Results of Proficiency Test
Engine Oil (Used)
June 2018

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1997, a proficiency test for used Engine Oil (Lubricating Oil) is organised every year by the Institute for Interlaboratory Studies (iis). During the annual proficiency testing program 2017/2018, it was decided to continue the round robin for the analysis of used Engine Oil in accordance with the latest applicable version of ASTM D4485 and SAE specifications.
In this interlaboratory study for used Engine Oil and used Engine Oil - Metals, 83 laboratories from 48 different countries registered for participation. See appendix 2 for the number of participants per country. In this report, the results of the 2018 proficiency test on used Engine Oil are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organiser of this proficiency test (PT). Sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. It was decided, depending on the registration, to send one bottle of 0.5 litre used Engine Oil labelled #18096 and one bottle of 50 mL with used Engine Oil labelled #18097 especially for wear metals analyses. The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

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

2.2 PROTOCOL

The protocol followed in the organisation was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of March 2017 (iis-protocol, version 3.4). This protocol 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 for used Engine Oil, approximately 60 litres, was donated by a third-party laboratory. After homogenisation, 98 amber glass bottles of 0.5 litre were filled and labelled #18096. The homogeneity of the subsamples #18096 was checked by determination of Density at 15°C in accordance with ASTM D4052 and Kinematic Viscosity at 40°C in accordance with ASTM D445 on 8 stratified randomly selected samples.

	Density at 15°C in kg/L	Kinematic Viscosity at 40°C in mm^2/s
Sample #18096-1	0.89748	130.2
Sample #18096-2	0.89748	130.3
Sample #18096-3	0.89749	130.2
Sample #18096-4	0.89748	130.4
Sample #18096-5	0.89748	130.3
Sample #18096-6	0.89748	130.3
Sample #18096-7	0.89747	130.2
Sample #18096-8	0.89748	130.2

Table 1: homogeneity test results of subsamples #18096

From the above test results, the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities of the reference test methods in agreement with the procedure of ISO13528, Annex B2 in the next table:

	Density at 15°C in kg/L	Kinematic Viscosity at 40°C in mm^2/s
r (observed)	0.00001	0.21
reference test method	ASTM D4052:18	ASTM D445:17a
0.3 * R (ref. test method)	0.00015	0.78

Table 2: evaluation of repeatabilities of the subsamples #18096

The calculated repeatabilities are less than 0.3 times the corresponding reproducibilities of the reference test methods. Therefore, homogeneity of the subsamples #18096 was assumed.

The necessary bulk material for used Engine Oil - Metals, approximately 5 litres, was also donated by the same third-party laboratory. After homogenisation, 88 PE bottles of 0.05 litre were filled with approximately 45 mL material and labelled #18097. The homogeneity of the subsamples #18097 was checked by determination of Calcium and Copper in accordance with ASTM D5185 on 8 stratified randomly selected samples.

	Calcium in mg/kg	Copper in mg/kg
Sample #18097-1	3567	22.7
Sample #18097-2	3469	22.2
Sample #18097-3	3466	22.0
Sample #18097-4	3467	22.0
Sample #18097-5	3532	22.8
Sample #18097-6	3535	22.5
Sample #18097-7	3532	22.4
Sample #18097-8	3607	22.4

Table 3: homogeneity test results of subsamples #18097

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

	Calcium in mg/kg	Copper in mg/kg
r (observed)	144	0.8
reference test method	ASTM D5185:18	ASTM D5185:18
0.3 * R (ref. test method)	184	1.6

Table 4: evaluation of repeatabilities of the subsamples #18097

The calculated repeatabilities are less than 0.3 times the corresponding reproducibilities of the reference test method. Therefore, homogeneity of the subsamples #18097 was assumed.

Depending on the registration to each of the participating laboratories one 0.5 litre amber glass bottle labelled #18096 (used Engine Oil) and/or one 0.05 litre PE bottle labelled #18097 (Used Engine Oil - Metals) were sent on May 23, 2018. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of Engine Oil, packed in the amber glass bottles and PE bottles, was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were requested to determine on sample #18096: Acid Number, Base Number, Density at 15°C, Flash Point PMcc, Fuel Dilution, Kinematic Viscosity at 40°C & 100°C, Viscosity Index, Kinematic Viscosity by Houillon at 40°C & 100°C and Water.
Also, some extra questions were asked about the determination of Acid number.
The participants were requested to determine 23 elements (Wear metals: Al, Ba, B, Cd, Cr, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, K, Si, Ag, Na, Sn, Ti, V, Ca, P and Zn) on sample #18097.

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

To get comparable test results, a detailed report form and a letter of instructions are prepared. On the report form, the reporting units are given as well as the reference test methods 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 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 reanalyses). Additional or corrected test results are used for data analysis and original results are placed under 'Remarks' in the result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1 STATISTICS

The protocol followed in the organisation of this proficiency test was the one as described in the report ‘iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation’ (iis-protocol, version 3.4) of March 2017.

For 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 dataset does not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

According to ISO5725 the original test results per determination were submitted to Dixon's and/or 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 requirements based on the target reproducibility in accordance with ISO13528. In this PT, the criterion of ISO13528, paragraph 9.2.1 was met for all evaluated tests, therefore, the uncertainty of all assigned values may be negligible and need not be included in the PT report.

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

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made using the sorted data for one determination (see appendix 1). On the Y-axis the reported analysis 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 "x". Accepted data are represented as a triangle.

Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also a normal Gauss curve was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM or ISO reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation in this interlaboratory study.

This target standard deviation was calculated from the literature reproducibility by division with 2.8.

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

The z-scores were calculated according to:

z(target) = (test result - average of PT) / target standard deviation

The z(target) scores are listed in the result tables of appendix 1.

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

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

4 EVALUATION

In this interlaboratory study, no problems with sample dispatch were encountered. For the main round used Engine Oil, seven participants did not report any test results at all and five participants reported after the final reporting date. For the PT on wear metals five participants did not report any test results at all and four participants reported after the final reporting date. Not all laboratories were able to report all analyses requested. In total 75 participants reported 1689 test results. Observed were 63 statistically outlying test results, which is 3.7% of the numerical test results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

Not all original data sets proved to have a normal Gaussian distribution. These are referred to as “not OK” or “suspect”. The statistical evaluation of these data sets should be used with due care, see also paragraph 3.1.

4.1 EVALUATION PER SAMPLE AND PER TEST

In this section, the reported test results are discussed per sample and per test. The test methods, which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These methods are also in the tables together with the reported test results. The abbreviations, used in these tables, are listed in appendix 3.

In the iis PT reports, ASTM methods are referred to with a number (e.g. D4739) and an added designation for the year that the method was adopted or revised (e.g. D4739:11). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D4739:11(2017)). In the results tables of Appendix 1 only the method number and year of adoption or revision e.g. D4739:11 will be used.
Unfortunately, a suitable standard test method, providing the precision data, is not available for all determinations. For the tests, that have no available precision data, the calculated reproducibility was compared against the reproducibility estimated from the Horwitz equation.

Sample #18096

Acid Number: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of BEP (pH 11) at both titration solvent volumes 60mL and 125mL from ASTM D664-A:17a.
When evaluated for the type of endpoint, i.e. Inflection Point (IP) or BEP (pH 11), the calculated reproducibility of both groups was still not in agreement with the requirements of test method D664-A:17a.
It is observed that 27 participants reported to have used Inflection Point as determination end point. It is remarkably because ASTM D664-A advise to use BEP for used oils.

Base Number ($HClO_4$): 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 agreement with the requirements of ASTM D2896:15-A forward titration.
Also, when the reported data of ASTM D2896 were evaluated separately for procedure A and B and Forward and Backward titration, the calculated reproducibilities after rejection of the statistical outliers are in agreement with the respective requirements of ASTM D2896 (-A or -B):15 forward titration and ASTM D2896 (-A):15 back titration. NB. the reproducibility of mode A or B forward is the same.
It is observed that 33 participants reported to use forward titration which is more applicable to fresh oils. Backward titration is the preferred method for a used oil.

Base Number (HCl): This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility is in agreement with the requirements of ASTM D4739:11(2017).

Density at 15°C: This determination may be 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 ASTM D4052:18.

Flash Point PMcc: ASTM D93 states the following in the scope: Procedure A is applicable to new and in-use lubricating oils. Procedure B is applicable to used lubricating oils. This may mean that in-use or used lubrication oils may be measured with procedure A as well as with procedure B.
Apparently, there is a bias between both procedures. Therefore, it was decided to evaluate the test results for both procedures separately.

Procedure A and other test methods: this determination was not problematic. One statistical outlier was observed and one other test result was excluded. However, the calculated reproducibility after rejection of the suspect data is in agreement with the requirements of ASTM D93:18-A.

Procedure B: this determination was very problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the requirements of ASTM D93:18-B. The test results appeared to be bimodal distributed. Possibly some participants reported to use procedure B but followed procedure A?

Fuel dilution: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D3524:14.

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 agreement with the requirements of ASTM D445:17a.

Kin.Visco. at 100°C: 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 D445:17a.

Viscosity Index: This determination was problematic. Three statistical outliers were observed and six other test results were excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ASTM D2270:10(2016).
The Viscosity Index was also calculated with the reported data by iis. This determination was also problematic. Two statistical outliers were observed and six other test results were excluded. The calculated reproducibility after rejection of the suspect data is still not in agreement with the requirements of ASTM D2270:10(2016).

Kin.Visco. at 40°C (Houillon): This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D7279:16.

Kin.Visco. at 100°C (Houillon): This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D7279:16.

Water: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D6304:16e1.

Sample #18097

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 D5185:18.

Barium: 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 D5185:18.
Despite the consensus value did not fit with the application range of ASTM D5185:18 it was decided to use the target value from this test method to calculate z-scores and not to use the reproducibility estimated from the Horwitz equation.

Boron: 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 D5185:18.

Cadmium: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the estimated reproducibility using 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 D5185:18.

Copper: 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 D5185:18.

Iron: 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 D5185:18.

Lead: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of ASTM D5185:18.

Lithium: All reporting laboratories agreed on a value <1 mg/kg.

Magnesium: This determination was not problematic. One statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5185:18.

Manganese: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D5185:18.

Molybdenum: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of ASTM D5185:18.

Nickel: 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 D5185:18.

Potassium: Thirty-four participants reported a numerical result <10 mg/kg. Since the average found for this element was low and below the application range of ASTM D5185, it was decided not to calculate z-scores.

Silicon: 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 D5185:18.

Silver: 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 D5185:18.

Sodium: This determination was not problematic. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5185:18.

Tin: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5185:18.

Titanium: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5185:18.

Vanadium: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D5185:18.

Calcium: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D5185:18.

Phosphorus: 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 D5185:18.
Despite the consensus value did not fit with the application range of ASTM D5185:18 it was decided to use the target value from this test method to calculate z-scores and not to use the reproducibility estimated from the Horwitz equation.

Zinc: This determination was not problematic. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D5185:18.

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 average results, calculated reproducibilities and reproducibilities derived from literature reference test methods (in casu ASTM and IP reference test methods), are compared in the next tables:

Parameter	unit	n	average	2.8 * sd	R (lit)
Acid Number	mg KOH/g	51	3.23	1.97	1.41
Base Number ($HClO_4$)	mg KOH/g	48	10.6	0.8	0.7
Base Number (HCl)	mg KOH/g	13	9.2	1.5	4.3
Density at 15°C	kg/L	52	0.8975	0.0005	0.0005
Flash Point PMcc – procedure A	°C	35	203.8	10.5	14.5
Flash Point PMcc – procedure B	°C	17	192.0	22.3	10
Fuel dilution	%M/M	12	1.2	2.8	1.6
Kinematic Viscosity at 40°C	mm^2/s	57	130.69	1.79	2.62
Kinematic Viscosity at 100°C	mm^2/s	52	14.278	0.204	0.165
Viscosity Index		46	108	2	2
Kinematic Viscosity (Houillon) at 40°C	mm^2/s	16	130.68	1.81	3.92
Kinematic Viscosity (Houillon) at 100°C	mm^2/s	15	14.334	0.278	0.803
Water	mg/kg	42	454	566	663

Table 5: reproducibilities of tests on sample #18096

Parameter	unit	n	average	2.8 * sd	R (lit)
Aluminium as Al	mg/kg	56	27.0	6.3	9.0
Barium as Ba	mg/kg	52	16.0	3.6	7.6
Boron as B	mg/kg	43	16.9	9.8	13.4
Cadmium as Cd	mg/kg	32	15.0	4.2	4.5
Chromium as Cr	mg/kg	60	20.8	5.3	5.2
Copper as Cu	mg/kg	61	21.3	5.2	5.1
Iron as Fe	mg/kg	60	21.5	5.2	6.1
Lead as Pb	mg/kg	59	30.8	9.2	10.3
Lithium as Li	mg/kg	15	<1	n.a.	n.a.
Magnesium as Mg	mg/kg	56	23.4	6.1	8.1
Manganese as Mn	mg/kg	55	16.1	4.8	3.6
Molybdenum as Mo	mg/kg	57	15.5	4.6	4.5
Nickel as Ni	mg/kg	59	25.4	6.3	7.6
Potassium as K	mg/kg	34	<10	n.a.	n.a.
Silicon as Si	mg/kg	52	30.3	6.9	11.0
Silver as Ag	mg/kg	49	16.2	3.7	5.7
Sodium as Na	mg/kg	48	17.4	5.5	8.4
Tin as Sn	mg/kg	58	16.2	7.0	11.8
Titanium as Ti	mg/kg	53	15.3	4.3	9.0
Vanadium as V	mg/kg	59	15.6	3.8	5.7
Calcium as Ca	mg/kg	59	3148	636	529
Phosphorus as P	mg/kg	56	1253	244	152
Zinc as Zn	mg/kg	55	1404	198	240

Table 6: reproducibilities of tests on sample #18097

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.

As used Engine Oil is a complex matrix to analyse, strict adherence to the test methods with regards to sample preparation, is advised. Improper sample preparation may be the cause of disagreement of the calculated reproducibility with the requirements of the respective reference test method. Also, one should be aware that for each element spectral interferences may occur, and differences may occur in uptake rates between test specimen and standard solutions through viscosity effects.

4.3 COMPARISON OF THE PROFICIENCY TEST OF JUNE 2018 WITH PREVIOUS PTS

	June 2018	June 2017	June 2016	June 2015	June 2014
Number of reporting labs	75	77	85	80	88
Number of test results	1689	1679	1890	1555	2150
Statistical outliers	63	72	57	66	61
Percentage outliers	3.7%	4.3%	3.0%	4.2%	2.8%

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:

Determination	June 2018	June 2017	June 2016	June 2015	June 2014
Acid Number	-	+/-	--	--	--
Base Number ($HClO_4$)	+/-	-	--	-	--
Base Number (HCl)	++	++	++	++	++
Density at 15°C	+/-	+/-	-	+/-	+
Flash Point PMcc – procedure A	+	+	-	-	-
Flash Point PMcc – procedure B	--	-	--	--	-
Fuel dilution	-	-	++	+	++
Kinematic Viscosity at 40°C	+	+	++	+	++
Kinematic Viscosity at 100°C	-	-	++	+/-	++
Viscosity Index	-	+/-	--	--	--
Kinematic Viscosity (Houillon) at 40°C	++	+	++	++	++
Kinematic Viscosity (Houillon) at 100°C	++	++	++	++	++
Water	+	+	++	++	-
Wear-Metals	+	+	+	+	+

Table 8: comparison determinations against the reference test method

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

++: group performed much better than the reference test method
+ : group performed better than the reference test method
+/-: group performance equals the reference test method
- : group performed worse than the reference test method
-- : group performed much worse than the reference test method
n.e.: not evaluated

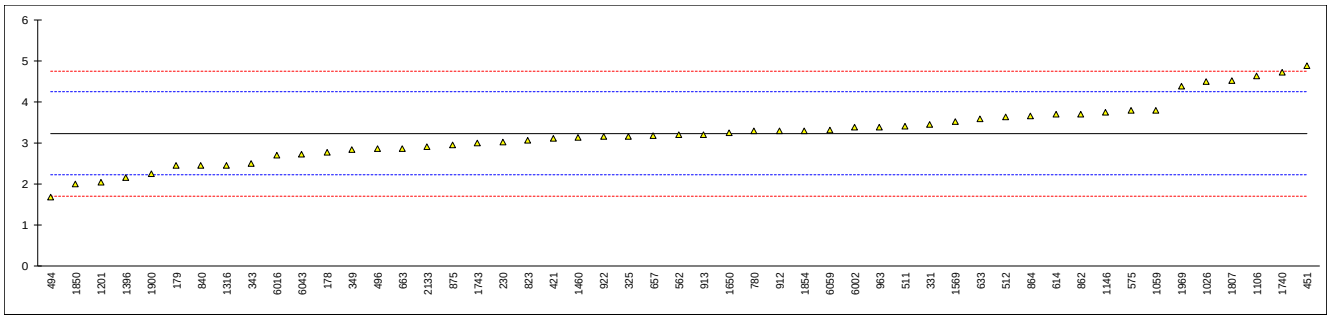
APPENDIX 1

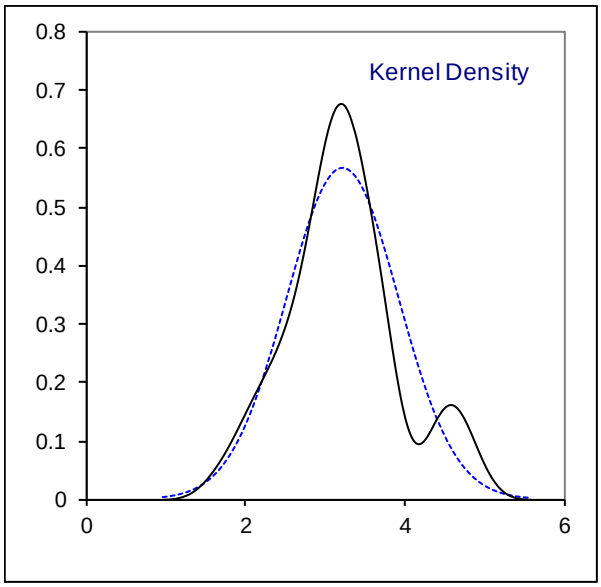
Determination of Acid Number (total) on sample #18096; results in mg KOH/g

lab	method	value	mark	z(targ)	end point	volume of titration solvent
178	D664mod	2.77		-0.91	--	--
179	D664-A	2.45		-1.54	Inflection Point	60 ml
211		-----		-----		
225		-----		-----		
230	D664-A	3.0104		-0.43	Inflection Point	125 ml
237		-----		-----		
252		-----		-----		
254		-----		-----		
255		-----		-----		
325	D664-A	3.16		-0.13	Buffer End Point (pH 11)	125 ml
331	D664mod	3.44		0.42	Buffer End Point (pH 11)	--
333		-----		-----		
343	D664-A	2.5		-1.44	Inflection Point	--
349	D664-A	2.84		-0.77	Inflection Point	125 ml
398		-----		-----		
421	ISO6619	3.1		-0.25	--	--
451	D664	4.87		3.26	--	--
494	D664-A	1.69		-3.05	Inflection Point	125 ml
496	D664-A	2.85		-0.75	Buffer End Point (pH 11)	60 ml
511	D974	3.402		0.35	--	--
512	D974	3.62		0.78	Inflection Point	125 ml
541		-----		-----		
562	D664-A	3.2		-0.05	--	--
575	D664-A	3.78		1.10	Buffer End Point (pH 11)	60 ml
603		-----		-----		
614	D664-A	3.69		0.92	--	60 ml
633	D664-A	3.575		0.69	Inflection Point	60 ml
634		-----		-----		
657	D664-A	3.177		-0.10	Inflection Point	60 ml
663	D664-A	2.862		-0.72	Buffer End Point (pH 11)	125 ml
780	D664-A	3.28		0.11	Inflection Point	60 ml
823	D664-A	3.06		-0.33	Inflection Point	125 ml
840	D664-A	2.46		-1.52	Inflection Point	125 ml
862	D664-A	3.70		0.94	Inflection Point	60 ml
864	D664-A	3.65		0.84	Inflection Point	60 ml
875	D664-A	2.96		-0.53	Inflection Point	60 ml
902		-----		-----		
912	D664-A	3.3		0.15	--	--
913	D664-A	3.2119		-0.03	--	--
922	D664-A	3.15		-0.15	Inflection Point	125 ml
962		-----		-----		
963	D664-A	3.39		0.32	Inflection Point	60 ml
974		-----		-----		
994		-----		-----		
1023		-----		-----		
1026	D664-A	4.5		2.53	Inflection Point	125 ml
1059	ISO6619	3.79		1.12	Buffer End Point (pH 11)	60 ml
1106	D664-B	4.636		2.80	Inflection Point	125 ml
1146	D664-A	3.743		1.02	Buffer End Point (pH 11)	60 ml
1173		-----		-----		
1201	D664-A	2.05		-2.33	Buffer End Point (pH 11)	125 ml
1316	D664-A	2.46		-1.52	Buffer End Point (pH 11)	125 ml
1396	D664-A	2.16		-2.12	--	60 ml
1435		-----		-----		
1448		-----		-----		
1456		-----		-----		
1460	D664-A	3.143		-0.17	Inflection Point	60 ml
1543		-----		-----		
1569	D664-A	3.51		0.56	Inflection Point	125 ml
1648		-----		-----		
1650	D664-A	3.24		0.03	Inflection Point	125 ml
1740	D664-A	4.71		2.94	--	--
1743	D664-A	3.0		-0.45	Buffer End Point (pH 11)	60 ml
1748		-----		-----		
1752		-----		-----		
1799		-----		-----		
1807	D664-A	4.51		2.55	Buffer End Point (pH 11)	60 ml
1850	ISO6619	1.99		-2.45	Inflection Point	125 ml
1854	D664-A	3.3		0.15	Inflection Point	125 ml
1900	D8045	2.250		-1.94	--	--
1969	D664-A	4.39		2.31	--	--
2133	D664-A	2.91205		-0.62	Buffer End Point (pH 11)	125 ml
6002	D664-A	3.373		0.29	Inflection Point	60 ml
6016	D664-A	2.698		-1.05	Inflection Point	60 ml
6043	D664-A	2.72		-1.00	Inflection Point	60 ml

lab	method	value	mark	z(targ)	end point	volume of titration solvent
6059	D664-A	3.32		0.19	Inflection Point	125 ml
9100		-----		-----		
9101		-----		-----		
9142		-----		-----		
9143		-----		-----		

			Inflection point (IP) only	BEP (pH 11) only
	normality	OK	suspect	OK
	n	51	27	12
	outliers	0	0	0
	mean (n)	3.227	3.146	3.213
	st.dev. (n)	0.7028	0.6419	0.6730
	R(calc.)	1.968	1.797	1.884
	st.dev.(D664-A:17a BEP, 60mL)	0.5041	0.3676	0.5021
	R(D664-A:17a BEP – 60mL)	1.412	--	1.406
Compare				
	R(D664-A:17a IP – 60 mL)	1.051	1.029	--
	R(D664-A:17a IP – 125 mL)	0.596	0.585	--
	R(D664-A:17a BEP – 125 mL)	1.420	--	1.414



