = R(0.01) and R(5) = R(0.05)

Lab 657 first reported: 220.6, 2.7, 0.3, 0.2, 0.2 and 0.2, Lab 869 first reported: 508.7, 44.6, 4.3, 1.4, 0.9 and 0.5

Lab 854 first reported: 509.1, 44.3, 4.2, 0.8, 0.4 and 0.2 Lab 1135 reported IP564 with equipment Izbal Telstar (instead of Parker Hannifin)



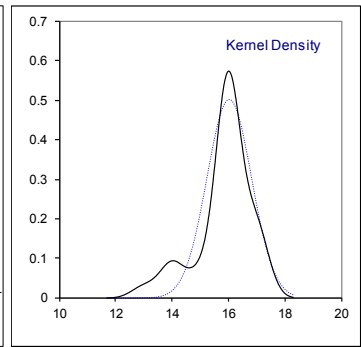
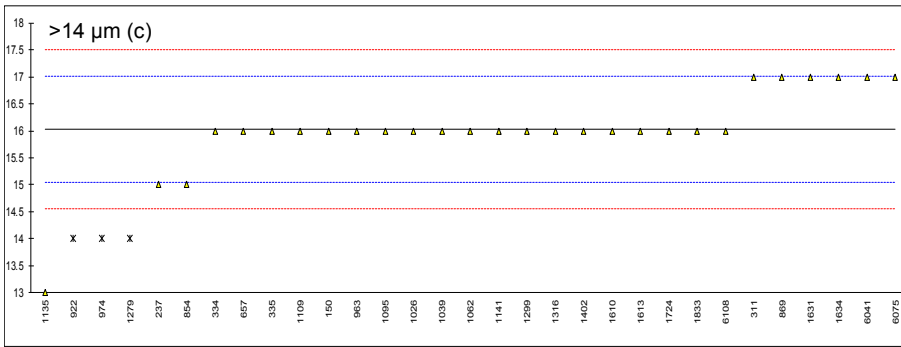
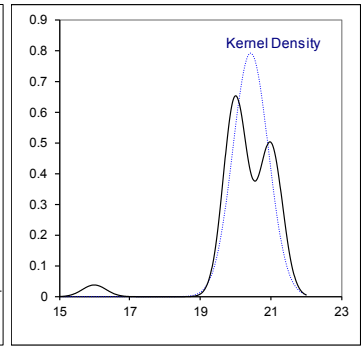
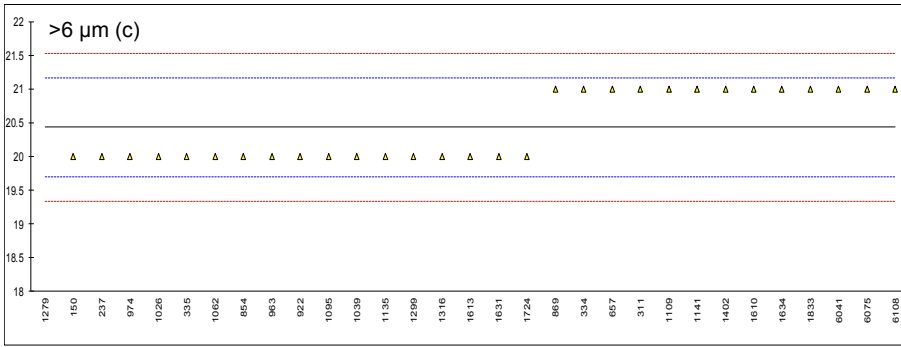
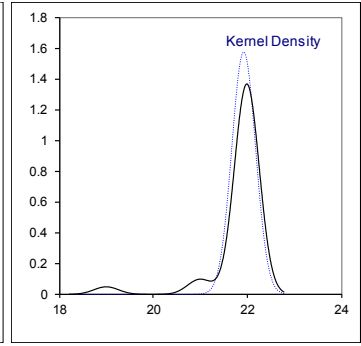
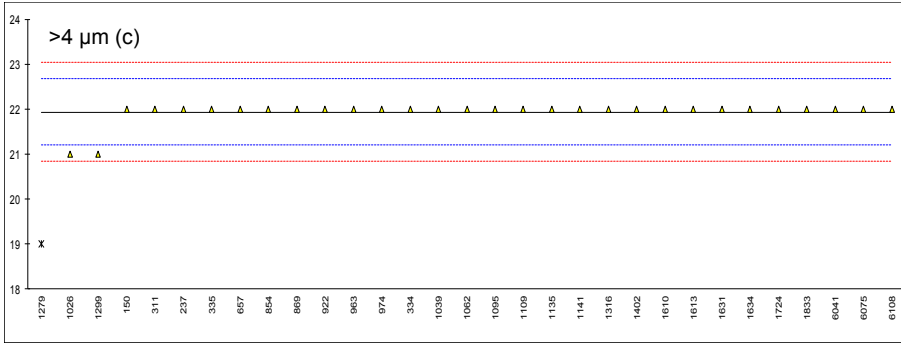
## Determination of Particle Size Distribution on sample #17162 acc. to IP565, in ISO scale numbers

lab	method	≥4 μm	mark	z(targ)	≥6 μm	mark	z(targ)	≥14 μm	mark	z(targ)
140		----		----	----		----	----		----
150	ISO4406 acc. to IP565	22		0.18	20		-1.18	16		-0.07
171		----		----	----		----	----		----
230		----		----	----		----	----		----
237	ISO4406 acc. to IP565	22		0.18	20		-1.18	15		-2.11
253		----		----	----		----	----		----
311	ISO4406 acc. to IP565	22		0.18	21		1.55	17		1.97
323		----		----	----		----	----		----
334		22		0.18	21		1.55	16		-0.07
335	ISO4406 acc. to IP565	22		0.18	20		-1.18	16		-0.07
372		----		----	----		----	----		----
447		----		----	----		----	----		----
453		----		----	----		----	----		----
496		----		----	----		----	----		----
657	ISO4406	22	C	0.18	21	C	1.55	16	C	-0.07
823		----		----	----		----	----		----
854	ISO4406 acc. to IP565	22	C	0.18	20	C	-1.18	15	C	-2.11
869	ISO4406 acc. to IP565	22	C	0.18	21	C	1.55	17	C	1.97
922	ISO4406 acc. to IP565	22		0.18	20		-1.18	14	R(0.05)	-4.15
963	ISO4406 acc. to IP564	22		0.18	20		-1.18	16		-0.07
974	ISO4406 acc. to IP565	22		0.18	20		-1.18	14	R(0.05)	-4.15
1011		----		----	----		----	----		----
1016		----		----	----		----	----		----
1026	ISO4406 acc. to IP565	21		-2.55	20		-1.18	16		-0.07
1039	ISO4406 acc. to IP565	22		0.18	20		-1.18	16		-0.07
1049		----		----	----		----	----		----
1059		----		----	----		----	----		----
1062	ISO4406 acc. to IP565	22		0.18	20		-1.18	16		-0.07
1064		----		----	----		----	----		----
1065		----		----	----		----	----		----
1081		----		----	----		----	----		----
1082		----		----	----		----	----		----
1095	ISO4406 acc. to IP565	22		0.18	20		-1.18	16		-0.07
1097		----		----	----		----	----		----
1109	ISO4406 acc. to IP565	22		0.18	21		1.55	16		-0.07
1135	ISO4406	22		0.18	20		-1.18	13		-6.19
1141	ISO4406 acc. to IP565	22		0.18	21		1.55	16		-0.07
1191		----		----	----		----	----		----
1201		----		----	----		----	----		----
1279	ISO4406 acc. to IP565	19	R(0.05)	-8.01	16	R(0.01)	-12.11	14	R(0.05)	-4.15
1299	ISO4406 acc. to IP577	21		-2.55	20		-1.18	16		-0.07
1316	ISO4406	22		0.18	20		-1.18	16		-0.07
1357		----		----	----		----	----		----
1402	ISO4406 acc. to IP565	22		0.18	21		1.55	16		-0.07
1587		----		----	----		----	----		----
1610	IP565	22		0.18	21		1.55	16		-0.07
1613	ISO4406 acc. to IP565	22		0.18	20		-1.18	16		-0.07
1631		22		0.18	20		-1.18	17		1.97
1634	ISO4406 acc. to IP565	22		0.18	21		1.55	17		1.97
1720		----		----	----		----	----		----
1724	ISO4406 acc. to IP565	22		0.18	20		-1.18	16		-0.07
1811		----		----	----		----	----		----
1833	ISO4406 acc. to IP565	22		0.18	21		1.55	16		-0.07
1913		----		----	----		----	----		----
1961		----		----	----		----	----		----
2130		----		----	----		----	----		----
6041	ISO4406 acc. to IP565	22		0.18	21		1.55	17		1.97
6054		----		----	----		----	----		----
6075		22		0.18	21		1.55	17		1.97
6108	ISO4406 acc. to IP565	22		0.18	21		1.55	16		-0.07
6147		----		----	----		----	----		----
9090		----		----	----		----	----		----
	normality	not OK			OK			not OK		
	n	30			30			28		
	outliers	1			1			3		
	mean (n)	21.93			20.43			16.04		
	st.dev. (n)	0.254			0.504			0.793		
	R(calc.)	0.71			1.41			2.22		
	R(IP565:13)	1.03			1.03			1.37		

