Results of Proficiency Test
Mono Ethylene Glycol
(MEG polyester grade)
October 2019

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 1994 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for Mono Ethylene Glycol (MEG polyester grade) every year. During the annual proficiency test program of 2019/2020, it was decided to continue the round robin for the analysis on Mono Ethylene Glycol based on the scope of the latest specification of ASTM E202.
In this interlaboratory study, 68 laboratories in 25 different countries registered for participation. See appendix 2 for the number of participants per country. In this report, the results of the 2019 Mono Ethylene Glycol proficiency test 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 organizer of this proficiency test (PT). Sample analyses for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory. It was decided to send three different samples of Mono Ethylene Glycol (MEG polyester grade): a 1L bottle labelled #19205 for various analyzes, a 100mL bottle labelled #19206 for determination of UV only and a 100mL bottle labelled #19207 for determination of Iron (Fe) only.
The participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2 PROTOCOL

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5). This protocol is electronically available through the iis website www.iisnl.com, from the FAQ page.

2.3 CONFIDENTIALITY STATEMENT

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

2.4 SAMPLES

Approximately 100 liters of MEG polyester grade was used for the sample for the regular analyses. After homogenization, 95 amber glass bottles of 1L were filled and labelled #19205. The homogeneity of the subsamples #19205 was checked by determination of Density in accordance with ASTM D4052 on 8 stratified randomly selected samples.

	Density at 20°C in kg/L
sample #19205-1	1.11325
sample #19205-2	1.11329
sample #19205-3	1.11323
sample #19205-4	1.11330
sample #19205-5	1.11323
sample #19205-6	1.11329
sample #19205-7	1.11326
sample #19205-8	1.11323

Table 1: homogeneity test results of subsamples #19205

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

	Density at 20°C in kg/L
r (observed)	0.00008
reference test method	ISO12185:96
0.3 * R (ref. test method)	0.0015

Table 2: evaluation of the repeatability of subsamples #19205

The calculated repeatability is in agreement with 0.3 times the corresponding reproducibility of the reference test method. Therefore, homogeneity of the subsamples was assumed.

Approximately 10 liters MEG polyester grade was used for the UV sample. After homogenization, 84 amber glass bottles of 100mL were filled and labelled #19206. The homogeneity of the subsamples #19206 was checked by determination of UV transmittance at 275 nm in accordance with ASTM E2193 option B (not sparged with N_2), 10 mm cuvet, on 8 stratified randomly selected samples.

	UV transmittance at 275 nm in %T
sample #19206-1	87.1
sample #19206-2	87.3
sample #19206-3	87.0
sample #19206-4	87.2

	UV transmittance at 275 nm in %T
sample #19206-5	87.4
sample #19206-6	87.3
sample #19206-7	87.3
sample #19206-8	87.3

Table 3: homogeneity test results of subsamples #19206

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

	UV transmittance at 275 nm in %T
r (observed)	0.36
reference test method	E2193-B:16
0.3 * R (ref. test method)	0.63

Table 4: evaluation of the repeatability of subsamples #19206

The calculated repeatability is in agreement with 0.3 times the corresponding reproducibility of the reference test method. Therefore, homogeneity of the subsamples was assumed.

Approximately 7 liters MEG polyester grade was used for the Fe sample. After homogenization 98 amber glass bottles of 100mL were filled and labelled #19207. The homogeneity of the subsamples #19207 was checked by determination of Iron (Fe) in accordance with ASTM E1615, on 8 stratified randomly selected samples.

	Iron as Fe in mg/kg
sample #19207-1	0.033
sample #19207-2	0.038
sample #19207-3	0.042
sample #19207-4	0.042
sample #19207-5	0.040
sample #19207-6	0.043
sample #19207-7	0.038
sample #19207-8	0.043

Table 5: homogeneity test results of subsamples #19207

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

	Iron as Fe in mg/kg
r (observed)	0.0096
reference test method	E1615:16
0.3 * R (ref. test method)	0.0130

Table 6: evaluation of the repeatability of subsamples #19207

The calculated repeatability is in agreement with 0.3 times the reproducibility of the reference test method. Therefore, homogeneity of the subsamples was assumed.

To each of the participating laboratories a set of 3 bottles had been sent on October 2, 2019: 1*1L bottle labelled #19205, 1*100mL bottle labelled #19206 and 1*100mL bottle labelled #19207. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of the Mono Ethylene Glycol packed in amber glass 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 #19205: Acidity as Acetic Acid (E2679 and D1613), Aldehydes as Acetaldehyde, Appearance, Ash content, Inorganic Chloride as Cl, Color Pt/Co (D1209 and D5386), Density at 20°C, Diethylene Glycol content, Distillation (Initial Boiling Point, 50% recovered and Dry Point), Miscibility with water, Purity by GC as received, Specific Gravity at 20/20°C and Water.
On sample #19206 it was requested to determine UV Transmittance at 350, 275, 250 and 220 nm and on sample #19207 it was requested to determine Iron as Fe.

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

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

3 RESULTS

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

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

3.1 STATISTICS

The protocol followed in the organization of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of June 2018 (iis-protocol, version 3.5).
For the statistical evaluation, the *unrounded* (when available) figures were used instead of the rounded test results. Test results reported as '<…' or '>…' were not used in the statistical evaluation.
First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test, a variant of the Kolmogorov-Smirnov test and by the calculation of skewness and kurtosis. Evaluation of the three normality indicators in combination with the visual evaluation of the graphic Kernel density plot, lead to judgement of the normality being either 'unknown', 'OK', 'suspect' or 'not OK'. After removal of outliers, this check was repeated. If a data set does not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

According to ISO5725 the original test results per determination were submitted to Dixon's and/or Grubbs' and/or Rosner's outlier tests. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and standard deviations.

For each assigned value, the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. In this PT, the criterion of ISO13528, paragraph 9.2.1. was met for all evaluated tests, therefore, the uncertainty of all assigned values may be negligible and need not be included in the PT report.

Finally, the reproducibilities were calculated from the standard deviations by multiplying these 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 reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.
Furthermore, Kernel Density Graphs were made. The Kernel Density Graph is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms. Also, a normal Gauss curve was projected over the Kernel Density Graph for reference.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation in this interlaboratory study.
The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used. In some cases, a reproducibility based on former iis proficiency tests could be used.

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

The z-scores were calculated according to:

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

The $z_{(target)}$ scores are listed in the result tables in 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:

	$\lvert z \rvert$	< 1	good
1 <	$\lvert z \rvert$	< 2	satisfactory
2 <	$\lvert z \rvert$	< 3	questionable
3 <	$\lvert z \rvert$		unsatisfactory

4 EVALUATION

In this proficiency test some problems were encountered with the dispatch of the samples (e.g. due to customs clearance), especially to Brazil, China, India and Mexico. Fifteen participants reported the test results after the final reporting date and fourteen other participants did not report any test results. Not all laboratories were able to report all analyses requested. In total 54 participants did report 759 numerical test results. Observed were 30 outlying test results, which is 4.0%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER SAMPLE AND PER TEST

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

In the iis PT reports, ASTM test methods are referred to with a number (e.g. D1209) and an added designation for the year that the test method was adopted or revised (e.g. D1209:05). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D1209:05(2019)). In the tables of appendix 1 only the test method number and year of adoption or revision will be used.

Sample #19205

Acidity E2679: This determination was very problematic. No statistical outliers were observed. However, the calculated reproducibility is not at all in agreement with the strict precision data of ASTM E2679:09(2016)e1.

Acidity D1613: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D1613:17.

Aldehydes as Acetaldehyde: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM E2313:15. However, the reproducibility of the reference test method is large at the level of 69 mg/kg.

Appearance: No problems have been observed with this determination. All reporting participants agreed on a test result of ‘Pass (Clear and Bright)’.

Ash content: The consensus value is below the application range (0.001 - 0.180 %M/M) of ASTM D482:13. Therefore no z-scores were calculated.

Inorganic Chloride: This determination was very problematic at the low concentration of 0.05 mg/kg. No statistical outliers were observed. However, the calculated reproducibility is not at all in agreement with the requirements of ASTM E2469:16.

Color Pt/Co D1209: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D1209:05(2019).

Color Pt/Co D5386: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of ASTM D5386:16.

Density at 20°C: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO12185:96.

Diethylene Glycol content: This determination was problematic. Seven statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM E2409:13.

Distillation: This determination was not problematic. In total six statistical outliers were observed and one other test result was excluded over three distillation parameters. All three calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of ASTM D1078:11 (automated and manual modes).

Miscibility with water: All reporting participants agreed on a test result of ‘passes test’.

Purity by GC as received: Regretfully, no reproducibility data for purity is mentioned in ASTM E2409:13. Therefore, no z-scores were calculated.
The calculated reproducibility of the 2019 PT is lower than the reproducibility of the 2018 and 2017 PTs (0.038 vs 0.055 and 0.090 respectively).

Specific Gravity: This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM E202:18.

Water: This determination was problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM E1064:16.

Sample #19206

UV: The reported test results were evaluated separately for option A (Nitrogen sparging) and option B (no Nitrogen sparging)

Option A: This determination was not problematic. In total over 4 parameters, one statistical outlier was observed. For the transmittance at 350, 250 and 220 nm the calculated reproducibilities after rejection of the statistical outlier are in agreement with the requirements of ASTM E2193:16. For the transmittance at 275 nm the calculated reproducibility data is not in agreement.

Option B: This determination was not problematic. In total over 4 parameters, eight statistical outliers were observed and two other test results were excluded. However, for the transmittance at 275 and 220 nm the calculated reproducibilities after rejection of the suspect data are in agreement with the requirements of ASTM E2193:16. For the transmittance at 350 and 250 nm the calculated reproducibility after rejection of the suspect data is not in agreement.

Sample #19207

Iron: 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 E1615:16.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant reference test method and the reproducibility as found for the group of participating laboratories. The number of significant test results, the average result, the calculated reproducibility (2.8 * standard deviation) and the target reproducibilities derived from reference test methods (in casu ASTM test methods) are presented in the next table.

Parameter	unit	n	average	2.8 * sd	R (lit)
Acidity as Acetic Acid (E2679)	mg/kg	8	1.94	1.95	0.98
Acidity as Acetic Acid (D1613)	mg/kg	42	7.3	10.5	14
Aldehydes as Acetaldehyde	mg/kg	36	68.6	50.5	59.0
Appearance		36	Pass	n.a.	n.a.
Ash content	%M/M	20	0.0003	(0.0018)	(0.005)
Inorganic Chloride as Cl	mg/kg	18	0.049	0.108	0.040
Color Pt/Co D1209, manual		32	7.2	6.2	7
Color Pt/Co D5386, automated		32	7.0	5.5	5.7
Density at 20°C	kg/L	47	1.1133	0.0003	0.0005
Diethylene Glycol content	mg/kg	36	26.9	8.7	6.9
Initial Boiling Point	°C	39	196.9	0.8	3.1
50% recovered	°C	34	197.6	0.4	1.4

Parameter	unit	n	average	2.8 * sd	R (lit)
Dry Point	°C	37	197.9	0.6	2.1
Miscibility with water		28	Passes test	n.a.	n.a.
Purity by GC as received	%M/M	41	99.958	0.038	n.a.
Specific Gravity 20/20°C		43	1.1154	0.0003	0.0005
Water	mg/kg	48	342	62	59
UV Transmittance at 350nm (N_2)	%T	7	94.85	0.99	0.94
UV Transmittance at 275nm (N_2)	%T	7	87.86	1.55	1.10
UV Transmittance at 250nm (N_2)	%T	5	84.20	2.02	2.06
UV Transmittance at 220nm (N_2)	%T	6	77.05	3.98	9.68
UV Transmittance at 350nm	%T	39	95.22	1.31	1.15
UV Transmittance at 275nm	%T	38	88.05	1.91	2.11
UV Transmittance at 250nm	%T	39	83.08	2.35	1.10
UV Transmittance at 220nm	%T	37	67.63	2.94	4.05
Iron as Fe	mg/kg	35	0.032	0.067	0.034

Table 7: reproducibilities of tests on samples #19205, #19206 and #19207

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2019 WITH PREVIOUS PTS

	October 2019	October 2018	October 2017	October 2016	October 2015
Number of reporting laboratories	54	61	62	59	53
Number of test results	759	855	880	808	751
Number of statistical outliers	30	33	37	46	14
Percentage outliers	4.0%	3.9%	4.2%	5.7%	1.9%

Table 8: comparison of statistical summary parameters with previous proficiency tests

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

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

	October 2019	October 2018	October 2017	October 2016	October 2015
Acidity as Acetic Acid (E2679)	--	(--)	--	--	--
Acidity as Acetic Acid (D1613)	+	++	++	++	++
Aldehydes as Acetaldehyde	+	++	++	++	++
Ash content	(++)	(++)	(++)	(++)	(++)
Inorganic Chloride as Cl	--	-	--	--	--
Color Pt/Co D1209, manual	+	+	++	++	++
Color Pt/Co D5368, automated	+/-	+	++	++	+
Density at 20°C	++	+	+	++	+
Diethylene Glycol content	-	--	-	--	--
Distillation	++	++	+	++	++
Specific Gravity 20/20°C	++	+	+	++	++
Water	+/-	-	--	+/-	--
UV Transmittance at 350nm	+/-	+/-	+/-	++	+
UV Transmittance at 275nm	+/-	+	-	+	-
UV Transmittance at 250nm	-	-	-	-	-
UV Transmittance at 220nm	+	+	+	+	--
Iron as Fe	--	+/-	+	+	+

Table 9: comparison determinations against the reference test method

Results between brackets should be used with due care

The following performance categories in above table were used:

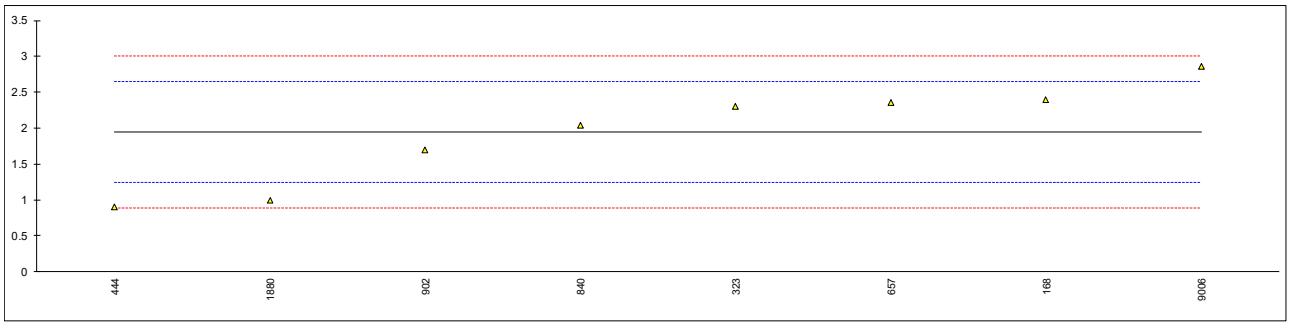
++: group performed much better than the reference test method
+ : group performed better than the reference test method
+/-: group performance equals the reference test method
- : group performed worse than the reference test method
-- : group performed much worse than the reference test method
n.e.: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