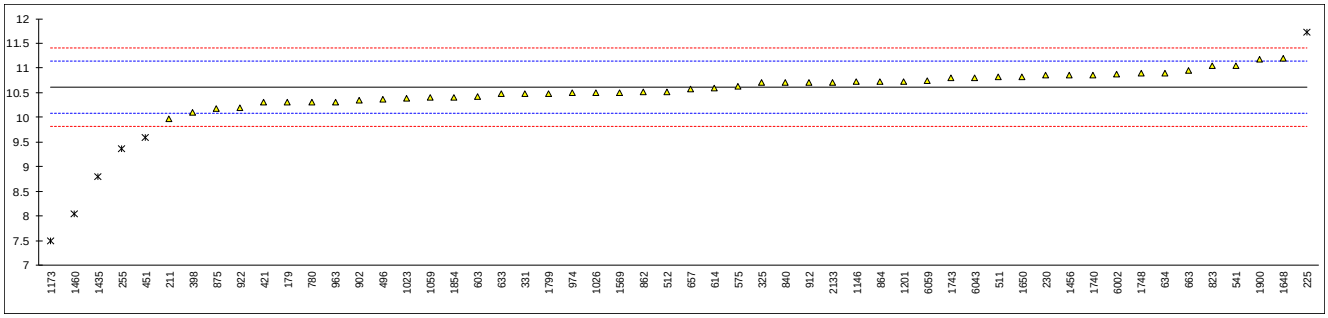


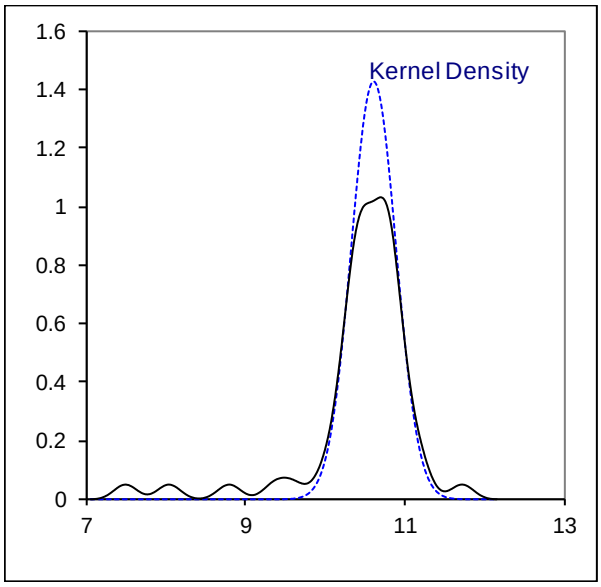
Determination of Base Number ($HClO_4$ titration) on sample #18096; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179	D2896 - B back	10.30		-1.17	
211	D2896 - B forward	9.96		-2.45	
225	D2896 - B back	11.72	R(0.05)	4.18	
230	INH-10	10.85		0.90	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	D2896	9.37	R(0.05)	-4.68	
325	D2896 - B forward	10.7		0.34	
331	D2896mod	10.47		-0.53	
333		-----		-----	
343		-----		-----	
349		-----		-----	
398	D2896 - A forward	10.10		-1.93	
421	ISO3771	10.3		-1.17	
451	D2896	9.6	R(0.05)	-3.81	
494		-----		-----	
496	D2896 - B back	10.37		-0.91	
511	in house	10.82		0.79	
512	in house	10.52		-0.34	
541	D2896 - B forward	11.05		1.65	
562		-----		-----	
575	D2896 - B forward	10.63		0.07	
603	D2896 - A forward	10.42		-0.72	
614	D2896 - B forward	10.6		-0.04	
633	D2896 - B back	10.47		-0.53	
634	D2896 - A forward	10.9		1.09	
657	D2896 - B forward	10.58		-0.12	
663	D2896 - A forward	10.95		1.28	
780	D2896 - B forward	10.3		-1.17	
823	D2896 - A forward	11.04		1.62	
840	D2896 - B forward	10.70		0.34	
862	D2896 - B forward	10.52		-0.34	
864	D2896 - A forward	10.72		0.41	
875	D2896 - A forward	10.17		-1.66	
902	D2896 - B forward	10.35		-0.98	
912	D2896 - B forward	10.7		0.34	
913		-----		-----	
922	D2896 - B forward	10.2		-1.55	
962		-----		-----	
963	D2896 - A forward	10.31		-1.13	
974	D2896 - A back	10.5		-0.42	
994		-----		-----	
1023	D2896	10.380		-0.87	
1026	D2896 - B forward	10.5		-0.42	
1059	ISO3771	10.4		-0.80	
1106		-----		-----	
1146	D2896 - A back	10.716		0.40	
1173	in house	7.5	R(0.01)	-11.73	
1201	D2896 - A forward	10.73	C	0.45	First reported 8.95
1316		-----		-----	
1396		-----		-----	
1435	D2896	8.80	R(0.01)	-6.83	
1448		-----		-----	
1456	D2896 - A forward	10.85		0.90	
1460	D2896 - A forward	8.045	R(0.01)	-9.67	
1543		-----		-----	
1569	D2896 - A forward	10.5		-0.42	
1648	D2896 - B back	11.20		2.22	
1650	D2896 - A forward	10.82		0.79	
1740	D2896 - B forward	10.86		0.94	
1743	D2896 - A forward	10.8		0.71	
1748	D2896 - A forward	10.893	C	1.06	First reported 11.896
1752		-----		-----	
1799	D2896 - B forward	10.47		-0.53	
1807		-----		-----	
1850		-----		-----	
1854	D2896 - A back	10.4		-0.80	
1900	in house	11.186		2.17	
1969		-----		-----	
2133	D2896 - B forward	10.71		0.37	
6002	ISO3771	10.872	C	0.98	First reported 14.872
6016		-----		-----	
6043	D2896 - A back	10.8		0.71	

lab	method	value	mark	z(targ)	remarks
6059	D2896 - B forward	10.74		0.49	
9100		-----		-----	
9101		-----		-----	
9142		-----		-----	
9143		-----		-----	

			Only method A		Only method B	
			Forward	Backward	Forward	Backward
	normality	OK	OK	n.a.	OK	n.a.
	n	48	15	4	17	4
	outliers	6	1	0	0	1
	mean (n)	10.611	10.661	10.604	10.563	10.585
	st.dev. (n)	0.2795	0.2919	0.1856	0.2580	0.4159
	R(calc.)	0.783	0.817	0.520	0.722	1.164
	st.dev.(D2896:15)	0.2653	0.2665	1.2119	0.2641	--
	R(D2896:15-A) forward	0.743	0.746	--		--
Compare						
	R(D2896:15-A) backward	3.396	--	3.393	--	unknown
	R(D2896:15-B) forward	0.743	--	--	0.739	--



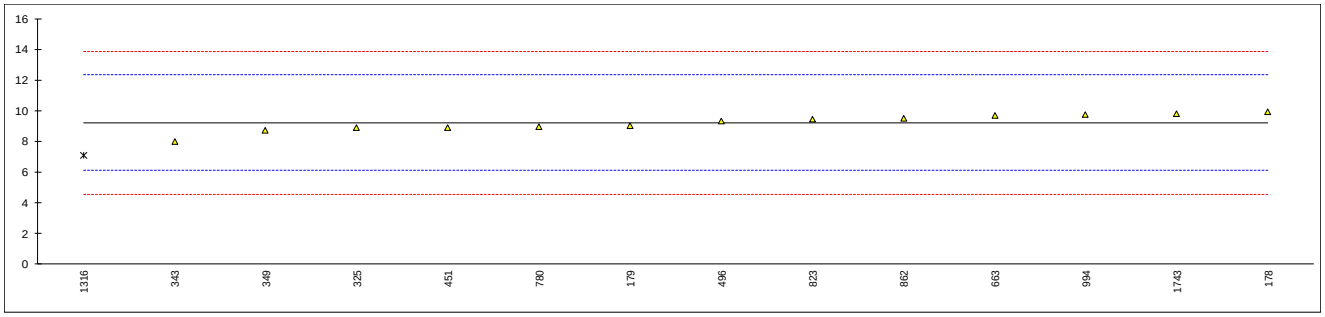


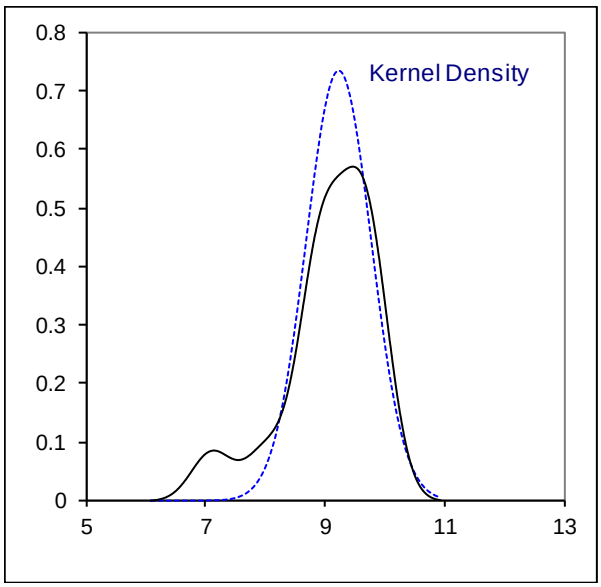
Determination of Base Number (HCl titration) on sample #18096; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
178	D4739mod	9.91		0.44	
179	D4739	9.03		-0.12	
211		-----		-----	
225		-----		-----	
230		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
325	D4739	8.9		-0.21	
331		-----		-----	
333		-----		-----	
343	D4739	8		-0.79	
349	D4739	8.69		-0.34	
398		-----		-----	
421		-----		-----	
451	D4739	8.9		-0.21	
494		-----		-----	
496	D4739	9.35		0.08	
511		-----		-----	
512		-----		-----	
541		-----		-----	
562		-----		-----	
575		-----		-----	
603		-----		-----	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657		-----		-----	
663	D4739	9.70		0.31	
780	D4739	8.94		-0.18	
823	D4739	9.45		0.15	
840		-----		-----	
862	D4739	9.50		0.18	
864		-----		-----	
875		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
974		-----		-----	
994	D4739	9.73		0.33	
1023		-----		-----	
1026		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1173		-----		-----	
1201		-----		-----	
1316	D4739	7.1	G(0.01)	-1.37	
1396		-----		-----	
1435		-----		-----	
1448		-----		-----	
1456		-----		-----	
1460		-----		-----	
1543		-----		-----	
1569		-----		-----	
1648		-----		-----	
1650		-----		-----	
1740		-----		-----	
1743	D4739	9.8		0.37	
1748		-----		-----	
1752		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		-----		-----	
1854		-----		-----	
1900		-----		-----	
1969		-----		-----	
2133		-----		-----	
6002		-----		-----	
6016		-----		-----	
6043		-----		-----	

lab	method	value	mark	z(targ)	remarks
6059		-----		-----	
9100		-----		-----	
9101		-----		-----	
9142		-----		-----	
9143		-----		-----	

normality	OK
n	13
outliers	1
mean (n)	9.223
st.dev. (n)	0.5431
R(calc.)	1.521
st.dev.(D4739:11)	1.5525
R(D4739:11)	4.347



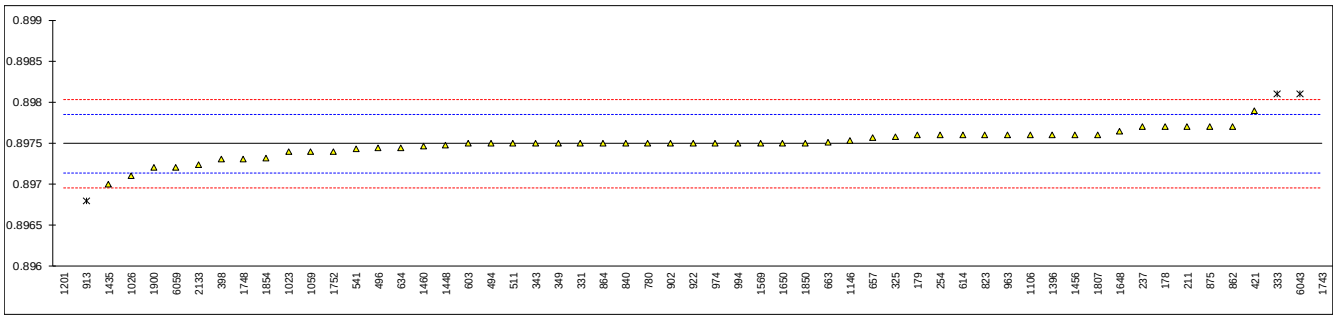


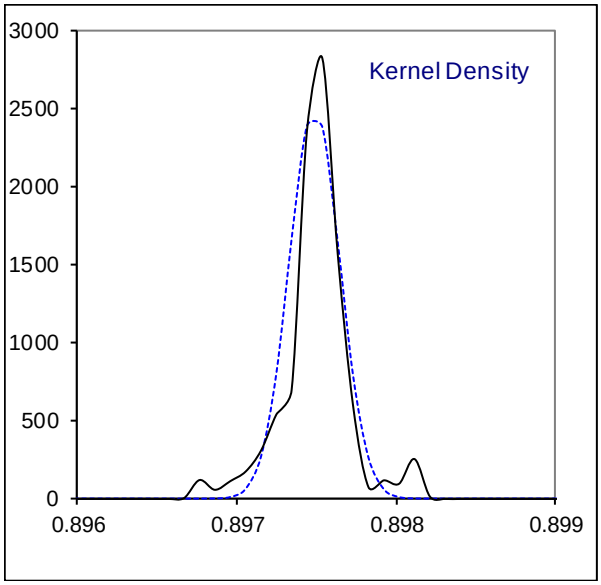
Determination of Density at 15°C on sample #18096; results in kg/L

lab	method	value	mark	z(targ)	remarks	Original reported
178	D4052	0.8977		1.15		897.7 kg/m^3
179	D4052	0.8976		0.59		897.6 kg/m^3
211	D4052	0.8977		1.15		897.7 kg/m^3
225		-----		-----		
230		-----		-----		
237	D4052	0.8977		1.15		897.7 kg/m^3
252		-----		-----		
254	D4052	0.8976		0.59		897.6 kg/m^3
255		-----		-----		
325	D4052	0.89758		0.48		
331	ISO12185	0.8975		0.03		897.5 kg/m^3
333	D4052	0.8981	R(0.05)	3.39		897.1 kg/m^3
343	D4052	0.8975		0.03		897.5 kg/m^3
349	D4052	0.8975		0.03		
398	D4052	0.8973		-1.09		897.3 kg/m^3
421	ISO12185	0.8979		2.27		897.9 kg/m^3
451		-----		-----		
494	D4052	0.8975		0.03		897.5 kg/m^3
496	D4052	0.89744		-0.31		897.44 kg/m^3
511	D4052	0.8975		0.03		
512		-----		-----		
541	D4052	0.89743		-0.36		
562		-----		-----		
575		-----		-----		
603	D4052	0.8975		0.03		
614	D4052	0.8976		0.59		
633		-----		-----		
634	D4052	0.89744		-0.31		
657	D4052	0.89757		0.42		
663	D4052	0.89751		0.09		
780	D4052	0.8975		0.03		897.5 kg/m^3
823	D4052	0.8976		0.59		897.6 kg/m^3
840	D4052	0.89750		0.03		
862	D4052	0.8977		1.15		897.7 kg/m^3
864	D4052	0.8975		0.03		
875	D4052	0.8977		1.15		
902	D4052	0.8975		0.03		
912		-----		-----		
913	D4052	0.8968	R(0.05)	-3.89		
922	D4052	0.8975		0.03		
962		-----		-----		
963	D4052	0.8976		0.59		
974	D4052	0.8975		0.03		
994	ISO12185	0.8975		0.03		
1023	D4052	0.8974		-0.53		897.4 kg/m^3
1026	D4052	0.8971		-2.21		
1059	D4052	0.8974		-0.53		897.4 kg/m^3
1106	D5002	0.8976		0.59		897.6 kg/m^3
1146	D4052	0.89753		0.20		
1173		-----		-----		
1201	D4052	0.8757	C,R(0.01)	-122.05	First reported 900.2 kg/m^3	
1316		-----		-----		
1396	IP365	0.8976		0.59		897.6 kg/m^3
1435	D4052	0.8970		-2.77		
1448	D4052	0.89747		-0.14		897.47 kg/m^3
1456	D4052	0.8976		0.59		
1460	D4052	0.89746		-0.19		
1543		-----		-----		
1569	D4052	0.8975		0.03		897.5 kg/m^3
1648	D4052	0.89765		0.87		897.65 kg/m^3
1650	D4052	0.8975		0.03		
1740		-----		-----		
1743		0.9000	C,R(0.01)	14.03	First reported 899.0 kg/m^3	
1748	D4052	0.8973		-1.09		897.3 kg/m^3
1752	D4052	0.89740		-0.53		897.40 kg/m^3
1799		-----		-----		
1807	D1298	0.8976		0.59		897.6 kg/m^3
1850	D4052	0.8975		0.03		
1854	D4052	0.89732		-0.98		
1900	D4052	0.8972		-1.65		897.2 kg/m^3
1969		-----		-----		
2133	D4052	0.89724		-1.43		
6002		-----		-----		
6016		-----		-----		
6043	D4052	0.8981	R(0.05)	3.39		

lab	method	value	mark	z(targ)	remarks	Original reported
6059	D4052	0.8972		-1.65		
9100		-----		-----		
9101		-----		-----		
9142		-----		-----		
9143		-----		-----		

normality	suspect
n	52
outliers	5
mean (n)	0.89749
st.dev. (n)	0.000160
R(calc.)	0.00045
st.dev.(D4052:18)	0.000179
R(D4052:18)	0.0005



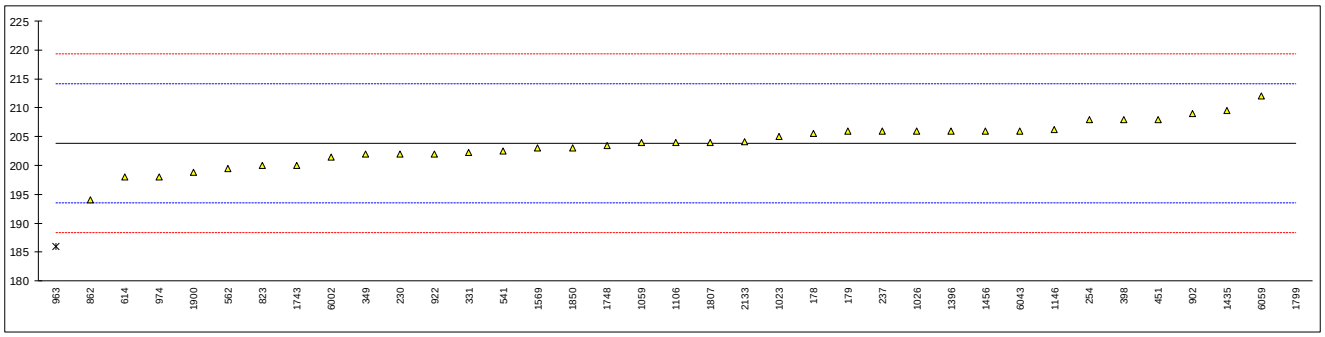


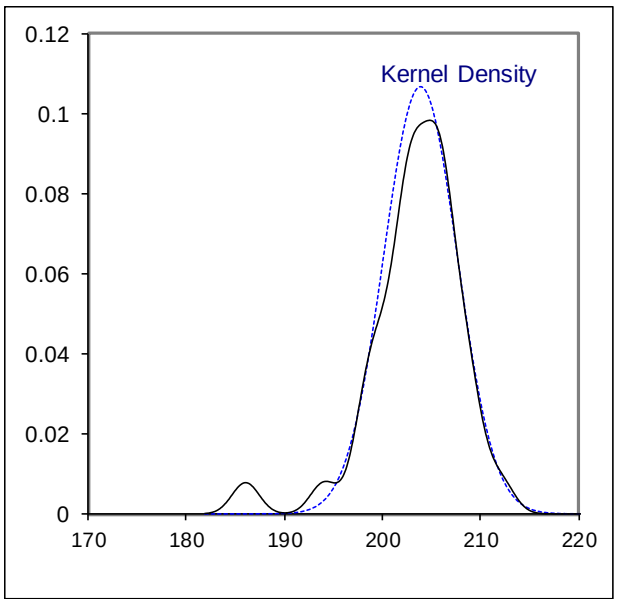
Determination of Flash Point PMcc (procedure A) on sample #18096; results in °C

lab	method	value	mark	z(targ)	remarks
178	D93-A	205.5		0.33	
179	D93-A	206.0		0.42	
211		-----		-----	
225		-----		-----	
230	D3828	202.0		-0.35	
237	D93-A	206.0		0.42	
252		-----		-----	
254	D93-A	208		0.81	
255		-----		-----	
325		-----		-----	
331	D93-A	202.2		-0.31	
333		-----		-----	
343		-----		-----	
349	D93-A	202		-0.35	
398	D93-A	208		0.81	
421		-----		-----	
451	D93-A	208		0.81	
494		-----		-----	
496		-----		-----	
511		-----		-----	
512		-----		-----	
541	D93-A	202.5		-0.25	
562	D93-A	199.5		-0.83	
575		-----		-----	
603		-----		-----	
614	D93-A	198		-1.12	
633		-----		-----	
634		-----		-----	
657		-----		-----	
663		-----		-----	
780		-----		-----	
823	D93-A	200		-0.74	
840		-----		-----	
862	D93-A	194		-1.90	
864		-----		-----	
875		-----		-----	
902	D93-A	209.0		1.00	
912		-----		-----	
913		-----		-----	
922	D93-A	202		-0.35	
962		-----		-----	
963	D93-A	186.0	R(0.01)	-3.45	
974	D93-A	198.0		-1.12	
994		-----		-----	
1023	D93-A	205.0		0.23	
1026	D93-A	206.0		0.42	
1059	ISO2719-A	204.0		0.04	
1106	D93-A	204.0		0.04	
1146	in house	206.2		0.46	
1173		-----		-----	
1201		-----		-----	
1316		-----		-----	
1396	IP523	206		0.42	
1435	D93-A	209.5		1.10	
1448		-----		-----	
1456	D93-A	206.0		0.42	
1460		-----		-----	
1543		-----		-----	
1569	D93-A	203		-0.16	
1648		-----		-----	
1650		-----		-----	
1740		-----		-----	
1743	D93-A	200		-0.74	
1748	D93-A	203.5		-0.06	
1752		-----		-----	
1799	D92	230	ex	5.07	Result excluded, method is an open cup method
1807	D93-A	204		0.04	
1850	ISO2719-A	203		-0.16	
1854		-----		-----	
1900	D7094	198.8		-0.97	
1969		-----		-----	
2133	D93-A	204.1		0.06	
6002	ISO2719-A	201.5		-0.45	
6016		-----		-----	
6043	D93-A	206		0.42	

lab	method	value	mark	z(targ)	remarks
6059	D93-A	212		1.59	
9100		-----		-----	
9101		-----		-----	
9142		-----		-----	
9143		-----		-----	

normality	OK
n	35
outliers	1 + 1 ex
mean (n)	203.809
st.dev. (n)	3.7391
R(calc.)	10.469
st.dev.(D93-A:18)	5.1680
R(D93-A:18)	14.470



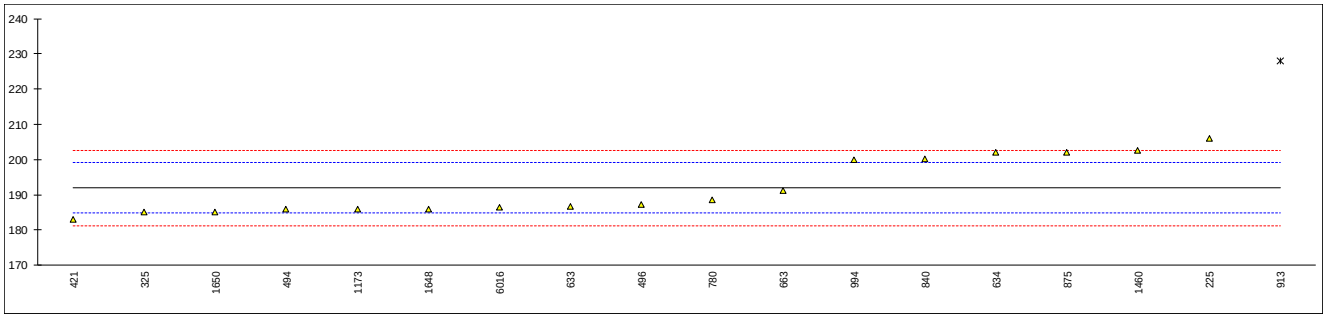


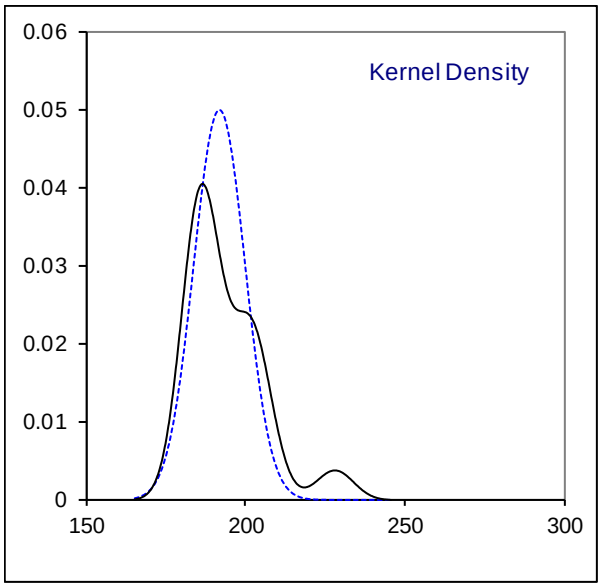
Determination of Flash Point PMcc (procedure B) on sample #18096; results in °C

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179		-----		-----	
211		-----		-----	
225	D93-B	206.0		3.92	
230		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
325	D93-B	185		-1.96	
331		-----		-----	
333		-----		-----	
343		-----		-----	
349		-----		-----	
398		-----		-----	
421	ISO2719-B	183.0		-2.52	
451		-----		-----	
494	D93-B	186.0		-1.68	
496	D93-B	187.2		-1.34	
511		-----		-----	
512		-----		-----	
541		-----		-----	
562		-----		-----	
575		-----		-----	
603		-----		-----	
614		-----		-----	
633	D93-B	186.6		-1.51	
634	D93-B	202.0		2.80	
657		-----		-----	
663	D93-B	191.3		-0.19	
780	D93-B	188.5		-0.98	
823		-----		-----	
840	D93-B	200.1		2.27	
862		-----		-----	
864		-----		-----	
875	D93-B	202.0		2.80	
902		-----		-----	
912		-----		-----	
913	D93-B	228	R(0.05)	10.08	
922		-----		-----	
962		-----		-----	
963		-----		-----	
974		-----		-----	
994	D93-B	200.0		2.24	
1023		-----		-----	
1026		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1173	D93-B	186.0		-1.68	
1201		-----		-----	
1316		-----		-----	
1396		-----		-----	
1435		-----		-----	
1448		-----		-----	
1456		-----		-----	
1460	D93-B	202.5		2.94	
1543		-----		-----	
1569		-----		-----	
1648	D93-B	186.0		-1.68	
1650	D93-B	185		-1.96	
1740		-----		-----	
1743		-----		-----	
1748		-----		-----	
1752		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		-----		-----	
1854		-----		-----	
1900		-----		-----	
1969		-----		-----	
2133		-----		-----	
6002		-----		-----	
6016	D93-B	186.5		-1.54	
6043		-----		-----	

lab	method	value	mark	z(targ)	remarks
6059		-----		-----	
9100		-----		-----	
9101		-----		-----	
9142		-----		-----	
9143		-----		-----	

normality	OK
n	17
outliers	1
mean (n)	191.982
st.dev. (n)	7.9767
R(calc.)	22.335
st.dev.(D93-B:18)	3.5714
R(D93-B:18)	10



