

Results of Proficiency Test
Hydraulic Fluid (used)
November 2017

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 2003, the Institute for Interlaboratory Studies (iis) organizes a proficiency test (PT) for the analysis of used Hydraulic Fluid every year. It was decided to continue this interlaboratory study during the annual program 2017/2018. In this interlaboratory study, 62 laboratories (inclusive PT on wear metals) from 40 different countries did register for participation. See appendix 2 for the number of participants per country. In this report, the test results of the 2017 interlaboratory study on used Hydraulic Fluid are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, was the organiser of this proficiency test. Sample analysis for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. It was decided to send two different samples of used Hydraulic fluids: one sample of 0.9 litre used Hydraulic Fluid, labelled #17226, and one sample of 0.1 litre used Hydraulic Fluid, labelled #17227, especially for wear metals.

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

2.1 ACCREDITATION

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

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organization, Statistics and Evaluation' of March 2017 (iis-protocol, version 3.4). This protocol is electronically available through the iis website www.iisnl.com, from the FAQ page.

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

The necessary bulk material of used Hydraulic Fluid was obtained from a local supplier. The approximately 65 litre of the bulk material was homogenised in a precleaned drum. After homogenisation, 70 amber glass one litre bottles were filled with 900 ml sample and labelled #17226. The homogeneity of the subsamples #17226 was checked by determination of Density at 15°C in accordance with ASTM D4052 and Viscosity at 40°C according to ASTM D445 on 8 stratified randomly selected samples.

	<i>Density at 15 °C in kg/L</i>	<i>Viscosity at 40 °C in mm²/s</i>
Sample #17226-1	0.87542	33.84
Sample #17226-2	0.87541	33.89
Sample #17226-3	0.87541	33.89
Sample #17226-4	0.87541	33.86
Sample #17226-5	0.87541	33.86
Sample #17226-6	0.87541	33.92
Sample #17226-7	0.87541	33.92
Sample #17226-8	0.87540	33.87

Table 1: homogeneity test results of subsamples #17226

From the test results of table 1, the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities of the reference test methods in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	<i>Density at 15 °C in kg/L</i>	<i>Viscosity at 40 °C in mm²/s</i>
r (observed)	0.00001	0.08
reference test method	ISO12185:96	iis, see ref. 17
0.3 * R (ref. test method)	0.00015	0.18

Table 2: repeatabilities of subsamples #17226

The calculated repeatabilities in table 2 were both less than 0.3 times the corresponding reproducibilities of the reference test methods. Therefore, homogeneity of the subsamples #17226 was assumed.

Approximately 10 litres of used hydraulic fluid was spiked by a third party. After the homogenisation 80 HDPE containers of 100mL were filled and labelled #17227. The homogeneity of the subsamples #17227 was checked by determination of Density at 15°C in accordance with ASTM D4052 and Copper in accordance with ASTM D5185 on 8 stratified randomly selected samples.

	<i>Density at 15 °C in kg/L</i>	<i>Copper in mg/kg</i>
Sample #17227-1	0.87592	21.6
Sample #17227-2	0.87589	21.5
Sample #17227-3	0.87594	21.3
Sample #17227-4	0.87593	21.5
Sample #17227-5	0.87593	21.1
Sample #17227-6	0.87593	21.2
Sample #17227-7	0.87593	21.1
Sample #17227-8	0.87593	21.1

Table 3: homogeneity test results of subsamples #17227

From the test results of table 3, the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities of the reference test methods in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	<i>Density at 15 °C in kg/L</i>	<i>Copper in mg/kg</i>
r (observed)	0.00004	0.5
reference test method	ISO12185:96	D5185:13e1
0.3* R (ref. test method)	0.00015	1.5

Table 4: repeatability of subsamples #17227

The calculated repeatabilities were less than 0.3 times the corresponding reproducibilities of the reference test methods. Therefore, homogeneity of the subsamples #17227 was assumed.

Depending on the registration to each of the participating laboratories one 1 litre amber glass bottle, labelled #17226 and/or one 100 mL HDPE container, labelled #17227 was dispatched on October 25, 2017. A SDS was added to the sample.

2.5 STABILITY OF THE SAMPLES

The stability of Hydraulic Fluid, packed in the brown glass bottles or in HDPE containers, was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were asked to determine on sample #17226: Total Acid Number, Density at 15°C, Flash Point PMcc, Kinematic Viscosity at 40°C and at 100°C, Viscosity Stabinger at 40°C and at 100°C, Sulphur, Water content by KF and Level of Contamination and to determine on sample #17227: 23 elements (20 wear metals and 3 additives).

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

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/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3 RESULTS

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

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

3.1 STATISTICS

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of 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, EN or ISO reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation of this interlaboratory study. The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used. In some cases, a reproducibility based on former iis proficiency tests could be used.

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

The z-scores were calculated according to:

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

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 proficiency test no severe problems were encountered during dispatch to the participants. One laboratory reported the test results after the final reporting date and five laboratories did not report any test results at all. Not all laboratories were able to report all analyses requested.

The 57 reporting participants sent in 1202 numerical test results. Observed were 89 outlying test results, which is 7.4% of the 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 test results are discussed per sample and per test. The test methods that are reported by the laboratories are taken into account for explaining the observed differences when possible and applicable. These test methods are also mentioned in the tables in appendix 1 together with the original data. The abbreviations used in these tables are listed in appendix 3.

In the iis PT reports, test methods are referred to with a number (e.g. D664-A) and an added designation for the year that the test method was adopted or revised (e.g. D664-A:17). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. Dxxxx:yy(2017)). In the tables of Appendix 1 only the test method number and year of adoption or revision will be used.

The reference method for the analyses of wear metals is test method ASTM D5185:13e1. Unfortunately, this test method does not provide precision data for all metals determined in this proficiency test. For these metals (Cd and Li) the calculated reproducibilities were compared to the reproducibility estimated from the Horwitz equation. For some metals (Al, Ba, Pb, K, Sn and Ti) the consensus values of the group are either above or below the respective application ranges on which the requirements of ASTM D5185:13e1 are based. However, it was decided to use the reproducibility from ASTM D5185:13e1 as the calculated reproducibility (after the rejection of the suspect data) is in general in good agreement with the requirements of ASTM D5185:13e1. More discussion per metal is given below.

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, see also paragraph 3.1.

Sample #17226

Acid Number (Total): This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D664-A:17.

Density at 15°C: This determination was problematic for a number of laboratories. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ISO12185:96.

Flash Point PMcc: This determination may be problematic depending on the test method used. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D93:16a method B but not with method A. When the test results of method A or B are evaluated separately, the calculated reproducibility obtained with method B is in agreement with the requirements of ASTM D93:16a method B. The calculated reproducibility obtained with method A is not (but almost) in agreement with requirements of ASTM D93:16a method A. It is observed that for this type of oil sample with a flash point of 123°C the speed of heating (difference between method A or B) has a significant effect on the Flash Point determination.

Kin.Visco.at 40°C: Till 2017 a precision statement for used oils was not present in ASTM D445:15a. In the version of 2017 of ASTM D445 a precision statement is given for used (in-service) formulated oils. However, it appears that the reproducibility is very strict. It is decided to continue with the target reproducibility as calculated from the reproducibilities found in iis PT's on used oils (see appendix 3, ref. 17).

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 the average reproducibility found for used oils in previous iis PTs.

Kin.Visco.at 100°C: See explanation about selection of the target reproducibility at Kin.Visco.at 40°C. 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 the average reproducibility found for used oils in previous iis PTs.

Visco. Stabinger at 40°C: 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 the requirements of ASTM D7042:16e3.

Visco. Stabinger at 100°C: This determination was problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D7042:16e3.

Sulphur: This determination was problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D4294:16e1.

Water: 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 D6304:16e1.

Level of Contamination: This determination was very problematic. In total seven statistical outliers were observed over six parameters (4 for counts per ml and 3 for scale number) and another seven test results were excluded. None of the calculated reproducibilities after rejection of the suspect data is at all in agreement with the requirements of ASTM D7647:10.

Sample #17227

Aluminium: 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 D5185:13e1.

Barium: This determination was not problematic. One statistical outlier was observed and another test result was excluded because most of the test results of this participant were detected as outliers. However, the calculated reproducibility after rejection of the suspect data is in good agreement with the requirements of ASTM D5185:13e1.

Boron: This determination was not problematic. Two statistical outliers were observed and another test result was excluded because most of the test results of this participant were detected as outliers. However, the calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ASTM D5185:13e1.

Cadmium: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the estimated requirements from the Horwitz equation.

Chromium: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of ASTM D5185:13e1.

- Copper: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D5185:13e1.
- Iron: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D5185:13e1.
- Lead: 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 D5185:13e1.
- Lithium: 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 the estimated requirements from the Horwitz equation.
- Magnesium: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of ASTM D5185:13e1.
- Manganese: This determination was very problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not at all in agreement with the requirements of ASTM D5185:13e1.
- Molybdenum This determination was not problematic. One statistical outlier was observed and another test result was excluded because most of the test results of this participant were detected as outliers. However, the calculated reproducibility after the rejection of the suspect data is in full agreement with the requirements of ASTM D5185:13e1.
- Nickel: 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 D5185:13e1.
- Potassium This determination was not problematic. One statistical outlier was observed and another test result was excluded because most of the test results of this participant were detected as outliers. However, the calculated reproducibility after the rejection of the suspect data is in good agreement with the requirements of ASTM D5185:13e1.

- Silicon: 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 the requirements of ASTM D5185:13e1.
- Silver: This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D5185:13e1.
- Sodium This determination was problematic. Four statistical outliers were observed and another test result was excluded because most of the test results of this participant were detected as outliers. The calculated reproducibility after the rejection of the suspect data is not in agreement with the requirements of ASTM D5185:13e1.
- Tin: 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 D5185:13e1.
- Titanium: 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 D5185:13e1.
- Vanadium: This determination was problematic for a number of laboratories. Six statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ASTM D5185:13e1.
- Calcium: This determination was very problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not at all in agreement with the requirements of ASTM D5185:13e1.
- Phosphorus: This determination was problematic. Five statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D5185:13e1.
- Zinc: This determination was problematic for a number of laboratories. Four statistical outliers were observed and another test result were excluded because most of the test results of this participant were detected as outliers. However, the calculated reproducibility after the rejection of the suspect data is in full agreement with the requirements of ASTM D5185:13e1.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant reference test method and the reproducibility as found for the group of participating laboratories. The target reproducibilities derived from literature reference test methods (R (lit)) or based on previous iis PTs and the calculated reproducibilities ($2.8 * sd$) are compared in the next table;

<i>Parameter</i>	<i>unit</i>	<i>n</i>	<i>average</i>	<i>2.8 * sd</i>	<i>R(lit)</i>
Total Acid Number	mg KOH/g	45	2.25	0.85	0.99
Density at 15°C	kg/L	40	0.8754	0.0005	0.0005
Flash Point PMcc	°C	38	123	11	10
Kinematic Viscosity at 40°C	mm ² /s	40	34.074	0.465	0.613
Kinematic Viscosity at 100°C	mm ² /s	37	9.170	0.167	0.202
Viscosity Stabinger at 40°C	mm ² /s	17	34.130	0.434	0.486
Viscosity Stabinger at 100°C	mm ² /s	17	9.147	0.122	0.107
Sulphur	mg/kg	19	3096	456	341
Water	mg/kg	40	820	561	946
Level of Contamination ≥ 4µm (c)	counts/ml	22	7353	14092	8399
Level of Contamination ≥ 6µm (c)	counts/ml	22	665	946	511
Level of Contamination ≥ 14µm (c)	counts/ml	22	46	94	63
Level of Contamination ≥ 4µm (c)	scale number	25	19.5	3.8	1.7
Level of Contamination ≥ 6µm (c)	scale number	25	16.4	2.0	1.2
Level of Contamination ≥ 14µm (c)	scale number	23	12.5	2.9	2.0

Table 5: reproducibilities of tests on sample #17226.

<i>Parameter</i>	<i>Unit</i>	<i>n</i>	<i>average</i>	<i>2.8 * sd</i>	<i>R (lit)</i>
Aluminium as Al	mg/kg	33	4.1	2.0	5.5
Barium as Ba	mg/kg	31	60.4	17.0	25.7
Boron as B	mg/kg	22	5.2	5.0	13.2
Cadmium as Cd	mg/kg	17	4.0	1.1	1.5
Chromium as Cr	mg/kg	34	3.9	1.9	1.9
Copper as Cu	mg/kg	34	20.8	3.4	5.0
Iron as Fe	mg/kg	36	10.5	2.9	3.4
Lead as Pb	mg/kg	32	6.1	2.4	5.7
Lithium as Li	mg/kg	12	22.1	4.5	6.2
Magnesium as Mg	mg/kg	33	7.3	2.5	3.3
Manganese as Mn	mg/kg	26	4.1	1.4	0.7
Molybdenum as Mo	mg/kg	30	3.8	1.7	1.7
Nickel as Ni	mg/kg	34	4.0	1.3	3.0
Potassium as K	mg/kg	20	2.8	5.7	8.9
Silicon as Si	mg/kg	33	6.2	3.9	5.9
Silver as Ag	mg/kg	29	4.0	1.1	1.4
Sodium as Na	mg/kg	28	7.2	5.2	4.5
Tin as Sn	mg/kg	30	3.6	2.2	4.7
Titanium as Ti	mg/kg	26	3.8	1.1	4.7
Vanadium as V	mg/kg	30	3.8	1.0	1.2

<i>Parameter</i>	<i>Unit</i>	<i>n</i>	<i>average</i>	<i>2.8 * sd</i>	<i>R (lit)</i>
Calcium as Ca	mg/kg	34	396	62	36
Phosphorus as P	mg/kg	31	1115	183	144
Zinc as Zn	mg/kg	33	1148	208	193

Table 6: reproducibilities of tests on sample #17227

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF NOVEMBER 2017 WITH THE PREVIOUS PTs.

	<i>November 2017</i>	<i>November 2016</i>	<i>November 2015</i>	<i>November 2014</i>	<i>November 2013</i>
Number of reporting labs	57	51	55	42	42
Number of test results reported	1202	1168	1126	922	776
Statistical outliers	89	29	43	55	41
Percentage outliers	7.4%	2.5%	3.8%	6.0%	5.3%

Table 7: comparison with previous proficiency tests.

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

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

<i>Determination</i>	<i>November 2017</i>	<i>November 2016</i>	<i>November 2015</i>	<i>November 2014</i>	<i>November 2013</i>
Total Acid Number	+	+	+	++	(--)
Density at 15°C	+/-	+/-	+/-	+/-	+/-
Flash Point PMcc	+/-	-	+	+/-	++
Kinematic Viscosity at 40°C	+	+	++	-	--
Kinematic Viscosity at 100°C	+	+/-	+/-	-	--
Viscosity Stabinger at 40°C	+	+/-	++	++	n.e.
Viscosity Stabinger at 100°C	-	+/-	+	++	n.e.
Sulphur	-	-	--	--	n.e.
Water	++	++	++	++	++
Level of Contamination – counts/ml	--	-	--	n.e.	n.e.
Level of Contamination – scale no.	-	-	n.e.	n.e.	n.e.
Aluminium as Al	(++)	++	++	++	(++)
Barium as Ba	(+)	++	+	++	-
Boron as B	++	n.e.	n.e.	n.e.	n.e.
Cadmium as Cd	+	n.e.	n.e.	n.e.	n.e.
Chromium as Cr	+/-	+	+	++	--
Copper as Cu	+	+/-	+	+/-	+
Iron as Fe	+	+	++	++	-
Lead as Pb	(++)	++	++	++	(++)
Lithium as Li	+	(--)	-	-	++

Determination	November 2017	November 2016	November 2015	November 2014	November 2013
Magnesium as Mg	+	+	+/-	++	+
Manganese as Mn	--	+/-	+/-	++	(--)
Molybdenum as Mo	+/-	+	+/-	+	(--)
Nickel as Ni	++	++	++	++	(++)
Potassium as K	(+)	n.e.	n.e.	n.e.	n.e.
Silicon as Si	+	++	++	++	+
Silver as Ag	+	+/-	+	+	--
Sodium as Na	-	+/-	+/-	+	-
Tin as Sn	(++)	++	++	++	(+)
Titanium as Ti	(++)	++	++	++	(++)
Vanadium as V	+	+	++	++	--
Calcium as Ca	--	-	-	-	--
Phosphorus as P	-	+	+/-	+	--
Zinc as Zn	+/-	-	--	++	-

Table 8: comparison determinations against the reference test methods

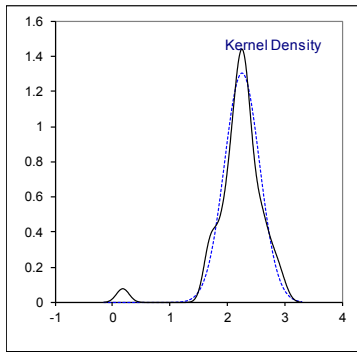
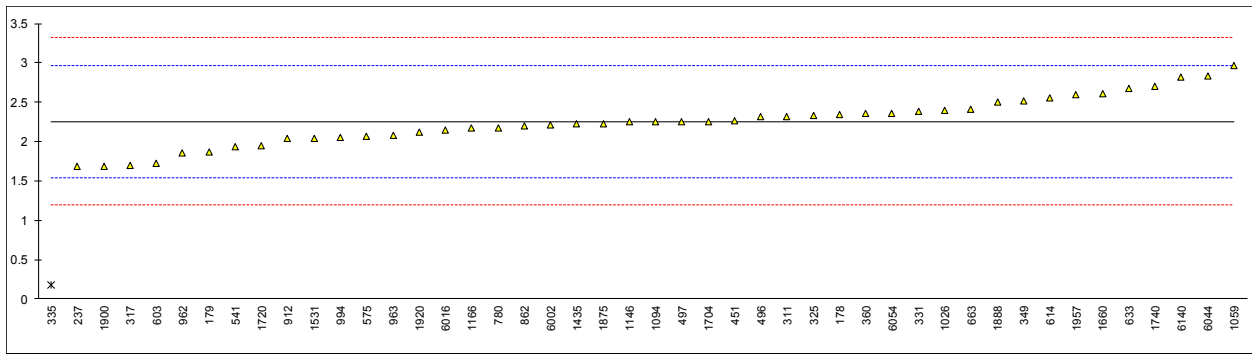
The figures between brackets should be used with care as these were lower or above the application range of reference method