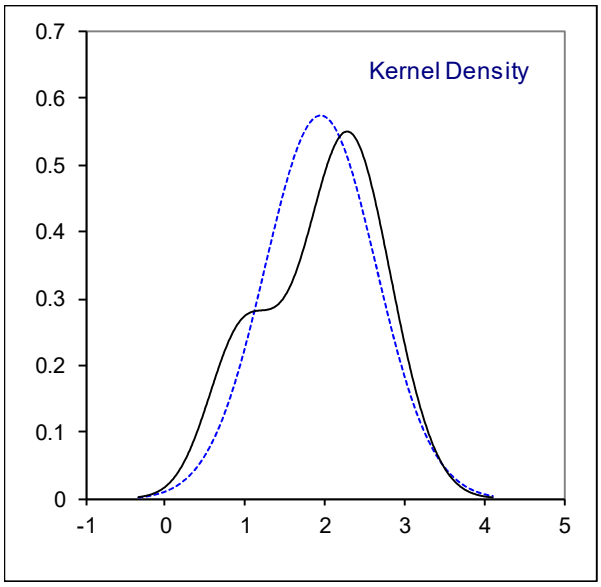
APPENDIX 1

Determination of Acidity as Acetic Acid (E2679) on sample #19205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168	E2679	2.4		1.30	
169		-----		-----	
171		-----		-----	
174		-----		-----	
311		-----		-----	
323	E2679	2.3		1.01	
343		-----		-----	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E2679	0.9		-2.97	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	E2679	2.35		1.16	
840	E2679	2.04		0.27	
848		-----		-----	
852		-----		-----	
857		-----		-----	
860		-----		-----	
861		-----		-----	
862		-----		-----	
865		-----		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	E2679	1.7		-0.69	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117		-----		-----	
1135		-----		-----	
1151		-----		-----	
1169		-----		-----	
1201		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509		-----		-----	
1515		-----		-----	
1603		-----		-----	
1608		-----		-----	
1656		-----		-----	
1718		-----		-----	
1742		-----		-----	
1823		-----		-----	
1880	E2679	1.0		-2.69	
1954		-----		-----	
2124		-----		-----	
6013		-----		-----	
6198		-----		-----	
6247		-----		-----	
6262		-----		-----	
7013		-----		-----	
9006	E2679	2.86		2.61	
9008		-----		-----	
9009		-----		-----	
9014		-----		-----	

normality	unknown
n	8
outliers	0
mean (n)	1.944
st.dev. (n)	0.6957
R(calc.)	1.948
st.dev.(E2679:09(16)e1)	0.3513
R(E2679:09(16)e1)	0.984

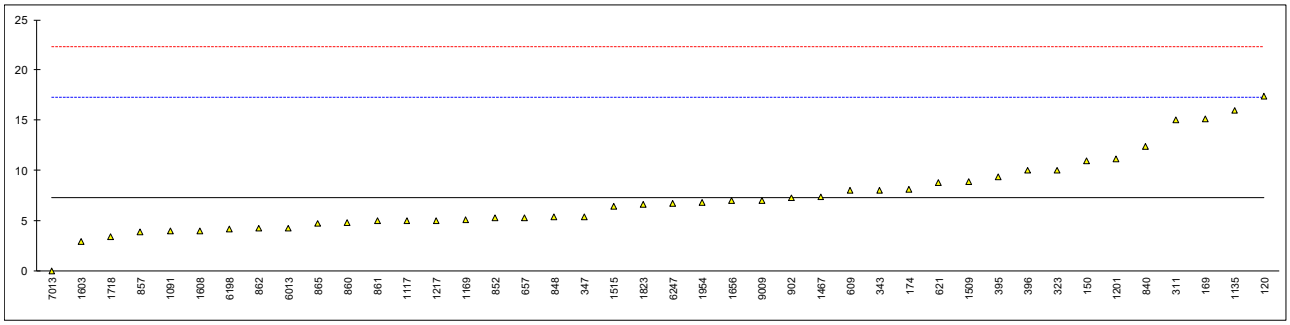


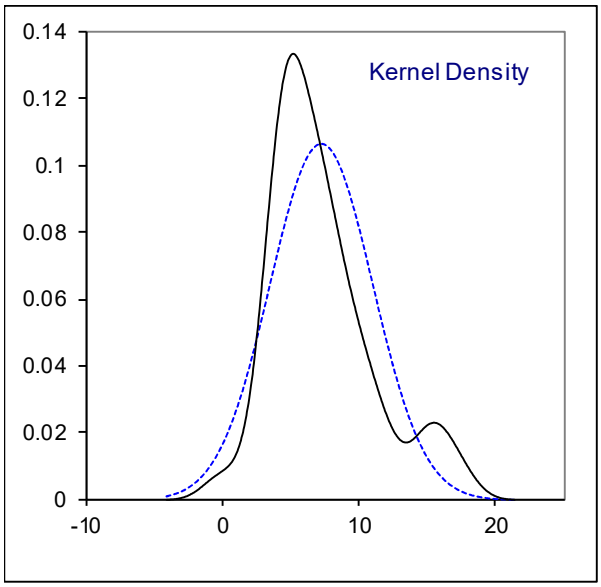


Determination of Acidity as Acetic Acid (D1613) on sample #19205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D1613	17.4		2.02	
150	D1613	11		0.74	
168		-----		-----	
169	D1613	15.1		1.56	
171		-----		-----	
174	D1613	8.1		0.16	
311	D1613	15		1.54	
323	D1613	10		0.54	
343	D1613	8		0.14	
347	D1613	5.4		-0.38	
370		-----		-----	
395	D1613	9.34		0.41	
396	D1613	10		0.54	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	D1613	8		0.14	
610		-----		-----	
621	D1613	8.8		0.30	
657	D1613	5.3		-0.40	
840	D1613	12.4		1.02	
848	D1613	5.4		-0.38	
852	D1613	5.3		-0.40	
857	D1613	3.9		-0.68	
860	D1613	4.8		-0.50	
861	D1613	5.0		-0.46	
862	D1613	4.3		-0.60	
865	D1613	4.7		-0.52	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	D1613	7.3		0.00	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	D1613	4		-0.66	
1117	D1613	5.0		-0.46	
1135	D1613	16		1.74	
1151		-----		-----	
1169	D1613	5.1		-0.44	
1201	D1613	11.2		0.78	
1217	D1613	5	C	-0.46	first reported 0.0005 mg/kg
1261		-----		-----	
1467	D1613	7.34		0.01	
1509	D1613	8.9		0.32	
1515	D1613	6.4		-0.18	
1603	In house	2.9		-0.88	
1608	D1613	4		-0.66	
1656	D1613	7		-0.06	
1718	D1613	3.4		-0.78	
1742		-----		-----	
1823	D1613	6.6	C	-0.14	first reported 0.00066 mg/kg
1880		-----		-----	
1954	D1613	6.8		-0.10	
2124		-----		-----	
6013		4.3		-0.60	
6198	D1613	4.2		-0.62	
6247	D1613	6.68		-0.12	
6262		-----		-----	
7013	D1613	0.00431		-1.46	
9006		-----		-----	
9008		-----		-----	
9009	D1613	7.0		-0.06	
9014		-----		-----	

normality	suspect
n	42
outliers	0
mean (n)	7.294
st.dev. (n)	3.7537
R(calc.)	10.510
st.dev.(D1613:17)	5.0000
R(D1613:17)	14

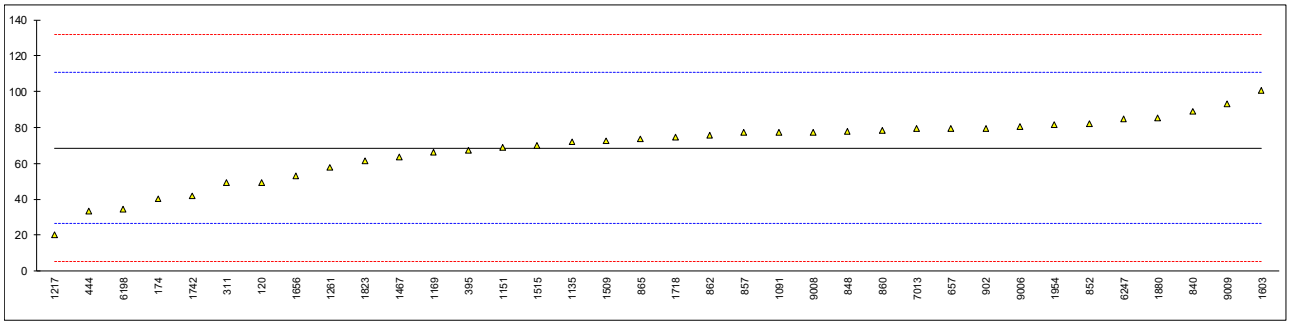


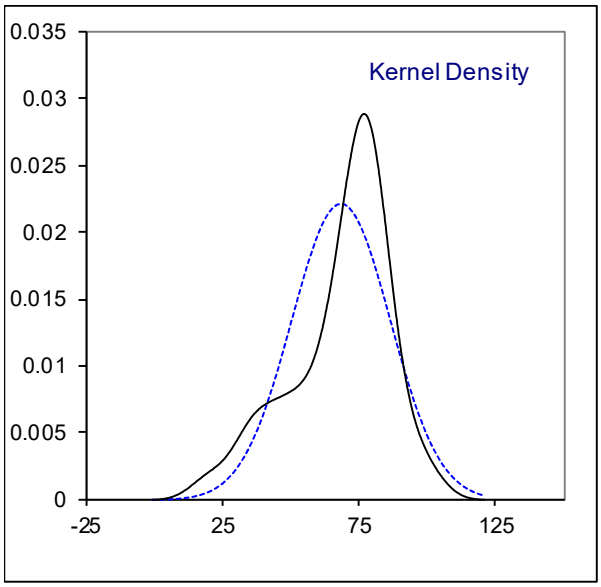


Determination of Aldehydes as Acetaldehyde on sample #19205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E2313	49.5		-0.91	
150		-----		-----	
168		-----		-----	
169		-----		-----	
171		-----		-----	
174	E2313	40.4		-1.34	
311	E2313	49.2		-0.92	
323	E2313	>50		-----	
343	E2313	>50		-----	
347		-----		-----	
370		-----		-----	
395	E2313	67.29		-0.06	
396		-----		-----	
444	E2313	33.6	C	-1.66	first reported 2.48
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	E2313	79.4		0.51	
840	E2313	88.84		0.96	
848	E2313	78.0		0.45	
852	E2313	82.0		0.64	
857	E2313	77.12		0.41	
860	E2313	78.5		0.47	
861		-----		-----	
862	E2313	76		0.35	
865	E2313	73.7		0.24	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	E2313	79.6		0.52	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2313	77.2		0.41	
1117		-----		-----	
1135	E2313	72		0.16	
1151	E2313	68.98		0.02	
1169	E2313	66.1		-0.12	
1201		-----		-----	
1217	E2313	20.4		-2.29	
1261	E2313	57.6		-0.52	
1467	E2313	63.74		-0.23	
1509	E2313	72.50		0.19	
1515	E2313	69.79		0.06	
1603	In house	100.4		1.51	
1608		-----		-----	
1656	E2313	53		-0.74	
1718	E2313	74.72		0.29	
1742	E2313	41.9		-1.27	
1823	E2313	61.205		-0.35	
1880	E2313	85.08		0.78	
1954	E2313	81.66		0.62	
2124		-----		-----	
6013		-----		-----	
6198	E2313	34.43		-1.62	
6247	E2313	84.63		0.76	
6262		-----		-----	
7013	E2313	79.35		0.51	
9006	E2313	80.60		0.57	
9008	E2313	77.2		0.41	
9009	E2313	93.42		1.18	
9014		-----		-----	

normality	OK
n	36
outliers	0
mean (n)	68.585
st.dev. (n)	18.0333
R(calc.)	50.493
st.dev.(E2313:15)	21.0700
R(E2313:15)	58.996





Determination of Appearance on sample #19205;

lab	method	value	mark	z(targ)	remarks
120	Visual	clear and bright		-----	
150	E2680	Pass		-----	
168	E2680	Pass		-----	
169	Visual	CB&FSM		-----	
171		-----		-----	
174	Visual	Clear & Free		-----	
311	E2680	pass		-----	
323	D4176	clear & bright		-----	
343	E2680	PASS		-----	
347	E2680	Pass		-----	
370	E2680	pass		-----	
395	E2680	PASS		-----	
396	E2680	Pass		-----	
444	E2680	Pass		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	E2680	pass		-----	
610		-----		-----	
621	Visual	Pass		-----	
657	E2680	Pass		-----	
840	E2680	Pass		-----	
848	visual	Clear and Bright			
852	visual	Pass		-----	
857	E2680	Pass		-----	
860		-----		-----	
861	E2680	PASS		-----	
862	Visual	Bright & clear			
865	Visual	Pass		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	E2680	Pass		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D4176	Pass		-----	
1135	Visual	CFSM		-----	clear liquid, free of suspended matter
1151	Visual	clear		-----	
1169	D4176	FCSM		-----	
1201	Visual	bright and Clear		-----	
1217	Visual	pass		-----	
1261	E2680	clear		-----	
1467	E2680	Pass		-----	
1509	E2680	CLFFSM		-----	clear & free from suspended matter
1515	E2680	PASS		-----	
1603	Visual	PASS		-----	
1608	D4176	Pass		-----	
1656	Visual	pass		-----	
1718	E2680	CLFFSM		-----	clear & free from suspended matter
1742		-----		-----	
1823	D4176	Clear and bright		-----	
1880	E2680	Pass		-----	
1954	Visual	Clear Liquid		-----	
2124		-----		-----	
6013		-----		-----	
6198	D4176	Pass		-----	
6247		clear colourless liquid		-----	
6262		-----		-----	
7013		-----		-----	
9006	E2680	pass		-----	
9008	Visual	pass		-----	
9009	E2680	Pass		-----	
9014		-----		-----	
	n	36			
	mean (n)	Pass (Clear and Bright)			

