Results of Proficiency Test
Used Engine Oil
June 2016

CONTENTS

Appendices:

1 INTRODUCTION

Since 1997, the Institute for Interlaboratory Studies organizes a proficiency test for the analysis of used Engine Oil. During the annual proficiency testing program 2015/2016, it was decided to continue the round robin for the analysis of used Engine Oil.

In this interlaboratory study, 87 laboratories in 50 different countries registered for participation. See appendix 2 for the number of participants per country. In this report, the results of the 2016 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. The sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC 17025 accredited laboratory. In this proficiency test, the participants received a 1 litre bottle used Engine Oil (labelled #16106) and a 100 mL bottle with used Engine Oil (labelled #16107) for Metals only.

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

2.1 ACCREDITATION

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

2.2 PROTOCOL

The protocol followed in the organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3). This protocol can be downloaded via the FAQ page of the iis website www.iisnl.com

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

In this proficiency test two different batches were used. The necessary bulk material for the first sample, used Engine Oil, was donated by a third party laboratory. The necessary 60 litre bulk material was homogenised in a precleaned 60L drum. After homogenisation, 118 subsamples were transferred to 0.5 L brown glass bottles and labelled #16106. The homogeneity of the subsamples #16106 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	Viscosity at 40°C in mm^2/s
Sample #16106-1	0.89548	123.6
Sample #16106-2	0.89548	124.2
Sample #16106-3	0.89548	124.2
Sample #16106-4	0.89548	124.2
Sample #16106-5	0.89548	124.2
Sample #16106-6	0.89548	124.2
Sample #16106-7	0.89548	124.0
Sample #16106-8	0.89548	123.9

Table 1: homogeneity test results of subsamples #16106

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

	Density at 15°C in kg/L	Viscosity at 40°C in mm^2/s
r (observed)	0.00000	0.2
reference test method	D4052:15	D445 (*)
0.3 * R (ref. test method)	0.00015	0.7

Table 2: evaluation of repeatabilities of the subsamples #16106

(*) The reproducibility is based on the reproducibility found in PTs for used oils, see lit. 16.

The second bulk material, used Engine Oil, enriched with several wear metals, was also obtained from a third party laboratory. The approximately 5 L bulk material was homogenised in a precleaned can. After homogenisation, 98 subsamples were transferred to 100 mL PE bottles, each filled with approximately 50 mL material and labelled #16107. The homogeneity of the subsamples #16107 was checked by determination of Copper and Calcium both in accordance with ASTM D5185 on 8 stratified randomly selected samples.

	Copper in mg/kg	Calcium in mg/kg
Sample #16107-1	16.3	2860
Sample #16107-2	16.1	2860
Sample #16107-3	16.2	2861
Sample #16107-4	15.5	2843
Sample #16107-5	15.7	2851
Sample #16107-6	15.4	2861
Sample #16107-7	15.4	2858
Sample #16107-8	15.3	2858

Table 3: homogeneity test results of subsamples #16107

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

	Copper in mg/kg	Calcium in mg/kg
r (observed)	1.2	18
reference test method	ASTM D5185:13e1	ASTM D5185:13e1
0.3 * R (ref. test method)	1.1	140

Table 4: evaluation of repeatabilities of the subsamples #16107

The calculated repeatabilities are all less than 0.3 times the corresponding reproducibilities of the reference methods. Therefore, homogeneity of the subsamples #16106 and #16107 was assumed.

To each of the participating laboratories two samples of used Engine Oil (1*0.5 L brown glass bottle labelled #16106 and 1*100 mL PE bottle, labelled #16107) were sent on May 25, 2016.

2.5 STABILITY OF THE SAMPLES

The stability of Engine Oil, packed in the brown 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 #16106: Acid Number, Base Number, Base Number (Strong), Density at 15°C, Flash Point PMcc, Fuel Dilution, Kinematic Viscosity at 40°C and at 100°C, Viscosity Index, Kinematic Viscosity by Houillon at 40°C and at 100°C and Water.
The participants were requested to determine 20 elements (Wear metals: Ag, Al, Ba, Cr, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, Na, Si, Sn, Ti and V and the additives Ca, P and Zn) on sample #16107.

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

3 RESULTS

During five weeks after sample dispatch, the test results of the individual laboratories were gathered via the data entry portal www.kpmd.co.uk/sgs-iis/. The reported test results are tabulated per determination in appendix 1 of this report. The laboratories are presented by their code numbers. Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline, the available test results were screened for suspect data. A test result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the reported test results. 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

Statistical calculations were performed as described in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' (iis-protocol, April 2014 version 3.3). For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as '<…' or '>…' were not used in the statistical evaluation.

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

In accordance to ISO 5725 the original test results per determination were submitted subsequently 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 the averages and the standard deviations.

For each assigned value the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. When the uncertainty passed the evaluation no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

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

3.2 GRAPHICS

In order to 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 test results are plotted. The corresponding laboratory numbers are on the X-axis.
The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected standard. 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.

3.3 Z-SCORES

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

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

The $z_{(target)}$ scores are listed in the test 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, some problems with sample despatch were encountered. Four participants reported after the final reporting date and two participants did not report any results at all. Not all laboratories were able to report all analyses requested. In total 85 participants reported 1890 test results. Observed were 57 statistically outlying testresults, which is 3.0% of the numerical test results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

4.1 EVALUATION PER TEST

In this section, the reported test results are discussed per sample and per test. The specified test methods and requirements 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.

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.

In the iis PT reports, ASTM methods are referred to with a number (e.g. D6595) and an added designation for the year that the method was adopted or revised (e.g. D6595:00). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D6595:00(2011)). In the results tables of Appendix 1 only the method number and year of adoption or revision e.g. D6595:00 will be used.

As used Engine Oil is a very difficult matrix to analyze, 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 standard. 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.

Sample #16106:

Acid Number: 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 D664:11a. Differences in sample intake may (partly) explain the large spread (see also proficiency test iis13L02).

Base Number: This determination was problematic. Four statistical outliers were observed and one test result was excluded from the statistical calculations as the reported test method is not equivalent with ASTM D2896. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ASTM D2896:15.

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

Density at 15°C: This determination was problematic. Eight statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM D4052:15.

Flash Point PMcc: ASTM D93 states the following in the scope: Procedure A is applicable to distillate fuels, new and in-use lubricating oils. Procedure B is applicable to residual fuel oils, cutback residua, used lubricating oils, mixtures of petroleum liquids with solids. This means that in-use or used lubrication oils may be measured with procedure A as well as with procedure B. Since the average test results of both method procedures are different in this proficiency test, it was decided to evaluate the test results for both procedures separately.

ASTM D93-A: this determination was problematic. One statistical outlier was observed and one test result was excluded for using method ASTM D92 (Cleveland Open Cup). The calculated reproducibility after rejection of the suspect data was not in agreement with the requirements of ASTM D93-A:16.

ASTM D93-B: this determination was very problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier was not at all in agreement with the requirements of ASTM D93-B:16. The group of test results appears to be bimodally divided.

Fuel dilution: This determination may not be problematic. Only five laboratories reported a numerical test result. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D3524:14.

Kin.Visco.at 40°C: Regretfully, a reproducibility for used oils is not present in ASTM D445:12 (see §17.3). Therefore, the target reproducibility is calculated from the reproducibilities found in iis PT's on used oils (see appendix 3, ref. 16). This determination was not problematic. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the average reproducibility found for used oils in previous iis PTs.

Kin.Visco.at 100°C: Regretfully, a reproducibility for used oils is not present in ASTM D445:12 (see §17.3). Therefore, the target reproducibility is calculated from the reproducibilities found in iis PT's on used oils (see appendix 3, ref. 16). This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the average reproducibility found for used oils in previous iis PTs.

Viscosity Index: This determination was problematic. Thirteen results were excluded from the statistical calculations due to several reasons (outlier in Kinematic Viscosity, used results determined by Houillon viscosity or made a calculation error). The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of ASTM D2270:10.

Kin.Visco.at 40°C: This determination was not problematic. No statistical outliers were observed.
(Houillon)   The calculated reproducibility is in good agreement with the requirements of ASTM D7279:16.

Kin.Visco.at 100°C: This determination was not problematic. No statistical outliers were observed.
(Houillon)   The calculated reproducibility is in good agreement with the requirements of ASTM D7279:16.

Water: This determination was problematic for a number of laboratories.
The preferred method to use for a product containing interfering components may be ASTM D6304:07 method C. This method is applicable for oils with difficult matrix interferences. Thirty laboratories reported results determined according ASTM D6304 method C. After excluding twenty-two test results from other test methods and one statistical outlier the calculated reproducibility is in good agreement with the requirements of ASTM D6304:07.

Sample #16107: Wear metals

As in previous proficiency tests on used Engine Oil, a number of participants reported to have used ASTM D6595 instead of ASTM D5185 for the determination of wear metals on used Engine Oil. In this proficiency test nine laboratories reported to have used ASTM D6595. This test method is used for the quantification of elements from dissolved materials to particles approximately 10 µm in size, while test method ASTM D5185 does not purport to quantitatively determine insoluble particles larger than a few micrometers. As also determined in previous rounds on used Engine Oil, the averages of ASTM D6595 data for the majority of the 20 elements, except for Li, Mo, Si, Ag, Sn, Ti, Ca and P were significant higher than the averages of the remaining data. This suggests the presence of particles larger than a few micrometers. Therefore it was decided to evaluate in this proficiency test the data obtained with ASTM D6595 separately (see appendix 1).

The determination of all the requested wear metals in this sample was not problematic for the group "ASTM D5185", which is all data without ASTM D6595 test results.
In total 31 statistical outliers were observed. The calculated reproducibilities of almost all metals after rejection of the statistical outliers are in agreement with the requirements of ASTM D5185, except for Lead (Pb), Manganese (Mn) and Phosphorus (P).

The determination of all the requested wear metals in this sample was not problematic for the group "ASTM D6595".
For this group no statistical outliers were observed. The calculated reproducibilities for the majority of metals are in agreement with the requirements of ASTM D6595, except for Barium (Ba), Lead (Pb), Magnesium (Mg) and Sodium (Na).
For Tin (Sn) no significant conclusions were drawn as the average concentration was below the application range of the test method.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant standard and the reproducibility as found for the group of participating laboratories. The average results, calculated reproducibilities and reproducibilities derived from literature standards (in casu ASTM and IP standards), are compared in the next table.

Parameter	unit	n	average	2.8 * sd	R (lit)
Acid Number (Total)	mg KOH/g	63	4.05	2.25	1.78
Base Number (Total)	mg KOH/g	57	8.98	1.07	0.63
Base Number (Strong)	mg KOH/g	19	6.41	1.50	3.66
Density at 15°C	kg/L	59	0.8955	0.0006	0.0005
Flash Point PMcc – method A	^{o}C	30	205.6	18.5	14.6
Flash Point PMcc – method B	^{o}C	20	199.1	28.2	10.0
Fuel dilution	%M/M	4	0.4	1.0	1.6
Kinematic Viscosity at 40°C	mm^2/s	64	124.10	1.33	2.23
Kinematic Viscosity at 100°C	mm^2/s	64	14.375	0.246	0.316
Viscosity Index		50	116.1	3.0	2.0
Kinematic Viscosity (Houillon) at 40°C	mm^2/s	19	124.38	1.46	3.73
Kinematic Viscosity (Houillon) at 100°C	mm^2/s	17	14.436	0.470	0.808
Water	mg/kg	29	124	208	304

Table 5: reproducibilities of test results of sample #16106

Parameter	Unit	n	Average	2.8 * sd	R (lit)
Aluminium as Al	mg/kg	56	10.0	3.0	6.9
Barium as Ba	mg/kg	58	9.5	2.5	4.7
Chromium as Cr	mg/kg	64	9.4	2.5	3.2
Copper as Cu	mg/kg	66	15.7	3.7	3.8
Iron as Fe	mg/kg	62	11.7	3.2	3.7
Lead as Pb	mg/kg	62	47.2	13.8	12.0
Lithium as Li	mg/kg	17	<2.5	n.a.	n.a.
Magnesium as Mg	mg/kg	58	15.9	3.7	6.1
Manganese as Mn	mg/kg	54	9.8	2.3	2.0
Molybdenum as Mo	mg/kg	60	9.9	3.2	3.3
Nickel as Ni	mg/kg	65	9.3	2.9	4.6
Sodium as Na	mg/kg	50	11.1	6.6	6.1
Silicon as Si	mg/kg	61	13.5	4.1	8.0
Silver as Ag	mg/kg	54	9.8	3.4	3.4
Tin as Sn	mg/kg	59	9.3	4.3	8.4
Titanium as Ti	mg/kg	49	9.2	2.5	7.1
Vanadium as V	mg/kg	58	9.2	2.1	3.2
Calcium as Ca	mg/kg	63	2829	466	461
Phosphorus as P	mg/kg	64	1086	224	142
Zinc as Zn	mg/kg	64	1196	220	202

Table 6: reproducibilities of test results of sample #16107 (without ASTM D6595 data)

Parameter	Unit	n	Average	2.8 * sd	R (lit)
Aluminium as Al	mg/kg	9	12.3	3.6	4.6
Barium as Ba	mg/kg	9	11.5	5.6	2.4
Chromium as Cr	mg/kg	9	12.2	3.7	3.4
Copper as Cu	mg/kg	9	18.5	3.7	5.3
Iron as Fe	mg/kg	9	14.0	2.6	5.7
Lead as Pb	mg/kg	8	52.6	11.2	7.0
Lithium as Li	mg/kg	2	<2.5	n.a.	n.a.
Magnesium as Mg	mg/kg	8	17.7	11.3	6.3
Manganese as Mn	mg/kg	7	12.2	4.1	5.4
Molybdenum as Mo	mg/kg	9	9.8	4.3	4.6
Nickel as Ni	mg/kg	9	12.4	3.5	3.5
Sodium as Na	mg/kg	8	17.0	9.4	4.7
Silicon as Si	mg/kg	9	14.4	4.9	4.8
Silver as Ag	mg/kg	8	10.4	3.9	3.8
Tin as Sn	mg/kg	8	6.2	5.7	(1.9)
Titanium as Ti	mg/kg	9	9.3	2.3	3.1
Vanadium as V	mg/kg	9	11.0	3.3	5.5
Calcium as Ca	mg/kg	7	2700	595	797
Phosphorus as P	mg/kg	7	1107	280	338
Zinc as Zn	mg/kg	7	1364	142	314

Table 7: reproducibilities of test results of sample #16107 (only ASTM D6595 data)

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

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

	June 2016	June 2015	June 2014	May 2013	May 2012
Number of reporting participants	85	80	88	83	77
Number of results reported	1890	1555	2150	1476	1216
Statistical outliers	57	66	61	90	53
Percentage outliers	3.0%	4.2%	2.8%	6.1%	4.4%

Table 8: comparison with previous proficiency tests

In proficiency tests, outlier percentages of 3% - 7.5% are quite normal. The performance of the determinations of the proficiency tests was compared against the requirements of the respective standards. The conclusions are given the following table:

Determination	June 2016	June 2015	June 2014 *)	May 2013	May 2012
Total Acid Number	--	--	--	-	-
Total Base Number	--	-	--	--	-
Base Number Strong	++	++	++	++	++
Density at 15 °C	-	+/-	+	--	-
Flash Point PMcc – method A	-	-	-	--	--
Flash Point PMcc – method B	--	--	-	--	--
Fuel Dilution	++	+	++	n.e.	n.e.
Kinematic Viscosity at 40 °C	++	+	++	++	++
Kinematic Viscosity at 100 °C	++	+/-	++	++	-
Viscosity Index	--	--	--	-	n.e.
Kinematic Viscosity (Houillon) at 40 °C	++	++	++	++	n.e.
Kinematic Viscosity (Houillon) at 100 °C	++	++	++	++	n.e.
Water	++	++	-	+	-
Metals (20 elements) #16107 (D5185)	+	+	+	+	+
Metals (20 elements) #16107 (D6595)	+	n.e.	n.e.	n.e.	n.e.

Table 9: comparison determinations against the reference standards

*) only for sample #14083

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

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

APPENDIX 1
Determination of Acid Number on Sample #16106; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
178	INH-1118	2.99		-1.66	
179	D664	2.94		-1.74	
211	D664	4.00		-0.08	
214		-----		-----	
225	D664	2.18		-2.94	
230	D664	2.89	C	-1.82	First reported 0.943
237	D664	4.55		0.79	
252		-----		-----	
254		-----		-----	
255		-----		-----	
271	D664	1.70		-3.69	
311	D664	3.61		-0.69	
315		-----		-----	
325	D664	4.39		0.54	
331	D664	3.52		-0.83	
333	D664	4.5		0.71	
343	D664	3.83		-0.34	
349	D664	4.74		1.09	
398	D664	<0,05		<-6.28	False negative test result?
421	ISO6619	4.83		1.23	
450		-----		-----	
451	D664	4.72		1.05	
473		-----		-----	
496	D664	3.44		-0.96	
497	D664	3.63		-0.66	
511	D664	3.904		-0.23	
512	D664	4.137		0.14	
541		-----		-----	
550	D664	2.27		-2.80	
562	D664	4.63		0.91	
575	D664	5.22		1.84	
603	D664	4.36		0.49	
614	D664	4.69		1.01	
621	D664	3.72		-0.52	
633		-----		-----	
634		-----		-----	
657	D664	5.81		2.77	
663	D664	4.203		0.24	
823	D664	4.65		0.94	
840	D664	4.008		-0.06	
862	D664	4.34		0.46	
864	D664	3.90		-0.23	
875	D664	3.12		-1.46	
902		-----		-----	
912	D664	4.80		1.18	
922	D664	3.892		-0.25	
963	D664	3.00		-1.65	
994	D664	3.82		-0.36	
1023		-----		-----	
1026	D664	4.1		0.08	
1059	ISO6619	4.22		0.27	
1106	D664	3.0605		-1.55	
1146	D664	3.97		-0.12	
1161	D664	4.417		0.58	
1173		-----		-----	
1201	D664	7.82	C,R(0.01)	5.93	First reported 8.05
1213	D664	4.78		1.15	
1264	D664	4.767		1.13	
1271	D664	4.975		1.46	
1278		-----		-----	
1316	D664	3.31		-1.16	
1396	D664	4.34		0.46	
1412	D664	3.94		-0.17	
1435		-----		-----	
1456		-----		-----	
1569	D664	4.34		0.46	
1648		-----		-----	
1650	D664	4.75		1.10	
1740	D664	5.3		1.97	
1748		-----		-----	
1784	D664	4.2		0.24	
1800		-----		-----	
1807	D664	4.2965		0.39	
1850	ISO6619	4.58		0.83	
1854	D664	4.1		0.08	

1900	In house	4.19	0.22
1957	D664	3.399	-1.02
1969	D664	4.579	0.83
1981		-----	-----
2122	IP177	3.913	-0.21
2133	D664	5.187	1.79
6010	D664	4.85	1.26
6016		-----	-----
6043	D664	2.66	-2.18
6044		-----	-----
6056	D974	3.09	-1.51
6059	D664	4.85	1.26

normality	OK
n	63
outliers	1
mean (n)	4.049
st.dev. (n)	0.8030
R(calc.)	2.248
R(D664:11a)	1.782

Kernel Density
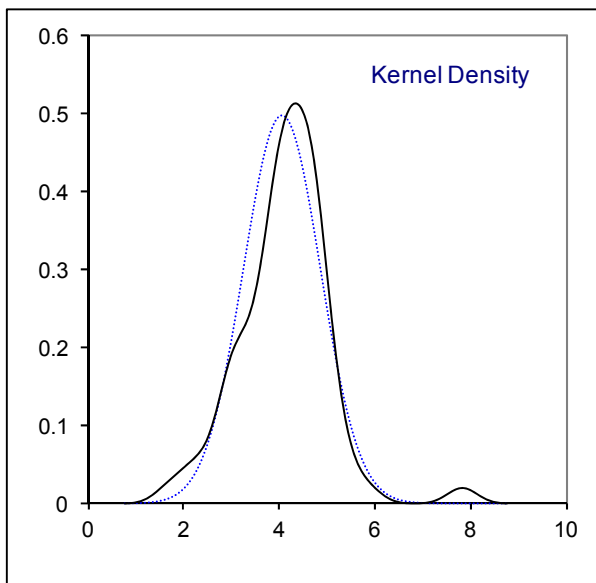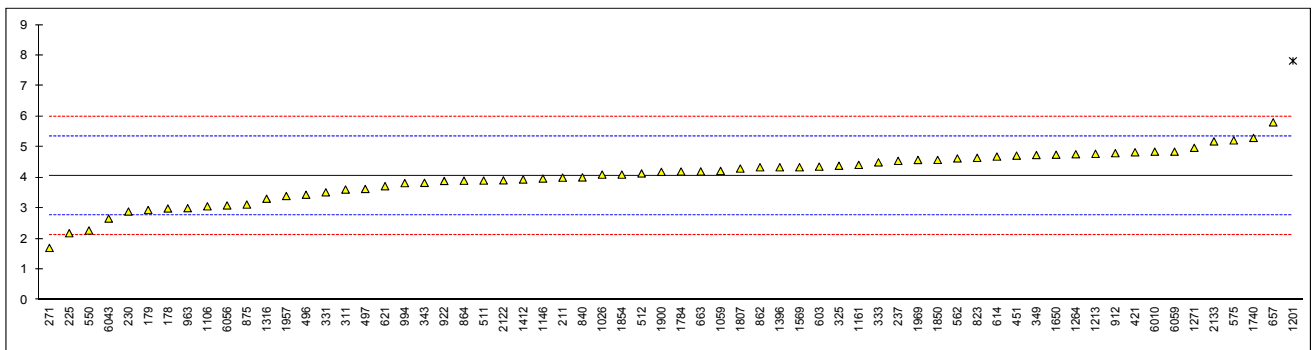
Determination of Base Number on Sample #16106; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179	D2896	10.45	R(0.05)	6.56	
211		-----		-----	
214		-----		-----	
225		-----		-----	
230	INH-10	9.43		2.02	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
271	D2896 - B	8.75		-1.01	
311	D2896 - B	8.2		-3.46	
315		-----		-----	
325	D2896 - B	8.7		-1.23	
331	D2896 - B	9.10		0.55	
333	D2896 - A	9.1		0.55	
343		-----		-----	
349		-----		-----	
398	D2896 - B	9.24		1.17	
421	ISO3771	9.25		1.22	
450		-----		-----	
451	D2896 - B	8.5		-2.13	
473	D2896 - B	9.0995		0.55	
496	D2896 - B	9.44		2.06	
497	D2896 - B	9.27		1.31	
511	D2896 - B	8.845		-0.59	
512	D2896 - B	8.653		-1.44	
541	D2896 - B	9.26		1.26	
550	D2896 - A	7.90	C	-4.80	First reported 7.8
562		-----		-----	
575	D2896 - B	8.87		-0.48	
603	D2896 - A	8.62		-1.59	
614	D2896 - B	9.02		0.19	
621		-----		-----	
633	D2896 - A	10.48	R(0.05)	6.70	
634	D2896 - B	9.125		0.66	
657	D2896 - B	9.16		0.82	
663	D2896 - B	9.41		1.93	
823	D2896 - A	8.3		-3.02	
840	D2896 - B	9.06		0.37	
862	D2896 - B	9.12		0.64	
864	D2896 - A	9.51		2.38	
875	D2896 - A	8.9		-0.34	
902	D2896 - B	8.919		-0.26	
912	D2896 - B	8.9		-0.34	
922	D2896 - B	9.60		2.78	
963	D2896 - A	8.45		-2.35	
994		-----		-----	
1023	D2896 - B	9.21		1.04	
1026	D2896 - B	9.2		0.99	
1059	ISO3771	9.1		0.55	
1106		-----		-----	
1146	D2896 - A	9.02		0.19	
1161	D2896 - B	8.507		-2.09	
1173	In house	6.0	R(0.01)	-13.26	
1201	D2896 - A	8.82		-0.70	
1213		-----		-----	
1264		-----		-----	
1271	ISO3771	8.56		-1.86	
1278		-----		-----	
1316		-----		-----	
1396		-----		-----	
1412		-----		-----	
1435	D2896	9.41		1.93	
1456	D2896 - A	9.78		3.58	
1569	D2896 - A	9.2		0.99	
1648	D2896 - A	9.68		3.13	
1650	D2896 - A	9.26		1.26	
1740	D2896 - A	9		0.10	
1748	D2896 - A	9.105		0.57	
1784	D2896 - B	8.9		-0.34	
1800		-----		-----	
1807	D2896 - A	8.03		-4.22	
1850	ISO3771	11.62	R(0.01)	11.78	
1854	D2896 - B	8.6		-1.68	

1900	D2896 - A	9.1		0.55	
1957	D2896 - A	8.99		0.06	
1969	D2896 - A	8.8		-0.79	
1981	D2896 - B	8.62		-1.59	
2122	IP400	6.10	ex	-12.82	Result exclude, see §4.1
2133	D2896 - B	8.76		-0.97	
6010	D2896 - B	9.27		1.31	
6016		-----		-----	
6043	D2896 - A	9.1		0.55	
6044	D2896 - A	9.013		0.16	
6056		-----		-----	
6059	D2896 - B	8.95		-0.12	

|		Only method A	Only Method B
normality	OK	OK	OK
n	57	21	31
outliers	4 (+1 excl)	1	0
mean (n)	8.977	8.937	8.976
st.dev. (n)	0.3834	0.4779	0.3150
R(calc.)	1.074	1.338	0.882
R(D2896:15)	0.628	0.626	0.628

Kernel Density
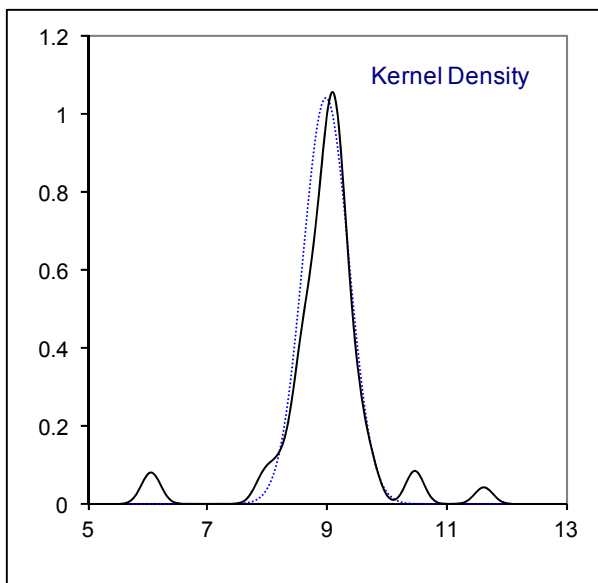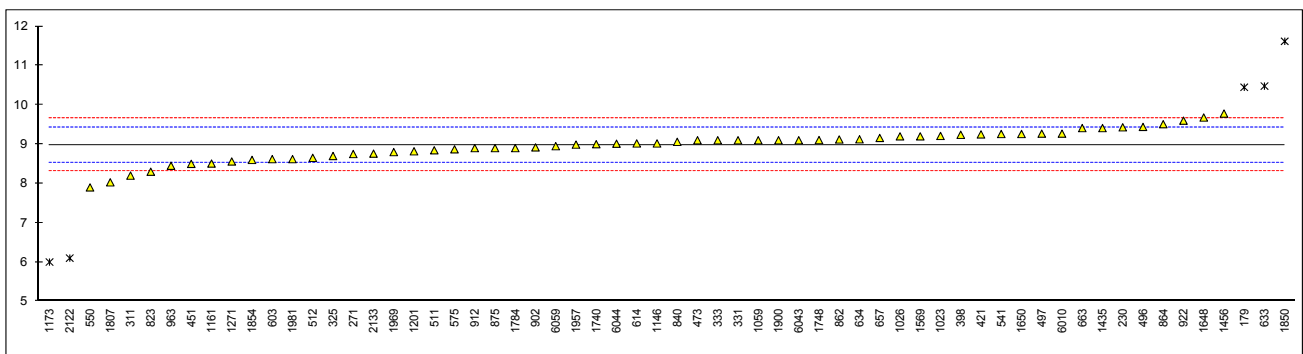
Determination of Base Number (Strong) on Sample #16106; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
178	D4739	6.10		-0.23	
179	D4739	6.10		-0.23	
211		-----		-----	
214		-----		-----	
225		-----		-----	
230		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
271		-----		-----	
311		-----		-----	
315		-----		-----	
325	D4739	6.25		-0.12	
331	D4739	6.00		-0.31	
333	D4739	7.0		0.45	
343	D4739	6.75		0.26	
349	D4739	5.9		-0.39	
398		-----		-----	
421		-----		-----	
450		-----		-----	
451	D4739	6.5		0.07	
473		-----		-----	
496	D4739	6.09		-0.24	
497	D4739	6.67		0.20	
511		-----		-----	
512		-----		-----	
541		-----		-----	
550	D4739	6.20		-0.16	
562		-----		-----	
575		-----		-----	
603		-----		-----	
614		-----		-----	
621		-----		-----	
633		-----		-----	
634		-----		-----	
657		-----		-----	
663	D4739	6.57		0.13	
823		-----		-----	
840		-----		-----	
862	D4739	6.03		-0.29	
864	D4739	6.86		0.35	
875		-----		-----	
902		-----		-----	
912		7.3		0.68	
922		-----		-----	
963		-----		-----	
994	D4739	6.47		0.05	
1023		-----		-----	
1026		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1201		-----		-----	
1213	D4739	9.32	R(0.01)	2.23	
1264	IP417	7.13		0.55	
1271		-----		-----	
1278		-----		-----	
1316	D4739	5.0		-1.08	
1396		-----		-----	
1412	D4739	6.80		0.30	
1435		-----		-----	
1456		-----		-----	
1569		-----		-----	
1648		-----		-----	
1650		-----		-----	
1740		-----		-----	
1748		-----		-----	
1784		-----		-----	
1800		-----		-----	
1807		-----		-----	
1850		-----		-----	
1854		-----		-----	