- ++: 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

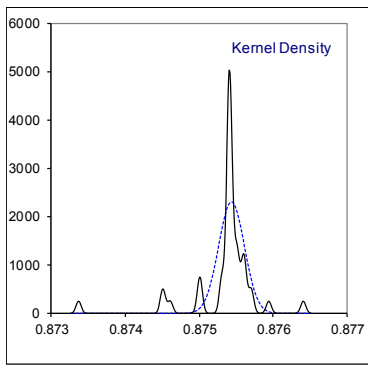
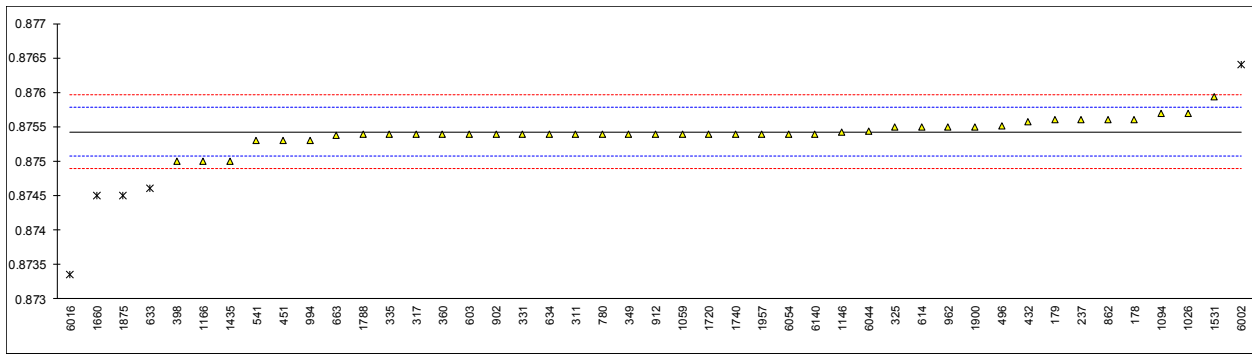
Determination of Acid Number (Total) on sample #17226; results in mg KOH/g.

lab	method	value	mark	z(targ)	remarks
178	INH-1118	2.34		0.24	
179	D664-B	1.87		-1.08	
237	D664-A	1.6787		-1.62	
255		----		----	
311	D664-A	2.32		0.19	
317	D974	1.7		-1.56	
325	D664-A	2.335		0.23	
331	D664Mod.	2.38		0.36	
335	ISO6618	0.18	R(0.01)	-5.86	
349	D664-A	2.52		0.75	
360	D664-A	2.353		0.28	
398		----		----	
432		----		----	
442		----		----	
451	in house	2.26		0.02	
496	D664-A	2.32		0.19	
497	D664-A	2.25		-0.01	
541	D974	1.93		-0.91	
562		----		----	
575	D664-A	2.07		-0.52	
603	D664-A	1.729		-1.48	
614	D664-A	2.56		0.87	
621		----		----	
633	D664-A	2.68		1.21	
634		----		----	
663	D664-A	2.414		0.45	
780	D664-A	2.17		-0.24	
862	D664-A	2.2		-0.15	
902		----		----	
912	D664-A	2.04		-0.60	
962	D974	1.85		-1.14	
963	D664-A	2.08		-0.49	
994	D664-A	2.05		-0.57	
1026	D664-A	2.4		0.41	
1059	ISO6619	2.96		2.00	
1094	D664-A	2.2485		-0.01	
1146	D664-A	2.247		-0.02	
1166	D664-A	2.1699		-0.24	
1435	D664-A	2.228		-0.07	
1531	D664-A	2.042		-0.60	
1660	IEC62021-1	2.604		0.99	
1704	D664-A	2.257		0.01	
1720	D664-A	1.95		-0.86	
1740	D664-A	2.70		1.26	
1788		----		----	
1875	ISO6618	2.23		-0.07	
1888	D664-A	2.501		0.70	
1900	D8045Mod.	1.679		-1.62	
1920	D664-A	2.126		-0.36	
1957	D664-A	2.591		0.95	
6002	D664-A	2.21		-0.12	
6016	D664-A	2.147		-0.30	
6044	D664-A	2.833		1.64	
6054	D974	2.3550		0.29	
6140	D664	2.8205		1.60	
	normality	OK			
	n	45			
	outliers	1			
	mean (n)	2.2533			
	st.dev. (n)	0.30521			
	R(calc.)	0.8546			
	st.dev.(D664-A:17)	0.35409			
	R(D664-A:17)	0.9915			



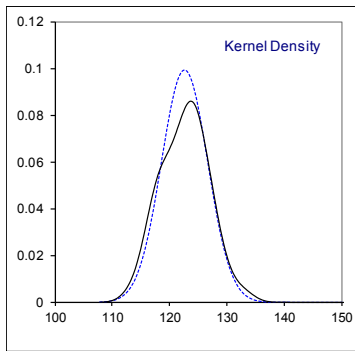
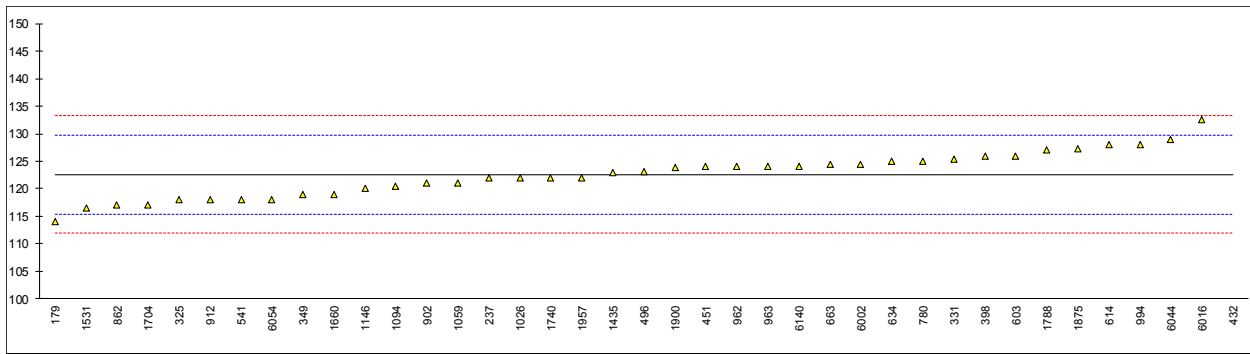
Determination of Density at 15°C on sample #17226; results in kg/L.

lab	method	value	mark	z(targ)	remarks
178	D4052	0.8756	C	0.96	reported: 0.8756 kg/m ³
179	D4052	0.8756	C	0.96	reported: 0.8756 kg/m ³
237	D4052	0.8756		0.96	
255		-----		-----	
311	D4052	0.8754		-0.16	
317	D4052	0.8754		-0.16	
325	D4052	0.875495	C	0.37	first reported: 0.875495 kg/m ³
331	ISO12185	0.8754		-0.16	
335	D1298	0.8754		-0.16	
349	D4052	0.8754		-0.16	
360	ISO12185	0.8754		-0.16	
398	D4052	0.8750		-2.40	
432	ISO12185	0.87557		0.79	
442		-----		-----	
451	in house	0.8753		-0.72	
496	ISO12185	0.87551		0.46	
497		-----		-----	
541	ISO12185	0.87530		-0.72	
562		-----		-----	
575		-----		-----	
603	D4052	0.87540		-0.16	
614	D4052	0.8755		0.40	
621		-----		-----	
633	D4052	0.87460	R(0.01)	-4.64	
634	D4052	0.8754		-0.16	
663	D4052	0.87538		-0.27	
780	ISO12185	0.8754		-0.16	
862	D4052	0.8756		0.96	
902	D4052	0.8754	C	-0.16	first reported: 0.87621
912	D4052	0.8754		-0.16	
962	D4052	0.8755		0.40	
963		-----		-----	
994	ISO12185	0.8753		-0.72	
1026	D4052	0.8757		1.52	
1059	ISO12185	0.8754		-0.16	
1094	D4052	0.87569		1.46	
1146	D4052	0.87543		0.01	
1166	INH-21411	0.875		-2.40	
1435	D4052	0.8750		-2.40	
1531	ISO12185	0.875933		2.82	
1660	D7042	0.8745	R(0.01)	-5.20	
1704		-----		-----	
1720	D4052	0.8754		-0.16	
1740	D4052	0.8754		-0.16	
1788	D4052	0.875395		-0.19	
1875	D7042	0.8745	R(0.01)	-5.20	
1888		-----		-----	
1900	D4052	0.8755	C	0.40	first reported: 0.8755 kg/m ³
1920		-----		-----	
1957	D4052	0.8754		-0.16	
6002	ISO3675	0.8764	C,R(0.01)	5.44	first reported: 0.8746
6016	D4052	0.87336	R(0.01)	-11.58	
6044	D4052	0.87544		0.06	
6054	D4052	0.87540		-0.16	
6140	D4052	0.8754	C	-0.16	reported: 0.8754 kg/m ³
	normality	not OK			
	n	40			
	outliers	5			
	mean (n)	0.87543			
	st.dev. (n)	0.000174			
	R(calc.)	0.00049			
	st.dev.(ISO12185:96)	0.000179			
	R(ISO12185:96)	0.0005			



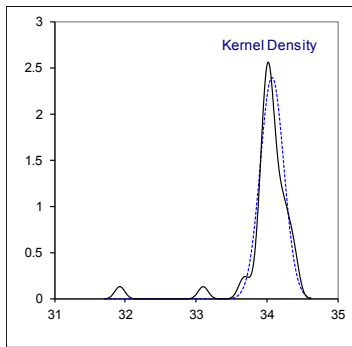
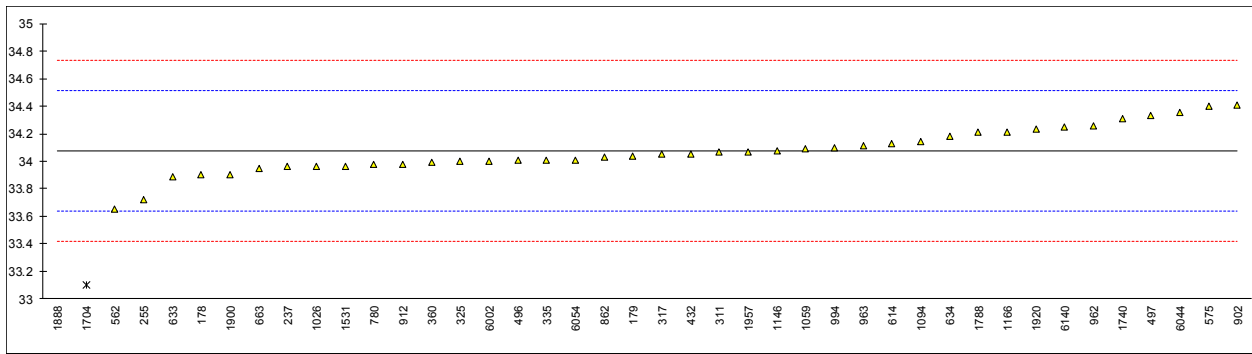
Determination of Flash Point PMcc on sample #17226; results in °C.

lab	method	value	mark	z(targ)	remarks
178		----		----	
179	D93-A	114.0		-2.41	
237	D93-B	122.0		-0.17	
255		----		----	
311		----		----	
317		----		----	
325	D93-A	118		-1.29	
331	D93-B	125.4		0.78	
335		----		----	
349	D93-A	119		-1.01	
360		----		----	
398	D93-A	126		0.95	
432	D93-A	197.5	R(0.01)	20.97	
442		----		----	
451	in house	124.0		0.39	
496	D93-A	123.2		0.17	
497		----		----	
541	D93-A	118.00		-1.29	
562		----		----	
575		----		----	
603	D3828	126.0		0.95	
614	D93-A	128		1.51	
621		----		----	
633		----		----	
634	D93-A	125.0		0.67	
663	D93-B	124.4		0.50	
780	D93-B	125.0		0.67	
862	D93-A	117.0		-1.57	
902	D93-A	121.0		-0.45	
912	D93-A	118		-1.29	
962	D93-A	124		0.39	
963	D93-A	124.0		0.39	
994	D93-B	128.0		1.51	
1026	D93-A	122.0		-0.17	
1059	ISO2719-A	121.0		-0.45	
1094	D93-A	120.5		-0.59	
1146	D93-A	120.1		-0.70	
1166		----		----	
1435	D93-A	123		0.11	
1531	D93-A	116.5		-1.71	
1660	D93-A	119		-1.01	
1704	D93-A	117		-1.57	
1720		----		----	
1740	D93-B	122		-0.17	
1788	D93-B	127.0		1.23	
1875	ISO2719-B	127.3		1.31	
1888		----		----	
1900	D7094	123.8		0.33	
1920		----		----	
1957	D93-A	122.0		-0.17	
6002	ISO2719-A	124.5		0.53	
6016	D93-B	132.5		2.77	
6044	D93-B	129		1.79	
6054	D93-A	118.0		-1.29	
6140	D93	124		0.39	
					<u>Only D93-method A</u>
	normality	OK			OK
	n	38			22
	outliers	1			1
	mean (n)	122.611			120.605
	st.dev. (n)	4.0254			3.5302
	R(calc.)	11.271			9.885
	st.dev.(D93-B:16a)	3.5714			---
	R(D93-B:16a)	10			---
	Compare R(D93-A:16a)	8.71			8.56
					<u>Only D93-method B</u>
					OK
					9
					0
					126.144
					3.3908
					9.494
					3.5714
					10



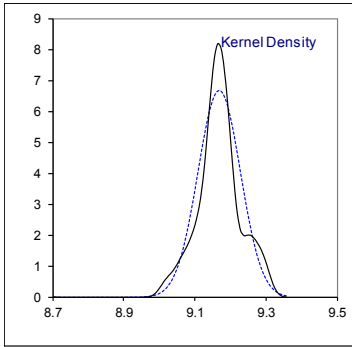
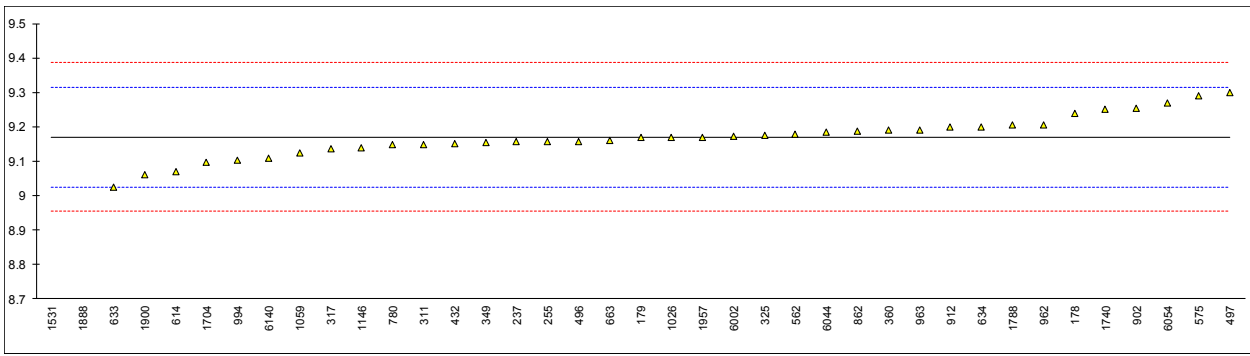
Determination of Kinematic Viscosity at 40°C on sample #17226; results in mm²/s.

lab	method	value	mark	z(targ)	remarks
178	D445	33.9		-0.80	
179	D445	34.04		-0.16	
237	D445	33.96		-0.52	
255	D7279	33.72		-1.62	corrected to D445
311	D445	34.07		-0.02	
317	D445	34.05		-0.11	
325	D445	34.00		-0.34	
331		----		----	
335	D445	34.01		-0.29	
349		----		----	
360	D445	33.992		-0.38	
398		----		----	
432	D445	34.05		-0.11	
442		----		----	
451		----		----	
496	D445	34.005		-0.32	corrected to D445
497	D7279	34.33		1.17	
541		----		----	
562	D7279	33.65		-1.94	
575	D445	34.40		1.49	
603		----		----	
614	D445	34.13		0.25	
621		----		----	
633	D7279	33.884		-0.87	corrected to D445
634	D445	34.18		0.48	
663	D445	33.948		-0.58	
780	D445	33.98		-0.43	
862	D445	34.03		-0.20	
902	D445	34.41		1.53	
912	D445	33.98		-0.43	
962	D445	34.26		0.85	
963	D445	34.11		0.16	
994	D445	34.10		0.12	
1026	D445	33.96	C	-0.52	first reported: 76.52
1059	ISO3104	34.09		0.07	
1094	D445	34.143		0.31	
1146	D445	34.075		0.00	
1166	ISO3104	34.215		0.64	
1435		----		----	
1531	D445	33.964		-0.50	
1660		----		----	
1704	D445	33.10	C,R(0.01)	-4.45	first reported: 33.35
1720		----		----	
1740	D445	34.31		1.08	
1788	D445	34.2092		0.62	
1875		----		----	
1888	D445	31.92	C,R(0.01)	-9.83	first reported: 36.19
1900	D445	33.9		-0.80	
1920	D445	34.236		0.74	
1957	D445	34.07		-0.02	
6002	ISO3104	34.00		-0.34	
6016		----		----	
6044	D445	34.352		1.27	
6054	D7279	34.01		-0.29	corrected to D445
6140	D445	34.25		0.80	
	normality	OK			
	n	40			
	outliers	2			
	mean (n)	34.0743			
	st.dev. (n)	0.16620			
	R(calc.)	0.4654			
	st.dev.(iis:15)	0.21905			
	R(iis:15)	0.6133			see appendix 3, ref 17
	Compare R(D445:17a)	0.2586			