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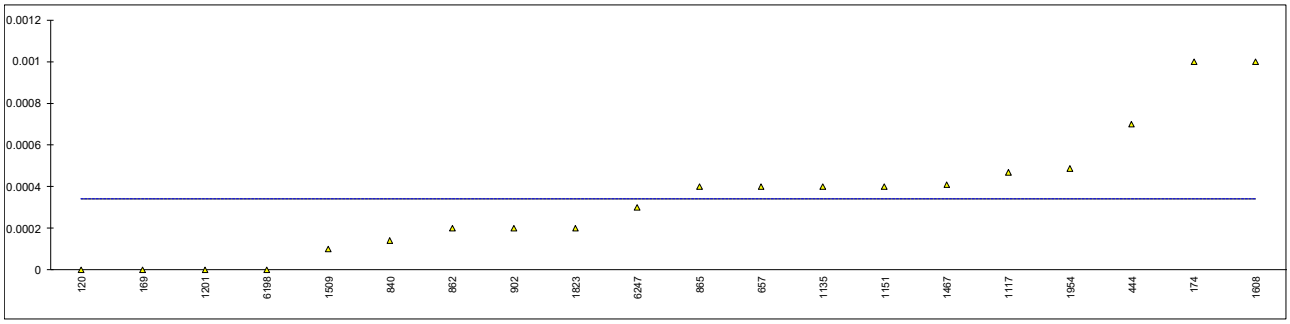
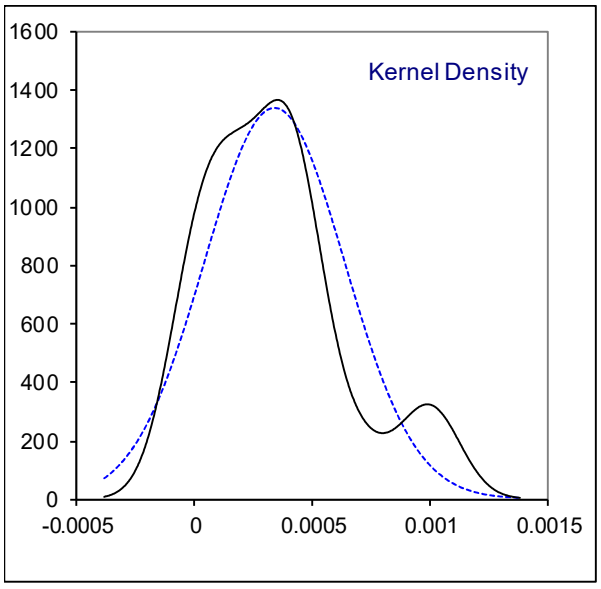
Determination of Ash content on sample #19205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D482	0.000		-----	
150	D482	<0.001		-----	
168		-----		-----	
169	D482	0.0		-----	
171		-----		-----	
174	D482	0.001		-----	
311	D482	<0.001		-----	
323	D482	<0.001		-----	
343	D482	<0.001		-----	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396	D482	<0.0010		-----	
444	D482	0.0007		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	D482	<0.001		-----	
657	D482	0.0004		-----	
840	D482	0.00014		-----	
848	D482	<0.001		-----	
852	D482	<0.001		-----	
857	D482	<0.001		-----	
860	D482	<0.001		-----	
861		-----		-----	
862	D482	0.0002		-----	
865	D482	0.0004		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	D482	0.0002		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D482	0.00047		-----	
1135	D482	0.0004		-----	
1151	D482	0.0004		-----	
1169		-----		-----	
1201	D482	0.000		-----	
1217		-----		-----	
1261		-----		-----	
1467	D482	0.00041		-----	
1509	D482	0.0001		-----	
1515		-----		-----	
1603	In house	<0.0010		-----	
1608	D482	0.001		-----	
1656	D482	<0.01		-----	
1718	D482	<0.0001		-----	
1742		-----		-----	
1823	D482	0.0002		-----	
1880		-----		-----	
1954	D482	0.000488		-----	
2124		-----		-----	
6013		-----		-----	
6198	D482	0.0000		-----	
6247	D482	0.0003		-----	
6262		-----		-----	
7013		-----		-----	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	
9014		-----		-----	

normality	OK
n	20
outliers	0
mean (n)	0.00034
st.dev. (n)	0.000297
R(calc.)	0.00083
st.dev.(D482:13)	(0.001786)
R(D482:13)	(0.005)

Application range: 0.001 – 0.180%M/M

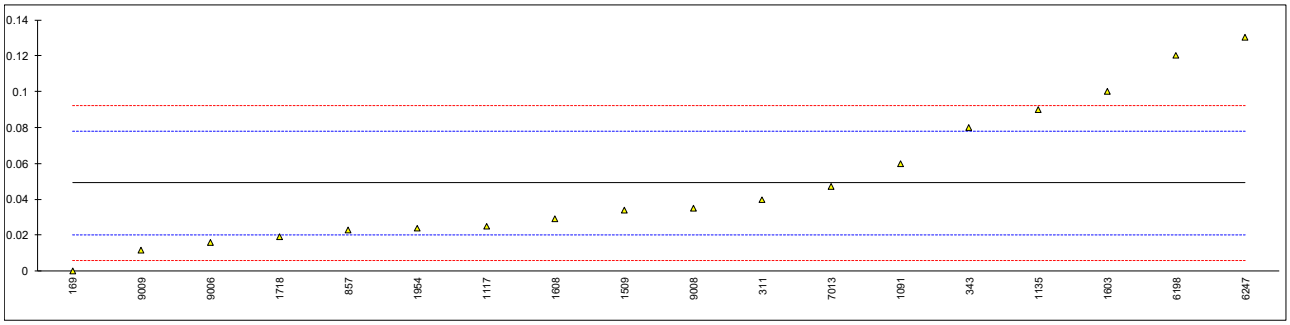


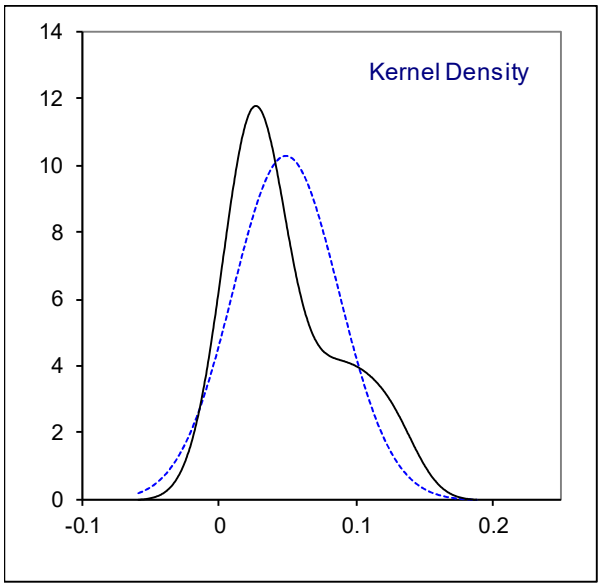


Determination of Inorganic Chloride as Cl on sample #19205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168		-----		-----	
169	E2469	0.00	C	-3.42	first reported 0.3296
171		-----		-----	
174	E2469	<0.01		-----	
311	E2469	0.04		-0.64	
323	E2469	<0.03		-----	
343	E2469	0.08		2.15	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657		-----		-----	
840	IMPCA002	<0.2		-----	
848		-----		-----	
852		-----		-----	
857	E2469	0.023		-1.82	
860		-----		-----	
861		-----		-----	
862		-----		-----	
865	In house	<0.3		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	E2469	<0.05		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2469	0.06		0.76	
1117	E2469	0.025		-1.68	
1135	In house	0.09		2.85	
1151		-----		-----	
1169		-----		-----	
1201		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	E2469	0.0342		-1.04	
1515		-----		-----	
1603	In house	0.10		3.54	
1608	E2469	0.029		-1.40	
1656	E2469	<0.1		-----	
1718	E2469	0.0192		-2.08	
1742		-----		-----	
1823		-----		-----	
1880	E2469	<0.01		-----	
1954	E2469	0.024		-1.75	
2124		-----		-----	
6013		-----		-----	
6198	E2469	0.12		4.93	
6247	E2469	0.13		5.63	
6262		-----		-----	
7013	E2469	0.047		-0.15	
9006	E2469	0.0162		-2.29	
9008	E2469	0.035		-0.98	
9009	E2469	0.0117		-2.61	
9014		-----		-----	

normality	OK
n	18
outliers	0
mean (n)	0.0491
st.dev. (n)	0.03873
R(calc.)	0.1084
st.dev.(E2469:16)	0.01436
R(E2469:16)	0.0402

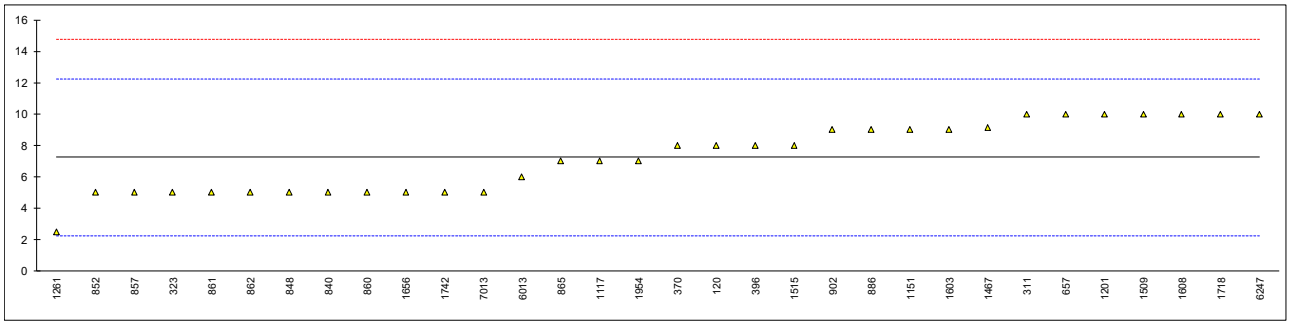


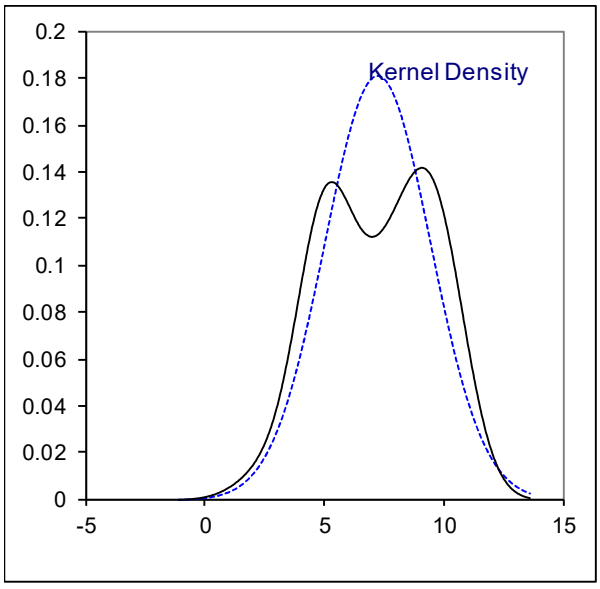


Determination of Color Pt/Co manual (D1209) on sample #19205

lab	method	value	mark	z(targ)	remarks
120	D1209	8		0.30	
150		-----		-----	
168		-----		-----	
169	D1209	<10.0		-----	
171		-----		-----	
174		-----		-----	
311	D1209	10		1.10	
323	D1209	5		-0.90	
343		-----		-----	
347		-----		-----	
370	D1209	8		0.30	
395		-----		-----	
396	D1209	8	C	0.30	first reported 3
444		-----		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	D1209	< 5		-----	
657	D1209	10		1.10	
840	D1209	5		-0.90	
848	D1209	5		-0.90	
852	D1209	5		-0.90	
857	D1209	5		-0.90	
860	D1209	5		-0.90	
861	D1209	5		-0.90	
862	D1209	5		-0.90	
865	D1209	7		-0.10	
869		-----		-----	
872		-----		-----	
886	D1209	9		0.70	
902	D1209	9		0.70	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D1209	7		-0.10	
1135		-----		-----	
1151	D1209	9		0.70	
1169		-----		-----	
1201	D1209	10		1.10	
1217		-----		-----	
1261	D1209	2.5		-1.90	
1467	D1209	9.13		0.76	
1509	D1209	10		1.10	
1515	D1209	8		0.30	
1603	In house	9		0.70	
1608	D1209	10		1.10	
1656	D1209	5		-0.90	
1718	D1209	10		1.10	
1742	D1209	5.0		-0.90	
1823		-----		-----	
1880		-----		-----	
1954	D1209	7		-0.10	
2124		-----		-----	
6013		6		-0.50	
6198		-----		-----	
6247	D1209	10		1.10	
6262		-----		-----	
7013	D1209	5		-0.90	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	
9014		-----		-----	

normality	OK
n	32
outliers	0
mean (n)	7.24
st.dev. (n)	2.207
R(calc.)	6.18
st.dev.(D1209:05)	2.500
R(D1209:05)	7