1900	-----	-----
1957	-----	-----
1969	-----	-----
1981	-----	-----
2122	-----	-----
2133	-----	-----
6010	-----	-----
6016	-----	-----
6043	-----	-----
6044	-----	-----
6056	-----	-----
6059	-----	-----

|	
normality	suspect
n	19
outliers	1
mean (n)	6.406
st.dev. (n)	0.5353
R(calc.)	1.499
R(D4739:11)	3.663

Kernel Density
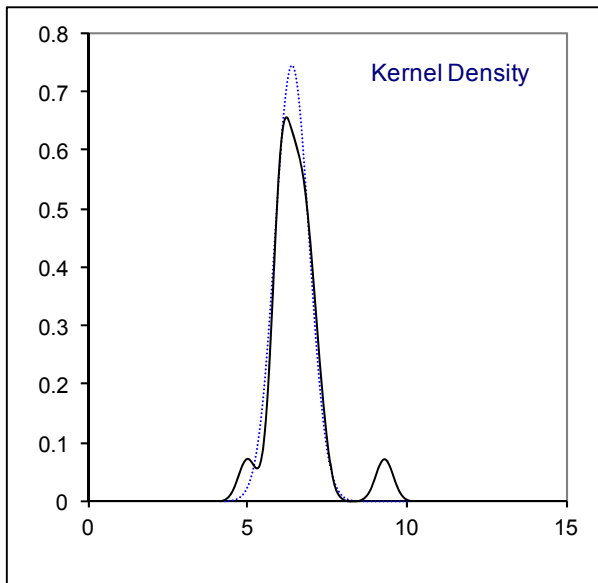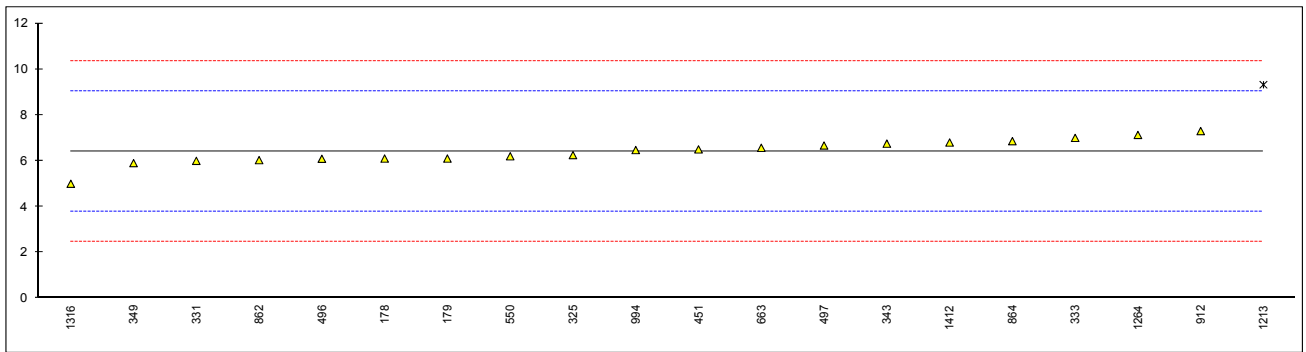
Determination of Density at 15°C on Sample #16106; results in kg/L

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179	D2896	0.8959		2.13	
211	D1298	0.8963	R(0.01)	4.37	
214		-----		-----	
225		-----		-----	
230		-----		-----	
237	D4052	0.8957		1.01	
252		-----		-----	
254	D4052	0.89580		1.57	
255		-----		-----	
271		-----		-----	
311		-----		-----	
315	D4052	0.8955		-0.11	
325	D4052	0.89569		0.95	
331	ISO12185	0.8955	C	-0.11	First reported 0.89675
333	D4052	0.8960		2.69	
343	D4052	0.89552		0.00	
349	D4052	0.89528		-1.34	
398	D4052	0.8960		2.69	
421	ISO12185	0.8947	R(0.05)	-4.59	
450		-----		-----	
451	D4052	0.8951		-2.35	
473	D4052	0.8957		1.01	
496	D4052	0.89555		0.17	
497	D4052	0.89543		-0.50	
511	D4052	0.89528		-1.34	
512	D4052	0.89532		-1.12	
541	D4052	0.8955		-0.11	
550		-----		-----	
562		-----		-----	
575		-----		-----	
603	D4052	0.89546		-0.33	
614	D4052	0.8943	R(0.01)	-6.83	
621	D4052	0.8955		-0.11	
633		-----		-----	
634	D4052	0.89548		-0.22	
657	D4052	0.8956		0.45	
663	D4052	0.89552		0.00	
823	D4052	0.89559		0.39	
840	D4052	0.89544		-0.45	
862	D4052	0.8956		0.45	
864	D4052	0.8955		-0.11	
875	D4052	0.8958		1.57	
902	D4052	0.89546		-0.33	
912	D4052	0.8955		-0.11	
922	D4052	0.8957		1.01	
963	D4052	0.8955		-0.11	
994	D4052	0.8958		1.57	
1023	D4052	0.8955		-0.11	
1026	D4052	0.8958		1.57	
1059	D4052	0.8954		-0.67	
1106	D5002	0.8958	C	1.57	First reported 0.8824
1146	ISO12185	0.89551		-0.05	
1161	ISO3675	0.8963	C,R(0.01)	4.15	First reported 0.8922
1173		-----		-----	
1201	D4052	0.8736	C,R(0.01)	-122.75	First reported 0.8981
1213	D4052	0.8943	C,R(0.01)	-6.83	First reported 0.89382
1264	D4052	0.8958		1.57	
1271	D4052	0.8953		-1.23	
1278		-----		-----	
1316	D4052	0.89554		0.11	
1396	IP365	0.8954		-0.67	
1412	D4052	0.8956		0.45	
1435	D4052	0.895		-2.91	
1456	D4052	0.8954		-0.67	
1569		-----		-----	
1648	ISO12185	0.8960		2.69	
1650	D4052	0.8952		-1.79	
1740	D4052	0.8950		-2.91	
1748	D4052	0.8957		1.01	
1784	D4052	0.8952		-1.79	
1800	In house	0.8953		-1.23	
1807		-----		-----	
1850	D4052	0.8955		-0.11	
1854	D4052	0.8951		-2.35	

1900	D4052	0.8953		-1.23
1957	D4052	0.8955		-0.11
1969		-----		-----
1981	D4052	0.8955		-0.11
2122	D4052	0.8967	R(0.01)	6.61
2133	D4052	0.89553		0.06
6010		-----		-----
6016	D4052	0.89551		-0.05
6043	D4052	0.8961	R(0.01)	3.25
6044	D4052	0.895553		0.19
6056		-----		-----
6059	D4052	0.8955		-0.11

normality	OK
n	59
outliers	8
mean (n)	0.89552
st.dev. (n)	0.000226
R(calc.)	0.00063
R(D4052:15)	0.00050

Kernel Density
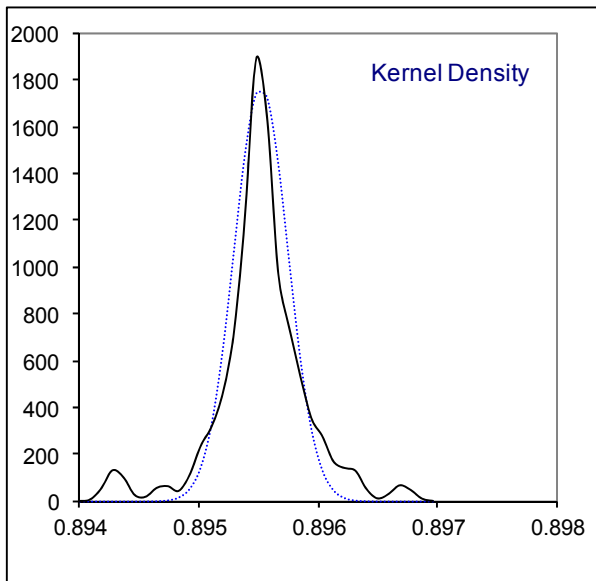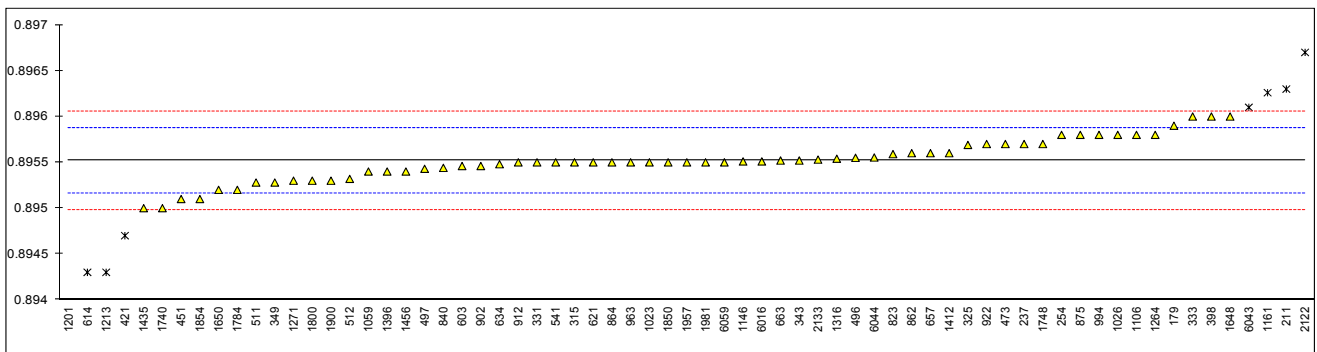
Determination of Flash Point PMcc (method A) on Sample #16106; results in °C

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179	D93-A	206.0		0.14	
211		-----		-----	
214		-----		-----	
225		-----		-----	
230		-----		-----	
237	D93-A	214.0		1.68	
252	D93-A	204.0		-0.24	
254		-----		-----	
255		-----		-----	
271	D93-A	>200		-----	
311		-----		-----	
315		-----		-----	
325		-----		-----	
331		-----		-----	
333	D93-A	203.0		-0.43	
343		-----		-----	
349		-----		-----	
398		-----		-----	
421		-----		-----	
450		-----		-----	
451	D93-A	216		2.06	
473		-----		-----	
496		-----		-----	
497		-----		-----	
511		-----		-----	
512		-----		-----	
541	D93-A	206.5		0.24	
550	D3828	203	ex	-0.43	Result excluded, method is not equivalent to ASTM D93
562	D93-A	203.8		-0.28	
575		-----		-----	
603	D3828	200.0	ex	-1.01	Result excluded, method is not equivalent to ASTM D93
614	D93-A	198		-1.39	
621		-----		-----	
633	D3828	228.3	ex	4.43	Result excluded, method is not equivalent to ASTM D93
634		-----		-----	
657		-----		-----	
663		-----		-----	
823		-----		-----	
840		-----		-----	
862	D93-A	207		0.34	
864	D93-A	205.5		0.05	
875	D93-A	208.0		0.53	
902	D93-A	209.0		0.72	
912	D93-A	202		-0.63	
922	D93-A	208		0.53	
963	D93-A	200		-1.01	
994		-----		-----	
1023	D93-A	207		0.34	
1026	ISO2719-A	208		0.53	
1059		-----		-----	
1106	D93-A	208.0		0.53	
1146	D93-A	206.2		0.18	
1161		-----		-----	
1173	IP34-A	187.25		-3.46	
1201		-----		-----	
1213		-----		-----	
1264	D92	214	ex	1.68	Result excluded, method is not equivalent to ASTM D93
1271	ISO2719-A	209		0.72	
1278		-----		-----	
1316		-----		-----	
1396	IP523	213	ex	1.49	Result excluded, method is not equivalent to ASTM D93
1412		-----		-----	
1435	D93-A	211.5		1.20	
1456	D93-A	212.0		1.30	
1569	D93-A	>210		-----	
1648		-----		-----	
1650		-----		-----	
1740	D93-A	191.5		-2.64	
1748	D93-A	208		0.53	
1784		-----		-----	
1800		-----		-----	
1807	D93-A	207.0		0.34	
1850		-----		-----	
1854		-----		-----	

1900	In house	216		2.06
1957	D93-A	207		0.34
1969		-----		-----
1981		-----		-----
2122	IP34-A	174	R(0.01)	-6.00
2133	D93-A	207.1		0.35
6010		-----		-----
6016		-----		-----
6043	D93-A	192		-2.55
6044		-----		-----
6056		-----		-----
6059		-----		-----

normality	suspect
n	30
outliers	1 (+ 5 excl)
mean (n)	205.61
st.dev. (n)	6.595
R(calc.)	18.46
R(D93A:16)	14.60
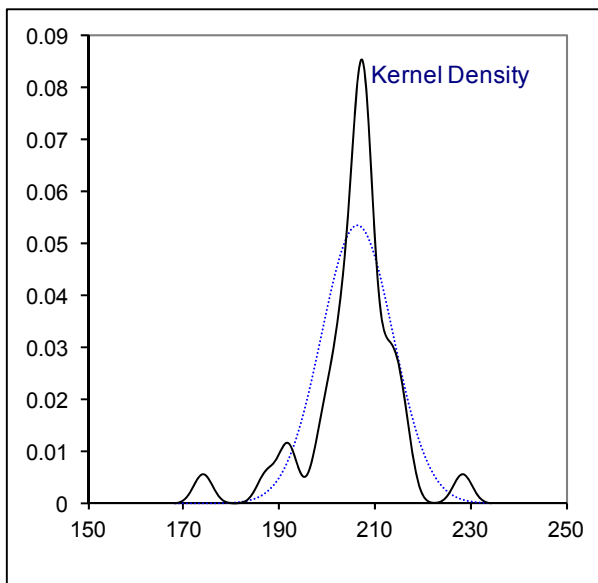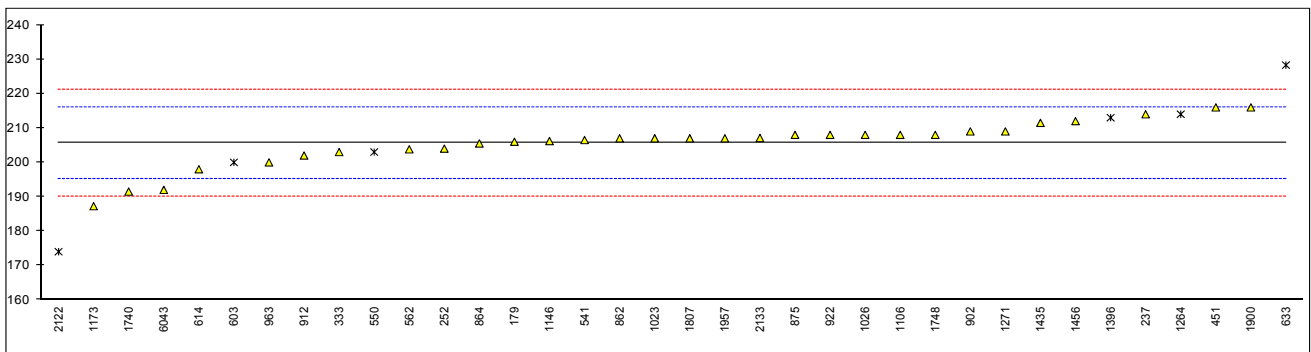
Determination of Flash Point PMcc (method B) on Sample #16106; results in °C

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179		-----		-----	
211		-----		-----	
214		-----		-----	
225		-----		-----	
230		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
271		-----		-----	
311		-----		-----	
315	D93-B	187.5		-3.14	
325	D93	191.0		-2.16	
331	D93-B	204.5		1.62	
333		-----		-----	
343	D93-B	190.0		-2.44	
349	D93-B	206		2.04	
398		-----		-----	
421	ISO2719-B	208.5		2.74	
450		-----		-----	
451		-----		-----	
473	D93-B	206.0		2.04	
496		-----		-----	
497		-----		-----	
511	D93-B	212.01		3.73	
512		-----		-----	
541		-----		-----	
550		-----		-----	
562		-----		-----	
575		-----		-----	
603		-----		-----	
614		-----		-----	
621	D93-B	186.0		-3.56	
633		-----		-----	
634		-----		-----	
657	D93-B	210	C	3.16	First reported 164
663	D93-B	191.58		-1.99	
823	D93-B	186.0	C	-3.56	First reported 168
840	D93-B	196		-0.76	
862		-----		-----	
864		-----		-----	
875		-----		-----	
902		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
994		-----		-----	
1023		-----		-----	
1026		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1201	D93-B	191.0		-2.16	
1213		-----		-----	
1264		-----		-----	
1271		-----		-----	
1278		-----		-----	
1316		-----		-----	
1396		-----		-----	
1412		-----		-----	
1435		-----		-----	
1456		-----		-----	
1569		-----		-----	
1648	ISO2719-B	204.7		1.68	
1650		-----		-----	
1740		-----		-----	
1748		-----		-----	
1784	D93-B	192		-1.88	
1800		-----		-----	
1807		-----		-----	
1850	ISO2719-B	170	R(0.05)	-8.04	
1854	D93-B	194		-1.32	

1900		-----	-----
1957		-----	-----
1969	ISO2719-B	214	4.28
1981		-----	-----
2122		-----	-----
2133		-----	-----
6010		-----	-----
6016	D93-B	188	-3.00
6043		-----	-----
6044	D93-B	198	-0.20
6056		-----	-----
6059	D93-B	216	4.84

normality	OK
n	21
outliers	1
mean (n)	198.70
st.dev. (n)	9.982
R(calc.)	27.95
R(D93B:16)	10.00
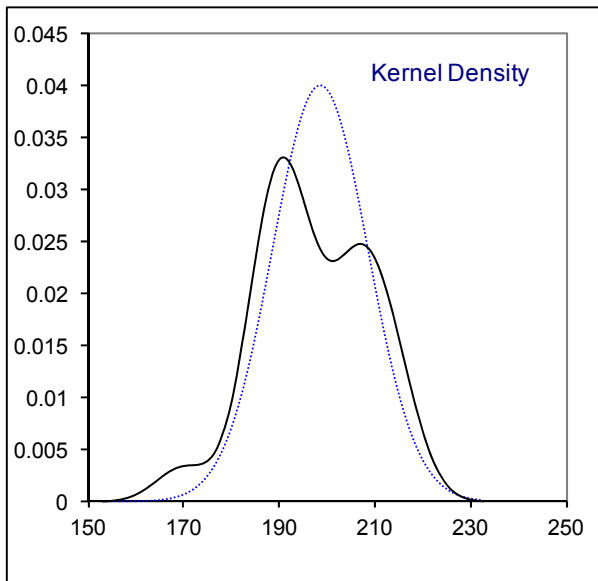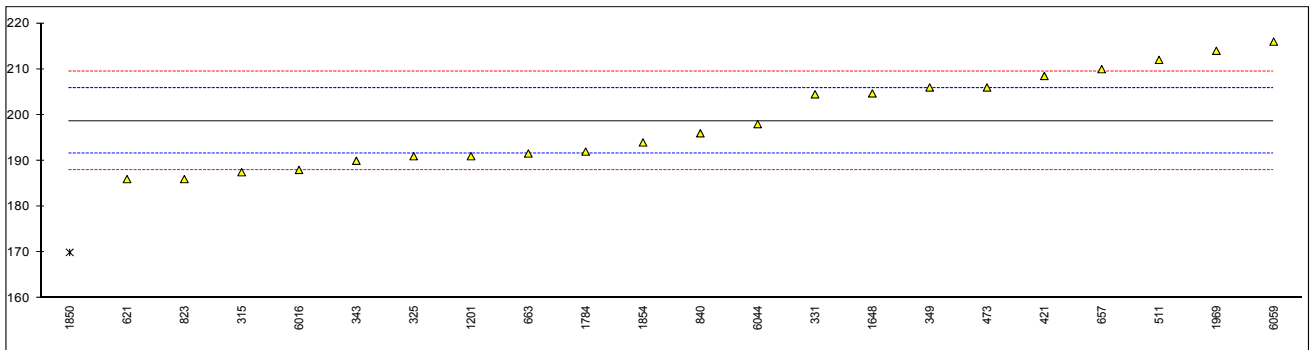
Determination of Fuel dilution on Sample #16106; results in %M/M

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179	D3524	0.8		0.68	
211		-----		-----	
214		-----		-----	
225		-----		-----	
230		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
271		-----		-----	
311		-----		-----	
315		-----		-----	
325	D3524	0.12		-0.51	
331		-----		-----	
333		-----		-----	
343	D3524	0.60		0.33	
349	D3524	3.2	G(0.05)	4.88	False positive test result?
398		-----		-----	
421		-----		-----	
450		-----		-----	
451		-----		-----	
473		-----		-----	
496		-----		-----	
497		-----		-----	
511		-----		-----	
512		-----		-----	
541		-----		-----	
550		-----		-----	
562		-----		-----	
575		-----		-----	
603		-----		-----	
614		-----		-----	
621		-----		-----	
633		-----		-----	
634		-----		-----	
657		-----		-----	
663		-----		-----	
823		-----		-----	
840		-----		-----	
862	D3524	<0.1		-----	
864		-----		-----	
875		-----		-----	
902		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
994		-----		-----	
1023		-----		-----	
1026		-----		-----	
1059	D3524	<0.5		-----	
1106		-----		-----	
1146	D3524	0.13		-0.49	
1161		-----		-----	
1173		-----		-----	
1201		-----		-----	
1213		-----		-----	
1264		-----		-----	
1271		-----		-----	
1278		-----		-----	
1316	D3524	<0.5		-----	
1396		-----		-----	
1412		-----		-----	
1435		-----		-----	
1456		-----		-----	
1569	D3524	<0.5		-----	
1648		-----		-----	
1650		-----		-----	
1740		-----		-----	
1748		-----		-----	
1784		-----		-----	
1800		-----		-----	
1807	D3524	< 1.0		-----	
1850		-----		-----	
1854		-----		-----	

1900	-----	-----
1957	-----	-----
1969	-----	-----
1981	-----	-----
2122	-----	-----
2133	-----	-----
6010	-----	-----
6016	-----	-----
6043	-----	-----
6044	-----	-----
6056	-----	-----
6059	-----	-----

| normality	unknown
n	4
outliers	1
mean (n)	0.41
st.dev. (n)	0.342
R(calc.)	0.96
R(D3524:14)	1.60
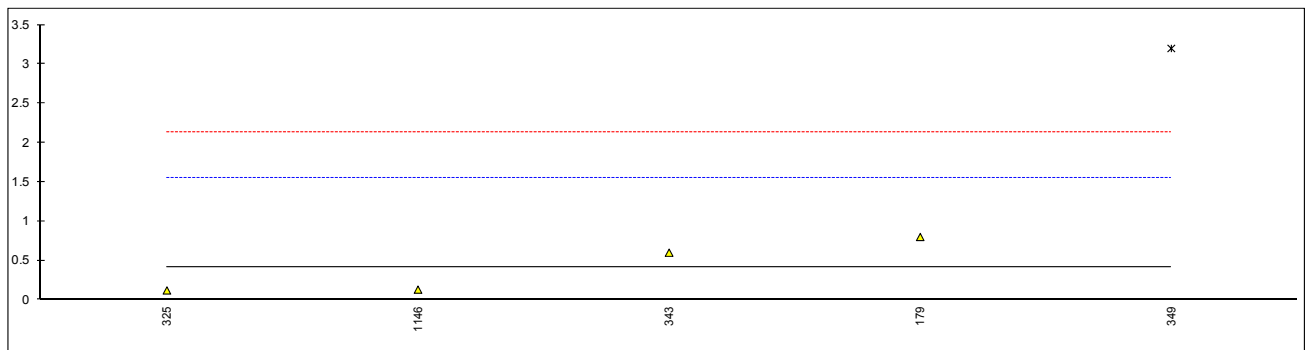
Determination of Kinematic Viscosity at 40°C (D445) on Sample #16106; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
178	D445	123.6		-0.62	
179	D445	124.1		0.00	
211	D445	124.1		0.00	
214		-----		-----	
225	D445	123.5		-0.75	
230		-----		-----	
237	D445	123.8		-0.37	
252	D445	125.8	R(0.05)	2.14	
254		-----		-----	
255		-----		-----	
271	D445	124.2		0.13	
311	D445	123.8		-0.37	
315	D445	124.1		0.00	
325	D445	123.72		-0.47	
331		-----		-----	
333	D445	124.0		-0.12	
343	D445	124.21		0.14	
349	D445	123.6		-0.62	
398	D445	124.60		0.63	
421	D7042	124.06		-0.05	
450		-----		-----	
451		-----		-----	
473	D7042	124.72		0.78	
496	D445	123.87		-0.28	
497		-----		-----	
511		-----		-----	
512		-----		-----	
541		-----		-----	
550		-----		-----	
562	D445	125.41		1.65	
575	D445	124.40		0.38	
603	D7042	123.93		-0.21	
614	D445	123.80		-0.37	
621		-----		-----	
633		-----		-----	
634	D445	122.56	R(0.05)	-1.93	
657		-----		-----	
663	D445	123.74		-0.45	
823	D445	124.4		0.38	
840	D445	124.13		0.04	
862	D445	124.4		0.38	
864	D445	123.1		-1.25	
875	D445	124.0		-0.12	
902	D445	126.8	C,R(0.01)	3.39	First reported 119.2
912	D445	123.5		-0.75	
922	D445	123.8		-0.37	
963	D445	124.6		0.63	
994	D445	124.02		-0.10	
1023	D445	124.09		-0.01	
1026	D445	123.5		-0.75	
1059	ISO3104	123.5		-0.75	
1106		-----		-----	
1146	D445	124.37		0.34	
1161	ISO3104	124.7		0.76	
1173	IP71	124.69		0.74	
1201	D445	124.3		0.25	
1213	D445	124.1		0.00	
1264	D7042	126.06	R(0.05)	2.46	
1271	ISO3104	123.653		-0.56	
1278		-----		-----	
1316	ISO3104	124.1		0.00	
1396	IP71	124.805		0.89	
1412	D445	124.75		0.82	
1435	D7042	124.87		0.97	
1456	D7042	124.07		-0.03	
1569	D445	124.0		-0.12	
1648	D445	124.16		0.08	
1650	D445	124.89		0.99	
1740	D445	124.4		0.38	
1748	D7042	122.96		-1.42	
1784	D445	124.1		0.00	
1800		-----		-----	
1807	D445	123.9		-0.25	
1850	ISO3104	125.2		1.38	
1854	D445	123.8		-0.37	

1900	D445	126.0	R(0.05)	2.39	
1957	D7042	123.88	C	-0.27	First reported 132.88
1969	ISO3104	124.1969		0.13	
1981	D445	124.1		0.00	
2122	In house	124.09		-0.01	
2133	D445	123.8		-0.37	
6010	D7042	124.04		-0.07	
6016	D7042	123.89		-0.26	
6043	D445	123		-1.37	
6044	D7042	124.7	C	0.76	First reported 127.5
6056	D445	124.27		0.22	
6059	D445	124.1		0.00	

normality	OK	
n	64	
outliers	5	
mean (n)	124.097	
st.dev. (n)	0.4760	
R(calc.)	1.333	
R(iis)	2.234	R(iis) = 1.8% of mean for used oils at 40°C (see lit.16)