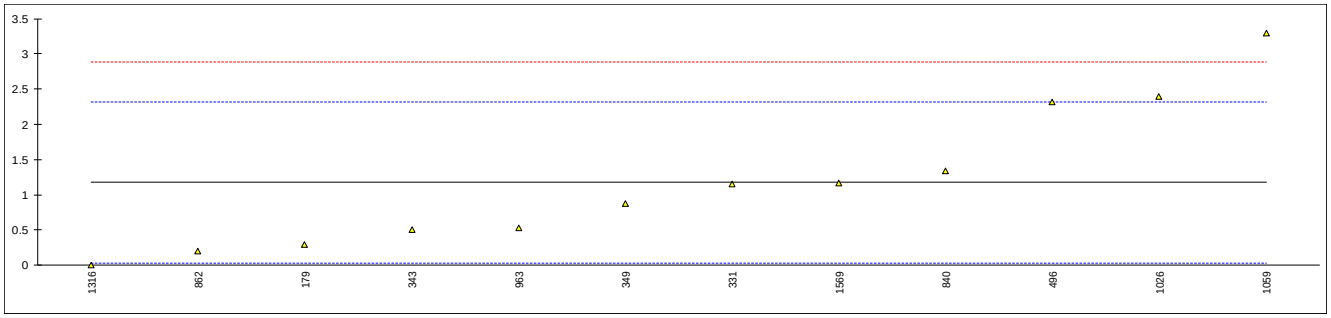


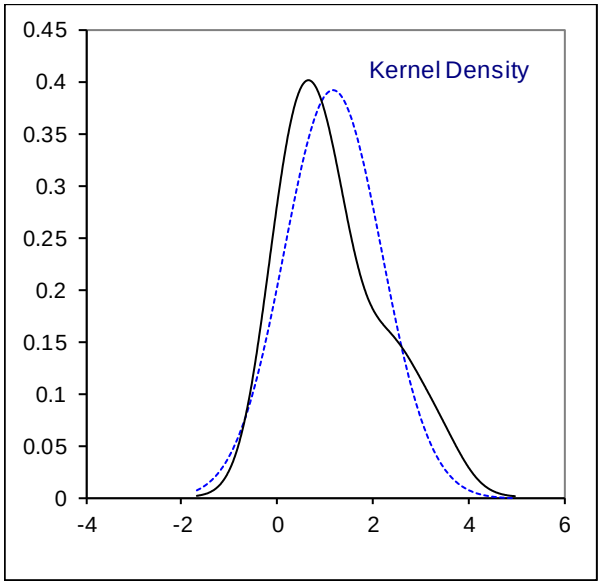
Determination of Fuel dilution on sample #18096; results in %M/M

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179	D3524	0.3		-1.53	
211		-----		-----	
225		-----		-----	
230		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
325		-----		-----	
331	in house	1.15		-0.04	
333		-----		-----	
343	D3524	0.5		-1.18	
349	D3524	0.87		-0.53	
398		-----		-----	
421		-----		-----	
451		-----		-----	
494		-----		-----	
496	DIN51454	2.31		1.99	
511		-----		-----	
512		-----		-----	
541		-----		-----	
562		-----		-----	
575		-----		-----	
603		-----		-----	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657		-----		-----	
663		-----		-----	
780		-----		-----	
823		-----		-----	
840	D3524	1.340		0.29	
862	D3524	0.2		-1.70	
864		-----		-----	
875		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
922		-----		-----	
962		-----		-----	
963	D3524	0.538		-1.11	
974		-----		-----	
994		-----		-----	
1023		-----		-----	
1026	D7593	2.4		2.15	
1059	D3524	3.3		3.72	
1106		-----		-----	
1146		-----		-----	
1173		-----		-----	
1201		-----		-----	
1316	D3524	0		-2.05	
1396		-----		-----	
1435		-----		-----	
1448		-----		-----	
1456		-----		-----	
1460		-----		-----	
1543		-----		-----	
1569	D3524	1.17		-0.01	
1648		-----		-----	
1650		-----		-----	
1740		-----		-----	
1743		-----		-----	
1748		-----		-----	
1752		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		-----		-----	
1854		-----		-----	
1900		-----		-----	
1969		-----		-----	
2133		-----		-----	
6002		-----		-----	
6016		-----		-----	
6043		-----		-----	

lab	method	value	mark	z(targ)	remarks
6059		-----		-----	
9100		-----		-----	
9101		-----		-----	
9142		-----		-----	
9143		-----		-----	

normality	OK
n	12
outliers	0
mean (n)	1.173
st.dev. (n)	1.0173
R(calc.)	2.848
st.dev.(D3524:14)	0.5714
R(D3524:14)	1.6



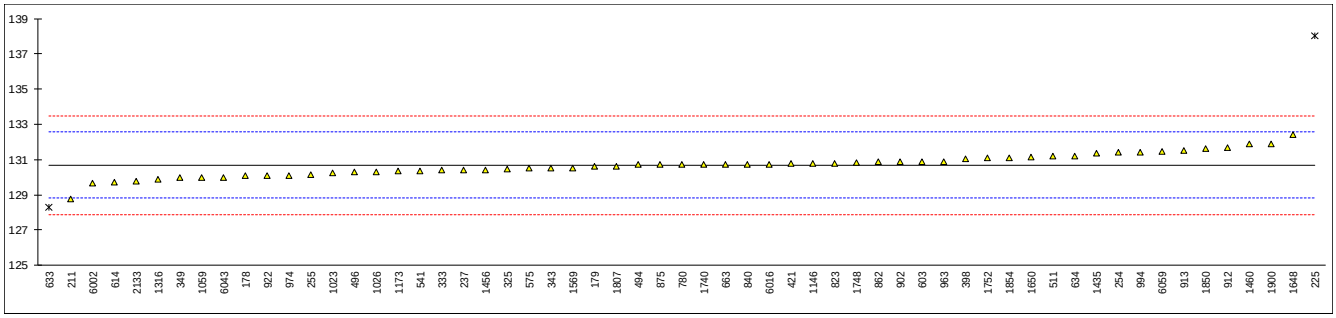


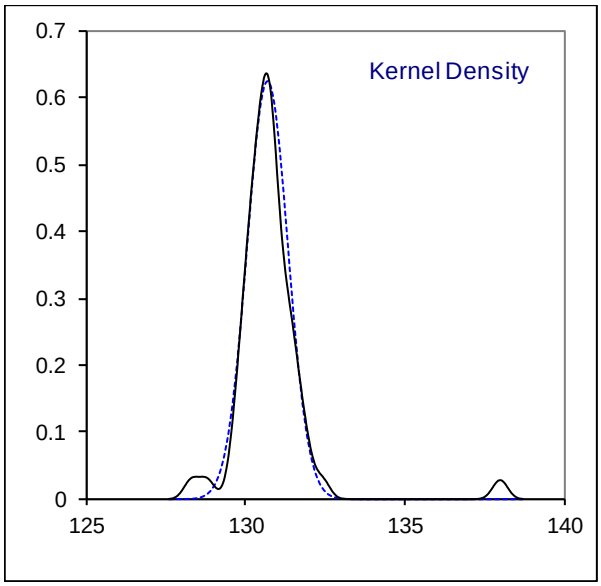
Determination of Kinematic Viscosity at 40°C on sample #18096; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
178	D445	130.1		-0.63	
179	D445	130.6		-0.10	
211	D445	128.79		-2.03	
225	D445	138.0	C,R(0.01)	7.82	First reported 137.7
230		-----		-----	
237	D445	130.4		-0.31	
252		-----		-----	
254	D445	131.4		0.76	
255	D7279 corrected to D445	130.14		-0.59	
325	D445	130.45		-0.26	
331		-----		-----	
333	D445	130.4		-0.31	
343	D445	130.5		-0.20	
349	D445	130.0		-0.74	
398	D445	131.04		0.37	
421	ISO3104	130.77		0.09	
451		-----		-----	
494	D445	130.7		0.01	
496	D445	130.30		-0.42	
511	D445	131.2	C	0.54	First reported 14.27
512		-----		-----	
541	D7042	130.35		-0.36	
562		-----		-----	
575	D445	130.5		-0.20	
603	D7042	130.9		0.22	
614	D445	129.7		-1.06	
633	D7279 corrected to D445	128.3	C,R(0.05)	-2.56	First reported 122.3
634	D445	131.2	C	0.54	First reported 133.9
657		-----		-----	
663	D445	130.73		0.04	
780	D445	130.7		0.01	
823	D445	130.8		0.12	
840	D445	130.74		0.05	
862	D445	130.86		0.18	
864		-----		-----	
875	D445	130.7		0.01	
902	D445	130.9		0.22	
912	D445	131.7		1.08	
913	D445	131.5		0.87	
922	D7042	130.1		-0.63	
962		-----		-----	
963	D445	130.9		0.22	
974	D445	130.1		-0.63	
994	D445	131.43		0.79	
1023	D445	130.26		-0.46	
1026	D445	130.3	C	-0.42	First reported 14.21
1059	ISO3104	130.0		-0.74	
1106		-----		-----	
1146	D445	130.77		0.09	
1173	IP71	130.346		-0.37	
1201		-----	W	-----	Test result withdrawn, reported 89.07
1316	ISO3104	129.9		-0.85	
1396		-----		-----	
1435	D7042	131.38	C	0.74	First reported 14.337
1448		-----		-----	
1456	D7042	130.4		-0.31	
1460	D445	131.895		1.29	
1543		-----		-----	
1569	D445	130.5		-0.20	
1648	D445	132.41		1.84	
1650	D445	131.14		0.48	
1740	D445	130.7		0.01	
1743		-----		-----	
1748	D7042	130.83		0.15	
1752	D7279 corrected to D445	131.1		0.44	
1799		-----		-----	
1807	D445	130.6		-0.10	
1850	ISO3104	131.6		0.97	
1854	ISO3104	131.1		0.44	
1900	D445	131.9		1.29	
1969		-----		-----	
2133	D445	129.78		-0.97	
6002	ISO3104	129.656		-1.11	
6016	D7042	130.74		0.05	
6043	D445	130		-0.74	

lab	method	value	mark	z(targ)	remarks
6059	D445	131.45		0.81	
9100		-----		-----	
9101		-----		-----	
9142		-----		-----	
9143		-----		-----	

normality	OK
n	57
outliers	2
mean (n)	130.690
st.dev. (n)	0.6398
R(calc.)	1.791
st.dev.(D445:17a)	0.9350
R(D445:17a)	2.618



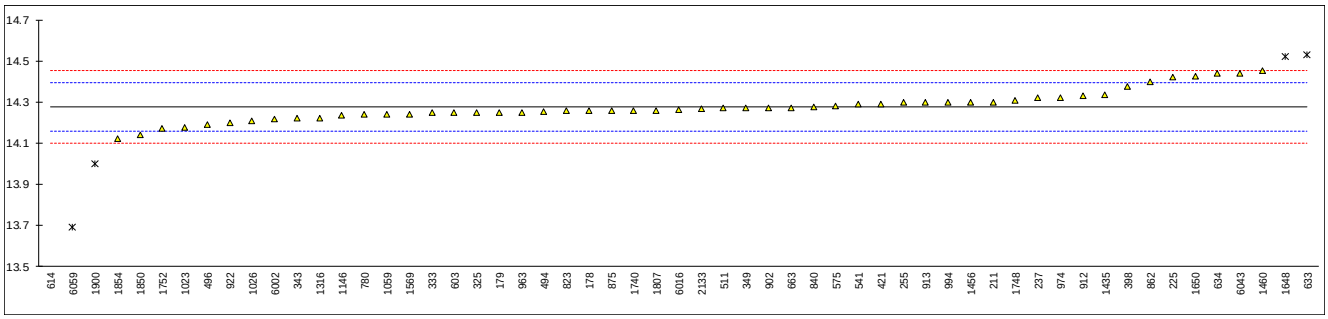


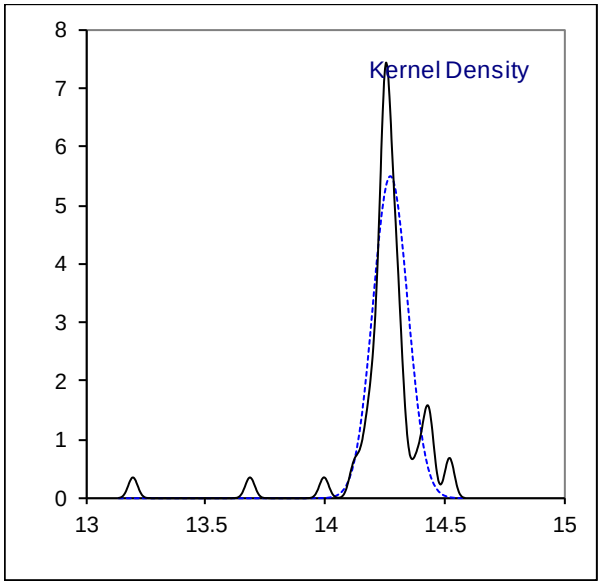
Determination of Kinematic Viscosity at 100°C on sample #18096; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
178	D445	14.26		-0.30	
179	D445	14.25		-0.47	
211	D445	14.301		0.40	
225	D445	14.42		2.42	
230		-----		-----	
237	D445	14.32		0.72	
252		-----		-----	
254		-----		-----	
255	D7279 corrected to D445	14.30		0.38	
325	D445	14.25		-0.47	
331		-----		-----	
333	D445	14.25		-0.47	
343	D445	14.22		-0.98	
349	D445	14.27		-0.13	
398	D445	14.376		1.67	
421	ISO3104	14.2914		0.23	
451		-----		-----	
494	D445	14.255		-0.39	
496	D445	14.190		-1.49	
511	D445	14.27	C	-0.13	First reported 131.2
512		-----		-----	
541	D7042	14.291		0.23	
562		-----		-----	
575	D445	14.28		0.04	
603	D7042	14.25		-0.47	
614	D445	13.2	R(0.01)	-18.35	
633	D7279 corrected to D445	14.53	R(0.05)	4.30	
634	D445	14.44		2.76	
657		-----		-----	
663	D445	14.271		-0.11	
780	D445	14.24		-0.64	
823	D445	14.26		-0.30	
840	D445	14.276		-0.03	
862	D445	14.397		2.03	
864		-----		-----	
875	D445	14.26		-0.30	
902	D445	14.27		-0.13	
912	D445	14.33		0.89	
913	D445	14.30		0.38	
922	D7042	14.20		-1.32	
962		-----		-----	
963	D445	14.25		-0.47	
974	D445	14.32		0.72	
994	D445	14.30		0.38	
1023	D445	14.177		-1.71	
1026	D445	14.21	C	-1.15	First reported 130.3
1059	ISO3104	14.24		-0.64	
1106		-----		-----	
1146	D445	14.235		-0.73	
1173		-----		-----	
1201		-----		-----	
1316	ISO3104	14.22		-0.98	
1396		-----		-----	
1435	D7042	14.337	C	1.01	First reported 131.38
1448		-----		-----	
1456	D7042	14.30		0.38	
1460	D445	14.451		2.95	
1543		-----		-----	
1569	D445	14.24		-0.64	
1648	D445	14.52	R(0.05)	4.13	
1650	D445	14.426		2.53	
1740	D445	14.26		-0.30	
1743		-----		-----	
1748	D7042	14.306		0.48	
1752	D7279 corrected to D445	14.17		-1.83	
1799		-----		-----	
1807	D445	14.26		-0.30	
1850	ISO3104	14.14		-2.34	
1854	ISO3104	14.12		-2.68	
1900	D445	14.00	R(0.05)	-4.73	
1969		-----		-----	
2133	D445	14.269		-0.15	
6002	ISO3104	14.2157		-1.05	
6016	D7042	14.262		-0.27	
6043	D445	14.44		2.76	

lab	method	value	mark	z(targ)	remarks
6059	D445	13.69	R(0.01)	-10.00	
9100		-----		-----	
9101		-----		-----	
9142		-----		-----	
9143		-----		-----	

normality	OK
n	52
outliers	5
mean (n)	14.2776
st.dev. (n)	0.07267
R(calc.)	0.2035
st.dev.(D445:17a)	0.05874
R(D445:17a)	0.1647

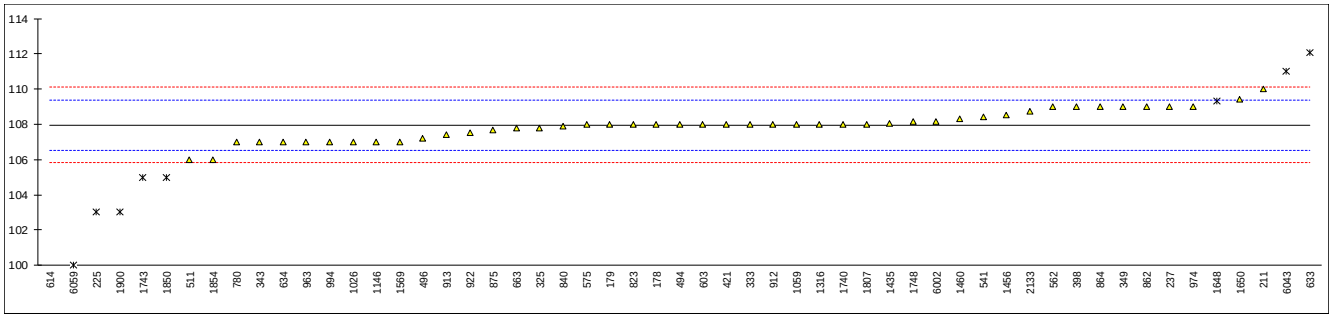


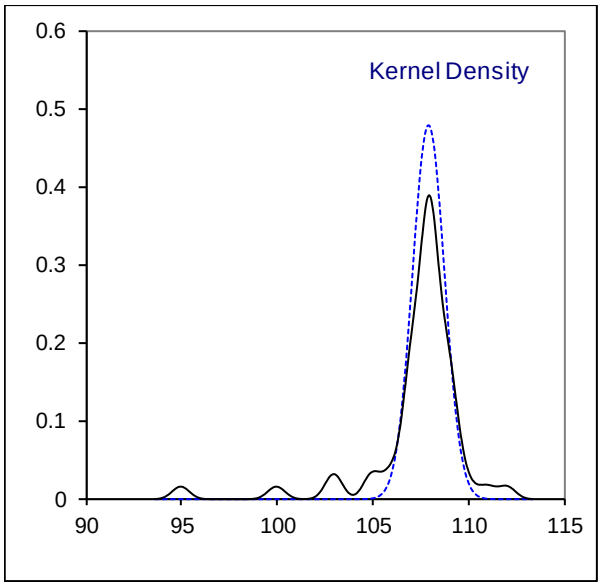


Determination of Viscosity Index on sample #18096

lab	method	value	mark	z(targ)	iis calc.	remarks
178	D2270	108		0.06	108.29	
179	D2270	108		0.06	107.67	
211	D2270	110		2.86	110.12	
225	D2270	103	C,ex	-6.94	102.86	fr.103.1. Result excluded, outlier in Viscosity at 40°C
230		-----		-----	-----	
237	D2270	109		1.46	108.75	
252		-----		-----	-----	
254		-----		-----	-----	
255		-----		-----	108.76	
325	D2270	107.8		-0.22	107.82	
331		-----		-----	-----	
333	D2270	108		0.06	107.87	
343	D2270	107		-1.34	107.39	
349	D2270	109		1.46	108.52	
398	D2270	109		1.46	108.83	
421	ISO2909	108		0.06	108.03	
451		-----		-----	-----	
494	D2270	108		0.06	107.64	
496	D2270	107.2		-1.06	107.20	
511	D2270	106	E	-2.74	107.34	Calculation error?
512		-----		-----	-----	
541	D2270	108.4		0.62	108.44	
562	D2270	109		1.46	-----	
575	D2270	108		0.06	108.15	
603	D2270	108	E	0.06	107.38	Calculation error?
614	D2270	95	ex	-18.14	94.70	Result excluded, outlier in Viscosity at 100°C
633	D2270	112.054	C,ex	5.74	113.54	fr.120. Result excluded, outlier in Visco 40°C & 100°C
634	D2270	107	E	-1.34	109.47	Calculation error?
657		-----		-----	-----	
663	D2270	107.8		-0.22	107.81	
780	D2270	107		-1.34	107.45	
823	D2270	108		0.06	107.60	
840	D2270	107.9		-0.08	107.86	
862	D2270	109		1.46	109.27	
864	D2270	109		1.46	-----	
875	D2270	107.7		-0.36	107.70	
902		-----		-----	107.63	
912	D2270	108		0.06	107.61	
913	D2270	107.4		-0.78	107.43	
922	D2270	107.5		-0.64	107.53	
962		-----		-----	-----	
963	D2270	107		-1.34	107.38	
974	D2270	109		1.46	109.05	
994	D2270	107		-1.34	107.49	
1023		-----		-----	107.08	
1026	D2270	107		-1.34	107.46	
1059	ISO2909	108		0.06	108.13	
1106		-----		-----	-----	
1146	D2270	107		-1.34	107.32	
1173		-----		-----	-----	
1201		-----		-----	-----	
1316	D2270	108		0.06	107.98	
1396		-----		-----	-----	
1435	D2270	108.03		0.10	108.01	
1448		-----		-----	-----	
1456	D2270	108.5		0.76	108.50	
1460	D2270	108.3	E	0.48	108.93	Calculation error?
1543		-----		-----	-----	
1569	D2270	107	E	-1.34	107.64	Calculation error?
1648	D2270	109.3	ex	1.88	109.30	Result excluded, outlier in Viscosity at 100°C
1650	D2270	109.4		2.02	109.36	
1740	D2270	108		0.06	107.70	
1743	ISO2909	105	C,R(0.05)	-4.14	-----	First reported 95
1748	D2270	108.155		0.28	108.15	
1752		-----		-----	106.17	
1799		-----		-----	-----	
1807	D2270	108		0.06	107.80	
1850	ISO2909	105	R(0.05)	-4.14	105.31	
1854	D2270	106		-2.74	105.53	
1900	D2270	103	ex	-6.94	103.23	Result excluded, outlier in Viscosity at 100°C
1969		-----		-----	-----	
2133	D2270	108.72093		1.07	108.72	
6002	ISO2909	108.16		0.29	108.16	
6016		-----		-----	107.69	
6043	D2270	111	R(0.05)	4.26	110.66	

lab	method	value	mark	z(targ)	iis calc.	remarks
6059	D2270	100	ex	-11.14	99.63	Result excluded, outlier in Viscosity at 100°C
9100		-----		-----		
9101		-----		-----		
9142		-----		-----		
9143		-----		-----		
	normality	OK			suspect	
	n	46			49	
	outliers	3 (+6 excl)			2 (+6 excl)	
	mean (n)	107.96			107.96	
	st.dev. (n)	0.835			0.801	
	R(calc.)	2.34			2.2442	
	st.dev.(D2270:10)	0.714			0.714	
	R(D2270:10)	2			2	