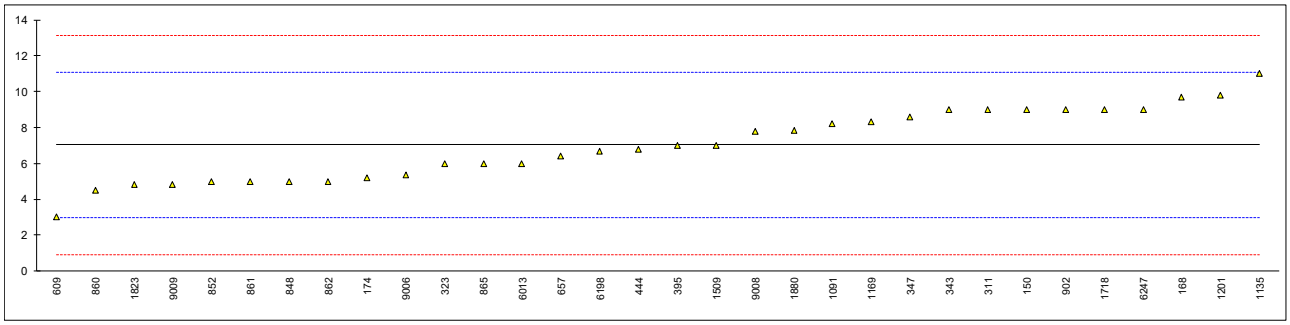


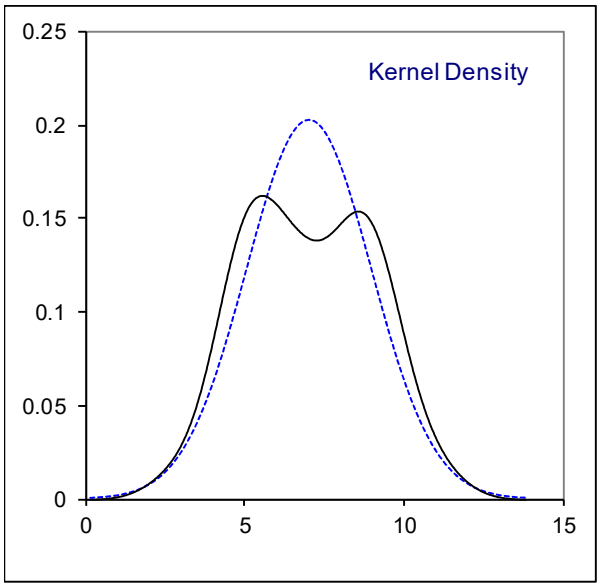


Determination of Color Pt/Co automated (D5386) on sample #19205

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	D5386	9		0.97	
168	D5386	9.7		1.32	
169		-----		-----	
171		-----		-----	
174	D5386	5.2		-0.90	
311	D5386	9		0.97	
323	D5386	6		-0.51	
343	D5386	9		0.97	
347	D5386	8.6		0.78	
370		-----		-----	
395	D5386	7		-0.01	
396		-----		-----	
444	D5386	6.8		-0.11	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	D5386	3		-1.98	
610		-----		-----	
621		-----		-----	
657	D5386	6.43		-0.29	
840		-----		-----	
848	D5386	5		-1.00	
852	D5386	5		-1.00	
857		-----		-----	
860	D5386	4.5		-1.24	
861	D5386	5		-1.00	
862	D5386	5		-1.00	
865	D5386	6		-0.51	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	D5386	9		0.97	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	D5386	8.2		0.58	
1117		-----		-----	
1135	D5386	11		1.96	
1151		-----		-----	
1169	D5386	8.3		0.63	
1201	D5386	9.8		1.37	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	D5386	7		-0.01	
1515		-----		-----	
1603		-----		-----	
1608		-----		-----	
1656		-----		-----	
1718	D5386	9		0.97	
1742		-----		-----	
1823	D5386	4.8		-1.10	
1880	D5386	7.83		0.40	
1954		-----		-----	
2124		-----		-----	
6013		6		-0.51	
6198	D5386	6.7		-0.16	
6247	D5386	9		0.97	
6262		-----		-----	
7013		-----		-----	
9006	D5386	5.36		-0.82	
9008	D5386	7.8		0.38	
9009	D5386	4.8		-1.10	
9014		-----		-----	

normality	OK
n	32
outliers	0
mean (n)	7.03
st.dev. (n)	1.963
R(calc.)	5.50
st.dev.(D5386:16)	2.031
R(D5386:16)	5.69

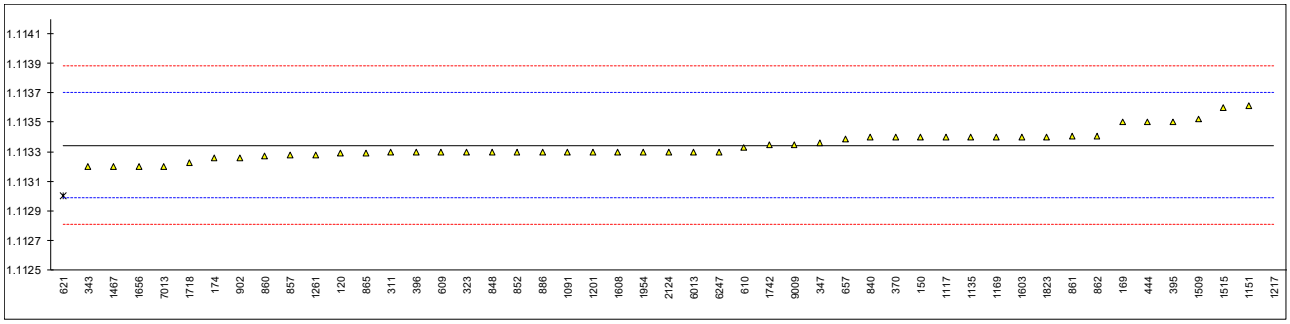


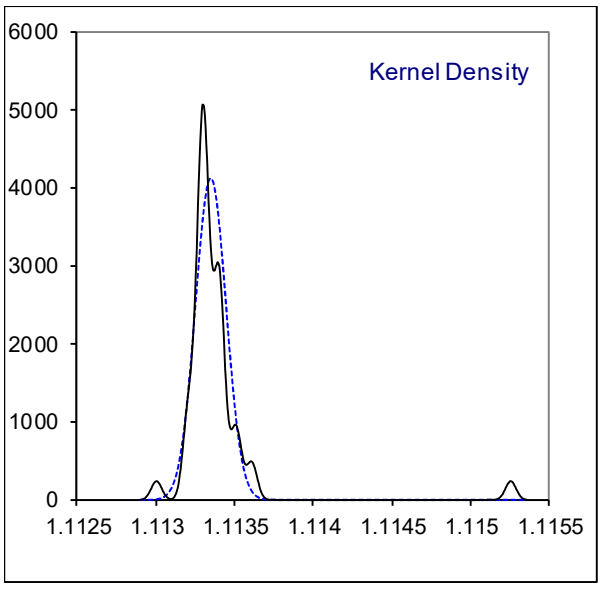


Determination of Density at 20°C on sample #19205; results in kg/L

lab	method	value	mark	z(targ)	remarks
120	D4052	1.11329		-0.31	
150	D4052	1.1134		0.31	
168		-----		-----	
169	D4052	1.1135		0.87	
171		-----		-----	
174	D4052	1.11326		-0.47	
311	D4052	1.1133		-0.25	
323	D4052	1.1133		-0.25	
343	D4052	1.1132		-0.81	
347	D4052	1.11336		0.09	
370	D4052	1.1134		0.31	
395	D4052	1.1135		0.87	
396	D4052	1.1133		-0.25	
444	D4052	1.1135		0.87	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	D4052	1.1133		-0.25	
610	D4052	1.11333		-0.08	
621	D4052	1.1130	R(0.05)	-1.93	
657	D4052	1.11339		0.25	
840	D4052	1.1134		0.31	
848	D4052	1.1133		-0.25	
852	GB/T2013	1.1133		-0.25	
857	D4052	1.11328		-0.36	
860	D4052	1.11327		-0.42	
861	D4052	1.11341		0.37	
862	D4052	1.11341		0.37	
865	D4052	1.11329		-0.31	
869		-----		-----	
872		-----		-----	
886	D4052	1.1133		-0.25	
902	D4052	1.11326		-0.47	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	D4052	1.1133		-0.25	
1117	D4052	1.1134		0.31	
1135	ISO12185	1.1134		0.31	
1151	D4052	1.11361		1.49	
1169	D4052	1.1134		0.31	
1201	ISO12185	1.1133		-0.25	
1217	ISO12185	1.11525	R(0.01)	10.67	
1261	D4052	1.11328		-0.36	
1467	D4052	1.1132		-0.81	
1509	D4052	1.11352		0.98	
1515	D4052	1.1136		1.43	
1603	In house	1.11340		0.31	
1608	D4052	1.1133		-0.25	
1656	D4052	1.1132		-0.81	
1718	D4052	1.11323		-0.64	
1742	ISO12185	1.11335		0.03	
1823	D4052	1.1134		0.31	
1880		-----		-----	
1954	D4052	1.1133		-0.25	
2124	In house	1.1133		-0.25	
6013		1.1133		-0.25	
6198		-----		-----	
6247	D4052	1.1133		-0.25	
6262		-----		-----	
7013	D4052	1.1132		-0.81	
9006		-----		-----	
9008		-----		-----	
9009	D4052	1.11335		0.03	
9014		-----		-----	

normality	OK
n	47
outliers	2
mean (n)	1.11334
st.dev. (n)	0.000097
R(calc.)	0.00027
st.dev.(ISO12185:96)	0.000179
R(ISO12185:96)	0.0005
Compare	
R(D4052:18a)	0.00050

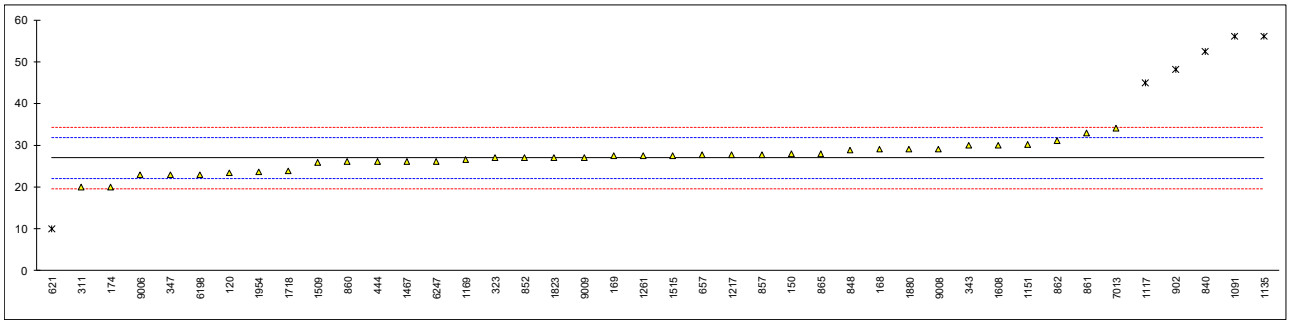


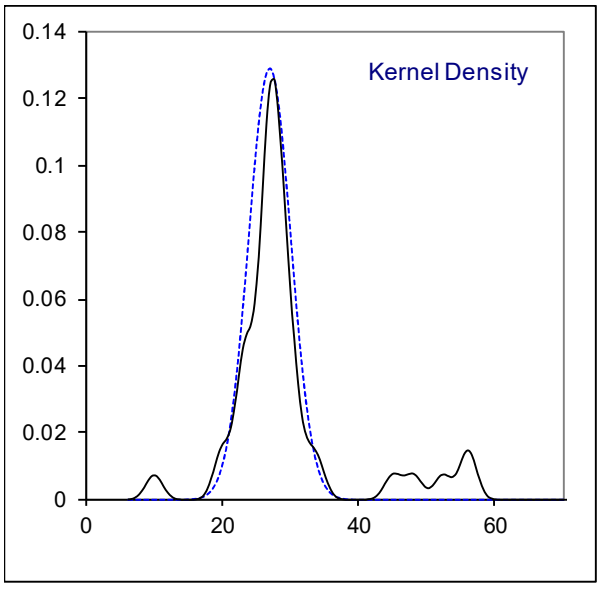


Determination of Diethylene Glycol content on sample #19205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E2409	23.35		-1.46	
150	E2409	28		0.44	
168	E2409	29	C	0.85	first reported 49
169	E2409	27.5		0.23	
171		-----		-----	
174	E2409	20		-2.83	
311	INH-100	20		-2.83	
323	E2409	27		0.03	
343	E2409	30		1.25	
347	E2409	23	C	-1.61	first reported 0.002 mg/kg
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E2409	26		-0.38	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	E2409	10	C,R(0.05)	-6.92	first reported 36
657	E2409	27.6		0.27	
840	E2409	52.3	C,R(0.01)	10.37	first reported 67.2
848	E2409	28.8		0.76	
852	E2409	27		0.03	
857	E2409	27.7		0.31	
860	E2409	26		-0.38	
861	E2409	33		2.48	
862	E2409	31		1.66	
865	E2409	28		0.44	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	E2409	48	C,R(0.05)	8.61	first reported 40
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2409	56	C,R(0.01)	11.88	first reported 133
1117	E2409	45	R(0.05)	7.38	
1135	E2409	56	R(0.01)	11.88	
1151	E2409	30.14		1.31	
1169	E2409	26.5		-0.18	
1201	In house	150	C,R(0.01)	50.29	first reported 0.02
1217	E2409	27.6	C	0.27	first reported 14.1
1261	E2409	27.5		0.23	
1467	E2409	26		-0.38	
1509	E2409	25.9		-0.42	
1515	E2409	27.5		0.23	
1603	In house	< 50		-----	
1608	E2409	30		1.25	
1656		-----		-----	
1718	E2409	23.8		-1.28	
1742		-----		-----	
1823	E2409	27		0.03	
1880	E2409	29		0.85	
1954	E2409	23.65		-1.34	
2124		-----		-----	
6013		-----		-----	
6198	E2409	23		-1.61	
6247	E2409	26		-0.38	
6262		-----		-----	
7013	E2409	34		2.89	
9006	E2409	22.97		-1.62	
9008	E2409	29		0.85	
9009	E2409	27		0.03	
9014		-----		-----	

normality	OK
n	36
outliers	7
mean (n)	26.93
st.dev. (n)	3.091
R(calc.)	8.65
st.dev.(E2409:13)	2.447
R(E2409:13)	6.85



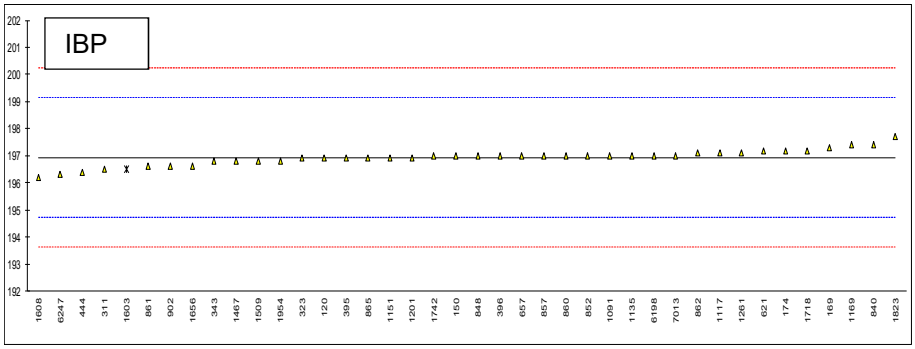


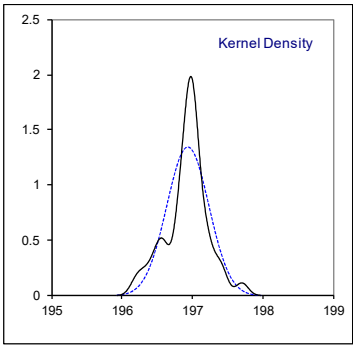
Determination of Distillation: IBP, 50% recovered, Dry Point on sample #19205; results in °C

