Results of Proficiency Test
Mono Ethylene glycol
(MEG polyester grade)
October 2020

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. M. Meijer
Correctors: ing. A.S. Noordman-de Neef & ing. R.J. Starink

Report: iis20C10

December 2020

CONTENTS

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 2020/2021 it was decided to continue the round robin for the analysis on Mono Ethylene glycol based on the scope of the latest version of ASTM E202.
In this interlaboratory study 68 laboratories in 24 different countries registered for participation. See appendix 2 for the number of participants per country. In this report the results of the 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 analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory. It was decided to send two different samples of Mono Ethylene glycol (MEG polyester grade): a 1L bottle labelled #20195 for various analyzes and a 100mL bottle labelled #20196 for determination of UV 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

For the first sample a batch of approximately 100 liters of MEG polyester grade was purchased from a local producer. After homogenization 100 amber glass bottles of 1L were filled and labelled #20195.
The homogeneity of the subsamples was checked by determination of Density at 20°C in accordance with ASTM D4052 on 8 stratified randomly selected subsamples.

	Density at 20°C in kg/L
sample #20195-1	1.11327
sample #20195-2	1.11327
sample #20195-3	1.11327
sample #20195-4	1.11327
sample #20195-5	1.11327
sample #20195-6	1.11327
sample #20195-7	1.11327
sample #20195-8	1.11326

Table 1: homogeneity test results of subsamples #20195

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

	Density at 20°C in kg/L
r (observed)	0.00001
reference test method	ISO12185:96
0.3 * R (reference test method)	0.0015

Table 2: evaluation of the repeatability of subsamples #20195

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

For the second sample a batch of approximately 10 liters MEG polyester grade was purchased from a local producer. After homogenization 100 amber glass bottles of 100mL were filled and labelled #20196.
The homogeneity of the subsamples was checked by determination of UV transmittance at 220 nm, 275 nm and 350 nm in accordance with ASTM E2193 option B (not sparged with N_2) using an 50 mm cuvette on 8 stratified randomly selected subsamples.

	UV at 220 nm in %T	UV at 275 nm in %T	UV at 350 nm in %T
sample #20196-1	91.1	98.9	99.9
sample #20196-2	91.0	98.7	99.9
sample #20196-3	91.5	98.9	99.9
sample #20196-4	92.0	98.9	99.9
sample #20196-5	91.8	98.9	99.9
sample #20196-6	92.2	99.0	99.9
sample #20196-7	91.8	98.9	99.9
sample #20196-8	91.4	98.9	99.9

Table 3: homogeneity test results of subsamples #20196

From the above test results the repeatabilities were 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 at 220 nm in %T	UV at 275 nm in %T	UV at 350 nm in %T
r (observed)	1.2	0.2	0.0
reference test method	E2193-B:16	E2193-B:16	E2193-B:16
0.3 * R (reference test method)	1.2	0.6	0.3

Table 4: evaluation of the repeatabilities of subsamples #20196

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

To each of the participating laboratories one sample labelled #20195 and one sample labelled #20196 were sent on September 23, 2020. 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 ANALYZES

The participants were requested to determine on sample #20195: Acidity as Acetic Acid (E2679 and D1613), Aldehydes as Acetaldehyde, Appearance, Ash content, Inorganic Chloride as Cl, Color Pt/Co (Manual and Automated), Density at 20°C, Di Ethylene glycol, Distillation (Initial Boiling Point, 50% recovered and Dry Point), Iron as Fe, Miscibility with water (Hydrocarbons), Purity by GC as received, Specific Gravity at 20/20°C and Water. On sample #20196 it was requested to determine UV Transmittance at 350, 275, 250 and 220 nm.

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

To get comparable test results a detailed report form and a letter of instructions are prepared. On the report form the reporting units are given as well as the reference test methods (when applicable) 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 participants 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, 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 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 reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle.

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

3.3 Z-SCORES

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

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used, like Horwitz or an estimated reproducibility based on former iis proficiency tests.
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 test result tables in appendix 1.

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

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

4 EVALUATION

In this interlaboratory study some problems were encountered with the dispatch of the samples due to the COVID-19 pandemic. Therefore, the final reporting date was extended with one week. When considering the test results of the two samples together two participants reported test results after the final reporting date and eight participants did not report any test results. Not all participants were able to report all tests requested.
In total 60 reporting laboratories submitted 852 numerical test results. Observed were 45 outlying test results, which is 5.3%. In proficiency studies outlier percentages of 3% - 7.5% are quite normal.

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

4.1 EVALUATION PER SAMPLE AND PER TEST

In this section the reported test results are discussed per sample and per test. The test methods, which were used by the various laboratories, were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the reported test results in appendix 1. 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 test results tables of appendix 1 only the test method number and year of adoption or revision (e.g. D1209:05) will be used.

Sample #20195

Acidity E2679: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the strict precision data of ASTM E2679:09(2016)e1.

Acidity D1613: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D1613:17.

Aldehydes as Acetaldehyde: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM E2313:20.

Appearance: This determination was not problematic. Almost all reporting participants agreed on a test result of Pass (Clear and Bright).

Ash content: This determination was not problematic. Almost all reporting participants agreed on a test result below the application range of 0.010 to 0.180 %M/M of ASTM D482:19. Therefore no z-scores were calculated.

Inorganic Chloride as Cl: This determination was problematic at the low concentration of 0.03 mg/kg. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM E2469:16.

Color Pt/Co (Manual): This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D1209:05(2019).

Color Pt/Co (Automated): This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5386:16.

Density at 20°C: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO12185:96.

Di Ethylene glycol: This determination was problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM E2409:20a.

Distillation: This determination was not problematic. In total four 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.

Iron as Fe: This determination was problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of ASTM E1615:16.

Miscibility with water: This determination was not problematic. 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 E2409:20a. Therefore, no z-scores were calculated.
The calculated reproducibility of the 2020 PT is lower than the reproducibility of the 2019 and 2018 PTs (0.031 vs 0.038 and 0.055 respectively).

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

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

Sample #20196

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. Four statistical outliers were observed and two other test results were excluded over 4 parameters. For the transmittance at 350, 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 250 nm the calculated reproducibility is not in agreement.