Kernel Density
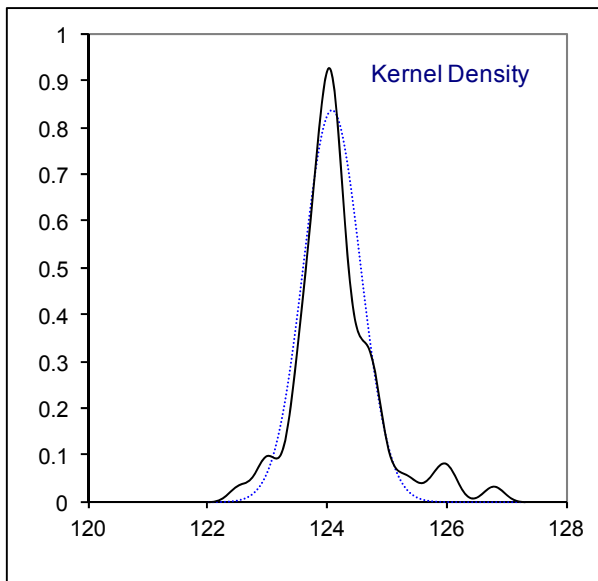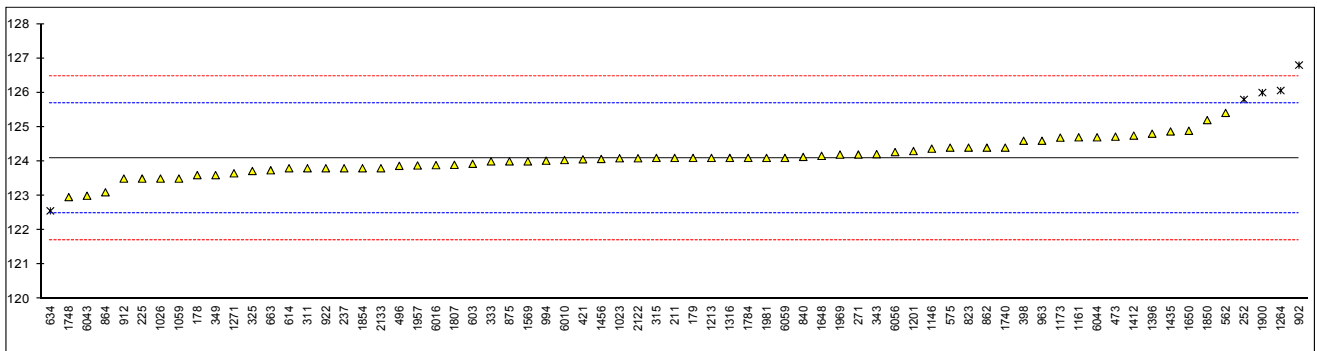
Determination of Kinematic Viscosity at 100°C (D445) on Sample #16106; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
178	D445	14.36		-0.13	
179	D445	14.41		0.31	
211	D445	14.42		0.40	
214		-----		-----	
225	D445	14.42		0.40	
230		-----		-----	
237	D445	14.35		-0.22	
252	D445	14.53		1.38	
254		-----		-----	
255		-----		-----	
271	D445	14.36		-0.13	
311	D445	14.29		-0.75	
315	D445	14.35		-0.22	
325	D445	14.349		-0.23	
331		-----		-----	
333	D445	14.36		-0.13	
343	D445	14.336		-0.34	
349	D445	14.37		-0.04	
398		-----		-----	
421	D7042	14.432		0.51	
450		-----		-----	
451		-----		-----	
473	D7042	14.418		0.38	
496	D445	14.333		-0.37	
497		-----		-----	
511		-----		-----	
512		-----		-----	
541		-----		-----	
550		-----		-----	
562	D445	14.39		0.14	
575	D445	14.47		0.85	
603	D7042	14.360		-0.13	
614	D445	14.41		0.31	
621		-----		-----	
633		-----		-----	
634	D445	14.122		-2.24	
657		-----		-----	
663	D445	14.409		0.31	
823	D445	14.59		1.91	
840	D445	14.412		0.33	
862	D445	14.38		0.05	
864	D445	14.42		0.40	
875	D445	14.38		0.05	
902	D445	14.54		1.47	
912	D445	14.29		-0.75	
922	D445	14.27		-0.93	
963	D445	14.30		-0.66	
994	D7042	14.401		0.23	
1023	D445	14.29		-0.75	
1026	D445	14.34		-0.31	
1059	ISO3104	14.35		-0.22	
1106		-----		-----	
1146	D445	14.366		-0.08	
1161	ISO3104	14.85	C,R(0.01)	4.21	First reported 14.78
1173		-----		-----	
1201	D445	14.32		-0.48	
1213	D445	14.42		0.40	
1264	D7042	14.533		1.40	
1271	ISO3104	14.459		0.75	
1278		-----		-----	
1316	ISO3104	14.35		-0.22	
1396		-----		-----	
1412	D445	14.35		-0.22	
1435	D7042	14.505		1.16	
1456	D7042	14.441		0.59	
1569	D445	14.38		0.05	
1648	D445	14.399		0.22	
1650	D445	14.496		1.08	
1740	D445	14.19		-1.63	
1748	D7042	14.411		0.32	
1784	D445	14.27		-0.93	
1800		-----		-----	
1807	D445	14.32		-0.48	
1850	ISO3104	14.75	R(0.01)	3.32	
1854	D445	14.36		-0.13	

Engine Oil: iis16L05 used

1900	D445	14.28	-0.84
1957	D7042	14.354	-0.18
1969	ISO3104	14.4959	1.07
1981	D445	14.3	-0.66
2122	In house	14.45	0.67
2133	D445	14.358	-0.15
6010	D7042	14.352	-0.20
6016	D7042	14.285	-0.79
6043	D445	14.54	1.47
6044	D7042	14.2932	-0.72
6056	D445	14.16	-1.90
6059	D445	14.32	-0.48

normality	OK	
n	64	
outliers	2	
mean (n)	14.3745	
st.dev. (n)	0.08783	
R(calc.)	0.2459	
R(iis)	0.3162	R(iis) = 2.2% of mean for used oils at 100°C (see lit.16)

Kernel Density
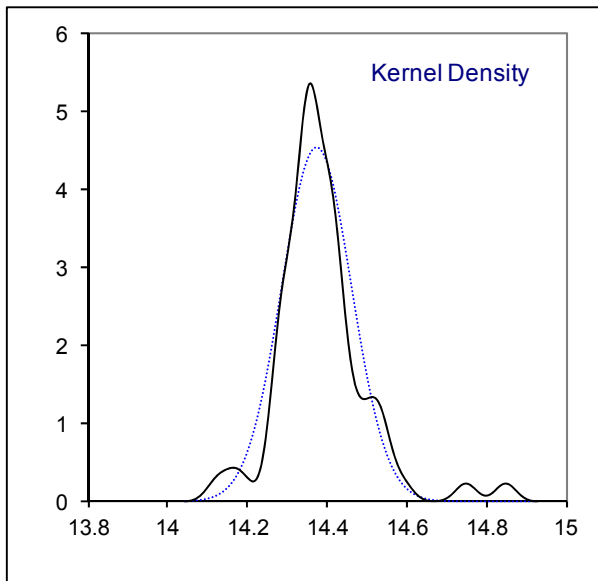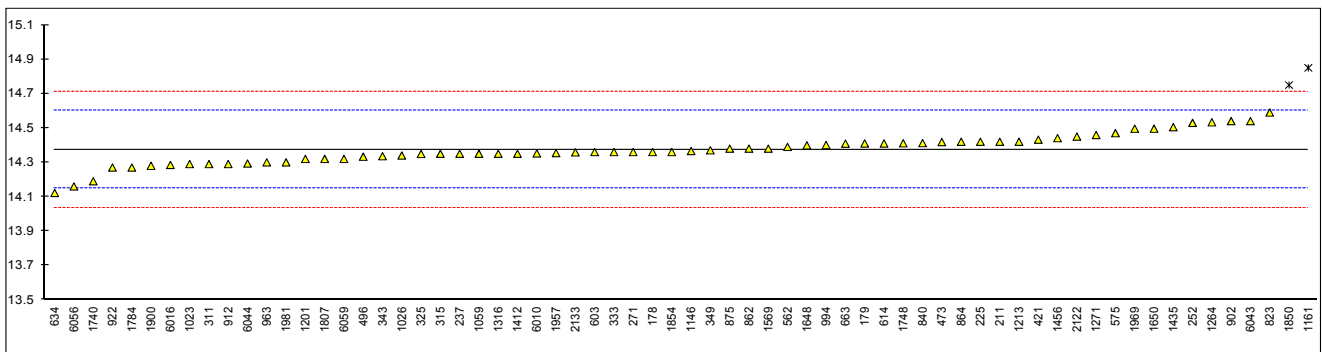
Determination of Viscosity Index on Sample #16106

lab	method	value	mark	z(targ)	iis calc.	remarks
178	D2270	116		-0.10	116.32	
179	D2270	116		-0.10	116.43	
211	D2270	117		1.30	116.56	
214		-----		-----	-----	
225		-----		-----	117.21	
230		-----		-----	-----	
237	D2270	116		-0.10	115.97	
252	D2270	116	ex	-0.10	116.13	Result excluded, outlier in viscosity at 40°C
254		-----		-----	-----	
255		-----		-----	-----	
271	D2270	115.67		-0.56	115.67	
311		-----		-----	115.19	
315	D2270	116		-0.10	115.65	
325	D2270	116.1		0.04	116.05	
331	In house	118	ex	2.70	-----	Result excluded, calculated with Visco Houillon
333	D2270	116		-0.10	115.89	
343	D2270	115		-1.50	115.35	
349	D2270	116		-0.10	116.45	
398		-----		-----	-----	
421	ISO2909	117		1.30	116.75	
450		-----		-----	-----	
451		-----		-----	-----	
473		-----		-----	115.86	
496	D2270	115.68		-0.55	115.68	
497		-----		-----	-----	
511	D2270	112	C,ex	-5.70	-----	First reported 111, excluded calc. with Visco Houillon
512	D2270	113	ex	-4.30	-----	Result excluded, calculated with Visco Houillon
541		-----		-----	-----	
550	D2270	108	C,ex	-11.30	-----	First reported 111, excluded calc. with Visco Houillon
562		114.78		-1.81	114.76	
575	D2270	117		1.30	116.87	
603	D2270	116		-0.10	115.96	
614	D2270	117		1.30	116.75	
621		-----		-----	-----	
633	D2270	118	ex	2.70	-----	Result excluded, calculated with Visco Houillon
634	D2270	114	ex	-2.90	114.33	Result excluded, outlier in viscosity at 40°C
657		-----		-----	-----	
663	D2270	117		1.30	116.81	
823	D2270	118		2.70	118.41	
840	D2270	116		-0.10	116.42	
862	D2270	116		-0.10	115.71	
864	D2270	118		2.70	117.65	
875	D2270	116.1		0.04	116.15	
902		-----		-----	115.20	
912	D2270	116		-0.10	115.52	
922	D2270	115		-1.50	114.93	
963	D2270	115		-1.50	114.46	
994	D2270	116.4		0.46	116.40	
1023		-----		-----	114.88	
1026	D2270	116		-0.10	116.17	
1059	ISO2909	116		-0.10	116.30	
1106		-----		-----	-----	
1146	D2270	115.56		-0.72	115.56	
1161	D2270	122.0	C,ex	8.30	121.36	First rep. 120.6, Result excluded outlier visco at 100°C
1173		-----		-----	-----	
1201	D2270	115		-1.50	115.04	
1213	D2270	117		1.30	116.56	
1264	D2270	116	ex	-0.10	115.90	Result excluded, outlier in viscosity at 40°C
1271	ISO2909	117.495		1.99	117.55	
1278		-----		-----	-----	
1316	D2270	116		-0.10	115.65	
1396		-----		-----	-----	
1412	D2270	114.9		-1.64	114.95	
1435	D2270	116.82		1.05	116.81	
1456	D2270	117	C	1.30	116.86	First reported 111
1569	D2270	116		-0.10	116.15	
1648	D2270	116.19		0.16	116.22	
1650	D2270	115.4	E,ex	-0.94	116.68	Calculation error? Result excluded
1740	D2270	113		-4.30	113.24	
1748	D2270	117.7		2.28	117.69	
1784		115		-1.50	114.61	
1800		-----		-----	-----	
1807	D2270	115		-1.50	115.48	
1850	ISO2909	120	ex	5.50	119.56	Result excluded, outlier in viscosity at 100°C
1854	D2270	116		-0.10	116.10	

1900	D2270	113	ex	-4.30	112.72	Result excluded, outlier in viscosity at 40°C
1957	D2270	116		-0.10	115.94	
1969	ISO2909	117.43		1.90	117.43	
1981	D2270	115		-1.50	115.00	
2122		-----		-----	116.95	
2133	D2270	112.35	E,ex	-5.21	116.08	Calculation error? Result excluded
6010	D2270	115.8		-0.38	115.74	
6016		-----		-----	115.03	
6043	D2270	119		4.10	119.31	
6044	D2270	114	C	-2.90	114.26	First reported 111
6056		-----		-----	112.98	
6059	D2270	115		-1.50	115.26	

| normality	suspect	suspect
n	50	61
outliers	0 (+13 excl)	0 (+5 excl)
mean (n)	116.07	115.99
st.dev. (n)	1.068	1.086
R(calc.)	2.99	3.04
R(D2270:10)	2.00	2.00
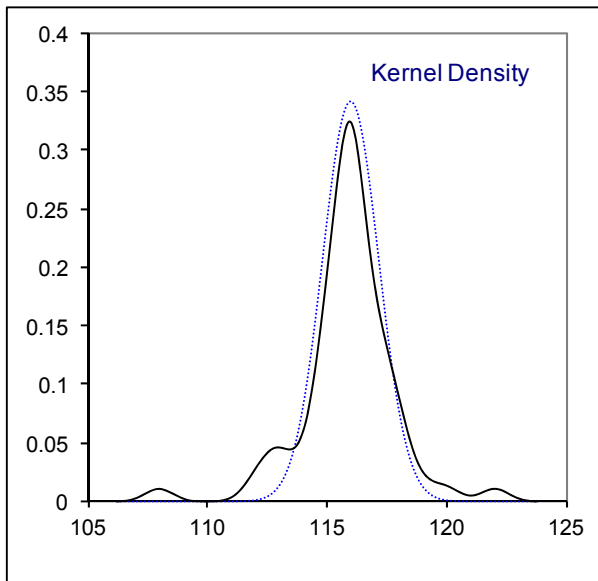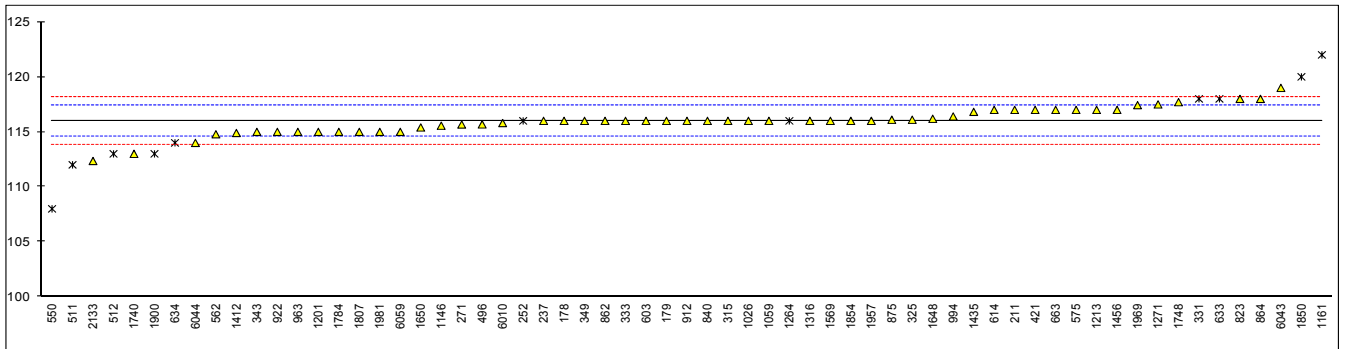
Determination of Kinematic Viscosity at 40°C (Houillon) on Sample #16106; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179		-----		-----	
211		-----		-----	
214		-----		-----	
225	D7279	123.4		-0.73	
230	INH-20	124.33		-0.03	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	D7279	124.55		0.13	
271		-----		-----	
311		-----		-----	
315		-----		-----	
325		-----		-----	
331	D7279	123.8		-0.43	
333		-----		-----	
343		-----		-----	
349		-----		-----	
398		-----		-----	
421		-----		-----	
450		-----		-----	
451	D7279	125.1		0.54	
473		-----		-----	
496	D7279	124.35		-0.02	
497	D7279	124.20		-0.13	
511	D7279	124.42		0.03	
512	D7279	125.4	C	0.77	First reported 14.56
541		-----		-----	
550	D7279	124.2		-0.13	
562		-----		-----	
575	D7279	124.17		-0.15	
603		-----		-----	
614		-----		-----	
621		-----		-----	
633	D7279	123.7		-0.51	
634		-----		-----	
657	D7279	124.66		0.21	
663	D7279	124.37		0.00	
823		-----		-----	
840		-----		-----	
862	D7279	124.8		0.32	
864	D7279	123.9		-0.36	
875		-----		-----	
902	D7279	125.3		0.69	
912		-----		-----	
922		-----		-----	
963		-----		-----	
994		-----		-----	
1023		-----		-----	
1026		-----		-----	
1059	D7279	124.4		0.02	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1201		-----		-----	
1213		-----		-----	
1264		-----		-----	
1271		-----		-----	
1278		-----		-----	
1316		-----		-----	
1396		-----		-----	
1412		-----		-----	
1435		-----		-----	
1456		-----		-----	
1569		-----		-----	
1648		-----		-----	
1650		-----		-----	
1740		-----		-----	
1748		-----		-----	
1784		-----		-----	
1800		-----		-----	
1807		-----		-----	
1850		-----		-----	
1854		-----		-----	

1900	-----	-----
1957	-----	-----
1969	-----	-----
1981	-----	-----
2122	-----	-----
2133	-----	-----
6010	-----	-----
6016	-----	-----
6043	-----	-----
6044	-----	-----
6056	-----	-----
6059	124.1	-0.21

normality	OK
n	19
outliers	0
mean (n)	124.376
st.dev. (n)	0.5202
R(calc.)	1.457
R(D7279:16)	3.731

Kernel Density
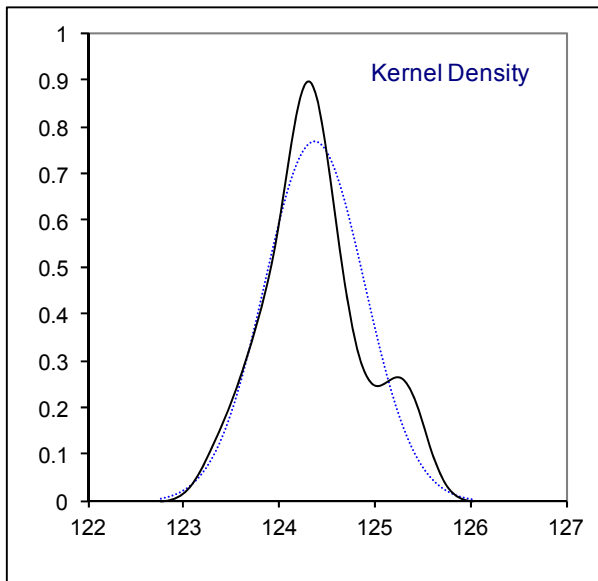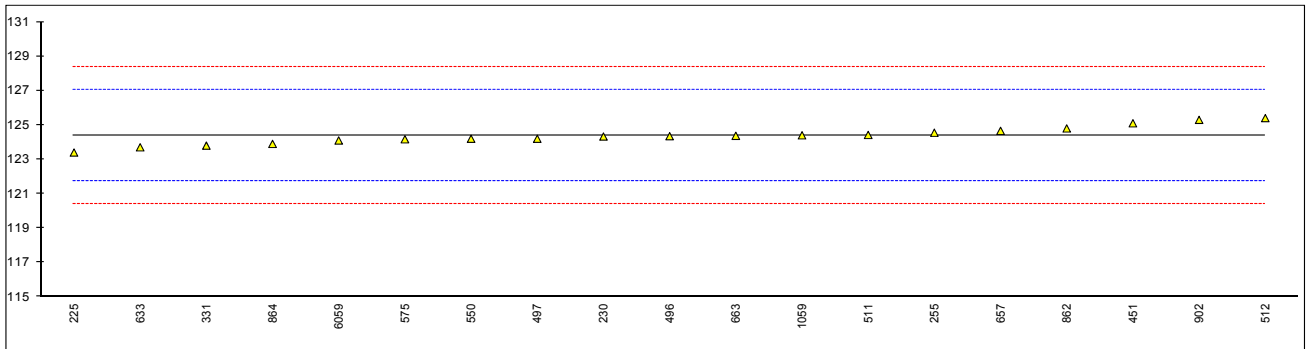
Determination of Kinematic Viscosity at 100°C (Houillon) on Sample #16106; results in mm²/s

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179		-----		-----	
211		-----		-----	
214		-----		-----	
225		-----		-----	
230	INH-20	14.6095		0.60	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	D7279	14.39		-0.16	
271		-----		-----	
311		-----		-----	
315		-----		-----	
325		-----		-----	
331	D7279	14.51		0.26	
333		-----		-----	
343		-----		-----	
349		-----		-----	
398		-----		-----	
421		-----		-----	
450		-----		-----	
451	D7279	14.4		-0.13	
473		-----		-----	
496	D7279	14.485		0.17	
497	D7279	14.45		0.05	
511	D7279	14.37	C	-0.23	First reported 14.273
512	D7279	14.56	C	0.43	First reported 125.35
541		-----		-----	
550	D7279	14.04		-1.37	
562		-----		-----	
575	D7279	14.45		0.05	
603		-----		-----	
614		-----		-----	
621		-----		-----	
633	D7279	14.47		0.12	
634		-----		-----	
657	D7279	14.25		-0.65	
663	D7279	14.423		-0.05	
823		-----		-----	
840		-----		-----	
862		-----		-----	
864	D7279	14.45		0.05	
875		-----		-----	
902	D7279	14.86		1.47	
912		-----		-----	
922		-----		-----	
963		-----		-----	
994		-----		-----	
1023		-----		-----	
1026		-----		-----	
1059	D7279	14.38		-0.20	
1106		-----		-----	
1146		-----		-----	
1161		-----		-----	
1173		-----		-----	
1201		-----		-----	
1213		-----		-----	
1264		-----		-----	
1271		-----		-----	
1278		-----		-----	
1316		-----		-----	
1396		-----		-----	
1412		-----		-----	
1435		-----		-----	
1456		-----		-----	
1569		-----		-----	
1648		-----		-----	
1650		-----		-----	
1740		-----		-----	
1748		-----		-----	
1784		-----		-----	
1800		-----		-----	
1807		-----		-----	
1850		-----		-----	
1854		-----		-----	

1900	-----	-----
1957	-----	-----
1969	-----	-----
1981	-----	-----
2122	-----	-----
2133	-----	-----
6010	-----	-----
6016	-----	-----
6043	-----	-----
6044	-----	-----
6056	-----	-----
6059	14.32	-0.40

normality	not OK
n	17
outliers	0
mean (n)	14.4363
st.dev. (n)	0.16786
R(calc.)	0.4700
R(D7279:16)	0.8084
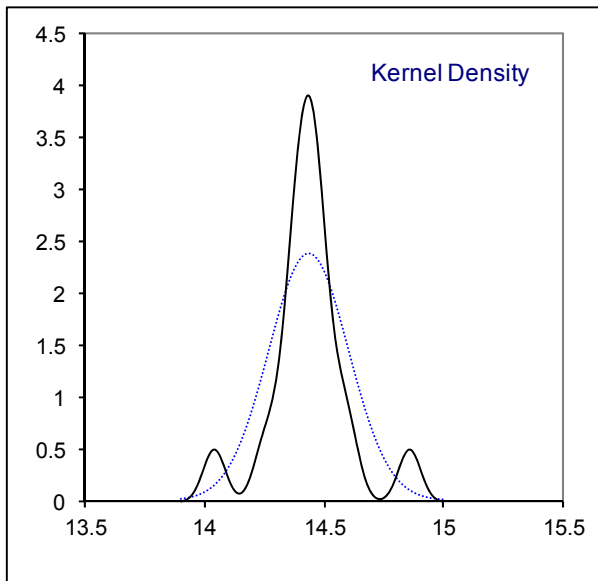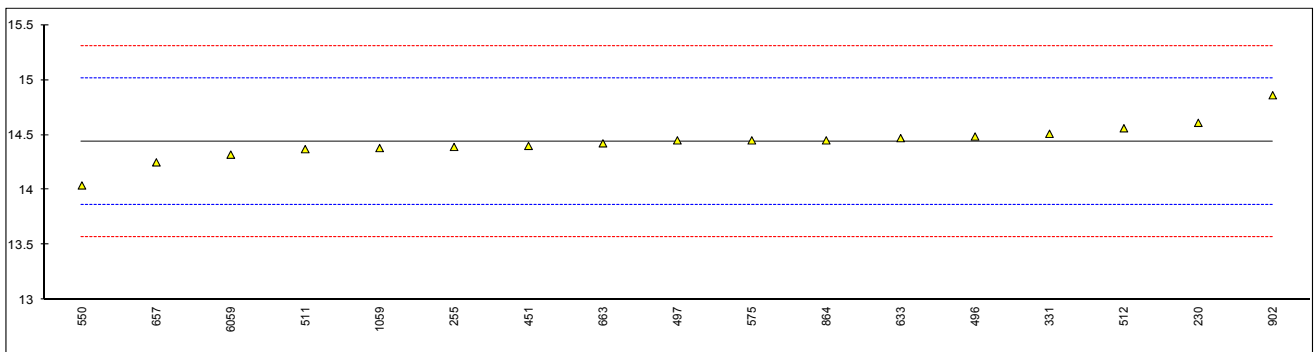
Determination of Water content by KF on Sample #16106; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178	D6304-C	71		-0.49	
179	D6304-C	121		-0.03	
211		-----		-----	
214		-----		-----	
225	D6304	732.57	ex	5.60	Test result excluded, see §4.1
230	D6304-A	67.0	ex	-0.52	Test result excluded, see §4.1
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
271	D6304-A	34.9	ex	-0.82	Test result excluded, see §4.1
311		-----		-----	
315	D6304-C	175.0		0.47	
325	D6304-C	103		-0.19	
331	In house	155.8	ex	0.29	Test result excluded, see §4.1
333		-----		-----	
343	E203	254	ex	1.20	Test result excluded, see §4.1
349	D6304-C	30		-0.86	
398	D6304-C	52.6		-0.66	
421	D6304-C	59.2		-0.59	
450		-----		-----	
451	D6304-C	900	R(0.01)	7.14	
473	D6304-C	83		-0.38	
496	D6304-C	160		0.33	
497	D6304-C	82		-0.38	
511		-----		-----	
512		-----		-----	
541		-----		-----	
550	E203	1200	C,ex	9.90	Test result excluded, see §4.1, first reported 1010
562	E203	228.1	C,ex	0.96	Test result excluded, see §4.1, first reported 1016
575		-----		-----	
603	D6304-C	74		-0.46	
614	D6304-C	103		-0.19	
621		-----		-----	
633	D6304-A	549.25	ex	3.91	Test result excluded, see §4.1
634	IP438	502	ex	3.48	Test result excluded, see §4.1
657	D6304-C	188		0.59	
663	D6304-C	160		0.33	
823		-----		-----	
840	D6304-C	199.1		0.69	
862	D6304-C	115		-0.08	
864		-----		-----	
875		-----		-----	
902		-----		-----	
912	D6304-C	157		0.31	
922	D6304-C	280		1.44	
963		-----		-----	
994		-----		-----	
1023	D6304-C	82		-0.38	
1026	D6304-C	60		-0.59	
1059	D6304-CMod.	70		-0.50	
1106		-----		-----	
1146	D6304-A	160	ex	0.33	Test result excluded, see §4.1
1161		-----		-----	
1173	IP438	220.4	ex	0.89	Test result excluded, see §4.1
1201	D6304-A	115	ex	-0.08	Test result excluded, see §4.1
1213		-----		-----	
1264	D6304-A	766.3	ex	5.91	Test result excluded, see §4.1
1271		-----		-----	
1278		-----		-----	
1316	D6304-C	120		-0.04	
1396		-----		-----	
1412		-----		-----	
1435	D1744	686.8	ex	5.18	Test result excluded, see §4.1
1456	D6304-C	44		-0.73	
1569	D6304-C	137		0.12	
1648	D6304-A	757.80	ex	5.83	Test result excluded, see §4.1
1650		-----		-----	
1740	D6304-A	316	ex	1.77	Test result excluded, see §4.1
1748		-----		-----	
1784	D6304-C	302.5		1.64	
1800		-----		-----	
1807		-----		-----	
1850		-----		-----	
1854	D6304-C	305		1.67	

1900	D6304-C	107		-0.15	
1957		-----		-----	
1969	ISO12937	4300	ex	38.43	Test result excluded, see §4.1
1981	D6304-C	100		-0.22	
2122	In house	354	ex	2.12	Test result excluded, see §4.1
2133	D6304-C	50		-0.68	
6010		-----		-----	
6016	D6304-A	668	ex	5.01	Test result excluded, see §4.1
6043	D6304-A	<20		-----	
6044	D6304-A	312.4	ex	1.74	Test result excluded, see §4.1
6056	ISO12937	1748	ex	14.94	Test result excluded, see §4.1
6059	D6304-A	400	ex	2.54	Test result excluded, see §4.1

|		All results
normality	suspect	not OK
n	29	49
outliers	1 (+22 excl)	3
mean (n)	123.81	240.22
st.dev. (n)	74.291	226.749
R(calc.)	208.02	634.90
R(D6304:07)	304.31	452.94