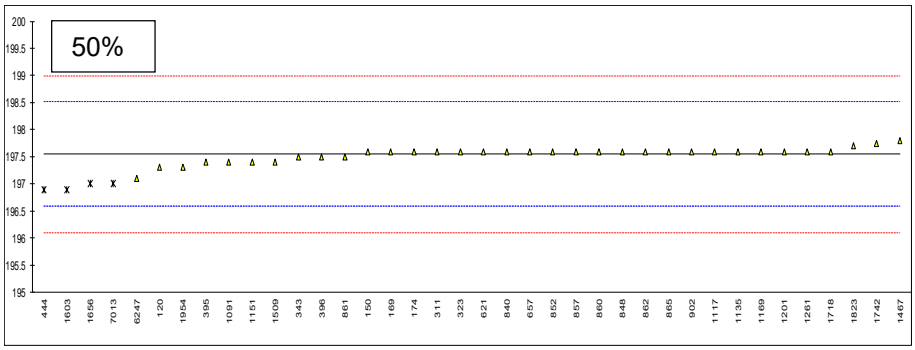
lab	method	IBP	mark	z(targ)	50% rec	mark	z(targ)	DP	mark	z(targ)
120	D1078-automated	196.9		-0.03	197.3		-0.52	196.5	R(0.01)	-1.87
150	D1078-automated	197.0		0.06	197.6		0.11	197.7		-0.29
168		-----		-----	-----		-----	-----		-----
169	D1078-automated	197.3		0.33	197.6		0.11	197.8		-0.15
171		-----		-----	-----		-----	-----		-----
174	D1078-automated	197.2		0.24	197.6		0.11	198.0		0.11
311	D1078-automated	196.5		-0.40	197.6		0.11	197.8		-0.15
323	D1078-manual	196.9		-0.03	197.6		0.11	198.0		0.11
343	D1078-automated	196.8		-0.12	197.5		-0.10	197.7		-0.29
347		-----		-----	-----		-----	-----		-----
370		-----		-----	-----		-----	-----		-----
395	D1078-manual	196.9		-0.03	197.4		-0.31	197.8		-0.15
396	D1078-manual	197.0		0.06	197.5		-0.10	198.0		0.11
444	D1078-manual	196.4		-0.49	196.9	R(0.05)	-1.35	197.9		-0.02
522		-----		-----	-----		-----	-----		-----
528		-----		-----	-----		-----	-----		-----
551		-----		-----	-----		-----	-----		-----
557		-----		-----	-----		-----	-----		-----
558		-----		-----	-----		-----	-----		-----
609		-----		-----	-----		-----	-----		-----
610		-----		-----	-----		-----	-----		-----
621	D1078-manual	197.2		0.24	197.6		0.11	197.9		-0.02
657	D1078-manual	197.0		0.06	197.6		0.11	197.7		-0.29
840	D1078-automated	197.42		0.44	197.60		0.11	197.78		-0.18
848	D1078-Manual	197.0		0.06	197.6		0.11	198.1		0.24
852	GB/T7534-Manual	197.0		0.06	197.6		0.11	198.0		0.11
857	D1078-manual	197.0		0.06	197.6		0.11	198.0		0.11
860	D1078	197.0		0.06	197.6		0.11	198.1		0.24
861	D1078	196.6		-0.31	197.5		-0.10	198.5		0.77
862	D1078-manual	197.1		0.15	197.6		0.11	198.0		0.11
865	D1078	196.9		-0.03	197.6		0.11	197.9		-0.02
869		-----		-----	-----		-----	-----		-----
872		-----		-----	-----		-----	-----		-----
886		-----		-----	-----		-----	-----		-----
902	D1078-automated	196.6		-0.31	197.6		0.11	197.8		-0.15
912		-----		-----	-----		-----	-----		-----
913		-----		-----	-----		-----	-----		-----
962		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
1091		197.0		0.06	197.4		-0.31	197.9		-0.02
1117	D1078-automated	197.1		0.15	197.6		0.11	197.7		-0.29
1135	D1078-automated	197.0		0.06	197.6		0.11	198.4		0.64
1151	D1078-automated	196.9		-0.03	197.4		-0.31	198.0		0.11
1169	D1078-manual	197.4		0.42	197.6		0.11	198.2		0.38
1201	D1078-automated	196.9		-0.03	197.6		0.11	197.7		-0.29
1217		-----		-----	-----		-----	-----		-----
1261	D1078-automated	197.1		0.15	197.6		0.11	197.9		-0.02
1467	D1078-automated	196.8		-0.12	197.8		0.52	198.3		0.51
1509	D1078-automated	196.8		-0.12	197.4		-0.31	197.7		-0.29
1515		-----		-----	-----		-----	-----		-----
1603	D1078-automated	196.5	ex	-0.40	196.9	R(0.05)	-1.35	197.0	R(0.01)	-1.21
1608		196.2		-0.67	-----		-----	197.5		-0.55
1656	D1078-manual	196.6		-0.31	197.0	R(0.05)	-1.14	198.0		0.11
1718	D1078-automated	197.2		0.24	197.6		0.11	197.9		-0.02
1742	D1078-automated	196.98		0.04	197.75		0.42	197.91		-0.01
1823	D1078-automated	197.7		0.70	197.7		0.31	198.1		0.24
1880		-----		-----	-----		-----	-----		-----
1954	D1078-automated	196.8		-0.12	197.3		-0.52	197.8		-0.15
2124		-----		-----	-----		-----	-----		-----
6013		-----		-----	-----		-----	-----		-----
6198	D1078-automated	197.0		0.06	-----		-----	198.0		0.11
6247	D1078	196.3		-0.58	197.1		-0.93	197.4		-0.68
6262		-----		-----	-----		-----	-----		-----
7013	D1078-automated	197.0		0.06	197.0	R(0.05)	-1.14	-----		-----
9006		-----		-----	-----		-----	-----		-----
9008		-----		-----	-----		-----	-----		-----
9009		-----		-----	-----		-----	-----		-----
9014		-----		-----	-----		-----	-----		-----

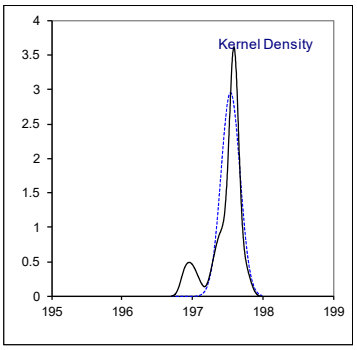
normality	suspect	not OK	suspect
n	39	34	37
outliers	0 (+1ex)	4	2
mean (n)	196.94	197.55	197.92
st.dev. (n)	0.297	0.135	0.222
R(calc.)	0.83	0.38	0.62
st.dev.(D1078-A:11)	1.097	0.482	0.756
R(D1078-A:11)	3.07	1.35	2.12
Compare			
R(D1078-M:11)	2.11	1.28	2.57

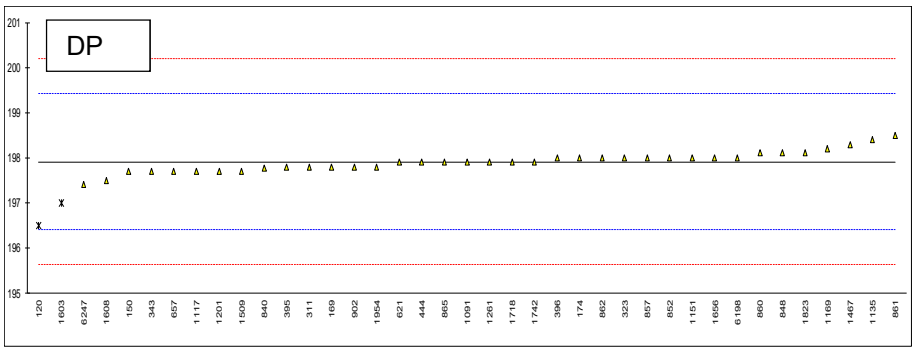
ex = test result excluded as two other reported test results are statistical outliers.

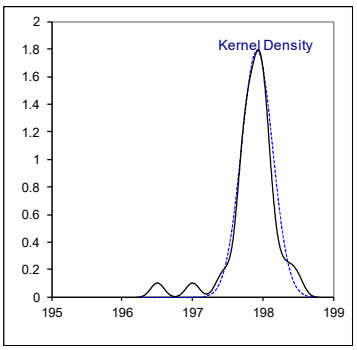












Determination of Miscibility with water (Hydrocarbons) on sample #19205;

lab	method	value	mark	z(targ)	remarks
120	D1722	passes test		-----	
150	D1722	Pass		-----	
168		-----		-----	
169	D1722	pass		-----	
171		-----		-----	
174	D1722	pass		-----	
311		-----		-----	
323	D1722	passes		-----	
343		-----		-----	
347		-----		-----	
370		-----		-----	
395	D1722	PASS		-----	
396	D1722	Pass		-----	
444	D1722	Pass		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	D1722	Pass		-----	
657		-----		-----	
840	D1722	Passes test		-----	
848	D1722	Pass		-----	
852	D1722	Pass		-----	
857	D1722	Passes test		-----	
860	D1722	Pass		-----	
861	D1722	PASS		-----	
862	D1722	pass		-----	
865	D1722	Passes test		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	D1722	Pass		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D1722	Pass		-----	
1135	D1722	pass		-----	
1151		-----		-----	
1169		-----		-----	
1201	D1722	Pass		-----	
1217		-----		-----	
1261		-----		-----	
1467	D1722	Pass		-----	
1509	D1722	Pass		-----	
1515	D1722	PASS		-----	
1603		-----		-----	
1608	D1722	Pass		-----	
1656		-----		-----	
1718	D1722	Pass		-----	
1742		-----		-----	
1823		-----		-----	
1880		-----		-----	
1954		-----		-----	
2124		-----		-----	
6013	D1722	pass		-----	
6198		-----		-----	
6247		-----		-----	
6262		-----		-----	
7013		-----		-----	
9006		-----		-----	
9008		-----		-----	
9009	D1722	Pass		-----	
9014		-----		-----	
	n	28			
	mean (n)	Passes test			

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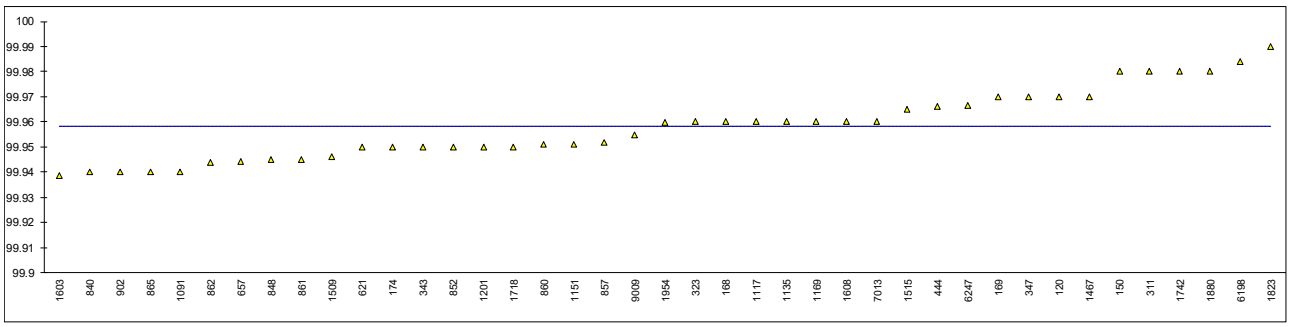
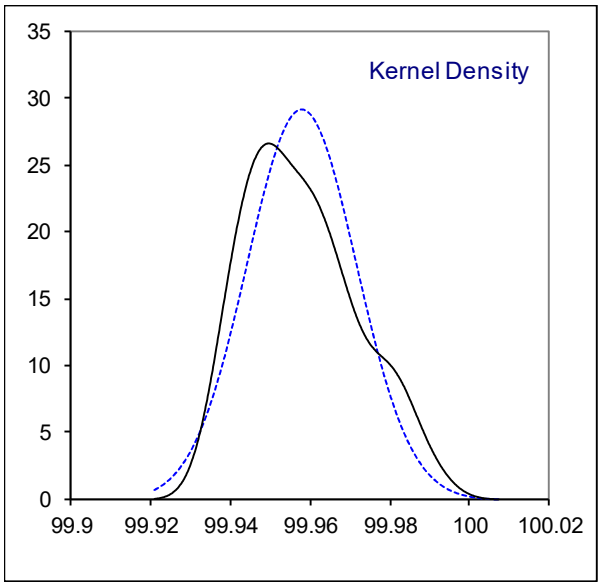
Determination of Purity by GC as received on sample #19205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	E2409	99.97		-----	
150	E2409	99.98		-----	
168	E2409	99.96		-----	
169	D3362	99.97		-----	
171		-----		-----	
174	E2409	99.95		-----	
311	INH-100	99.98		-----	
323	E2409	99.96		-----	
343	E2409	99.95		-----	
347	E2409	99.97		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E2409	99.9661		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621	E202	99.95		-----	
657	E2409	99.9441		-----	
840	E2409	99.94	C	-----	first reported 99.91
848	E2409	99.945		-----	
852	E2409	99.95		-----	
857	E2409	99.952		-----	
860	E2409	99.951		-----	
861	E2409	99.945		-----	
862	E202	99.944		-----	
865	E2409	99.94		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	E2409	99.94		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2409	99.94		-----	
1117	E2409	99.96		-----	
1135	E2409	99.96		-----	
1151	E202	99.951		-----	
1169	E2409	99.96		-----	
1201	In house	99.95		-----	
1217		-----		-----	
1261		-----		-----	
1467	E2409	99.97		-----	
1509	E2409	99.946		-----	
1515	E2409	99.9649		-----	
1603	In house	99.9387		-----	
1608	E2409	99.96		-----	
1656		-----		-----	
1718	E2409	99.950		-----	
1742	In house	99.98		-----	
1823	E2409	99.99		-----	
1880	E2409	99.98		-----	
1954	E2409	99.9596		-----	
2124		-----		-----	
6013		-----		-----	
6198	E2409	99.984		-----	
6247	E2409	99.9664		-----	
6262		-----		-----	
7013	E2409	99.96		-----	
9006		-----		-----	
9008		-----		-----	
9009	E2409	99.955		-----	
9014		-----		-----	

normality	OK
n	41
outliers	0
mean (n)	99.9581
st.dev. (n)	0.01369
R(calc.)	0.0383
st.dev.(lit.)	unknown
R(lit.)	unknown
Compare	
R(iis18C09)	0.0546
R(iis17C13)	0.0902