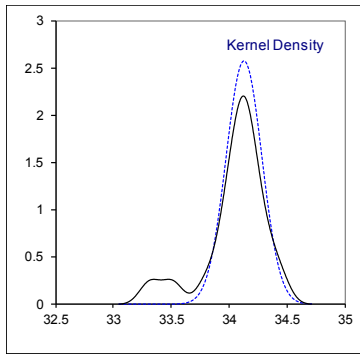
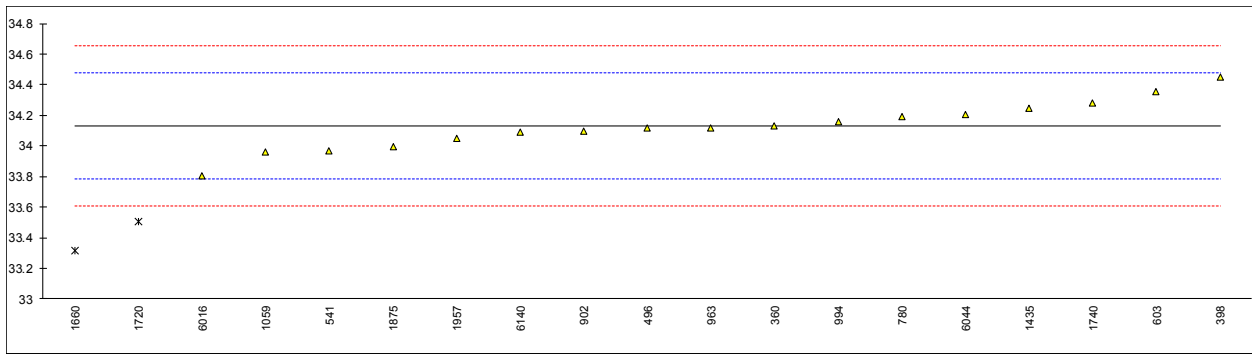
Determination of Kinematic Viscosity at 100°C on sample #17226; results in mm²/s.

lab	method	value	mark	z(targ)	remarks
178	D445	9.24		0.97	
179	D445	9.170		0.00	
237	D445	9.156		-0.20	
255	D7279	9.157		-0.18	corrected to D445
311	D445	9.149		-0.29	
317	D445	9.136		-0.47	
325	D445	9.175		0.07	
331		----		----	
335		----		----	
349	D445	9.153		-0.24	
360	D445	9.1891		0.26	
398		----		----	
432	D445	9.152		-0.25	
442		----		----	
451		----		----	
496	D445	9.1580		-0.17	
497	D7279	9.298		1.78	corrected to D445
541		----		----	
562	D7279	9.178		0.11	
575	D445	9.290		1.66	
603		----		----	
614	D445	9.07		-1.39	
621		----		----	
633	D7279	9.0236		-2.03	corrected to D445
634	D445	9.19925		0.40	
663	D445	9.1614		-0.12	
780	D445	9.149		-0.29	
862	D445	9.189		0.26	
902	D445	9.254		1.16	
912	D445	9.199		0.40	
962	D445	9.205		0.48	
963	D445	9.190		0.28	
994	D445	9.102		-0.94	
1026	D445	9.17	C	0.00	first reported: 11.39
1059	ISO3104	9.123		-0.65	
1094		----	W	----	first reported: 9.433
1146	D445	9.1382		-0.44	
1166		----		----	
1435		----		----	
1531	D445	7.075	R(0.01)	-29.08	
1660		----		----	
1704	D445	9.0960		-1.03	
1720		----		----	
1740	D445	9.251		1.12	
1788	D445	9.2043		0.47	
1875		----		----	
1888	D445	8.65	C,R(0.01)	-7.22	first reported: 8.65
1900	D445	9.06		-1.53	
1920		----		----	
1957	D445	9.17		0.00	
6002	ISO3104	9.1724		0.03	
6016		----		----	
6044	D445	9.185		0.21	
6054	D7279	9.270		1.39	corrected to D445
6140	D445	9.11		-0.83	
	normality	OK			
	n	37			
	outliers	2			
	mean (n)	9.1701			
	st.dev. (n)	0.05975			
	R(calc.)	0.1673			
	st.dev.(iis:15)	0.07205			
	R(iis:15)	0.2017			see appendix 3, ref 17
	Compare R(D445:17a)	0.0860			



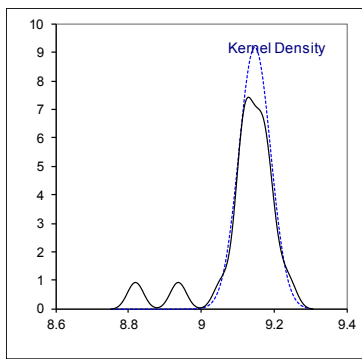
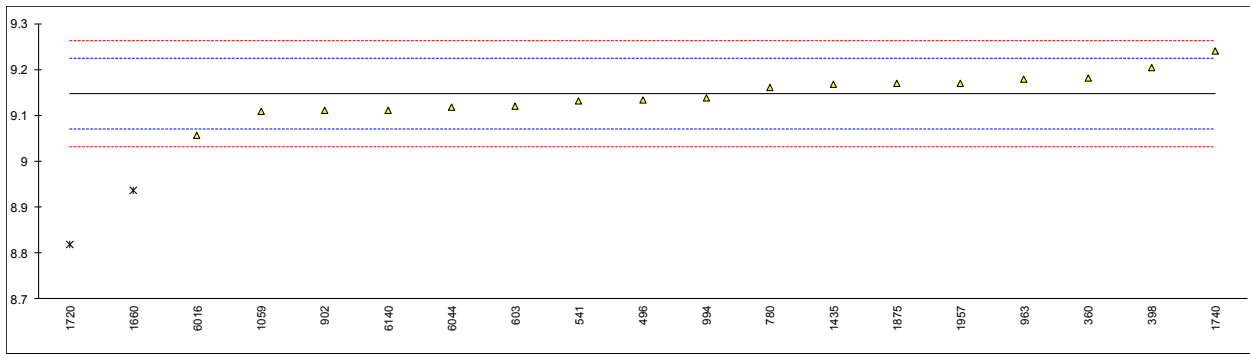
Determination of Viscosity Stabinger at 40°C on sample #17226; results in mm²/s.

lab	method	value	mark	z(targ)	remarks
178		----		----	
179		----		----	
237		----		----	
255		----		----	
311		----		----	
317		----		----	
325		----		----	
331		----		----	
335		----		----	
349		----		----	
360	D7042	34.130		0.00	
398	D7042	34.447		1.82	
432		----		----	
442		----		----	
451		----		----	
496	D7042	34.117		-0.08	
497		----		----	
541	D7042	33.966		-0.95	
562		----		----	
575		----		----	
603	D7042	34.355		1.29	
614		----		----	
621		----		----	
633		----		----	
634		----		----	
663		----		----	
780	D7042	34.19		0.34	
862		----		----	
902	D7042	34.10		-0.17	
912		----		----	
962		----		----	
963	D7042	34.12		-0.06	
994	D7042	34.155		0.14	
1026		----		----	
1059	D7042	33.96		-0.98	
1094		----		----	
1146		----		----	
1166		----		----	
1435	D7042	34.245		0.66	
1531		----		----	
1660	D7042	33.314	G(0.05)	-4.70	
1704		----		----	
1720	D7042	33.509	C,G(0.05)	-3.58	first reported: 35.1
1740	D7042	34.28		0.86	
1788		----		----	
1875	D7042	33.997		-0.77	
1888		----		----	
1900		----		----	
1920		----		----	
1957	D7042	34.05		-0.46	
6002		----		----	
6016	D7042	33.806		-1.87	
6044	D7042	34.206		0.44	
6054		----		----	
6140	D7042	34.09		-0.23	
	normality	OK			
	n	17			
	outliers	2			
	mean (n)	34.1302			
	st.dev. (n)	0.15501			
	R(calc.)	0.4340			
	st.dev.(D7042:16e3)	0.17365			
	R(D7042:16e3)	0.4862			



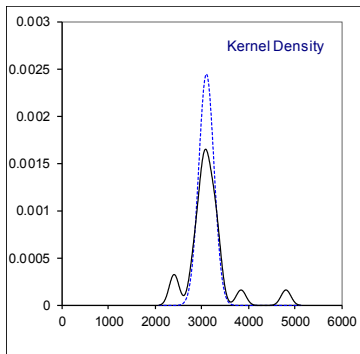
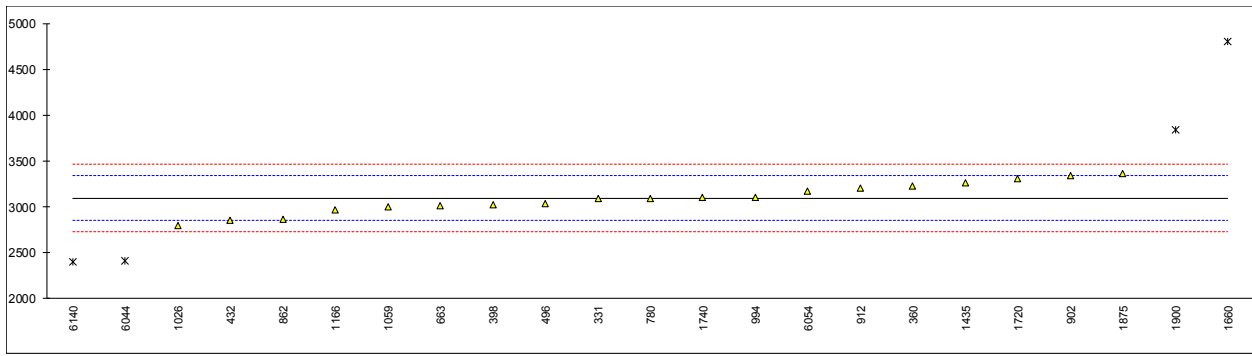
Determination of Viscosity Stabinger at 100°C on sample #17226; results in mm²/s.

lab	method	value	mark	z(targ)	remarks
178		----		----	
179		----		----	
237		----		----	
255		----		----	
311		----		----	
317		----		----	
325		----		----	
331		----		----	
335		----		----	
349		----		----	
360	D7042	9.1820		0.91	
398	D7042	9.2032		1.46	
432		----		----	
442		----		----	
451		----		----	
496	D7042	9.1339		-0.34	
497		----		----	
541	D7042	9.1308		-0.42	
562		----		----	
575		----		----	
603	D7042	9.1207		-0.69	
614		----		----	
621		----		----	
633		----		----	
634		----		----	
663		----		----	
780	D7042	9.161		0.36	
862		----		----	
902	D7042	9.110		-0.97	
912		----		----	
962		----		----	
963	D7042	9.180		0.86	
994	D7042	9.139		-0.21	
1026		----		----	
1059	D7042	9.109		-0.99	
1094		----		----	
1146		----		----	
1166		----		----	
1435	D7042	9.1671		0.52	
1531		----		----	
1660	D7042	8.9370	G(0.01)	-5.48	
1704		----		----	
1720	D7042	8.8194	C,G(0.01)	-8.55	first reported: 9.414
1740	D7042	9.240		2.42	
1788		----		----	
1875	D7042	9.1689		0.57	
1888		----		----	
1900		----		----	
1920		----		----	
1957	D7042	9.17		0.60	
6002		----		----	
6016	D7042	9.056		-2.37	
6044	D7042	9.118		-0.76	
6054		----		----	
6140	D7042	9.11		-0.97	
	normality	OK			
	n	17			
	outliers	2			
	mean (n)	9.1470			
	st.dev. (n)	0.04346			
	R(calc.)	0.1217			
	st.dev.(D7042:16e3)	0.03834			
	R(D7042:16e3)	0.1074			



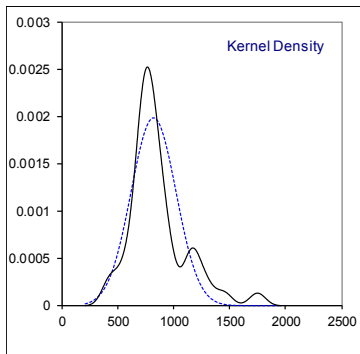
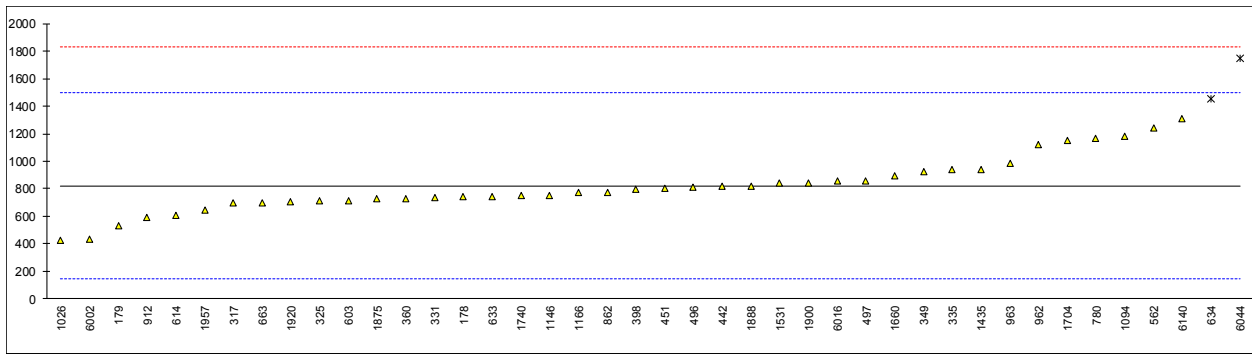
Determination of Sulphur on sample #17226; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178		----		----	
179		----		----	
237		----		----	
255		----		----	
311		----		----	
317		----		----	
325		----		----	
331	ISO8754	3087		-0.07	
335		----		----	
349		----		----	
360	D4294	3230		1.10	
398	D4294	3020		-0.62	
432	D5185	2854		-1.98	
442		----		----	
451		----		----	
496	D2622	3038		-0.47	
497		----		----	
541		----		----	
562		----		----	
575		----		----	
603		----		----	
614		----		----	
621		----		----	
633		----		----	
634		----		----	
663	D5453	3010		-0.70	
780	D4294	3090		-0.05	
862	D2622	2870		-1.85	
902	D4294	3340		2.00	
912	D4294	3210		0.94	
962		----		----	
963		----		----	
994	D4294	3105		0.08	
1026	D2622	2800		-2.43	
1059	ISO14596Mod.	3000		-0.79	
1094		----		----	
1146		----		----	
1166	In house	2968.87		-1.04	
1435	D5185	3265		1.39	
1531		----		----	
1660	D4294	4800	R(0.01)	13.98	
1704		----		----	
1720	D4294	3303		1.70	
1740	D4294	3100		0.03	
1788		----		----	
1875	DIN51724	3360		2.17	
1888		----		----	
1900	D5185	3837.8	R(0.01)	6.09	
1920		----		----	
1957		----		----	
6002		----		----	
6016		----		----	
6044	D4294	2409	R(0.01)	-5.64	
6054	D4294	3170		0.61	
6140	D4294	2400	R(0.01)	-5.71	
	normality	OK			
	n	19			
	outliers	4			
	mean (n)	3095.8			
	st.dev. (n)	162.69			
	R(calc.)	455.5			
	st.dev.(D4294:16e1)	121.87			
	R(D4294:16e1)	341.2			



Determination of Water by KF on sample #17226; results in mg/kg.

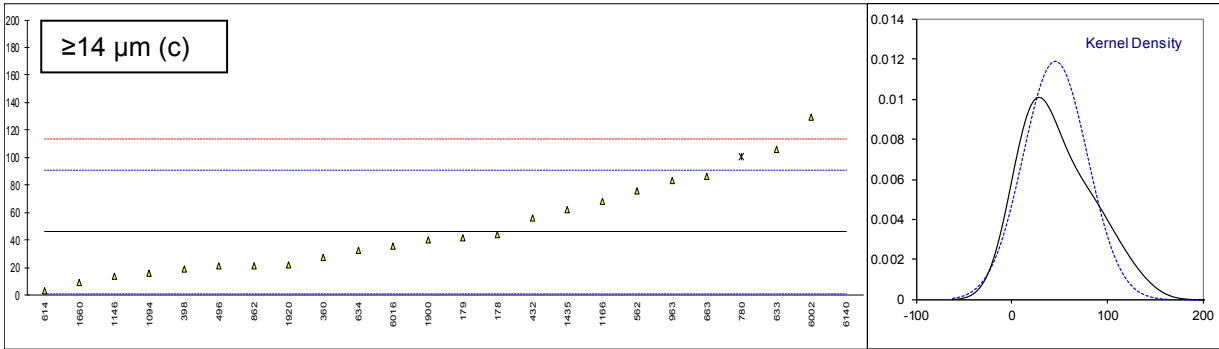
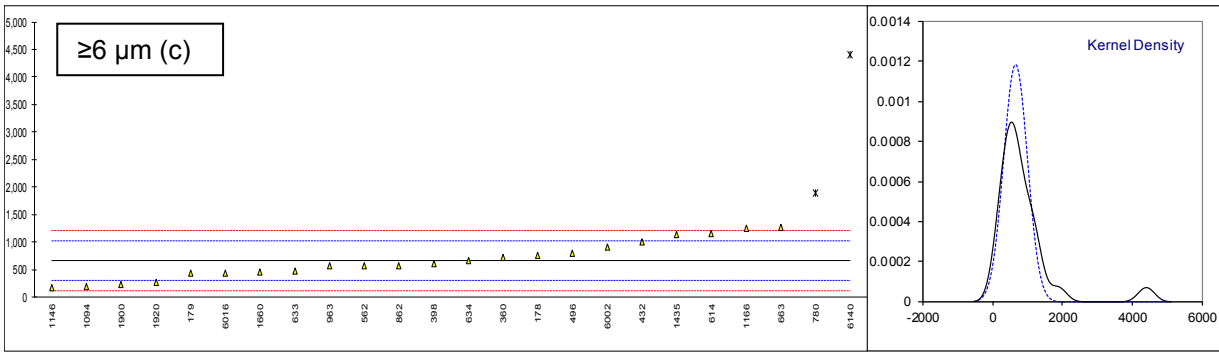
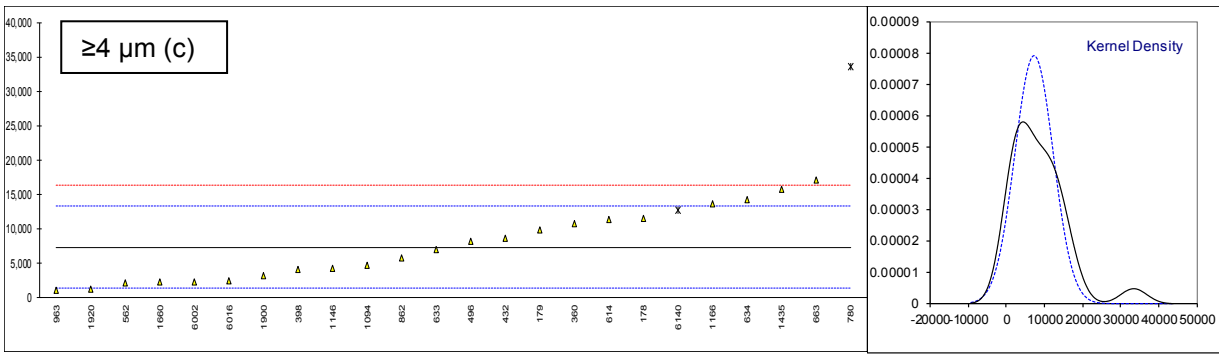
lab	method	value	mark	z(targ)	remarks
178	D6304-C	744		-0.22	
179	D6304-C	535		-0.84	
237		----		----	
255		----		----	
311		----		----	
317	D6304-A	700		-0.35	
325	D6304-C	711		-0.32	
331	In house	734.3		-0.25	
335	D6304-A	936		0.34	
349	D6304-A	927		0.32	
360	ISO12937	730.0		-0.27	
398	D6304-C	795		-0.07	
432		----		----	
442	IP438	820		0.00	
451	in house	803		-0.05	
496	D6304-C	814.5		-0.02	
497	D6304-C	859		0.12	
541		----		----	
562	E203	1240		1.24	
575		----		----	
603	D6304-C	712.9		-0.32	
614	D6304-A	611		-0.62	
621		----		----	
633	D6304-C	746		-0.22	
634	D6304-A	1450.7	C,R(0.05)	1.87	first reported: 2100.5
663	D6304-C	700		-0.35	
780	D6304-A	1163		1.02	
862	D6304-C	774		-0.14	
902		----		----	
912	D6304-C	590		-0.68	
962	D6304-A	1124		0.90	
963	D6304-A	986		0.49	
994		----		----	
1026	D6304-C	423		-1.17	
1059		----		----	
1094	D6304-A	1180		1.07	
1146	D6304-C	752		-0.20	
1166	In house	771		-0.14	
1435	D6304-A	937		0.35	
1531	D6304-A	839.2		0.06	
1660	IEC60814	892		0.21	
1704	D6304-A	1150		0.98	
1720		----		----	
1740	D6304-C	751		-0.20	
1788		----		----	
1875	ISO12937	725.4		-0.28	
1888	EN60814	822.5		0.01	
1900	D6304-C	844		0.07	
1920	D6304-C	708		-0.33	
1957	D6304-A	644.3		-0.52	
6002	D6304-C	437.62		-1.13	
6016	D6304-A	855		0.10	
6044	D6304-B	1747.3	R(0.01)	2.74	
6054		----		----	
6140	D6304	1308		1.44	
	normality	OK			
	n	40			
	outliers	2			
	mean (n)	819.893			
	st.dev. (n)	200.3732			
	R(calc.)	561.045			
	st.dev.(D6304:16e1)	337.8853			
	R(D6304:16e1)	946.079			