Option B: This determination was problematic for a number of laboratories. Fourteen statistical outliers were observed and three other test results were excluded over 4 parameters. For the transmittance at 350, 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 250 nm the calculated reproducibility is not in agreement.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	unit	n	average	2.8 * sd	R(lit)
Acidity as Acetic Acid (E2679)	mg/kg	10	1.38	2.69	0.70
Acidity as Acetic Acid (D1613)	mg/kg	45	6.0	5.7	14
Aldehydes as Acetaldehyde	mg/kg	44	13.0	6.9	11.1
Appearance		51	Pass	n.a.	n.a.
Ash content	%M/M	33	<0.01	n.e.	n.e.
Inorganic Chloride as Cl	mg/kg	20	0.026	0.046	0.022

Parameter	unit	n	average	2.8 * sd	R(lit)
Color Pt/Co (Manual)		22	1.8	2.5	7
Color Pt/Co (Automated)		43	1.5	1.8	4.8
Density at 20°C	kg/L	53	1.1133	0.0004	0.0005
Di Ethylene glycol	mg/kg	42	31.2	14.8	7.9
Initial Boiling Point	°C	42	197.0	0.8	3.1
50% recovered	°C	40	197.5	0.6	1.4
Dry Point	°C	39	197.8	0.8	2.1
Iron as Fe	mg/kg	37	0.012	0.015	0.013
Miscibility with water		27	Passes test	n.a.	n.a.
Purity by GC as received	%M/M	43	99.971	0.031	n.a.
Specific Gravity 20/20°C		48	1.1154	0.0003	0.0005
Water	mg/kg	53	142	38	23
UV Transmittance at 350nm (N_2)	%T	7	99.92	0.22	0.94
UV Transmittance at 275nm (N_2)	%T	8	98.96	1.17	1.10
UV Transmittance at 250nm (N_2)	%T	7	97.22	4.33	2.06
UV Transmittance at 220nm (N_2)	%T	7	92.90	4.11	9.68
UV Transmittance at 350nm	%T	43	99.97	0.46	1.15
UV Transmittance at 275nm	%T	43	99.32	0.99	2.11
UV Transmittance at 250nm	%T	42	96.22	1.40	1.10
UV Transmittance at 220nm	%T	45	80.06	3.05	4.05

Table 5: reproducibilities of tests on samples #20195 and #20196

Without further statistical calculations, it can be concluded that for most tests there is a good compliance of the group of participating laboratories with the target reproducibilities. Problematic tests have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF OCTOBER 2020 WITH PREVIOUS PTS

	October 2020	October 2019	October 2018	October 2017	October 2016
Number of reporting laboratories	60	54	61	62	59
Number of test results	852	759	855	880	808
Number of statistical outliers	45	30	33	37	46
Percentage of statistical outliers	5.3%	4.0%	3.9%	4.2%	5.7%

Table 6: 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 reference test methods. The conclusions are given the following table.

	October 2020	October 2019	October 2018	October 2017	October 2016
Acidity as Acetic Acid (E2679)	--	--	(--)	--	--
Acidity as Acetic Acid (D1613)	++	+	++	++	++
Aldehydes as Acetaldehyde	+	+	++	++	++
Ash content	n.e.	(++)	(++)	(++)	(++)
Inorganic Chloride as Cl	--	--	-	--	--
Color Pt/Co (Manual)	++	+	+	++	++
Color Pt/Co (Automated)	++	+/-	+	++	++
Density at 20°C	+	++	+	+	++
Di Ethylene glycol	-	-	--	-	--
Distillation	++	++	++	+	++
Iron as Fe	-	--	+/-	+	+
Specific Gravity 20/20°C	+	++	+	+	++
Water	-	+/-	-	--	+/-
UV Transmittance at 350nm	++	+/-	+/-	+/-	++
UV Transmittance at 275nm	+	+/-	+	-	+
UV Transmittance at 250nm	-	-	-	-	-
UV Transmittance at 220nm	+	+	+	+	+

Table 7: comparison determinations against the reference test method

Results between brackets should be used with due care

The following performance categories were used:

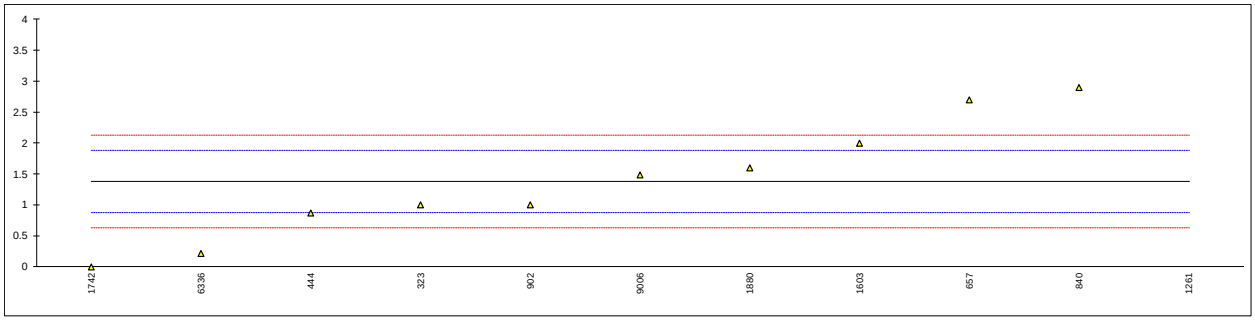
++ : group performed much better than the reference test method
+ : group performed better than the reference test method
+/- : group performance equals the reference test method
- : group performed worse than the reference test method
-- : group performed much worse than the reference test method
n.e.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

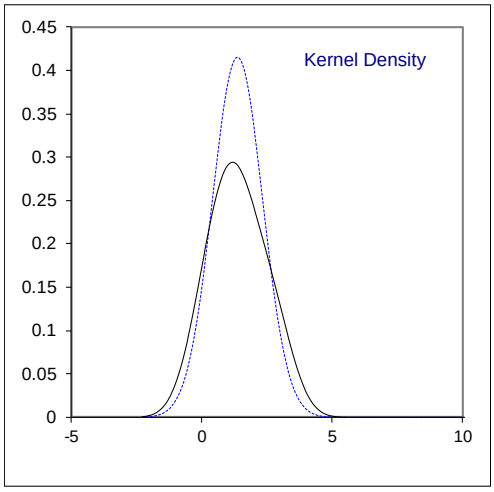
APPENDIX 1

Determination of Acidity as Acetic Acid (E2679) on sample #20195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168		-----		-----	
169		-----		-----	
171		-----		-----	
174		-----		-----	
311		-----		-----	
323	E2679	1.0		-1.52	
343		-----		-----	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E2679	0.870		-2.04	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	E2679	2.7		5.31	
840	E2679	2.9	C	6.11	first reported 5.86
848		-----		-----	
852		-----		-----	
857		-----		-----	
860		-----		-----	
861		-----		-----	
862		-----		-----	
865		-----		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	E2679	1.0		-1.52	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117		-----		-----	
1135		-----		-----	
1151		-----		-----	
1169		-----		-----	
1217		-----		-----	
1261	E2679	28	D(0.01)	106.88	
1467		-----		-----	
1509		-----		-----	
1515		-----		-----	
1603	In house	2.0		2.50	
1608		-----		-----	
1656		-----		-----	
1701		-----		-----	
1718		-----		-----	
1742	E2679	0.0		-5.53	
1823		-----		-----	
1880	E2679	1.6		0.89	
1954		-----		-----	
2458		-----		-----	
6198		-----		-----	
6247		-----		-----	
6262		-----		-----	
6336	E2679	0.222		-4.64	
7006		-----		-----	
7013		-----		-----	
9006	E2679	1.49		0.45	
9008		-----		-----	
9009		-----		-----	

normality	OK
n	10
outliers	1
mean (n)	1.378
st.dev. (n)	0.9599
R(calc.)	2.688
st.dev.(E2679:09e1)	0.2491
R(E2679:09e1)	0.697