Lab 657 first reported: 15, 9 and 5

Lab 854 first reported: 16, 13 and 13

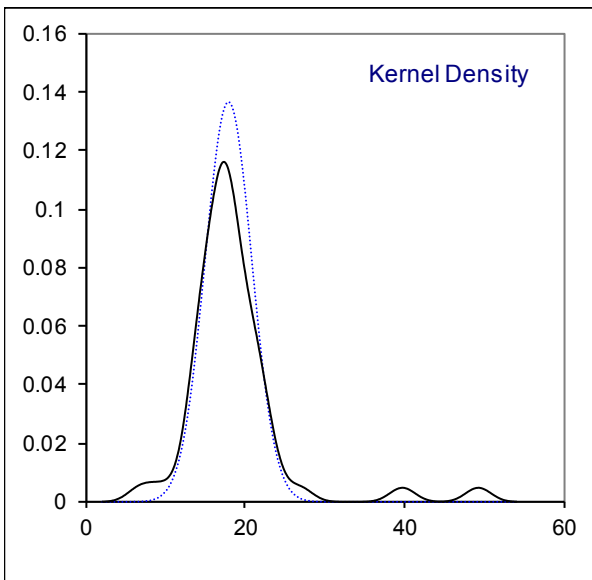
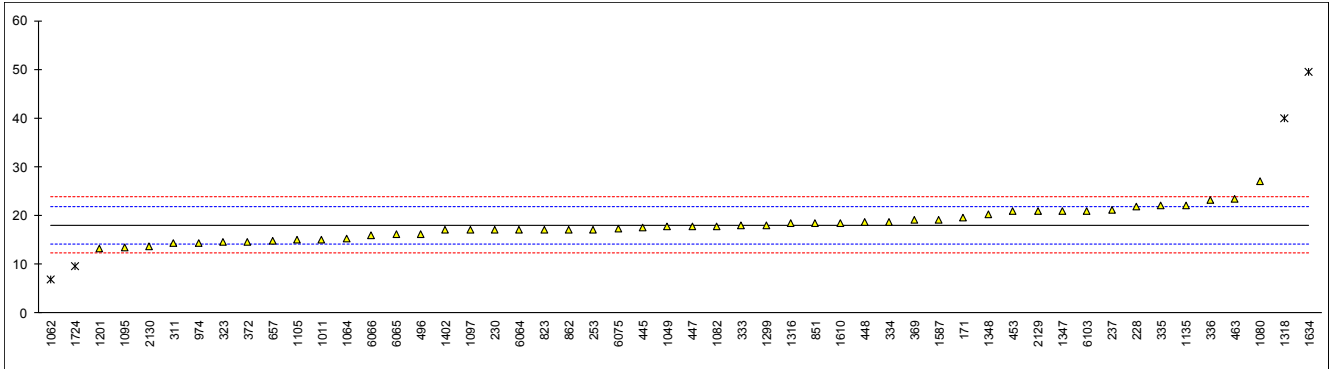
Lab 869 first reported: 16, 13 and 13



## Determination of FAME on sample #17163; results in mg/kg

lab	method	value	mark	z(targ)	remarks
62		----		----	
140		----		----	
171	IP585	19.5		0.75	
228	D7797	21.84		1.96	
230	IP585	17.06		-0.51	
237	D7797	21.1		1.58	
253	IP583	17.2		-0.43	
254		----		----	
311	IP585	14.3		-1.93	
317		----		----	
323	IP585	14.7		-1.72	
333	IP585	18.0		-0.02	
334	IP585	18.7		0.34	
335	IP585	22.0		2.04	
336	IP585	23.1		2.61	
369	IP583	19.2		0.60	
372	IP590	14.7		-1.72	
445	IP585	17.54		-0.26	
447	IP583	17.7		-0.18	
448	IP583	18.6		0.29	
453	IP590	20.865		1.46	
463	IP583	23.43		2.78	
496	IP585	16.2		-0.95	
631		----		----	
657	IP585	14.9		-1.62	
663		----		----	
823	IP585	17.1		-0.49	
851	IP583	18.41		0.19	
862	IP585	17.1		-0.49	
974	IP583	14.4		-1.88	
1011	IP585	15.1		-1.52	
1049	D7797	17.69		-0.18	
1062		7	DG(0.05)	-5.70	
1064	IP585	15.32		-1.40	
1065		----		----	
1080	In house	26.98		4.61	
1082	IP585	17.75		-0.15	
1095	IP585	13.4		-2.40	
1097	IP583	17.05		-0.51	
1105	IP585	15.09		-1.52	
1135	IP585	22.175		2.13	
1191		----		----	
1201	IP585	13.3		-2.45	
1299	IP585	18.1		0.03	
1316	IP585	18.36		0.16	
1318	IP585	39.87	G(0.01)	11.26	
1347	D7797	20.96		1.51	
1348	D7797	20.19		1.11	
1357		----		----	
1402	IP585	17.0		-0.54	
1587	IP583	19.21	C	0.60	first reported: 32.21
1610	IP583	18.52		0.25	
1613		----		----	
1631		----		----	
1634	IP585	49.4	C,G(0.01)	16.18	first reported: 43.7
1724	IP590	9.72	DG(0.05)	-4.29	
1787		----		----	
1833		----		----	
1913		----		----	
2129	IP590	20.93		1.49	
2130	IP590	13.75		-2.21	
6041		----		----	
6064	IP585	17.09		-0.49	
6065	IP585	16.11		-1.00	
6066	IP585	15.91		-1.10	
6075	IP590	17.37		-0.35	
6103	D7797	21.04		1.55	

normality	OK			<u>IP585 only:</u>	<u>IP583/D7797 only:</u>	<u>IP590 only:</u>
n	48			OK	OK	OK
outliers	4	<u>Spike:</u>	<u>Recovery:</u>	26	16	5
mean (n)	18.04	16.1	<120%	17.11	19.16	17.52
st.dev. (n)	2.922			2.523	2.214	3.354
R(calc.)	8.18			7.06	6.20	9.39
R(IP585:10)	5.43			5.19	5.92	4.35