Kernel Density
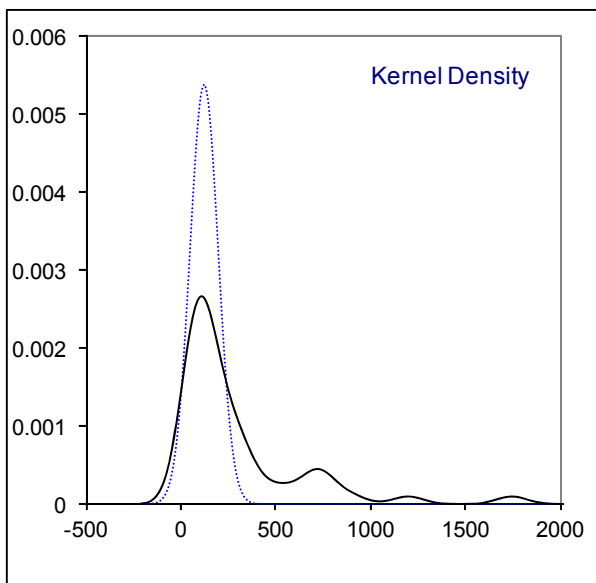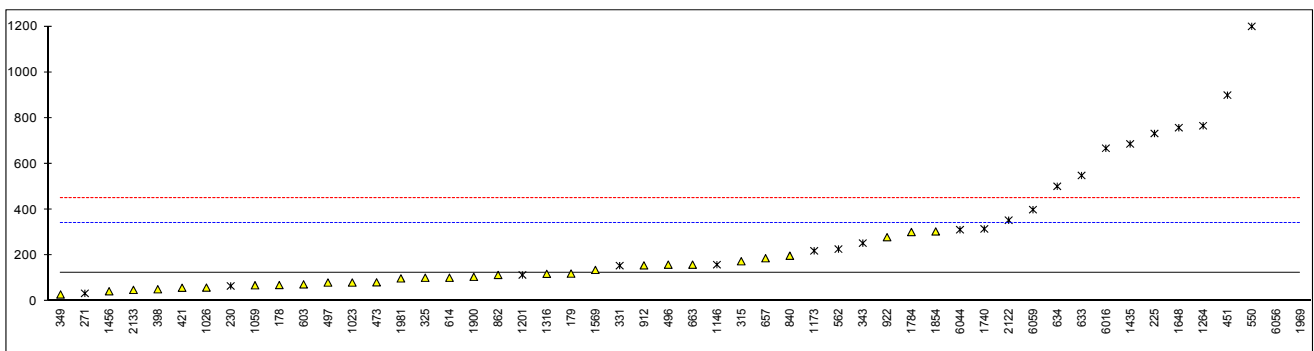
Determination of Aluminium as Al on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	9		-0.42	-----		-----	
179	D5185	11		0.39	-----		-----	
211	D6595	-----		-----	11		-0.81	
214		-----		-----	-----		-----	
225	D6595	-----		-----	12.043		-0.18	
230	D6595	-----		-----	14.5		1.32	
237	D5185	9.695		-0.14	-----		-----	
252		-----		-----	-----		-----	
254		-----		-----	-----		-----	
255	INH-01	12.43		0.97	-----		-----	
271	D5185	8.85		-0.48	-----		-----	
311	D5185	10		-0.02	-----		-----	
315		-----		-----	-----		-----	
325	D5185	10		-0.02	-----		-----	
331	D5185	9.5		-0.22	-----		-----	
333	D5185	9		-0.42	-----		-----	
343	D5185	10.0		-0.02	-----		-----	
349	D5185	6	R(0.05)	-1.63	-----		-----	
398		-----		-----	-----		-----	
421	D5185	9.2		-0.34	-----		-----	
450		-----		-----	-----		-----	
451	In house	5.3	R(0.05)	-1.92	-----		-----	
473	D5185	5.547	R(0.05)	-1.82	-----		-----	
496	D5185	8.94		-0.44	-----		-----	
497	D5185	9.0		-0.42	-----		-----	
511	D5185	10.75		0.29	-----		-----	
512	D5185	10.26		0.09	-----		-----	
541	D5185	10.1		0.02	-----		-----	
550	D5185	10		-0.02	-----		-----	
562	D6595	-----		-----	13.6		0.77	
575	D6595	-----		-----	11.45		-0.54	
603	D5185	14	R(0.05)	1.60	-----		-----	
614	D5185	10.3		0.11	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	10.663		-1.02	
634	D6595	-----		-----	13.420		0.66	
657	D5185	10.6		0.23	-----		-----	
663	D5185	12.4		0.95	-----		-----	
823	D5185	9.5		-0.22	-----		-----	
840	D5185	10.1		0.02	-----		-----	
862	D5185	10		-0.02	-----		-----	
864	D5185	10.2		0.06	-----		-----	
875	D5185	9.47		-0.23	-----		-----	
902	D5185	10.649		0.25	-----		-----	
912	D5185	9.8		-0.10	-----		-----	
922	D5185	11.1		0.43	-----		-----	
963	D5185	8.30		-0.70	-----		-----	
994	D5185	10.2		0.06	-----		-----	
1023	D5185	9.852		-0.08	-----		-----	
1026	D5185	9		-0.42	-----		-----	
1059	In house	10		-0.02	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	10.0		-0.02	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	8.69		-0.55	-----		-----	
1201	D5185	10		-0.02	-----		-----	
1213		-----		-----	-----		-----	
1264	D6595	-----		-----	12.33		0.00	
1271	D5185	10.3		0.11	-----		-----	
1278	D5185	10.2		0.06	-----		-----	
1316	D5185	10.3		0.11	-----		-----	
1396	In house	16.93	R(0.01)	2.79	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	9.326		-0.29	-----		-----	
1456	D5185	9.93		-0.04	-----		-----	
1569	D5185	7		-1.23	-----		-----	
1648	D5185	14.92	R(0.05)	1.97	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	12		-0.20	
1748		-----		-----	-----		-----	
1784	D5185	12.3		0.91	-----		-----	
1800	In house	10.35		0.13	-----		-----	
1807	D5185	8.4		-0.66	-----		-----	
1850		-----		-----	-----		-----	
1854	D5185	11.9		0.75	-----		-----	
1900	D5185	11.180		0.46	-----		-----	

1957	D5185	7.83		-0.89	-----		-----	
1969		-----		-----	-----		-----	
1981	D5185	12.5	C	1.00	-----		-----	First reported 1.86
2122	D5185	10.975		0.38	-----		-----	
2133	D5185	9.538		-0.20	-----		-----	
6010	DIN51399-1	9.70		-0.14	-----		-----	
6016	D5185	10.3		0.11	-----		-----	
6043	D5185	11		0.39	-----		-----	
6044	D5185	10.362		0.13	-----		-----	
6056		-----		-----	-----		-----	
6059	D5185	10.93		0.36	-----		-----	

|				
	normality	OK		OK
	n	56		9
	outliers	6		0
	mean (n)	10.039		12.334
	st.dev. (n)	1.0869		1.2759
	R(calc.)	3.043		3.572
	R(D5185:13e1)	6.922		--	Application range: 6 – 40 mg/kg
.	R(D6595:16)	--		4.606	Application range: 0.25 – 100 mg/kg
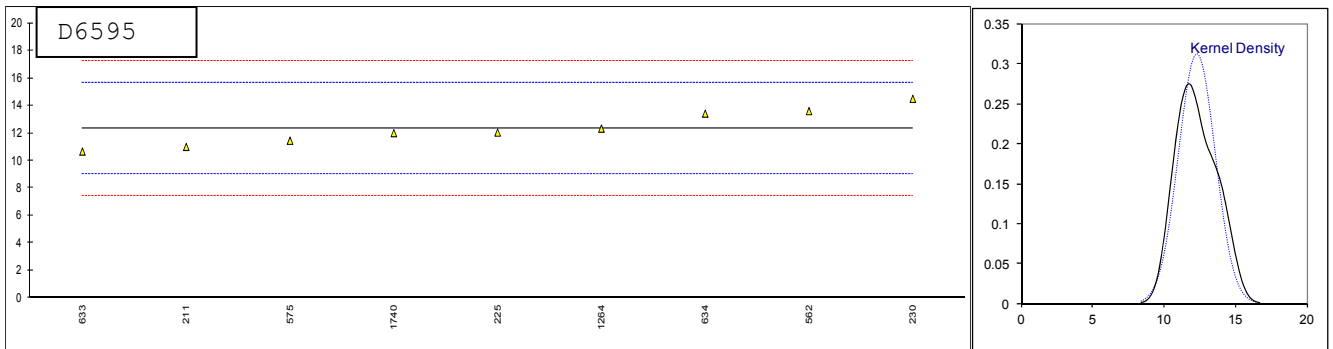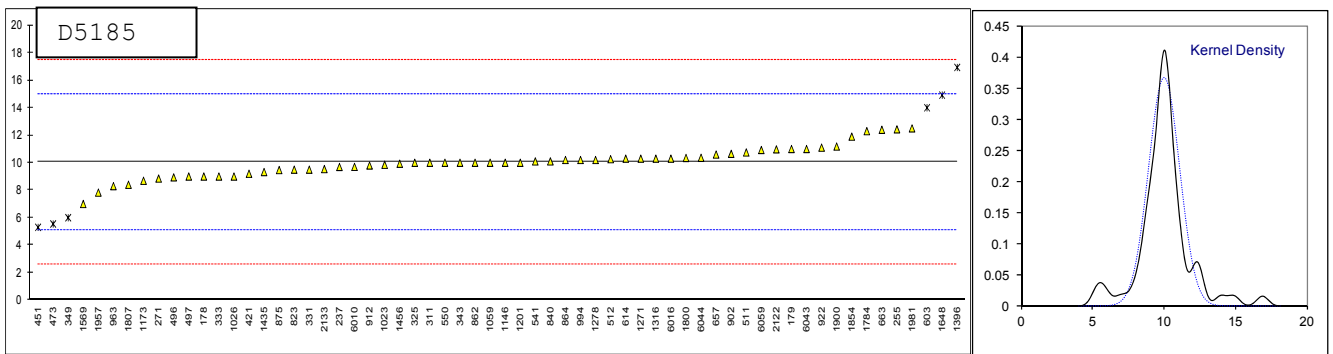
Determination of Barium as Ba on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	10		0.29	-----		-----	
179	D5185	10		0.29	-----		-----	
211	D6595	-----		-----	11		-0.61	
214		-----		-----	-----		-----	
225	D6595	-----		-----	9.481		-2.42	
230	D6595	-----		-----	14.3		3.31	
237	D5185	9.712		0.12	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	10.08		0.34	-----		-----	
255		-----		-----	-----		-----	
271	D5185	8.58		-0.56	-----		-----	
311	D5185	10		0.29	-----		-----	
315		-----		-----	-----		-----	
325	D5185	10		0.29	-----		-----	
331	D5185	9.4		-0.07	-----		-----	
333	D5185	10		0.29	-----		-----	
343	D5185	9.50		-0.01	-----		-----	
349	D5185	10		0.29	-----		-----	
398		-----		-----	-----		-----	
421	D5185	9.3		-0.13	-----		-----	
450		-----		-----	-----		-----	
451	In house	10.0		0.29	-----		-----	
473	D5185	9.625		0.07	-----		-----	
496	D5185	9.83		0.19	-----		-----	
497	D5185	9.3		-0.13	-----		-----	
511	D5185	8.85		-0.40	-----		-----	
512	D5185	9.296		-0.13	-----		-----	
541	D5185	9.542		0.02	-----		-----	
550	D5185	9		-0.31	-----		-----	
562	D6595	-----		-----	9.2		-2.75	
575	D6595	-----		-----	9.19		-2.76	
603	D5185	7		-1.50	-----		-----	
614	D5185	10.05		0.32	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	10.874		-0.76	
634	D6595	-----		-----	13.215		2.02	
657	D5185	9.7		0.11	-----		-----	
663	D5185	11.14		0.97	-----		-----	
823	D5185	8.9		-0.37	-----		-----	
840	D5185	9.11		-0.24	-----		-----	
862	D5185	9		-0.31	-----		-----	
864	D5185	9.6		0.05	-----		-----	
875	D5185	9.57		0.03	-----		-----	
902	D5185	10.277		0.46	-----		-----	
912	D5185	9.4		-0.07	-----		-----	
922	D5185	9.7		0.11	-----		-----	
963	D5185	7.80		-1.02	-----		-----	
994	D5185	9.3		-0.13	-----		-----	
1023	D5185	9.54		0.02	-----		-----	
1026	D5185	9		-0.31	-----		-----	
1059		-----		-----	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	9.1		-0.25	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	9.00		-0.31	-----		-----	
1201	D5185	8		-0.90	-----		-----	
1213	D5185	8.8		-0.43	-----		-----	
1264	D6595	-----		-----	13.37		2.21	
1271	D5185	10.1		0.35	-----		-----	
1278	D5185	10.20		0.41	-----		-----	
1316	D5185	9.54		0.02	-----		-----	
1396		-----		-----	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	9.970		0.27	-----		-----	
1456	D5185	9.60		0.05	-----		-----	
1569	D5185	8		-0.90	-----		-----	
1648		-----		-----	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	13		1.77	
1748		-----		-----	-----		-----	
1784	D5185	11.2		1.01	-----		-----	
1800	In house	9.85		0.20	-----		-----	
1807	D5185	7.2		-1.38	-----		-----	
1850		41	R(0.01)	18.81	-----		-----	
1854	D5185	11.3		1.07	-----		-----	

1900	D5185	9.765	0.15	-----	-----
1957	D5185	8.17	-0.80	-----	-----
1969		-----	-----	-----	-----
1981		-----	-----	-----	-----
2122	D5185	9.595	0.05	-----	-----
2133	D5185	8.950	-0.34	-----	-----
6010		-----	-----	-----	-----
6016	D5185	9.6	0.05	-----	-----
6043	D5185	11	0.89	-----	-----
6044	D5185	10.43	0.55	-----	-----
6056		-----	-----	-----	-----
6059	D5185	11.27	1.05	-----	-----

|				
normality	suspect		OK	
n	58		9	
outliers	1		0	
mean (n)	9.513		11.514	
st.dev. (n)	0.8809		1.9960	
R(calc.)	2.466		5.589	
R(D5185:13e1)	4.687		--	Application range: 0.5 – 4 mg/kg
R(D6595:16)	--		2.354	Application range: 25 – 115 mg/kg
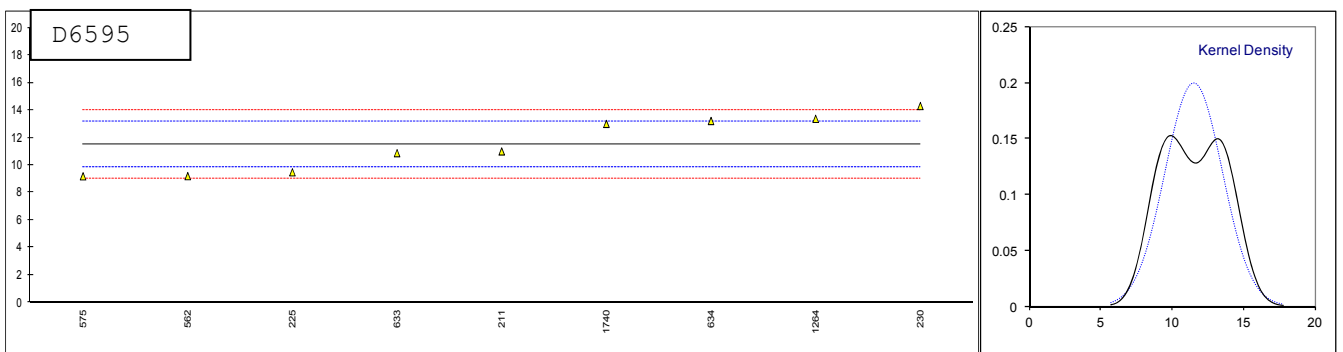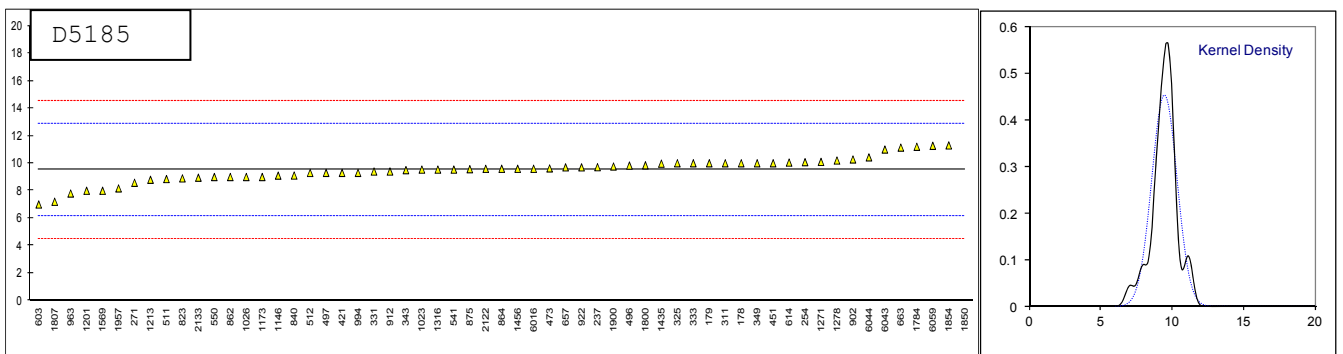
Determination of Chromium as Cr on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	10		0.52	-----		-----	
179	D5185	10		0.52	-----		-----	
211	D6595	-----		-----	10		-1.77	
214		-----		-----	-----		-----	
225	D6595	-----		-----	11.370		-0.66	
230	D6595	-----		-----	13.1		0.75	
237	D5185	9.366		-0.04	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	10.36		0.83	-----		-----	
255	INH-01	6.14	R(0.05)	-2.88	-----		-----	
271	D5185	8.32		-0.96	-----		-----	
311	D5185	10		0.52	-----		-----	
315		-----		-----	-----		-----	
325	D5185	9		-0.36	-----		-----	
331	D5185	8.8		-0.54	-----		-----	
333	D5185	9		-0.36	-----		-----	
343	D5185	9.9		0.43	-----		-----	
349	D5185	10		0.52	-----		-----	
398	D5185	10.7		1.13	-----		-----	
421	D5185	9.2		-0.19	-----		-----	
450		-----		-----	-----		-----	
451	In house	11.1		1.48	-----		-----	
473	D5185	9.770		0.31	-----		-----	
496	D5185	8.60		-0.72	-----		-----	
497	D5185	8.7		-0.63	-----		-----	
511	D5185	9.05		-0.32	-----		-----	
512	D5185	9.298		-0.10	-----		-----	
541	D5185	9.33		-0.07	-----		-----	
550	D5185	10		0.52	-----		-----	
562	D6595	-----		-----	12.9		0.59	
575	D6595	-----		-----	13.04		0.70	
603	D5185	7		-2.12	-----		-----	
614	D5185	9.84		0.38	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	10.231		-1.59	
634	D6595	-----		-----	12.450		0.22	
657	D5185	9.6		0.16	-----		-----	
663	D5185	11.0		1.40	-----		-----	
823	D5185	8.6		-0.72	-----		-----	
840	D5185	9.66		0.22	-----		-----	
862	D5185	9		-0.36	-----		-----	
864	D5185	9.3		-0.10	-----		-----	
875	D5185	9.14		-0.24	-----		-----	
902	D5185	9.426		0.01	-----		-----	
912	D5185	9.9		0.43	-----		-----	
922	D5185	9.8		0.34	-----		-----	
963	D5185	8.20		-1.07	-----		-----	
994	D5185	9.1		-0.28	-----		-----	
1023	D5185	9.547		0.12	-----		-----	
1026	D5185	9		-0.36	-----		-----	
1059	In house	9		-0.36	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	9.2		-0.19	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	8.57		-0.74	-----		-----	
1201	D5185	<1		-----	-----		-----	False negative test result?
1213	D5185	9.0		-0.36	-----		-----	
1264	D6595	-----		-----	13.52		1.09	
1271	D5185	9.6		0.16	-----		-----	
1278	D5185	9.65		0.21	-----		-----	
1316	D5185	9.20		-0.19	-----		-----	
1396	In house	7.80		-1.42	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	9.282		-0.12	-----		-----	
1456	D5185	9.03		-0.34	-----		-----	
1569	D5185	9		-0.36	-----		-----	
1648	D5185	11.10		1.48	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	13		0.67	
1748		-----		-----	-----		-----	
1784	D5185	11.4		1.75	-----		-----	
1800	In house	9.68		0.23	-----		-----	
1807	D5185	7.3		-1.86	-----		-----	
1850		11		1.40	-----		-----	
1854	D5185	10.8		1.22	-----		-----	

1900	D5185	9.961		0.48	-----		-----	
1957	D5185	6.85		-2.26	-----		-----	
1969		-----		-----	-----		-----	
1981	D5185	9.51	C	0.09	-----		-----	First reported 0.81
2122	D5185	10.14		0.64	-----		-----	
2133	D5185	8.726		-0.61	-----		-----	
6010	DIN51399-1	8.75		-0.58	-----		-----	
6016	D5185	9.4		-0.01	-----		-----	
6043	D5185	10		0.52	-----		-----	
6044	D5185	9.676		0.23	-----		-----	
6056		-----		-----	-----		-----	
6059	D5185	10.22		0.71	-----		-----	

|			
normality	suspect		OK
n	64		9
outliers	1		0
mean (n)	9.413		12.179
st.dev. (n)	0.9066		1.3159
R(calc.)	2.538		3.684
R(D5185:13e1)	3.180		--	Application range: 1 – 40 mg/kg
R(D6595:16)	--		3.440	Application range: 0.18 – 152 mg/kg
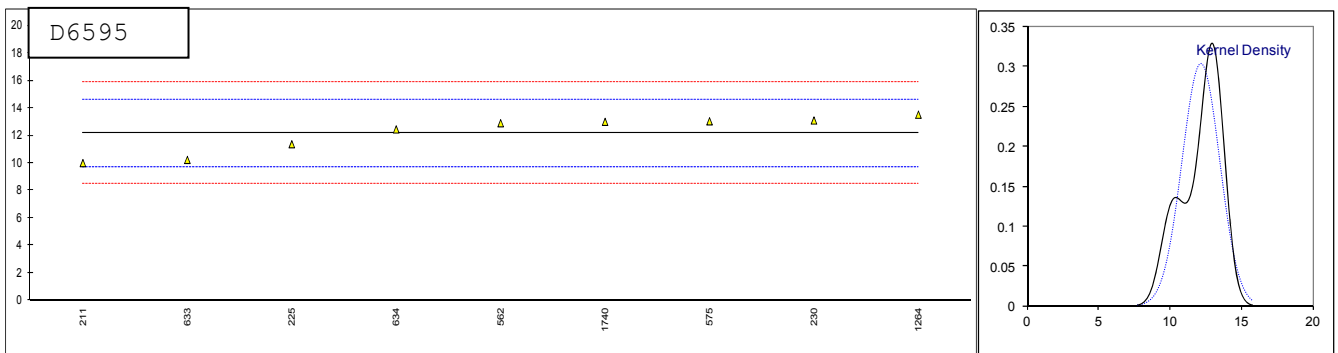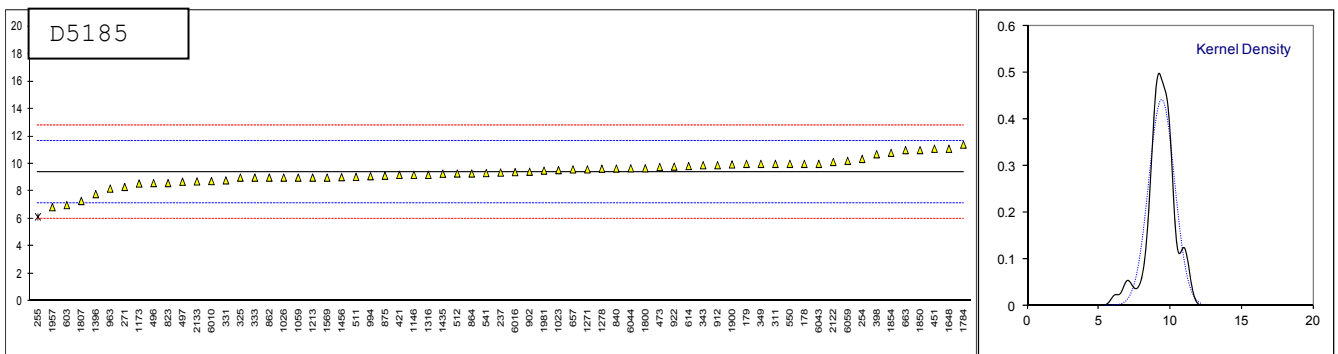
Determination of Copper as Cu on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	16		0.21	-----		-----	
179	D5185	17		0.95	-----		-----	
211	D6595	-----		-----	16		-1.29	
214		-----		-----	-----		-----	
225	D6595	-----		-----	19.267		0.43	
230	D6595	-----		-----	17.99		-0.25	
237	D5185	14.76		-0.71	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	15.48		-0.18	-----		-----	
255	INH-01	14.22		-1.11	-----		-----	
271	D5185	14.50		-0.91	-----		-----	
311	D5185	15		-0.54	-----		-----	
315		-----		-----	-----		-----	
325	D5185	15		-0.54	-----		-----	
331	D5185	13.9		-1.35	-----		-----	
333	D5185	16		0.21	-----		-----	
343	D5185	17.5		1.32	-----		-----	
349	D5185	18		1.69	-----		-----	
398	D5185	14.9		-0.61	-----		-----	
421	D5185	15.7		-0.02	-----		-----	
450		-----		-----	-----		-----	
451	In house	16.7		0.73	-----		-----	
473	D5185	16.48		0.56	-----		-----	
496	D5185	16.03		0.23	-----		-----	
497	D5185	15.0		-0.54	-----		-----	
511	D5185	15.5		-0.17	-----		-----	
512	D5185	15.38		-0.25	-----		-----	
541	D5185	15.5		-0.17	-----		-----	
550	D5185	15		-0.54	-----		-----	
562	D6595	-----		-----	19	C	0.29	First reported 20.9
575	D6595	-----		-----	20.48		1.07	
603	D5185	17		0.95	-----		-----	
614	D5185	15.95		0.17	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	17.301		-0.61	
634	D6595	-----		-----	18.401		-0.03	
657	D5185	16.6		0.65	-----		-----	
663	D5185	19.0		2.43	-----		-----	
823	D5185	14.2		-1.13	-----		-----	
840	D5185	14.6		-0.83	-----		-----	
862	D5185	16		0.21	-----		-----	
864	D5185	15.6		-0.09	-----		-----	
875	D5185	14.8		-0.68	-----		-----	
902	D5185	15.787		0.05	-----		-----	
912	D5185	16.5		0.58	-----		-----	
922	D5185	15.2		-0.39	-----		-----	
963	D5185	15.60		-0.09	-----		-----	
994	D5185	15.1		-0.46	-----		-----	
1023	D5185	15.636		-0.06	-----		-----	
1026	D5185	15		-0.54	-----		-----	
1059	In house	16		0.21	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	15.2		-0.39	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	14.92		-0.60	-----		-----	
1201	D5185	15		-0.54	-----		-----	
1213	D5185	13.5		-1.65	-----		-----	
1264	D6595	-----		-----	19.66		0.64	
1271	D5185	15		-0.54	-----		-----	
1278	D5185	15.6		-0.09	-----		-----	
1316	D5185	15.4		-0.24	-----		-----	
1396	In house	13.05		-1.98	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	15.630		-0.07	-----		-----	
1456	D5185	15.5		-0.17	-----		-----	
1569	D5185	16		0.21	-----		-----	
1648	D5185	17.75		1.50	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	18		-0.24	
1748		-----		-----	-----		-----	
1784	D5185	18.0		1.69	-----		-----	
1800	In house	15.85		0.09	-----		-----	
1807	D5185	14		-1.28	-----		-----	
1850		19		2.43	-----		-----	
1854	D5185	17.2		1.10	-----		-----	