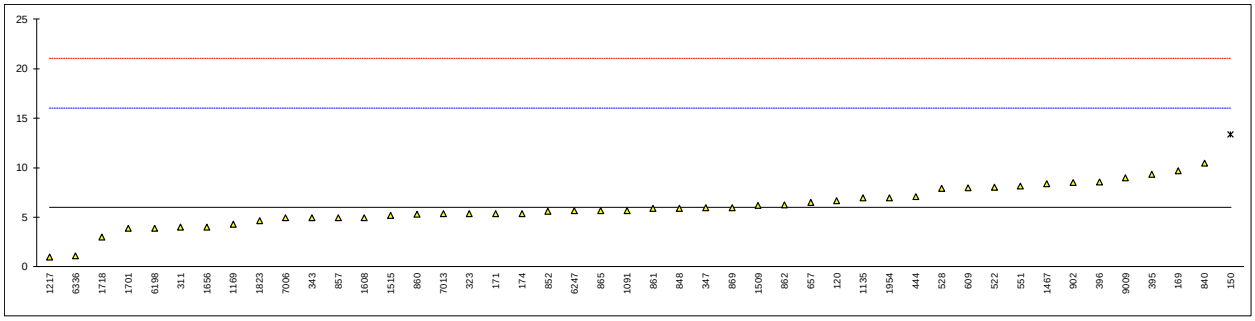


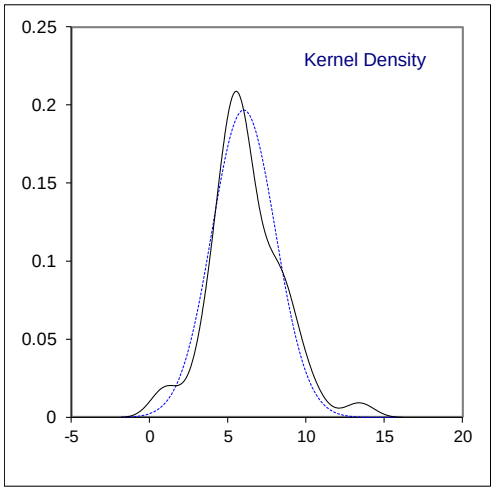


Determination of Acidity as Acetic Acid (D1613) on sample #20195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D1613	6.7		0.13	
150	D1613	13.4	R(0.05)	1.47	
168		-----		-----	
169	D1613	9.700		0.73	
171	D1613	5.4		-0.13	
174	D1613	5.4		-0.13	
311	D1613	4		-0.41	
323	D1613	5.4		-0.13	
343	D1613	5		-0.21	
347	D1613	6		-0.01	
370		-----		-----	
395	D1613	9.34		0.66	
396	D1613	8.6		0.51	
444	D1613	7.11		0.22	
522	D1613	8.08		0.41	
528	D1613	7.95		0.38	
551	D1613	8.2		0.43	
557		-----		-----	
558		-----		-----	
609	D1613	8		0.39	
610		-----		-----	
621		-----		-----	
657	D1613	6.5		0.09	
840	D1613	10.5		0.89	
848	D1613	5.9		-0.03	
852	D1613	5.6		-0.09	
857	D1613	5.0		-0.21	
860	D1613	5.3		-0.15	
861	D1613	5.9		-0.03	
862	D1613	6.3		0.05	
865	D1613	5.7		-0.07	
869	D1613	6		-0.01	
872		-----		-----	
886		-----		-----	
902	D1613	8.5		0.49	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	D1613	5.7		-0.07	
1117	D1613	<5	C	-----	first reported <0,0005 mg/kg
1135	D1613	7		0.19	
1151		-----		-----	
1169	D1613	4.3		-0.35	
1217	D1613	1		-1.01	
1261		-----		-----	
1467	D1613	8.4		0.47	
1509	D1613	6.2		0.03	
1515	D1613	5.2		-0.17	
1603		-----		-----	
1608	D1613	5	C	-0.21	first reported 0.0005 mg/kg
1656	D1613	4		-0.41	
1701	D1613	3.9		-0.43	
1718	D1613	3.0		-0.61	
1742		-----		-----	
1823	D1613	4.7		-0.27	
1880		-----		-----	
1954	D1613	7.0		0.19	
2458		-----		-----	
6198	D1613	3.9	C	-0.43	first reported 0.0004 mg/kg
6247	D1613	5.68		-0.07	
6262		-----		-----	
6336	D1613	1.10		-0.99	
7006	D1613	4.9569		-0.22	
7013	D1613	5.39		-0.13	
9006		-----		-----	
9008		-----		-----	
9009	D1613	9		0.59	

normality	OK
n	45
outliers	1
mean (n)	6.033
st.dev. (n)	2.0250
R(calc.)	5.670
st.dev.(D1613:17)	5.0000
R(D1613:17)	14