Determination of Level of Contamination on sample #17226; results in counts per ml.

lab	method	≥ 4 μm (c)	mark	z(targ)	≥ 6 μm (c)	mark	z(targ)	≥ 14 μm (c)	mark	z(targ)
178	D7647	11491		1.38	752		0.47	44		-0.09
179	D7647	9892		0.85	433		-1.27	42		-0.18
237		----		----	----		----	----		----
255		----		----	----		----	----		----
311		----		----	----		----	----		----
317		----		----	----		----	----		----
325		----		----	----		----	----		----
331		----		----	----		----	----		----
335		----		----	----		----	----		----
349		----		----	----		----	----		----
360	ISO4406	10772.3		1.14	716.4		0.28	27.7		-0.82
398		4097		-1.09	609		-0.31	19		-1.21
432	ISO11500	8624		0.42	1005		1.86	56		0.44
442		----		----	----		----	----		----
451		----		----	----		----	----		----
496	D7647	8249		0.30	792		0.69	21		-1.12
497		----		----	----		----	----		----
541		----		----	----		----	----		----
562	D7596	2123		-1.74	569		-0.53	76		1.33
575		----		----	----		----	----		----
603		----		----	----		----	----		----
614	ISO4406	11431		1.36	1159		2.70	3		-1.92
621		----		----	----		----	----		----
633	D7647	6951.8		-0.13	471.3		-1.06	106.2		2.68
634	ISO11500	14220		2.29	661		-0.02	33		-0.58
663	D7647	17141		3.26	1273		3.33	86		1.78
780	ISO11500	33519	R(0.01)	8.72	1885	R(0.05)	6.68	101	ex	2.45
862	ISO11500	5759		-0.53	574		-0.50	21		-1.12
902		----		----	----		----	----		----
912		----		----	----		----	----		----
962		----		----	----		----	----		----
963	D7647	1144		-2.07	561		-0.57	83		1.65
994		----		----	----		----	----		----
1026		----		----	----		----	----		----
1059		----		----	----		----	----		----
1094	D7647	4741.33		-0.87	189.33		-2.61	15.84		-1.35
1146	ISO11500	4284		-1.02	174		-2.69	14		-1.43
1166	ISO4406	13606.30		2.08	1248.70		3.20	68.23		0.99
1435	ISO4407	15753.83		2.80	1131.63		2.55	61.93		0.71
1531		----		----	----		----	----		----
1660	ISO4407	2280		-1.69	448		-1.19	9		-1.65
1704		----		----	----		----	----		----
1720		----		----	----		----	----		----
1740		----		----	----		----	----		----
1788		----		----	----		----	----		----
1875		----		----	----		----	----		----
1888		----		----	----		----	----		----
1900	D7596	3141		-1.40	237		-2.35	40		-0.27
1920	D7596	1271.605		-2.03	277.125		-2.13	21.76		-1.08
1957		----	W	----	----	W	----	----	W	----
6002	D7596	2346.6		-1.67	915.3		1.37	129.3		3.71
6016		2452.5		-1.63	440.9		-1.23	35.4		-0.47
6044		----		----	----		----	----		----
6054		----		----	----		----	----		----
6140	D7647	12789.00	ex	1.81	4397.40	R(0.01)	20.44	857.80	R(0.01)	36.16
	normality	OK			OK			OK		
	n	22			22			22		
	outliers	1+1ex			2			1+1ex		
	mean (n)	7353.285			665.349			46.062		
	st.dev. (n)	5032.9102			337.9088			33.5731		
	R(calc.)	14092.148			946.145			94.005		
	st.dev.(D7647:10)	2999.7154			182.5507			22.4489		
	R(D7646:10)	8399.203			511.142			62.857		

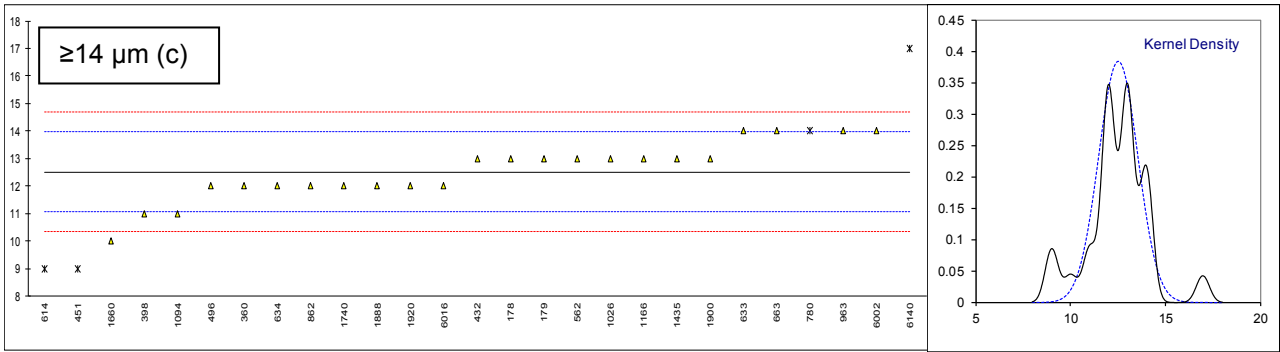
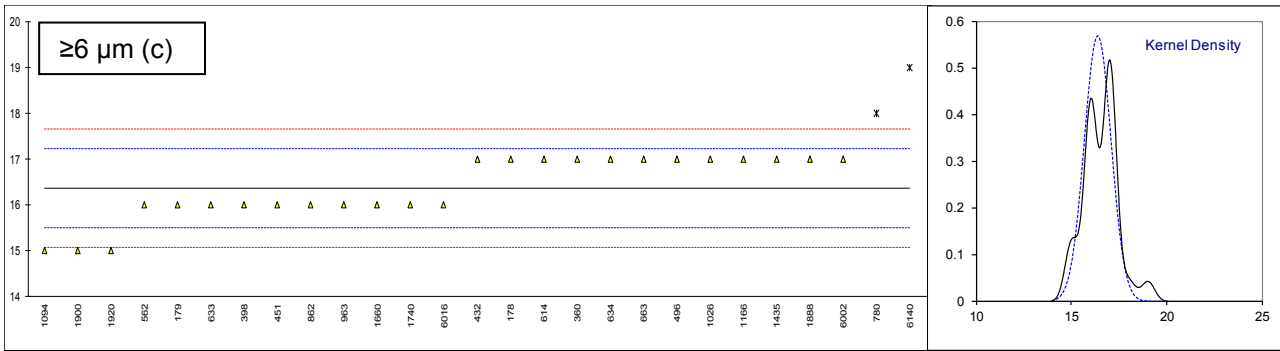
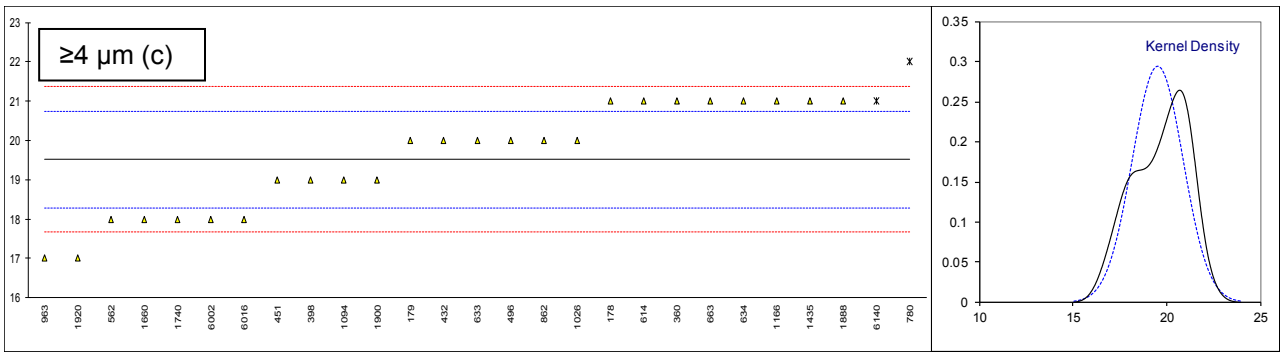
Lab 1957 reported: 426.6; 170.6; 90.2 respectively, but withdraw the test results



Determination of Level of Contamination acc. to ISO4406 scale on sample #17226;
 results in scale number

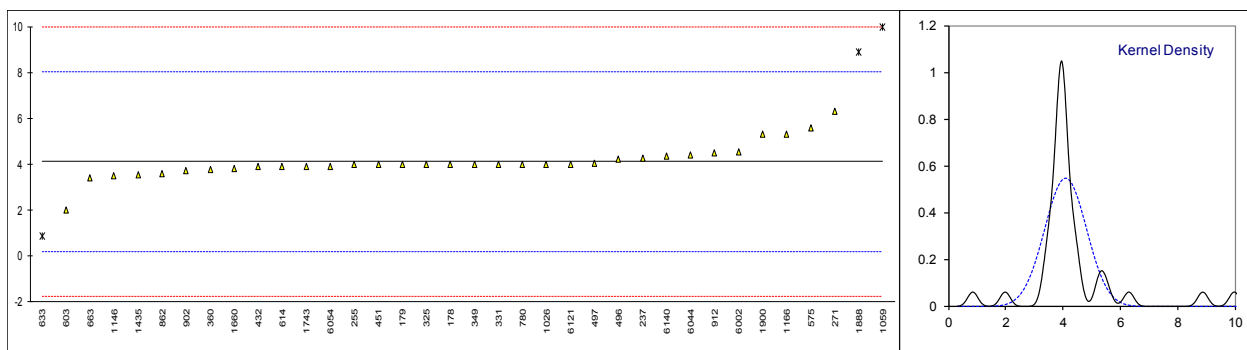
lab	method	≥ 4 μm (c)	mark	z(targ)	≥ 6 μm (c)	mark	z(targ)	≥ 14 μm (c)	mark	z(targ)
178	ISO4406	21		2.41	17		1.48	13		0.66
179	ISO4406	20		0.78	16		-0.83	13		0.66
237		----		----	----		----	----		----
255		----		----	----		----	----		----
311		----		----	----		----	----		----
317		----		----	----		----	----		----
325		----		----	----		----	----		----
331		----		----	----		----	----		----
335		----		----	----		----	----		----
349		----		----	----		----	----		----
360	ISO4406	21		2.41	17		1.48	12		-0.72
398	ISO4406	19		-0.85	16		-0.83	11		-2.11
432	ISO4406	20		0.78	17		1.48	13		0.66
442		----		----	----		----	----		----
451	ISO4406	19		-0.85	16		-0.83	9	DG(0.05)	-4.88
496	ISO4406	20		0.78	17		1.48	12		-0.72
497		----		----	----		----	----		----
541		----		----	----		----	----		----
562		18		-2.48	16		-0.83	13		0.66
575		----		----	----		----	----		----
603		----		----	----		----	----		----
614	ISO4406	21	C	2.41	17	C	1.48	9	C,DG(0.05)	-4.88
621		----		----	----		----	----		----
633	ISO4406	20		0.78	16		-0.83	14		2.05
634	ISO4406	21		2.41	17		1.48	12		-0.72
663	ISO4406	21		2.41	17		1.48	14		2.05
780	ISO4406	22	ex	4.04	18	ex	3.79	14	ex	2.05
862	ISO11500	20		0.78	16		-0.83	12		-0.72
902		----		----	----		----	----		----
912		----		----	----		----	----		----
962		----		----	----		----	----		----
963	ISO4406	17		-4.11	16		-0.83	14		2.05
994		----		----	----		----	----		----
1026	ISO4406	20		0.78	17		1.48	13		0.66
1059		----		----	----		----	----		----
1094	ISO4406	19		-0.85	15		-3.14	11		-2.11
1146		----		----	----		----	----		----
1166	ISO4406	21		2.41	17		1.48	13		0.66
1435	ISO4406	21		2.41	17		1.48	13		0.66
1531		----		----	----		----	----		----
1660	ISO4406	18		-2.48	16		-0.83	10		-3.49
1704		----		----	----		----	----		----
1720		----		----	----		----	----		----
1740	ISO4406	18		-2.48	16		-0.83	12		-0.72
1788		----		----	----		----	----		----
1875		----		----	----		----	----		----
1888	ISO4406	21		2.41	17		1.48	12		-0.72
1900		19		-0.85	15		-3.14	13		0.66
1920	ISO4406	17		-4.11	15		-3.14	12		-0.72
1957		----		----	----		----	----		----
6002	ISO4406	18		-2.48	17		1.48	14		2.05
6016	ISO4406	18		-2.48	16		-0.83	12		-0.72
6044		----		----	----		----	----		----
6054		----		----	----		----	----		----
6140	ISO4406	21	ex	2.41	19	D(0.05)	6.09	17	ex	6.20
	normality	OK			OK			OK		
	n	25			25			23		
	outliers	0+2ex			1+1ex			2+2ex		
	mean (n)	19.52			16.36			12.52		
	st.dev. (n)	1.358			0.700			1.039		
	R(calc.)	3.80			1.96			2.91		
	st.dev.(D7647:10)	0.614			0.433			0.722		
	R(D7647:10)	1.72			1.21			2.02		

Lab 614 first reported the test results of counts/ml in the scale number columns



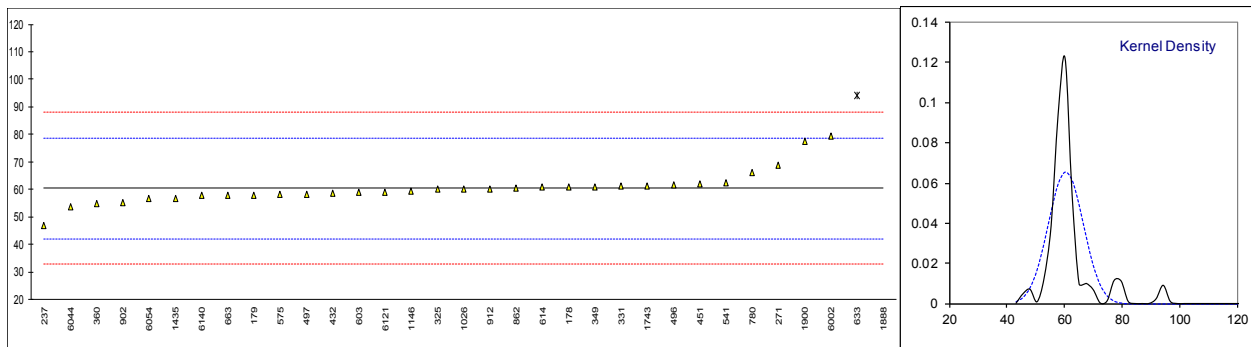
Determination of Aluminum (Al) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178	D5185	4		-0.06	
179	D5185	4		-0.06	
237	D5185	4.243		0.07	
255	INH-OL1	3.98		-0.07	
271	D5185	6.319		1.13	
311		----		----	
325	D5185	4		-0.06	
331	D5185Mod.	4.0		-0.06	
349	D5185	4		-0.06	
360	D5185	3.77		-0.17	
398		----		----	
432	D5185	3.9		-0.11	
451	INH-116	4		-0.06	
496	D5185	4.23		0.06	
497	D5185	4.06		-0.03	
541	D5185	<6		----	
575	D6595	5.56		0.74	
603	D5185	2		-1.08	
614	D5185	3.9		-0.11	
633	D6595	0.87	R(0.01)	-1.65	
663	D5185	3.41		-0.36	
780	D5185	4		-0.06	
862	D5185	3.6		-0.26	
902	D5185	3.700		-0.21	
912	D5185	4.5		0.20	
963		----		----	
994		----		----	
1026	D5185	4		-0.06	
1059	In house	10	R(0.01)	3.00	
1128		----		----	
1146	In house	3.489		-0.32	
1166	In house	5.32		0.62	
1320		----		----	
1372		----		----	
1435	D5185	3.532		-0.30	
1660	D5185	3.8		-0.16	
1743	D5185	3.9		-0.11	
1888	D5185	8.9	R(0.01)	2.44	
1900	D5185	5.312		0.61	
1957		----	W	----	first reported: 0.812
6002	D6595	4.52		0.21	
6016		----		----	
6044	D5185	4.38		0.14	
6054	IP501	3.91480		-0.10	
6075		----		----	
6121	In house	4		-0.06	
6140	D5185	4.36		0.13	
	normality	not OK			
	n	33			
	outliers	3			
	mean (n)	4.112			
	st.dev. (n)	0.7284			
	R(calc.)	2.040			
	st.dev.(D5185:13e1)	1.9601			
	R(D5185:13e1)	5.488			



Determination of Barium (Ba) on sample #17227; results in mg/kg.