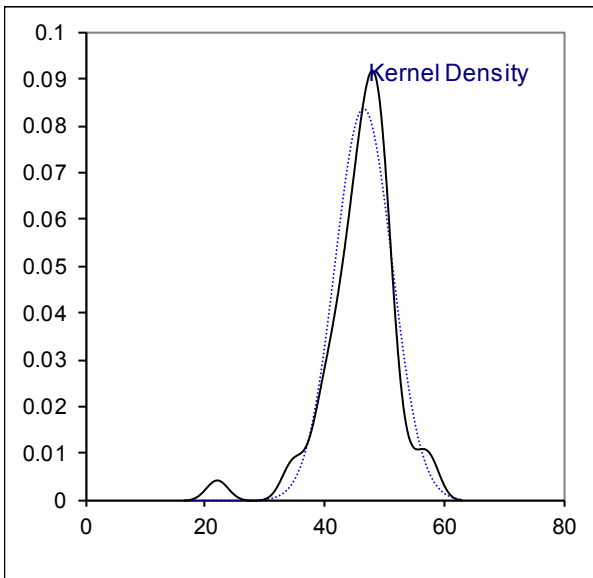
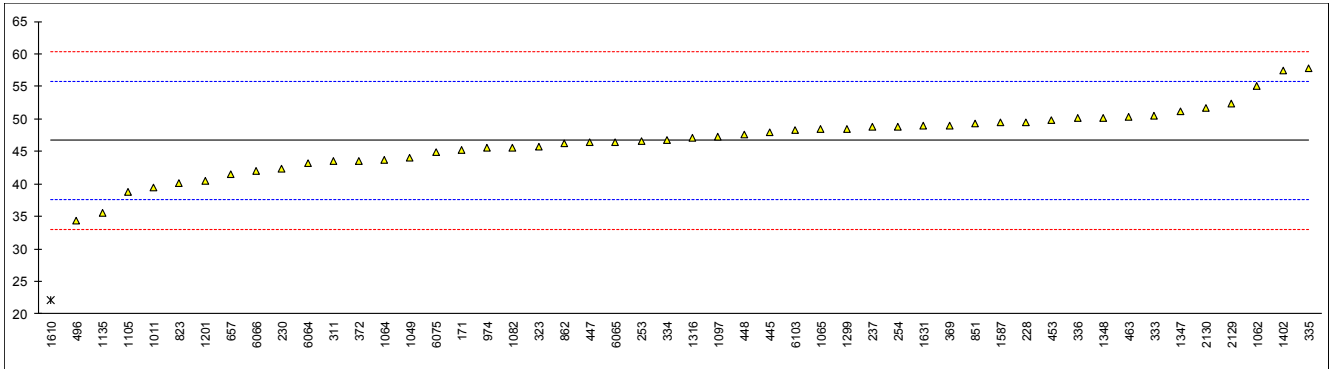


## Determination of FAME on sample #17164; results in mg/kg

lab	method	value	mark	z(targ)	remarks
62		----		----	
140		----		----	
171	IP585	45.2		-0.32	
228	D7797	49.52		0.62	
230	IP585	42.39		-0.93	
237	D7797	48.77		0.46	
253	IP583	46.61		-0.01	
254	D7797	48.82		0.47	
311	IP585	43.5		-0.69	
317		----		----	
323	IP585	45.7		-0.21	
333	IP585	50.5		0.84	
334	IP585	46.8		0.03	
335	IP585	57.7		2.41	
336	IP585	50.1		0.75	
369	IP583	48.9		0.49	
372	IP590	43.5		-0.69	
445	IP585	47.88		0.27	
447	IP583	46.36		-0.07	
448	IP583	47.52		0.19	
453	IP590	49.778		0.68	
463	IP583	50.33		0.80	
496	IP585	34.4		-2.68	
631		----		----	
657	IP585	41.5		-1.13	
663		----		----	
823	IP585	40.1		-1.43	
851	IP583	49.26		0.57	
862	IP585	46.2		-0.10	
974	IP583	45.5		-0.25	
1011	IP585	39.4		-1.59	
1049	D7797	43.99		-0.58	
1062		55		1.82	
1064	IP585	43.75		-0.64	
1065	D7797	48.38		0.38	
1080		----		----	
1082	IP585	45.63		-0.23	
1095		----		----	
1097	IP583	47.24		0.13	
1105	D7797	38.78		-1.72	
1135	IP585	35.519		-2.44	
1191		----		----	
1201	IP585	40.4		-1.37	
1299	IP585	48.5		0.40	
1316	IP585	47.05		0.08	
1318		----		----	
1347	D7797	51.08		0.97	
1348	D7797	50.2		0.77	
1357		----		----	
1402	IP585	57.44		2.36	
1587	IP583	49.46		0.61	
1610	IP583	22.16	R(0.01)	-5.36	
1613		----		----	
1631	IP590	48.87		0.48	
1634		----		----	
1724		----	W	----	first reported: 12.78
1787		----		----	
1833		----		----	
1913		----		----	
2129	IP585	52.38		1.25	
2130	IP590	51.71		1.10	
6041		----		----	
6064	IP585	43.16		-0.77	
6065	IP585	46.47		-0.04	
6066	IP585	42.00		-1.02	
6075	IP590	44.92		-0.38	
6103	D7797	48.33		0.36	



normality	OK			<u>IP585 only:</u>	<u>IP583/D7797 only:</u>	<u>IP590 only:</u>
n	49			OK	not OK	OK
outliers	1	<u>Spike:</u>	<u>Recovery:</u>	25	18	5
mean (n)	46.66	58.3	<80%	45.35	47.73	47.76
st.dev. (n)	4.779			5.665	2.865	3.432
R(calc.)	13.38			15.86	8.02	9.61
R(IP585:10)	12.81			12.47	7.34	10.46