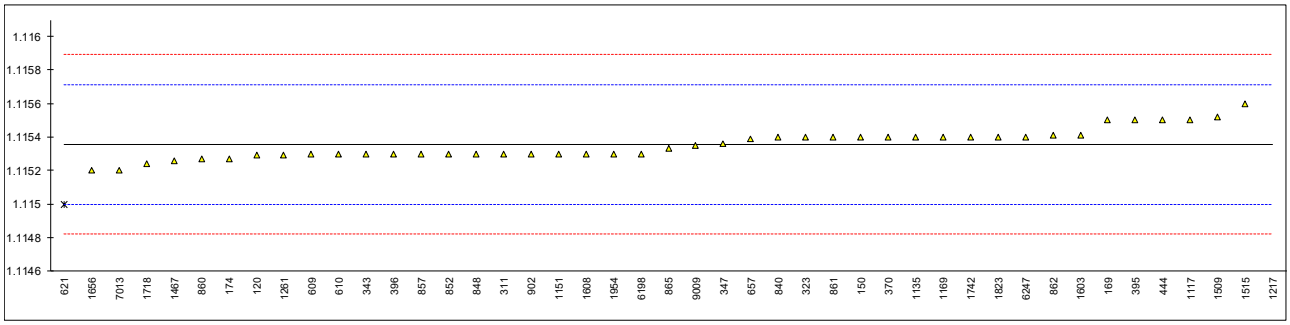


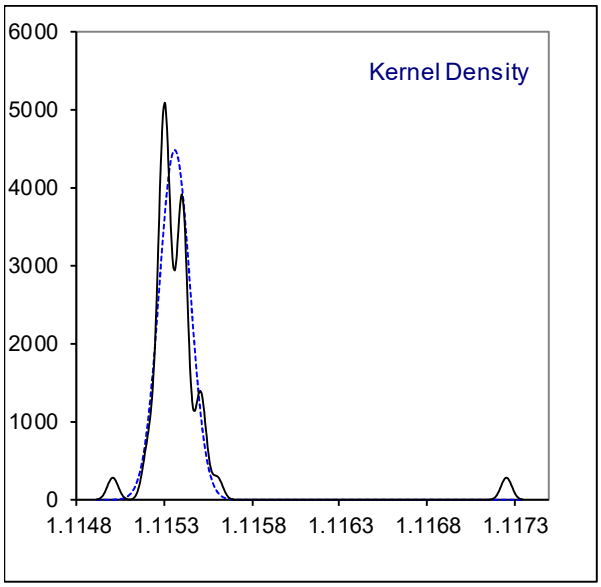


Determination of Specific Gravity 20/20°C on sample #19205;

lab	method	value	mark	z(targ)	remarks
120	D4052	1.11529		-0.37	
150	D4052	1.1154		0.25	
168		-----		-----	
169	D4052	1.1155		0.81	
171		-----		-----	
174	D4052	1.11527		-0.48	
311	D4052	1.1153		-0.31	
323	E202	1.1154		0.25	
343	D4052	1.1153		-0.31	
347	D4052	1.11536		0.03	
370	E202	1.1154		0.25	
395	D4052	1.1155		0.81	
396	D4052	1.1153		-0.31	
444	D4052	1.1155		0.81	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	D4052	1.1153		-0.31	
610	D4052	1.1153		-0.31	
621	D4052	1.1150	R(0.05)	-1.99	
657	D4052	1.11539		0.19	
840	D4052	1.1154		0.25	
848	D4052	1.1153		-0.31	
852	D4052	1.1153		-0.31	
857	D4052	1.11530		-0.31	
860	D4052	1.11527		-0.48	
861	D4052	1.1154		0.25	
862	D4052	1.11541		0.31	
865	D4052	1.11533		-0.14	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	D4052	1.1153		-0.31	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D4052	1.1155		0.81	
1135	E202	1.1154		0.25	
1151	D4052	1.1153		-0.31	
1169	D4052	1.1154		0.25	
1201		-----		-----	
1217	E202	1.11726	R(0.01)	10.67	
1261	D4052	1.11529		-0.37	
1467	D4052	1.11526		-0.53	
1509	D4052	1.11552		0.92	
1515	D4052	1.1156		1.37	
1603	In house	1.11541		0.31	
1608	D4052	1.1153		-0.31	
1656	D4052	1.1152		-0.87	
1718	D4052	1.11524		-0.65	
1742	D4052	1.1154		0.25	
1823	D4052	1.1154		0.25	
1880		-----		-----	
1954	D4052	1.1153		-0.31	
2124		-----		-----	
6013		-----		-----	
6198	D4052	1.1153		-0.31	
6247	D4052	1.1154		0.25	
6262		-----		-----	
7013	D4052	1.1152		-0.87	
9006		-----		-----	
9008		-----		-----	
9009	D4052	1.11535		-0.03	
9014		-----		-----	

normality	OK
n	43
outliers	2
mean (n)	1.11536
st.dev. (n)	0.000089
R(calc.)	0.00025
st.dev.(E202:18)	0.000179
R(E202:18)	0.0005

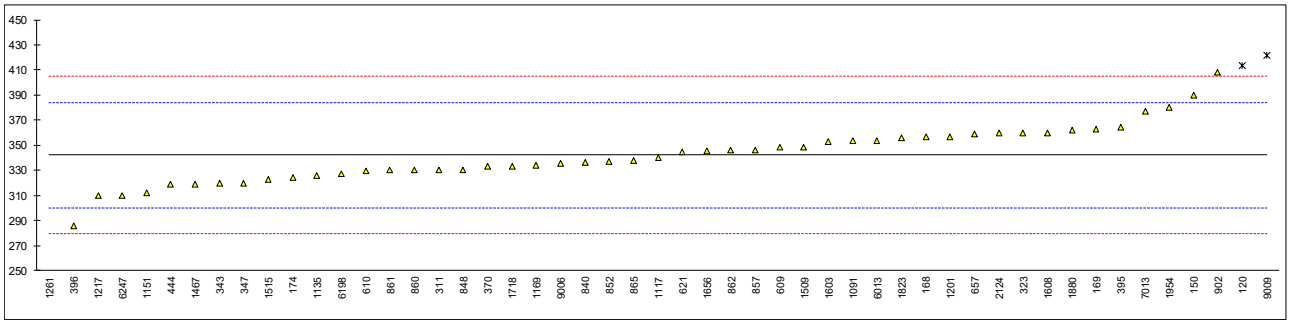


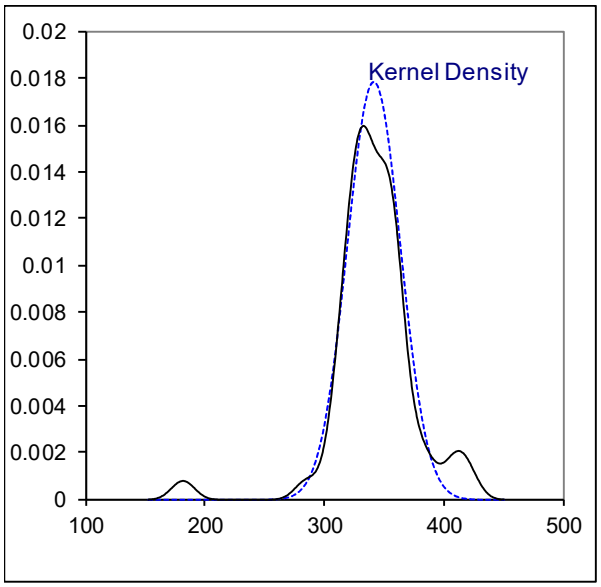


Determination of Water on sample #19205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E203	413.1	DG(0.05)	3.39	
150	E1064	390		2.29	
168	E1064	357		0.71	
169	E1064	362.5		0.97	
171		-----		-----	
174	E1064	324		-0.87	
311	E203	330		-0.58	
323	E1064	360		0.85	
343	E1064	320		-1.06	
347	E1064	320		-1.06	
370	E1064	333		-0.44	
395	E1064	364.1		1.05	
396	E1064	286		-2.69	
444	E1064	319		-1.11	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	E1064	348		0.28	
610	D6304	329.8		-0.59	
621	E1064	344.57	C	0.11	first reported 176.57
657	E1064	359.2		0.82	
840	E1064	336		-0.30	
848	E1064	330		-0.58	
852	E1064	337		-0.25	
857	E1064	346		0.18	
860	E1064	330		-0.58	
861	E1064	330		-0.58	
862	E1064	346		0.18	
865	E1064	338		-0.20	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	E1064	408		3.15	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	ISO12937	354		0.57	
1117	E1064	340		-0.10	
1135	E1064	326		-0.77	
1151	E1064	312.3		-1.43	
1169	E1064	334		-0.39	
1201	E1064	357		0.71	
1217	E1064	310	C	-1.54	first reported 0.0310 mg/kg
1261	E1064	182.5	G(0.01)	-7.64	
1467	E1064	319	C	-1.11	first reported 260.6
1509	E1064	348		0.28	
1515	E1064	323		-0.92	
1603	In house	353		0.52	
1608	E1064	360		0.85	
1656	E1064	345		0.14	
1718	E1064	333		-0.44	
1742		-----		-----	
1823	E1064	356.0		0.66	
1880	E1064	362		0.95	
1954	E1064	380		1.81	
2124	E1064	359.7		0.84	
6013		354		0.57	
6198	E1064	327.5		-0.70	
6247	E203	310		-1.54	
6262		-----		-----	
7013	E1064	376.90		1.66	
9006	E1064	335.5		-0.32	
9008		-----		-----	
9009	E1064	422	DG(0.05)	3.82	
9014		-----		-----	

normality	suspect
n	48
outliers	3
mean (n)	342.17
st.dev. (n)	22.303
R(calc.)	62.45
st.dev.(E1064:16)	20.90
R(E1064:16)	58.511

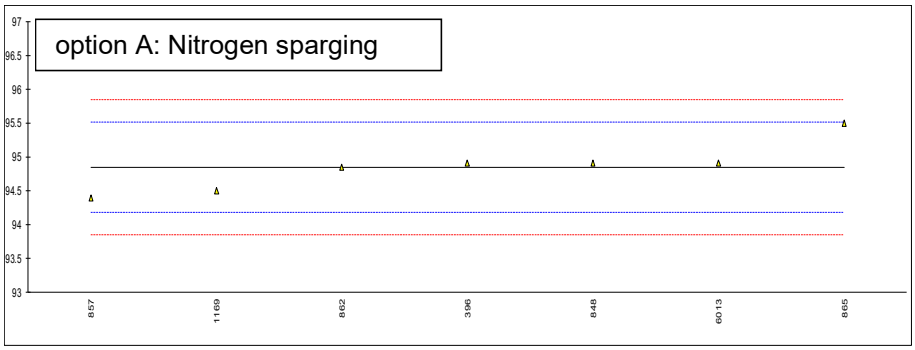


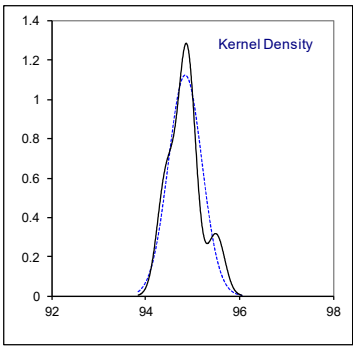


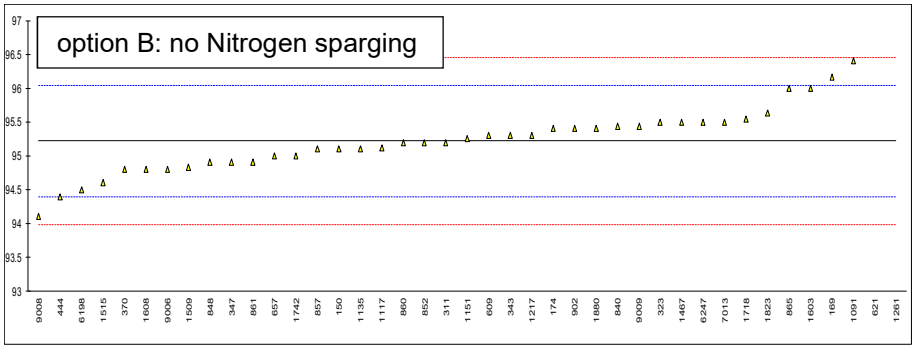
Determination of UV Transmittance at 350nm on sample #19206; results in %Transmittance

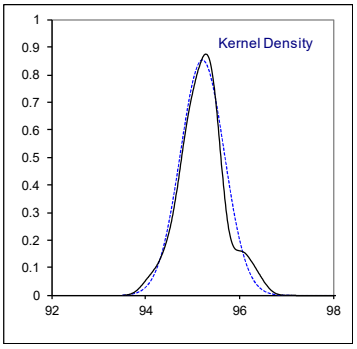
lab	Method	cuvet	Option A	mark	z(targ)	Option B	mark	z(targ)	remarks
120		50 mm	-----		-----	-----		-----	
150	E2193	10 mm	-----		-----	95.1		-0.29	
168			-----		-----	-----		-----	
169	E2193	10 mm	-----		-----	96.16498		2.30	
171			-----		-----	-----		-----	
174	E2193	10 mm	-----		-----	95.4		0.44	
311	E2193	10 mm	-----		-----	95.2		-0.04	
323	E2193	10 mm	-----		-----	95.5		0.68	
343	E2193	10 mm	-----		-----	95.3		0.20	
347	E2193	50 mm	-----		-----	94.9		-0.77	
370	E2193	10 mm	-----		-----	94.8		-1.01	
395			-----		-----	-----		-----	
396	E2193	10 mm	94.9		0.15	-----		-----	
444	E2193	10 mm	-----		-----	94.4		-1.98	
522			-----		-----	-----		-----	
528			-----		-----	-----		-----	
551			-----		-----	-----		-----	
557			-----		-----	-----		-----	
558			-----		-----	-----		-----	
609	E2193	10 mm	-----		-----	95.3		0.20	
610			-----		-----	-----		-----	
621	E2193	10 mm	-----		-----	99.28	R(0.01)	9.86	
657	E2193	10 mm	-----		-----	95.00		-0.53	
840	E2193	10 mm	-----		-----	95.43		0.51	
848	E2193	50 mm	94.9		0.15	94.9		-0.77	
852	E2193	10 mm	-----		-----	95.2		-0.04	
857	E2193	10 mm	94.4		-1.34	95.1		-0.29	
860	E2193	10 mm	-----		-----	95.2		-0.04	
861	E2193	50 mm	-----		-----	94.9		-0.77	
862	E2193	50 mm	94.84		-0.03	-----		-----	
865	E2193		95.5		1.95	96.0		1.90	
869			-----		-----	-----		-----	
872			-----		-----	-----		-----	
886			-----		-----	-----		-----	
902	E2193	10 mm	-----		-----	95.4		0.44	
912			-----		-----	-----		-----	
913			-----		-----	-----		-----	
962			-----		-----	-----		-----	
963			-----		-----	-----		-----	
1091	E2193	10 mm	-----		-----	96.4		2.87	
1117	E2193	50 mm	-----		-----	95.12		-0.24	
1135	E2193	10 mm	-----		-----	95.1		-0.29	
1151	E2193	10 mm	-----		-----	95.25		0.08	
1169	E2193	50 mm	94.5		-1.04	-----		-----	%T corr. to 10 mm
1201			-----		-----	-----		-----	
1217	E2193	50 mm	-----		-----	95.3		0.20	
1261	E2193	10 mm	-----		-----	100	R(0.01)	11.60	
1467	E2193	10 mm	-----		-----	95.50		0.68	
1509	E2193	50 mm	-----		-----	94.83		-0.94	
1515	E2193	50 mm	-----		-----	94.6		-1.50	
1603	In house	10 mm	-----		-----	96		1.90	
1608	E2193	50 mm	-----		-----	94.8		-1.01	
1656			-----		-----	-----		-----	
1718	E2193	50 mm	-----		-----	95.54		0.78	
1742	E2193	10 mm	-----		-----	95.0		-0.53	
1823	E2193	50 mm	-----		-----	95.626		0.99	
1880	E2193	10 mm	-----		-----	95.4		0.44	
1954			-----		-----	-----		-----	
2124			-----		-----	-----		-----	
6013	E2193	10 mm	94.9		0.15	-----		-----	
6198	E2193	10 mm	-----		-----	94.50		-1.74	
6247	E2193	10 mm	-----		-----	95.5		0.68	
6262			-----		-----	-----		-----	
7013	E2193	10 mm	-----		-----	95.5		0.68	
9006	E2193	10 mm	-----		-----	94.8		-1.01	
9008	E2193	10 mm	-----		-----	94.1		-2.71	
9009	E2193	10 mm	-----		-----	95.440		0.54	
9014			-----		-----	-----		-----	

normality	unknown	OK
n	7	39
outliers	0	2
mean (n)	94.849	95.218
st.dev. (n)	0.3547	0.4663
R(calc.)	0.993	1.306
st.dev.(E2193:16)	0.3343	0.4121
R(E2193:16)	0.936	1.154