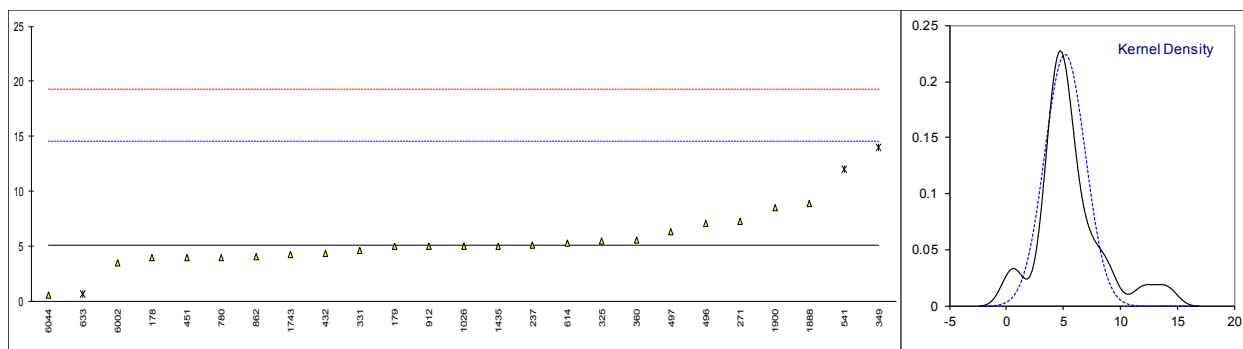
lab	method	value	mark	z(targ)	remarks
178	D5185	61		0.06	
179	D5185	58		-0.27	
237	D5185	47.03		-1.46	
255		----		----	
271	D5185	68.905		0.92	
311		----		----	
325	D5185	60		-0.05	
331	D5185Mod.	61.1		0.07	
349	D5185	61		0.06	
360	D5185	54.81		-0.61	
398		----		----	
432	D5185	58.7		-0.19	
451	INH-116	62		0.17	
496	D5185	61.5		0.12	
497	D5185	58.189		-0.25	
541	D5185	62.42		0.22	
575	D6595	58.10		-0.25	
603	D5185	59		-0.16	
614	D5185	60.99		0.06	
633	D6595	94.0	ex	3.66	see § 4.1
663	D5185	57.69		-0.30	
780	D5185	66		0.61	
862	D5185	60.4		0.00	
902	D5185	55.39		-0.55	
912	D5185	60.10		-0.04	
963		----		----	
994		----		----	
1026	D5185	60		-0.05	
1059		----		----	
1128		----		----	
1146	In house	59.55		-0.10	
1166		----		----	
1320		----		----	
1372		----		----	
1435	D5185	56.80		-0.40	
1660		----		----	
1743	D5185	61.1		0.07	
1888	D5185	660.3	C,R(0.01)	65.40	first reported: 733.1
1900	D5185	77.380		1.85	
1957		----	W	----	first reported: 49.86
6002	D6595	79.38		2.07	
6016		----		----	
6044	D5185	53.61		-0.74	
6054	IP501	56.7645		-0.40	
6075		----		----	
6121	In house	59		-0.16	
6140	D5185	57.67		-0.30	
	normality	not OK			
	n	31			
	outliers	1+1ex			
	mean (n)	60.438			
	st.dev. (n)	6.0778			
	R(calc.)	17.018			
	st.dev.(D5185:13e1)	9.1727			
	R(D5185:13e1)	25.684			



Determination of Boron (B) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178	D5185	4		-0.24	
179	D5185	5		-0.03	
237	D5185	5.153		0.00	
255		----		----	
271	D5185	7.284		0.45	
311		----		----	
325	D5185	5.5		0.07	
331	D5185Mod.	4.6		-0.12	
349	D5185	14	R(0.05)	1.87	
360	D5185	5.60		0.10	
398		----		----	
432	D5185	4.4		-0.16	
451	INH-116	4		-0.24	
496	D5185	7.12		0.42	
497	D5185	6.39		0.26	
541	D5185	12.0	R(0.05)	1.45	
575		----		----	
603		----		----	
614	D5185	5.3		0.03	
633	D6595	0.67	ex	-0.95	see § 4.1
663		----		----	
780	D5185	4		-0.24	
862	D5185	4.1		-0.22	
902		----		----	
912	D5185	5.0		-0.03	
963		----		----	
994		----		----	
1026	D5185	5		-0.03	
1059		----		----	
1128		----		----	
1146		----		----	
1166		----		----	
1320		----		----	
1372		----		----	
1435	D5185	5.026		-0.03	
1660		----		----	
1743	D5185	4.3		-0.18	
1888	D5185	8.9		0.79	
1900	D5185	8.562		0.72	
1957		----	W	----	first reported: 13.02
6002	D6595	3.55		-0.34	
6016		----		----	
6044	D5185	0.55	C	-0.97	first reported: 55.22
6054		----		----	
6075		----		----	
6121		----		----	
6140		----		----	

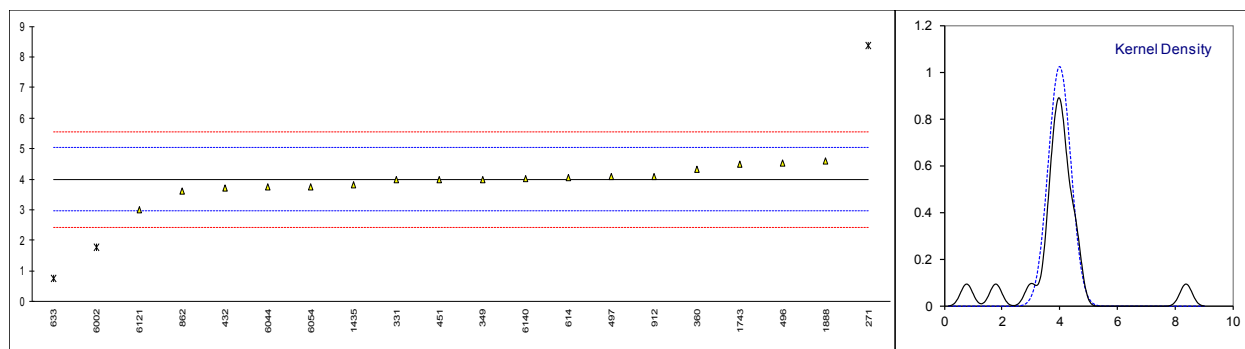
normality suspect
n 22
outliers 2+1ex
mean (n) 5.152
st.dev. (n) 1.7793
R(calc.) 4.982
st.dev.(D5185:13e1) 4.7196
R(D5185:13e1) 13.215



Determination of Cadmium (Cd) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178		----		----	
179		----		----	
237		----		----	
255		----		----	
271	D5185	8.375	G(0.01)	8.45	
311		----		----	
325		----		----	
331	D5185Mod.	4.0		0.02	
349	D5185	4		0.02	
360	D5185	4.34		0.67	
398		----		----	
432	D5185	3.7		-0.56	
451	INH-116	4		0.02	
496	D5185	4.52		1.02	
497	D5185	4.09		0.19	
541		----		----	
575		----		----	
603		----		----	
614	D5185	4.06		0.13	
633	D6595	0.77	G(0.01)	-6.21	
663		----		----	
780		----		----	
862	D5185	3.6		-0.76	
902		----		----	
912	D5185	4.1		0.21	
963		----		----	
994		----		----	
1026		----		----	
1059		----		----	
1128		----		----	
1146		----		----	
1166		----		----	
1320		----		----	
1372		----		----	
1435	D5185	3.829		-0.31	
1660		----		----	
1743	D5185	4.5		0.98	
1888	D5185	4.6		1.17	
1900		----		----	
1957		----		----	
6002	D6595	1.78	G(0.01)	-4.27	
6016		----		----	
6044	D5185	3.74		-0.49	
6054	IP501	3.75319		-0.46	
6075		----		----	
6121	In house	3		-1.91	
6140	D5185	4.03		0.07	

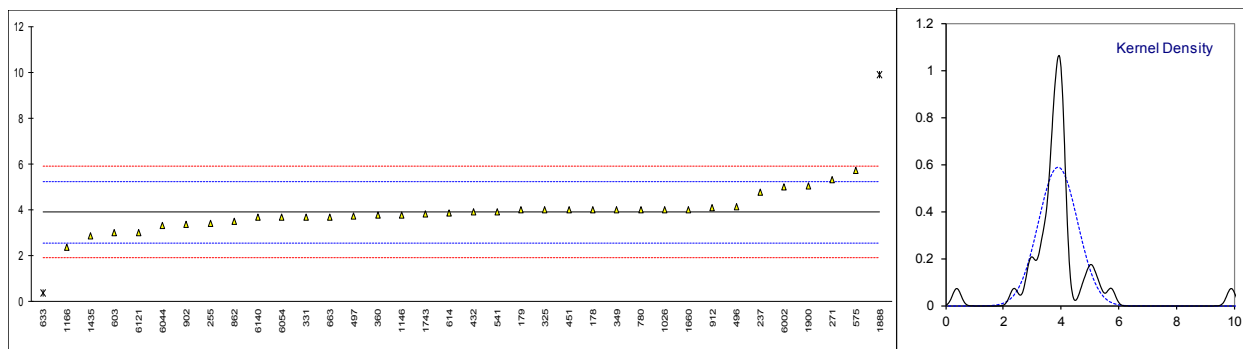
normality suspect
n 17
outliers 3
mean (n) 3.992
st.dev. (n) 0.3893
R(calc.) 1.090
st.dev.(Horwitz) 0.5186
R(Horwitz) 1.452



Determination of Chromium (Cr) on sample #17227; results in mg/kg.

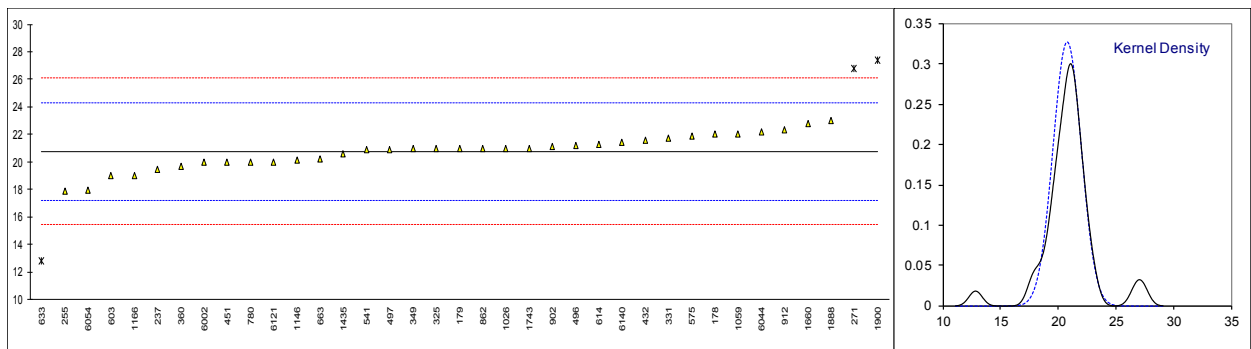
lab	method	value	mark	z(targ)	remarks
178	D5185	4		0.16	
179	D5185	4		0.16	
237	D5185	4.766		1.32	
255	INH-OL1	3.40		-0.75	
271	D5185	5.301		2.12	
311		----		----	
325	D5185	4		0.16	
331	D5185Mod.	3.7		-0.29	
349	D5185	4		0.16	
360	D5185	3.76		-0.20	
398		----		----	
432	D5185	3.9		0.01	
451	INH-116	4		0.16	
496	D5185	4.13		0.36	
497	D5185	3.71		-0.28	
541	D5185	3.92		0.04	
575	D6595	5.73		2.77	
603	D5185	3		-1.35	
614	D5185	3.88		-0.02	
633	D6595	0.38	R(0.01)	-5.30	
663	D5185	3.70		-0.29	
780	D5185	4		0.16	
862	D5185	3.5		-0.59	
902	D5185	3.357		-0.81	
912	D5185	4.1		0.31	
963		----		----	
994		----		----	
1026	D5185	4		0.16	
1059	In house	<4		----	
1128		----		----	
1146	In house	3.788		-0.16	
1166	In house	2.37		-2.30	
1320		----		----	
1372		----		----	
1435	D5185	2.847		-1.58	
1660	D5185	4.0		0.16	
1743	D5185	3.8		-0.14	
1888	D5185	9.9	C,R(0.01)	9.06	first reported: 7.5
1900	D5185	5.059		1.76	
1957		----	W	----	first reported: -0.5
6002	D6595	5.01		1.68	
6016		----		----	
6044	D5185	3.305		-0.89	
6054	IP501	3.69903		-0.29	
6075		----		----	
6121	In house	3		-1.35	
6140	D5185	3.67		-0.34	

normality suspect
n 34
outliers 2
mean (n) 3.894
st.dev. (n) 0.6784
R(calc.) 1.900
st.dev.(D5185:13e1) 0.6629
R(D5185:13e1) 1.856



Determination of Copper (Cu) on sample #17227; results in mg/kg.

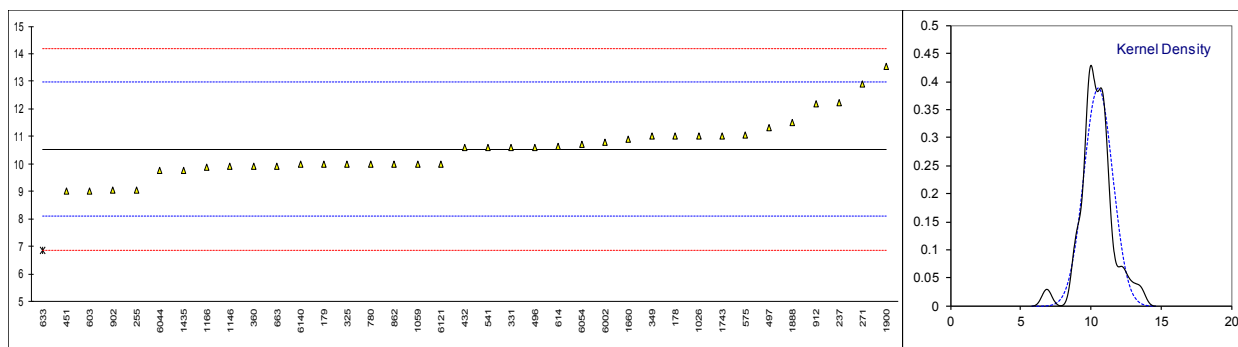
lab	method	value	mark	z(targ)	remarks
178	D5185	22		0.69	
179	D5185	21		0.13	
237	D5185	19.49		-0.72	
255	INH-OL1	17.86		-1.64	
271	D5185	26.773	R(0.01)	3.37	
311		----		----	
325	D5185	21		0.13	
331	D5185Mod.	21.7		0.52	
349	D5185	21		0.13	
360	D5185	19.7		-0.60	
398		----		----	
432	D5185	21.6		0.47	
451	INH-116	20		-0.43	
496	D5185	21.2		0.24	
497	D5185	20.9		0.07	
541	D5185	20.9		0.07	
575	D6595	21.87		0.62	
603	D5185	19		-1.00	
614	D5185	21.26		0.27	
633	D6595	12.8	R(0.01)	-4.48	
663	D5185	20.22		-0.31	
780	D5185	20		-0.43	
862	D5185	21		0.13	
902	D5185	21.14		0.21	
912	D5185	22.3		0.86	
963		----		----	
994		----		----	
1026	D5185	21		0.13	
1059	In house	22		0.69	
1128		----		----	
1146	In house	20.14		-0.35	
1166	In house	19.00		-1.00	
1320		----		----	
1372		----		----	
1435	D5185	20.61		-0.09	
1660	D5185	22.8		1.14	
1743	D5185	21		0.13	
1888	D5185	23.0		1.25	
1900	D5185	27.358	R(0.01)	3.70	
1957		----	W	----	first reported: 14.829
6002	D6595	19.986		-0.44	
6016		----		----	
6044	D5185	22.16		0.78	
6054	IP501	17.9548		-1.58	
6075		----		----	
6121	In house	20		-0.43	
6140	D5185	21.45		0.38	
normality		OK			
n		34			
outliers		3			
mean (n)		20.772			
st.dev. (n)		1.2197			
R(calc.)		3.415			
st.dev.(D5185:13e1)		1.7804			
R(D5185:13e1)		4.985			



Determination of Iron (Fe) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178	D5185	11		0.38	
179	D5185	10		-0.44	
237	D5185	12.24		1.39	
255	INH-OL1	9.06		-1.21	
271	D5185	12.891		1.92	
311		----		----	
325	D5185	10		-0.44	
331	D5185Mod.	10.6		0.05	
349	D5185	11		0.38	
360	D5185	9.92		-0.51	
398		----		----	
432	D5185	10.6		0.05	
451	INH-116	9		-1.26	
496	D5185	10.6		0.05	
497	D5185	11.3		0.62	
541	D5185	10.6		0.05	
575	D6595	11.04		0.41	
603	D5185	9		-1.26	
614	D5185	10.63		0.07	
633	D6595	6.87	R(0.05)	-3.00	
663	D5185	9.93		-0.50	
780	D5185	10		-0.44	
862	D5185	10		-0.44	
902	D5185	9.057		-1.21	
912	D5185	12.2		1.36	
963		----		----	
994		----		----	
1026	D5185	11		0.38	
1059	In house	10		-0.44	
1128		----		----	
1146	In house	9.908		-0.52	
1166	In house	9.89		-0.53	
1320		----		----	
1372		----		----	
1435	D5185	9.786		-0.62	
1660	D5185	10.9		0.29	
1743	D5185	11		0.38	
1888	D5185	11.5		0.79	
1900	D5185	13.551		2.46	
1957		----	W	----	first reported: 5.640
6002	D6595	10.77		0.19	
6016		----		----	
6044	D5185	9.755		-0.64	
6054	IP501	10.7273		0.15	
6075		----		----	
6121	In house	10		-0.44	
6140	D5185	9.99		-0.45	

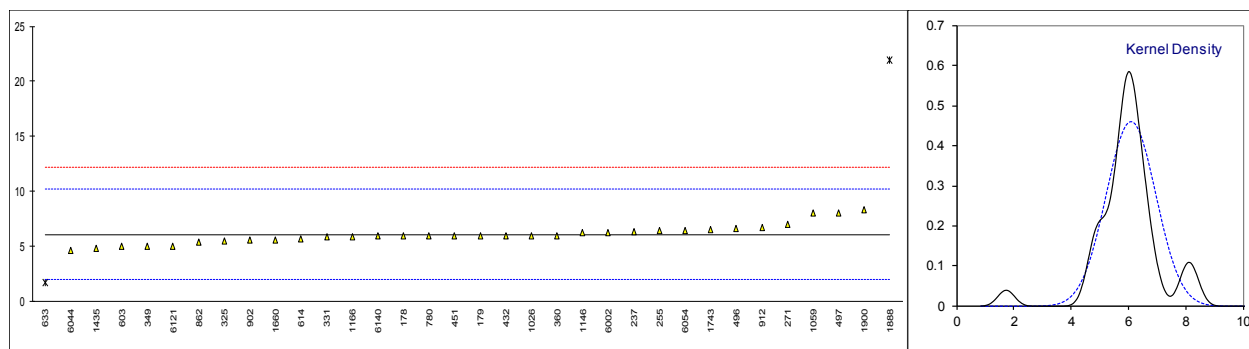
normality suspect
n 36
outliers 1
mean (n) 10.540
st.dev. (n) 1.0285
R(calc.) 2.880
st.dev.(D5185:13e1) 1.2221
R(D5185:13e1) 3.422



Determination of Lead (Pb) on sample #17227; results in mg/kg.