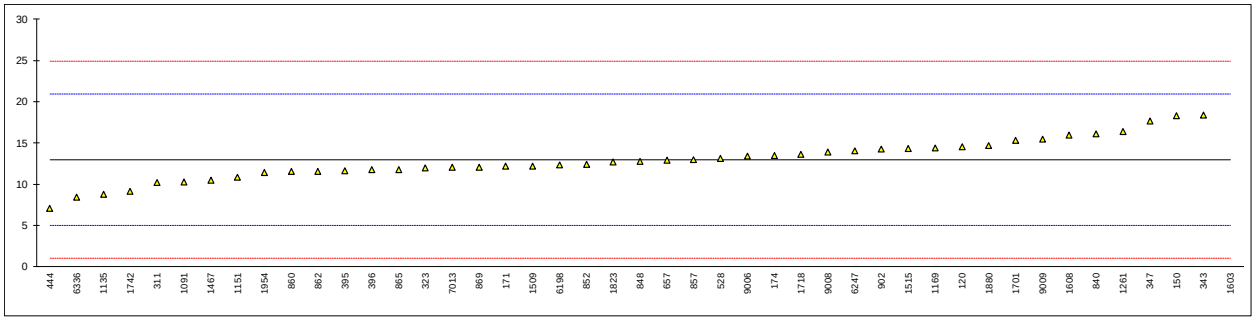


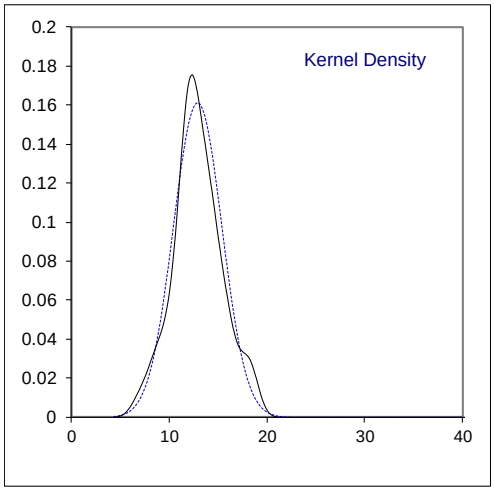


Determination of Aldehydes as Acetaldehyde on sample #20195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E2313	14.6		0.41	
150	E2313	18.3		1.34	
168		-----		-----	
169		-----		-----	
171	E2313	12.2		-0.19	
174	E2313	13.5		0.14	
311	E2313	10.2		-0.69	
323	E2313	12.0		-0.24	
343	E2313	18.4		1.37	
347	E2313	17.7	C	1.19	first reported 22
370		-----		-----	
395	E2313	11.65		-0.33	
396	E2313	11.8		-0.29	
444	E2313	7.11		-1.47	
522		-----		-----	
528	E2313	13.14		0.05	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	E2313	12.9		-0.01	
840	E2313	16.1	C	0.79	first reported 22.3
848	E2313	12.8		-0.04	
852	E2313	12.4		-0.14	
857	E2313	13.0		0.01	
860	E2313	11.6		-0.34	
861		-----		-----	
862	E2313	11.6		-0.34	
865	E2313	11.8		-0.29	
869	E2313	12.1		-0.21	
872		-----		-----	
886		-----		-----	
902	E2313	14.3		0.34	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2313	10.3		-0.67	
1117	In house	< 0,1		<-3.23	possibly a false negative test result?
1135	E2313	8.8		-1.04	
1151	E2313	10.88	C	-0.52	first reported 1.71
1169	E2313	14.41		0.37	
1217		-----		-----	
1261	E2313	16.42		0.87	
1467	E2313	10.5	C	-0.62	first reported 1.43
1509	E2313	12.22		-0.18	
1515	E2313	14.37		0.36	
1603	In house	65.6	C,R(0.01)	13.23	first reported 72.9
1608	E2313	15.98		0.76	
1656		-----		-----	
1701	E2313	15.33		0.60	
1718	E2313	13.64		0.17	
1742	E2313	9.2		-0.94	
1823	E2313	12.697		-0.06	
1880	E2313	14.72		0.44	
1954	E2313	11.44	C	-0.38	first reported 9.6
2458		-----		-----	
6198	E2313	12.38	C	-0.14	first reported 8.4438
6247	E2313	14.09		0.29	
6262		-----		-----	
6336	E2313	8.46	C	-1.13	first reported 2.46
7006		-----		-----	
7013	E2313	12.087		-0.22	
9006	E2313	13.4		0.11	
9008	E2313	13.9		0.24	
9009	E2313	15.47		0.63	

normality	OK
n	44
outliers	1
mean (n)	12.952
st.dev. (n)	2.4776
R(calc.)	6.937
st.dev.(E2313:20)	3.9790
R(E2313:20)	11.141





Determination of Appearance on sample #20195;

lab	method	value	mark	z(targ)	remarks
120	D4176	PASS		-----	
150	E2680	Pass		-----	
168	E2680	Pass		-----	
169	Visual	CBFSM		-----	
171	Visual	Pass		-----	
174	Visual	Clear & Free		-----	
311	E2680	pass		-----	
323	Visual	C&B		-----	
343	E2680	pass		-----	
347	E2680	Pass		-----	
370	E2680	pass		-----	
395	E2680	PASS		-----	
396	E2680	Pass		-----	
444	E2680	Pass		-----	
522	Visual	PASS		-----	
528	E2680	PASS		-----	
551	E2680	Pass		-----	
557		-----		-----	
558		-----		-----	
609	E2680	Pass		-----	
610		-----		-----	
621		-----		-----	
657	E2680	Pass		-----	
840	E2680	Pass		-----	
848	E2680	B&C		-----	
852	Visual	pass		-----	
857	E2680	Pass		-----	
860	E2680	Pass		-----	
861	Visual	Bright clear		-----	
862	E2680	PASS		-----	
865	E2680	Pass		-----	
869	E2680	B&C		-----	
872		-----		-----	
886		-----		-----	
902	E2680	PASS		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	Visual	clear		-----	
1117	E2680	Pass		-----	
1135	Visual	CFSM		-----	
1151	Visual	clear		-----	
1169	D4176	CFSM		-----	
1217	Visual	pass		-----	
1261		clear		-----	
1467	E2680	pass		-----	
1509	E2680	Pass		-----	
1515	E2680	Pass		-----	
1603	Visual	CFP		-----	
1608	D4176	Pass		-----	
1656	Visual	Pass		-----	
1701		-----		-----	
1718	E2680	CFFSM		-----	
1742	E2680	Fail		-----	
1823	E2680	pass		-----	
1880	E2680	Pass		-----	
1954	Visual	clear colorless liquid		-----	
2458		-----		-----	
6198	D4176	Pass		-----	
6247	D4176	Clear colourless liquid		-----	
6262		-----		-----	
6336	E2680	pass		-----	
7006		-----		-----	
7013		-----		-----	
9006		-----		-----	
9008	Visual	Pass		-----	
9009	Visual	Pass		-----	
	n	51			
	mean (n)	Pass (Clear and Bright)			

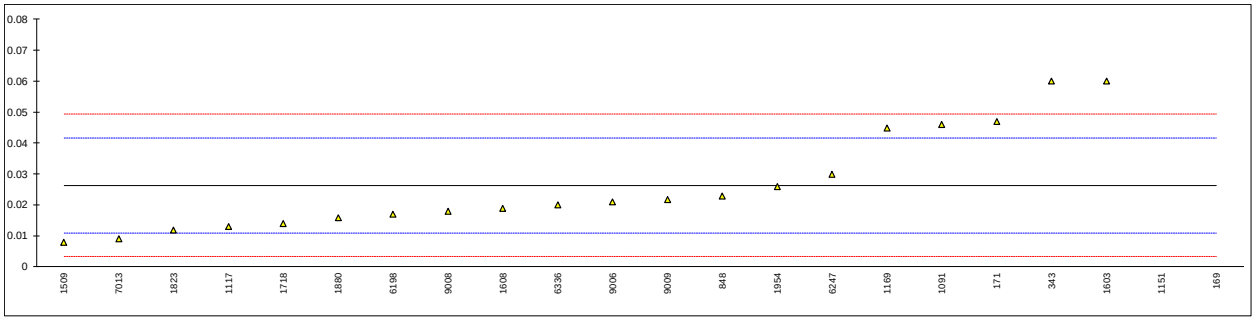
Determination of Ash content on sample #20195; results in %M/M

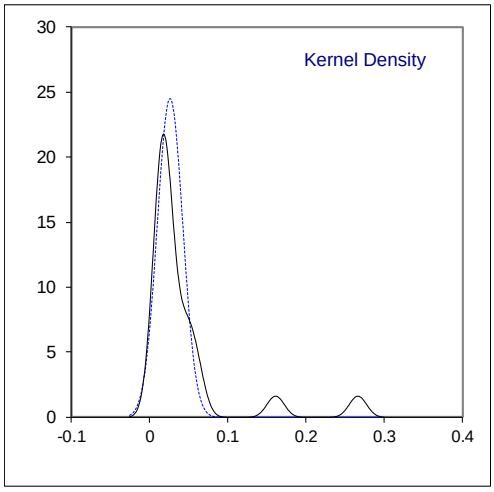
lab	method	value	mark	z(targ)	remarks
120	D482	0.000		-----	
150	D482	<0.001		-----	
168		-----		-----	
169	D482	0.000		-----	
171	D482	<0.010	C	-----	first reported 0.006
174	D482	<0.001		-----	
311	D482	<0.001		-----	
323	D482	<0.0010		-----	
343	D482	<0,001		-----	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396	D482	<0,0100		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551	D482	<0.001		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	D482	0.0004		-----	
840	D482	0.0001		-----	
848	D482	0.0002		-----	
852	D482	<0.001		-----	
857	D482	<0.001		-----	
860	D482	<0.001		-----	
861		-----		-----	
862	D482	0.0002		-----	
865	D482	0.0004		-----	
869	D482	0.0003		-----	
872		-----		-----	
886		-----		-----	
902	D482	<0,001		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D482	< 10		-----	
1135	D482	0.0004	C	-----	first reported 0.004
1151	D482	0.0007		-----	
1169		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467	D482	0.000566		-----	
1509	D482	0.0003		-----	
1515		-----		-----	
1603	In house	N.N. < 0,0010		-----	NN= below quantification limit
1608	D482	0		-----	
1656	D482	<0.001		-----	
1701		-----		-----	
1718	D482	0.0000		-----	
1742		-----		-----	
1823	D482	<0.010		-----	
1880		-----		-----	
1954	D482	0.00045	C	-----	first reported 0.0045
2458		-----		-----	
6198		-----		-----	
6247	D482	0.0003		-----	
6262		-----		-----	
6336	D482	0.0002		-----	
7006		-----		-----	
7013	D482	0.0002998		-----	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	
	n	33			
	mean (n)	<0.01			