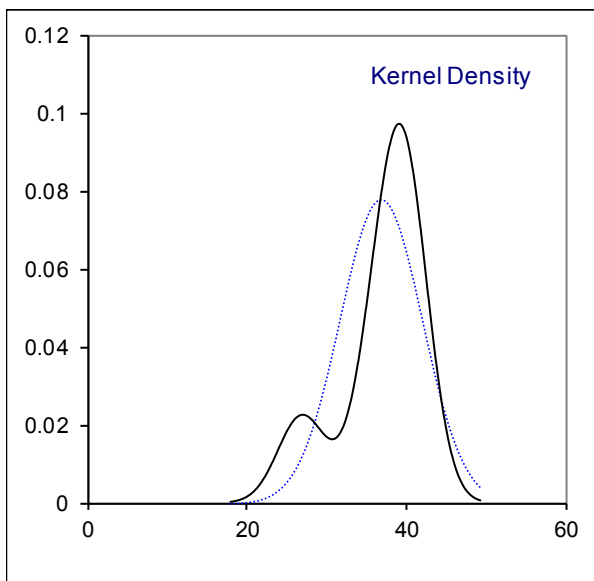
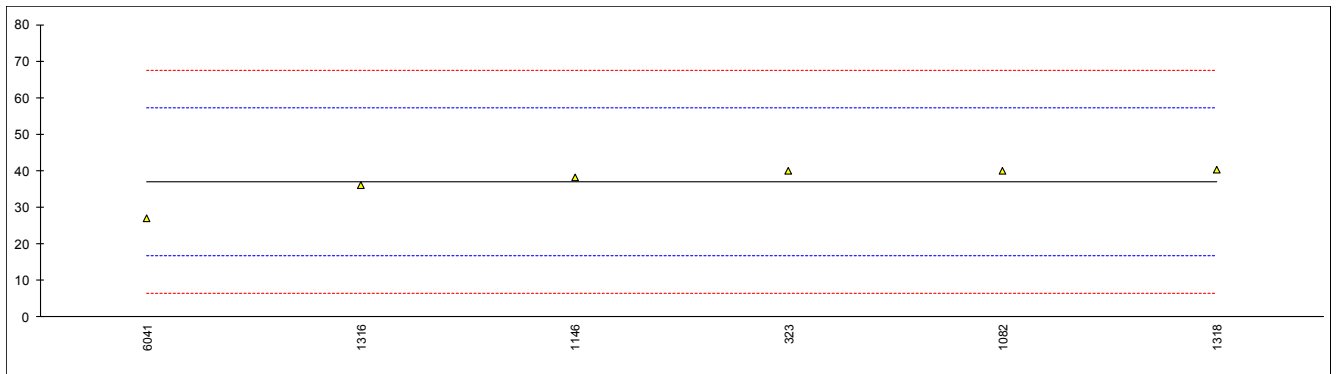


## Determination of Copper as Cu on sample #17165; results in µg/kg

lab	method	value	mark	z(targ)	remarks
52		----		----	
120		----		----	
140		----		----	
150		----		----	
159		----		----	
171		----		----	
175		----		----	
177		----		----	
194		----		----	
230		----		----	
237		----		----	
254		----		----	
256		----		----	
323	D6732	40		0.30	
334		----		----	
335		----		----	
372		----		----	
391		----		----	
398		----		----	
399		----		----	
402		----		----	
440		----		----	
445		----		----	
447		----		----	
453		----		----	
496		----		----	
631		----		----	
657		----		----	
823		----		----	
851		----		----	
869		----		----	
963		----		----	
974		----		----	
994		----		----	
1016		----		----	
1039		----		----	
1040		----		----	
1049		----		----	
1064		----		----	
1065		----		----	
1081		----		----	
1082	D7111	40		0.30	
1097		----		----	
1109		----		----	
1146	In house	38.2		0.12	
1191		----		----	
1201		----		----	
1279		----		----	
1316	In house	36		-0.09	
1318	D6732	40.4		0.34	
1357		----		----	
1399		----		----	
1417		----		----	
1468		----		----	
1586		----		----	
1587		----		----	
1610		----		----	
1613		----		----	
1631		----		----	
1650		----		----	
1720		----		----	
1724		----		----	
1833		----		----	
1854		----		----	
1913		----		----	
1961		----		----	
2129		----		----	
2130		----		----	
6041	D7111	27		-0.98	
6075		----		----	
6101		----		----	
6103		----		----	

6108	----	----
6114	----	----
6147	----	----
9090	----	----

normality	unknown
n	6
outliers	0
mean (n)	36.9
st.dev. (n)	5.14
R(calc.)	14.4
R(D6732:04)	28.4



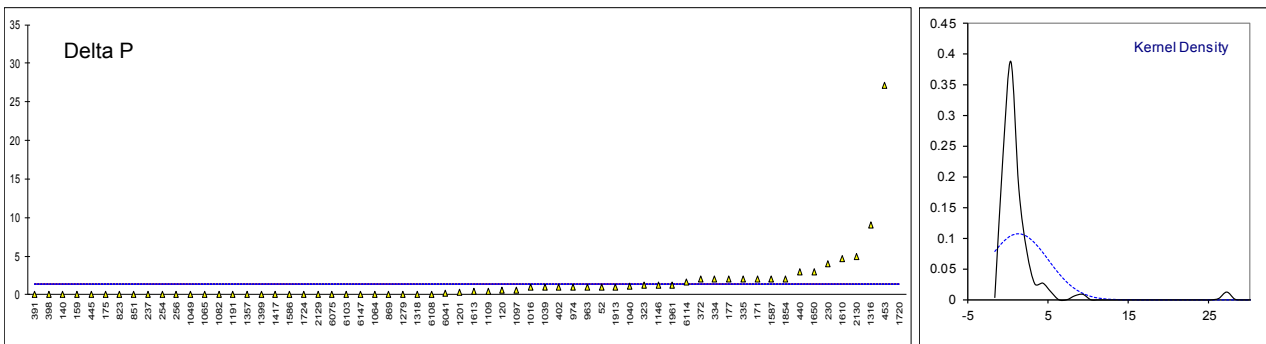
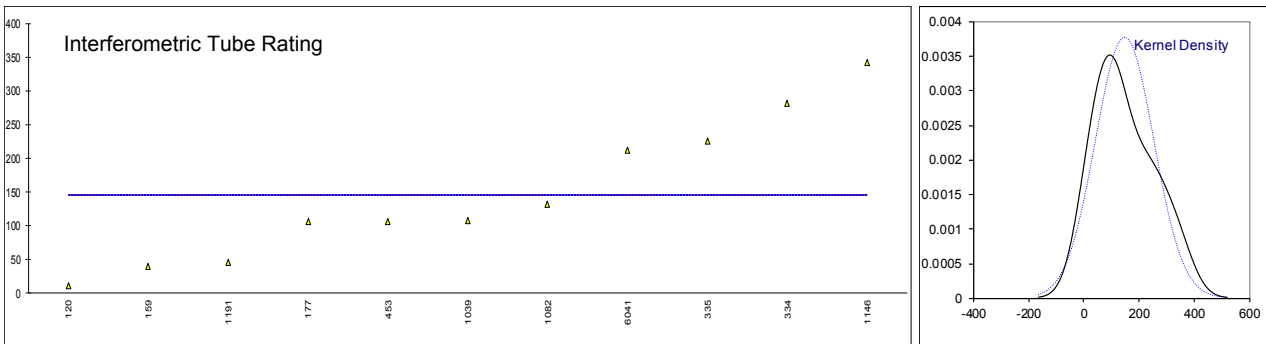
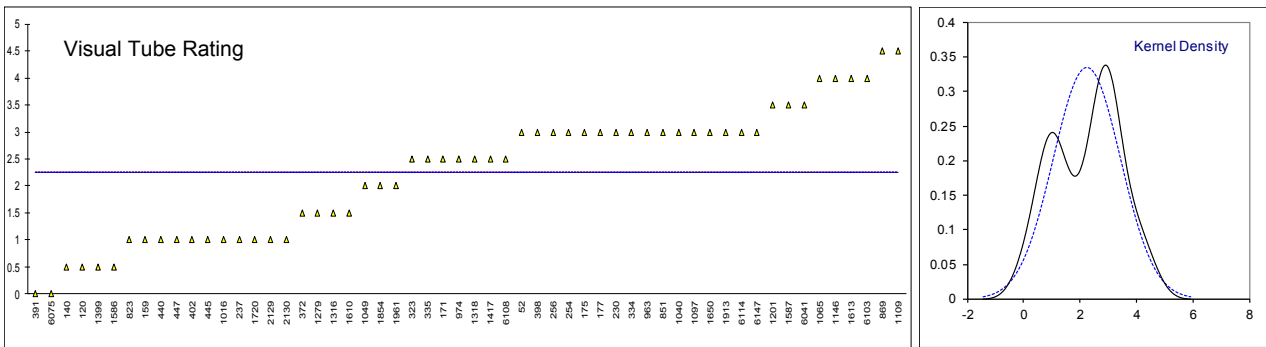
Determination of JFTOT at 260 °C on sample #17165; Visual tube rating (VTR), Interferometric tube rating (ITR) in nm and Ellipsometric tube rating (ETR) in nm, Delta P in mmHg, Evaluation Pass/Fail