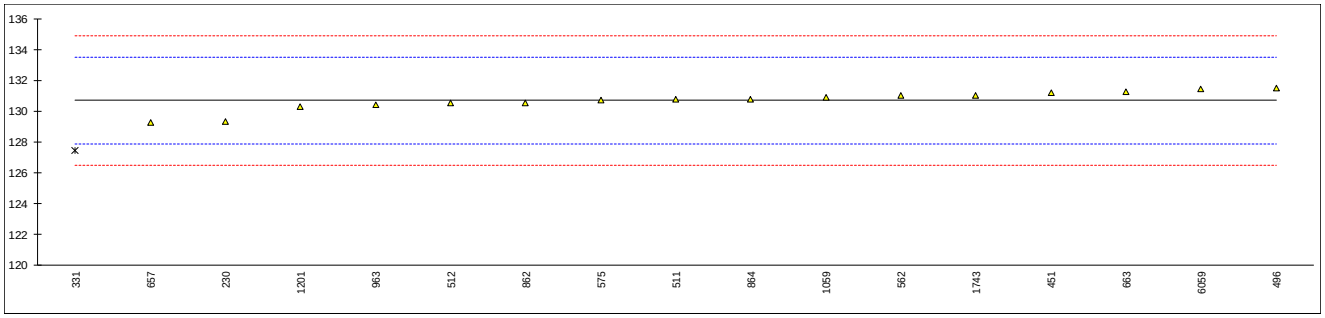


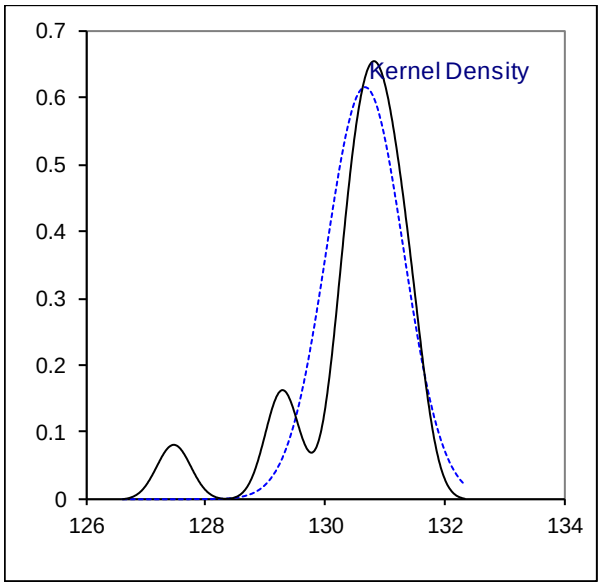
Determination of Kinematic Viscosity at 40°C (Houillon) on sample #18096; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179		-----		-----	
211		-----		-----	
225		-----		-----	
230	INH-20	129.32		-0.97	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
325		-----		-----	
331	D7279mod	127.47	G(0.01)	-2.29	
333		-----		-----	
343		-----		-----	
349		-----		-----	
398		-----		-----	
421		-----		-----	
451	D7279	131.2		0.37	
494		-----		-----	
496	D7279	131.5		0.58	
511	D7279	130.8	C	0.08	First reported 14.35
512	D7279	130.5	C	-0.13	First reported 14.48
541		-----		-----	
562	D7279	131.0		0.23	
575	D7279	130.7		0.01	
603		-----		-----	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657	D7279	129.27		-1.01	
663	D7279	131.26		0.41	
780		-----		-----	
823		-----		-----	
840		-----		-----	
862	D7279	130.5		-0.13	
864	D7279	130.8		0.08	
875		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
922		-----		-----	
962		-----		-----	
963	D7279	130.4		-0.20	
974		-----		-----	
994		-----		-----	
1023		-----		-----	
1026		-----		-----	
1059	D7279	130.9		0.16	
1106		-----		-----	
1146		-----		-----	
1173		-----		-----	
1201	D7279	130.3		-0.27	
1316		-----		-----	
1396		-----		-----	
1435		-----		-----	
1448		-----		-----	
1456		-----		-----	
1460		-----		-----	
1543		-----		-----	
1569		-----		-----	
1648		-----		-----	
1650		-----		-----	
1740		-----		-----	
1743	D7279	131.0		0.23	
1748		-----		-----	
1752		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		-----		-----	
1854		-----		-----	
1900		-----		-----	
1969		-----		-----	
2133		-----		-----	
6002		-----		-----	
6016		-----		-----	
6043		-----		-----	

lab	method	value	mark	z(targ)	remarks
6059		131.45		0.55	
9100		-----		-----	
9101		-----		-----	
9142		-----		-----	
9143		-----		-----	

normality	suspect
n	16
outliers	1
mean (n)	130.681
st.dev. (n)	0.6470
R(calc.)	1.812
st.dev.(D7279:16)	1.4002
R(D7279:16)	3.920



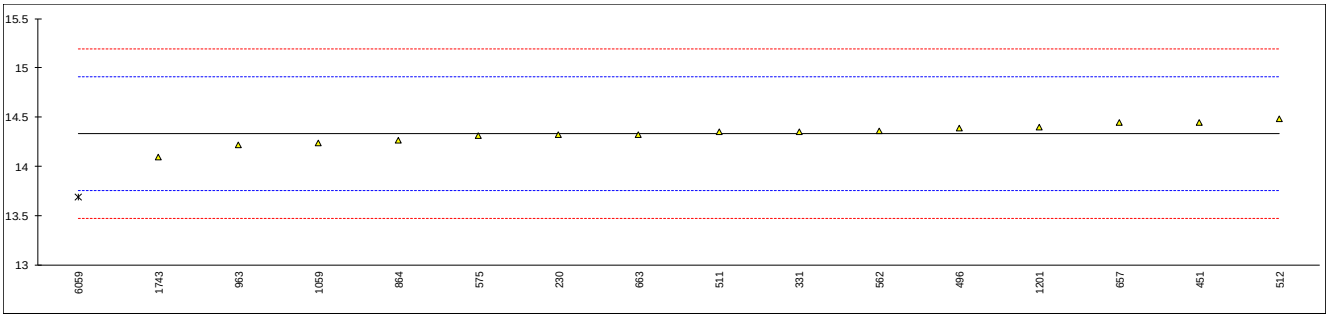


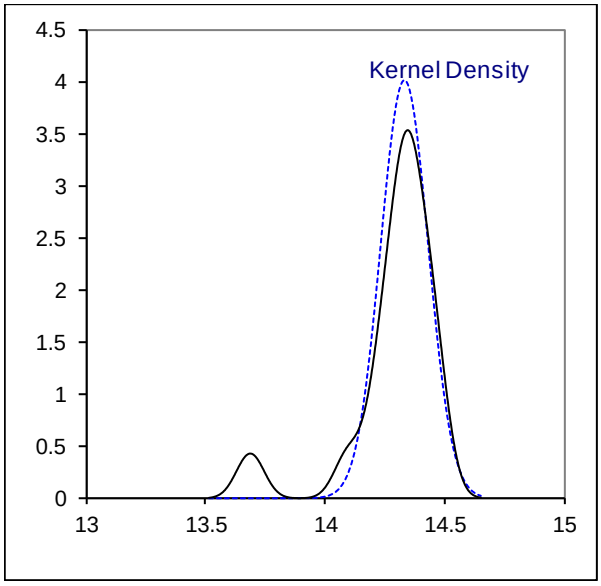
Determination of Kinematic Viscosity at 100°C (Houillon) on sample #18096; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179		-----		-----	
211		-----		-----	
225		-----		-----	
230	INH-20	14.321		-0.05	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
325		-----		-----	
331	D7279mod	14.35		0.06	
333		-----		-----	
343		-----		-----	
349		-----		-----	
398		-----		-----	
421		-----		-----	
451	D7279	14.45		0.40	
494		-----		-----	
496	D7279	14.39		0.19	
511	D7279	14.35	C	0.06	First reported 130.8
512	D7279	14.48	C	0.51	First reported 130.5
541		-----		-----	
562	D7279	14.36		0.09	
575	D7279	14.31		-0.08	
603		-----		-----	
614		-----		-----	
633		-----		-----	
634		-----		-----	
657	D7279	14.4475		0.40	
663	D7279	14.325		-0.03	
780		-----		-----	
823		-----		-----	
840		-----		-----	
862		-----		-----	
864	D7279	14.27		-0.22	
875		-----		-----	
902		-----		-----	
912		-----		-----	
913		-----		-----	
922		-----		-----	
962		-----		-----	
963	D7279	14.22		-0.40	
974		-----		-----	
994		-----		-----	
1023		-----		-----	
1026		-----		-----	
1059	D7279	14.24		-0.33	
1106		-----		-----	
1146		-----		-----	
1173		-----		-----	
1201	D7279	14.40		0.23	
1316		-----		-----	
1396		-----		-----	
1435		-----		-----	
1448		-----		-----	
1456		-----		-----	
1460		-----		-----	
1543		-----		-----	
1569		-----		-----	
1648		-----		-----	
1650		-----		-----	
1740		-----		-----	
1743	D7279	14.1	C	-0.82	First reported 13.30
1748		-----		-----	
1752		-----		-----	
1799		-----		-----	
1807		-----		-----	
1850		-----		-----	
1854		-----		-----	
1900		-----		-----	
1969		-----		-----	
2133		-----		-----	
6002		-----		-----	
6016		-----		-----	
6043		-----		-----	

lab	method	value	mark	z(targ)	remarks
6059		13.69	G(0.01)	-2.25	
9100		-----		-----	
9101		-----		-----	
9142		-----		-----	
9143		-----		-----	

normality	OK
n	15
outliers	1
mean (n)	14.3342
st.dev. (n)	0.09923
R(calc.)	0.2778
st.dev.(D7279:16)	0.28668
R(D7279:16)	0.8027

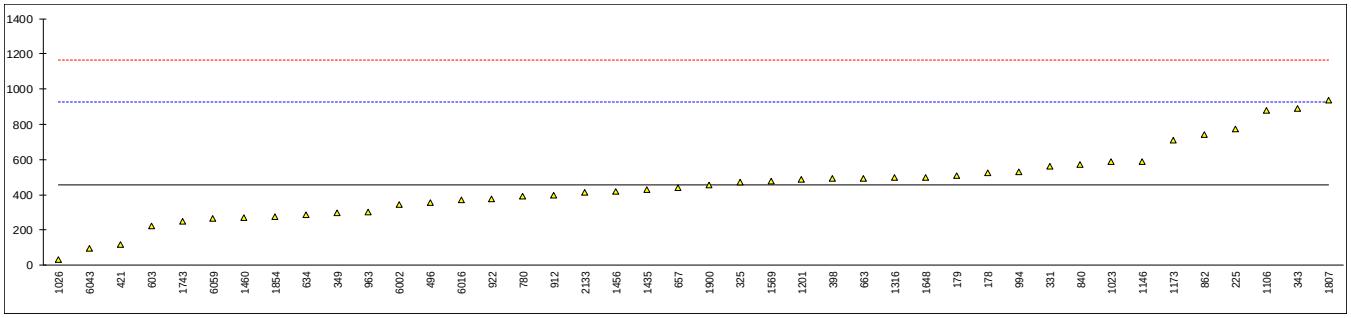


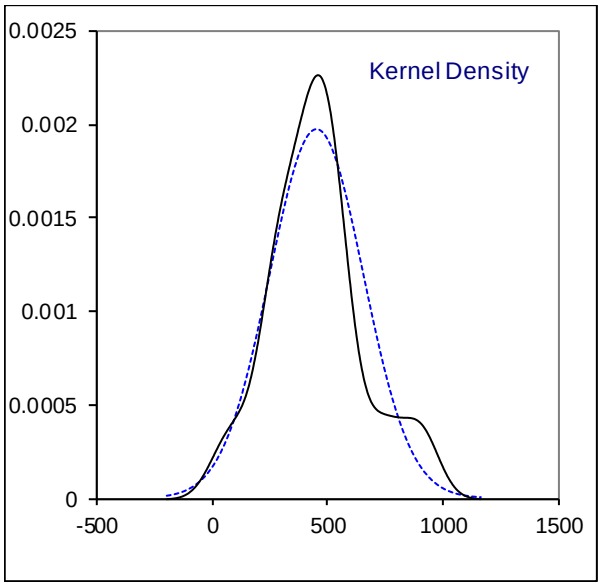


Determination of Water content by KF on sample #18096; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D6304-C	527		0.31	
179	D6304-C	511		0.24	
211		-----		-----	
225	D6304-A	775		1.36	
230		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
325	D6304-C	473		0.08	
331	D6304mod	563.7		0.46	
333		-----		-----	
343	E203	890		1.84	
349	D6304-A	299	C	-0.65	First reported 1713
398	D6304-C	491		0.16	
421	D6304-C	118		-1.42	
451		-----		-----	
494		-----		-----	
496	D6304-C	357		-0.41	
511		-----		-----	
512		-----		-----	
541		-----		-----	
562		-----		-----	
575		-----		-----	
603	D6304-C	222		-0.98	
614		-----		-----	
633		-----		-----	
634	D6304-C	288		-0.70	
657	D6304-C	441.23		-0.05	
663	D6304-C	495		0.17	
780	D6304-C	392		-0.26	
823		-----		-----	
840	D6304-C	571.7		0.50	
862	D6304-C	742.8		1.22	
864		-----		-----	
875		-----		-----	
902		-----		-----	
912	D6304-A	399		-0.23	
913		-----		-----	
922	D6304-C	375		-0.33	
962		-----		-----	
963	D6304-C	302		-0.64	
974		-----		-----	
994	IP438	528		0.31	
1023	D6304-C	585.7		0.56	
1026	D6304-A	32		-1.78	
1059		-----		-----	
1106	D6304-A	880.9		1.80	
1146	D6304-C	586		0.56	
1173	in house	710.5		1.08	
1201	D6304-A	490		0.15	
1316	D6304-C	500		0.20	
1396		-----		-----	
1435	D6304-A	428.7		-0.11	
1448		-----		-----	
1456	D6304-C	418		-0.15	
1460	D6304-A	269.5		-0.78	
1543		-----		-----	
1569	D6304-C	475		0.09	
1648	D6304-C	500		0.20	
1650		-----		-----	
1740		-----		-----	
1743		250		-0.86	
1748		-----		-----	
1752		-----		-----	
1799		-----		-----	
1807	ISO12937	938		2.05	
1850		-----		-----	
1854	D6304-C	275		-0.75	
1900	D6304-C	456		0.01	
1969		-----		-----	
2133	D6304-C	413		-0.17	
6002	D6304-C	346.27		-0.45	
6016	D6304-A	371.45		-0.35	
6043	D4928	98		-1.50	

lab	method	value	mark	z(targ)	remarks
6059	D6304-A	265		-0.80	
9100		-----		-----	
9101		-----		-----	
9142		-----		-----	
9143		-----		-----	
					Only ASTM D6304-C results
	normality	OK			OK
	n	42			25
	outliers	0			0
	mean (n)	453.58			434.47
	st.dev. (n)	202.261			132.731
	R(calc.)	566.33			371.645
	st.dev.(D6304:16e1)	236.869			230.829
	R(D6304:16e1)	663.23			646.32



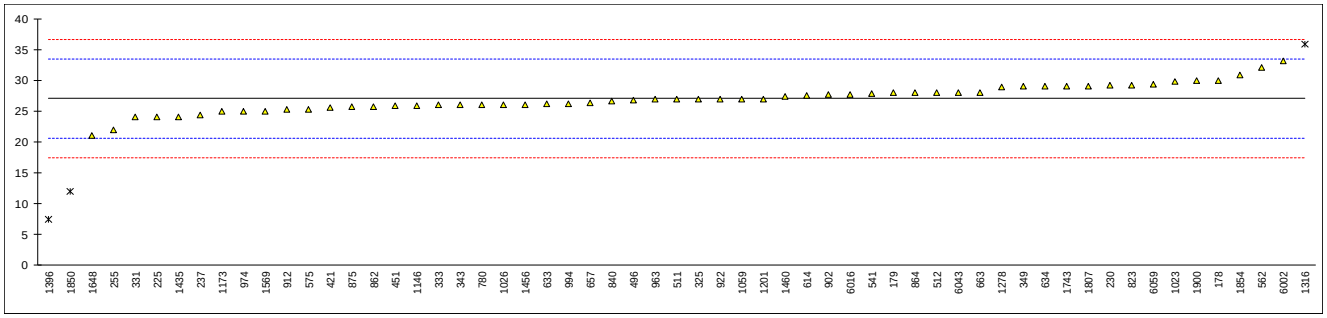


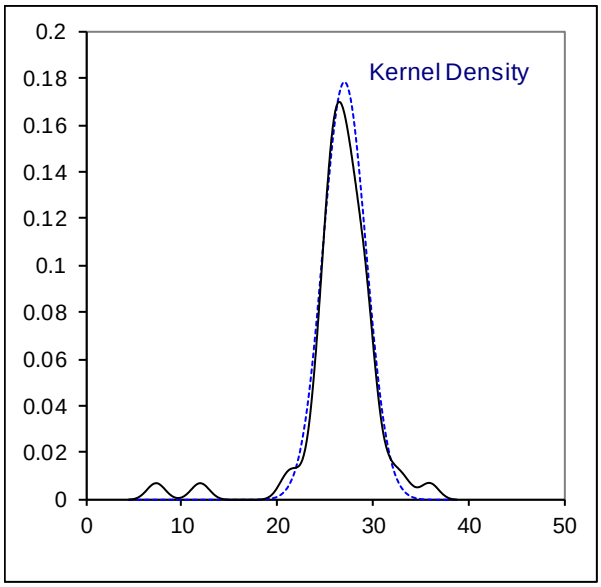
Determination of Aluminium as Al on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	30		0.93	
179	D5185	28		0.30	
225	D6595	24.1		-0.92	
230	D5185	29.2		0.68	
237	D5185	24.31		-0.85	
254		-----		-----	
255	INH-OL1	21.92		-1.60	
325	D5185	27		-0.01	
331	D5185Mod.	24.0		-0.95	
333	D5185	26		-0.32	
343	D5185	26		-0.32	
349		29		0.61	
398		-----		-----	
421	D5185	25.5		-0.48	
451		25.8		-0.39	
494		-----		-----	
496	D5185	26.81		-0.07	
511	D5185	27		-0.01	
512	D5185	28		0.30	
541	D5185	27.8		0.24	
562	D6595	32		1.55	
575	D6595	25.3		-0.54	
614	D5185	27.6		0.18	
633	D6595	26.1		-0.29	
634	D6595	29		0.61	
657	D5185	26.30		-0.23	
663	D5185	28.02		0.31	
780	D5185	26		-0.32	
823	D5185	29.2		0.68	
840	D5185	26.7		-0.10	
862	D5185	25.7		-0.42	
864	D5185	28		0.30	
875	D5185	25.7		-0.42	
902	D5185	27.61		0.18	
912	D5185	25.2		-0.57	
922	D5185	27		-0.01	
962		-----		-----	
963	D5185	26.90		-0.04	
974		25		-0.64	
994	D5185	26.2		-0.26	
1023	D5185	29.8069		0.87	
1026	D5185	26		-0.32	
1059	In house	27		-0.01	
1146	In house	25.86		-0.37	
1173	INH-66	24.895		-0.67	
1201	D5185	27		-0.01	
1278	D5185	28.9		0.58	
1316	D5185	35.9	R(0.05)	2.77	
1396	In house	7.40	R(0.01)	-6.14	
1435	D5185	24.12		-0.91	
1456	D5185	26		-0.32	
1460	D5185	27.38		0.11	
1543		-----		-----	
1569	D5185	25		-0.64	
1648	D5185	21		-1.89	
1740		-----		-----	
1743	D5185	29		0.61	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	29		0.61	
1850	In house	12	R(0.01)	-4.70	
1854		30.9		1.21	
1900	D5185	29.92		0.90	
2160		-----		-----	
6002	D6595	33.19		1.92	
6016	D5185	27.71	C	0.21	First reported 2.771
6043		28		0.30	
6059	D5185	29.3		0.71	

normality	OK
n	56
outliers	3
mean (n)	27.035
st.dev. (n)	2.2330
R(calc.)	6.253
st.dev.(D5185:18)	3.1983
R(D5185:18)	8.955

Application range : 6 – 40 mg/kg



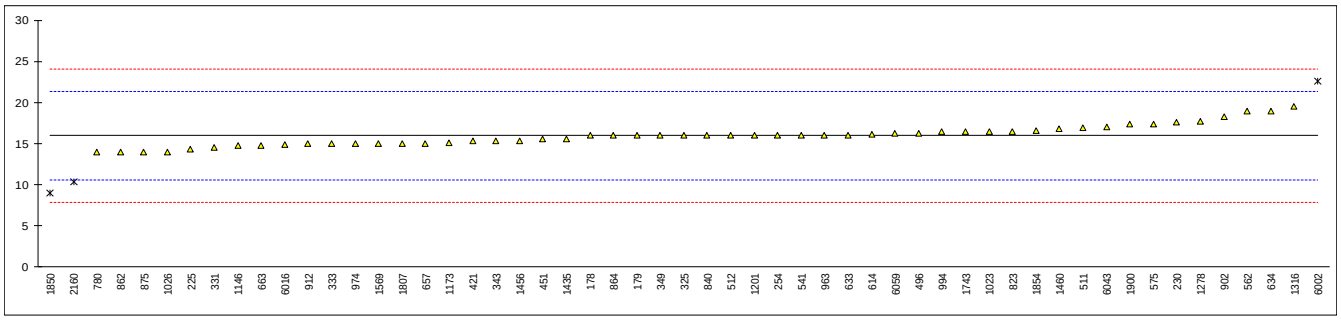


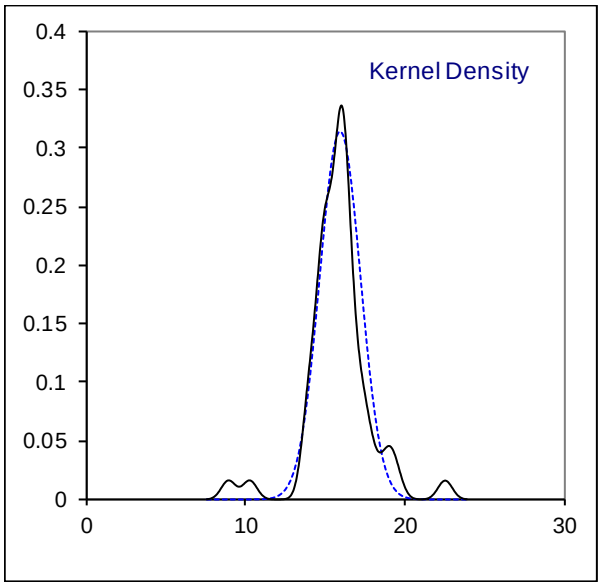
Determination of Barium as Ba on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	16		0.01	
179	D5185	16		0.01	
225	D6595	14.3		-0.62	
230	D5185	17.64		0.62	
237		-----		-----	
254	INH-018	16.010		0.01	
255		-----		-----	
325	D5185	16		0.01	
331	D5185Mod.	14.5		-0.55	
333	D5185	15		-0.36	
343	D5185	15.3		-0.25	
349		16		0.01	
398		-----		-----	
421	D5185	15.3		-0.25	
451		15.5		-0.18	
494		-----		-----	
496	D5185	16.26		0.11	
511	D5185	16.9		0.34	
512	D5185	16.0		0.01	
541	D5185	16.04		0.02	
562	D6595	19		1.12	
575	D6595	17.4		0.53	
614	D5185	16.12		0.05	
633	D6595	16.05		0.03	
634	D6595	19		1.12	
657	D5185	15.03		-0.35	
663	D5185	14.77		-0.45	
780	D5185	14		-0.73	
823	D5185	16.5		0.19	
840	D5185	16.0		0.01	
862	D5185	14.0		-0.73	
864	D5185	16		0.01	
875	D5185	14.0		-0.73	
902	D5185	18.27		0.85	
912	D5185	14.96		-0.38	
922		-----		-----	
962		-----		-----	
963	D5185	16.04		0.02	
974		15		-0.36	
994	D5185	16.4		0.16	
1023	D5185	16.4679		0.18	
1026	D5185	14		-0.73	
1059		-----		-----	
1146	In house	14.75		-0.45	
1173	INH-66	15.07		-0.34	
1201	D5185	16		0.01	
1278	D5185	17.68		0.63	
1316	D5185	19.5		1.31	
1396		-----		-----	
1435	D5185	15.57		-0.15	
1456	D5185	15.3		-0.25	
1460	D5185	16.78		0.30	
1543		-----		-----	
1569	D5185	15		-0.36	
1648		-----		-----	
1740		-----		-----	
1743	D5185	16.4		0.16	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	15		-0.36	
1850	In house	9	R(0.01)	-2.59	
1854		16.6		0.23	
1900	D5185	17.318		0.50	
2160	In house	10.33	R(0.01)	-2.09	
6002	D6595	22.54	C,R(0.01)	2.43	First reported 28.54
6016	D5185	14.85	C	-0.42	First reported 1.485
6043		17		0.38	
6059	D5185	16.2		0.08	

normality	OK
n	52
outliers	3
mean (n)	15.976
st.dev. (n)	1.2727
R(calc.)	3.564
st.dev.(D5185:18)	2.6971
R(D5185:18)	7.552
Compare	
R(Horwitz)	4.716