Determination of Inorganic Chloride as Cl on sample #20195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	IMPCA002	<0.1		-----	
168		-----		-----	
169	INH-2637	0.266	C,R(0.01)	31.19	first reported 0.401
171	E2469	0.047		2.69	
174	E2469	<0.01		-----	
311	E2469	<0.01		-----	
323	E2469	<0.03		-----	
343	E2469	0.06		4.39	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444		-----		-----	
522		-----		-----	
528		-----		-----	
551		-----		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657		-----		-----	
840	IMPCA002	<0.2		-----	
848	E2469	0.023		-0.43	
852		-----		-----	
857	E2469	<0.01		-----	
860		-----		-----	
861		-----		-----	
862		-----		-----	
865	INH-001	<0.2		-----	
869		-----		-----	
872		-----		-----	
886		-----		-----	
902	E2469	<0,05		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2469	0.046		2.56	
1117	E2469	0.013		-1.73	
1135	E2469	<0.2		-----	
1151	E2469	0.161	R(0.01)	17.53	
1169	E2469	0.045		2.43	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	E2469	0.0080		-2.38	
1515		-----		-----	
1603	In house	0.06	C	4.39	first reported 0.11
1608	E2469	0.019		-0.95	
1656	E2469	<0.03		-----	
1701		-----		-----	
1718	E2469	0.0141		-1.59	
1742		-----		-----	
1823	E2469	0.012		-1.86	
1880	E2469	0.016		-1.34	
1954	E2469	0.026		-0.04	
2458		-----		-----	
6198	E2469	0.017		-1.21	
6247	E2469	0.03		0.48	
6262		-----		-----	
6336	E2469	0.02		-0.82	
7006		-----		-----	
7013	E2469	0.009		-2.25	
9006	E2469	0.021		-0.69	
9008	E2469	0.018		-1.08	
9009	E2469	0.0217		-0.60	

normality	suspect
n	20
outliers	2
mean (n)	0.0263
st.dev. (n)	0.01627
R(calc.)	0.0456
st.dev.(E2469:16)	0.00769
R(E2469:16)	0.0215

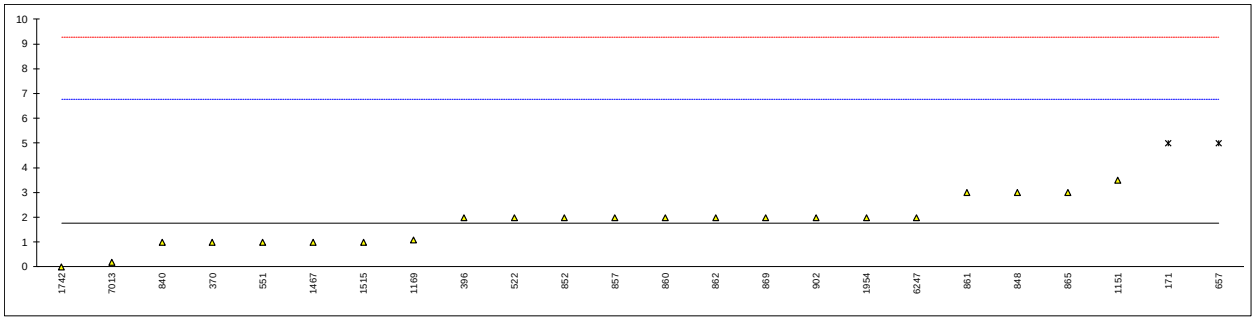


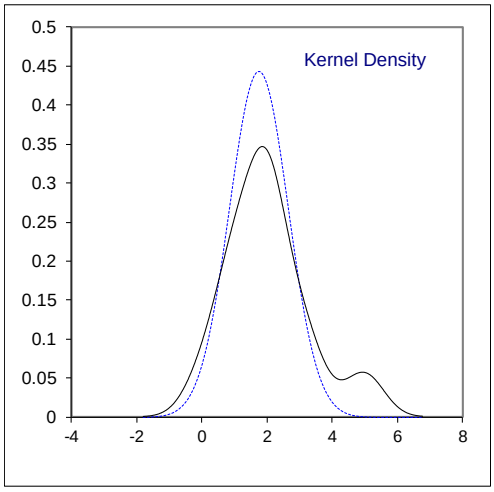


Determination of Color Pt/Co (Manual) on sample #20195

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
168		-----		-----	
169	D1209	<5.0		-----	
171	D1209	5	R(0.05)	1.29	
174		-----		-----	
311	D1209	<5		-----	
323	D1209	<5		-----	
343		-----		-----	
347		-----		-----	
370	D1209	1		-0.31	
395		-----		-----	
396	D1209	2		0.09	
444		-----		-----	
522	D1209	2		0.09	
528		-----		-----	
551	D1209	1		-0.31	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	D1209	5	R(0.05)	1.29	
840	D1209	1		-0.31	
848	D1209	3		0.49	
852	D1209	2		0.09	
857	D1209	2		0.09	
860	D1209	2		0.09	
861	D1209	3		0.49	
862	D1209	2		0.09	
865	D1209	3		0.49	
869	D1209	2		0.09	
872		-----		-----	
886	D1209	<5		-----	
902	D1209	2		0.09	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117		-----		-----	
1135		-----		-----	
1151	D1209	3.5		0.69	
1169	D1209	1.1	C	-0.27	first reported 7.5
1217		-----		-----	
1261	D1209	< 5		-----	
1467	D1209	1		-0.31	
1509	D1209	<5		-----	
1515	D1209	1		-0.31	
1603		-----		-----	
1608		-----		-----	
1656	D1209	<5		-----	
1701		-----		-----	
1718	D1209	<5		-----	
1742	D1209	0.0		-0.71	
1823		-----		-----	
1880		-----		-----	
1954	D1209	2		0.09	
2458		-----		-----	
6198		-----		-----	
6247	D1209	2		0.09	
6262		-----		-----	
6336	D1209	<5		-----	
7006		-----		-----	
7013	D1209	0.2		-0.63	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	

normality	OK
n	22
outliers	2
mean (n)	1.76
st.dev. (n)	0.902
R(calc.)	2.52
st.dev.(D1209:05)	2.500
R(D1209:05)	7