lab	method	VTR	ITR	ETR	Delta P	Pass/Fail	iis evaluation	remarks
52	D3241 - A1	3	----	----	1	----	Fail	
120	D3241 - A1	<1	10.7	----	0.6	Pass	Pass	
140	D3241 - A1	<1	----	----	0	pass	Pass	
150		----	----	----	----	----	----	
159	D3241 - A1	1	39.4	----	0	PASS	Pass	
171	D3241 - A1	<3	----	----	2	----	Pass	
175	D3241 - A1	3A	----	----	0	Fail	Fail	
177	D3241 - A1	3	105.7	----	2	fail	Fail	
194		----	----	----	----	----	----	
230	D3241 - A1	3	----	----	4.0	Fail	Fail	
237	D3241 - A1	1A	C	----	0	pass	Fail	first reported: 1, wrong eval.
254	D3241 - A1	3	C	----	0	pass	Fail	first reported: <2, wrong eval.
256	D3241 - A1	3	C	----	0	Pass	Fail	first reported: 1, wrong eval
323	IP323 - B	<3	----	----	1.2	----	Pass	
334	D3241 - A1	3AP	282	----	2	----	Fail	
335		<3,P	225	----	2	----	Fail	
372	D3241 - A1	<2A	----	----	2	Fail	Fail	
391	D3241 - A1	0P	----	----	0	Fail	Fail	
398	D3241 - A1	3P	----	----	0	----	Fail	
399		----	----	----	----	----	----	
402	D3241 - A1	1	----	----	1	Pass	Pass	
440	IP323 - B	1P	C	----	3	Pass	Fail	first reported: 1, wrong eval.
445	IP323 - B	1	----	----	0.0	Pass	Pass	
447	D3241 - A1	1	----	----	<1	Pass	Pass	
453	IP323 - B	A/Blue	106.5	----	27.2	Fail	Fail	
496		----	----	----	----	----	----	
631		----	----	----	----	----	----	
657		----	----	----	----	----	----	
823	D3241 - A1	1	----	----	0.0	Pass	Pass	
851	D3241 - A1	3P	C	----	0	Pass	Fail	first reported: <1
869	D3241 - A1	>4P	----	287.35	0.1	Fail	Fail	
963	D3241 - A1	3	----	----	1	Fail	Fail	
974	D3241 - A1	<3	----	----	1	Pass	Pass	
994		----	----	----	----	----	----	
1016	D3241 - A1	1	----	----	1	----	Pass	
1039		----	108.6	----	1.0	fail	Fail	
1040	D3241 - A1	3A	----	----	1.1	Fail	Fail	
1049	D3241 - A1	2A	----	----	0.0	Fail	Fail	
1064	D3241 - A1	P	----	----	0.1	Fail	Fail	
1065	D3241 - A1	4P	----	192	0	----	Fail	
1081		----	----	----	----	----	----	
1082	D3241 - A1	A	132	----	0	----	Fail	
1097	D3241 - A1	3A	----	----	0.6	Fail	Fail	
1109	D3241 - A1	>4A	----	----	0.5	Fail	Fail	
1146	D3241 - A1	4P	341.8	----	1.2	fail	Fail	
1191		----	46	----	0	----	Pass	
1201	D3241 - A1	<4P	----	----	0.3	Fail	Fail	
1279	D3241 - A1	<2	C	----	0.1	Pass	Pass	first reported: <1
1316	D3241 - A1	<2	----	15.96	9.0	Pass	Pass	
1318	D3241 - A1	<3A	----	----	0.1	Fail	Fail	
1357		----	----	----	0	Fail	Fail	
1399	D3241 - A1	<1	----	----	0	pass	Pass	
1417	IP323 - B	<3	----	----	0	Pass	Pass	
1468		----	----	----	----	----	----	
1586	D3241 - A1	<1	----	----	0.0	Pass	Pass	
1587	D3241 - A1	<4	----	----	2.0	Fail	Fail	
1610	IP323	<2	----	----	4.7	Pass	Pass	
1613	D3241 - A1	4	----	----	0.4	fail	Fail	
1631		----	----	----	----	----	----	
1650	D3241	3P	----	----	3	Fail	Fail	
1720	D3241 - A1	1	C	----	250	----	Fail	first reported: <1
1724		----	W	----	----	W	W	first reported: 1, 0, Pass
1833		----	----	----	----	----	----	
1854	D3241 - A1	2	C	----	2	C	Pass	first reported: 1, 1
1913	D3241 - A1	3	----	----	1.0	Fail	Fail	
1961	D3241 - A1	2	----	----	1.3	Pass	Pass	
2129	D3241 - A1	1	----	----	0	Pass	Pass	
2130	D3241 - A1	1	----	----	5	Pass	Pass	
6041	D3241 - A1	<4P	211.4	----	0.2	Fail	Fail	
6075	D3241 - A1	0	----	----	0	pass	Pass	
6101		----	W	----	----	W	W	first reported: <1, 0.1, Pass
6103	ISO6249	4	----	----	0	Fail	Fail	

6108	D3241 - A1	<3	----	----	0.1	----	Pass	
6114	D3241 - A1	3+P+A	----	----	1.6	Fail	Fail	
6147	D3241 - A1	3	----	----	0	Fail	C	Fail
9090		----	----	----	----	----		first reported: Pass
normality	OK	OK	unknown	suspect				
n	56	11	3	62				
range of results								
min	0	46	16	0				
max.	>4	342	287	>30				
Pass						25	24	
Fail						26	38	

For the graphical display non-numeric values were calculated as follows: visual tube rating: < x as (x-0.5) and > x as (x+0.5)

Pass according to specification AFQRJOS is when VTR is less than 3 (no peacock or abnormal color), ITR/ETR is less than 85 and Delta P is maximum 25.