Application range: 0.5 – 4 mg/kg



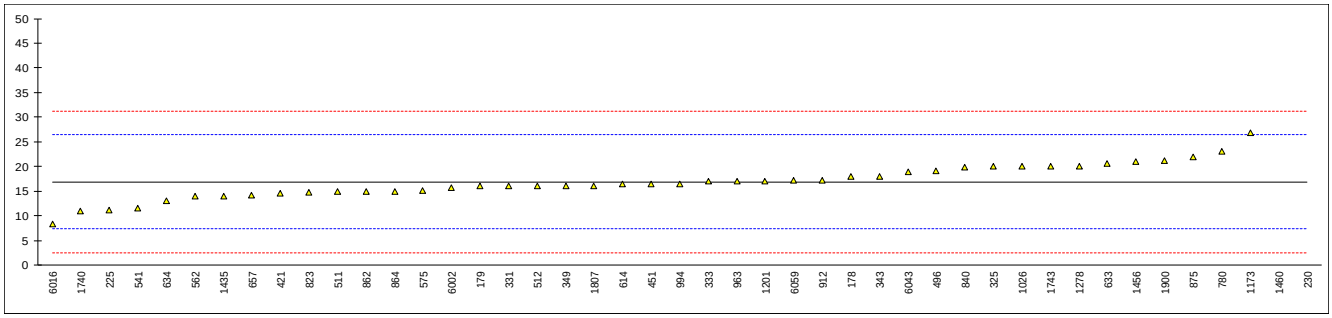


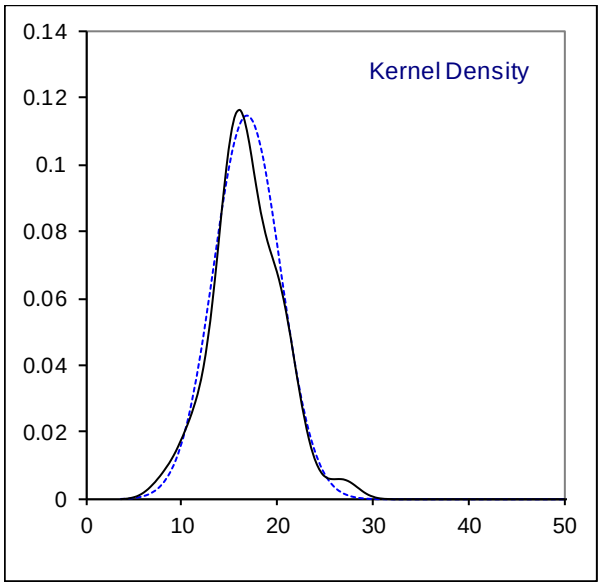
Determination of Boron as B on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	18		0.23	
179	D5185	16		-0.19	
225	D6595	11.1		-1.21	
230	D5185	121.4	C,R(0.01)	21.88	First reported 92.4
237		-----		-----	
254		-----		-----	
255		-----		-----	
325	D5185	20		0.65	
331	D5185Mod.	16.0		-0.19	
333	D5185	17		0.02	
343	D5185	18		0.23	
349		16	C	-0.19	First reported 37
398		-----		-----	
421	D5185	14.6		-0.48	
451		16.5		-0.08	
494		-----		-----	
496	D5185	19.05		0.45	
511	D5185	15		-0.39	
512	D5185	16		-0.19	
541	D5185	11.5		-1.13	
562	D6595	14		-0.60	
575	D6595	15.1		-0.37	
614	D5185	16.4		-0.10	
633	D6595	20.67		0.79	
634	D6595	13		-0.81	
657	D5185	14.28		-0.55	
663		-----		-----	
780	D5185	23		1.28	
823	D5185	14.8		-0.44	
840	D5185	19.9		0.63	
862	D5185	15.0		-0.39	
864	D5185	15		-0.39	
875	D5185	22.0		1.07	
902		-----		-----	
912	D5185	17.24		0.07	
922		-----		-----	
962		-----		-----	
963	D5185	17.00		0.02	
974		-----		-----	
994	D5185	16.5		-0.08	
1023		-----		-----	
1026	D5185	20		0.65	
1059		-----		-----	
1146		-----		-----	
1173	INH-66	26.925		2.10	
1201	D5185	17		0.02	
1278	D5185	20.03		0.66	
1316		-----		-----	
1396		-----		-----	
1435	D5185	14.07		-0.59	
1456	D5185	21		0.86	
1460	D5185	74.6	R(0.01)	12.08	
1543		-----		-----	
1569		-----		-----	
1648		-----		-----	
1740	D5185	11		-1.23	
1743	D5185	20		0.65	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	16		-0.19	
1850		-----		-----	
1854		-----		-----	
1900	D5185	21.128		0.89	
2160	In house	--		-----	
6002	D6595	15.66		-0.26	
6016	D5185	8.39	C	-1.78	First reported 0.839
6043		19		0.44	
6059	D5185	17.2		0.07	

normality	OK
n	43
outliers	2
mean (n)	16.885
st.dev. (n)	3.4859
R(calc.)	9.761
st.dev.(D5185:18)	4.7760
R(D5185:18)	13.373

Application range: 4 – 30 mg/kg

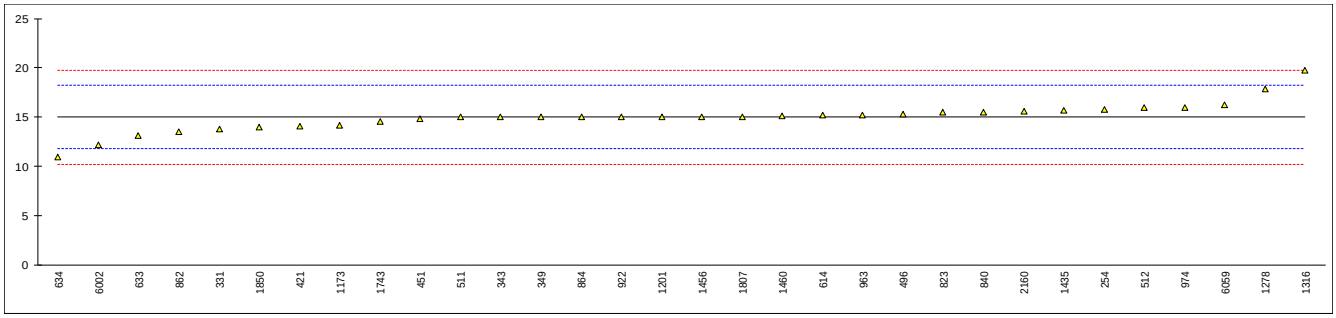


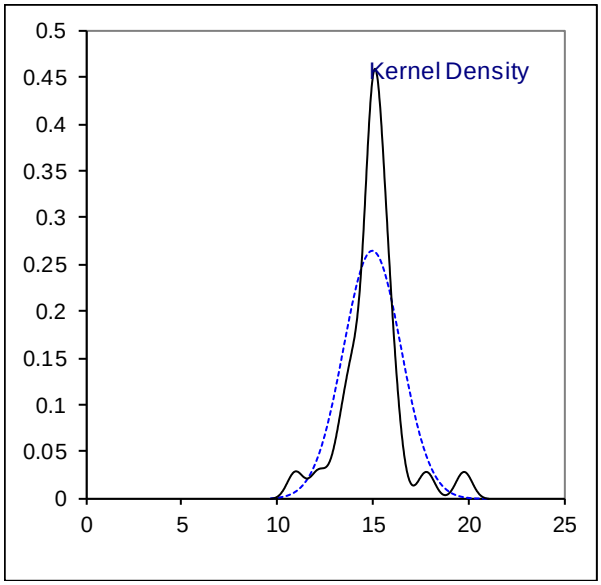


Determination of Cadmium as Cd on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179		-----		-----	
225		-----		-----	
230		-----		-----	
237		-----		-----	
254	INH-018	15.828		0.51	
255		-----		-----	
325		-----		-----	
331	D5185Mod.	13.8		-0.76	
333		-----		-----	
343	D5185	15		-0.01	
349		15		-0.01	
398		-----		-----	
421	D5185	14.1		-0.57	
451		14.8		-0.13	
494		-----		-----	
496	D5185	15.36		0.22	
511	D5185	15		-0.01	
512	D5185	16		0.62	
541		-----		-----	
562		-----		-----	
575		-----		-----	
614	D5185	15.21		0.13	
633	D6595	13.19		-1.14	
634	D6595	11		-2.51	
657		-----		-----	
663		-----		-----	
780		-----		-----	
823	D5185	15.5		0.31	
840	D5185	15.5		0.31	
862	D5185	13.5		-0.94	
864	D5185	15		-0.01	
875		-----		-----	
902		-----		-----	
912	D5185	<1	C	<-8.77	First reported 0, Possibly a false negative test result?
922	D5185	15		-0.01	
962		-----		-----	
963	D5185	15.23		0.14	
974		16		0.62	
994		-----		-----	
1023		-----		-----	
1026		-----		-----	
1059		-----		-----	
1146		-----		-----	
1173	INH-66	14.17		-0.53	
1201	D5185	15		-0.01	
1278	D5185	17.83		1.77	
1316	D5185	19.8		3.00	
1396		-----		-----	
1435	D5185	15.67		0.41	
1456	D5185	15		-0.01	
1460	D5185	15.13		0.08	
1543		-----		-----	
1569		-----		-----	
1648		-----		-----	
1740		-----		-----	
1743	D5185	14.6		-0.26	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	15		-0.01	
1850	In house	14		-0.63	
1854		-----		-----	
1900		-----		-----	
2160	In house	15.58		0.36	
6002	D6595	12.2		-1.76	
6016		-----		-----	
6043		-----		-----	
6059	D5185	16.3		0.81	

normality	not OK
n	32
outliers	0
mean (n)	15.009
st.dev. (n)	1.5076
R(calc.)	4.221
st.dev.(Horwitz)	1.5974
R(Horwitz)	4.473



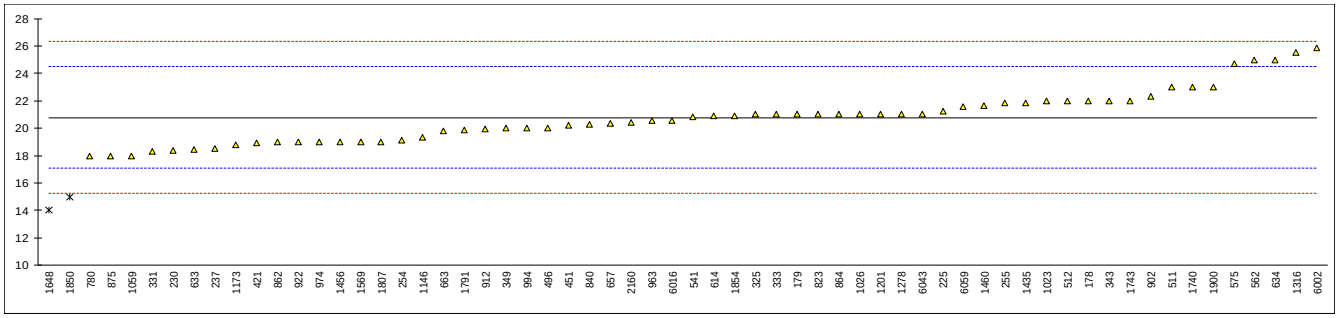


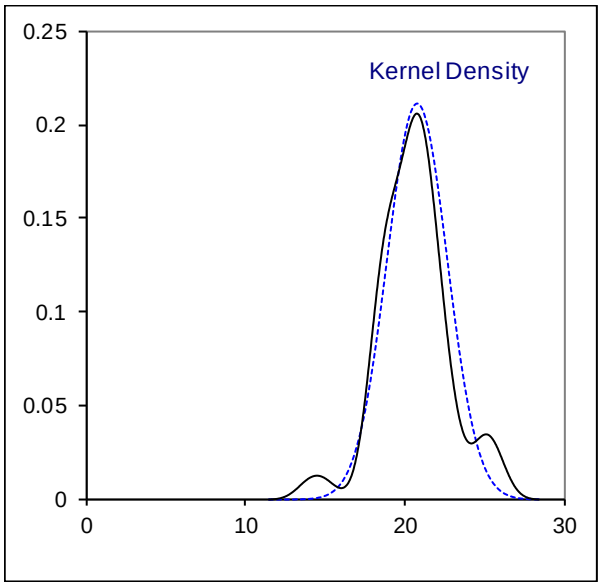
Determination of Chromium as Cr on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	22		0.66	
179	D5185	21		0.12	
225	D6595	21.2		0.23	
230	D5185	18.4		-1.29	
237	D5185	18.54		-1.22	
254	INH-018	19.159		-0.88	
255	INH-OL1	21.85		0.58	
325	D5185	21		0.12	
331	D5185Mod.	18.3		-1.35	
333	D5185	21		0.12	
343	D5185	22		0.66	
349		20		-0.42	
398		-----		-----	
421	D5185	18.9		-1.02	
451		20.2		-0.32	
494		-----		-----	
496	D5185	20.03		-0.41	
511	D5185	23		1.20	
512	D5185	22		0.66	
541	D5185	20.8		0.01	
562	D6595	25		2.29	
575	D6595	24.7		2.13	
614	D5185	20.87		0.05	
633	D6595	18.46		-1.26	
634	D6595	25		2.29	
657	D5185	20.33		-0.25	
663	D5185	19.78		-0.54	
780	D5185	18		-1.51	
823	D5185	21		0.12	
840	D5185	20.3		-0.26	
862	D5185	19.0		-0.97	
864	D5185	21		0.12	
875	D5185	18.0		-1.51	
902	D5185	22.30		0.82	
912	D5185	19.96		-0.45	
922	D5185	19		-0.97	
962		-----		-----	
963	D5185	20.54		-0.13	
974		19		-0.97	
994	D5185	20.0		-0.42	
1023	D5185	21.9703		0.65	
1026	D5185	21		0.12	
1059	In house	18		-1.51	
1146	In house	19.33		-0.79	
1173	INH-66	18.76		-1.10	
1201	D5185	21		0.12	
1278	D5185	21.0		0.12	
1316	D5185	25.5		2.56	
1396		-----		-----	
1435	D5185	21.86		0.59	
1456	D5185	19		-0.97	
1460	D5185	21.64		0.47	
1543		-----		-----	
1569	D5185	19		-0.97	
1648	D5185	14	DG(0.05)	-3.68	
1740	D5185	23		1.20	
1743	D5185	22		0.66	
1748		-----		-----	
1752		-----		-----	
1791	In house	19.86		-0.50	
1807	D5185	19		-0.97	
1850	In house	15	DG(0.05)	-3.14	
1854		20.9		0.06	
1900	D5185	23.001		1.21	
2160	In house	20.42		-0.20	
6002	D6595	25.89		2.77	
6016	D5185	20.57	C	-0.12	First reported 2.057
6043		21		0.12	
6059	D5185	21.6		0.44	

normality	OK
n	60
outliers	2
mean (n)	20.782
st.dev. (n)	1.8878
R(calc.)	5.286
st.dev.(D5185:18)	1.8413
R(D5185:18)	5.156

Application range: 1 – 40 mg/kg



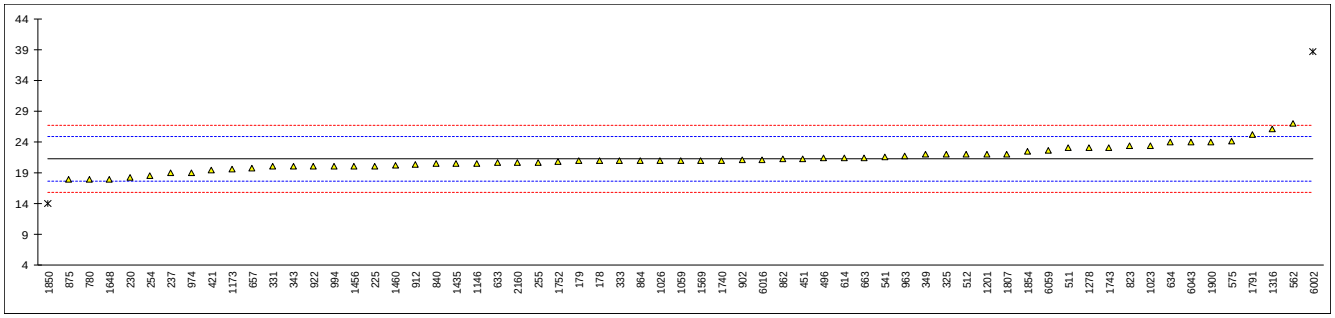


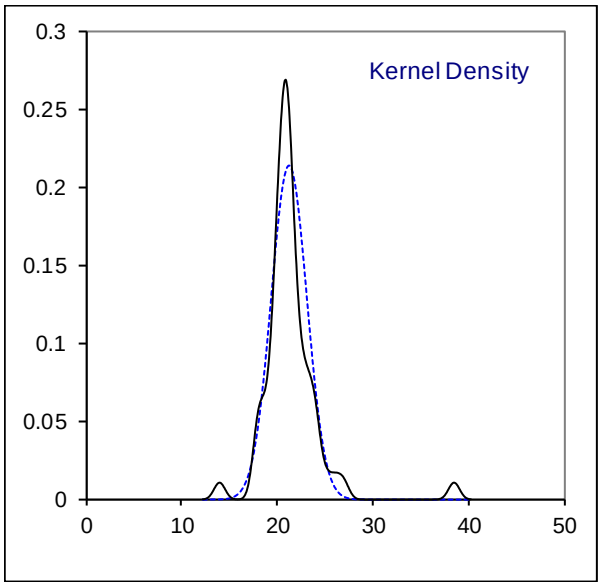
Determination of Copper as Cu on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	21		-0.16	
179	D5185	21		-0.16	
225	D6595	20.1		-0.65	
230	D5185	18.2		-1.69	
237	D5185	18.97		-1.27	
254	INH-018	18.610		-1.47	
255	INH-OL1	20.72		-0.31	
325	D5185	22		0.39	
331	D5185Mod.	20.0		-0.71	
333	D5185	21		-0.16	
343	D5185	20		-0.71	
349		22		0.39	
398		-----		-----	
421	D5185	19.5		-0.98	
451		21.3		0.01	
494		-----		-----	
496	D5185	21.36		0.04	
511	D5185	23		0.94	
512	D5185	22		0.39	
541	D5185	21.6		0.17	
562	D6595	27		3.13	
575	D6595	24.2		1.60	
614	D5185	21.42		0.07	
633	D6595	20.62		-0.37	
634	D6595	24		1.49	
657	D5185	19.73		-0.85	
663	D5185	21.48		0.11	
780	D5185	18		-1.80	
823	D5185	23.4		1.16	
840	D5185	20.5		-0.43	
862	D5185	21.2		-0.05	
864	D5185	21		-0.16	
875	D5185	18.0		-1.80	
902	D5185	21.11		-0.10	
912	D5185	20.36		-0.51	
922	D5185	20		-0.71	
962		-----		-----	
963	D5185	21.64		0.19	
974		19		-1.25	
994	D5185	20.0		-0.71	
1023	D5185	23.4434		1.18	
1026	D5185	21		-0.16	
1059	In house	21		-0.16	
1146	In house	20.52		-0.42	
1173	INH-66	19.67		-0.89	
1201	D5185	22		0.39	
1278	D5185	23.0		0.94	
1316	D5185	26.1		2.64	
1396		-----		-----	
1435	D5185	20.5		-0.43	
1456	D5185	20		-0.71	
1460	D5185	20.27		-0.56	
1543		-----		-----	
1569	D5185	21		-0.16	
1648	D5185	18		-1.80	
1740	D5185	21		-0.16	
1743	D5185	23		0.94	
1748		-----		-----	
1752	In house	20.87		-0.23	
1791	In house	25.17		2.13	
1807	D5185	22		0.39	
1850	In house	14	R(0.05)	-3.99	
1854		22.5		0.66	
1900	D5185	24.021		1.50	
2160	In house	20.67		-0.34	
6002	D6595	38.60	C,R(0.01)	9.49	First reported 32.60
6016	D5185	21.18	C	-0.06	First reported 2.118
6043		24		1.49	
6059	D5185	22.6		0.72	

normality	OK
n	61
outliers	2
mean (n)	21.287
st.dev. (n)	1.8658
R(calc.)	5.224
st.dev.(D5185:18)	1.8246
R(D5185:18)	5.109

Application range: 2 – 160 mg/kg



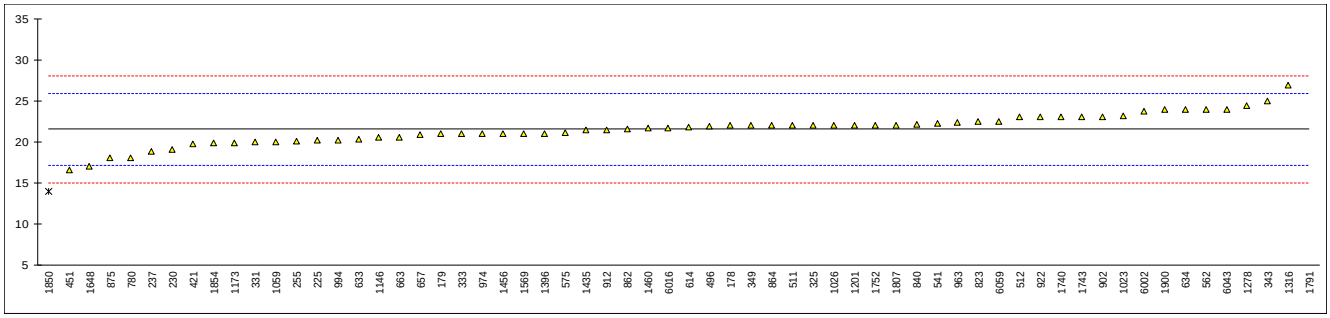


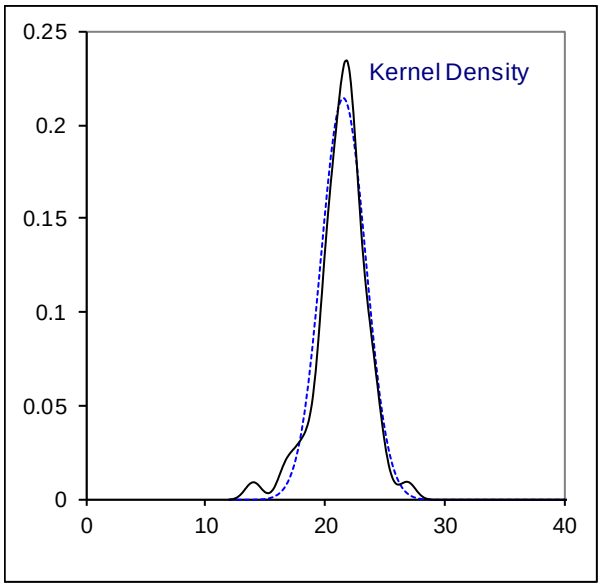
Determination of Iron as Fe on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	22		0.22	
179	D5185	21		-0.25	
225	D6595	20.2		-0.62	
230	D5185	19.04		-1.15	
237	D5185	18.8		-1.26	
254		-----		-----	
255	INH-OL1	20.07		-0.68	
325	D5185	22		0.22	
331	D5185Mod.	20.0		-0.71	
333	D5185	21		-0.25	
343	D5185	25		1.60	
349		22		0.22	
398		-----		-----	
421	D5185	19.7		-0.85	
451		16.6		-2.28	
494		-----		-----	
496	D5185	21.87		0.15	
511	D5185	22		0.22	
512	D5185	23		0.68	
541	D5185	22.3		0.35	
562	D6595	24		1.14	
575	D6595	21.1		-0.20	
614	D5185	21.75		0.10	
633	D6595	20.32		-0.56	
634	D6595	24		1.14	
657	D5185	20.89		-0.30	
663	D5185	20.56		-0.45	
780	D5185	18		-1.63	
823	D5185	22.5		0.45	
840	D5185	22.1		0.26	
862	D5185	21.6		0.03	
864	D5185	22		0.22	
875	D5185	18.0		-1.63	
902	D5185	23.03		0.69	
912	D5185	21.47		-0.03	
922	D5185	23		0.68	
962		-----		-----	
963	D5185	22.33		0.37	
974		21		-0.25	
994	D5185	20.2		-0.62	
1023	D5185	23.1118		0.73	
1026	D5185	22		0.22	
1059	In house	20		-0.71	
1146	In house	20.55		-0.45	
1173	INH-66	19.91		-0.75	
1201	D5185	22		0.22	
1278	D5185	24.4		1.32	
1316	D5185	26.9		2.48	
1396	In house	21.01		-0.24	
1435	D5185	21.43		-0.05	
1456	D5185	21		-0.25	
1460	D5185	21.65		0.05	
1543		-----		-----	
1569	D5185	21		-0.25	
1648	D5185	17		-2.09	
1740	D5185	23		0.68	
1743	D5185	23		0.68	
1748		-----		-----	
1752	In house	22.00		0.22	
1791	In house	63.67	R(0.01)	19.47	
1807	D5185	22		0.22	
1850	In house	14	R(0.05)	-3.48	
1854		19.9		-0.76	
1900	D5185	23.899		1.09	
2160	In house	--		-----	
6002	D6595	23.70		1.00	
6016	D5185	21.68	C	0.07	First reported 2.168
6043		24		1.14	
6059	D5185	22.5		0.45	

normality	suspect
n	60
outliers	2
mean (n)	21.535
st.dev. (n)	1.8631
R(calc.)	5.217
st.dev.(D5185:18)	2.1645
R(D5185:18)	6.061