1900	D5185	16.713		0.74	-----	-----	
1957	D5185	13.75		-1.46	-----	-----	
1969		-----		-----	-----	-----	
1981	D5185	12.92	C	-2.08	-----	-----	First reported 8.24
2122	D5185	16.30		0.43	-----	-----	
2133	D5185	14.69		-0.77	-----	-----	
6010	DIN51399-1	15.25		-0.35	-----	-----	
6016	D5185	16.3		0.43	-----	-----	
6043	D5185	18		1.69	-----	-----	
6044	D5185	15.795		0.05	-----	-----	
6056		-----		-----	-----	-----	
6059	D5185	19.24		2.61	-----	-----	

| | normality | OK | | | OK | |
	n	66			9	
	outliers	0			0	
	mean (n)	15.722			18.455	
	st.dev. (n)	1.3252			1.3367	
	R(calc.)	3.711			3.743	
	R(D5185:13e1)	3.773			--	Application range: 2 – 160 mg/kg
.	R(D6595:16)	--			5.310	Application range: 0.47 – 100 mg/kg
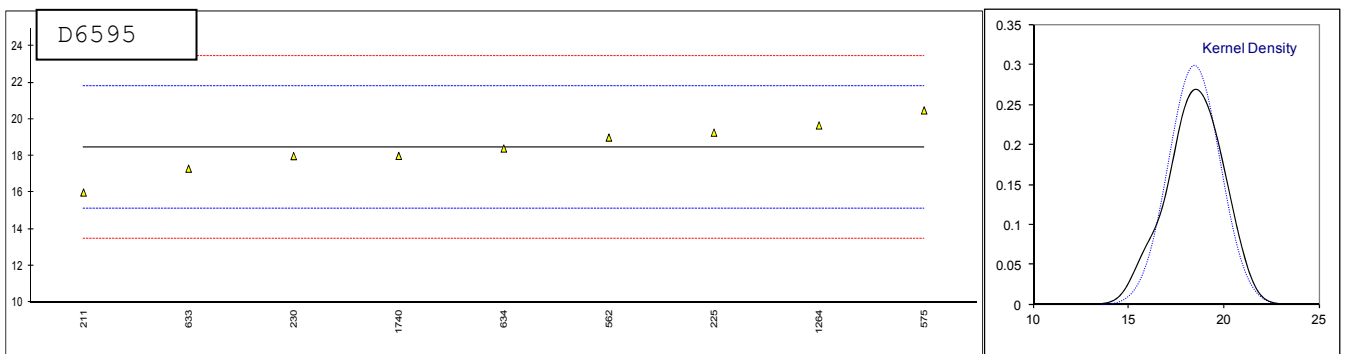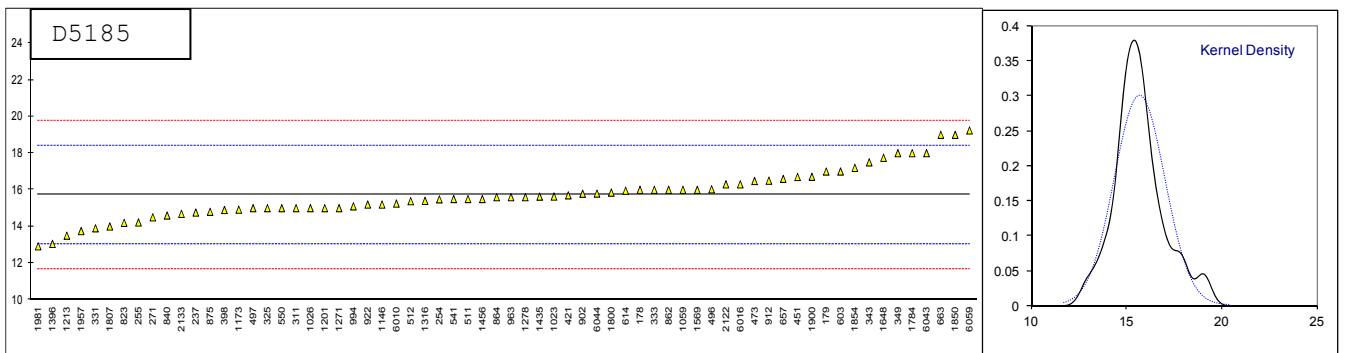
Determination of Iron as Fe on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	12		0.26	-----		-----	
179	D5185	12		0.26	-----		-----	
211	D6595	-----		-----	14		-0.02	
214		-----		-----	-----		-----	
225	D6595	-----		-----	13.609		-0.21	
230	D6595	-----		-----	14.9		0.42	
237	D5185	11.24		-0.32	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	22.73	C,R(0.01)	8.35	-----		-----	First reported 28.71
255	INH-01	9.60		-1.56	-----		-----	
271	D5185	10.75		-0.69	-----		-----	
311	D5185	12		0.26	-----		-----	
315		-----		-----	-----		-----	
325	D5185	11.5		-0.12	-----		-----	
331	D5185	11.2		-0.35	-----		-----	
333	D5185	12		0.26	-----		-----	
343	D5185	14.1		1.84	-----		-----	
349	D5185	12		0.26	-----		-----	
398		-----		-----	-----		-----	
421	D5185	11.5		-0.12	-----		-----	
450		-----		-----	-----		-----	
451	In house	12.1		0.33	-----		-----	
473	D5185	11.57		-0.07	-----		-----	
496	D5185	11.3		-0.27	-----		-----	
497	D5185	11.2		-0.35	-----		-----	
511	D5185	10.75		-0.69	-----		-----	
512	D5185	11.97		0.23	-----		-----	
541	D5185	11.7		0.03	-----		-----	
550	D5185	11		-0.50	-----		-----	
562	D6595	-----		-----	13.3		-0.36	
575	D6595	-----		-----	14.20		0.08	
603	D5185	9		-2.01	-----		-----	
614	D5185	12.04		0.29	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	12.168		-0.92	
634	D6595	-----		-----	14.384		0.17	
657	D5185	11.6		-0.05	-----		-----	
663	D5185	13.8		1.61	-----		-----	
823	D5185	10.6		-0.80	-----		-----	
840	D5185	11.7		0.03	-----		-----	
862	D5185	12		0.26	-----		-----	
864	D5185	11.7		0.03	-----		-----	
875	D5185	11.8		0.10	-----		-----	
902	D5185	13.143		1.12	-----		-----	
912	D5185	12.6		0.71	-----		-----	
922	D5185	12.0		0.26	-----		-----	
963	D5185	10.30		-1.03	-----		-----	
994	D5185	11.2		-0.35	-----		-----	
1023	D5185	11.649		-0.01	-----		-----	
1026	D5185	12		0.26	-----		-----	
1059	In house	11		-0.50	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	11.4		-0.20	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	10.64		-0.77	-----		-----	
1201	D5185	6	R(0.01)	-4.27	-----		-----	
1213	D5185	13.0		1.01	-----		-----	
1264	D6595	-----		-----	14.85		0.39	
1271	D5185	11.7		0.03	-----		-----	
1278	D5185	12.1		0.33	-----		-----	
1316	D5185	11.2		-0.35	-----		-----	
1396	In house	11.63		-0.02	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	11.64		-0.02	-----		-----	
1456	D5185	11.0		-0.50	-----		-----	
1569	D5185	10		-1.25	-----		-----	
1648	D5185	23.20	R(0.01)	8.71	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	15		0.47	
1748		-----		-----	-----		-----	
1784	D5185	14.1		1.84	-----		-----	
1800	In house	12.25		0.44	-----		-----	
1807	D5185	8.9		-2.08	-----		-----	
1850		12		0.26	-----		-----	
1854	D5185	13.6		1.46	-----		-----	

1900	D5185	12.488	0.62	-----	-----
1957	D5185	8.80	-2.16	-----	-----
1969		-----	-----	-----	-----
1981	D5185	11.21	-0.34	-----	-----
2122	D5185	12.21	0.41	-----	-----
2133	D5185	10.78	-0.67	-----	-----
6010	DIN51399-1	12.82	0.87	-----	-----
6016	D5185	11.8	0.10	-----	-----
6043	D5185	14	1.76	-----	-----
6044	D5185	10.825	-0.63	-----	-----
6056		-----	-----	-----	-----
6059	D5185	13.30	1.24	-----	-----

|	normality	OK		OK	
	n	62		9	
	outliers	3		0	
	mean (n)	11.661		14.0457	
	st.dev. (n)	1.1271		0.9152	
	R(calc.)	3.156		2.562	
	R(D5185:13e1)	3.710		--	Application range: 2- 140 mg/kg
.	R(D6595:16)	--		5.732	Application range: 4.8 – 210 mg/kg
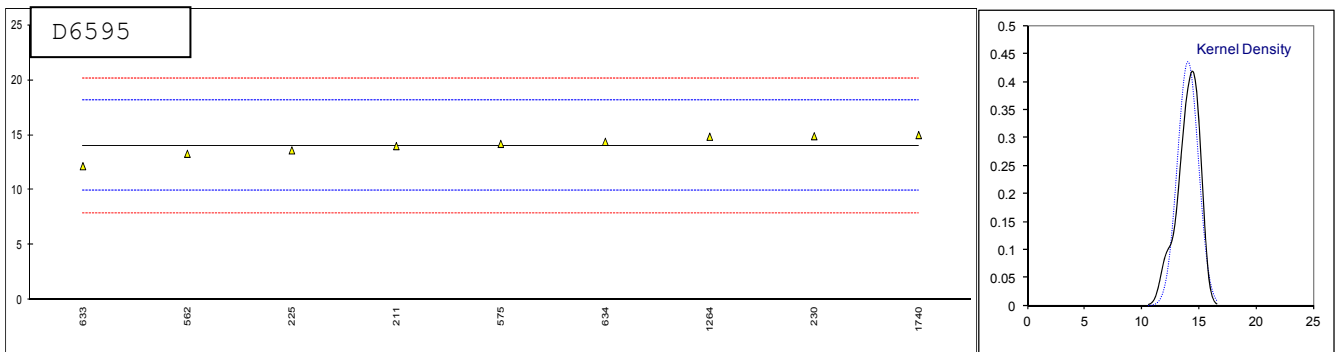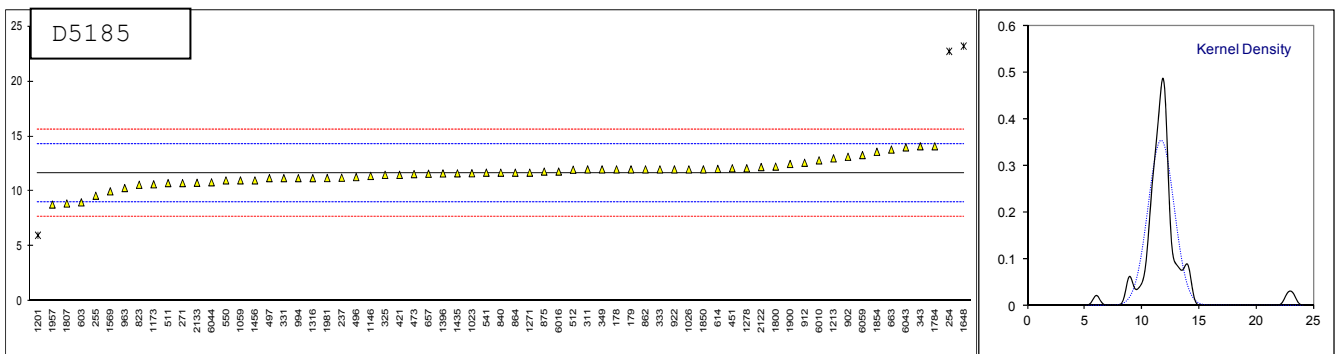
Determination of Lead as Pb on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	51		0.89	-----		-----	
179	D5185	49		0.42	-----		-----	
211	D6595	-----		-----	49		-1.46	
214		-----		-----	-----		-----	
225	D6595	-----		-----	47.526		-2.04	
230	D6595	-----		-----	52.1		-0.22	
237	D5185	45.12		-0.48	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	42.58		-1.07	-----		-----	
255	INH-01	42.70		-1.05	-----		-----	
271	D5185	54.57		1.72	-----		-----	
311	D5185	50		0.66	-----		-----	
315		-----		-----	-----		-----	
325	D5185	49		0.42	-----		-----	
331	D5185	45.3		-0.44	-----		-----	
333	D5185	48		0.19	-----		-----	
343	D5185	51.0		0.89	-----		-----	
349	D5185	52		1.12	-----		-----	
398	D5185	52.1		1.14	-----		-----	
421	D5185	47.7		0.12	-----		-----	
450		-----		-----	-----		-----	
451	In house	80.9	R(0.01)	7.86	-----		-----	
473	D5185	31.79		-3.59	-----		-----	
496	D5185	49.91		0.63	-----		-----	
497	D5185	44.6		-0.60	-----		-----	
511	D5185	45.778		-0.33	-----		-----	
512	D5185	47.32		0.03	-----		-----	
541	D5185	47.0		-0.04	-----		-----	
550	D5185	46		-0.28	-----		-----	
562		-----		-----	-----		-----	
575	D6595	-----		-----	57.48		1.93	
603	D5185	41		-1.44	-----		-----	
614	D5185	49.12		0.45	-----		-----	
621		-----		-----	-----		-----	
633	D5185	-----		-----	50.934		-0.68	
634	D6595	-----		-----	50.102		-1.01	
657	D5185	51.4		0.98	-----		-----	
663	D5185	55.5		1.94	-----		-----	
823	D5185	43.6		-0.84	-----		-----	
840	D5185	45.7		-0.35	-----		-----	
862	D5185	47		-0.04	-----		-----	
864	D5185	48.7		0.35	-----		-----	
875	D5185	42.2		-1.16	-----		-----	
902	D5185	52.176		1.16	-----		-----	
912		-----		-----	-----		-----	
922	D5185	49.8		0.61	-----		-----	
963	D5185	48.60		0.33	-----		-----	
994	D5185	40.0		-1.68	-----		-----	
1023	D5185	53.806		1.54	-----		-----	
1026	D5185	48		0.19	-----		-----	
1059	In house	50		0.66	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	48.2		0.24	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	44.29		-0.68	-----		-----	
1201	D5185	44		-0.74	-----		-----	
1213	D5185	46.0		-0.28	-----		-----	
1264	D6595	-----		-----	55.99		1.34	
1271	D5185	49.4		0.52	-----		-----	
1278	D5185	48.0		0.19	-----		-----	
1316	D5185	48.2		0.24	-----		-----	
1396	In house	49.16		0.46	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	48.95		0.41	-----		-----	
1456	D5185	47.0		-0.04	-----		-----	
1569	D5185	35		-2.84	-----		-----	
1648	D5185	21.80	R(0.01)	-5.92	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	58		2.14	
1748		-----		-----	-----		-----	
1784	D5185	50.1		0.68	-----		-----	
1800	In house	49.27		0.49	-----		-----	
1807	D5185	37		-2.37	-----		-----	
1850		35		-2.84	-----		-----	
1854	D5185	46		-0.28	-----		-----	

1900	D5185	52.036		1.13	-----	-----	
1957		-----		-----	-----	-----	
1969		-----		-----	-----	-----	
1981	D5185	45.78	C	-0.33	-----	-----	First reported 3.23
2122	D5185	49.68		0.58	-----	-----	
2133	D5185	44.88		-0.54	-----	-----	
6010	DIN51399-1	45.12		-0.48	-----	-----	
6016	D5185	51.5		1.00	-----	-----	
6043	D5185	54		1.59	-----	-----	
6044	D5185	40.166		-1.64	-----	-----	
6056		-----		-----	-----	-----	
6059	D5185	57.87		2.49	-----	-----	

|			
normality	suspect		unknown
n	62		8
outliers	2		0
mean (n)	47.188		52.642
st.dev. (n)	4.9230		4.0076
R(calc.)	13.784		11.221
R(D5185:13e1)	12.014		--	Application range: 10 – 160 mg/kg
. R(D6595:16)	--		7.008	Application range: 0.43 – 101 mg/kg
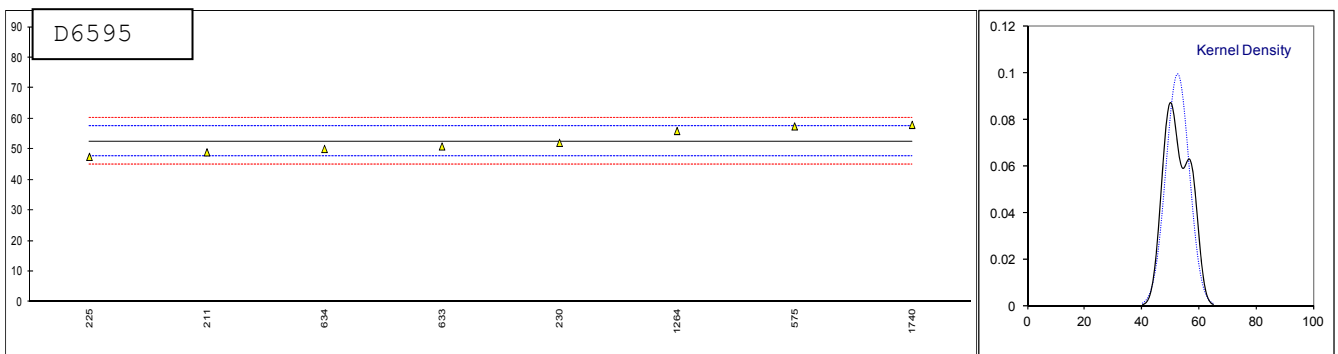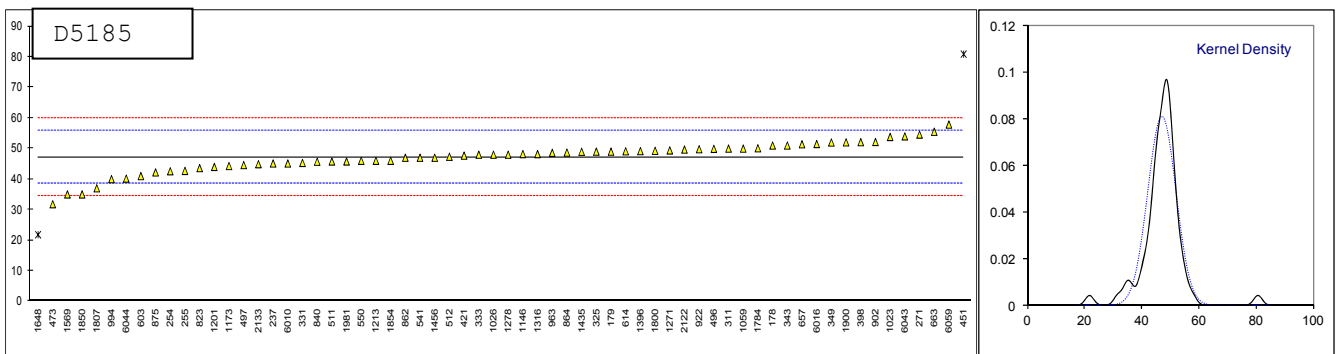
Determination of Lithium as Li on Sample #16107; results in mg/kg

lab	method	value	mark	z(targ)	remarks
178		-----		-----	
179		-----		-----	
211		-----		-----	
214		-----		-----	
225		-----		-----	
230	D6595	<1		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
271		-----		-----	
311		-----		-----	
315		-----		-----	
325		-----		-----	
331	D5185	0.0		-----	
333		-----		-----	
343	D5185	<1		-----	
349		-----		-----	
398		-----		-----	
421		-----		-----	
450		-----		-----	
451	In house	1.2		-----	
473		-----		-----	
496	D5185	0.13		-----	
497	D5185	0.1		-----	
511		-----		-----	
512		-----		-----	
541		-----		-----	
550		-----		-----	
562		-----		-----	
575		-----		-----	
603		-----		-----	
614	D5185	0.0		-----	
621		-----		-----	
633	D6595	0.557		-----	
634		-----		-----	
657	D5185	0.07		-----	
663		-----		-----	
823		-----		-----	
840		-----		-----	
862	D5185	<1		-----	
864	D5185	0.1		-----	
875		-----		-----	
902		-----		-----	
912		-----		-----	
922		-----		-----	
963		-----		-----	
994		-----		-----	
1023		-----		-----	
1026		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146	In house	0.1		-----	
1161		-----		-----	
1173		-----		-----	
1201	D5185	0		-----	
1213		-----		-----	
1264		-----		-----	
1271		-----		-----	
1278		-----		-----	
1316		-----		-----	
1396		-----		-----	
1412		-----		-----	
1435		0.0182		-----	
1456	D5185	0.0		-----	
1569		-----		-----	
1648		-----		-----	
1650		-----		-----	
1740	D6595	<1		-----	
1748		-----		-----	
1784		-----		-----	
1800		-----		-----	
1807	D5185	<2.5		-----	
1850		-----		-----	
1854		-----		-----	

1900	-----	-----
1957	-----	-----
1969	-----	-----
1981	-----	-----
2122	-----	-----
2133	-----	-----
6010	-----	-----
6016	-----	-----
6043	-----	-----
6044	-----	-----
6056	-----	-----
6059	ND	-----

normality	unknown
n	17
outliers	n.a.
mean (n)	<2.5
st.dev. (n)	n.a.
R(calc.)	n.a.
R(Horwitz)	n.a.
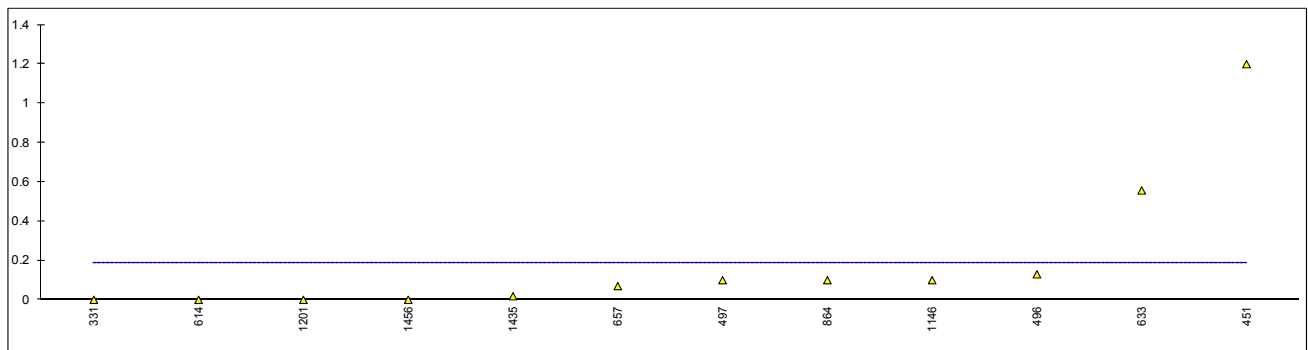
Determination of Magnesium as Mg on Sample #16107; results in mg/kg

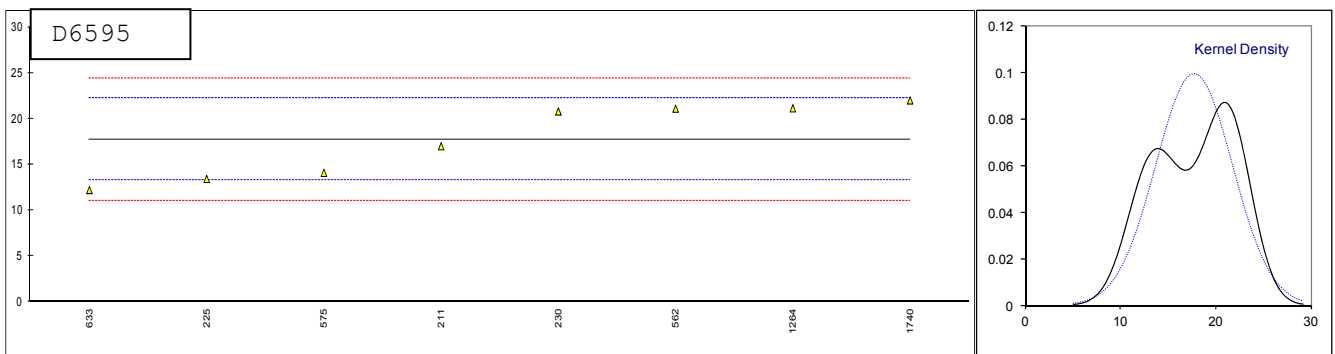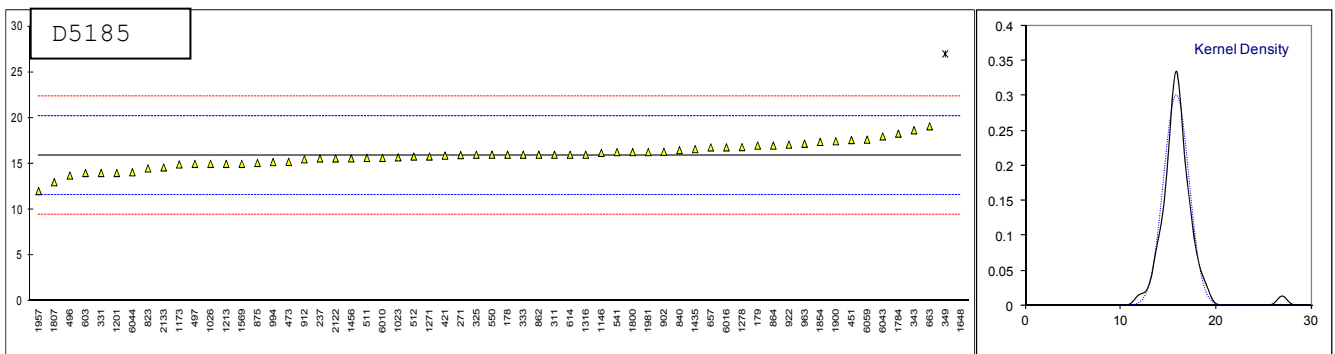| lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	16		0.04	-----		-----	
179	D5185	17		0.51	-----		-----	
211	D6595	-----		-----	17		-0.32	
214		-----		-----	-----		-----	
225	D6595	-----		-----	13.439		-1.92	
230	D6595	-----		-----	20.8		1.37	
237	D5185	15.59		-0.15	-----		-----	
252		-----		-----	-----		-----	
254		-----		-----	-----		-----	
255		-----		-----	-----		-----	
271	D5185	15.96		0.02	-----		-----	
311	D5185	16		0.04	-----		-----	
315		-----		-----	-----		-----	
325	D5185	16		0.04	-----		-----	
331	D5185	14.0		-0.88	-----		-----	
333	D5185	16		0.04	-----		-----	
343	D5185	18.67		1.28	-----		-----	
349	D5185	27	R(0.01)	5.13	-----		-----	
398		-----		-----	-----		-----	
421	D5185	15.9		0.00	-----		-----	
450		-----		-----	-----		-----	
451	In house	17.6		0.78	-----		-----	
473	D5185	15.22		-0.32	-----		-----	
496	D5185	13.73		-1.01	-----		-----	
497	D5185	15.0		-0.42	-----		-----	
511	D5185	15.65		-0.12	-----		-----	
512	D5185	15.8		-0.05	-----		-----	
541	D5185	16.28		0.17	-----		-----	
550	D5185	16		0.04	-----		-----	
562	D6595	-----		-----	21.1		1.51	
575	D6595	-----		-----	14.10		-1.62	
603	D5185	14		-0.88	-----		-----	
614	D5185	16.0		0.04	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	12.222		-2.46	
634		-----		-----	-----		-----	
657	D5185	16.8		0.41	-----		-----	
663	D5185	19.1		1.48	-----		-----	
823	D5185	14.5		-0.65	-----		-----	
840	D5185	16.5		0.27	-----		-----	
862	D5185	16		0.04	-----		-----	
864	D5185	17.0		0.51	-----		-----	
875	D5185	15.1		-0.37	-----		-----	
902	D5185	16.318		0.19	-----		-----	
912	D5185	15.5		-0.19	-----		-----	
922	D5185	17.1		0.55	-----		-----	
963	D5185	17.2	C	0.60	-----		-----	First reported 8.70
994	D5185	15.2		-0.33	-----		-----	
1023	D5185	15.711		-0.09	-----		-----	
1026	D5185	15		-0.42	-----		-----	
1059		-----		-----	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	16.2		0.14	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	14.94		-0.45	-----		-----	
1201	D5185	14		-0.88	-----		-----	
1213	D5185	15.0		-0.42	-----		-----	
1264	D6595	-----		-----	21.14		1.53	
1271	D5185	15.8		-0.05	-----		-----	
1278	D5185	16.83		0.43	-----		-----	
1316	D5185	16.0		0.04	-----		-----	
1396		-----		-----	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	16.61		0.33	-----		-----	
1456	D5185	15.6		-0.14	-----		-----	
1569	D5185	15		-0.42	-----		-----	
1648	D5185	46.35	R(0.01)	14.06	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	22		1.91	
1748		-----		-----	-----		-----	
1784	D5185	18.3		1.11	-----		-----	
1800	In house	16.28		0.17	-----		-----	
1807	D5185	13		-1.34	-----		-----	
1850		-----		-----	-----		-----	
1854	D5185	17.4		0.69	-----		-----	

1900	D5185	17.469		0.72	-----	-----	
1957	D5185	12.03		-1.79	-----	-----	
1969		-----		-----	-----	-----	
1981	D5185	16.28	C	0.17	-----	-----	First reported 7.39
2122	D5185	15.59		-0.15	-----	-----	
2133	D5185	14.61		-0.60	-----	-----	
6010	DIN51399-1	15.65		-0.12	-----	-----	
6016	D5185	16.8		0.41	-----	-----	
6043	D5185	18		0.97	-----	-----	
6044	D5185	14.085		-0.84	-----	-----	
6056		-----		-----	-----	-----	
6059	D5185	17.64		0.80	-----	-----	

|				
	normality	OK		unknown
	n	58		8
	outliers	2		0
	mean (n)	15.906		17.725
	st.dev. (n)	1.3286		4.0197
	R(calc.)	3.720		11.255
	R(D5185:13e1)	6.061		--	Application range: 5 – 1700 mg/kg
.	R(D6595:16)	--		6.266	Application range: 4.9 – 1360 mg/kg