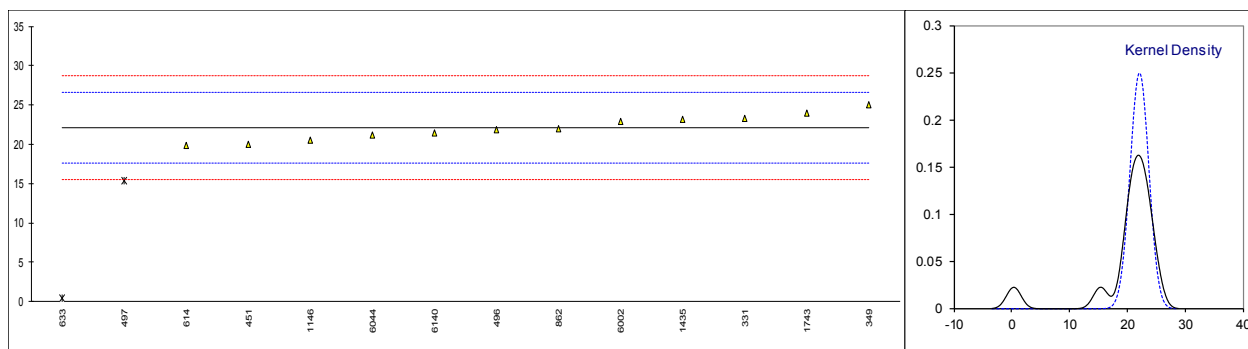
lab	method	value	mark	z(targ)	remarks
178	D5185	6		-0.04	
179	D5185	6		-0.04	
237	D5185	6.379	C	0.14	first reported: 12.22
255	INH-OL1	6.41		0.16	
271	D5185	6.970		0.43	
311		----		----	
325	D5185	5.5		-0.29	
331	D5185Mod.	5.9		-0.09	
349	D5185	5		-0.53	
360	D5185	6.01		-0.04	
398		----		----	
432	D5185	6.0		-0.04	
451	INH-116	6		-0.04	
496	D5185	6.61		0.25	
497	D5185	8.07		0.97	
541	D5185	<10		----	
575		----		----	
603	D5185	5		-0.53	
614	D5185	5.70		-0.19	
633	D6595	1.73	R(0.01)	-2.12	
663		----		----	
780	D5185	6		-0.04	
862	D5185	5.4		-0.34	
902	D5185	5.576		-0.25	
912	D5185	6.7		0.30	
963		----		----	
994		----		----	
1026	D5185	6		-0.04	
1059	In house	8		0.93	
1128		----		----	
1146	In house	6.208		0.06	
1166	In house	5.92		-0.08	
1320		----		----	
1372		----		----	
1435	D5185	4.813		-0.62	
1660	D5185	5.6		-0.24	
1743	D5185	6.5		0.20	
1888	D5185	21.9	R(0.01)	7.70	
1900	D5185	8.296		1.08	
1957		----	W	----	first reported: 3.913
6002	D6595	6.242		0.07	
6016		----		----	
6044	D5185	4.67		-0.69	
6054	IP501	6.42234		0.16	
6075		----		----	
6121	In house	5		-0.53	
6140	D5185	5.93		-0.08	

normality suspect
n 32
outliers 2
mean (n) 6.088
st.dev. (n) 0.8649
R(calc.) 2.422
st.dev.(D5185:13e1) 2.0530
R(D5185:13e1) 5.748



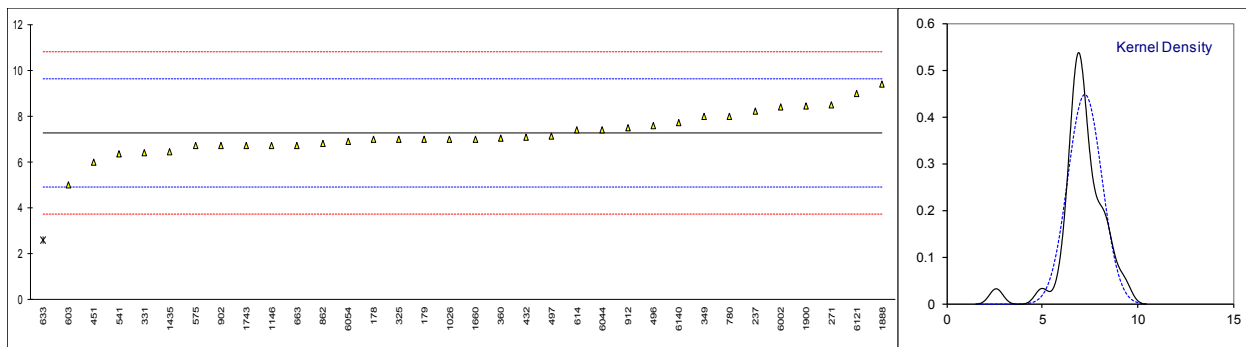
Determination of Lithium (Li) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178		----		----	
179		----		----	
237		----		----	
255		----		----	
271		----		----	
311		----		----	
325		----		----	
331	D5185Mod.	23.3		0.54	
349	D5185	25		1.31	
360		----		----	
398		----		----	
432		----		----	
451	INH-116	20		-0.95	
496	D5185	21.9		-0.09	
497	D5185	15.4	G(0.05)	-3.02	
541		----		----	
575		----		----	
603		----		----	
614	D5185	19.9		-0.99	
633	D6595	0.41	G(0.01)	-9.77	
663		----		----	
780		----		----	
862	D5185	22		-0.05	
902		----		----	
912		----		----	
963		----		----	
994		----		----	
1026		----		----	
1059		----		----	
1128		----		----	
1146	In house	20.54		-0.70	
1166		----		----	
1320		----		----	
1372		----		----	
1435	D5185	23.10		0.45	
1660		----		----	
1743	D5185	24		0.86	
1888		----		----	
1900		----		----	
1957		----	W	----	first reported: 35.241
6002	D6595	22.84		0.33	
6016		----		----	
6044	D5185	21.16		-0.42	
6054		----		----	
6075		----		----	
6121		----		----	
6140	D5185	21.48		-0.28	
normality		OK			
n		12			
outliers		2			
mean (n)		22.102			
st.dev. (n)		1.5957			
R(calc.)		4.468			
st.dev.(Horwitz)		2.2192			
R(Horwitz)		6.214			



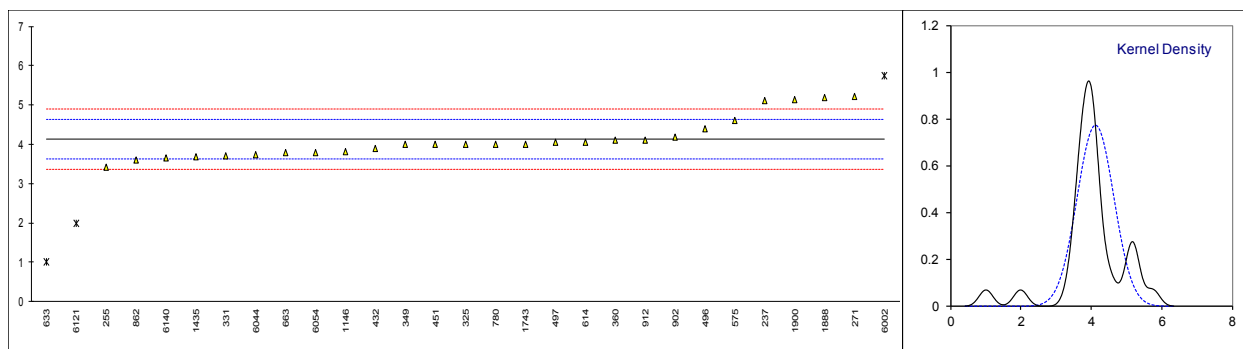
Determination of Magnesium (Mg) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178	D5185	7		-0.21	
179	D5185	7		-0.21	
237	D5185	8.22		0.82	
255		----		----	
271	D5185	8.473		1.03	
311		----		----	
325	D5185	7		-0.21	
331	D5185Mod.	6.4		-0.72	
349	D5185	8		0.63	
360	D5185	7.047		-0.17	
398		----		----	
432	D5185	7.1		-0.13	
451	INH-116	6		-1.06	
496	D5185	7.60		0.29	
497	D5185	7.14		-0.09	
541	D5185	6.34		-0.77	
575	D6595	6.70		-0.47	
603	D5185	5		-1.90	
614	D5185	7.38		0.11	
633	D6595	2.61	R(0.01)	-3.93	
663	D5185	6.74		-0.43	
780	D5185	8		0.63	
862	D5185	6.80		-0.38	
902	D5185	6.712		-0.46	
912	D5185	7.5		0.21	
963		----		----	
994		----		----	
1026	D5185	7		-0.21	
1059		----		----	
1128		----		----	
1146	In house	6.731		-0.44	
1166		----		----	
1320		----		----	
1372		----		----	
1435	D5185	6.469		-0.66	
1660	D5185	7.0		-0.21	
1743	D5185	6.73		-0.44	
1888	D5185	9.4		1.82	
1900	D5185	8.434		1.00	
1957		----	W	----	first reported: 3.079
6002	D6595	8.398		0.97	
6016		----		----	
6044	D5185	7.385		0.11	
6054	IP501	6.90524		-0.29	
6075		----		----	
6121	In house	9		1.48	
6140	D5185	7.72		0.40	
	normality	OK			
	n	33			
	outliers	1			
	mean (n)	7.252			
	st.dev. (n)	0.8891			
	R(calc.)	2.489			
	st.dev.(D5185:13e1)	1.1823			
	R(D5185:13e1)	3.311			



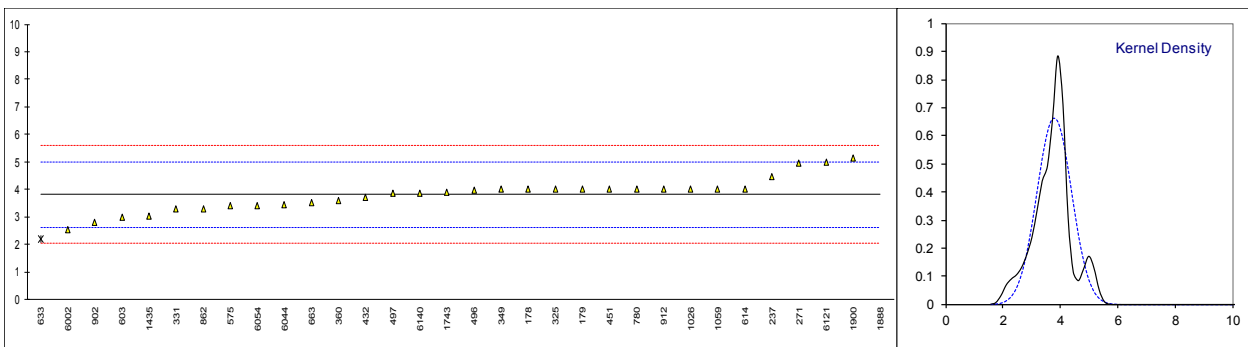
Determination of Manganese (Mn) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178		----		----	
179		----		----	
237	D5185	5.120		3.92	
255	INH-OL1	3.41		-2.81	
271	D5185	5.208		4.27	
311		----		----	
325	D5185	4		-0.49	
331	D5185Mod.	3.7		-1.67	
349	D5185	4		-0.49	
360	D5185	4.10		-0.09	
398		----		----	
432	D5185	3.9		-0.88	
451	INH-116	4		-0.49	
496	D5185	4.40		1.09	
497	D5185	4.04		-0.33	
541	D5185	<5		----	
575	D6595	4.60		1.87	
603	D5185	<1	C	<12.29	Possibly a false negative test result? first reported: 2
614	D5185	4.05		-0.29	
633	D6595	1.02	R(0.01)	-12.21	
663	D5185	3.78		-1.35	
780	D5185	4		-0.49	
862	D5185	3.6		-2.06	
902	D5185	4.192		0.27	
912	D5185	4.1		-0.09	
963		----		----	
994		----		----	
1026		----		----	
1059	In house	<4		----	
1128		----		----	
1146	In house	3.816		-1.21	
1166		----		----	
1320		----		----	
1372		----		----	
1435	D5185	3.672		-1.78	
1660		----		----	
1743	D5185	4.0		-0.49	
1888	D5185	5.2	C	4.23	first reported: 6
1900	D5185	5.148		4.03	
1957		----	W	----	first reported: 6.495
6002	D6595	5.746	R(0.01)	6.38	
6016		----		----	
6044	D5185	3.74		-1.51	
6054	IP501	3.79444		-1.30	
6075		----		----	
6121	In house	2	R(0.01)	-8.36	
6140	D5185	3.65		-1.86	
normality		suspect			
n		26			
outliers		3			
mean (n)		4.124			
st.dev. (n)		0.5171			
R(calc.)		1.448			
st.dev.(D5185:13e1)		0.2542			
R(D5185:13e1)		0.712			



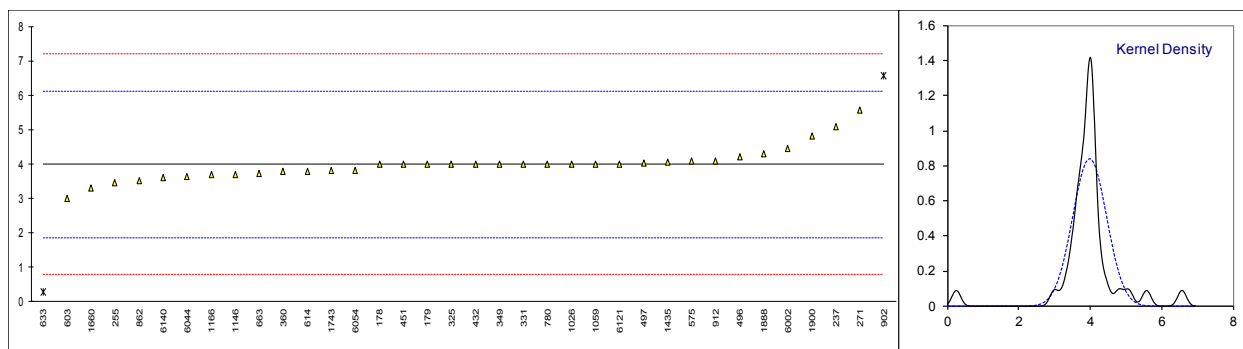
Determination of Molybdenum (Mo) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178	D5185	4		0.32	
179	D5185	4		0.32	
237	D5185	4.479		1.13	
255		----		----	
271	D5185	4.944		1.92	
311		----		----	
325	D5185	4		0.32	
331	D5185Mod.	3.3		-0.86	
349	D5185	4		0.32	
360	D5185	3.59		-0.37	
398		----		----	
432	D5185	3.7		-0.18	
451	INH-116	4		0.32	
496	D5185	3.99		0.31	
497	D5185	3.86		0.09	
541	D5185	<5		----	
575	D6595	3.40		-0.69	
603	D5185	3		-1.37	
614	D5185	4.03		0.37	
633	D6595	2.19	ex	-2.74	see § 4.1
663	D5185	3.53		-0.47	
780	D5185	4		0.32	
862	D5185	3.3		-0.86	
902	D5185	2.793		-1.72	
912	D5185	4.0		0.32	
963		----		----	
994		----		----	
1026	D5185	4		0.32	
1059	In house	4		0.32	
1128		----		----	
1146		----		----	
1166		----		----	
1320		----		----	
1372		----		----	
1435	D5185	3.033		-1.31	
1660		----		----	
1743	D5185	3.9		0.15	
1888	D5185	46.9	C,R(0.01)	72.95	first reported: 33.9
1900	D5185	5.150		2.27	
1957		----	W	----	first reported: 0.412
6002	D6595	2.524		-2.17	
6016		----		----	
6044	D5185	3.46		-0.59	
6054	IP501	3.40982		-0.68	
6075		----		----	
6121	In house	5		2.02	
6140	D5185	3.87		0.10	
	normality	OK			
	n	30			
	outliers	1+1ex			
	mean (n)	3.809			
	st.dev. (n)	0.5995			
	R(calc.)	1.679			
	st.dev.(D5185:13e1)	0.5907			
	R(D5185:13e1)	1.654			



Determination of Nickel (Ni) on sample #17227; results in mg/kg.