Application range: 2 – 140 mg/kg



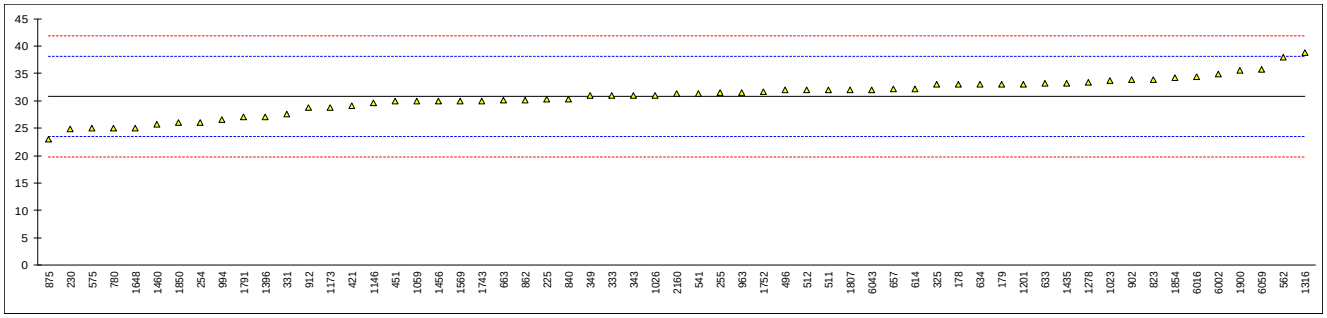


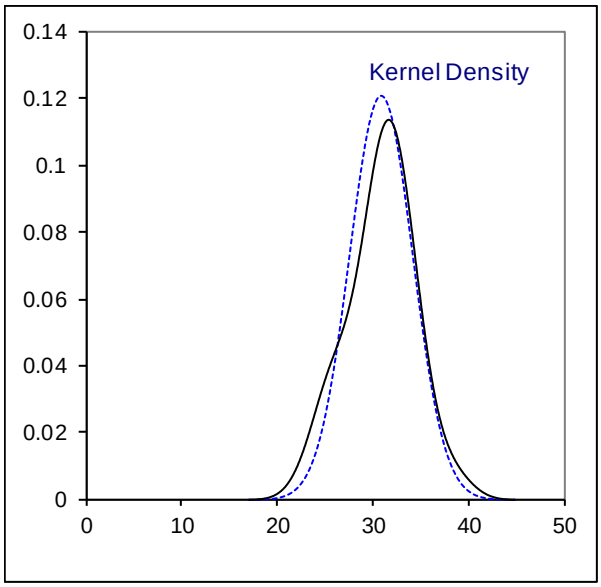
Determination of Lead as Pb on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	33		0.59	
179	D5185	33		0.59	
225	D6595	30.3		-0.15	
230	D5185	24.9	C	-1.61	First reported 57.5
237		-----		-----	
254	INH-018	26.036		-1.30	
255	INH-OL1	31.51		0.18	
325	D5185	33		0.59	
331	D5185Mod.	27.5		-0.91	
333	D5185	31		0.05	
343	D5185	31		0.05	
349		31		0.05	
398		-----		-----	
421	D5185	29.1		-0.47	
451		30		-0.23	
494		-----		-----	
496	D5185	31.99		0.31	
511	D5185	32		0.32	
512	D5185	32		0.32	
541	D5185	31.3		0.13	
562	D6595	38		1.95	
575	D6595	25.0		-1.58	
614	D5185	32.23		0.38	
633	D6595	33.10		0.62	
634	D6595	33		0.59	
657	D5185	32.11		0.35	
663	D5185	30.04		-0.22	
780	D5185	25		-1.58	
823	D5185	33.8		0.81	
840	D5185	30.3		-0.15	
862	D5185	30.1		-0.20	
864		-----		-----	
875	D5185	23.0		-2.13	
902	D5185	33.78		0.80	
912	D5185	28.7		-0.58	
922		-----		-----	
962		-----		-----	
963	D5185	31.56		0.20	
974		-----		-----	
994	D5185	26.5		-1.18	
1023	D5185	33.7118		0.78	
1026	D5185	31		0.05	
1059	In house	30		-0.23	
1146	In house	29.59		-0.34	
1173	INH-66	28.83		-0.54	
1201	D5185	33		0.59	
1278	D5185	33.4		0.70	
1316	D5185	38.8		2.16	
1396	In house	27.10		-1.01	
1435	D5185	33.23		0.65	
1456	D5185	30		-0.23	
1460	D5185	25.69		-1.40	
1543		-----		-----	
1569	D5185	30		-0.23	
1648	D5185	25		-1.58	
1740		-----		-----	
1743	D5185	30		-0.23	
1748		-----		-----	
1752	In house	31.73		0.24	
1791	In house	27.02		-1.04	
1807	D5185	32		0.32	
1850	In house	26		-1.31	
1854		34.2		0.91	
1900	D5185	35.630		1.30	
2160	In house	31.28		0.12	
6002	D6595	34.89		1.10	
6016	D5185	34.45	C	0.98	First reported 3.445
6043		32		0.32	
6059	D5185	35.8		1.35	

normality	OK
n	59
outliers	0
mean (n)	30.834
st.dev. (n)	3.2982
R(calc.)	9.235
st.dev.(D5185:18)	3.6814
R(D5185:18)	10.308

Application range: 10 – 160 mg/kg





Determination of Lithium as Li on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179		-----		-----	
225		-----		-----	
230	D5185	0	C	-----	First reported 1.80
237		-----		-----	
254		-----		-----	
255		-----		-----	
325		-----		-----	
331		-----		-----	
333		-----		-----	
343		-----		-----	
349		<1		-----	
398		-----		-----	
421		-----		-----	
451		0		-----	
494		-----		-----	
496	D5185	0.35		-----	
511		-----		-----	
512		-----		-----	
541		-----		-----	
562		-----		-----	
575		-----		-----	
614	D5185	<1		-----	
633	D6595	0.15		-----	
634		-----		-----	
657		-----		-----	
663		-----		-----	
780		-----		-----	
823		-----		-----	
840		-----		-----	
862	D5185	<1		-----	
864		-----		-----	
875		-----		-----	
902		-----		-----	
912		-----		-----	
922		-----		-----	
962		-----		-----	
963		-----		-----	
974		<1		-----	
994		-----		-----	
1023		-----		-----	
1026		-----		-----	
1059		-----		-----	
1146	In house	0.1664		-----	
1173		-----		-----	
1201		-----		-----	
1278		-----		-----	
1316		-----		-----	
1396		-----		-----	
1435	D5185	0.0561		-----	
1456	D5185	0		-----	
1460	D5185	0.536		-----	
1543		-----		-----	
1569		-----		-----	
1648		-----		-----	
1740		-----		-----	
1743	D5185	0.12		-----	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807		-----		-----	
1850		-----		-----	
1854		-----		-----	
1900		-----		-----	
2160	In house	--		-----	
6002	D6595	0.04		-----	
6016		-----		-----	
6043		-----		-----	
6059	D5185	<1		-----	

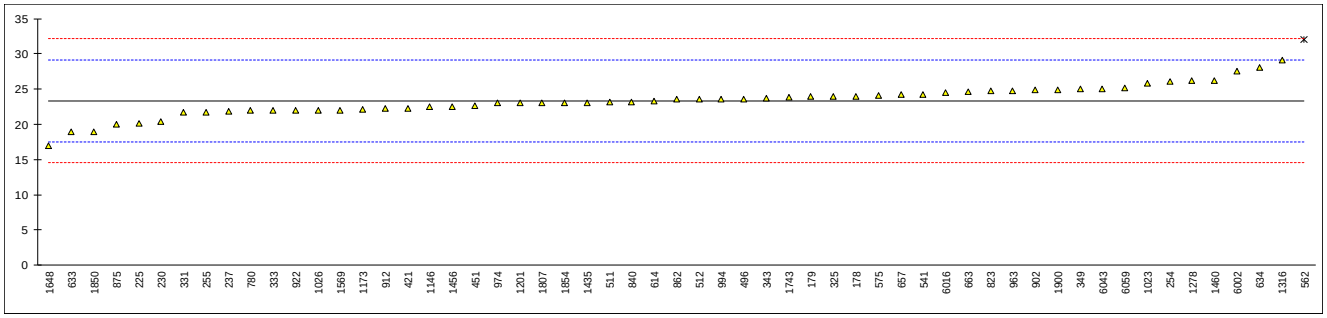
normality	n.a.
n	15
outliers	n.a.
mean (n)	<1
st.dev. (n)	n.a.
R(calc.)	n.a.
st.dev.(lit)	n.a.
R(lit)	n.a.

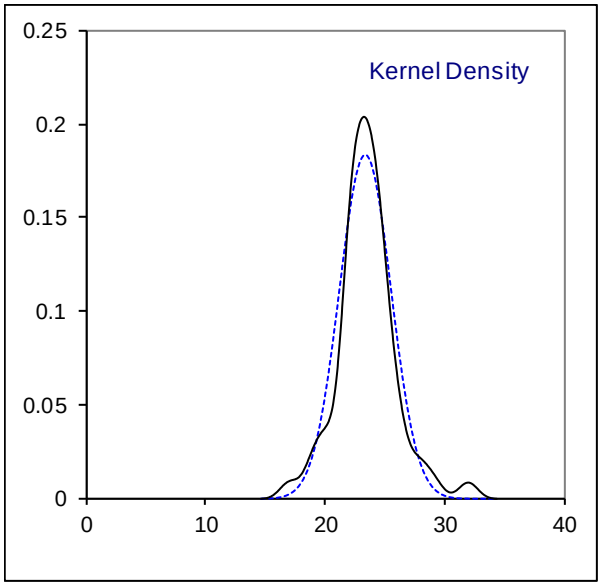
Determination of Magnesium as Mg on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	24		0.22	
179	D5185	24		0.22	
225	D6595	20.1		-1.12	
230	D5185	20.35		-1.03	
237	D5185	21.84		-0.52	
254	INH-018	26.063		0.93	
255	INH-OL1	21.74		-0.56	
325	D5185	24		0.22	
331	D5185Mod.	21.7		-0.57	
333	D5185	22		-0.47	
343	D5185	23.7		0.12	
349		25		0.56	
398		-----		-----	
421	D5185	22.3		-0.36	
451		22.6		-0.26	
494		-----		-----	
496	D5185	23.51		0.05	
511	D5185	23.1		-0.09	
512	D5185	23.5		0.05	
541	D5185	24.28		0.32	
562	D6595	32	R(0.05)	2.97	
575	D6595	24.1		0.25	
614	D5185	23.3		-0.02	
633	D6595	18.94		-1.52	
634	D6595	28		1.59	
657	D5185	24.23		0.30	
663	D5185	24.64		0.44	
780	D5185	22		-0.47	
823	D5185	24.7		0.46	
840	D5185	23.2		-0.06	
862	D5185	23.5		0.05	
864		-----		-----	
875	D5185	20.0		-1.15	
902	D5185	24.83		0.50	
912	D5185	22.24		-0.39	
922	D5185	22		-0.47	
962		-----		-----	
963	D5185	24.80		0.49	
974		23		-0.12	
994	D5185	23.5		0.05	
1023	D5185	25.8333		0.85	
1026	D5185	22		-0.47	
1059		-----		-----	
1146	In house	22.44		-0.32	
1173	INH-66	22.15		-0.42	
1201	D5185	23		-0.12	
1278	D5185	26.2		0.98	
1316	D5185	29.1		1.97	
1396		-----		-----	
1435	D5185	23.09		-0.09	
1456	D5185	22.5		-0.30	
1460	D5185	26.24		0.99	
1543		-----		-----	
1569	D5185	22		-0.47	
1648	D5185	17		-2.19	
1740		-----		-----	
1743	D5185	23.8		0.15	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	23		-0.12	
1850	In house	19		-1.50	
1854		23		-0.12	
1900	D5185	24.925		0.54	
2160	In house	--		-----	
6002	D6595	27.55		1.44	
6016	D5185	24.43	C	0.37	First reported 2.443
6043		25		0.56	
6059	D5185	25.2		0.63	

normality	suspect
n	56
outliers	1
mean (n)	23.361
st.dev. (n)	2.1710
R(calc.)	6.079
st.dev.(D5185:18)	2.9101
R(D5185:18)	8.148

Application range: 5 – 1700 mg/kg



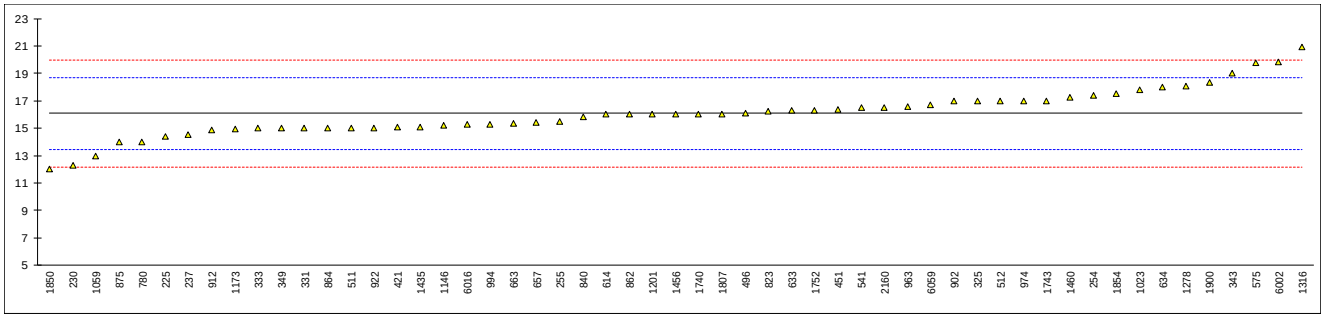


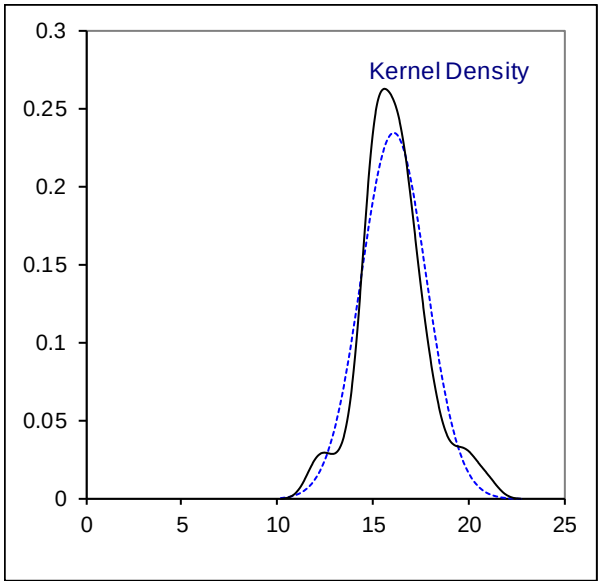
Determination of Manganese as Mn on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179		-----		-----	
225	D6595	14.4		-1.29	
230	D5185	12.3		-2.91	
237	D5185	14.51		-1.21	
254	INH-018	17.379		1.00	
255	INH-OL1	15.46		-0.48	
325	D5185	17		0.71	
331	D5185Mod.	15.0		-0.83	
333	D5185	15		-0.83	
343	D5185	19		2.24	
349		15		-0.83	
398		-----		-----	
421	D5185	15.1		-0.75	
451		16.4		0.24	
494		-----		-----	
496	D5185	16.10		0.01	
511	D5185	15		-0.83	
512	D5185	17		0.71	
541	D5185	16.5		0.32	
562		-----		-----	
575	D6595	19.8		2.86	
614	D5185	16.0		-0.06	
633	D6595	16.30		0.17	
634	D6595	18		1.47	
657	D5185	15.45		-0.49	
663	D5185	15.32		-0.59	
780	D5185	14		-1.60	
823	D5185	16.2		0.09	
840	D5185	15.8		-0.22	
862	D5185	16.0		-0.06	
864	D5185	15		-0.83	
875	D5185	14.0		-1.60	
902	D5185	16.97		0.68	
912	D5185	14.88		-0.92	
922	D5185	15		-0.83	
962		-----		-----	
963	D5185	16.56		0.37	
974		17		0.71	
994	D5185	15.3		-0.60	
1023	D5185	17.7745		1.30	
1026		-----		-----	
1059	In house	13		-2.37	
1146	In house	15.21		-0.67	
1173	INH-66	14.91		-0.90	
1201	D5185	16		-0.06	
1278	D5185	18.07		1.53	
1316	D5185	20.9		3.70	
1396		-----		-----	
1435	D5185	15.11		-0.75	
1456	D5185	16		-0.06	
1460	D5185	17.26		0.91	
1543		-----		-----	
1569		-----		-----	
1648		-----		-----	
1740	D5185	16		-0.06	
1743	D5185	17		0.71	
1748		-----		-----	
1752	In house	16.33		0.19	
1791		-----		-----	
1807	D5185	16		-0.06	
1850	In house	12		-3.14	
1854		17.5		1.09	
1900	D5185	18.344		1.74	
2160	In house	16.53		0.34	
6002	D6595	19.86		2.90	
6016	D5185	15.26	C	-0.63	First reported 1.526
6043		-----		-----	
6059	D5185	16.7		0.48	

normality	suspect
n	55
outliers	0
mean (n)	16.082
st.dev. (n)	1.6975
R(calc.)	4.753
st.dev.(D5185:18)	1.3013
R(D5185:18)	3.644

Application range: 5 – 700 mg/kg



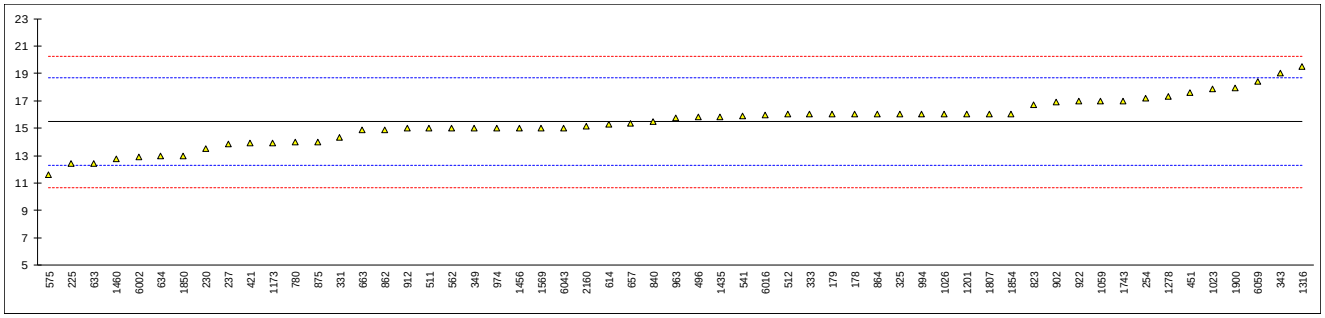


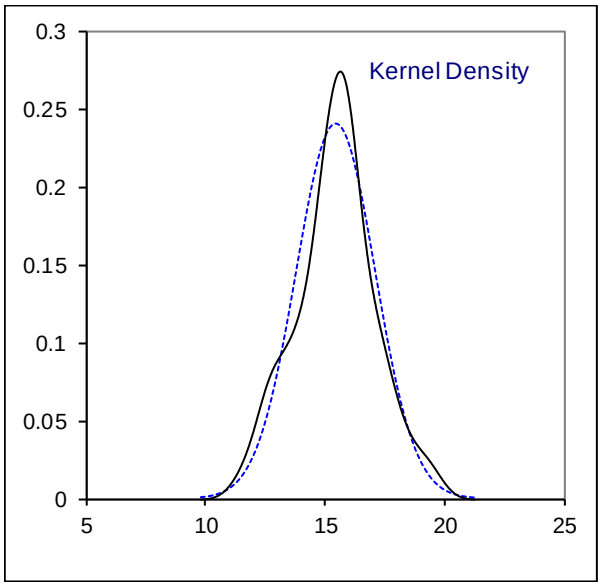
Determination of Molybdenum as Mo on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	16		0.34	
179	D5185	16		0.34	
225	D6595	12.4		-1.92	
230	D5185	13.5		-1.23	
237	D5185	13.85		-1.01	
254	INH-018	17.173		1.07	
255		-----		-----	
325	D5185	16		0.34	
331	D5185Mod.	14.3		-0.73	
333	D5185	16		0.34	
343	D5185	19		2.22	
349		15		-0.29	
398		-----		-----	
421	D5185	13.9		-0.98	
451		17.6		1.34	
494		-----		-----	
496	D5185	15.81		0.22	
511	D5185	15		-0.29	
512	D5185	16		0.34	
541	D5185	15.9		0.27	
562	D6595	15		-0.29	
575	D6595	11.6		-2.42	
614	D5185	15.27		-0.12	
633	D6595	12.44		-1.89	
634	D6595	13		-1.54	
657	D5185	15.37		-0.06	
663	D5185	14.87		-0.37	
780	D5185	14		-0.91	
823	D5185	16.7		0.78	
840	D5185	15.5		0.02	
862	D5185	14.9		-0.35	
864	D5185	16		0.34	
875	D5185	14.0		-0.91	
902	D5185	16.90		0.90	
912	D5185	14.98		-0.30	
922	D5185	17		0.96	
962		-----		-----	
963	D5185	15.74		0.17	
974		15		-0.29	
994	D5185	16.0		0.34	
1023	D5185	17.8784		1.51	
1026	D5185	16		0.34	
1059	In house	17		0.96	
1146		-----		-----	
1173	INH-66	13.91		-0.97	
1201	D5185	16		0.34	
1278	D5185	17.35		1.18	
1316	D5185	19.5		2.53	
1396		-----		-----	
1435	D5185	15.83		0.23	
1456	D5185	15		-0.29	
1460	D5185	12.77		-1.68	
1543		-----		-----	
1569	D5185	15		-0.29	
1648		-----		-----	
1740		-----		-----	
1743	D5185	17		0.96	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	16		0.34	
1850	In house	13		-1.54	
1854		16		0.34	
1900	D5185	17.927		1.54	
2160	In house	15.17		-0.18	
6002	D6595	12.90		-1.60	
6016	D5185	15.93	C	0.29	First reported 1.593
6043		15		-0.29	
6059	D5185	18.4		1.84	

normality	OK
n	57
outliers	0
mean (n)	15.461
st.dev. (n)	1.6576
R(calc.)	4.641
st.dev.(D5185:18)	1.5973
R(D5185:18)	4.472

Application range: 5 – 200 mg/kg



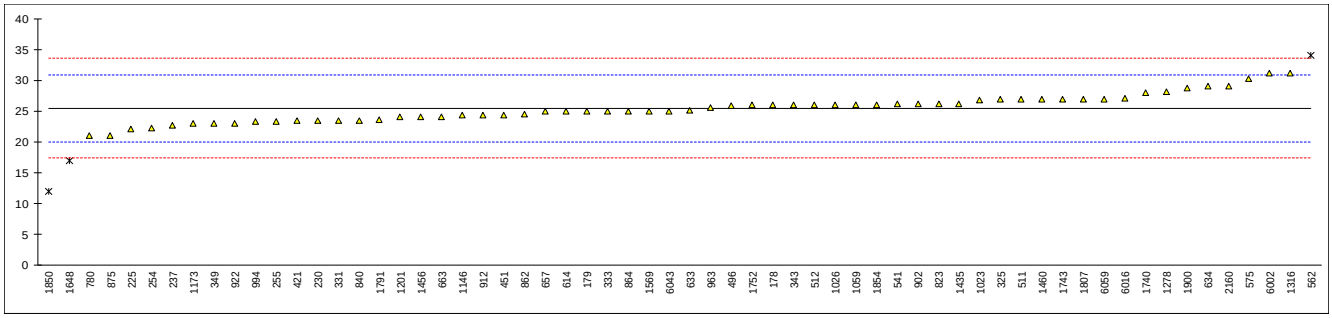


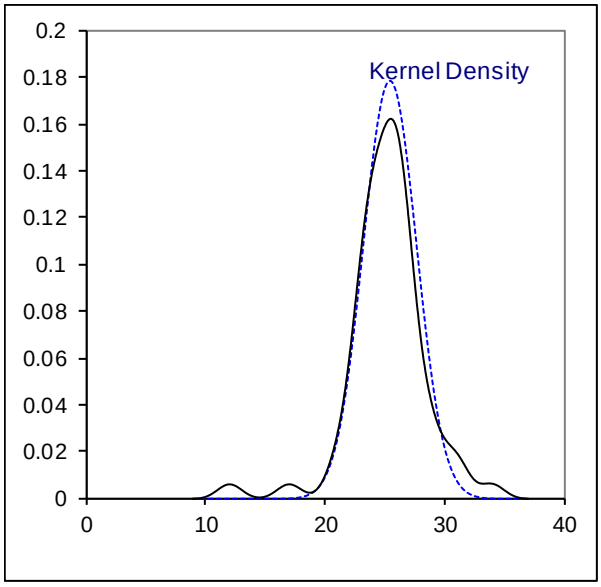
Determination of Nickel as Ni on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	26		0.21	
179	D5185	25		-0.16	
225	D6595	22.1		-1.24	
230	D5185	23.4		-0.76	
237	D5185	22.63		-1.04	
254	INH-018	22.193		-1.20	
255	INH-OL1	23.34		-0.78	
325	D5185	27		0.58	
331	D5185Mod.	23.5		-0.72	
333	D5185	25		-0.16	
343	D5185	26		0.21	
349		23		-0.90	
398		-----		-----	
421	D5185	23.4		-0.76	
451		24.4		-0.39	
494		-----		-----	
496	D5185	25.83		0.14	
511	D5185	27		0.58	
512	D5185	26		0.21	
541	D5185	26.1		0.24	
562	D6595	34	R(0.05)	3.17	
575	D6595	30.3		1.80	
614	D5185	24.96		-0.18	
633	D6595	25.06		-0.14	
634	D6595	29		1.32	
657	D5185	24.94		-0.19	
663	D5185	24.09		-0.50	
780	D5185	21		-1.64	
823	D5185	26.2		0.28	
840	D5185	23.5		-0.72	
862	D5185	24.5		-0.35	
864	D5185	25		-0.16	
875	D5185	21.0		-1.64	
902	D5185	26.15		0.26	
912	D5185	24.38		-0.39	
922	D5185	23		-0.90	
962		-----		-----	
963	D5185	25.64		0.07	
974		-----		-----	
994	D5185	23.3		-0.79	
1023	D5185	26.7137		0.47	
1026	D5185	26		0.21	
1059	In house	26		0.21	
1146	In house	24.36		-0.40	
1173	INH-66	22.95		-0.92	
1201	D5185	24		-0.53	
1278	D5185	28.2		1.02	
1316	D5185	31.2		2.13	
1396		-----		-----	
1435	D5185	26.20		0.28	
1456	D5185	24		-0.53	
1460	D5185	27.0		0.58	
1543		-----		-----	
1569	D5185	25		-0.16	
1648	D5185	17	R(0.05)	-3.12	
1740	D5185	28		0.95	
1743	D5185	27		0.58	
1748		-----		-----	
1752	In house	25.97		0.20	
1791	In house	23.62		-0.67	
1807	D5185	27		0.58	
1850	In house	12	R(0.01)	-4.97	
1854		26		0.21	
1900	D5185	28.692		1.20	
2160	In house	29.00		1.32	
6002	D6595	31.15		2.11	
6016	D5185	27.09	C	0.61	First reported 2.709
6043		25		-0.16	
6059	D5185	27.0		0.58	

normality	OK
n	59
outliers	3
mean (n)	25.442
st.dev. (n)	2.2360
R(calc.)	6.261
st.dev.(D5185:18)	2.7021
R(D5185:18)	7.566

Application range: 5 – 40 mg/kg





Determination of Potassium as K on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	<3		-----	
179	D5185	<1		-----	
225	D6595	1.4		-----	
230	D5185	0.0		-----	
237		-----		-----	
254		-----		-----	
255		-----		-----	
325	D5185	1		-----	
331	D5185Mod.	1.0		-----	
333	D5185	2		-----	
343	D5185	<1		-----	
349		<1	C	-----	First reported 5
398		-----		-----	
421	D5185	1.2		-----	
451		1.1		-----	
494		-----		-----	
496	D5185	1.58		-----	
511	D5185	2		-----	
512	D5185	1		-----	
541	D5185	<40		-----	
562		-----		-----	
575		-----		-----	
614	D5185	1.8		-----	
633	D6595	1.58		-----	
634	D6595	1.8		-----	
657	D5185	1.25		-----	
663	D5185	7.31		-----	
780		-----		-----	
823	D5185	2.3		-----	
840	D5185	1.1		-----	
862	D5185	<1		-----	
864		-----		-----	
875		-----		-----	
902		-----		-----	
912	D5185	0.98		-----	
922	D5185	<1		-----	
962		-----		-----	
963		-----		-----	
974		1		-----	
994		-----		-----	
1023		-----		-----	
1026		-----		-----	
1059		-----		-----	
1146		-----		-----	
1173		-----		-----	
1201	D5185	<1		-----	
1278	D5185	1.87		-----	
1316		-----		-----	
1396		-----		-----	
1435	D5185	1.938		-----	
1456	D5185	0		-----	
1460		-----		-----	
1543		-----		-----	
1569		-----		-----	
1648		-----		-----	
1740		-----		-----	
1743	D5185	2.2		-----	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	<2,5		-----	
1850		-----		-----	
1854		-----		-----	
1900	D5185	0.242		-----	
2160	In house	--		-----	
6002	D6595	1.44		-----	
6016		-----		-----	
6043		-----		-----	
6059	D5185	2.0		-----	

normality	n.a.
n	34
outliers	n.a.
mean (n)	<10
st.dev. (n)	n.a.
R(calc.)	n.a.
st.dev.(D5185:18)	n.a.
R(D5185:18)	n.a.