Determination of Manganese as Mn on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178		-----		-----	-----		-----	
179	D5185	10		0.24	-----		-----	
211	D6595	-----		-----	10		-1.14	
214		-----		-----	-----		-----	
225	D6595	-----		-----	11.898		-0.15	
230	D6595	-----		-----	14.5		1.21	
237	D5185	9.689		-0.19	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	10.66		1.16	-----		-----	
255	INH-01	8.88		-1.31	-----		-----	
271	D5185	7.72		-2.92	-----		-----	
311	D5185	11		1.63	-----		-----	
315		-----		-----	-----		-----	
325	D5185	10		0.24	-----		-----	
331	D5185	9.4		-0.59	-----		-----	
333	D5185	10		0.24	-----		-----	
343	D5185	11.5		2.32	-----		-----	
349	D5185	10		0.24	-----		-----	
398		-----		-----	-----		-----	
421	D5185	9.6		-0.31	-----		-----	
450		-----		-----	-----		-----	
451	In house	10.7		1.21	-----		-----	
473	D5185	10.10		0.38	-----		-----	
496	D5185	9.45		-0.52	-----		-----	
497	D5185	9.6		-0.31	-----		-----	
511	D5185	9.1		-1.01	-----		-----	
512	D5185	9.84		0.02	-----		-----	
541	D5185	9.87		0.06	-----		-----	
550		-----		-----	-----		-----	
562		-----		-----	-----		-----	
575	D6595	-----		-----	13.49		0.68	
603	D5185	8		-2.53	-----		-----	
614	D5185	9.9		0.10	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	11.373		-0.42	
634	D6595	-----		-----	12.025	C	-0.08	First reported 13.125
657	D5185	9.6		-0.31	-----		-----	
663	D5185	11.4		2.18	-----		-----	
823	D5185	8.9		-1.29	-----		-----	
840	D5185	10.0		0.24	-----		-----	
862	D5185	10		0.24	-----		-----	
864	D5185	9.6		-0.31	-----		-----	
875	D5185	9.69		-0.19	-----		-----	
902	D5185	10.054		0.32	-----		-----	
912	D5185	9.8		-0.04	-----		-----	
922	D5185	10.3		0.66	-----		-----	
963	D5185	8.7	C	-1.56	-----		-----	First reported 17.2
994	D5185	9.31		-0.72	-----		-----	
1023	D5185	10.102		0.38	-----		-----	
1026		-----		-----	-----		-----	
1059	In house	11		1.63	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	9.4		-0.59	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	9.04		-1.09	-----		-----	
1201	D5185	9		-1.15	-----		-----	
1213	D5185	9.4		-0.59	-----		-----	
1264		-----		-----	-----		-----	
1271	D5185	9.7		-0.18	-----		-----	
1278	D5185	10.2		0.52	-----		-----	
1316	D5185	9.55		-0.38	-----		-----	
1396		-----		-----	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	9.084		-1.03	-----		-----	
1456	D5185	9.70		-0.18	-----		-----	
1569		-----		-----	-----		-----	
1648		-----		-----	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	12		-0.10	
1748		-----		-----	-----		-----	
1784	D5185	12.3		3.43	-----		-----	
1800	In house	10.07		0.34	-----		-----	
1807	D5185	10		0.24	-----		-----	
1850		6	R(0.01)	-5.31	-----		-----	
1854	D5185	10.8		1.35	-----		-----	

1900	D5185	10.446	0.86	-----	-----
1957	D5185	8.17	-2.30	-----	-----
1969		-----	-----	-----	-----
1981		-----	-----	-----	-----
2122	D5185	10.36	0.74	-----	-----
2133	D5185	9.232	-0.82	-----	-----
6010		-----	-----	-----	-----
6016	D5185	9.8	-0.04	-----	-----
6043		-----	-----	-----	-----
6044		-----	-----	-----	-----
6056		-----	-----	-----	-----
6059	D5185	10.90	1.49	-----	-----

|	normality	suspect		unknown	
	n	54		7	
	outliers	1		0	
	mean (n)	9.826		12.184	
	st.dev. (n)	0.8333		1.4513	
	R(calc.)	2.333		4.064	
	R(D5185:13e1)	2.017		--	Application range: 5 – 700 mg/kg
.	R(D6595:16)	--		5.368	Application range: 0.3 – 117 mg/kg
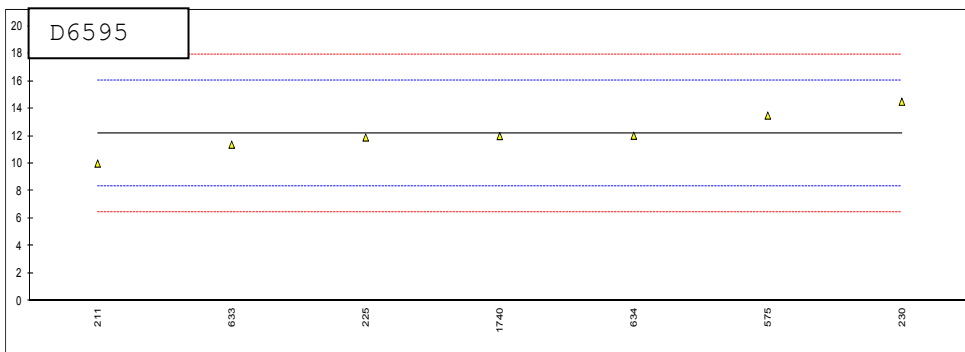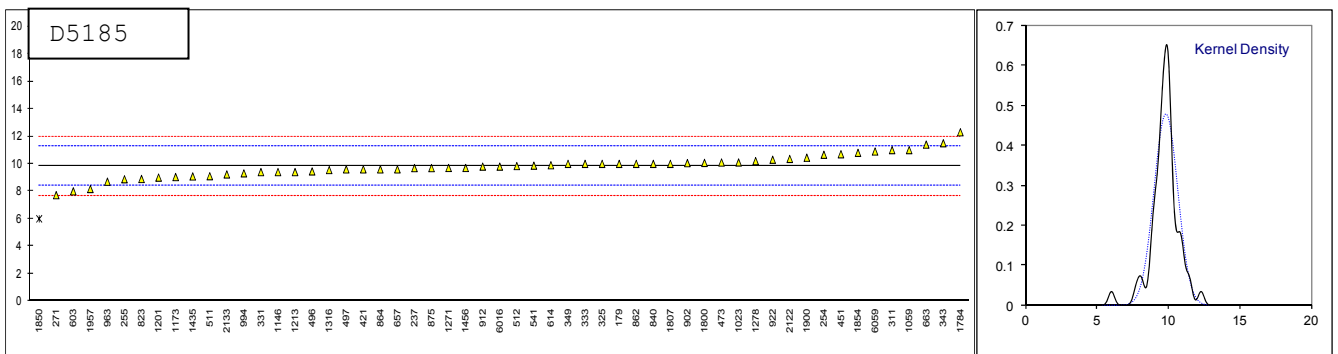
Determination of Molybdenum as Mo on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	11		0.96	-----		-----	
179	D5185	10		0.10	-----		-----	
211	D6595	-----		-----	9.7		-0.06	
214		-----		-----	-----		-----	
225	D6595	-----		-----	11.909		1.28	
230	D6595	-----		-----	11.3		0.91	
237	D5185	9.799		-0.08	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	9.71		-0.15	-----		-----	
255		-----		-----	-----		-----	
271	D5185	7.62		-1.95	-----		-----	
311	D5185	11		0.96	-----		-----	
315		-----		-----	-----		-----	
325	D5185	10		0.10	-----		-----	
331	D5185	9.4		-0.42	-----		-----	
333	D5185	10		0.10	-----		-----	
343	D5185	11.4		1.30	-----		-----	
349	D5185	11		0.96	-----		-----	
398		-----		-----	-----		-----	
421	D5185	9.5		-0.33	-----		-----	
450		-----		-----	-----		-----	
451	In house	11.9		1.73	-----		-----	
473	D5185	9.258		-0.54	-----		-----	
496	D5185	9.03		-0.74	-----		-----	
497	D5185	9.4		-0.42	-----		-----	
511	D5185	9.70		-0.16	-----		-----	
512	D5185	10.12		0.20	-----		-----	
541	D5185	10.0		0.10	-----		-----	
550	D5185	11		0.96	-----		-----	
562	D6595	-----		-----	7.5		-1.40	
575	D6595	-----		-----	8.88		-0.56	
603	D5185	8		-1.62	-----		-----	
614	D5185	9.91		0.02	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	11.587		1.08	
634	D6595	-----		-----	8.521		-0.78	
657	D5185	10.8		0.78	-----		-----	
663	D5185	11.7		1.56	-----		-----	
823	D5185	9.1		-0.68	-----		-----	
840	D5185	9.39		-0.43	-----		-----	
862	D5185	10		0.10	-----		-----	
864	D5185	10.2		0.27	-----		-----	
875	D5185	9.47		-0.36	-----		-----	
902	D5185	9.931		0.04	-----		-----	
912	D5185	9.5		-0.33	-----		-----	
922	D5185	10.4		0.44	-----		-----	
963	D5185	9.11		-0.67	-----		-----	
994	D5185	9.6		-0.25	-----		-----	
1023	D5185	11.326		1.24	-----		-----	
1026	D5185	10		0.10	-----		-----	
1059	In house	11		0.96	-----		-----	
1106		-----		-----	-----		-----	
1146		-----		-----	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	8.86		-0.88	-----		-----	
1201	D5185	7		-2.48	-----		-----	
1213	D5185	9.5		-0.33	-----		-----	
1264	D6595	-----		-----	8.84		-0.59	
1271	D5185	10.5		0.53	-----		-----	
1278	D5185	10.5		0.53	-----		-----	
1316	D5185	10.1		0.18	-----		-----	
1396		-----		-----	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	9.438		-0.39	-----		-----	
1456	D5185	9.58		-0.26	-----		-----	
1569	D5185	8		-1.62	-----		-----	
1648		-----		-----	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	10		0.12	
1748		-----		-----	-----		-----	
1784	D5185	12.0		1.82	-----		-----	
1800	In house	10.36		0.41	-----		-----	
1807	D5185	7.8		-1.80	-----		-----	
1850		4	R(0.01)	-5.06	-----		-----	
1854	D5185	11.3		1.21	-----		-----	

1900	D5185	11.027	0.98	-----	-----
1957	D5185	8.34	-1.33	-----	-----
1969		-----	-----	-----	-----
1981	D5185	7.26	-2.26	-----	-----
2122	D5185	10.68	0.68	-----	-----
2133	D5185	9.427	-0.40	-----	-----
6010	DIN51399-1	9.15	-0.63	-----	-----
6016	D5185	10.8	0.78	-----	-----
6043	D5185	11	0.96	-----	-----
6044	D5185	8.416	-1.27	-----	-----
6056		-----	-----	-----	-----
6059	D5185	11.94	1.76	-----	-----

|				
	normality	OK		OK	
	n	60		9	
	outliers	1		0	
	mean (n)	9.888		9.804	
	st.dev. (n)	1.1445		1.5262	
	R(calc.)	3.205		4.273	
	R(D5185:13e1)	3.256		--	Application range: 5 – 200 mg/kg
.	R(D6595:16)	--		4.614	Application range: 0.21 – 100 mg/kg
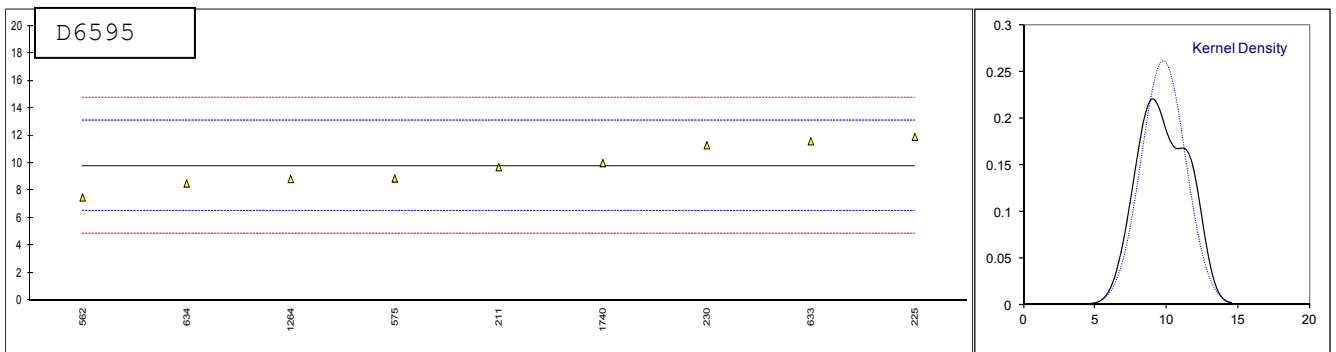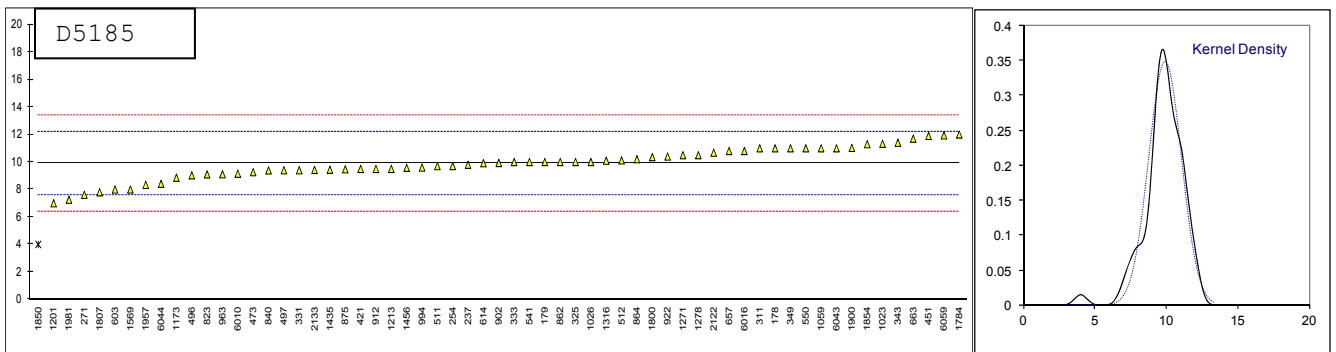
Determination of Nickel as Ni on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	10		0.45	-----		-----	
179	D5185	10		0.45	-----		-----	
211	D6595	-----		-----	10		-1.91	
214		-----		-----	-----		-----	
225	D6595	-----		-----	12.739		0.29	
230	D6595	-----		-----	12.97		0.48	
237	D5185	10.29		0.63	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	10.63		0.83	-----		-----	
255	INH-01	10.24		0.59	-----		-----	
271	D5185	7.97		-0.80	-----		-----	
311	D5185	10		0.45	-----		-----	
315		-----		-----	-----		-----	
325	D5185	10		0.45	-----		-----	
331	D5185	8.8		-0.29	-----		-----	
333	D5185	9		-0.17	-----		-----	
343	D5185	10.6		0.82	-----		-----	
349	D5185	10		0.45	-----		-----	
398	D5185	9.3		0.02	-----		-----	
421	D5185	9.0		-0.17	-----		-----	
450		-----		-----	-----		-----	
451	In house	10.2		0.57	-----		-----	
473	D5185	10.44		0.72	-----		-----	
496	D5185	8.51		-0.47	-----		-----	
497	D5185	8.7		-0.35	-----		-----	
511	D5185	8.75		-0.32	-----		-----	
512	D5185	8.481		-0.48	-----		-----	
541	D5185	9.17		-0.06	-----		-----	
550	D5185	9		-0.17	-----		-----	
562	D6595	-----		-----	14.1		1.39	
575	D6595	-----		-----	11.44		-0.75	
603	D5185	7		-1.39	-----		-----	
614	D5185	9.18		-0.05	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	11.458		-0.74	
634	D6595	-----		-----	13.372		0.80	
657	D5185	9.0		-0.17	-----		-----	
663	D5185	11.0		1.06	-----		-----	
823	D5185	8.8		-0.29	-----		-----	
840	D5185	9.03		-0.15	-----		-----	
862	D5185	9		-0.17	-----		-----	
864	D5185	9.8		0.33	-----		-----	
875	D5185	8.51		-0.47	-----		-----	
902	D5185	9.649		0.23	-----		-----	
912	D5185	9.5		0.14	-----		-----	
922	D5185	10.4		0.69	-----		-----	
963	D5185	7.92		-0.83	-----		-----	
994	D5185	9.2		-0.04	-----		-----	
1023	D5185	9.235		-0.02	-----		-----	
1026	D5185	9		-0.17	-----		-----	
1059	In house	11		1.06	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	9.0		-0.17	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	8.85		-0.26	-----		-----	
1201	D5185	10		0.45	-----		-----	
1213	D5185	8.2		-0.66	-----		-----	
1264	D6595	-----		-----	13.28		0.73	
1271	D5185	8.8		-0.29	-----		-----	
1278	D5185	9.50		0.14	-----		-----	
1316	D5185	9.05		-0.13	-----		-----	
1396	In house	8.15		-0.69	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	9.820		0.34	-----		-----	
1456	D5185	8.93		-0.21	-----		-----	
1569	D5185	7		-1.39	-----		-----	
1648	D5185	8.95		-0.20	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	12		-0.30	
1748		-----		-----	-----		-----	
1784	D5185	12.0		1.67	-----		-----	
1800	In house	9.42		0.09	-----		-----	
1807	D5185	6.4		-1.76	-----		-----	
1850		17	R(0.01)	4.74	-----		-----	
1854	D5185	10.9		1.00	-----		-----	

1900	D5185	8.866		-0.25	-----	-----	
1957	D5185	7.65		-0.99	-----	-----	
1969		-----		-----	-----	-----	
1981	D5185	9.65	C	0.23	-----	-----	First reported 1.19
2122	D5185	9.523		0.16	-----	-----	
2133	D5185	8.745		-0.32	-----	-----	
6010	DIN51399-1	8.35		-0.56	-----	-----	
6016	D5185	7.9		-0.84	-----	-----	
6043	D5185	9		-0.17	-----	-----	
6044	D5185	10.791		0.93	-----	-----	
6056		-----		-----	-----	-----	
6059	D5185	10.77		0.92	-----	-----	

|			
normality	OK	OK	
n	65	9	
outliers	1	0	
mean (n)	9.270	12.373	
st.dev. (n)	1.0339	1.2635	
R(calc.)	2.895	3.538	
R(D5185:13e1)	4.567	--	Application range: 5 – 40 mg/kg
. R(D6595:16)	--	3.485	Application range: 0.35 – 100 mg/kg
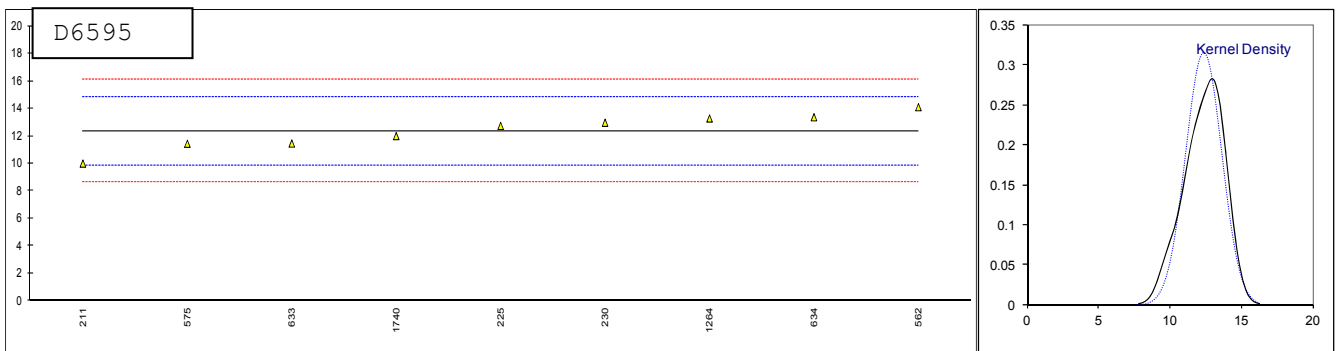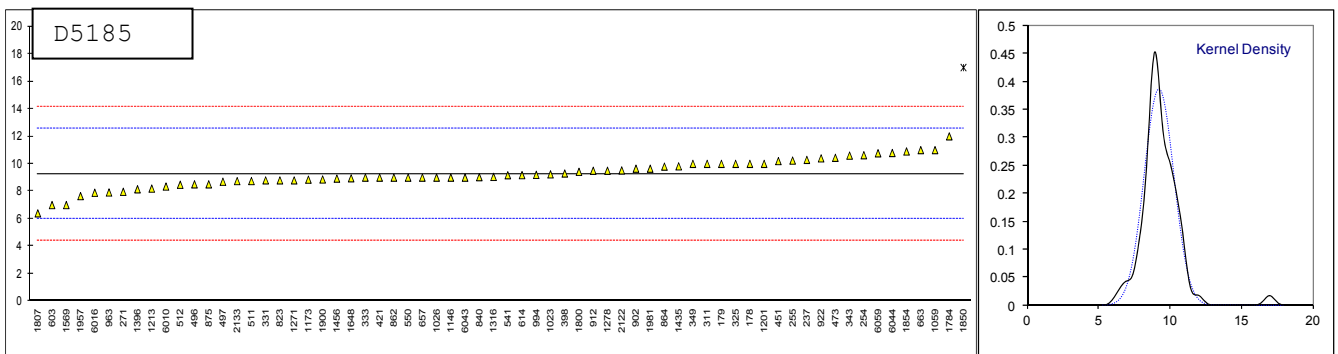
Determination of Sodium as Na on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	6		-2.36	-----		-----	
179	D5185	14		1.32	-----		-----	
211	D6595	-----		-----	20		1.80	
214		-----		-----	-----		-----	
225	D6595	-----		-----	13.826		-1.91	
230	D6595	-----		-----	17.9		0.54	
237	D5185	7.878		-1.50	-----		-----	
252		-----		-----	-----		-----	
254		-----		-----	-----		-----	
255		-----		-----	-----		-----	
271	D5185	10.37		-0.35	-----		-----	
311	D5185	11		-0.06	-----		-----	
315		-----		-----	-----		-----	
325	D5185	10		-0.52	-----		-----	
331	D5185	9.6		-0.71	-----		-----	
333	D5185	7		-1.90	-----		-----	
343	D5185	10.6		-0.25	-----		-----	
349	D5185	14		1.32	-----		-----	
398		-----		-----	-----		-----	
421	D5185	10.8		-0.16	-----		-----	
450		-----		-----	-----		-----	
451	In house	13.1		0.90	-----		-----	
473		-----		-----	-----		-----	
496	D5185	12.58		0.66	-----		-----	
497	D5185	11.9		0.35	-----		-----	
511	D5185	10.5		-0.29	-----		-----	
512	D5185	9.40		-0.80	-----		-----	
541	D5185	11.2		0.03	-----		-----	
550	D5185	11		-0.06	-----		-----	
562	D6595	-----		-----	17.4	C	0.24	First reported 21.2
575	D6595	-----		-----	14.68		-1.39	
603	D5185	17		2.69	-----		-----	
614	D5185	10.1		-0.48	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	11.961		-3.03	
634		-----		-----	-----		-----	
657	D5185	9.9		-0.57	-----		-----	
663	D5185	11.6		0.21	-----		-----	
823	D5185	11.5		0.17	-----		-----	
840	D5185	14.7		1.64	-----		-----	
862	D5185	11		-0.06	-----		-----	
864	D5185	12.1		0.44	-----		-----	
875		-----		-----	-----		-----	
902		-----		-----	-----		-----	
912		-----		-----	-----		-----	
922		-----		-----	-----		-----	
963	D5185	10.31		-0.38	-----		-----	
994	D5185	11.31		0.08	-----		-----	
1023	D5185	11.454		0.15	-----		-----	
1026	D5185	9		-0.98	-----		-----	
1059		-----		-----	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	9.5		-0.75	-----		-----	
1161		-----		-----	-----		-----	
1173		-----		-----	-----		-----	
1201	D5185	3	R(0.05)	-3.74	-----		-----	
1213	D5185	8.9		-1.03	-----		-----	
1264	D6595	-----		-----	22.23		3.14	
1271	D5185	11.2		0.03	-----		-----	
1278	D5185	9.23		-0.88	-----		-----	
1316	D5185	9.41		-0.79	-----		-----	
1396		-----		-----	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	9.178		-0.90	-----		-----	
1456	D5185	9.80		-0.62	-----		-----	
1569	D5185	11		-0.06	-----		-----	
1648	D5185	15.27		1.90	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	18		0.60	
1748		-----		-----	-----		-----	
1784	D5185	13.8		1.22	-----		-----	
1800	In house	< 15		-----	-----		-----	
1807	D5185	9.2		-0.89	-----		-----	
1850		-----		-----	-----		-----	
1854	D5185	12.5		0.63	-----		-----	

1900	D5185	12.662	0.70	-----	-----
1957	D5185	7.44	-1.70	-----	-----
1969		-----	-----	-----	-----
1981		-----	-----	-----	-----
2122	D5185	9.82	-0.61	-----	-----
2133	D5185	9.752	-0.64	-----	-----
6010	DIN51399-1	13.01	0.86	-----	-----
6016	D5185	11.2	0.03	-----	-----
6043		-----	-----	-----	-----
6044	D5185	17.612	2.98	-----	-----
6056		-----	-----	-----	-----
6059	D5185	15.54	2.02	-----	-----

|				
	normality	OK		unknown
	n	50		8
	outliers	1		0
	mean (n)	11.139		17.000
	st.dev. (n)	2.3720		3.3631
	R(calc.)	6.642		9.417
	R(D5185:13e1)	6.090		--	Application range: 7 - 70 mg/kg
.	R(D6595:16)	--		4.661	Application range: 3.6 – 99.6 mg/kg
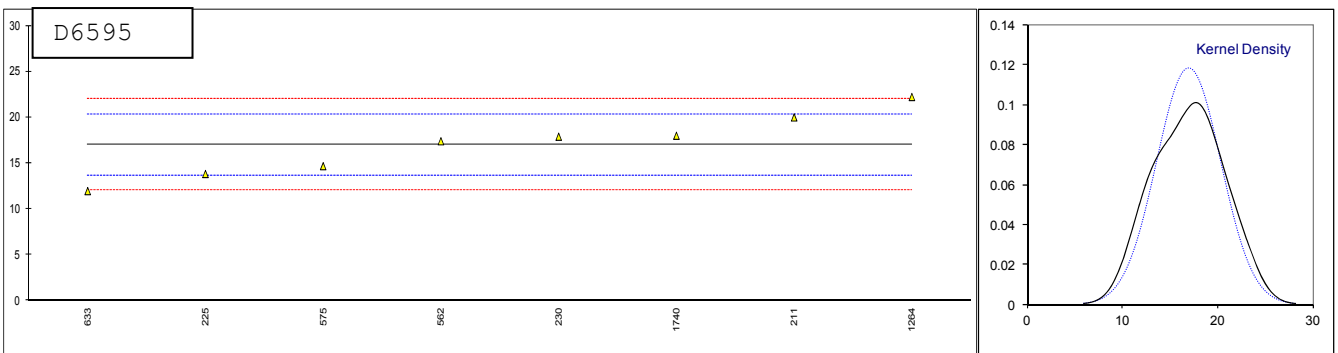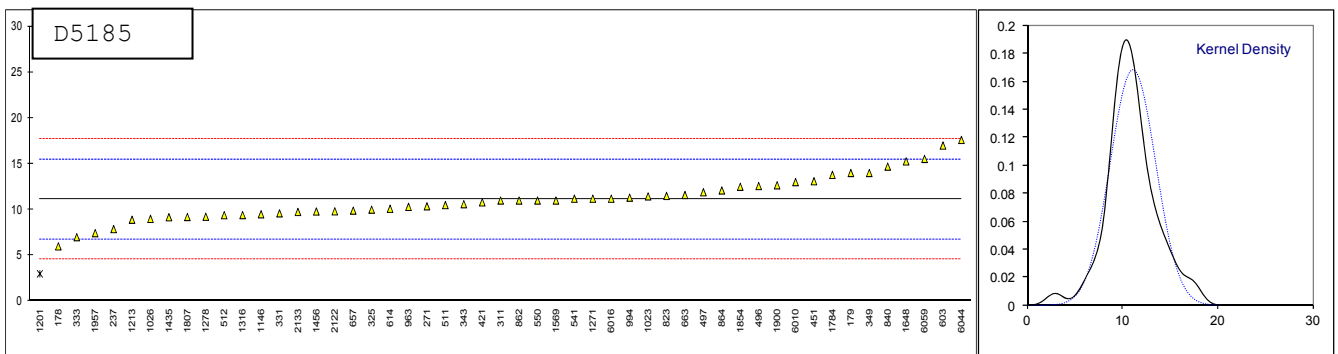
Determination of Silicon as Si on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	13		-0.18	-----		-----	
179	D5185	14		0.17	-----		-----	
211	D6595	-----		-----	14		-0.26	
214		-----		-----	-----		-----	
225	D6595	-----		-----	12.723		-1.01	
230	D6595	-----		-----	15.8		0.80	
237	D5185	12.43		-0.38	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	17.53	C	1.40	-----		-----	First reported 24.22
255	INH-01	12.77		-0.26	-----		-----	
271	D5185	12.55		-0.34	-----		-----	
311	D5185	15		0.52	-----		-----	
315		-----		-----	-----		-----	
325	D5185	14		0.17	-----		-----	
331	D5185	13.5		-0.01	-----		-----	
333	D5185	14		0.17	-----		-----	
343	D5185	13.7		0.06	-----		-----	
349	D5185	14		0.17	-----		-----	
398		-----		-----	-----		-----	
421	D5185	13.3		-0.08	-----		-----	
450		-----		-----	-----		-----	
451	In house	13.5		-0.01	-----		-----	
473	D5185	15.19		0.58	-----		-----	
496	D5185	13.63		0.04	-----		-----	
497	D5185	13.1		-0.15	-----		-----	
511	D5185	12.035		-0.52	-----		-----	
512	D5185	13.5		-0.01	-----		-----	
541	D5185	13.5		-0.01	-----		-----	
550	D5185	15		0.52	-----		-----	
562	D6595	-----		-----	14.9		0.27	
575	D6595	-----		-----	16.31		1.10	
603	D5185	11		-0.88	-----		-----	
614	D5185	13.61		0.03	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	10.845		-2.11	
634	D6595	-----		-----	14.65		0.12	
657	D5185	14.0		0.17	-----		-----	
663	D5185	15.4		0.66	-----		-----	
823	D5185	14.2		0.24	-----		-----	
840	D5185	13.3		-0.08	-----		-----	
862	D5185	13		-0.18	-----		-----	
864	D5185	13.0		-0.18	-----		-----	
875		-----		-----	-----		-----	
902	D5185	14.337		0.28	-----		-----	
912	D5185	13.8		0.10	-----		-----	
922	D5185	14.3		0.27	-----		-----	
963	D5185	10.81		-0.95	-----		-----	
994	D5185	12.4		-0.39	-----		-----	
1023	D5185	14.306		0.27	-----		-----	
1026	D5185	13		-0.18	-----		-----	
1059	In house	15		0.52	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	12.6		-0.32	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	12.72		-0.28	-----		-----	
1201	D5185	12		-0.53	-----		-----	
1213		-----		-----	-----		-----	
1264	D6595	-----		-----	14.74		0.18	
1271	D5185	12		-0.53	-----		-----	
1278	D5185	13.4		-0.04	-----		-----	
1316	D5185	13.0		-0.18	-----		-----	
1396	In house	24.55	R(0.01)	3.86	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	12.66		-0.30	-----		-----	
1456	D5185	12.8		-0.25	-----		-----	
1569	D5185	12		-0.53	-----		-----	
1648	D5185	14.50		0.34	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	16		0.92	
1748		-----		-----	-----		-----	
1784	D5185	17.5		1.39	-----		-----	
1800	In house	14.05		0.18	-----		-----	
1807	D5185	12		-0.53	-----		-----	
1850		18		1.57	-----		-----	
1854	D5185	14.3		0.27	-----		-----	