## APPENDIX 2

## z-scores distillation

lab	method	IBP	10% rec.	50% rec.	90%rec.	FBP
52	D86-automated	-1.06	0.20	0.26	0.42	0.04
62	D86-automated	-0.65	-0.26	0.26	1.82	-0.47
120	D86-automated	1.12	-0.34	-0.21	0.11	0.63
131		----	----	----	----	----
140	D86-automated	-0.76	-2.24	-0.11	-0.66	-0.71
150		-0.59	-0.49	-0.67	-0.58	-0.44
159	D86-automated	0.44	0.12	0.73	0.42	0.51
169	D86-automated	-0.41	1.42	0.26	-1.28	1.26
171	D86-automated	0.13	-0.03	-0.58	0.04	-0.87
175	D86-automated	-0.28	-0.49	0.35	0.89	0.59
177	D86-automated	-2.19	-0.56	0.45	1.04	0.98
194		----	----	----	----	----
221	D86-manual	0.20	0.81	0.35	-1.28	0.20
224	D86-manual	0.22	0.59	-0.56	-2.03	-0.96
225	D86-manual	0.20	0.05			-1.38
228	D86-manual	-1.51	-2.24	<b>-4.31</b>	<b>-4.38</b>	-1.38
230	D86-automated	0.57	-0.49	-1.05	-1.05	-0.24
237	D86-manual	-0.48	-0.72	1.29	0.27	-0.59
238	D86-manual	-0.48	-0.72	-2.45	-1.67	-1.78
252	D86-manual	0.54	0.05	0.35	-0.51	0.98
253	D86-manual	0.20	0.05	-0.11	0.27	-0.20
254	D86-manual	0.20	0.81	0.35	-0.51	0.59
256		0.54	0.05	-0.58	-0.51	-0.20
258	D86-automated	2.07	1.65	2.22	1.74	0.75
273	D86-automated	0.71	0.20	0.17	1.04	0.91
311	D86-automated	-0.65	-0.11	-0.30	0.35	0.24
317	D86-automated	-1.06	0.12	-0.02	-0.27	0.55
323	D86-automated	-0.07	0.35	0.26	0.27	-0.40
333	D86-automated	-0.89	0.88	0.63	-0.27	0.27
334		0.06	-0.64	-0.21	0.50	0.87
335	D86-automated	-0.04	-0.56	-0.02	0.89	-1.03
336		0.47	-0.56	-0.21	-0.35	-0.71
353		0.61	0.58	0.07	0.50	-0.20
369	D86-automated	0.47	-0.11	-0.39	-0.12	-2.56
370	D86-automated	0.88	0.20	-0.39	-0.35	0.20
372	D86-automated	0.06	-0.41	-0.02	-1.28	0.00
391	D86-automated	0.51	0.05	0.26	0.19	0.91
399		----	----	----	----	----
402	D86-automated	0.44	0.20	1.01	2.21	0.83
440	IP123-manual	0.54	0.05	0.35	-1.28	0.59
445	D86-automated	-0.89	-0.79	-0.49	-0.04	0.12
447	D86-automated	0.16	0.20	0.91	1.67	0.87
448		-0.28	0.58	0.63	2.52	0.98
453	IP123-automated	-0.24	0.20	0.73	0.81	0.24
463	D86-automated	1.08	0.66	0.07	-0.51	0.39
468	D86-automated	-0.31	1.34	0.82	1.04	-0.36
485	D86-automated	-0.62	0.27	-0.16	-0.62	-0.91
496	D86-automated	0.57	0.35	0.35	-0.58	0.83
594	GOST2177	1.19	0.73	<b>2.87</b>	<b>5.39</b>	<b>3.51</b>
603	D86-automated	0.30	1.04	0.45	-0.27	1.18
608		-0.35	-0.72	-0.21	-1.20	-0.67
631		----	----	----	----	----
633		----	----	----	----	----
634		----	----	----	----	----
657	D86-automated	0.68	0.35	0.45	0.73	1.89
663	D86-automated	0.57	0.12	-0.49	0.11	0.98
671		----	----	----	----	----
704	D86-manual	0.20	-1.48	-1.98	-2.45	-2.17
732	D86-manual	0.37	0.81	0.35	-2.06	-0.79
785	D86-automated	0.27	-0.26	-0.49	0.58	0.27
798	D86-manual	0.20	0.81	1.29	0.27	0.98
823	D86-automated	-1.40	-0.26	-0.67	-0.97	-0.63
851	D86-automated	0.47	0.58	0.63	1.35	0.04
854	D86-automated	-0.04	0.05	0.35	0.35	0.47
862	D86-automated	0.13	-0.11	0.26	0.42	0.39
869	D86-manual	0.54	0.81	1.29	1.43	0.59
875	D86-automated	0.61	0.58	0.63	0.66	0.67
922	D86-automated	-0.72	-1.25	-1.98	-2.76	-0.79
962	D86-automated	0.54	0.73	0.17	-0.43	-0.32
963	D86-automated	-0.05	0.96	0.60	-0.15	0.53
970	D86-automated	0.33	0.81	0.17	-0.20	-0.24
974	D86-automated	0.33	0.81	0.17	-0.20	-0.47
994	D86-manual	0.20	-1.48	-1.51	-2.06	-1.78

lab	method	IBP	10% rec.	50% rec.	90%rec.	FBP
995	D86-manual	-0.82	-1.48	-1.51	-0.12	-1.18
996	D86-manual	0.03	-1.48	-0.58	0.27	-0.20
997		-0.65	-2.24	-0.58	-0.12	-0.79
1011	D86-automated	-0.14	0.20	-0.02	0.11	0.27
1016		----	----	----	----	----
1026		----	----	----	----	----
1039	D86-automated	0.57	-2.32	0.07	-0.35	0.20
1049	D86-automated	-0.38	0.50	0.63	1.28	-0.04
1059	D86-automated	0.68	0.50	0.54	-0.27	0.83
1062		0.03	0.27	0.17	1.59	-2.49
1064	D86-automated	-0.24	0.58	0.82	1.59	1.42
1065	D86-automated	0.03	-0.11	-1.05	0.11	-2.21
1079	D86-automated	1.49	0.73	0.63	1.12	1.38
1081		----	----	----	----	----
1082	D86-automated	0.81	0.35	-0.11	0.04	0.51
1097	ISO3405-automated	1.32	0.58	0.45	0.50	-0.16
1109	D86-automated	0.30	-0.41	-0.30	-0.04	-0.08
1135	D86-automated	-0.31	0.12	-0.11	0.50	0.31
1141	D86-automated	-0.21	-0.34	-1.23	0.19	0.20
1182	D86-automated	1.02	-0.64	0.07	1.12	-1.15
1191	D86-automated	-1.20	0.96	0.73	0.27	0.04
1201	D86-automated	-1.33	-0.03	1.29	2.91	-0.04
1279	D86-automated	-0.52	0.66	-0.21	-0.97	-0.75
1284		----	----	----	----	----
1299	D86-automated	-0.93	-0.87	-0.30	0.35	-0.36
1316	D86-automated	-0.62	-0.18	0.63	1.12	0.43
1318	D86-automated	-0.89	-0.34	-0.86	-0.74	-0.16
1347	D86-manual	0.88	0.81	0.82	-1.28	0.59
1348	D86-automated	0.47	0.20	-0.39	-0.12	-0.36
1357	D86-automated	-0.14	0.88	-0.02	-1.98	-0.28
1372		----	----	----	----	----
1397	D86-automated	0.47	0.05	-0.02	-0.58	0.31
1417	IP123-automated	0.27	0.12	1.10	1.90	0.47
1496	D86-automated	0.88	1.19	0.54	0.81	0.08
1586	D86-automated	0.78	0.58	0.26	1.28	0.63
1587	D86-automated	-0.65	0.27	0.07	-0.51	0.16
1610	IP123-automated	-0.07	-0.64	-0.21	0.11	-0.32
1613	D86-manual	-0.39	-0.28	-0.84	-0.51	-0.92
1631	D86-automated	0.06	-0.64	0.26	0.11	1.10
1634	D86-automated	-0.28	0.58	0.54	1.20	0.83
1650	D86-automated	-0.99	-0.72	-0.58	-0.82	-0.36
1715	ISO3405-automated	1.08	0.66	0.26	1.20	0.79
1720	D86-automated	-0.38	0.43	0.35	0.35	0.75
1724	D86-automated	-0.59	0.43	-0.39	-0.04	0.35
1811	D86-automated	-0.76	-0.56	-1.61	-2.37	-1.15
1833		----	----	----	----	----
1881		----	----	----	----	----
1883	D86-manual	-0.14	-1.48	-0.58	-1.28	0.20
1913	D86-automated	-0.28	0.88	0.17	0.97	-0.55
1961		----	----	----	----	----
2129	D86-automated	-2.08	-0.49	-0.86	-0.35	-0.63
2130	D86-automated	0.33	-0.03	0.35	0.42	1.58
2133	D86-automated	0.16	0.27	0.45	0.11	0.63
6041	D86-automated	-0.07	0.66	0.82	0.27	0.67
6054	D86-automated	<b><u>-2.73</u></b>	0.35	-0.49	-0.66	-0.47
6075	D86-automated	-1.37	-1.25	-0.58	-0.58	0.00
6101		0.28	-0.13	0.05	0.27	0.62
6103	ISO3405-automated	-1.03	-1.33	-1.33	-1.05	-2.53
6108		0.37	0.12	-0.11	-0.04	0.67
6114	D86-automated	0.91	0.50	0.26	1.35	0.47
6135	D86-automated	-0.52	0.43	0.26	-1.36	-0.12
6136	D86-manual	0.68	-0.95	-1.14	-1.13	0.51
6138	ISO3405-automated	1.15	0.88	0.35	-0.89	0.08
6142	D86-automated	-1.10	-0.87	-0.77	-0.20	-0.44
6147	D86-automated	0.16	0.20	0.35	-0.20	0.59