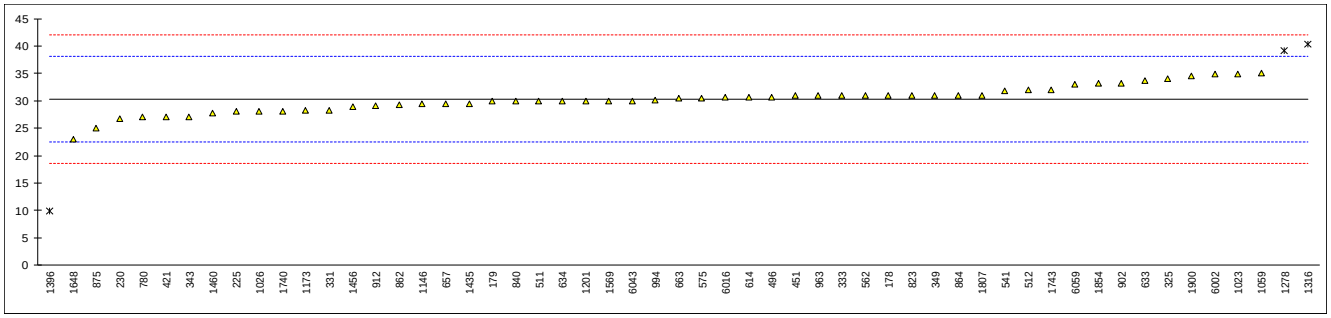
Application range : 40 – 1200 mg/kg

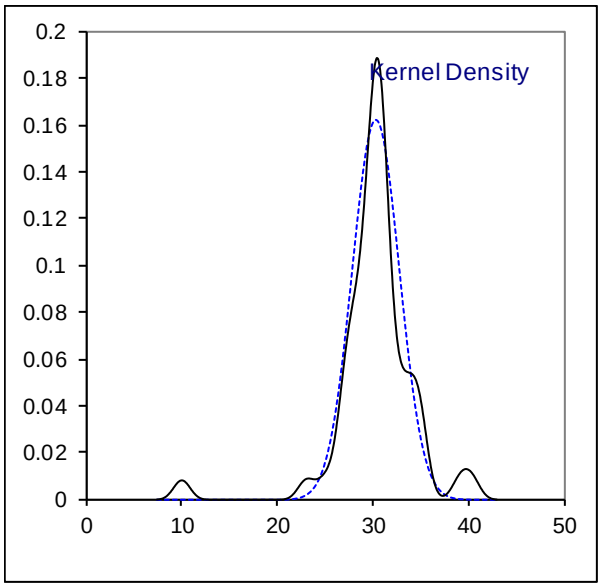
Determination of Silicon as Si on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	31		0.19	
179	D5185	30		-0.07	
225	D6595	28		-0.58	
230	D5185	26.7		-0.91	
237		-----		-----	
254		-----		-----	
255		-----		-----	
325	D5185	34		0.95	
331	D5185Mod.	28.3		-0.50	
333	D5185	31		0.19	
343	D5185	27		-0.83	
349		31		0.19	
398		-----		-----	
421	D5185	27.0		-0.83	
451		30.9		0.16	
494		-----		-----	
496	D5185	30.70		0.11	
511	D5185	30		-0.07	
512	D5185	32		0.44	
541	D5185	31.9		0.42	
562	D6595	31		0.19	
575	D6595	30.5		0.06	
614	D5185	30.66		0.10	
633	D6595	33.77		0.90	
634	D6595	30		-0.07	
657	D5185	29.39		-0.22	
663	D5185	30.42		0.04	
780	D5185	27		-0.83	
823	D5185	31.0		0.19	
840	D5185	30.0		-0.07	
862	D5185	29.2		-0.27	
864	D5185	31		0.19	
875	D5185	25.0		-1.34	
902	D5185	33.14		0.74	
912	D5185	29.12		-0.29	
922		-----		-----	
962		-----		-----	
963	D5185	30.99		0.19	
974		-----		-----	
994	D5185	30.1		-0.04	
1023	D5185	34.9022		1.19	
1026	D5185	28		-0.58	
1059	In house	35		1.21	
1146	In house	29.36		-0.23	
1173	INH-66	28.24		-0.52	
1201	D5185	30		-0.07	
1278	D5185	39.1	R(0.05)	2.26	
1316	D5185	40.3	R(0.05)	2.56	
1396	In house	9.97	R(0.01)	-5.18	
1435	D5185	29.51		-0.19	
1456	D5185	29		-0.32	
1460	D5185	27.67		-0.66	
1543		-----		-----	
1569	D5185	30		-0.07	
1648	D5185	23		-1.85	
1740	D5185	28		-0.58	
1743	D5185	32		0.44	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	31		0.19	
1850		-----		-----	
1854		33.1		0.72	
1900	D5185	34.583		1.10	
2160	In house	--		-----	
6002	D6595	34.81		1.16	
6016	D5185	30.64	C	0.10	First reported 3.064
6043		30		-0.07	
6059	D5185	33.0		0.70	

normality	OK
n	52
outliers	3
mean (n)	30.262
st.dev. (n)	2.4623
R(calc.)	6.894
st.dev.(D5185:18)	3.9155
R(D5185:18)	10.963

Application range: 8 – 50 mg/kg



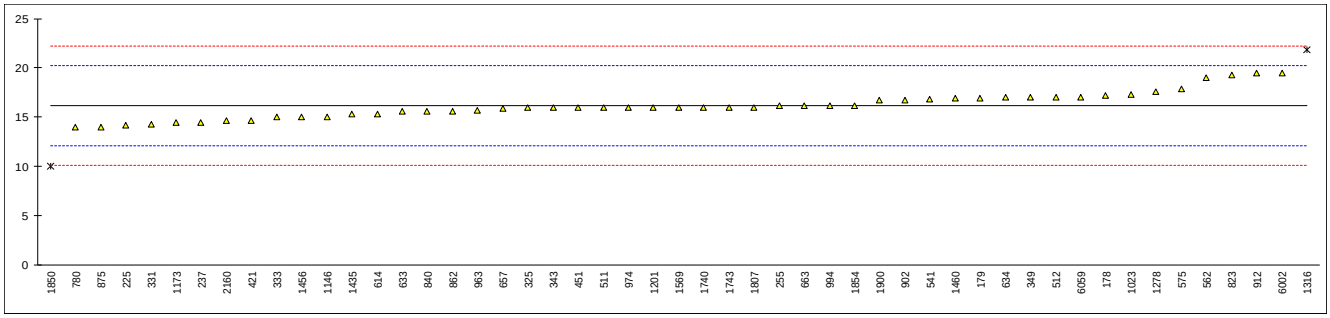


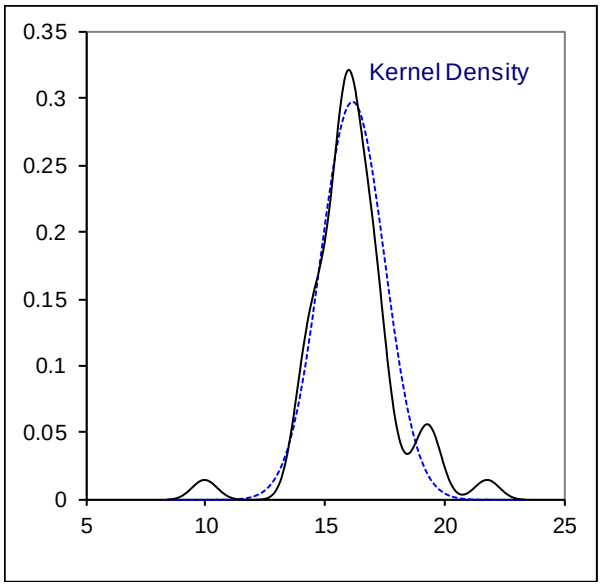
Determination of Silver as Ag on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	17.24		0.52	
179	D5185	16.9		0.36	
225	D6595	14.2		-0.98	
230		-----		-----	
237	D5185	14.47		-0.85	
254		-----		-----	
255	INH-OL1	16.13		-0.03	
325	D5185	16		-0.09	
331	D5185Mod.	14.3		-0.93	
333	D5185	15		-0.58	
343	D5185	16		-0.09	
349		17		0.41	
398		-----		-----	
421	D5185	14.7		-0.73	
451		16		-0.09	
494		-----		-----	
496		-----		-----	
511	D5185	16		-0.09	
512	D5185	17		0.41	
541	D5185	16.8		0.31	
562	D6595	19		1.39	
575	D6595	17.9		0.85	
614	D5185	15.3		-0.44	
633	D6595	15.60		-0.29	
634	D6595	17		0.41	
657	D5185	15.91		-0.13	
663	D5185	16.17		-0.01	
780	D5185	14		-1.08	
823	D5185	19.3		1.54	
840	D5185	15.6		-0.29	
862	D5185	15.6		-0.29	
864		-----		-----	
875	D5185	14.0		-1.08	
902	D5185	16.76		0.29	
912	D5185	19.46		1.62	
922		-----		-----	
962		-----		-----	
963	D5185	15.71		-0.23	
974		16		-0.09	
994	D5185	16.2		0.01	
1023	D5185	17.2823		0.54	
1026		-----		-----	
1059		-----		-----	
1146	In house	15.01		-0.58	
1173	INH-66	14.46		-0.85	
1201	D5185	16		-0.09	
1278	D5185	17.6		0.70	
1316	D5185	21.8	R(0.01)	2.78	
1396		-----		-----	
1435	D5185	15.28		-0.45	
1456	D5185	15		-0.58	
1460	D5185	16.89		0.35	
1543		-----		-----	
1569	D5185	16		-0.09	
1648		-----		-----	
1740	D5185	16		-0.09	
1743	D5185	16		-0.09	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	16		-0.09	
1850	In house	10	R(0.01)	-3.06	
1854		16.2		0.01	
1900	D5185	16.755		0.28	
2160	In house	14.67		-0.75	
6002	D6595	19.46		1.62	
6016		-----		-----	
6043		-----		-----	
6059	D5185	17.0		0.41	

normality	OK
n	49
outliers	2
mean (n)	16.181
st.dev. (n)	1.3382
R(calc.)	3.747
st.dev.(D5185:18)	2.0226
R(D5185:18)	5.663

Application range: 0.5 – 50 mg/kg



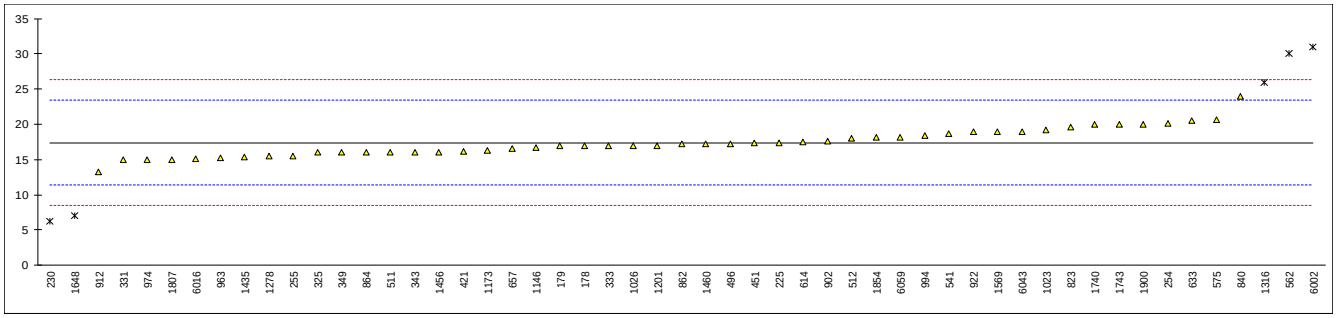


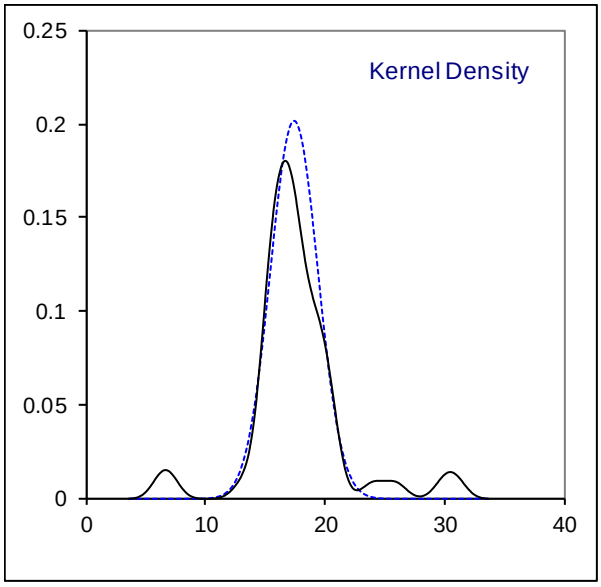
Determination of Sodium as Na on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	17		-0.14	
179	D5185	17		-0.14	
225	D6595	17.4		0.00	
230	D5185	6.3	C,R(0.01)	-3.72	First reported 36.9
237		-----		-----	
254	INH-018	20.130		0.91	
255	INH-OL1	15.54		-0.63	
325	D5185	16		-0.47	
331	D5185Mod.	15.0		-0.81	
333	D5185	17		-0.14	
343	D5185	16		-0.47	
349		16		-0.47	
398		-----		-----	
421	D5185	16.1		-0.44	
451		17.3		-0.04	
494		-----		-----	
496	D5185	17.28		-0.04	
511	D5185	16		-0.47	
512	D5185	18		0.20	
541	D5185	18.7		0.43	
562	D6595	30	R(0.01)	4.21	
575	D6595	20.6		1.07	
614	D5185	17.5		0.03	
633	D6595	20.55		1.05	
634		-----		-----	
657	D5185	16.58		-0.28	
663		-----		-----	
780		-----		-----	
823	D5185	19.6		0.73	
840	D5185	24.0		2.21	
862	D5185	17.2		-0.07	
864	D5185	16		-0.47	
875		-----		-----	
902	D5185	17.65		0.08	
912	D5185	13.2		-1.41	
922	D5185	19		0.53	
962		-----		-----	
963	D5185	15.26		-0.72	
974		15		-0.81	
994	D5185	18.4		0.33	
1023	D5185	19.2219		0.61	
1026	D5185	17		-0.14	
1059		-----		-----	
1146	In house	16.73		-0.23	
1173	INH-66	16.28		-0.38	
1201	D5185	17		-0.14	
1278	D5185	15.5		-0.64	
1316	D5185	25.9	R(0.01)	2.84	
1396		-----		-----	
1435	D5185	15.42		-0.67	
1456	D5185	16		-0.47	
1460	D5185	17.27		-0.05	
1543		-----		-----	
1569	D5185	19		0.53	
1648	D5185	7	R(0.01)	-3.49	
1740	D5185	20		0.87	
1743	D5185	20		0.87	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	15		-0.81	
1850		-----		-----	
1854		18.1		0.23	
1900	D5185	20.020		0.87	
2160	In house	--		-----	
6002	D6595	30.98	C,R(0.01)	4.54	First reported 35.98
6016	D5185	15.04	C	-0.79	First reported 1.504
6043		19		0.53	
6059	D5185	18.2		0.26	

normality	suspect
n	48
outliers	5
mean (n)	17.412
st.dev. (n)	1.9808
R(calc.)	5.546
st.dev.(D5185:18)	2.9870
R(D5185:18)	8.364

Application range: 7 – 70 mg/kg



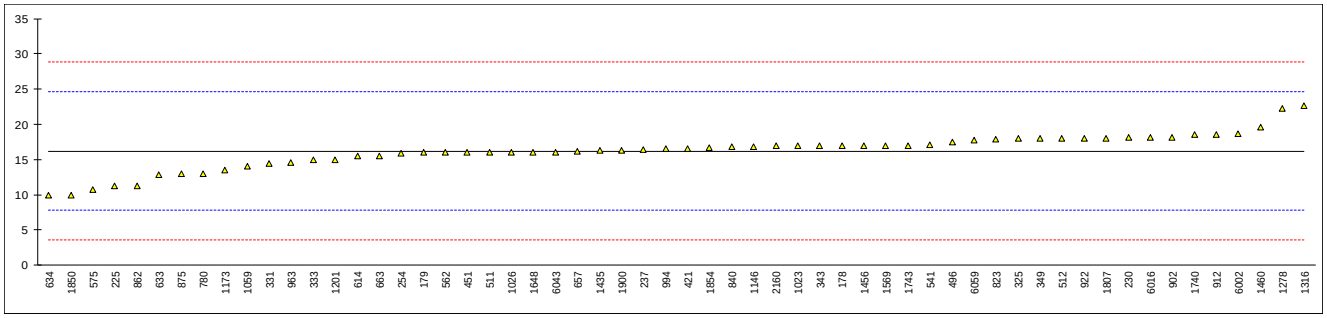


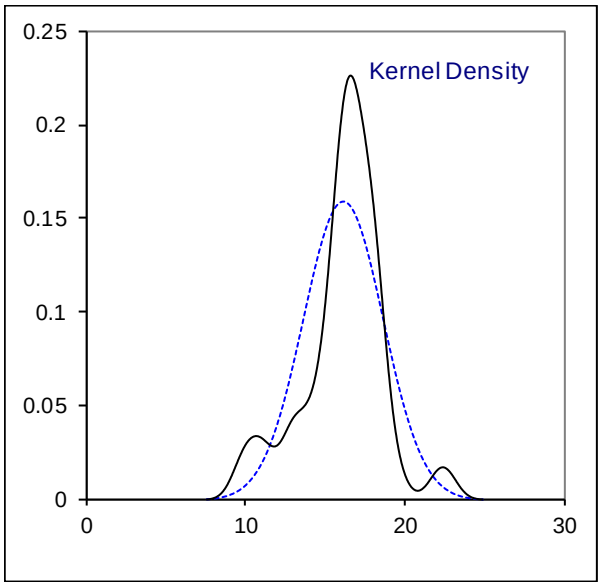
Determination of Tin as Sn on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	17		0.19	
179	D5185	16		-0.05	
225	D6595	11.3		-1.16	
230	D5185	18.1		0.45	
237	D5185	16.42		0.05	
254	INH-018	15.938		-0.06	
255		-----		-----	
325	D5185	18		0.43	
331	D5185Mod.	14.5		-0.40	
333	D5185	15		-0.29	
343	D5185	17		0.19	
349		18		0.43	
398		-----		-----	
421	D5185	16.6		0.09	
451		16		-0.05	
494		-----		-----	
496	D5185	17.47		0.30	
511	D5185	16		-0.05	
512	D5185	18		0.43	
541	D5185	17.1		0.21	
562	D6595	16		-0.05	
575	D6595	10.7		-1.31	
614	D5185	15.53		-0.16	
633	D6595	12.82		-0.80	
634	D6595	9.9		-1.50	
657	D5185	16.14		-0.02	
663	D5185	15.55		-0.16	
780	D5185	13		-0.76	
823	D5185	17.9		0.40	
840	D5185	16.8		0.14	
862	D5185	11.3		-1.16	
864		-----		-----	
875	D5185	13.0		-0.76	
902	D5185	18.20		0.47	
912	D5185	18.56		0.56	
922	D5185	18		0.43	
962		-----		-----	
963	D5185	14.60		-0.38	
974		-----		-----	
994	D5185	16.5		0.07	
1023	D5185	16.9621		0.18	
1026	D5185	16		-0.05	
1059	In house	14		-0.52	
1146	In house	16.86		0.15	
1173	INH-66	13.48		-0.65	
1201	D5185	15		-0.29	
1278	D5185	22.2		1.42	
1316	D5185	22.7		1.54	
1396		-----		-----	
1435	D5185	16.32		0.03	
1456	D5185	17		0.19	
1460	D5185	19.57		0.80	
1543		-----		-----	
1569	D5185	17		0.19	
1648	D5185	16		-0.05	
1740	D5185	18.5		0.54	
1743	D5185	17		0.19	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	18		0.43	
1850	In house	10		-1.47	
1854		16.7		0.12	
1900	D5185	16.342		0.03	
2160	In house	16.93		0.17	
6002	D6595	18.61		0.57	
6016	D5185	18.18	C	0.47	First reported 1.818
6043		16		-0.05	
6059	D5185	17.7		0.35	

normality	suspect
n	58
outliers	0
mean (n)	16.207
st.dev. (n)	2.5039
R(calc.)	7.011
st.dev.(D5185:18)	4.2176
R(D5185:18)	11.809

Application range: 10 – 40 mg/kg



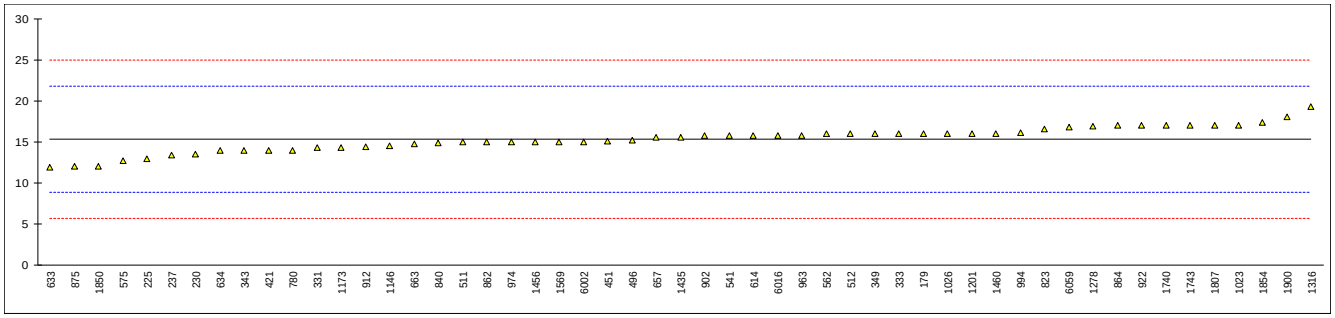


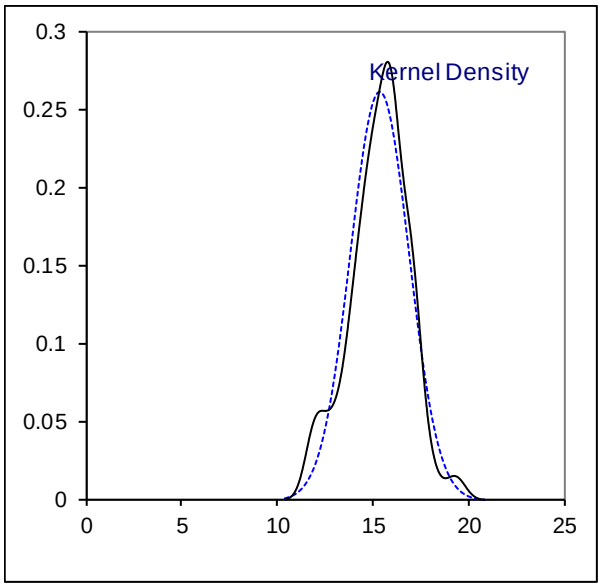
Determination of Titanium as Ti on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179	D5185	16		0.20	
225	D6595	12.9		-0.76	
230	D5185	13.5		-0.57	
237	D5185	13.37		-0.61	
254		-----		-----	
255		-----		-----	
325		-----		-----	
331	D5185Mod.	14.3		-0.32	
333	D5185	16		0.20	
343	D5185	14		-0.42	
349		16		0.20	
398		-----		-----	
421	D5185	14.0		-0.42	
451		15.1		-0.08	
494		-----		-----	
496	D5185	15.18		-0.05	
511	D5185	15		-0.11	
512	D5185	16		0.20	
541	D5185	15.8		0.14	
562	D6595	16		0.20	
575	D6595	12.7		-0.82	
614	D5185	15.8		0.14	
633	D6595	11.92		-1.06	
634	D6595	14		-0.42	
657	D5185	15.54		0.06	
663	D5185	14.79		-0.17	
780	D5185	14		-0.42	
823	D5185	16.6		0.39	
840	D5185	14.9		-0.14	
862	D5185	15.0		-0.11	
864	D5185	17		0.51	
875	D5185	12.0		-1.04	
902	D5185	15.74		0.12	
912	D5185	14.42		-0.29	
922	D5185	17		0.51	
962		-----		-----	
963	D5185	15.82		0.15	
974		15		-0.11	
994	D5185	16.1		0.23	
1023	D5185	17.0629		0.53	
1026	D5185	16		0.20	
1059		-----		-----	
1146	In house	14.48		-0.27	
1173	INH-66	14.34		-0.31	
1201	D5185	16		0.20	
1278	D5185	16.96		0.50	
1316	D5185	19.3		1.23	
1396		-----		-----	
1435	D5185	15.59		0.08	
1456	D5185	15		-0.11	
1460	D5185	16.03		0.21	
1543		-----		-----	
1569	D5185	15		-0.11	
1648		-----		-----	
1740	D5185	17		0.51	
1743	D5185	17		0.51	
1748		-----		-----	
1752		-----		-----	
1791		-----		-----	
1807	D5185	17		0.51	
1850	In house	12		-1.04	
1854		17.4		0.64	
1900	D5185	17.994		0.82	
2160	In house	--		-----	
6002	D6595	15.00		-0.11	
6016	D5185	15.80	C	0.14	First reported 1.580
6043		-----		-----	
6059	D5185	16.8		0.45	

normality	OK
n	53
outliers	0
mean (n)	15.344
st.dev. (n)	1.5293
R(calc.)	4.282
st.dev.(D5185:18)	3.2224
R(D5185:18)	9.023