1900	D5185	15.377	0.65	-----		-----
1957	D5185	10.63	-1.01	-----		-----
1969		-----	-----	-----		-----
1981		-----	-----	-----		-----
2122	D5185	13.80	0.10	-----		-----
2133	D5185	12.57	-0.33	-----		-----
6010	DIN51399-1	12.11	-0.49	-----		-----
6016	D5185	14.3	0.27	-----		-----
6043	D5185	14	0.17	-----		-----
6044	D5185	10.408	-1.09	-----		-----
6056		-----	-----	-----		-----
6059	D5185	13.52	0.00	-----		-----

|				
	normality	suspect		suspect
	n	61		9
	outliers	1		0
	mean (n)	13.524		14.441
	st.dev. (n)	1.4671		1.7389
	R(calc.)	4.108		4.869
	R(D5185:13e1)	8.008		--	Application range: 8 – 50 mg/kg
.	R(D6595:16)	--		4.764	Application range: 3.2 – 142 mg/kg
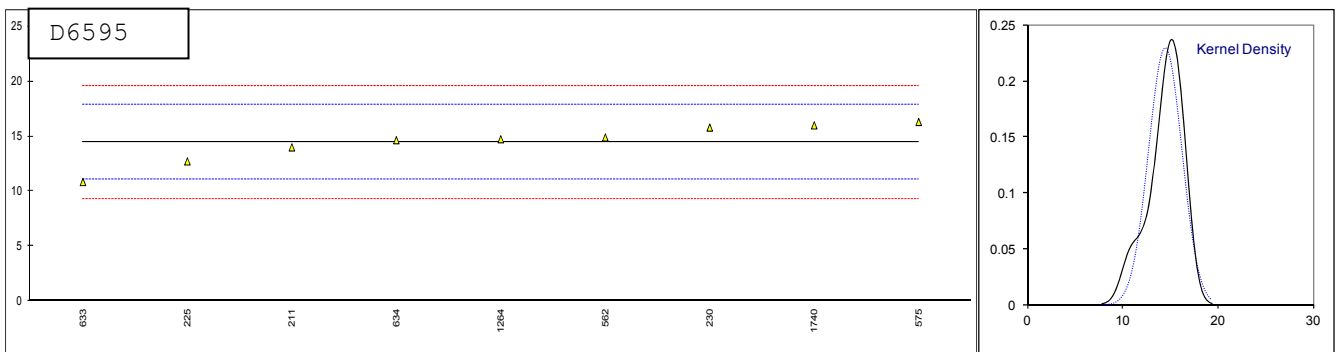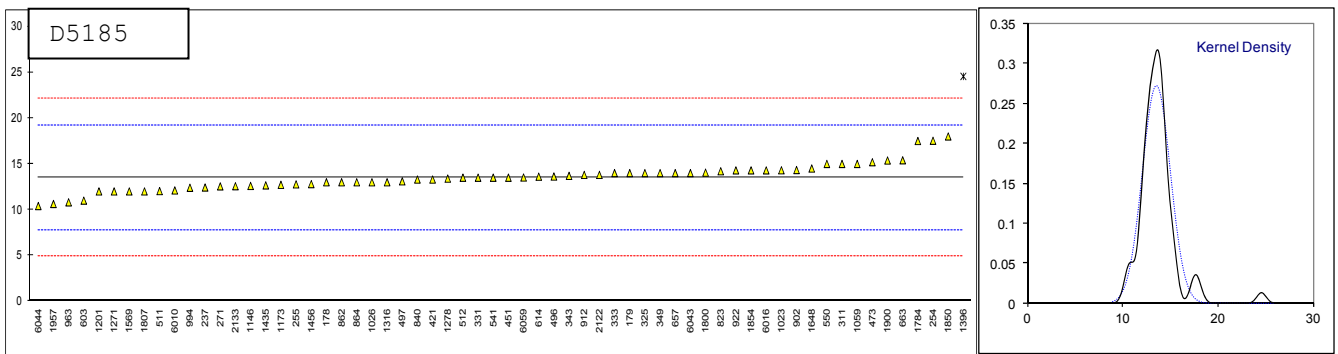
Determination of Silver as Ag on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	9.78		-0.02	-----		-----	
179	D5185	10.02		0.17	-----		-----	
211	D6595	-----		-----	9.8		-0.46	
214		-----		-----	-----		-----	
225	D6595	-----		-----	12.897		1.79	
230		-----		-----	-----		-----	
237	D5185	11.02		0.99	-----		-----	
252		-----		-----	-----		-----	
254		-----		-----	-----		-----	
255	INH-01	9.12		-0.56	-----		-----	
271	D5185	12.90		2.52	-----		-----	
311	D5185	10		0.16	-----		-----	
315		-----		-----	-----		-----	
325	D5185	9.5		-0.25	-----		-----	
331	D5185	8.4		-1.15	-----		-----	
333		-----		-----	-----		-----	
343	D5185	10.6		0.65	-----		-----	
349	D5185	12		1.79	-----		-----	
398		-----		-----	-----		-----	
421	D5185	9.5		-0.25	-----		-----	
450		-----		-----	-----		-----	
451	In house	9.2		-0.49	-----		-----	
473	D5185	10.56		0.61	-----		-----	
496	D5185	9.60		-0.17	-----		-----	
497	D5185	9.0		-0.66	-----		-----	
511	D5185	10.4		0.48	-----		-----	
512	D5185	8.155		-1.35	-----		-----	
541	D5185	9.36		-0.36	-----		-----	
550	D5185	9		-0.66	-----		-----	
562	D6595	-----		-----	9.8		-0.46	
575	D6595	-----		-----	9.99		-0.32	
603	D5185	12		1.79	-----		-----	
614	D5185	9.3		-0.41	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	10.804		0.27	
634	D6595	-----		-----	9.139		-0.94	
657	D5185	11.0		0.97	-----		-----	
663	D5185	11.5		1.38	-----		-----	
823	D5185	8.9		-0.74	-----		-----	
840	D5185	9.84		0.03	-----		-----	
862	D5185	9		-0.66	-----		-----	
864	D5185	8.9		-0.74	-----		-----	
875	D5185	8.5		-1.07	-----		-----	
902	D5185	10.013		0.17	-----		-----	
912	D5185	10.9		0.89	-----		-----	
922	D5185	12.1		1.87	-----		-----	
963	D5185	9.01		-0.65	-----		-----	
994	D5185	9.35		-0.37	-----		-----	
1023	D5185	9.517		-0.24	-----		-----	
1026		-----		-----	-----		-----	
1059		-----		-----	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	9.0		-0.66	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	8.81		-0.81	-----		-----	
1201	D5185	10		0.16	-----		-----	
1213		-----		-----	-----		-----	
1264	D6595	-----		-----	12.04		1.17	
1271	D5185	9.1		-0.58	-----		-----	
1278	D5185	10.8		0.81	-----		-----	
1316	D5185	9.23		-0.47	-----		-----	
1396		-----		-----	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	7.666		-1.75	-----		-----	
1456	D5185	8.80		-0.82	-----		-----	
1569	D5185	9		-0.66	-----		-----	
1648		-----		-----	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	9		-1.04	
1748		-----		-----	-----		-----	
1784	D5185	9.9		0.08	-----		-----	
1800	In house	< 10		-----	-----		-----	
1807	D5185	8.1		-1.39	-----		-----	
1850		10		0.16	-----		-----	
1854	D5185	9.9		0.08	-----		-----	

1900	D5185	10.840	0.84	-----	-----
1957	D5185	8.31	-1.22	-----	-----
1969		-----	-----	-----	-----
1981		-----	-----	-----	-----
2122	D5185	12.575	2.26	-----	-----
2133	D5185	9.247	-0.46	-----	-----
6010		-----	-----	-----	-----
6016	D5185	9.6	-0.17	-----	-----
6043		-----	-----	-----	-----
6044	D5185	8.477	-1.08	-----	-----
6056		-----	-----	-----	-----
6059	D5185	12.26	2.00	-----	-----

|	normality	OK	unknown	
	n	54	8	
	outliers	0	0	
	mean (n)	9.807	10.434	
	st.dev. (n)	1.2083	1.3896	
	R(calc.)	3.383	3.891	
	R(D5185:13e1)	3.432	--	Application range: 0.5 – 50 mg/kg
.	R(D6595:16)	--	3.847	Application range: 31 – 102 mg/kg
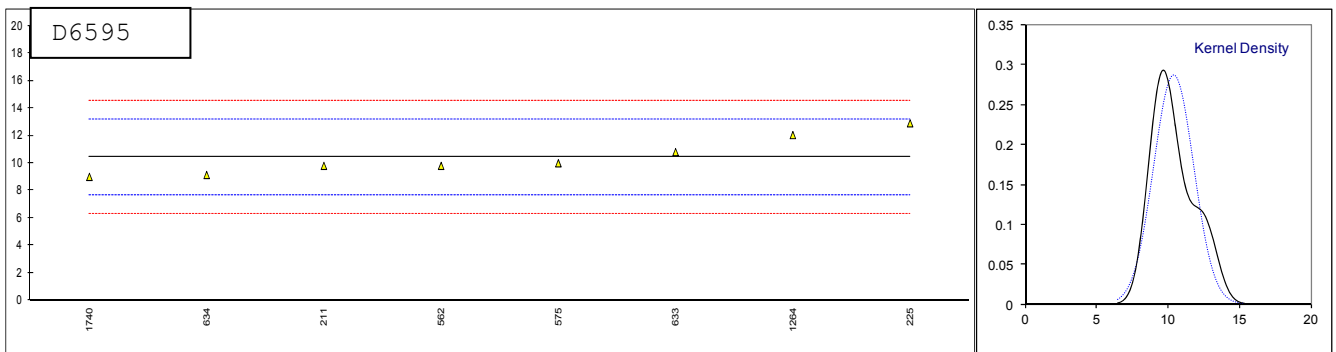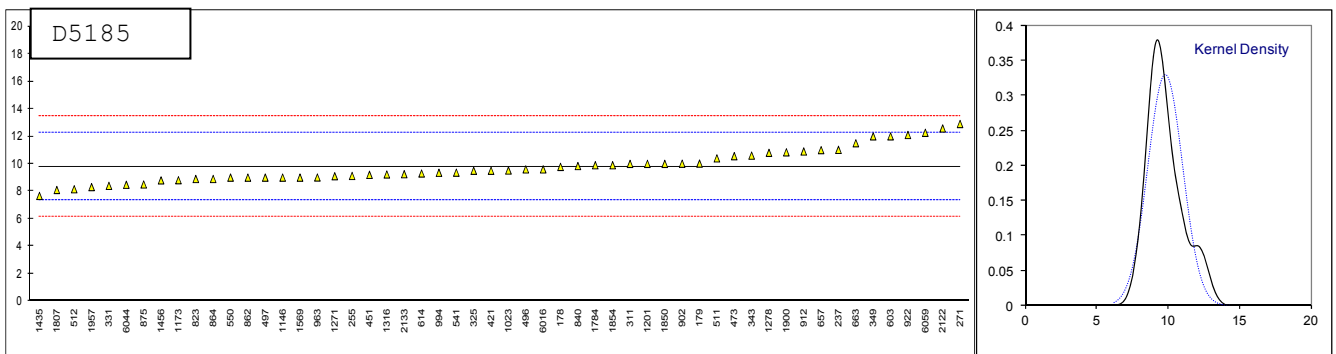
Determination of Tin as Sn on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	10		0.24	-----		-----	
179	D5185	9		-0.10	-----		-----	
211	D6595	-----		-----	3.5		-----	
214		-----		-----	-----		-----	
225	D6595	-----		-----	4.541		-----	
230	D6595	-----		-----	6.69		-----	
237	D5185	10.02		0.25	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	5.48		-1.27	-----		-----	
255		-----		-----	-----		-----	
271	D5185	7.37		-0.64	-----		-----	
311	D5185	10		0.24	-----		-----	
315		-----		-----	-----		-----	
325	D5185	10		0.24	-----		-----	
331	D5185	9.4		0.04	-----		-----	
333	D5185	9		-0.10	-----		-----	
343	D5185	10.0		0.24	-----		-----	
349	D5185	9		-0.10	-----		-----	
398		-----		-----	-----		-----	
421	D5185	9.3		0.00	-----		-----	
450		-----		-----	-----		-----	
451	In house	11.1		0.61	-----		-----	
473	D5185	4.355		-1.65	-----		-----	
496	D5185	8.98		-0.10	-----		-----	
497		-----		-----	-----		-----	
511	D5185	9.75		0.15	-----		-----	
512	D5185	7.28		-0.67	-----		-----	
541	D5185	<10		-----	-----		-----	
550	D5185	11		0.57	-----		-----	
562	D6595	-----		-----	8.1		-----	
575		-----		-----	-----		-----	
603	D5185	6		-1.10	-----		-----	
614	D5185	9.65		0.12	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	5.087		-----	
634	D6595	-----		-----	4.478		-----	
657	D5185	10.7		0.47	-----		-----	
663	D5185	10.7		0.47	-----		-----	
823	D5185	8.4		-0.30	-----		-----	
840	D5185	9.72		0.14	-----		-----	
862	D5185	9		-0.10	-----		-----	
864	D5185	10.1		0.27	-----		-----	
875	D5185	8.55		-0.25	-----		-----	
902	D5185	8.761		-0.18	-----		-----	
912		-----		-----	-----		-----	
922	D5185	9.9		0.20	-----		-----	
963	D5185	11.42		0.71	-----		-----	
994	D5185	8.9		-0.13	-----		-----	
1023	D5185	10.685		0.47	-----		-----	
1026	D5185	9		-0.10	-----		-----	
1059	In house	11		0.57	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	9.2		-0.03	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	6.40		-0.97	-----		-----	
1201	D5185	7		-0.77	-----		-----	
1213	D5185	8.5		-0.26	-----		-----	
1264	D6595	-----		-----	7.96		-----	
1271	D5185	9.3		0.00	-----		-----	
1278	D5185	10.6		0.44	-----		-----	
1316	D5185	9.36		0.02	-----		-----	
1396		-----		-----	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	8.856		-0.14	-----		-----	
1456	D5185	9.20		-0.03	-----		-----	
1569	D5185	9		-0.10	-----		-----	
1648	D5185	12.02		0.91	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	9		-----	
1748		-----		-----	-----		-----	
1784	D5185	9.1		-0.06	-----		-----	
1800	In house	11.58		0.77	-----		-----	
1807	D5185	8.3		-0.33	-----		-----	
1850		11		0.57	-----		-----	
1854	D5185	10.4		0.37	-----		-----	

1900	D5185	12.250		0.99	-----	-----
1957	D5185	8.33		-0.32	-----	-----
1969		-----		-----	-----	-----
1981	D5185	2.26	DG(0.05)	-2.35	-----	-----
2122	D5185	9.72		0.14	-----	-----
2133	D5185	8.742		-0.18	-----	-----
6010	DIN51399-1	7.55		-0.58	-----	-----
6016	D5185	8.9		-0.13	-----	-----
6043	D5185	11		0.57	-----	-----
6044	D5185	7.533		-0.59	-----	-----
6056		-----		-----	-----	-----
6059	D5185	10.62		0.45	-----	-----

|				
normality	suspect		unknown	
n	59		8	
outliers	1		0	
mean (n)	9.288		6.170	
st.dev. (n)	1.5461		2.0363	
R(calc.)	4.329		5.702	
R(D5185:13e1)	8.362		--	Application range: 10 -40 mg/kg
. R(D6595:16)	--		(1.891)	Application range: 30 – 139 mg/kg
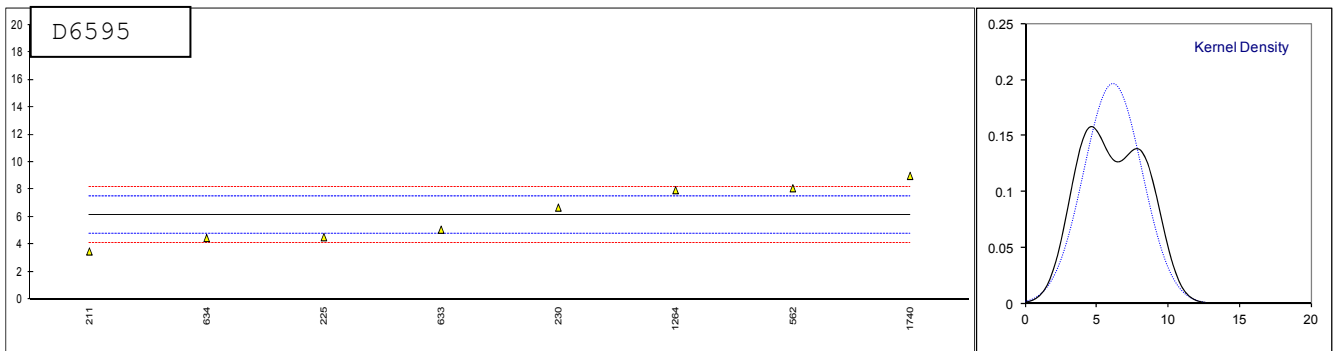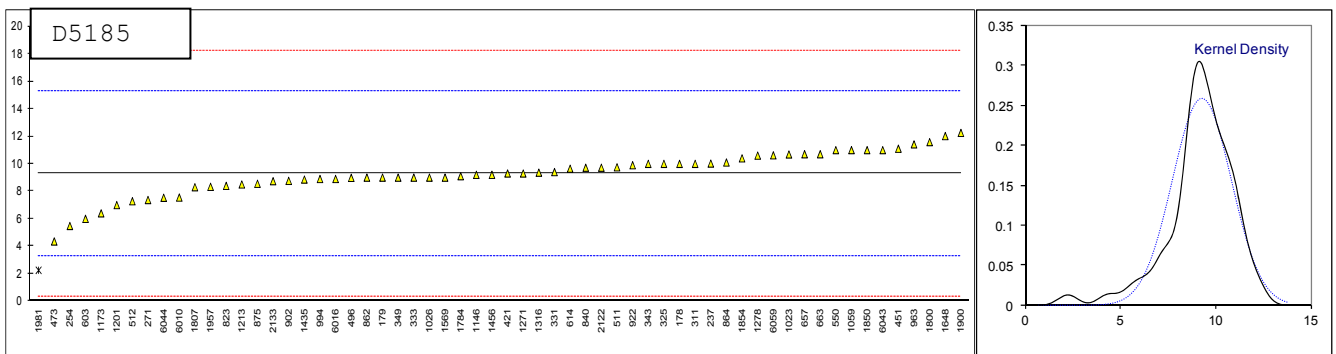
Determination of Titanium as Ti on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178		-----		-----	-----		-----	
179	D5185	10		0.32	-----		-----	
211	D6595	-----		-----	9.5		0.20	
214		-----		-----	-----		-----	
225	D6595	-----		-----	10.126		0.77	
230	D6595	-----		-----	10.4		1.01	
237	D5185	8.912		-0.11	-----		-----	
252		-----		-----	-----		-----	
254		-----		-----	-----		-----	
255		-----		-----	-----		-----	
271	D5185	7.47		-0.68	-----		-----	
311	D5185	10		0.32	-----		-----	
315		-----		-----	-----		-----	
325		-----		-----	-----		-----	
331	D5185	8.9		-0.12	-----		-----	
333		-----		-----	-----		-----	
343	D5185	10.5		0.51	-----		-----	
349	D5185	10		0.32	-----		-----	
398		-----		-----	-----		-----	
421	D5185	8.9		-0.12	-----		-----	
450		-----		-----	-----		-----	
451	In house	9.2		0.00	-----		-----	
473	D5185	9.467		0.11	-----		-----	
496	D5185	8.94		-0.10	-----		-----	
497	D5185	8.6		-0.24	-----		-----	
511	D5185	9.35		0.06	-----		-----	
512	D5185	9.74		0.21	-----		-----	
541	D5185	9.28		0.03	-----		-----	
550	D5185	9		-0.08	-----		-----	
562	D6595	-----		-----	9.7		0.38	
575	D6595	-----		-----	9.29		0.01	
603	D5185	7		-0.87	-----		-----	
614	D5185	9.6		0.16	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	9.182		-0.09	
634	D6595	-----		-----	8.784		-0.45	
657	D5185	9.9		0.28	-----		-----	
663	D5185	10.9		0.67	-----		-----	
823	D5185	8.2		-0.39	-----		-----	
840	D5185	8.84		-0.14	-----		-----	
862	D5185	9		-0.08	-----		-----	
864	D5185	9.3		0.04	-----		-----	
875	D5185	9.51		0.12	-----		-----	
902	D5185	9.486		0.11	-----		-----	
912	D5185	10.1		0.36	-----		-----	
922	D5185	9.8		0.24	-----		-----	
963	D5185	8.01		-0.47	-----		-----	
994	D5185	9.0		-0.08	-----		-----	
1023	D5185	9.461		0.10	-----		-----	
1026		-----		-----	-----		-----	
1059		-----		-----	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	9.0		-0.08	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	8.78		-0.16	-----		-----	
1201	D5185	8		-0.47	-----		-----	
1213	D5185	8.6		-0.24	-----		-----	
1264	D6595	-----		-----	7.543		-1.57	
1271	D5185	8.6		-0.24	-----		-----	
1278	D5185	9.67		0.19	-----		-----	
1316	D5185	9.28		0.03	-----		-----	
1396		-----		-----	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	9.453		0.10	-----		-----	
1456	D5185	8.95		-0.10	-----		-----	
1569	D5185	9		-0.08	-----		-----	
1648		-----		-----	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	9		-0.25	
1748		-----		-----	-----		-----	
1784		-----		-----	-----		-----	
1800	In house	9.71		0.20	-----		-----	
1807	D5185	7.3		-0.75	-----		-----	
1850		4	R(0.01)	-2.05	-----		-----	
1854		-----		-----	-----		-----	

1900	D5185	10.314	0.44	-----	-----
1957	D5185	7.70	-0.59	-----	-----
1969		-----	-----	-----	-----
1981		-----	-----	-----	-----
2122	D5185	9.829	0.25	-----	-----
2133	D5185	8.865	-0.13	-----	-----
6010		-----	-----	-----	-----
6016	D5185	9.5	0.12	-----	-----
6043		-----	-----	-----	-----
6044		-----	-----	-----	-----
6056		-----	-----	-----	-----
6059	D5185	11.71	0.99	-----	-----

|				
normality	suspect		suspect	
n	49		9	
outliers	1		0	
mean (n)	9.196		9.281	
st.dev. (n)	0.8802		0.8326	
R(calc.)	2.464		2.331	
R(D5185:13e1)	7.093		--	Application range: 5 – 40 mg/kg
R(D6595:16)	--		3.094	Application range: 6.8 – 103 mg/kg
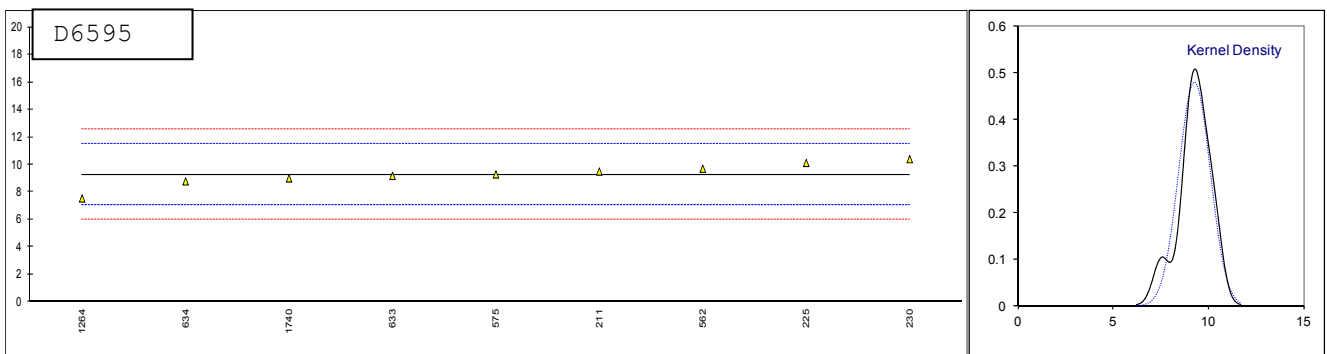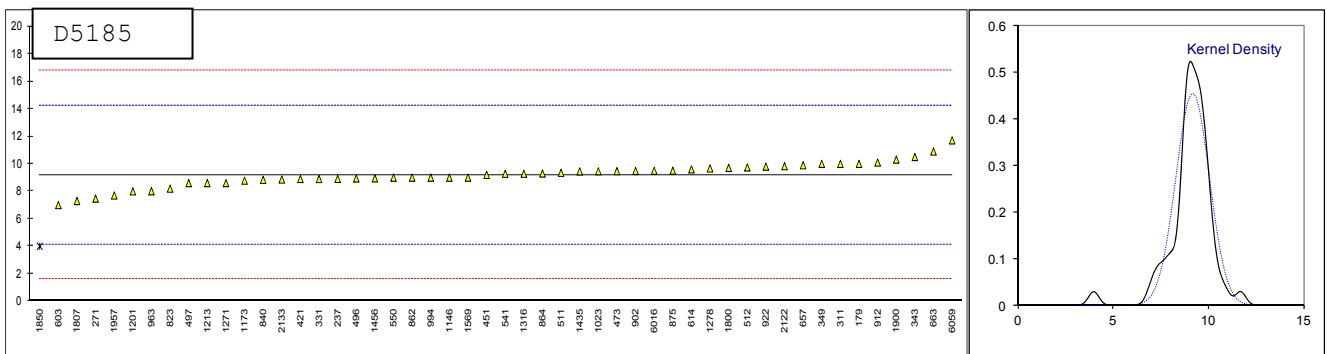
Determination of Vanadium as V on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	9		-0.20	-----		-----	
179	D5185	10		0.66	-----		-----	
211	D6595	-----		-----	10		-0.49	
214		-----		-----	-----		-----	
225	D6595	-----		-----	11.257		0.15	
230	D6595	-----		-----	12.2		0.63	
237	D5185	9.171		-0.05	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	9.18		-0.05	-----		-----	
255		-----		-----	-----		-----	
271	D5185	8.02		-1.05	-----		-----	
311	D5185	10		0.66	-----		-----	
315		-----		-----	-----		-----	
325	D5185	9		-0.20	-----		-----	
331	D5185	9.0		-0.20	-----		-----	
333		-----		-----	-----		-----	
343	D5185	11.2		1.71	-----		-----	
349	D5185	10		0.66	-----		-----	
398	D5185	13.3	R(0.01)	3.53	-----		-----	
421	D5185	9.1		-0.12	-----		-----	
450		-----		-----	-----		-----	
451	In house	9.5		0.23	-----		-----	
473	D5185	9.337		0.09	-----		-----	
496	D5185	9.03		-0.18	-----		-----	
497	D5185	9.1		-0.12	-----		-----	
511	D5185	9.25		0.01	-----		-----	
512	D5185	9.92		0.60	-----		-----	
541	D5185	9.58		0.30	-----		-----	
550	D5185	9		-0.20	-----		-----	
562	D6595	-----		-----	12.1		0.58	
575	D6595	-----		-----	10.35		-0.31	
603	D5185	8		-1.07	-----		-----	
614	D5185	9.6		0.32	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	9.426		-0.79	
634	D6595	-----		-----	11.994		0.53	
657	D5185	8.9		-0.29	-----		-----	
663	D5185	11.1		1.62	-----		-----	
823	D5185	8.1		-0.98	-----		-----	
840	D5185	8.59		-0.56	-----		-----	
862	D5185	9		-0.20	-----		-----	
864	D5185	9.1		-0.12	-----		-----	
875	D5185	9.27		0.03	-----		-----	
902	D5185	9.395		0.14	-----		-----	
912	D5185	10.0		0.66	-----		-----	
922	D5185	9.8		0.49	-----		-----	
963	D5185	8.21		-0.89	-----		-----	
994	D5185	9.0		-0.20	-----		-----	
1023	D5185	9.5		0.23	-----		-----	
1026	D5185	9		-0.20	-----		-----	
1059	In house	9		-0.20	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	9.0		-0.20	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	8.62		-0.53	-----		-----	
1201	D5185	8		-1.07	-----		-----	
1213	D5185	9.0		-0.20	-----		-----	
1264	D6595	-----		-----	9.34		-0.83	
1271	D5185	9.3		0.06	-----		-----	
1278	D5185	9.72		0.42	-----		-----	
1316	D5185	9.09		-0.12	-----		-----	
1396	In house	8.40		-0.72	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	9.312		0.07	-----		-----	
1456	D5185	9.20		-0.03	-----		-----	
1569	D5185	9		-0.20	-----		-----	
1648	D5185	17.30	R(0.01)	6.99	-----		-----	
1650		-----		-----	-----		-----	
1740	D6595	-----		-----	12		0.53	
1748		-----		-----	-----		-----	
1784	D5185	10.3		0.92	-----		-----	
1800	In house	9.67		0.38	-----		-----	
1807	D5185	7.4		-1.59	-----		-----	
1850		6	R(0.01)	-2.80	-----		-----	
1854	D5185	9.3		0.06	-----		-----	