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

APPENDIX 3

z-scores Particle Size Distribution on sample #17162 acc. to IP564 and IP565, results in counts/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		----	----	----	----	----	----		----	----	----	----	----	----
150		----	----	----	----	----	----	IP565	-2.58	-1.45	-1.61	-1.78	-1.56	-0.85
171		----	----	----	----	----	----	IP565	0.39	-0.13	-1.40	-2.73	-2.29	-1.91
230		----	----	----	----	----	----		----	----	----	----	----	----
237		----	----	----	----	----	----	IP565	-0.32	-0.74	-3.24	-2.90	-2.39	-1.69
253	IP564	<b>4.43</b>	<b>4.51</b>	<b>9.56</b>	<b>3.76</b>	<b>5.81</b>	<b>2.43</b>		----	----	----	----	----	----
311		----	----	----	----	----	----	IP565	-0.03	0.29	3.30	4.91	3.80	3.13
323		----	----	----	----	----	----		----	----	----	----	----	----
334		----	----	----	----	----	----	IP565	0.90	0.29	1.04	2.81	2.43	2.01
335		----	----	----	----	----	----	IP565	4.44	-0.17	-1.32	-2.10	-2.09	-1.35
372	IP564	-0.51	-0.43	-1.08	-0.80	-1.37	-1.43		----	----	----	----	----	----
447	IP564	-1.09	-1.30	-3.41	-1.78	-1.71	-1.69		----	----	----	----	----	----
453	IP564	-0.32	-0.46	-2.20	-0.87	-0.83	-0.02		----	----	----	----	----	----
496	IP564	1.02	1.57	2.05	1.33	1.11	0.24		----	----	----	----	----	----
657		----	----	----	----	----	----	IP565	2.78	0.73	-1.20	-1.45	-1.37	-1.41
823		----	----	----	----	----	----		----	----	----	----	----	----
854		----	----	----	----	----	----	IP565	-1.75	-2.02	-3.70	-3.01	-2.29	-1.35
869		----	----	----	----	----	----	IP565	0.77	2.09	3.05	0.28	0.11	-0.17
922		----	----	----	----	----	----	IP565	1.06	-1.43	-3.85	-3.00	-2.39	-1.80
963		----	----	----	----	----	----	IP565	-0.63	-0.25	0.13	0.40	0.85	1.51
974		----	----	----	----	----	----	IP565	-2.18	<b>-4.38</b>	-4.66	-3.46	-2.65	-1.85
1011		----	----	----	----	----	----		----	----	----	----	----	----
1016		----	----	----	----	----	----	IP565	-0.20	0.54	0.21	-1.19	-1.72	-1.24
1026		----	----	----	----	----	----	IP565	<b>-13.06</b>	<b>-5.49</b>	-0.17	-0.07	-1.31	-1.35
1039		----	----	----	----	----	----	IP565	0.66	-0.13	-0.14	-0.49	-0.33	-0.23
1049	IP564	<b>-7.37</b>	-3.55	-1.49	0.06	1.08	2.35		----	----	----	----	----	----
1059	IP564	-2.31	-1.12	0.37	----	----	----		----	----	----	----	----	----
1062		----	----	----	----	----	----	IP565	3.16	-1.47	-0.85	0.22	0.66	0.89
1064		----	----	----	----	----	----	IP565	0.33	0.64	0.27	-2.11	-2.06	-1.52
1065	IP564	<b>-14.67</b>	<b>-9.19</b>	<b>-5.28</b>	<b>-2.00</b>	<b>-1.79</b>	<b>-1.34</b>		----	----	----	----	----	----
1081		----	----	----	----	----	----		----	----	----	----	----	----
1082		----	----	----	----	----	----		----	----	----	----	----	----
1095		----	----	----	----	----	----	IP565	-0.42	-0.65	-0.41	----	----	----
1097	IP564	1.12	2.25	0.50	0.44	0.27	0.41		----	----	----	----	----	----
1109		----	----	----	----	----	----	IP565	-0.91	0.96	1.29	0.67	0.13	-0.06
1135		----	----	----	----	----	----	IP564	<b>-2.25</b>	<b>-5.34</b>	<b>-5.10</b>	<b>-3.36</b>	<b>-2.49</b>	<b>-1.35</b>
1141		----	----	----	----	----	----	IP565	1.29	1.19	1.73	1.43	0.64	-0.68
1191	IP564	-0.64	-0.80	-1.30	-0.92	-1.14	-1.17		----	----	----	----	----	----
1201		----	----	----	----	----	----	IP565	-2.00	-0.83	-2.45	-2.59	-2.41	-1.85
1279		----	----	----	----	----	----	IP565	<b>-23.33</b>	<b>-12.67</b>	<b>-4.53</b>	<b>-1.82</b>	<b>-0.01</b>	<b>0.72</b>
1299		----	----	----	----	----	----	IP577	<b>-6.41</b>	<b>-2.86</b>	<b>1.45</b>	<b>7.88</b>	<b>15.47</b>	<b>35.18</b>
1316		----	----	----	----	----	----	in house	-3.14	-0.67	0.79	0.82	0.31	1.38
1357		----	----	----	----	----	----		----	----	----	----	----	----
1402		----	----	----	----	----	----	IP565	<b>0.29</b>	<b>0.16</b>	<b>1.58</b>	<b>5.48</b>	<b>12.58</b>	<b>18.09</b>
1587	IP564	2.62	3.82	4.98	3.92	4.17	1.82		----	----	----	----	----	----
1610		----	----	----	----	----	----	IP565	0.59	-0.01	1.25	2.37	3.06	<b>7.34</b>
1613		----	----	----	----	----	----		-1.45	-0.49	0.63	1.73	2.13	2.29
1631		----	----	----	----	----	----	IP565	<b>-2.29</b>	<b>-0.42</b>	<b>2.01</b>	<b>5.86</b>	<b>8.82</b>	<b>11.09</b>
1634		----	----	----	----	----	----	IP565	3.29	2.06	5.11	2.88	4.00	4.81
1720		----	----	----	----	----	----		----	----	----	----	----	----
1724		----	----	----	----	----	----	IP565	-3.77	-1.68	-0.47	-0.84	-1.37	-1.91
1811		----	----	----	----	----	----		-2.25	1.19	1.07	2.30	2.62	2.63
1833		----	----	----	----	----	----	IP565	0.86	0.38	1.31	3.42	3.75	1.84
1913	IP564	-0.19	-0.35	-0.54	0.06	-0.15	1.03		----	----	----	----	----	----
1961	IP564	-0.32	-0.34	-2.66	-1.45	-1.44	-1.25		----	----	----	----	----	----
2130	IP564	<b>3.57</b>	<b>4.77</b>	<b>6.80</b>	<b>5.41</b>	<b>7.83</b>	<b>4.45</b>		----	----	----	----	----	----
6041		----	----	----	----	----	----	IP565	1.12	1.13	2.79	3.13	2.51	2.01
6054	IP564	0.63	0.70	4.77	<b>8.25</b>	<b>13.44</b>	-0.29		----	----	----	----	----	----
6075		----	----	----	----	----	----	IP565	<b>13.32</b>	<b>3.53</b>	<b>4.30</b>	<b>4.03</b>	<b>4.75</b>	<b>3.58</b>
6108		----	----	----	----	----	----	IP565	-0.02	0.61	1.48	0.31	-0.78	-1.29
6147		----	----	----	----	----	----		----	----	----	----	----	----
9090		----	----	----	----	----	----		----	----	----	----	----	----