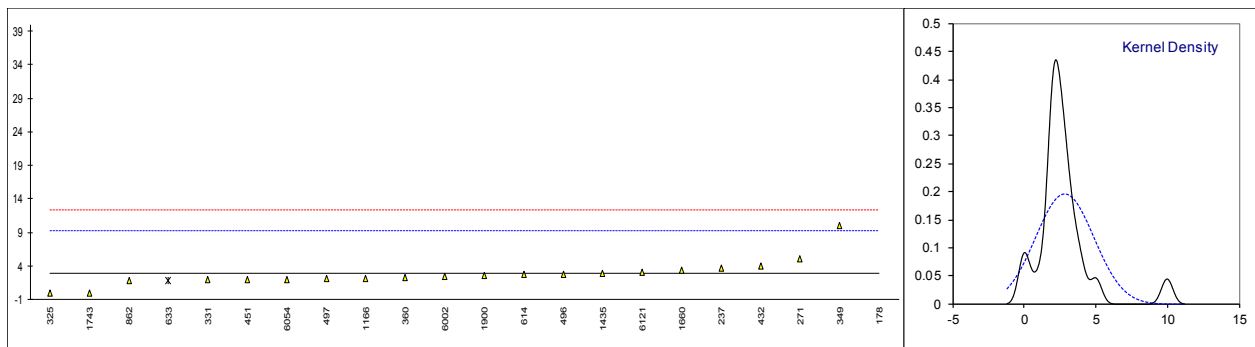
lab	method	value	mark	z(targ)	remarks
178	D5185	4		0.01	
179	D5185	4		0.01	
237	D5185	5.076		1.02	
255	INH-OL1	3.46		-0.49	
271	D5185	5.572		1.48	
311		----		----	
325	D5185	4		0.01	
331	D5185Mod.	4.0		0.01	
349	D5185	4		0.01	
360	D5185	3.78		-0.19	
398		----		----	
432	D5185	4.0		0.01	
451	INH-116	4		0.01	
496	D5185	4.22		0.22	
497	D5185	4.03		0.04	
541	D5185	<5		----	
575	D6595	4.10		0.11	
603	D5185	3		-0.92	
614	D5185	3.79		-0.18	
633	D6595	0.27	R(0.01)	-3.47	
663	D5185	3.73		-0.24	
780	D5185	4		0.01	
862	D5185	3.5		-0.45	
902	D5185	6.559	R(0.01)	2.41	
912	D5185	4.1		0.11	
963		----		----	
994		----		----	
1026	D5185	4		0.01	
1059	In house	4		0.01	
1128		----		----	
1146	In house	3.703		-0.26	
1166	In house	3.68		-0.29	
1320		----		----	
1372		----		----	
1435	D5185	4.046		0.06	
1660	D5185	3.3		-0.64	
1743	D5185	3.8		-0.17	
1888	D5185	4.3		0.29	
1900	D5185	4.799		0.76	
1957		----	W	----	first reported: 1.437
6002	D6595	4.46		0.44	
6016		----		----	
6044	D5185	3.63		-0.33	
6054	IP501	3.82259		-0.15	
6075		----		----	
6121	In house	4		0.01	
6140	D5185	3.59		-0.37	
normality		not OK			
n		34			
outliers		2			
mean (n)		3.985			
st.dev. (n)		0.4734			
R(calc.)		1.326			
st.dev.(D5185:13e1)		1.0694			
R(D5185:13e1)		2.994			



Determination of Potassium (K) on sample #17227; results in mg/kg.

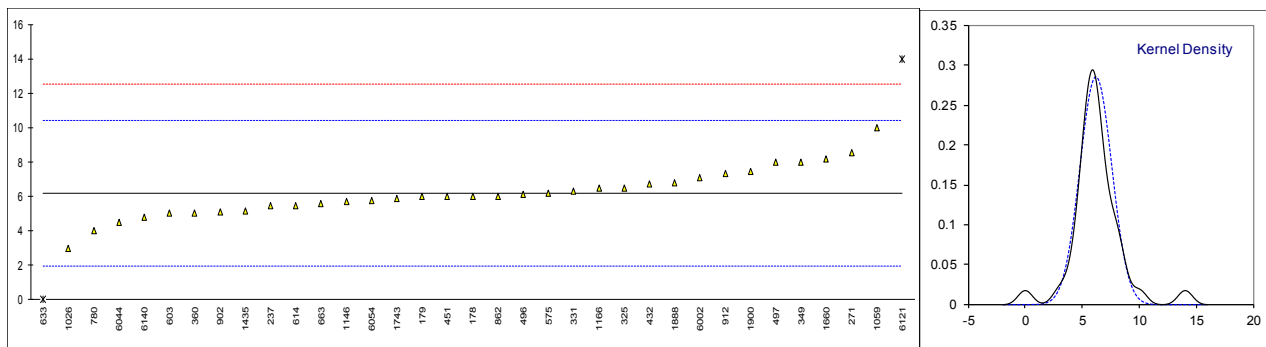
lab	method	value	mark	z(targ)	remarks
178	D5185	1147	R(0.01)	359.06	
179		----		----	
237	D5185	3.611		0.25	
255		----		----	
271	D5185	5.018		0.69	
311		----		----	
325	D5185	0		-0.89	
331	D5185Mod.	2.0		-0.26	
349	D5185	10		2.25	
360	D5185	2.22		-0.19	
398		----		----	
432	D5185	4.0		0.37	
451	INH-116	2		-0.26	
496	D5185	2.72		-0.03	
497	D5185	2.09		-0.23	
541	D5185	<40		----	
575		----		----	
603		----		----	
614	D5185	2.7		-0.04	
633	D6595	1.82	ex	-0.32	see § 4.1
663		----		----	
780	D5185	<1		----	
862	D5185	1.8		-0.32	
902		----		----	
912		----		----	
963		----		----	
994		----		----	
1026		----		----	
1059		----		----	
1128		----		----	
1146		----		----	
1166	In house	2.17		-0.21	
1320		----		----	
1372		----		----	
1435	D5185	2.946		0.04	
1660	D5185	3.3		0.15	
1743	D5185	0.0		-0.89	
1888		----		----	
1900	D5185	2.548		-0.09	
1957		----		----	
6002	D6595	2.426		-0.13	
6016		----		----	
6044		----		----	
6054	IP501	2.01258		-0.26	
6075		----		----	
6121	In house	3		0.05	
6140		----		----	

normality not OK
n 20
outliers 1+1ex
mean (n) 2.828
st.dev. (n) 2.0415
R(calc.) 5.716
st.dev.(D5185:13e1) 3.1865
R(D5185:13e1) 8.922



Determination of Silicon (Si) on sample #17227; results in mg/kg.

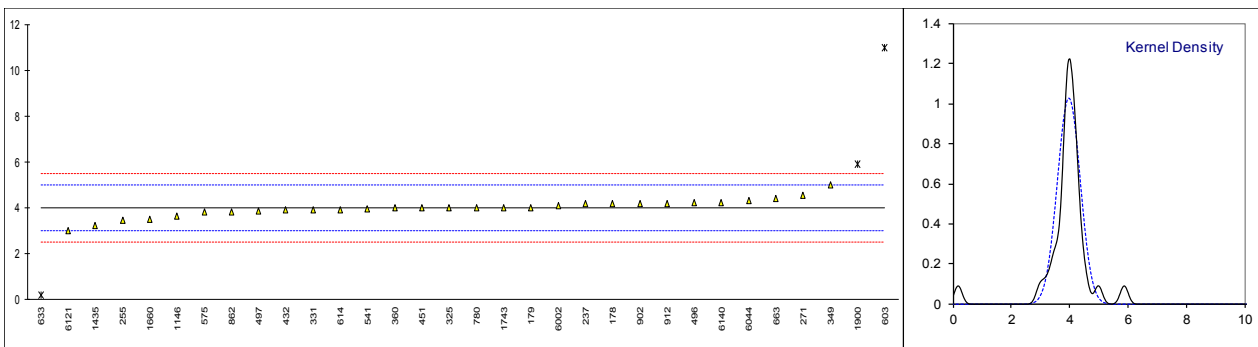
lab	method	value	mark	z(targ)	remarks
178	D5185	6		-0.09	
179	D5185	6		-0.09	
237	D5185	5.428		-0.36	
255		----		----	
271	D5185	8.551		1.12	
311		----		----	
325	D5185	6.5		0.15	
331	D5185Mod.	6.3		0.06	
349	D5185	8		0.86	
360	D5185	5.03		-0.55	
398		----		----	
432	D5185	6.7		0.24	
451	INH-116	6		-0.09	
496	D5185	6.10		-0.04	
497	D5185	8.00		0.86	
541	D5185	<8		----	
575	D6595	6.18		0.00	
603	D5185	5		-0.56	
614	D5185	5.48		-0.33	
633	D6595	0.0	R(0.01)	-2.93	
663	D5185	5.59		-0.28	
780	D5185	4		-1.04	
862	D5185	6.0		-0.09	
902	D5185	5.116		-0.51	
912	D5185	7.3		0.53	
963		----		----	
994		----		----	
1026	D5185	3		-1.51	
1059	In house	10		1.81	
1128		----		----	
1146	In house	5.671		-0.24	
1166	In house	6.48		0.14	
1320		----		----	
1372		----		----	
1435	D5185	5.163		-0.48	
1660	D5185	8.2		0.96	
1743	D5185	5.9		-0.13	
1888	D5185	6.8		0.29	
1900	D5185	7.463		0.61	
1957		----		----	
6002	D6595	7.11		0.44	
6016		----		----	
6044	D5185	4.475		-0.81	
6054	IP501	5.74412		-0.21	
6075		----		----	
6121	In house	14	R(0.01)	3.71	
6140	D5185	4.78		-0.67	
normality		suspect			
n		33			
outliers		2			
mean (n)		6.184			
st.dev. (n)		1.3945			
R(calc.)		3.905			
st.dev.(D5185:13e1)		2.1078			
R(D5185:13e1)		5.902			



Determination of Silver (Ag) on sample #17227; results in mg/kg.

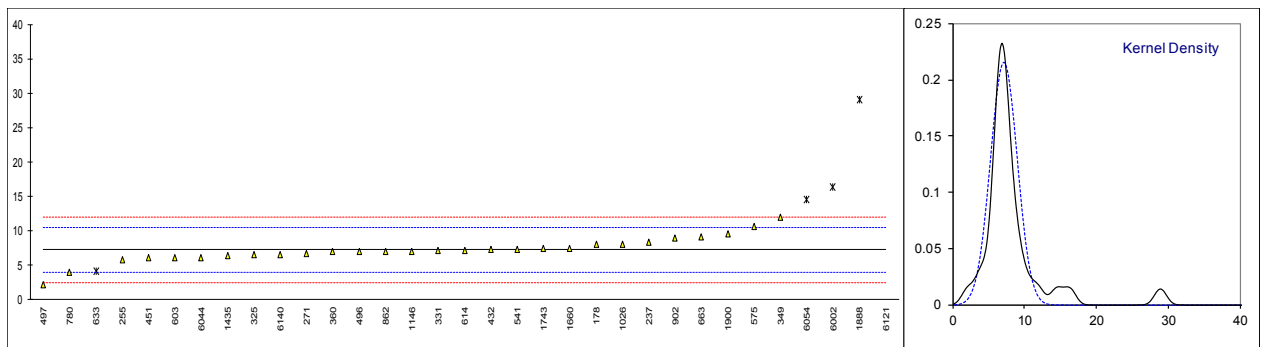
lab	method	value	mark	z(targ)	remarks
178	D5185	4.18		0.39	
179	D5185	4.01		0.05	
237	D5185	4.159		0.35	
255	INH-OL1	3.47		-1.04	
271	D5185	4.560		1.15	
311		----		----	
325	D5185	4		0.03	
331	D5185Mod.	3.9		-0.17	
349	D5185	5		2.03	
360	D5185	4.00	C	0.03	first reported: 6.21
398		----		----	
432	D5185	3.9		-0.17	
451	INH-116	4		0.03	
496	D5185	4.23		0.49	
497	D5185	3.86		-0.25	
541	D5185	3.96		-0.05	
575	D6595	3.80		-0.37	
603	D5185	11	C,R(0.01)	14.08	first reported: 8
614	D5185	3.9		-0.17	
633	D6595	0.19	R(0.01)	-7.62	
663	D5185	4.42		0.87	
780	D5185	4		0.03	
862	D5185	3.8		-0.37	
902	D5185	4.197		0.42	
912	D5185	4.2		0.43	
963		----		----	
994		----		----	
1026		----		----	
1059		----		----	
1128		----		----	
1146	In house	3.634		-0.71	
1166		----		----	
1320		----		----	
1372		----		----	
1435	D5185	3.248		-1.48	
1660	D5185	3.5		-0.98	
1743	D5185	4.0	C	0.03	first reported: 7.8
1888		----		----	
1900	D5185	5.885	R(0.01)	3.81	
1957		----	W	----	first reported: 2.488
6002	D6595	4.106		0.24	
6016		----		----	
6044	D5185	4.33		0.69	
6054		----		----	
6075		----		----	
6121	In house	3		-1.98	
6140	D5185	4.24		0.51	

normality suspect
n 29
outliers 3
mean (n) 3.986
st.dev. (n) 0.3879
R(calc.) 1.086
st.dev.(D5185:13e1) 0.4983
R(D5185:13e1) 1.395



Determination of Sodium (Na) on sample #17227; results in mg/kg.

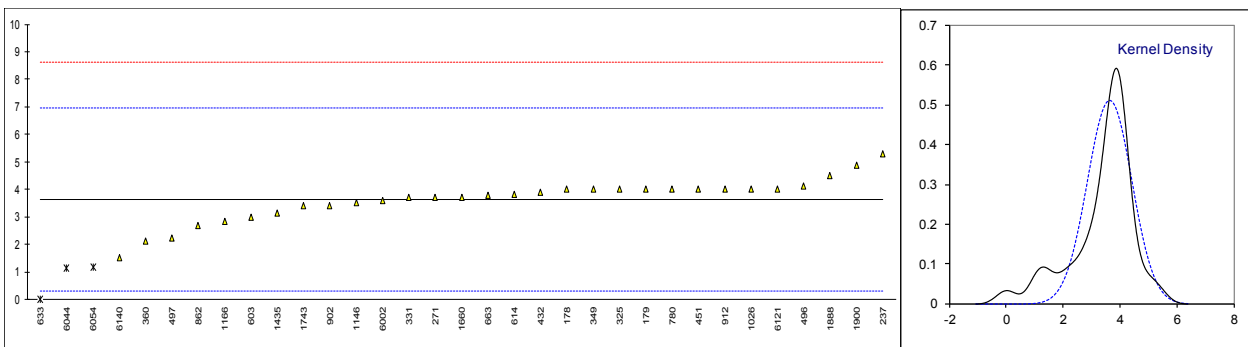
lab	method	value	mark	z(targ)	remarks
178	D5185	8		0.49	
179		----		----	
237	D5185	8.27		0.66	
255	INH-OL1	5.77		-0.90	
271	D5185	6.614		-0.38	
311		----		----	
325	D5185	6.5		-0.45	
331	D5185Mod.	7.1		-0.07	
349	D5185	12		3.00	
360	D5185	6.94		-0.17	
398		----		----	
432	D5185	7.3		0.05	
451	INH-116	6		-0.76	
496	D5185	6.98		-0.15	
497	D5185	2.20		-3.14	
541	D5185	7.3		0.05	
575	D6595	10.59		2.11	
603	D5185	6		-0.76	
614	D5185	7.13		-0.05	
633	D6595	4.15	ex	-1.92	see § 4.1
663	D5185	9.03		1.14	
780	D5185	4		-2.01	
862	D5185	7.0		-0.13	
902	D5185	8.887		1.05	
912		----		----	
963		----		----	
994		----		----	
1026	D5185	8		0.49	
1059		----		----	
1128		----		----	
1146	In house	7.010		-0.13	
1166		----		----	
1320		----		----	
1372		----		----	
1435	D5185	6.328		-0.55	
1660	D5185	7.5		0.18	
1743	D5185	7.4		0.12	
1888	D5185	29	C,R(0.01)	13.63	first reported: 17.6
1900	D5185	9.516		1.44	
1957		----	W	----	first reported: 12.01
6002	D6595	16.378	R(0.05)	5.74	
6016		----		----	
6044	D5185	6.119		-0.69	
6054	IP501	14.5488	C,R(0.05)	4.59	first reported: 26.0205
6075		----		----	
6121	In house	57	R(0.01)	31.16	
6140	D5185	6.51		-0.44	
	normality	not OK			
	n	28			
	outliers	4+1ex			
	mean (n)	7.214			
	st.dev. (n)	1.8486			
	R(calc.)	5.176			
	st.dev.(D5185:13e1)	1.5979			
	R(D5185:13e1)	4.474			



Determination of Tin (Sn) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178	D5185	4		0.22	
179	D5185	4		0.22	
237	D5185	5.31		1.01	
255		----		----	
271	D5185	3.700		0.04	
311		----		----	
325	D5185	4		0.22	
331	D5185Mod.	3.7		0.04	
349	D5185	4		0.22	
360	D5185	2.11		-0.91	
398		----		----	
432	D5185	3.9		0.16	
451	INH-116	4		0.22	
496	D5185	4.14		0.30	
497	D5185	2.24		-0.83	
541	D5185	<10		----	
575		----		----	
603	D5185	3		-0.38	
614	D5185	3.83		0.12	
633	D6595	0.0	R(0.01)	-2.18	
663	D5185	3.80		0.10	
780	D5185	4		0.22	
862	D5185	2.7		-0.56	
902	D5185	3.413		-0.13	
912	D5185	4.0		0.22	
963		----		----	
994		----		----	
1026	D5185	4		0.22	
1059	In house	<8		----	
1128		----		----	
1146	In house	3.528		-0.06	
1166	In house	2.85		-0.47	
1320		----		----	
1372		----		----	
1435	D5185	3.150		-0.29	
1660	D5185	3.7		0.04	
1743	D5185	3.4		-0.14	
1888	D5185	4.5		0.52	
1900	D5185	4.881		0.75	
1957		----	W	----	first reported: 2.038
6002	D6595	3.612		-0.01	
6016		----		----	
6044	D5185	1.13	R(0.05)	-1.50	
6054	IP501	1.16439	R(0.05)	-1.48	
6075		----		----	
6121	In house	4		0.22	
6140	D5185	1.52		-1.27	

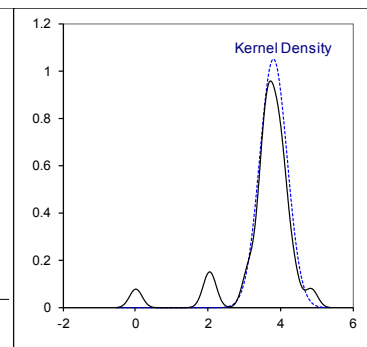
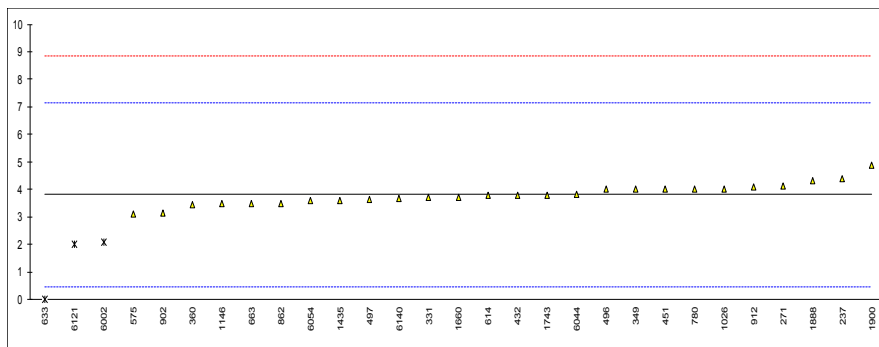
normality suspect
n 30
outliers 3
mean (n) 3.633
st.dev. (n) 0.7812
R(calc.) 2.187
st.dev.(D5185:13e1) 1.6688
R(D5185:13e1) 4.673