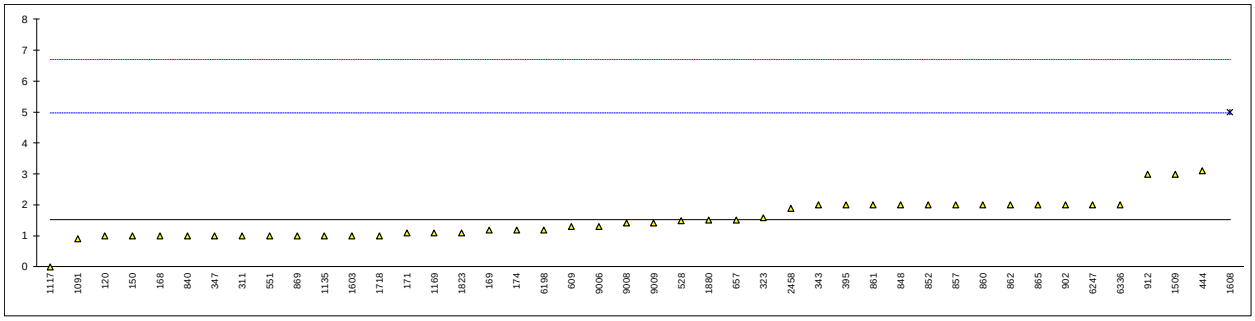


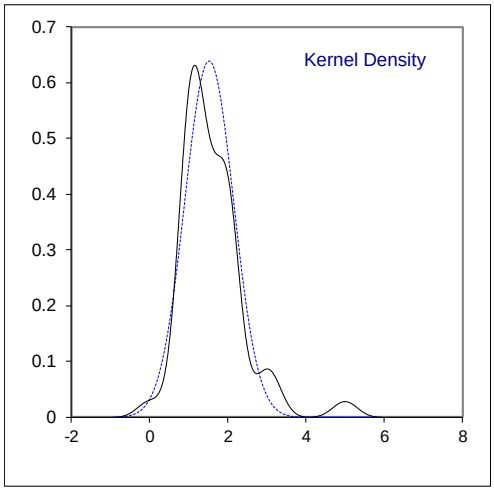


Determination of Color Pt/Co (Automated) on sample #20195

lab	method	value	mark	z(targ)	remarks
120	D5386	1		-0.30	
150	D5386	1		-0.30	
168	D5386	1		-0.30	
169	D5386	1.19		-0.19	
171	D5386	1.1		-0.24	
174	D5386	1.2		-0.19	
311	D5386	1		-0.30	
323	D5386	1.6		0.05	
343	D5386	2		0.28	
347	D5386	1		-0.30	
370		-----		-----	
395	D5386	2		0.28	
396		-----		-----	
444	D5386	3.1		0.91	
522		-----		-----	
528	D5386	1.5		-0.01	
551	D5386	1		-0.30	
557		-----		-----	
558		-----		-----	
609	D5386	1.3		-0.13	
610		-----		-----	
621		-----		-----	
657	D5386	1.52		0.00	
840	D5386	1.0		-0.30	
848	D5386	2		0.28	
852	D5386	2		0.28	
857	D5386	2		0.28	
860	D5386	2		0.28	
861	D5386	2		0.28	
862	D5386	2		0.28	
865	D5386	2		0.28	
869	D5386	1		-0.30	
872		-----		-----	
886		-----		-----	
902	D5386	2		0.28	
912	D5386	3.0		0.86	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	D5386	0.9		-0.36	
1117	D1209	0		-0.88	
1135	D5386	1		-0.30	
1151		-----		-----	
1169	D5386	1.1	C	-0.24	first reported 7.5
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	D5386	3		0.86	
1515		-----		-----	
1603	In house	1		-0.30	
1608	D1209	5	R(0.01)	2.02	
1656	D5386	<5		-----	
1701		-----		-----	
1718	D5386	1		-0.30	
1742		-----		-----	
1823	D5386	1.1		-0.24	
1880	D5386	1.51		-0.01	
1954		-----		-----	
2458	ISO6271	1.9		0.22	
6198	D5386	1.2		-0.19	
6247	D5386	2		0.28	
6262		-----		-----	
6336	D5386	2		0.28	
7006		-----		-----	
7013		-----		-----	
9006	D5386	1.3		-0.13	
9008	D5386	1.42		-0.06	
9009	D5386	1.42		-0.06	

normality	OK
n	43
outliers	1
mean (n)	1.52
st.dev. (n)	0.625
R(calc.)	1.75
st.dev.(D5386:16)	1.727
R(D5386:16)	4.83