1900	D5185	9.932	0.61	-----	-----
1957	D5185	7.80	-1.24	-----	-----
1969		-----	-----	-----	-----
1981		-----	-----	-----	-----
2122	D5185	9.8	0.49	-----	-----
2133	D5185	8.808	-0.37	-----	-----
6010		-----	-----	-----	-----
6016	D5185	9.6	0.32	-----	-----
6043		-----	-----	-----	-----
6044	D5185	8.859	-0.32	-----	-----
6056		-----	-----	-----	-----
6059	D5185	11.48	1.95	-----	-----

normality	suspect		OK
n	58		9
outliers	3		0
mean (n)	9.234		10.963
st.dev. (n)	0.7655		1.1910
R(calc.)	2.143		3.335
R(D5185:13e1)	3.229		--
R(D6595:16)	--		5.456

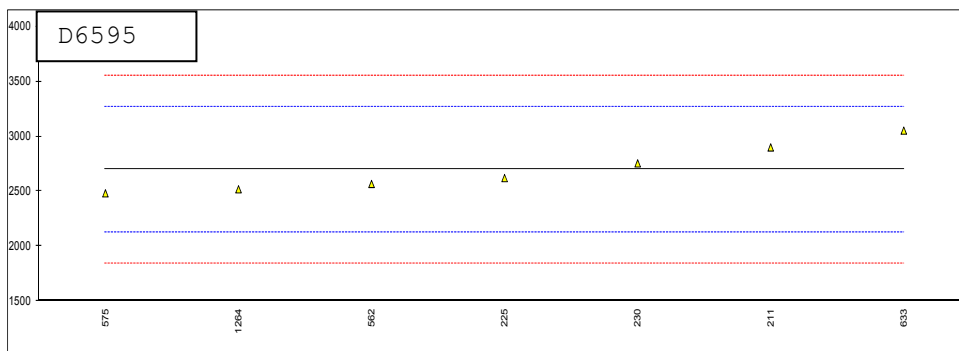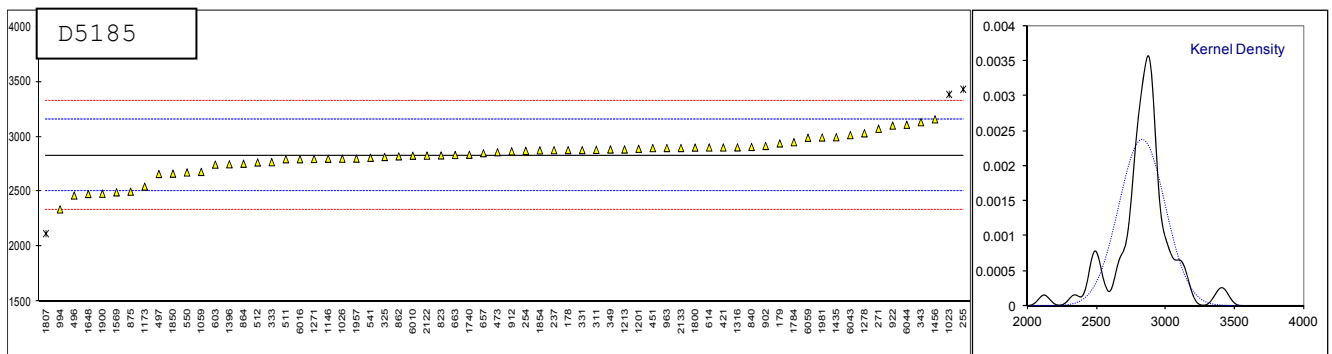Application range: 1 – 50 mg/kg
Application range: 2.1 – 101 mg/kg
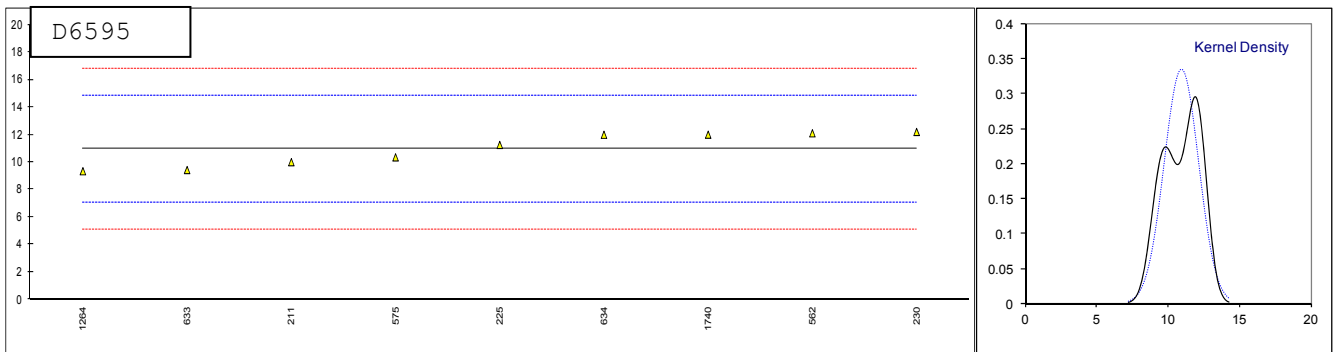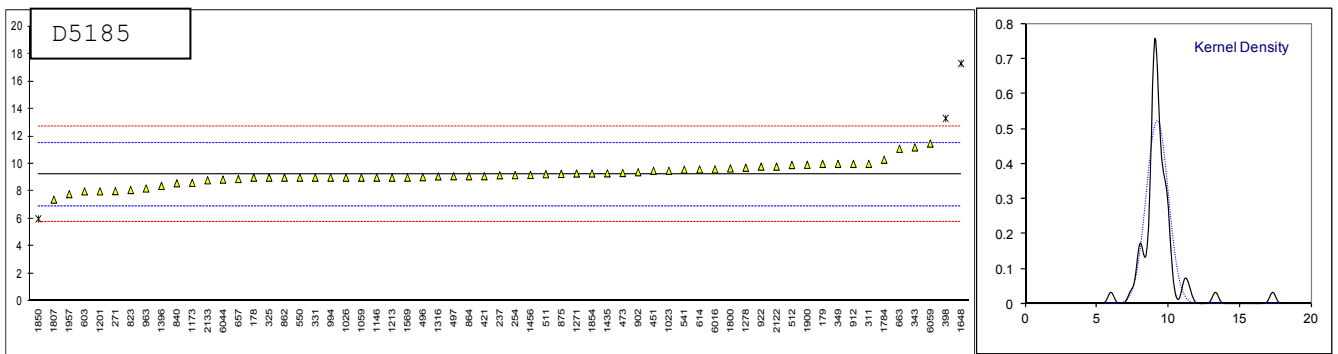
Determination of Calcium as Ca on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	2878		0.30	-----		-----	
179	D5185	2939		0.67	-----		-----	
211	D6595	-----		-----	2900		0.70	
214		-----		-----	-----		-----	
225	D6595	-----		-----	2621.0		-0.28	
230	D6595	-----		-----	2755.3		0.19	
237	D5185	2877		0.29	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	2871.56	C	0.26	-----		-----	First reported 3527.51
255	INH-01	3431	DG(0.05)	3.66	-----		-----	
271	D5185	3072.53		1.48	-----		-----	
311	D5185	2880		0.31	-----		-----	
315		-----		-----	-----		-----	
325	D5185	2815		-0.09	-----		-----	
331	D5185	2878.0		0.30	-----		-----	
333	D5185	2768		-0.37	-----		-----	
343	D5185	3131.7		1.84	-----		-----	
349	D5185	2884		0.33	-----		-----	
398		-----		-----	-----		-----	
421	D5185	2902		0.44	-----		-----	
450		-----		-----	-----		-----	
451	In house	2896.3		0.41	-----		-----	
473	D5185	2859.0		0.18	-----		-----	
496	D5185	2465		-2.22	-----		-----	
497	D5185	2661		-1.02	-----		-----	
511	D5185	2795		-0.21	-----		-----	
512	D5185	2766		-0.39	-----		-----	
541	D5185	2808.3		-0.13	-----		-----	
550	D5185	2675		-0.94	-----		-----	
562	D6595	-----		-----	2567.9		-0.46	
575	D6595	-----		-----	2482.6		-0.76	
603	D5185	2746		-0.51	-----		-----	
614	D5185	2902		0.44	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	3053.0		1.24	
634		-----		-----	-----		-----	
657	D5185	2850		0.13	-----		-----	
663	D5185	2833.9		0.03	-----		-----	
823	D5185	2830		0.00	-----		-----	
840	D5185	2907		0.47	-----		-----	
862	D5185	2821		-0.05	-----		-----	
864	D5185	2754		-0.46	-----		-----	
875	D5185	2500		-2.00	-----		-----	
902	D5185	2916.1		0.53	-----		-----	
912	D5185	2867		0.23	-----		-----	
922	D5185	3101		1.65	-----		-----	
963	D5185	2897		0.41	-----		-----	
994	D5185	2339		-2.98	-----		-----	
1023	D5185	3383.955	DG(0.05)	3.37	-----		-----	
1026	D5185	2800		-0.18	-----		-----	
1059	In house	2680		-0.91	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	2799		-0.18	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	2545.78		-1.72	-----		-----	
1201	D5185	2890		0.37	-----		-----	
1213	D5185	2884		0.33	-----		-----	
1264	D6595	-----		-----	2519.3		-0.63	
1271	D5185	2797		-0.20	-----		-----	
1278	D5185	3031		1.23	-----		-----	
1316	D5185	2903		0.45	-----		-----	
1396	In house	2749.27		-0.49	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	2995		1.01	-----		-----	
1456	D5185	3158		2.00	-----		-----	
1569	D5185	2494		-2.04	-----		-----	
1648	D5185	2479.0		-2.13	-----		-----	
1650		-----		-----	-----		-----	
1740	D5185	2836		0.04	-----		-----	
1748		-----		-----	-----		-----	
1784	D5185	2950		0.73	-----		-----	
1800	In house	2900.88		0.43	-----		-----	
1807	D5185	2118	R(0.05)	-4.32	-----		-----	
1850		2664		-1.01	-----		-----	
1854	D5185	2876		0.28	-----		-----	

1900	D5185	2481.426	-2.12	-----	-----
1957	D5185	2801	-0.17	-----	-----
1969		-----	-----	-----	-----
1981	D5185	2993	0.99	-----	-----
2122	D5185	2827.84	-0.01	-----	-----
2133	D5185	2897	0.41	-----	-----
6010	DIN51399-1	2827	-0.01	-----	-----
6016	D5185	2795	-0.21	-----	-----
6043	D5185	3014	1.12	-----	-----
6044	D5185	3108.23	1.70	-----	-----
6056		-----	-----	-----	-----
6059	D5185	2990.00	0.98	-----	-----

	normality	OK		unknown
	n	63		7
	outliers	3		0
	mean (n)	2829.4		2699.9
	st.dev. (n)	166.53		212.63
	R(calc.)	466.3		595.4
	R(D5185:13e1)	460.6		--
.	R(D6595:16)	--		797.4

Application range: 4 – 9000 mg/kg
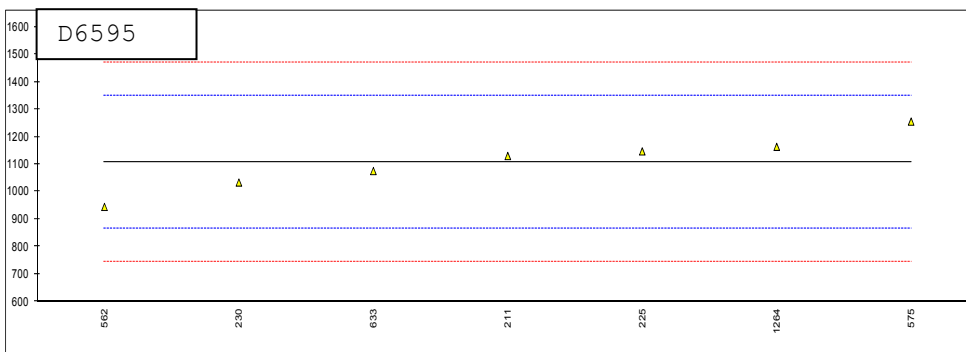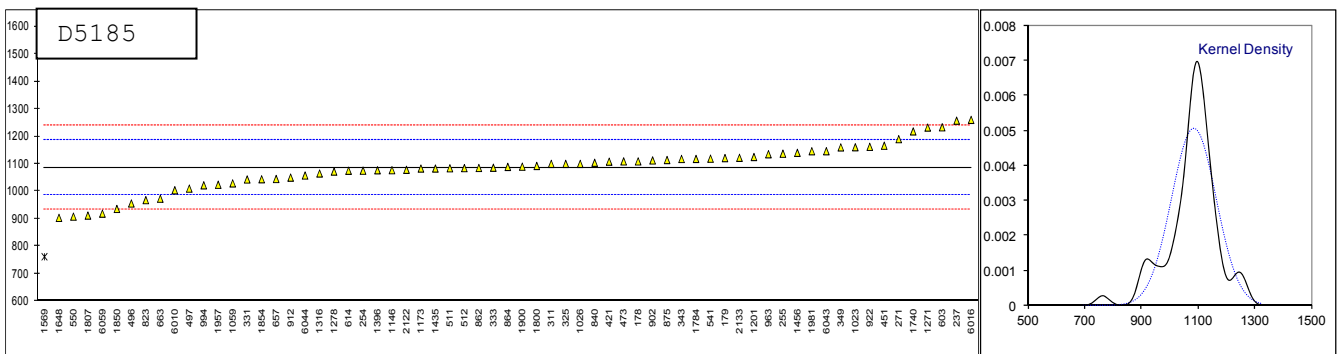Application range: 3.7 – 11460 mg/kg

Determination of Phosphorus as P on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	1109		0.45	-----		-----	
179	D5185	1121		0.69	-----		-----	
211	D6595	-----		-----	1130		0.19	
214		-----		-----	-----		-----	
225	D6595	-----		-----	1146.7		0.33	
230	D6595	-----		-----	1033.5		-0.61	
237	D5185	1257		3.37	-----		-----	
252		-----		-----	-----		-----	
254	INH-018	1075.26		-0.22	-----		-----	
255	INH-01	1137		1.00	-----		-----	
271	D5185	1189.83		2.05	-----		-----	
311	D5185	1100		0.27	-----		-----	
315		-----		-----	-----		-----	
325	D5185	1100		0.27	-----		-----	
331	D5185	1043.3		-0.85	-----		-----	
333	D5185	1086		-0.01	-----		-----	
343	D5185	1117.7		0.62	-----		-----	
349	D5185	1160		1.46	-----		-----	
398		-----		-----	-----		-----	
421	D5185	1108		0.43	-----		-----	
450		-----		-----	-----		-----	
451	In house	1166		1.58	-----		-----	
473	D5185	1109.0		0.45	-----		-----	
496	D5185	955.9		-2.58	-----		-----	
497	D5185	1010		-1.51	-----		-----	
511	D5185	1084		-0.04	-----		-----	
512	D5185	1084.38		-0.04	-----		-----	
541	D5185	1118.8		0.64	-----		-----	
550	D5185	908		-3.52	-----		-----	
562	D6595	-----		-----	944.7	C	-1.34	First reported 444
575	D6595	-----		-----	1255.2		1.23	
603	D5185	1233		2.90	-----		-----	
614	D5185	1075		-0.22	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	1075.3		-0.26	
634		-----		-----	-----		-----	
657	D5185	1045		-0.82	-----		-----	
663	D5185	973.2		-2.23	-----		-----	
823	D5185	968		-2.34	-----		-----	
840	D5185	1104		0.35	-----		-----	
862	D5185	1085		-0.03	-----		-----	
864	D5185	1089		0.05	-----		-----	
875	D5185	1114		0.55	-----		-----	
902	D5185	1112.5		0.52	-----		-----	
912	D5185	1050		-0.72	-----		-----	
922	D5185	1162		1.50	-----		-----	
963	D5185	1135		0.96	-----		-----	
994	D5185	1022		-1.27	-----		-----	
1023	D5185	1160.472		1.47	-----		-----	
1026	D5185	1100		0.27	-----		-----	
1059	In house	1029		-1.13	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	1077		-0.18	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	1083.0		-0.06	-----		-----	
1201	D5185	1125		0.77	-----		-----	
1213		-----		-----	-----		-----	
1264	D6595	-----		-----	1163.4		0.47	
1271	D5185	1232		2.88	-----		-----	
1278	D5185	1072		-0.28	-----		-----	
1316	D5185	1065		-0.42	-----		-----	
1396	In house	1076.61		-0.19	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	1083		-0.06	-----		-----	
1456	D5185	1140		1.06	-----		-----	
1569	D5185	762	R(0.05)	-6.41	-----		-----	
1648	D5185	903.6		-3.61	-----		-----	
1650		-----		-----	-----		-----	
1740	D5185	-----		2.60	1218		-----	
1748		-----		-----	-----		-----	
1784	D5185	1118		0.63	-----		-----	
1800	In house	1092.48		0.12	-----		-----	
1807	D5185	912		-3.44	-----		-----	
1850		936		-2.97	-----		-----	
1854	D5185	1044		-0.84	-----		-----	

1900	D5185	1089.888		0.07	-----	-----	
1957	D5185	1024		-1.23	-----	-----	
1969		-----		-----	-----	-----	
1981	D5185	1146		1.18	-----	-----	
2122	D5185	1078.27		-0.16	-----	-----	
2133	D5185	1122		0.71	-----	-----	
6010	DIN51399-1	1004		-1.63	-----	-----	
6016	D5185	1260	C	3.43	-----	-----	First reported 1365
6043	D5185	1146		1.18	-----	-----	
6044	D5185	1057.6		-0.57	-----	-----	
6056		-----		-----	-----	-----	
6059	D5185	918.98		-3.31	-----	-----	

|	normality	OK		unknown	
	n	64		7	
	outliers	1		0	
	mean (n)	1086.3		1107.0	
	st.dev. (n)	79.83		100.00	
	R(calc.)	223.5		280.0	
	R(D5185:13e1)	141.7		--	Application range: 10 – 1000 mg/kg
.	R(D6595:16)	--		338.3	Application range: 52 – 2572 mg/kg

Determination of Zinc as Zn on Sample #16107; results in mg/kg

lab	method	D5185	mark	z(targ)	D6595	mark	z(targ)	remarks
178	D5185	1254		0.80	-----		-----	
179	D5185	1175		-0.29	-----		-----	
211	D6595	-----		-----	1340		-0.21	
214		-----		-----	-----		-----	
225	D6595	-----		-----	1287.9		-0.68	
230	D6595	-----		-----	1380.0		0.14	
237	D5185	1106		-1.25	-----		-----	
252		-----		-----	-----		-----	
254		-----		-----	-----		-----	
255	INH-01	1357		2.23	-----		-----	
271	D5185	1224.77		0.40	-----		-----	
311	D5185	1230		0.47	-----		-----	
315		-----		-----	-----		-----	
325	D5185	1265		0.96	-----		-----	
331	D5185	1222.7		0.37	-----		-----	
333	D5185	1173		-0.32	-----		-----	
343	D5185	1222.7		0.37	-----		-----	
349	D5185	1274		1.08	-----		-----	
398	D5185	1170.1		-0.36	-----		-----	
421	D5185	1209		0.18	-----		-----	
450		-----		-----	-----		-----	
451	In house	1255		0.82	-----		-----	
473	D5185	1224.0		0.39	-----		-----	
496	D5185	1012		-2.56	-----		-----	
497	D5185	1140		-0.78	-----		-----	
511	D5185	1052		-2.00	-----		-----	
512	D5185	1159.2		-0.51	-----		-----	
541	D5185	1170.6		-0.35	-----		-----	
550	D5185	1112		-1.17	-----		-----	
562	D6595	-----		-----	1416.9	C	0.47	First reported 444
575	D6595	-----		-----	1346.0		-0.16	
603	D5185	1059		-1.90	-----		-----	
614	D5185	1173		-0.32	-----		-----	
621		-----		-----	-----		-----	
633	D6595	-----		-----	1436.0		0.64	
634		-----		-----	-----		-----	
657	D5185	1145		-0.71	-----		-----	
663	D5185	1207.3		0.16	-----		-----	
823	D5185	1030		-2.31	-----		-----	
840	D5185	1184		-0.17	-----		-----	
862	D5185	1176		-0.28	-----		-----	
864	D5185	1176		-0.28	-----		-----	
875	D5185	1190		-0.08	-----		-----	
902	D5185	1205.0		0.12	-----		-----	
912	D5185	1150		-0.64	-----		-----	
922	D5185	1310		1.58	-----		-----	
963	D5185	1231		0.48	-----		-----	
994	D5185	1130		-0.92	-----		-----	
1023	D5185	1311.38		1.60	-----		-----	
1026	D5185	1300		1.44	-----		-----	
1059	In house	1179		-0.24	-----		-----	
1106		-----		-----	-----		-----	
1146	In house	1227		0.43	-----		-----	
1161		-----		-----	-----		-----	
1173	INH-66	1186.05		-0.14	-----		-----	
1201	D5185	1150		-0.64	-----		-----	
1213	D5185	1343		2.04	-----		-----	
1264	D6595	-----		-----	1340.8		-0.21	
1271	D5185	1165		-0.43	-----		-----	
1278	D5185	1180		-0.22	-----		-----	
1316	D5185	1172		-0.33	-----		-----	
1396	In house	1333.60		1.91	-----		-----	
1412		-----		-----	-----		-----	
1435	D5185	1068		-1.78	-----		-----	
1456	D5185	1262		0.92	-----		-----	
1569	D5185	879	R(0.05)	-4.40	-----		-----	
1648	D5185	1043.6		-2.12	-----		-----	
1650		-----		-----	-----		-----	
1740	D5185	-----		2.72	1392		-----	
1748		-----		-----	-----		-----	
1784	D5185	1220		0.33	-----		-----	
1800	In house	1243.56		0.66	-----		-----	
1807	D5185	841	R(0.05)	-4.93	-----		-----	
1850		1237		0.57	-----		-----	
1854	D5185	1190		-0.08	-----		-----	

1900	D5185	1183.505	-0.17	-----	-----	
1957	D5185	1089	-1.49	-----	-----	
1969		-----	-----	-----	-----	
1981	D5185	1314	1.64	-----	-----	
2122	D5185	1210.76	0.20	-----	-----	
2133	D5185	1205	0.12	-----	-----	
6010	DIN51399-1	1228	0.44	-----	-----	
6016	D5185	1175	-0.29	-----	-----	First reported 1365
6043	D5185	1271	1.04	-----	-----	
6044	D5185	1134.8	-0.85	-----	-----	
6056		-----	-----	-----	-----	
6059	D5185	1160.00	-0.50	-----	-----	

normality	OK		unknown	
n	64		7	
outliers	2		0	
mean (n)	1196.1		1363.9	
st.dev. (n)	78.75		50.77	
R(calc.)	220.5		142.2	
R(D5185:13e1)	201.7		--	Application range: 60 – 1600 mg/kg
R(D6595:16)	--		314.2	Application range: 5.3 – 1345 mg/kg
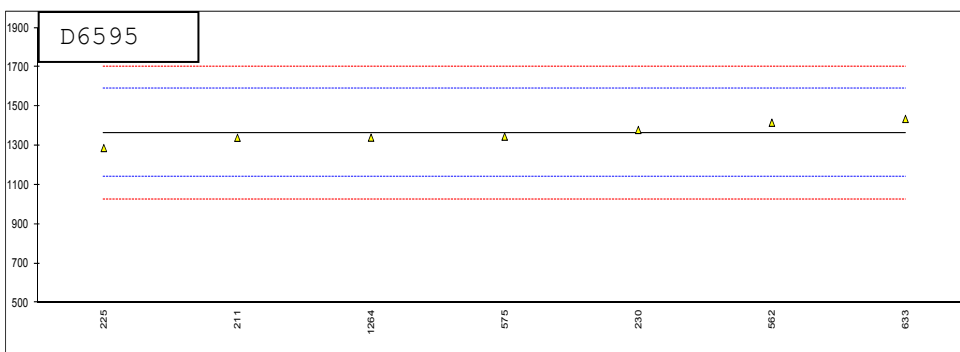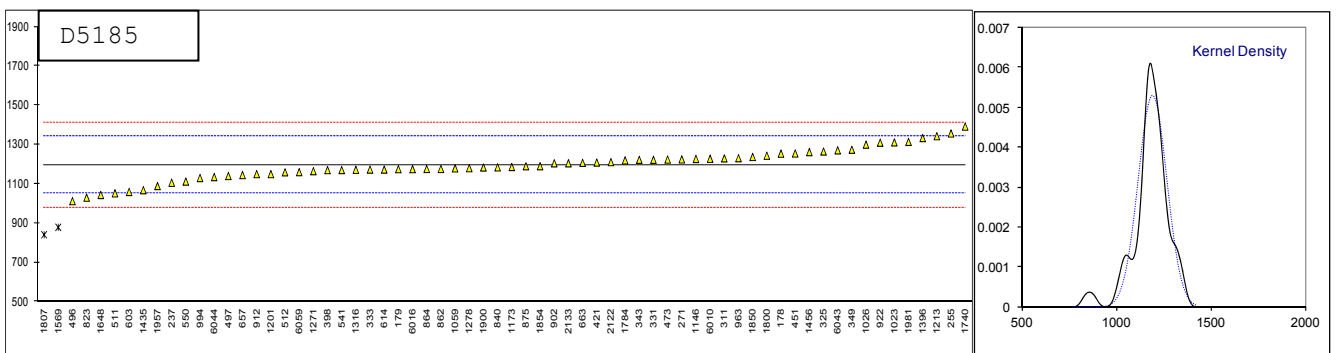
APPENDIX 2

Number of participants per country

   1 lab in ALGERIA
   1 lab in ARGENTINA
2 labs in AUSTRALIA
2 labs in AZERBAIJAN
2 labs in BELGIUM
   1 lab in BOSNIA and HERZEGOVINA
   1 lab in BRAZIL
   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
2 labs in FRANCE
3 labs in GERMANY
4 labs in GREECE
   1 lab in INDIA
   1 lab in INDONESIA
   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
5 labs in NETHERLANDS
   1 lab in NIGERIA
3 labs in NORWAY
   1 lab in PAKISTAN
2 labs in PERU
2 labs in PHILIPPINES
   1 lab in RUSSIAN FEDERATION
   1 lab in SAUDI ARABIA
   1 lab in SINGAPORE
   1 lab in SLOVENIA
   1 lab in SOUTH AFRICA
   1 lab in SOUTH KOREA
6 labs in SPAIN
   1 lab in SWEDEN
   1 lab in TANZANIA
   1 lab in THAILAND
3 labs in TURKEY
   1 lab in UNITED ARAB EMIRATES
6 labs in UNITED KINGDOM
2 labs in UNITED STATES OF AMERICA
2 labs in VIETNAM

APPENDIX 3

Abbreviations:

C	= final result after checking of first reported suspect 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	= excluded from calculations
W	= results withdrawn on request of the participants
fr.	= first reported
S	= scope of the reported method is not applicable
n.a.	= not applicable
n.e.	= not evaluated
SDS	= Safety Data Sheet
R(iis)	= reproducibility based on the reproducibilities found in previous iis PT's for this test

Literature:

1   iis Interlaboratory Studies, Protocol for the Organization, Statistics and Evaluation, April 2014

2   ASTM E178:08

3   ASTM E1301:03

4   ISO 5725:86

5   ISO 5725, parts 1-6:1994

6   M. Thompson and R. Wood, J. AOAC Int, <u>76</u>, 926, (1993)

7   W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)

8   IP 367/84

9   DIN 38402 T41/42

10   P.L. Davies, First reported Z. Anal. Chem, <u>331</u>, 513, (1988)

11   J.N. Miller, Analyst, <u>118</u>, 455, (1993)

12   Analytical Methods Committee Technical brief, No4 January 2001.

13   The Royal Society of Chemistry 2002, Analyst 2002, 127 pages 1359-1364, P.J. Lowthian and M. Thompson (see http://www.rsc.org/suppdata/an/b2/b205600n/).

14   MEMO iis: Precision data of used oils for Kinematic Viscosity (ASTM D445)

15   Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, *Technometrics*, 25(2), pp. 165-172, (1983)

16   Estimation of reproducibility and measurement uncertainty of a viscosity test method from proficiency test data, R.G. Visser and C.M. Nijssen-Wester, Accred. Qual. Assur. DOI 10.1007/s00769-015-1110-y