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

Z-scores bold and italic test result: excluded



## APPENDIX 4

## Equipment used in Particle Size distribution

Lab	Equipment	Method reported	Method reported for calibration	Remarks
140	----	----	----	
150	Stanhope-Seta	IP565	ISO11171	
171	----	IP565	----	
230	----	----	----	
237	Stanhope-Seta	IP565	ISO4406	
253	Parker Hannifin	IP564	----	
311	Stanhope-Seta	IP565	ISO11171	
323	----	----	----	
334	Stanhope-Seta	C IP565	ISO11171	first reported: PAMAS
335	Stanhope-Seta	IP565	ISO11171	
372	Parker Hannifin	IP564	ISO11171	
447	Parker Hannifin	IP564	ISO11171	
453	Parker Hannifin	IP564	ISO11171	
496	Parker Hannifin	IP564	ISO11171	
657	Stanhope-Seta	IP565	ISO11171	
823	Stanhope-Seta	IP565	ISO11171	
854	Stanhope-Seta	IP565	ISO11171	
869	Stanhope-Seta	IP565	ISO11171	
922	Stanhope-Seta	IP565	ISO11171	
963	Stanhope-Seta	IP565 C	ISO11171	first reported: IP564
974	Stanhope-Seta	IP565	ISO11171	
1011	----	----	----	
1016	Stanhope-Seta	IP565	Stanhope Seta	
1026	Stanhope-Seta	IP565	----	
1039	Stanhope-Seta	IP565	ISO11171	
1049	Parker Hannifin	IP564	ISO11171/11943	
1059	Parker Hannifin	IP564	ISO11171	
1062	Stanhope-Seta	IP565	ISO11171	
1064	Stanhope-Seta	IP565	ISO11171	
1065	Parker Hannifin	IP564	----	
1081	----	----	----	
1082	----	----	----	
1095	Stanhope-Seta	IP565	----	
1097	Parker Hannifin	IP564	ISO11171	
1109	Stanhope-Seta	IP565	ISO11171	
1135	Izbal Telstar	IP564	ISO11171	
1141	Stanhope-Seta	IP565	ISO11171	
1191	Parker Hannifin	IP564 C	----	first reported: IP577
1201	Stanhope-Seta	IP565	ISO11171	
1279	Stanhope-Seta	IP565	----	
1299	Pamas	IP577	ISO11171	
1316	Pamas SBSS	in house C	ISO11171	first reported: IP565
1357	----	----	----	
1402	Stanhope-Seta	IP565	ISO11171	
1587	Parker Hannifin	IP564	ISO11171	
1610	Stanhope-Seta	IP565	ISO4406	
1613	Stanhope-Seta	----	ISO11171	
1631	Stanhope-Seta	IP565	ISO11171	
1634	Stanhope-Seta	IP565	ISO11171	
1720	----	----	----	
1724	Stanhope-Seta	IP565	----	
1811	----	----	----	
1833	Stanhope-Seta	IP565	ISO11171	
1913	Parker Hannifin	IP564	ISO11171	
1961	Parker Hannifin	IP564	ISO11171	
2130	Parker Hannifin	IP564	ISO11171	
6041	Stanhope-Seta	IP565	----	
6054	Parker Hannifin	IP564 C	ISO11171	first reported: IP565
6075	Stanhope-Seta	IP565	ISO11171	
6108	Stanhope-Seta	IP565	ISO11171	
6147	----	----	----	
9090	----	----	----	

**APPENDIX 5****Number of participants per country**

1 lab in AFGHANISTAN	1 lab in MARTINIQUE
1 lab in AUSTRALIA	1 lab in MAURITIUS
1 lab in AUSTRIA	1 lab in MOROCCO
1 lab in AZERBAIJAN	1 lab in MOZAMBIQUE
5 labs in BELGIUM	9 labs in NETHERLANDS
2 labs in CANADA	2 labs in NIGERIA
9 labs in CHINA, People's Republic	1 lab in NORWAY
2 labs in COTE D'IVOIRE	2 labs in OMAN
3 labs in COLOMBIA	1 lab in PAKISTAN
1 lab in CROATIA	6 labs in PHILIPPINES
1 lab in CZECH REPUBLIC	1 lab in POLAND
2 labs in DENMARK	3 labs in PORTUGAL
1 lab in DJIBOUTI	2 labs in QATAR
1 lab in EGYPT	1 lab in ROMANIA
1 lab in ESTONIA	3 labs in RUSSIAN FEDERATION
2 labs in FINLAND	2 labs in SAUDI ARABIA
6 labs in FRANCE	1 lab in SENEGAL
1 lab in FRENCH GUIANA	1 lab in SERBIA
3 labs in GEORGIA	1 lab in SINGAPORE
3 labs in GERMANY	1 lab in SLOVENIA
2 labs in GREECE	2 labs in SOUTH AFRICA
1 lab in GUAM	1 lab in SOUTH KOREA
1 lab in GUINEA REPUBLIC	1 lab in SPAIN
1 lab in HONG KONG	1 lab in SUDAN
2 labs in HUNGARY	4 labs in SWEDEN
2 labs in IRELAND	1 lab in TANZANIA
1 lab in ISRAEL	1 lab in THAILAND
2 labs in ITALY	1 lab in TOGO
1 lab in JORDAN	1 lab in TUNISIA
1 lab in KAZAKHSTAN	3 labs in TURKEY
2 labs in KENYA	1 lab in TURKMENISTAN
1 lab in LATVIA	1 lab in UKRAINE
3 labs in LEBANON	2 labs in UNITED ARAB EMIRATES
3 labs in LITHUANIA	10 labs in UNITED KINGDOM
1 lab in MACEDONIA	11 labs in UNITED STATES OF AMERICA
2 labs in MALAYSIA	1 lab in VIETNAM
1 lab in MALTA	

## APPENDIX 6

### 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's outlier test
R(0.05)	= straggler in Rosner's 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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