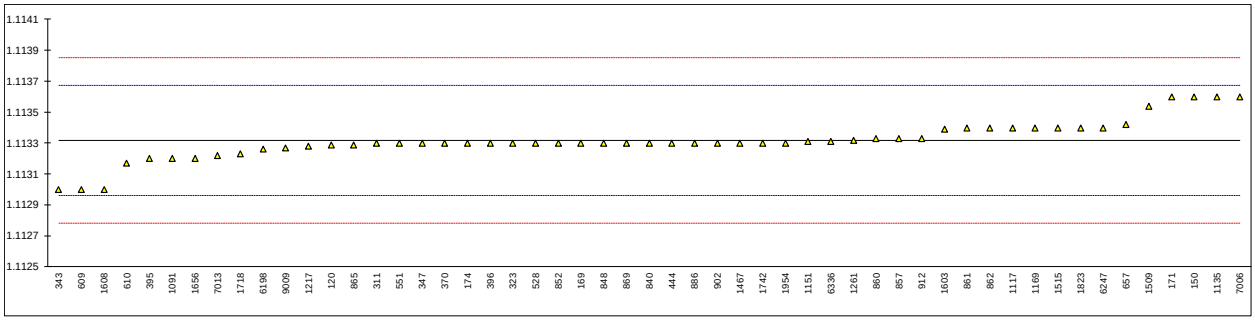


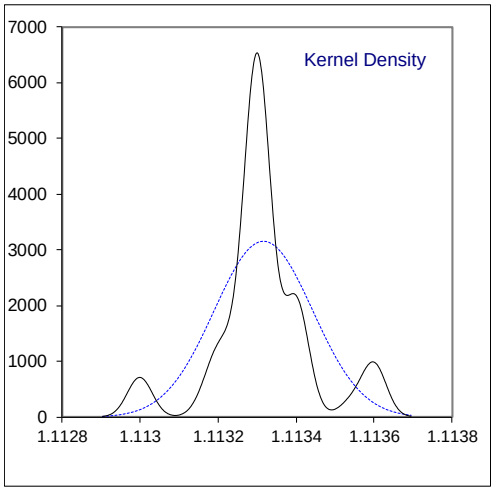


Determination of Density at 20°C on sample #20195; results in kg/L

lab	method	value	mark	z(targ)	remarks
120	D4052	1.11329		-0.15	
150	D4052	1.1136		1.58	
168		-----		-----	
169	D4052	1.1133		-0.10	
171	ISO12185	1.1136		1.58	
174	D4052	1.1133		-0.10	
311	D4052	1.1133		-0.10	
323	D4052	1.1133		-0.10	
343	D4052	1.113		-1.78	
347	D4052	1.1133		-0.10	
370	D4052	1.1133		-0.10	
395	D4052	1.1132		-0.66	
396	D4052	1.1133		-0.10	
444	D4052	1.1133		-0.10	
522		-----		-----	
528	D4052	1.1133		-0.10	
551	D4052	1.1133		-0.10	
557		-----		-----	
558		-----		-----	
609	D4052	1.1130		-1.78	
610	D4052	1.11317	C	-0.82	first reported 1113.17 kg/L
621		-----		-----	
657	D4052	1.11342		0.58	
840	D4052	1.1133		-0.10	
848	D4052	1.1133		-0.10	
852	D4052	1.1133		-0.10	
857	D4052	1.11333		0.07	
860	D4052	1.11333		0.07	
861	D4052	1.1134		0.46	
862	D4052	1.1134		0.46	
865	D4052	1.11329		-0.15	
869	D4052	1.1133		-0.10	
872		-----		-----	
886	D4052	1.1133		-0.10	
902	ISO12185	1.1133		-0.10	
912	ISO12185	1.11333		0.07	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	D4052	1.1132		-0.66	
1117	D4052	1.1134		0.46	
1135	ISO12185	1.1136		1.58	
1151	D4052	1.11331		-0.04	
1169	D4052	1.1134		0.46	
1217	ISO12185	1.11328		-0.21	
1261	D4052	1.11332		0.02	
1467	D4052	1.1133	C	-0.10	first reported 1.1128
1509	D4052	1.11354		1.25	
1515	D4052	1.1134		0.46	
1603	In house	1.11339		0.41	
1608	D4052	1.1130		-1.78	
1656	D4052	1.1132		-0.66	
1701		-----		-----	
1718	D4052	1.11323		-0.49	
1742	ISO12185	1.1133		-0.10	
1823	D4052	1.1134		0.46	
1880		-----		-----	
1954	D4052	1.1133	C	-0.10	first reported 1.1111
2458		-----		-----	
6198	D4052	1.11326		-0.32	
6247	D4052	1.1134		0.46	
6262		-----		-----	
6336	ISO12185	1.11331		-0.04	
7006	D4052	1.1136		1.58	
7013	D4052	1.11322		-0.54	
9006		-----		-----	
9008		-----		-----	
9009	D4052	1.11327		-0.26	

normality	suspect
n	53
outliers	0
mean (n)	1.11332
st.dev. (n)	0.000126
R(calc.)	0.00035
st.dev.(ISO12185:96)	0.000179
R(ISO12185:96)	0.0005

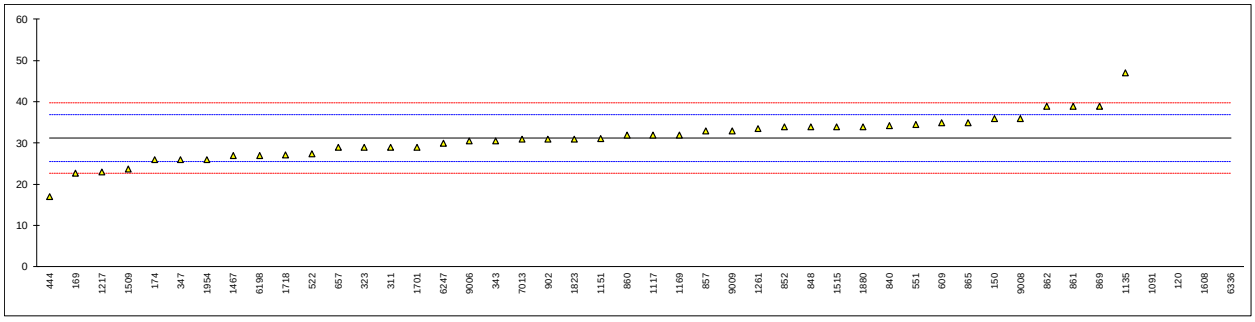


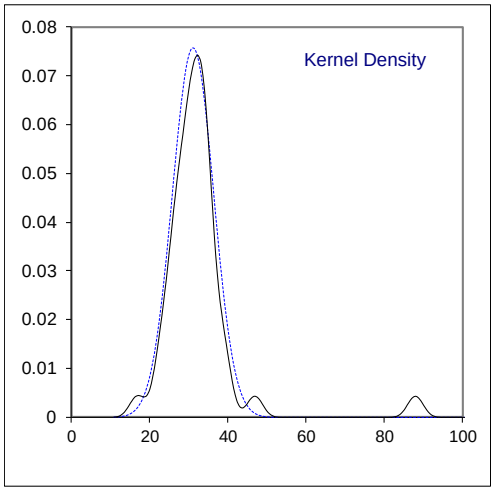


Determination of Di Ethylene glycol on sample #20195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E2409	166.30	R(0.01)	47.64	
150	E2409	36		1.69	
168		-----		-----	
169	E2409	22.8		-2.96	
171	E2409	<100	C	-----	first reported 99.93
174	E2409	26		-1.84	
311	INH-100	29		-0.78	
323	E2409	29		-0.78	
343	E2409	30.6		-0.21	
347	E2409	26		-1.84	
370		-----		-----	
395		-----		-----	
396	E2409	<50		-----	
444	E2409	17	C	-5.01	first reported 0.0017 mg/kg
522	E2409	27.4		-1.34	
528		-----		-----	
551	E2409	34.6		1.20	
557		-----		-----	
558		-----		-----	
609	E2409	35		1.34	
610		-----		-----	
621		-----		-----	
657	E2409	29.0		-0.78	
840	E2409	34.3		1.09	
848	E2409	34		0.99	
852	E2409	34		0.99	
857	E2409	33		0.63	
860	E2409	32		0.28	
861	E2409	39		2.75	
862	E2409	39		2.75	
865	E2409	35		1.34	
869	E2409	39		2.75	
872		-----		-----	
886		-----		-----	
902	E2409	31		-0.07	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2409	88	R(0.01)	20.03	
1117	E2409	32	C	0.28	first reported 59
1135	E2409	47		5.57	
1151	E2409	31.09		-0.04	
1169	E2409	32		0.28	
1217	E2409	23.0		-2.89	
1261	E2409	33.56		0.83	
1467	E2409	27		-1.48	
1509	E2409	23.7		-2.65	
1515	E2409	34.0		0.99	
1603	In house	N.N. <50	C	-----	first reported <0,0050 mg/kg
1608	E2409	200	R(0.01)	59.53	
1656		-----		-----	
1701	E2409	29		-0.78	
1718	E2409	27.1		-1.45	
1742		-----		-----	
1823	E2409	31		-0.07	
1880	E2409	34		0.99	
1954	E2409	26.0		-1.84	
2458		-----		-----	
6198	E2409	27		-1.48	
6247	E2409	30		-0.43	
6262		-----		-----	
6336	E2409	200	C,R(0.01)	59.53	first reported 0
7006	E2409	<LOQ[42]		-----	
7013	E2409	30.98		-0.08	
9006	E2409	30.54		-0.24	
9008	E2409	36		1.69	
9009	E2409	33		0.63	

normality	suspect
n	42
outliers	4
mean (n)	31.21
st.dev. (n)	5.270
R(calc.)	14.76
st.dev.(E2409:20a)	2.835
R(E2409:20a)	7.94