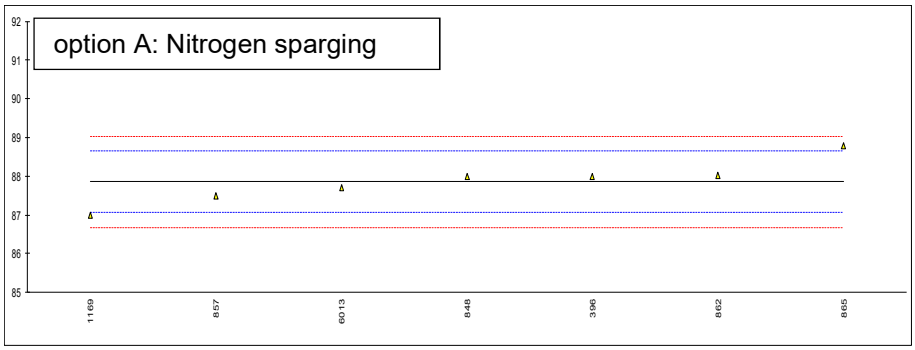


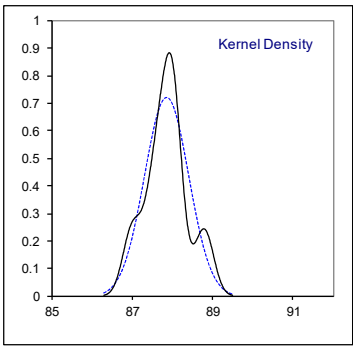


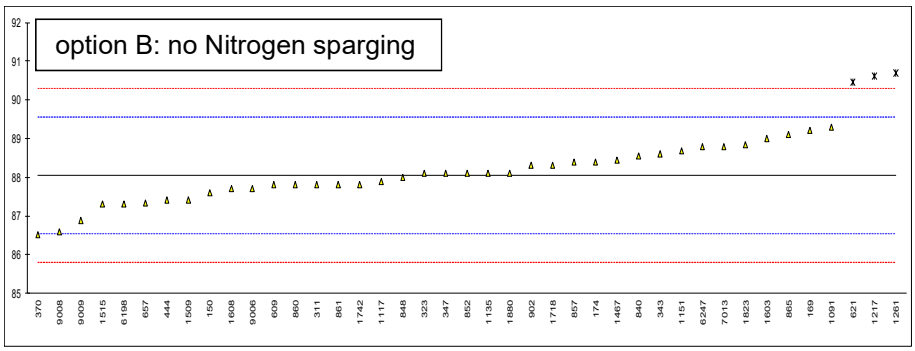
Determination of UV Transmittance at 275nm on sample #19206; results in %Transmittance

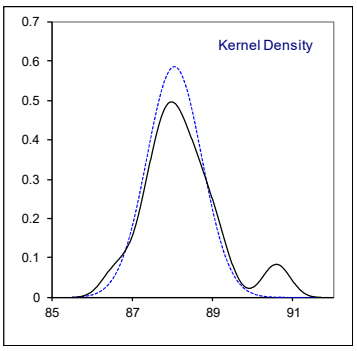
lab	Method	cuvet	Option A	mark	z(targ)	Option B	mark	z(targ)	remarks
120		50 mm	-----		-----	-----		-----	
150	E2193	10 mm	-----		-----	87.6		-0.60	
168			-----		-----	-----		-----	
169	E2193	10 mm	-----		-----	89.21553		1.55	
171			-----		-----	-----		-----	
174	E2193	10 mm	-----		-----	88.4		0.47	
311	E2193	10 mm	-----		-----	87.8		-0.33	
323	E2193	10 mm	-----		-----	88.1		0.07	
343	E2193	10 mm	-----		-----	88.6		0.73	
347	E2193	50 mm	-----		-----	88.1		0.07	
370	E2193	10 mm	-----		-----	86.5		-2.06	
395			-----		-----	-----		-----	
396	E2193	10 mm	88.0		0.36	-----		-----	
444	E2193	10 mm	-----		-----	87.4		-0.86	
522			-----		-----	-----		-----	
528			-----		-----	-----		-----	
551			-----		-----	-----		-----	
557			-----		-----	-----		-----	
558			-----		-----	-----		-----	
609	E2193	10 mm	-----		-----	87.8		-0.33	
610			-----		-----	-----		-----	
621	E2193	10 mm	-----		-----	90.46	R(0.01)	3.21	
657	E2193	10 mm	-----		-----	87.34		-0.94	
840	E2193	10 mm	-----		-----	88.55		0.67	
848	E2193	50 mm	88.0		0.36	88.0		-0.07	
852	E2193	10 mm	-----		-----	88.1		0.07	
857	E2193	10 mm	87.5		-0.92	88.4		0.47	
860	E2193	10 mm	-----		-----	87.8		-0.33	
861	E2193	50 mm	-----		-----	87.8		-0.33	
862	E2193	50 mm	88.02		0.41	-----		-----	
865	E2193		88.8		2.40	89.1		1.40	
869			-----		-----	-----		-----	
872			-----		-----	-----		-----	
886			-----		-----	-----		-----	
902	E2193	10 mm	-----		-----	88.3		0.33	
912			-----		-----	-----		-----	
913			-----		-----	-----		-----	
962			-----		-----	-----		-----	
963			-----		-----	-----		-----	
1091	E2193	10 mm	-----		-----	89.3	C	1.66	first reported 90.8
1117	E2193	50 mm	-----		-----	87.90		-0.20	
1135	E2193	10 mm	-----		-----	88.1		0.07	
1151	E2193	10 mm	-----		-----	88.67		0.83	
1169	E2193	50 mm	87.0		-2.19	-----		-----	%T corr. to 10 mm
1201			-----		-----	-----		-----	
1217	E2193	50 mm	-----		-----	90.6	R(0.01)	3.39	
1261	E2193	10 mm	-----		-----	90.7	R(0.01)	3.53	
1467	E2193	10 mm	-----		-----	88.43		0.51	
1509	E2193	50 mm	-----		-----	87.42		-0.84	
1515	E2193	50 mm	-----		-----	87.3		-1.00	
1603	In house	10 mm	-----		-----	89		1.26	
1608	E2193	50 mm	-----		-----	87.7		-0.46	
1656			-----		-----	-----		-----	
1718	E2193	50 mm	-----		-----	88.31		0.35	
1742	E2193	10 mm	-----		-----	87.8		-0.33	
1823	E2193	50 mm	-----		-----	88.852		1.07	
1880	E2193	10 mm	-----		-----	88.1		0.07	
1954			-----		-----	-----		-----	
2124			-----		-----	-----		-----	
6013	E2193	10 mm	87.7		-0.41	-----		-----	
6198	E2193	10 mm	-----		-----	87.30		-1.00	
6247	E2193	10 mm	-----		-----	88.8		1.00	
6262			-----		-----	-----		-----	
7013	E2193	10 mm	-----		-----	88.8		1.00	
9006	E2193	10 mm	-----		-----	87.7		-0.46	
9008	E2193	10 mm	-----		-----	86.6		-1.93	
9009	E2193	10 mm	-----		-----	86.892		-1.54	
9014			-----		-----	-----		-----	

normality	unknown	OK
n	7	38
outliers	0	3
mean (n)	87.860	88.049
st.dev. (n)	0.5543	0.6827
R(calc.)	1.552	1.911
st.dev.(E2193:16)	0.3921	0.7518
R(E2193:16)	1.098	2.105







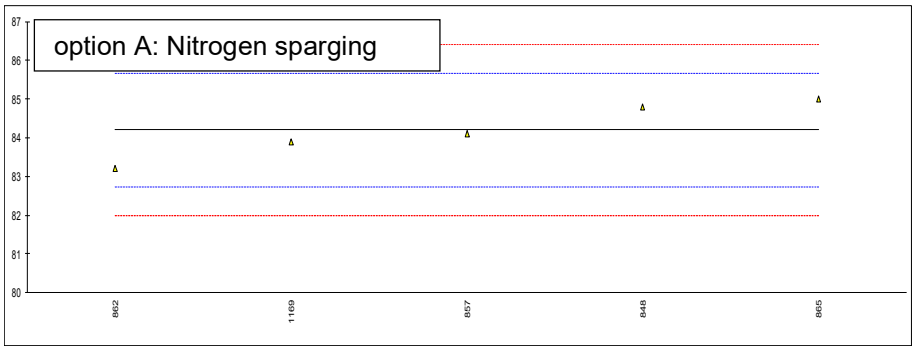


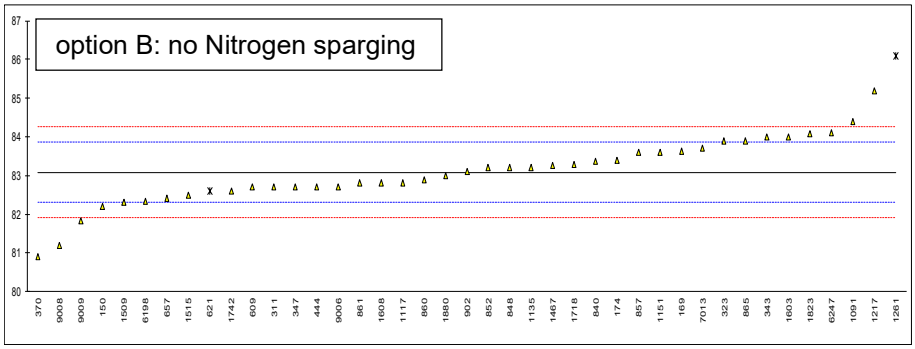
Determination of UV Transmittance at 250nm on sample #19206; results in %Transmittance

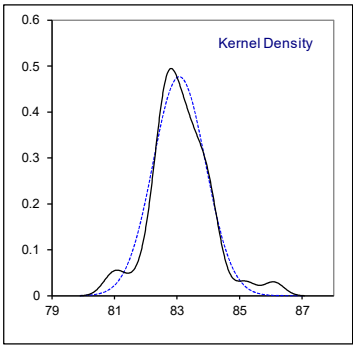
lab	Method	cuvet	Option A	mark	z(targ)	Option B	mark	z(targ)	remarks
120		50 mm	-----		-----	-----		-----	
150	E2193	10 mm	-----		-----	82.2		-2.24	
168			-----		-----	-----		-----	
169	E2193	10 mm	-----		-----	83.63384		1.40	
171			-----		-----	-----		-----	
174	E2193	10 mm	-----		-----	83.4		0.81	
311	E2193	10 mm	-----		-----	82.7		-0.97	
323	E2193	10 mm	-----		-----	83.9		2.08	
343	E2193	10 mm	-----		-----	84.0		2.33	
347	E2193	50 mm	-----		-----	82.7		-0.97	
370	E2193	10 mm	-----		-----	80.9		-5.55	
395			-----		-----	-----		-----	
396	E2193	10 mm	-----		-----	-----		-----	
444	E2193	10 mm	-----		-----	82.7		-0.97	
522			-----		-----	-----		-----	
528			-----		-----	-----		-----	
551			-----		-----	-----		-----	
557			-----		-----	-----		-----	
558			-----		-----	-----		-----	
609	E2193	10 mm	-----		-----	82.7		-0.97	
610			-----		-----	-----		-----	
621	E2193	10 mm	-----		-----	82.60	ex	-1.23	
657	E2193	10 mm	-----		-----	82.42		-1.68	
840	E2193	10 mm	-----		-----	83.36		0.70	
848	E2193	50 mm	84.8		0.81	83.2		0.30	
852	E2193	10 mm	-----		-----	83.2		0.30	
857	E2193	10 mm	84.1		-0.14	83.6		1.31	
860	E2193	10 mm	-----		-----	82.9		-0.46	
861	E2193	50 mm	-----		-----	82.8		-0.72	
862	E2193	50 mm	83.21		-1.35	-----		-----	
865	E2193		85.0		1.08	83.9		2.08	
869			-----		-----	-----		-----	
872			-----		-----	-----		-----	
886			-----		-----	-----		-----	
902	E2193	10 mm	-----		-----	83.1		0.04	
912			-----		-----	-----		-----	
913			-----		-----	-----		-----	
962			-----		-----	-----		-----	
963			-----		-----	-----		-----	
1091	E2193	10 mm	-----		-----	84.4	C	3.35	first reported 85.6
1117	E2193	50 mm	-----		-----	82.82		-0.67	
1135	E2193	10 mm	-----		-----	83.2		0.30	
1151	E2193	10 mm	-----		-----	83.61		1.34	
1169	E2193	50 mm	83.9		-0.41	-----		-----	%T corr. to 10 mm
1201			-----		-----	-----		-----	
1217	E2193	50 mm	-----		-----	85.2		5.38	
1261	E2193	10 mm	-----		-----	86.1	R(0.05)	7.67	
1467	E2193	10 mm	-----		-----	83.26		0.45	
1509	E2193	50 mm	-----		-----	82.30		-1.99	
1515	E2193	50 mm	-----		-----	82.5		-1.48	
1603	In house	10 mm	-----		-----	84		2.33	
1608	E2193	50 mm	-----		-----	82.8		-0.72	
1656			-----		-----	-----		-----	
1718	E2193	50 mm	-----		-----	83.29		0.53	
1742	E2193	10 mm	-----		-----	82.6		-1.23	
1823	E2193	50 mm	-----		-----	84.086		2.55	
1880	E2193	10 mm	-----		-----	83.0		-0.21	
1954			-----		-----	-----		-----	
2124			-----		-----	-----		-----	
6013	E2193	10 mm	-----		-----	-----		-----	
6198	E2193	10 mm	-----		-----	82.32		-1.94	
6247	E2193	10 mm	-----		-----	84.1		2.58	
6262			-----		-----	-----		-----	
7013	E2193	10 mm	-----		-----	83.7		1.57	
9006	E2193	10 mm	-----		-----	82.7		-0.97	
9008	E2193	10 mm	-----		-----	81.2		-4.78	
9009	E2193	10 mm	-----		-----	81.826		-3.19	
9014			-----		-----	-----		-----	

normality	unknown	OK
n	5	39
outliers	0	1 (+1 ex)
mean (n)	84.202	83.083
st.dev. (n)	0.7211	0.8379
R(calc.)	2.019	2.346
st.dev.(E2193:16)	0.7368	0.3936
R(E2193:16)	2.063	1.102

ex = test result excluded as two or more of the other reported test results are statistical outliers.