Determination of Titanium (Ti) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178		----		----	
179		----		----	
237	D5185	4.395		0.35	
255		----		----	
271	D5185	4.139		0.19	
311		----		----	
325		----		----	
331	D5185Mod.	3.7		-0.07	
349	D5185	4		0.11	
360	D5185	3.46		-0.21	
398		----		----	
432	D5185	3.8		-0.01	
451	INH-116	4		0.11	
496	D5185	4.00		0.11	
497	D5185	3.64		-0.10	
541	D5185	<5		----	
575	D6595	3.10		-0.43	
603		----		----	
614	D5185	3.78		-0.02	
633	D6595	0.0	R(0.01)	-2.28	
663	D5185	3.49		-0.19	
780	D5185	4		0.11	
862	D5185	3.5		-0.19	
902	D5185	3.142		-0.40	
912	D5185	4.1		0.17	
963		----		----	
994		----		----	
1026	D5185	4		0.11	
1059		----		----	
1128		----		----	
1146	In house	3.485		-0.20	
1166		----		----	
1320		----		----	
1372		----		----	
1435	D5185	3.611		-0.12	
1660	D5185	3.7		-0.07	
1743	D5185	3.8		-0.01	
1888	D5185	4.3		0.29	
1900	D5185	4.863		0.63	
1957		----	W	----	first reported: -0.655
6002	D6595	2.094	R(0.01)	-1.03	
6016		----		----	
6044	D5185	3.84		0.02	
6054	IP501	3.60207		-0.13	
6075		----		----	
6121	In house	2	R(0.01)	-1.08	
6140	D5185	3.69		-0.07	

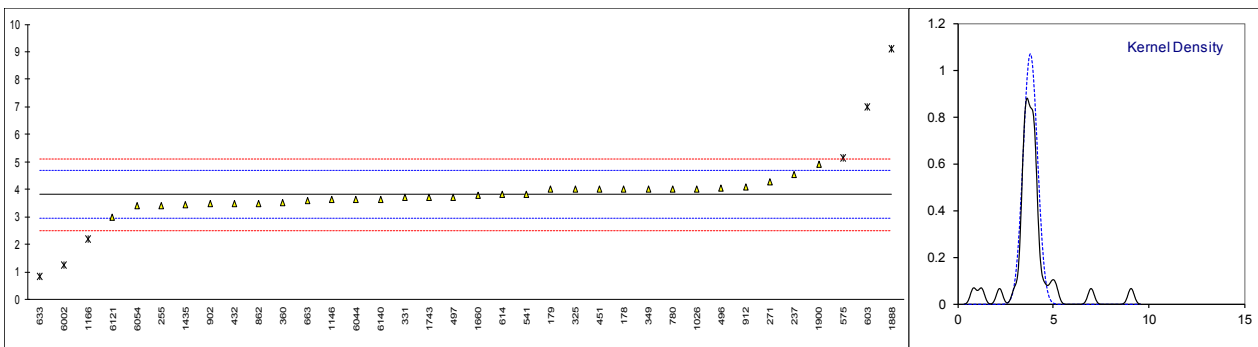
normality suspect
n 26
outliers 3
mean (n) 3.813
st.dev. (n) 0.3791
R(calc.) 1.061
st.dev.(D5185:13e1) 1.6748
R(D5185:13e1) 4.690



Determination of Vanadium (V) on sample #17227; results in mg/kg.

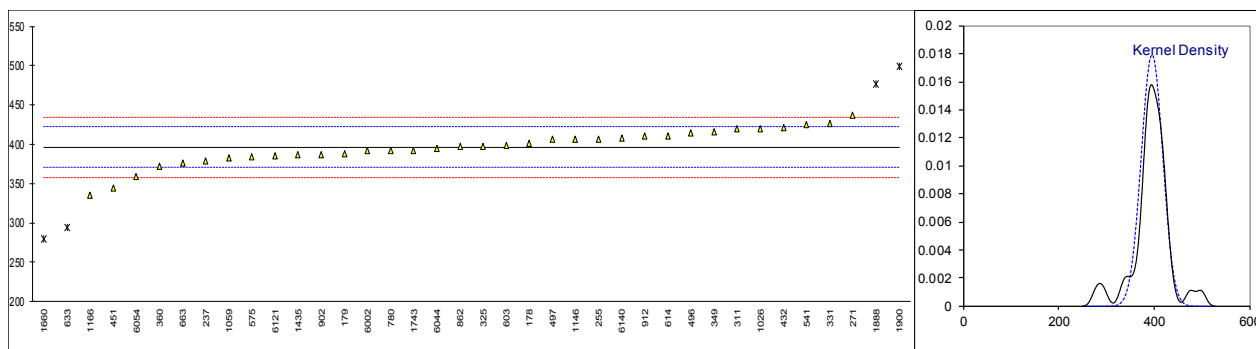
lab	method	value	mark	z(targ)	remarks
178	D5185	4		0.44	
179	D5185	4		0.44	
237	D5185	4.553		1.71	
255	INH-OL1	3.42		-0.89	
271	D5185	4.276		1.08	
311		----		----	
325	D5185	4		0.44	
331	D5185Mod.	3.7		-0.25	
349	D5185	4		0.44	
360	D5185	3.52		-0.66	
398		----		----	
432	D5185	3.5		-0.71	
451	INH-116	4		0.44	
496	D5185	4.06		0.58	
497	D5185	3.72		-0.20	
541	D5185	3.83		0.05	
575	D6595	5.14	R(0.05)	3.06	
603	D5185	7	C,R(0.01)	7.34	first reported: 2
614	D5185	3.83		0.05	
633	D6595	0.82	R(0.01)	-6.86	
663	D5185	3.59		-0.50	
780	D5185	4		0.44	
862	D5185	3.5		-0.71	
902	D5185	3.473		-0.77	
912	D5185	4.1		0.67	
963		----		----	
994		----		----	
1026	D5185	4		0.44	
1059	In house	<4		----	
1128		----		----	
1146	In house	3.620		-0.43	
1166	In house	2.19	R(0.05)	-3.72	
1320		----		----	
1372		----		----	
1435	D5185	3.447		-0.83	
1660	D5185	3.8		-0.02	
1743	D5185	3.7		-0.25	
1888	D5185	9.1	C,R(0.01)	12.16	first reported: 7.1
1900	D5185	4.903		2.52	
1957		----	W	----	first reported: 6.940
6002	D6595	1.24	R(0.01)	-5.90	
6016		----		----	
6044	D5185	3.63		-0.41	
6054	IP501	3.39627		-0.94	
6075		----		----	
6121	In house	3		-1.85	
6140	D5185	3.64		-0.38	

normality suspect
n 30
outliers 6
mean (n) 3.807
st.dev. (n) 0.3734
R(calc.) 1.045
st.dev.(D5185:13e1) 0.4351
R(D5185:13e1) 1.218



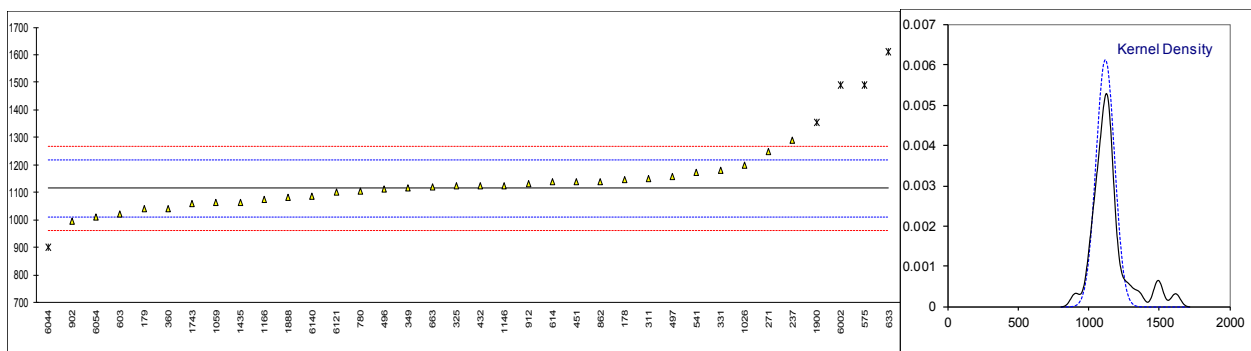
Determination of Calcium (Ca) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178	D5185	401		0.37	
179	D5185	388		-0.65	
237	D5185	378.4		-1.40	
255	INH-OL1	407		0.84	
271	D5185	436.717		3.16	
311	D5185	420		1.85	
325	D5185	397.5		0.09	
331	D5185Mod.	426.0		2.32	
349	D5185	416		1.54	
360	D5185	371.8		-1.92	
398		----		----	
432	D5185	421		1.93	
451	INH-116	345		-4.02	
496	D5185	414.0		1.38	
497	D5185	406.39		0.79	
541	D5185	424.9		2.24	
575	D6595	384.60		-0.92	
603	D5185	399		0.21	
614	D5185	411.05		1.15	
633	D6595	294.3	R(0.05)	-7.98	
663	D5185	376.23		-1.57	
780	D5185	392		-0.34	
862	D5185	397		0.05	
902	D5185	387.3		-0.71	
912	D5185	410		1.07	
963		----		----	
994		----		----	
1026	D5185	420		1.85	
1059	In house	383		-1.04	
1128		----		----	
1146	In house	406.5		0.80	
1166	In house	335.77		-4.74	
1320		----		----	
1372		----		----	
1435	D5185	387.1		-0.72	
1660	D5185	280	R(0.05)	-9.10	
1743	D5185	392		-0.34	
1888	D5185	476.1	C,R(0.05)	6.25	first reported: 494.1
1900	D5185	499.16	R(0.05)	8.05	
1957		----	W	----	first reported: 358.7
6002	D6595	391.5		-0.38	
6016		----		----	
6044	D5185	394.2		-0.16	
6054	IP501	359.568		-2.88	
6075		----		----	
6121	In house	386		-0.81	
6140	D5185	407.94		0.91	
normality		OK			
n		34			
outliers		4			
mean (n)		396.308			
st.dev. (n)		22.2574			
R(calc.)		62.321			
st.dev.(D5185:13e1)		12.7754			
R(D5185:13e1)		35.771			



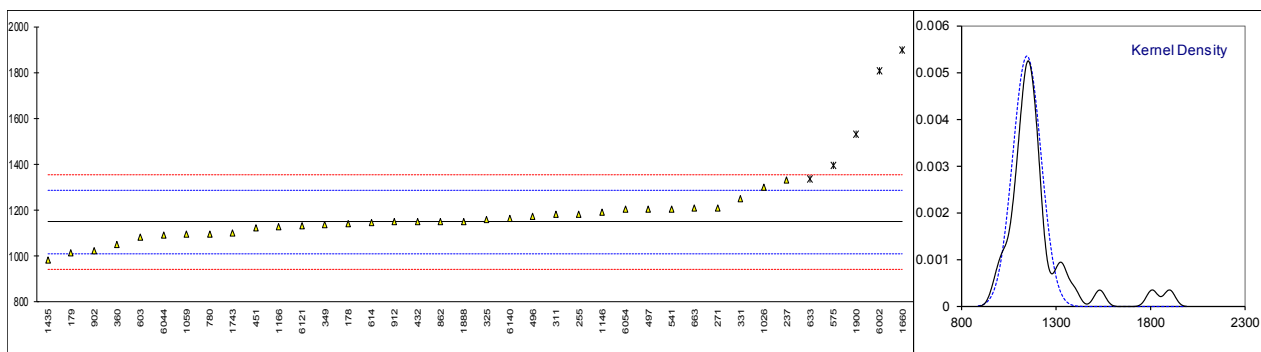
Determination of Phosphorus (P) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178	D5185	1147		0.63	
179	D5185	1039		-1.48	
237	D5185	1290	C	3.42	first reported: 129.7
255		----		----	
271	D5185	1248.860		2.61	
311	D5185	1150		0.68	
325	D5185	1124.5		0.19	
331	D5185Mod.	1179.6		1.26	
349	D5185	1116		0.02	
360	D5185	1040		-1.46	
398		----		----	
432	D5185	1125		0.20	
451	INH-116	1140		0.49	
496	D5185	1114		-0.02	
497	D5185	1156.1		0.80	
541	D5185	1174.7		1.17	
575	D6595	1490	C,R(0.01)	7.32	first reported: 1386.80
603	D5185	1020		-1.85	
614	D5185	1137.8		0.45	
633	D6595	1613	R(0.01)	9.71	
663	D5185	1119.4		0.09	
780	D5185	1105		-0.19	
862	D5185	1140		0.49	
902	D5185	994.7		-2.34	
912	D5185	1132		0.33	
963		----		----	
994		----		----	
1026	D5185	1200		1.66	
1059	In house	1063		-1.01	
1128		----		----	
1146	In house	1125		0.20	
1166	In house	1076.03		-0.76	
1320		----		----	
1372		----		----	
1435	D5185	1065		-0.97	
1660		----		----	
1743	D5185	1060		-1.07	
1888	D5185	1082.9	C	-0.62	first reported: 1325.6
1900	D5185	1354.7	R(0.05)	4.68	
1957		----	W	----	first reported: 1077.9
6002	D6595	1489.4	R(0.01)	7.30	
6016		----		----	
6044	D5185	902.1	C,R(0.05)	-4.15	first reported: 922.1
6054	IP501	1010.89		-2.03	
6075		----		----	
6121	In house	1100		-0.29	
6140	D5185	1084.74		-0.59	
	normality	OK			
	n	31			
	outliers	5			
	mean (n)	1114.878			
	st.dev. (n)	65.2098			
	R(calc.)	182.588			
	st.dev.(D5185:13e1)	51.2772			
	R(D5185:13e1)	143.576			



Determination of Zinc (Zn) on sample #17227; results in mg/kg.

lab	method	value	mark	z(targ)	remarks
178	D5185	1142		-0.09	
179	D5185	1015		-1.93	
237	D5185	1332		2.67	
255	INH-OL1	1183		0.51	
271	D5185	1209.430		0.89	
311	D5185	1180		0.46	
325	D5185	1161		0.19	
331	D5185Mod.	1248.1		1.45	
349	D5185	1136		-0.18	
360	D5185	1048		-1.45	
398		----		----	
432	D5185	1149		0.01	
451	INH-116	1121		-0.39	
496	D5185	1174		0.38	
497	D5185	1203.3		0.80	
541	D5185	1205.1		0.83	
575	D6595	1396.60	R(0.05)	3.61	
603	D5185	1081		-0.97	
614	D5185	1146.5		-0.02	
633	D6595	1337	ex	2.74	see § 4.1
663	D5185	1207.0		0.86	
780	D5185	1095		-0.77	
862	D5185	1150		0.03	
902	D5185	1024		-1.80	
912	D5185	1148		0.00	
963		----		----	
994		----		----	
1026	D5185	1300		2.21	
1059	In house	1094		-0.79	
1128		----		----	
1146	In house	1189		0.59	
1166	In house	1127.96		-0.29	
1320		----		----	
1372		----		----	
1435	D5185	980.9		-2.43	
1660	D5185	1900	R(0.01)	10.92	
1743	D5185	1100		-0.70	
1888	D5185	1152.2		0.06	
1900	D5185	1531.6	R(0.01)	5.57	
1957		----	W	----	first reported: 1086.4
6002	D6595	1808	R(0.01)	9.58	
6016		----		----	
6044	D5185	1089		-0.86	
6054	IP501	1203.17		0.80	
6075		----		----	
6121	In house	1130		-0.26	
6140	D5185	1162.62		0.21	
normality		OK			
n		33			
outliers		4+1ex			
mean (n)		1148.099			
st.dev. (n)		74.4209			
R(calc.)		208.379			
st.dev.(D5185:13e1)		68.8490			
R(D5185:13e1)		192.777			



APPENDIX 2

Number of participants per country

1 lab in ARGENTINA
1 lab in AUSTRALIA
1 lab in AUSTRIA
1 lab in AZERBAIJAN
2 labs in BELGIUM
2 labs in BULGARIA
1 lab in CHILE
1 lab in CHINA, People's Republic
1 lab in COLOMBIA
1 lab in COTE D'IVOIRE
1 lab in EGYPT
3 labs in FRANCE
4 labs in GERMANY
3 labs in GREECE
2 labs in INDIA
1 lab in INDONESIA
2 labs in ITALY
1 lab in KAZAKHSTAN
2 labs in MALAYSIA
1 lab in MARTINIQUE
1 lab in MOROCCO
5 labs in NETHERLANDS
1 lab in NIGERIA
1 lab in NORWAY
2 labs in PHILIPPINES
2 labs in POLAND
1 lab in PORTUGAL
1 lab in RUSSIAN FEDERATION
2 labs in SAUDI ARABIA
1 lab in SLOVAKIA
1 lab in SLOVENIA
1 lab in SOUTH AFRICA
1 lab in SPAIN
1 lab in SUDAN
2 labs in SWEDEN
1 lab in TANZANIA
1 lab in THAILAND
1 lab in TURKEY
2 labs in UNITED KINGDOM
2 labs in UNITED STATES OF AMERICA

APPENDIX 3**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
U	= test result probably reported in a different unit
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
SDS	= Safety Data Sheet

Literature:

- 1 iis Interlaboratory Studies, Protocol for the Organization, Statistics and Evaluation, March 2017
- 2 ASTM E178:02
- 3 ASTM E1301:95(2003)
- 4 ISO 5725:86
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- 7 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
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- 11 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
- 12 J.N. Miller, Analyst, 118, 455, (1993)
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- 15 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, *Technometrics*, 25(2), 165-172, (1983)
- 16 Horwitz, R. Albert, J. AOAC Int, 79, 3, 589, (1996)
- 17 R.G. Visser and C. Nijssen-Wester, Estimation of reproducibility and measurement uncertainty of a viscosity test method from proficiency test data, Accred Qual Assur 20, 125-129, (2015), DOI 10.1007/s00769-015-1110-y