Application range: 5 – 40 mg/kg



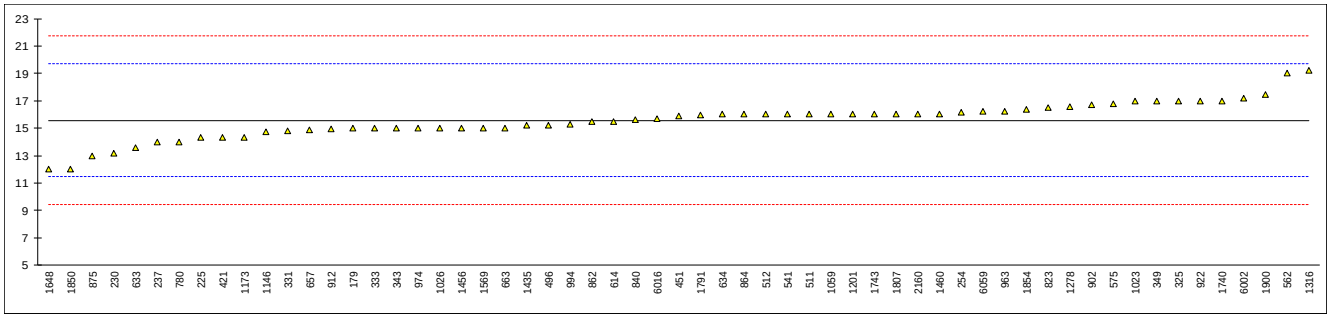


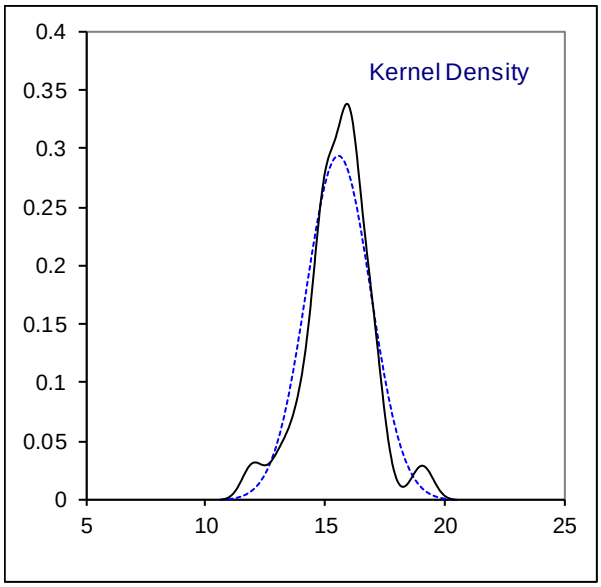
Determination of Vanadium as V on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179	D5185	15		-0.28	
225	D6595	14.3		-0.63	
230	D5185	13.2		-1.16	
237	D5185	13.96		-0.79	
254	INH-018	16.171		0.29	
255		-----		-----	
325	D5185	17		0.69	
331	D5185Mod.	14.8		-0.38	
333	D5185	15		-0.28	
343	D5185	15		-0.28	
349		17		0.69	
398		-----		-----	
421	D5185	14.3		-0.63	
451		15.9		0.15	
494		-----		-----	
496	D5185	15.24		-0.17	
511	D5185	16		0.20	
512	D5185	16		0.20	
541	D5185	16.0		0.20	
562	D6595	19		1.67	
575	D6595	16.8		0.59	
614	D5185	15.5		-0.04	
633	D6595	13.60		-0.97	
634	D6595	16		0.20	
657	D5185	14.89		-0.34	
663	D5185	15.02		-0.27	
780	D5185	14		-0.77	
823	D5185	16.5		0.45	
840	D5185	15.6		0.01	
862	D5185	15.5		-0.04	
864	D5185	16		0.20	
875	D5185	13.0		-1.26	
902	D5185	16.70		0.54	
912	D5185	14.94		-0.31	
922	D5185	17		0.69	
962		-----		-----	
963	D5185	16.21		0.31	
974		15		-0.28	
994	D5185	15.3		-0.14	
1023	D5185	16.9494		0.67	
1026	D5185	15		-0.28	
1059	In house	16		0.20	
1146	In house	14.76		-0.40	
1173	INH-66	14.34		-0.61	
1201	D5185	16		0.20	
1278	D5185	16.56		0.48	
1316	D5185	19.2		1.76	
1396		-----		-----	
1435	D5185	15.22		-0.18	
1456	D5185	15		-0.28	
1460	D5185	16.04		0.22	
1543		-----		-----	
1569	D5185	15		-0.28	
1648	D5185	12		-1.75	
1740	D5185	17		0.69	
1743	D5185	16		0.20	
1748		-----		-----	
1752		-----		-----	
1791	In house	15.96		0.18	
1807	D5185	16		0.20	
1850	In house	12		-1.75	
1854		16.4		0.40	
1900	D5185	17.485		0.93	
2160	In house	16.00		0.20	
6002	D6595	17.18	C	0.78	First reported 7.18
6016	D5185	15.66	C	0.04	First reported 1.566
6043		-----		-----	
6059	D5185	16.2		0.30	

normality	suspect
n	59
outliers	0
mean (n)	15.583
st.dev. (n)	1.3550
R(calc.)	3.794
st.dev.(D5185:18)	2.0507
R(D5185:18)	5.742

Application range: 1 – 50 mg/kg



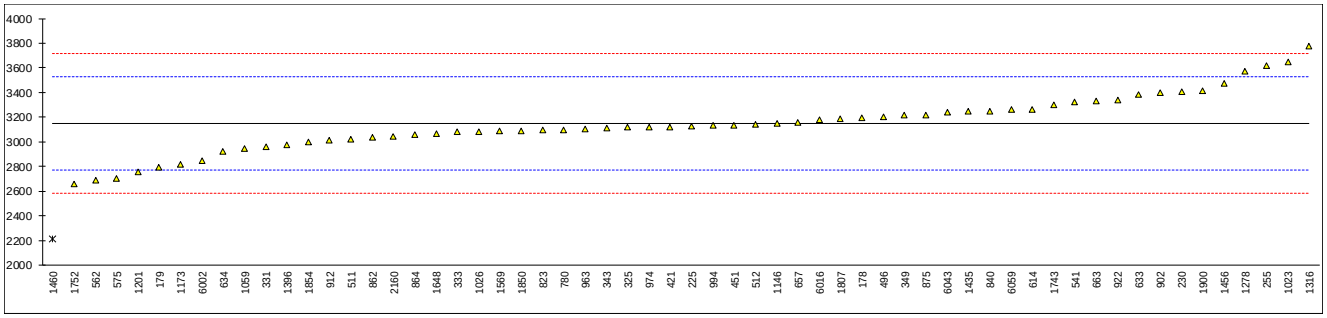


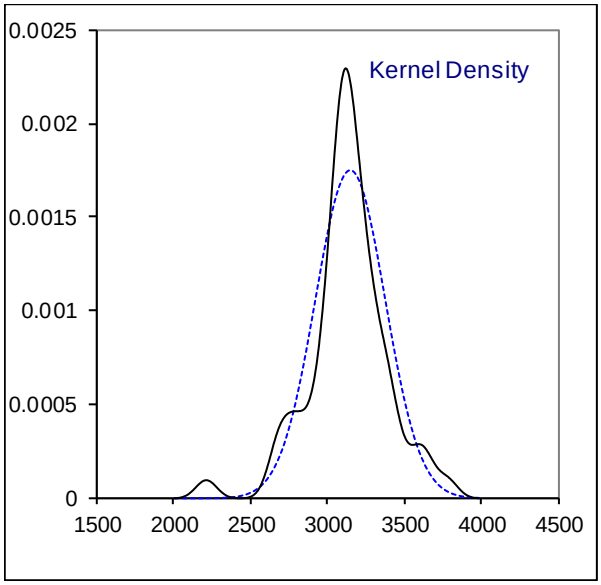
Determination of Calcium as Ca on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	3193		0.24	
179	D5185	2798		-1.85	
225	D6595	3126		-0.12	
230	D5185	3403.4	C	1.35	First reported 4117.2
237		-----		-----	
254		-----		-----	
255	INH-OL1	3615		2.47	
325	D5185	3119		-0.15	
331	D5185Mod.	2963.3		-0.98	
333	D5185	3079		-0.37	
343	D5185	3110		-0.20	
349		3215		0.35	
398		-----		-----	
421	D5185	3120		-0.15	
451		3136.9		-0.06	
494		-----		-----	
496	D5185	3200		0.27	
511	D5185	3024		-0.66	
512	D5185	3141		-0.04	
541	D5185	3321.0		0.92	
562	D6595	2690		-2.42	
575	D6595	2703		-2.36	
614	D5185	3263		0.61	
633	D6595	3384		1.25	
634	D6595	2920		-1.21	
657	D5185	3160.5		0.07	
663	D5185	3334.5		0.99	
780	D5185	3100		-0.25	
823	D5185	3098		-0.26	
840	D5185	3248		0.53	
862	D5185	3038		-0.58	
864	D5185	3060		-0.47	
875	D5185	3220		0.38	
902	D5185	3399		1.33	
912	D5185	3017.2		-0.69	
922	D5185	3336		0.99	
962		-----		-----	
963	D5185	3108.08		-0.21	
974		3119		-0.15	
994	D5185	3132		-0.08	
1023	D5185	3646.71		2.64	
1026	D5185	3083		-0.34	
1059	In house	2943		-1.09	
1146	In house	3152		0.02	
1173	INH-66	2816.96		-1.75	
1201	D5185	2760		-2.05	
1278	D5185	3570		2.23	
1316	D5185	3780		3.34	
1396	In house	2978.04		-0.90	
1435	D5185	3247		0.52	
1456	D5185	3478		1.75	
1460	D5185	2210	R(0.01)	-4.96	
1543		-----		-----	
1569	D5185	3087		-0.32	
1648	D5185	3070		-0.41	
1740		-----		-----	
1743	D5185	3300		0.80	
1748		-----		-----	
1752	In house	2660.2		-2.58	
1791		-----		-----	
1807	D5185	3184		0.19	
1850	In house	3092		-0.30	
1854		3000		-0.78	
1900	D5185	3413.6		1.41	
2160	In house	3041		-0.57	
6002	D6595	2850.86		-1.57	
6016	D5185	3180	C	0.17	First reported 318.0
6043		3244		0.51	
6059	D5185	3262.0		0.60	

normality	OK
n	59
outliers	1
mean (n)	3148.0
st.dev. (n)	227.26
R(calc.)	636.3
st.dev.(D5185:18)	188.97
R(D5185:18)	529.1

Application range: 40 – 9000 mg/kg



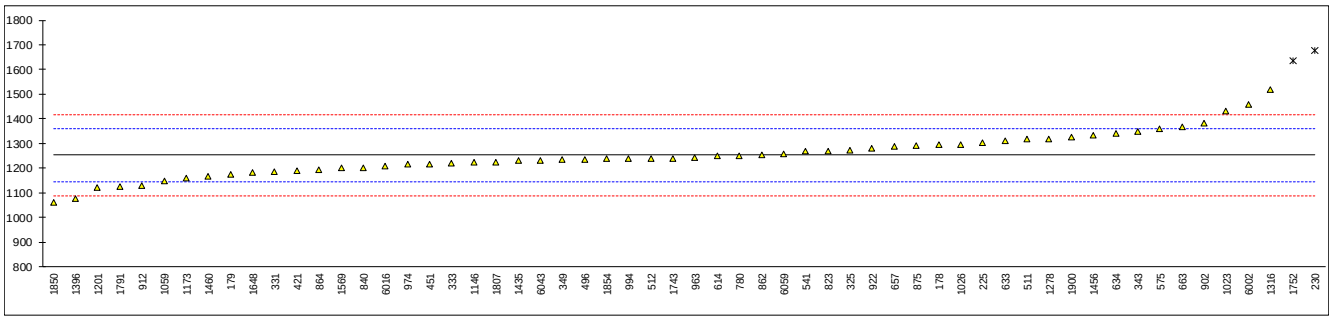


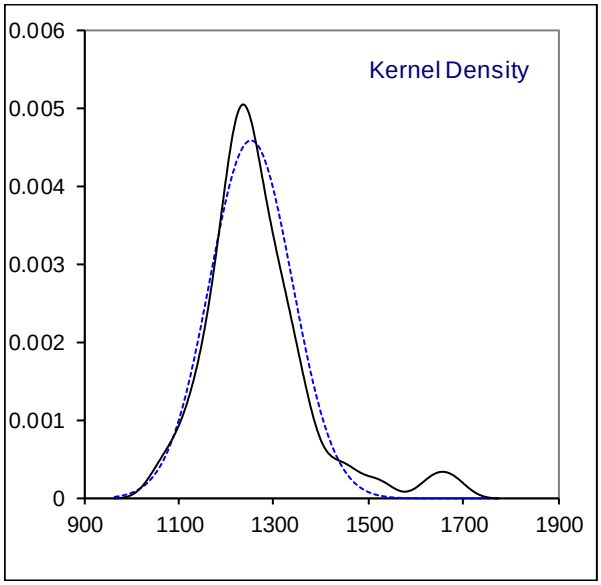
Determination of Phosphorus as P on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	1294		0.76	
179	D5185	1175		-1.43	
225	D6595	1303		0.93	
230	D5185	1677.7	C,R(0.01)	7.82	First reported 1846.7
237		-----		-----	
254		-----		-----	
255		-----		-----	
325	D5185	1274		0.39	
331	D5185Mod.	1184.3		-1.26	
333	D5185	1221		-0.58	
343	D5185	1350		1.79	
349		1236		-0.31	
398		-----		-----	
421	D5185	1191		-1.13	
451		1216.8		-0.66	
494		-----		-----	
496	D5185	1236		-0.31	
511	D5185	1317		1.18	
512	D5185	1240		-0.23	
541	D5185	1268.7		0.29	
562		-----		-----	
575	D6595	1358		1.94	
614	D5185	1250		-0.05	
633	D6595	1309		1.04	
634	D6595	1340		1.61	
657	D5185	1287.0		0.63	
663	D5185	1368.0		2.12	
780	D5185	1250		-0.05	
823	D5185	1269		0.30	
840	D5185	1203		-0.91	
862	D5185	1254		0.02	
864	D5185	1195		-1.06	
875	D5185	1290		0.69	
902	D5185	1383		2.40	
912	D5185	1128.6		-2.28	
922	D5185	1280		0.50	
962		-----		-----	
963	D5185	1243.49		-0.17	
974		1215		-0.69	
994	D5185	1239		-0.25	
1023	D5185	1433.5		3.33	
1026	D5185	1294		0.76	
1059	In house	1150		-1.89	
1146	In house	1223		-0.55	
1173	INH-66	1160.04		-1.70	
1201	D5185	1120		-2.44	
1278	D5185	1320		1.24	
1316	D5185	1520		4.92	
1396	In house	1078.41		-3.21	
1435	D5185	1230		-0.42	
1456	D5185	1333		1.48	
1460	D5185	1167		-1.58	
1543		-----		-----	
1569	D5185	1200		-0.97	
1648	D5185	1181		-1.32	
1740		-----		-----	
1743	D5185	1240		-0.23	
1748		-----		-----	
1752	In house	1635.4	R(0.01)	7.04	
1791	In house	1125.86		-2.33	
1807	D5185	1223		-0.55	
1850	In house	1063		-3.49	
1854		1238		-0.27	
1900	D5185	1326.1		1.35	
2160	In house	--		-----	
6002	D6595	1457.12		3.76	
6016	D5185	1209	C	-0.80	First reported 120.9
6043		1233		-0.36	
6059	D5185	1256.0		0.06	

normality	suspect
n	56
outliers	2
mean (n)	1252.7
st.dev. (n)	87.19
R(calc.)	244.1
st.dev.(D5185:18)	54.35
R(D5185:18)	152.2
Compare	
R(Horwitz)	191.8

Application range: 10 – 1000 mg/kg



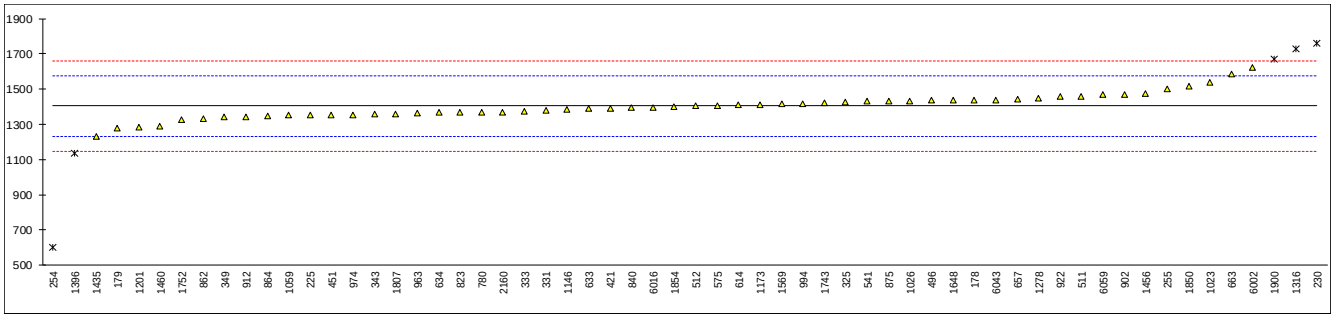


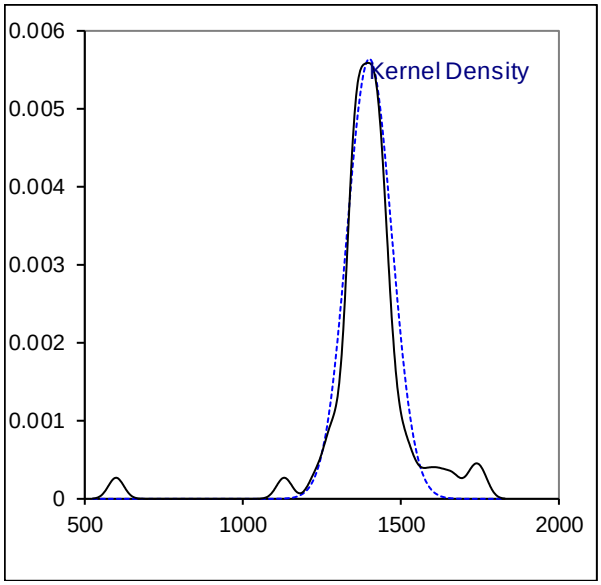
Determination of Zinc as Zn on sample #18097; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D5185	1437		0.39	
179	D5185	1276		-1.48	
225	D6595	1351		-0.61	
230	D5185	1759.5	C,R(0.05)	4.15	First reported 2089.1
237		-----		-----	
254	INH-018	599.495	C,R(0.01)	-9.36	First reported 701.077
255	INH-OL1	1503		1.16	
325	D5185	1426		0.26	
331	D5185Mod.	1380.3		-0.27	
333	D5185	1372		-0.37	
343	D5185	1360		-0.51	
349		1342		-0.72	
398		-----		-----	
421	D5185	1392		-0.13	
451		1352.2		-0.60	
494		-----		-----	
496	D5185	1436		0.38	
511	D5185	1459		0.65	
512	D5185	1405		0.02	
541	D5185	1429.9		0.31	
562		-----		-----	
575	D6595	1406		0.03	
614	D5185	1410		0.08	
633	D6595	1391		-0.14	
634	D6595	1370		-0.39	
657	D5185	1440.50		0.43	
663	D5185	1584.8		2.11	
780	D5185	1370		-0.39	
823	D5185	1370		-0.39	
840	D5185	1397		-0.08	
862	D5185	1330		-0.86	
864	D5185	1349		-0.63	
875	D5185	1430		0.31	
902	D5185	1469		0.76	
912	D5185	1343.6		-0.70	
922	D5185	1456		0.61	
962		-----		-----	
963	D5185	1364.64		-0.45	
974		1355		-0.56	
994	D5185	1415		0.13	
1023	D5185	1538.82		1.58	
1026	D5185	1433		0.34	
1059	In house	1350		-0.62	
1146	In house	1384		-0.23	
1173	INH-66	1410.75		0.09	
1201	D5185	1284		-1.39	
1278	D5185	1450		0.54	
1316	D5185	1730	R(0.05)	3.80	
1396	In house	1133.25	R(0.05)	-3.15	
1435	D5185	1233		-1.98	
1456	D5185	1474		0.82	
1460	D5185	1289		-1.33	
1543		-----		-----	
1569	D5185	1414		0.12	
1648	D5185	1436		0.38	
1740		-----		-----	
1743	D5185	1420		0.19	
1748		-----		-----	
1752	In house	1328.2		-0.88	
1791		-----		-----	
1807	D5185	1360		-0.51	
1850	In house	1516		1.31	
1854		1398		-0.06	
1900	D5185	1668.7	R(0.05)	3.09	
2160	In house	1371		-0.38	
6002	D6595	1624.8		2.58	
6016	D5185	1397	C	-0.08	First reported 139.7
6043		1437		0.39	
6059	D5185	1468.0		0.75	

normality	suspect
n	55
outliers	5
mean (n)	1403.5
st.dev. (n)	70.71
R(calc.)	198.0
st.dev.(D5185:18)	85.87
R(D5185:18)	240.4

Application range: 60 – 1600 mg/kg





APPENDIX 2

Number of participants per country

1 lab in ARGENTINA
2 labs in AUSTRALIA
1 lab in AZERBAIJAN
2 labs in BELGIUM
1 lab in BRUNEI
1 lab in CHILE
2 labs in CHINA, People's Republic
1 lab in COLOMBIA
1 lab in COTE D'IVOIRE
1 lab in CROATIA
1 lab in CYPRUS
1 lab in CZECH REPUBLIC
2 labs in DENMARK
3 labs in FRANCE
2 labs in GERMANY
3 labs in GREECE
2 labs in INDIA
1 lab in ITALY
1 lab in JORDAN
1 lab in KAZAKHSTAN
2 labs in KENYA
1 lab in MACEDONIA
3 labs in MALAYSIA
1 lab in MAURITIUS
2 labs in MOROCCO
3 labs in NETHERLANDS
5 labs in NIGERIA
2 labs in NORWAY
1 lab in PAKISTAN
2 labs in PERU
2 labs in PHILIPPINES
2 labs in POLAND
1 lab in ROMANIA
2 labs in RUSSIAN FEDERATION
3 labs in SAUDI ARABIA
1 lab in SINGAPORE
1 lab in SLOVENIA
1 lab in SOUTH KOREA
5 labs in SPAIN
1 lab in SUDAN
1 lab in SWEDEN
1 lab in TANZANIA
1 lab in THAILAND
2 labs in TURKEY
1 lab in UNITED ARAB EMIRATES
3 labs in UNITED KINGDOM
2 labs in UNITED STATES OF AMERICA
1 lab in VIETNAM

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
ex	= test result excluded from the statistical evaluation
W	= test result withdrawn on request of participant
fr.	= first reported
n.a.	= not applicable
n.e.	= not evaluated
SDS	= Safety Data Sheet

Literature:

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3 ASTM E1301:89
4 ISO 5725:86
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15 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, *Technometrics*, 25(2), 165-172, (1983)
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