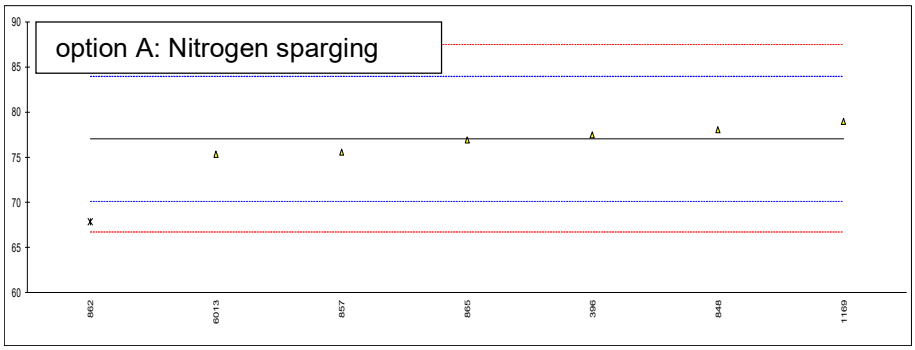


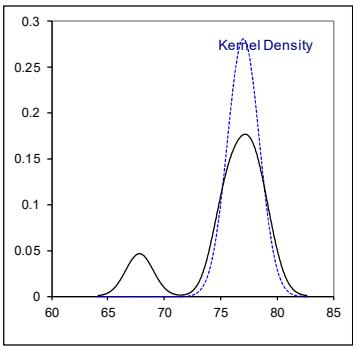
Determination of UV Transmittance at 220nm on sample #19206; results in %Transmittance

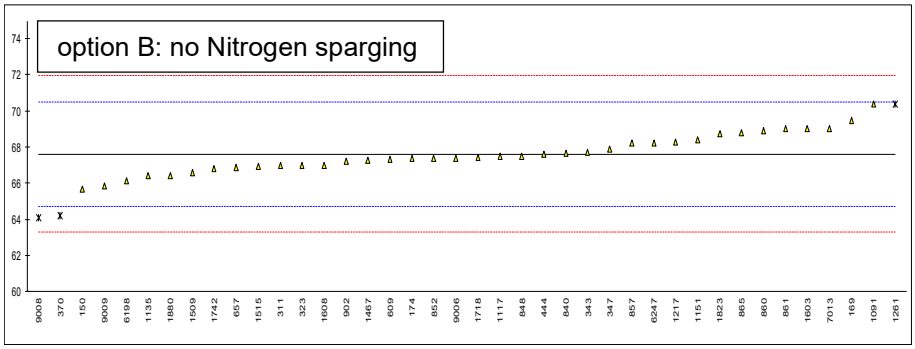
lab	Method	cuvet	Option A	mark	z(targ)	Option B	mark	z(targ)	remarks
120		50 mm	-----		-----	-----		-----	
150	E2193	10 mm	-----		-----	65.7		-1.34	
168			-----		-----	-----		-----	
169	E2193	10 mm	-----		-----	69.49342		1.29	
171			-----		-----	-----		-----	
174	E2193	10 mm	-----		-----	67.4		-0.16	
311	E2193	10 mm	-----		-----	67.0		-0.44	
323	E2193	10 mm	-----		-----	67.0		-0.44	
343	E2193	10 mm	-----		-----	67.7		0.05	
347	E2193	50 mm	-----		-----	67.9		0.19	
370	E2193	10 mm	-----		-----	64.2	DG(0.05)	-2.37	
395			-----		-----	-----		-----	
396	E2193	10 mm	77.5		0.13	-----		-----	
444	E2193	10 mm	-----		-----	67.6	C	-0.02	first reported 72.8
522			-----		-----	-----		-----	
528			-----		-----	-----		-----	
551			-----		-----	-----		-----	
557			-----		-----	-----		-----	
558			-----		-----	-----		-----	
609	E2193	10 mm	-----		-----	67.3		-0.23	
610			-----		-----	-----		-----	
621	E2193	10 mm	-----		-----	-----		-----	
657	E2193	10 mm	-----		-----	66.85		-0.54	
840	E2193	10 mm	-----		-----	67.67		0.03	
848	E2193	50 mm	78.0		0.27	67.5		-0.09	
852	E2193	10 mm	-----		-----	67.4		-0.16	
857	E2193	10 mm	75.6		-0.42	68.2		0.39	
860	E2193	10 mm	-----		-----	68.9		0.88	
861	E2193	50 mm	-----		-----	69.0		0.95	
862	E2193	50 mm	67.79	D(0.05)	-2.68	-----		-----	
865	E2193		76.9		-0.04	68.8		0.81	
869			-----		-----	-----		-----	
872			-----		-----	-----		-----	
886			-----		-----	-----		-----	
902	E2193	10 mm	-----		-----	67.2		-0.30	
912			-----		-----	-----		-----	
913			-----		-----	-----		-----	
962			-----		-----	-----		-----	
963			-----		-----	-----		-----	
1091	E2193	10 mm	-----		-----	70.4		1.92	
1117	E2193	50 mm	-----		-----	67.48		-0.10	
1135	E2193	10 mm	-----		-----	66.4		-0.85	
1151	E2193	10 mm	-----		-----	68.42		0.55	
1169	E2193	50 mm	79.0		0.56	-----		-----	%T corr. to 10 mm
1201			-----		-----	-----		-----	
1217	E2193	50 mm	-----		-----	68.3		0.46	
1261	E2193	10 mm	-----		-----	70.4	ex	1.92	
1467	E2193	10 mm	-----		-----	67.26		-0.26	
1509	E2193	50 mm	-----		-----	66.56		-0.74	
1515	E2193	50 mm	-----		-----	66.9		-0.51	
1603	In house	10 mm	-----		-----	69		0.95	
1608	E2193	50 mm	-----		-----	67.0		-0.44	
1656			-----		-----	-----		-----	
1718	E2193	50 mm	-----		-----	67.45		-0.13	
1742	E2193	10 mm	-----		-----	66.8		-0.57	
1823	E2193	50 mm	-----		-----	68.751		0.77	
1880	E2193	10 mm	-----		-----	66.4		-0.85	
1954			-----		-----	-----		-----	
2124			-----		-----	-----		-----	
6013	E2193	10 mm	75.3		-0.51	-----		-----	
6198	E2193	10 mm	-----		-----	66.15		-1.02	
6247	E2193	10 mm	-----		-----	68.2		0.39	
6262			-----		-----	-----		-----	
7013	E2193	10 mm	-----		-----	69.0		0.95	
9006	E2193	10 mm	-----		-----	67.4		-0.16	
9008	E2193	10 mm	-----		-----	64.1	DG(0.05)	-2.44	
9009	E2193	10 mm	-----		-----	65.863		-1.22	
9014			-----		-----	-----		-----	

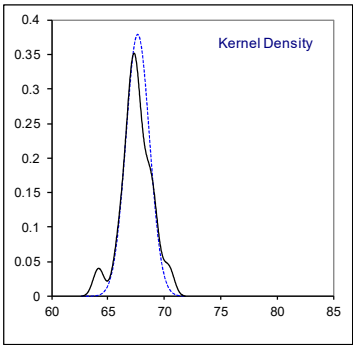
normality	unknown	OK
n	6	37
outliers	1	2 (+1 ex)
mean (n)	77.050	67.631
st.dev. (n)	1.4209	1.0502
R(calc.)	3.979	2.941
st.dev.(E2193:16)	3.4579	1.4454
R(E2193:16)	9.682	4.047

ex = test result excluded as two or more of the other reported test results are statistical outliers.





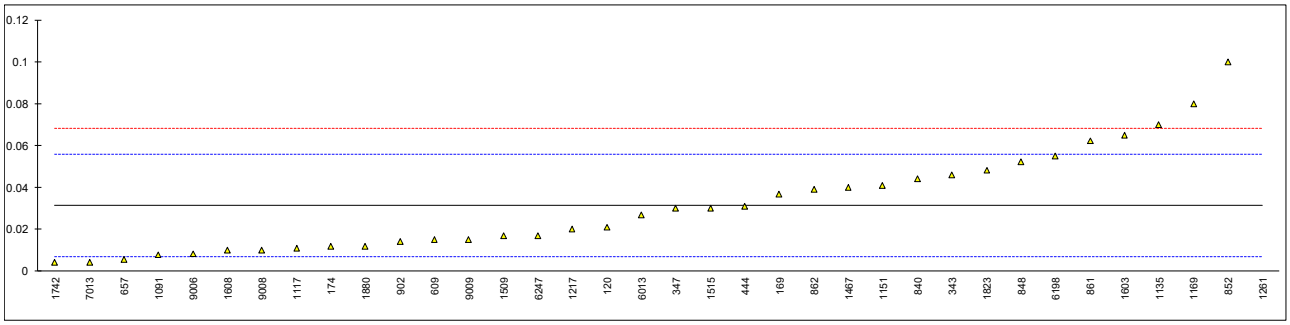


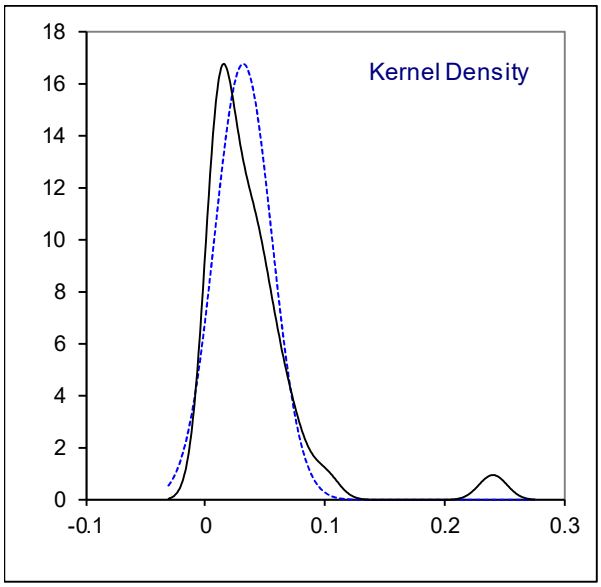


Determination of Iron as Fe on sample #19207; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E394	0.021		-0.86	
150		-----		-----	
168		-----		-----	
169	E1615	0.037		0.46	
171		-----		-----	
174	E1615	0.012		-1.60	
311	E1615	<0.010		-----	
323		-----		-----	
343	E1615	0.046		1.19	
347	E394	0.03		-0.12	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E1615	0.031	C	-0.04	first reported 310 mg/kg
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609	E1615	0.015		-1.35	
610		-----		-----	
621		-----		-----	
657	E1615	0.0057		-2.11	
840	E394	0.044		1.03	
848	E1615	0.052	C	1.69	first reported 0.11 (E394)
852	E394	0.10		5.63	
857		-----		-----	
860		-----		-----	
861	E394	0.062		2.51	
862	E1615	0.039		0.62	
865		-----		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	E1615	0.014		-1.43	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E1615	0.008		-1.93	
1117	E394	0.011		-1.68	
1135	E1615	0.07		3.16	
1151	E394	0.041		0.78	
1169	E394	0.08		3.99	
1201		-----	W	-----	first reported 0.07
1217	E202	0.02		-0.94	
1261	E394	0.24	R(0.01)	17.12	
1467	E394	0.040		0.70	
1509	E394	0.017		-1.19	
1515	E394	0.03		-0.12	
1603	In house	0.065	C	2.75	first reported 0.13
1608	E394	0.01		-1.76	
1656	E1615	<0.01		-----	
1718	E394	<0.01		-----	
1742	In house	0.004		-2.25	
1823	E394	0.048		1.36	
1880	E1615	0.012		-1.60	
1954	E394	<1		-----	
2124		-----		-----	
6013	E1615	0.027		-0.37	
6198	E394	0.055		1.93	
6247	E394	0.017		-1.19	
6262		-----		-----	
7013	E1615	0.0040		-2.25	
9006	E1615	0.00825		-1.91	
9008	E1615	0.01		-1.76	
9009	E1615	0.0150		-1.35	
9014		-----		-----	

normality	suspect
n	35
outliers	1
mean (n)	0.0315
st.dev. (n)	0.02386
R(calc.)	0.0668
st.dev.(E1615:16)	0.01218
R(E1615:16)	0.0341





APPENDIX 2

Number of participants per country

1 lab in AUSTRALIA
4 labs in BELGIUM
3 labs in BRAZIL
2 labs in CANADA
10 labs in CHINA, People's Republic
1 lab in FINLAND
1 lab in GERMANY
4 labs in INDIA
1 lab in INDONESIA
1 lab in IRAN, Islamic Republic of
2 labs in ITALY
2 labs in KUWAIT
1 lab in LITHUANIA
3 labs in MALAYSIA
2 labs in MEXICO
3 labs in NETHERLANDS
1 lab in RUSSIAN FEDERATION
6 labs in SAUDI ARABIA
3 labs in SINGAPORE
2 labs in SPAIN
1 lab in TAIWAN
3 labs in TURKEY
2 labs in UNITED KINGDOM
8 labs in UNITED STATES OF AMERICA
1 lab in VIETNAM

APPENDIX 3

Abbreviations:

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
W	= test result withdrawn on request of participant
ex	= test result excluded from the statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
SDS	= Safety Data Sheet

Literature:

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018
2 ASTM E178:02
3 ASTM E1301:03
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6 ISO 13528:05
7 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
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11 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
12 J.N. Miller, Analyst, 118, 455, (1993)
13 Analytical Methods Committee Technical brief, No 4, January 2001.
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15 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)
16 Horwitz, R. Albert, J. AOAC Int. 79-3, 589 (1996)