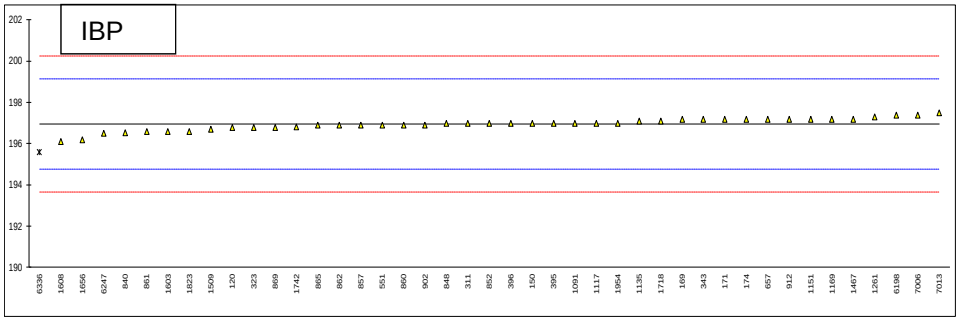


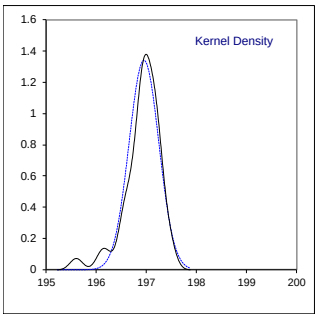
Determination of Distillation: IBP, 50% recovered, Dry Point on sample #20195; results in °C

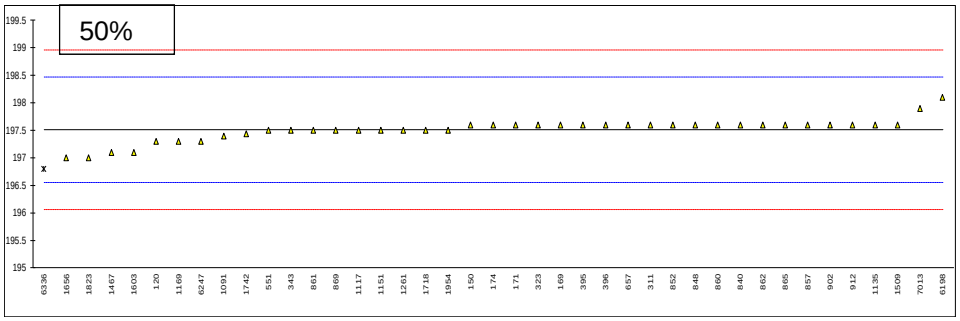
lab	method	IBP	mark	z(targ)	50% rec	mark	z(targ)	DP	mark	z(targ)
120	D1078-automated	196.8		-0.14	197.3		-0.44	197.6		-0.29
150	D1078-automated	197.0		0.04	197.6		0.18	197.8		-0.02
168		-----		-----	-----		-----	-----		-----
169	D1078-automated	197.2		0.22	197.6		0.18	197.9		0.11
171	D1078-automated	197.2		0.22	197.6		0.18	197.6		-0.29
174	D1078-automated	197.2		0.22	197.6		0.18	197.8		-0.02
311	D1078-automated	197.0		0.04	197.6		0.18	197.8		-0.02
323	D1078-manual	196.8		-0.14	197.6		0.18	197.9		0.11
343	D1078-automated	197.2		0.22	197.5		-0.02	198		0.24
347		-----		-----	-----		-----	-----		-----
370		-----		-----	-----		-----	-----		-----
395	D1078-manual	197.0		0.04	197.6		0.18	198.0		0.24
396	D1078-manual	197.0		0.04	197.6		0.18	198.0		0.24
444		-----		-----	-----		-----	-----		-----
522		-----		-----	-----		-----	-----		-----
528		-----		-----	-----		-----	-----		-----
551	D1078-automated	196.9		-0.05	197.5		-0.02	198.0		0.24
557		-----		-----	-----		-----	-----		-----
558		-----		-----	-----		-----	-----		-----
609		-----		-----	-----		-----	-----		-----
610		-----		-----	-----		-----	-----		-----
621		-----		-----	-----		-----	-----		-----
657	D1078-manual	197.2		0.22	197.6		0.18	198.0		0.24
840	D1078-automated	196.55		-0.37	197.60		0.18	197.74		-0.10
848	D1078-manual	197.0		0.04	197.6		0.18	198.1		0.37
852	D1078-manual	197.0		0.04	197.6		0.18	198.0		0.24
857	D1078-manual	196.9		-0.05	197.6		0.18	197.9		0.11
860	D1078-manual	196.9		-0.05	197.6		0.18	198.0		0.24
861	D1078-manual	196.6		-0.32	197.5		-0.02	198.4		0.77
862	D1078-manual	196.9		-0.05	197.6		0.18	197.9		0.11
865	D1078-automated	196.9		-0.05	197.6		0.18	198.0		0.24
869	D1078-automated	196.8		-0.14	197.5		-0.02	197.7		-0.15
872		-----		-----	-----		-----	-----		-----
886		-----		-----	-----		-----	-----		-----
902	D1078-automated	196.9		-0.05	197.6		0.18	197.7		-0.15
912	D1078-manual	197.2		0.22	197.6		0.18	198.0		0.24
913		-----		-----	-----		-----	-----		-----
962		-----		-----	-----		-----	-----		-----
963		-----		-----	-----		-----	-----		-----
1091	D1078-automated	197.0		0.04	197.4		-0.23	198.8	R(0.05)	1.30
1117	D1078-automated	197.0		0.04	197.5		-0.02	197.5		-0.42
1135	D1078-automated	197.1		0.13	197.6		0.18	197.9		0.11
1151	D1078-automated	197.2		0.22	197.5		-0.02	198.3		0.64
1169	D1078-manual	197.2		0.22	197.3		-0.44	197.6		-0.29
1217		-----		-----	-----		-----	-----		-----
1261	D1078-automated	197.3		0.32	197.5		-0.02	197.7		-0.15
1467	D1078-automated	197.2		0.22	197.1		-0.85	197.5		-0.42
1509	D1078-automated	196.7		-0.23	197.6		0.18	197.8		-0.02
1515		-----		-----	-----		-----	-----		-----
1603	D1078-automated	196.6		-0.32	197.1		-0.85	197.3		-0.68
1608	D1078-automated	196.1		-0.78	-----		-----	197.1		-0.95
1656	D1078-manual	196.2		-0.69	197.0		-1.06	197.4		-0.55
1701		-----		-----	-----		-----	-----		-----
1718	D1078-automated	197.1		0.13	197.5		-0.02	198.0		0.24
1742	D1078-automated	196.82		-0.12	197.44		-0.15	197.71		-0.14
1823	D1078-automated	196.6		-0.32	197.0		-1.06	197.5		-0.42
1880		-----		-----	-----		-----	-----		-----
1954	D1078-automated	197.0		0.04	197.5		-0.02	197.7		-0.15
2458		-----		-----	-----		-----	-----		-----
6198		197.4		0.41	198.1		1.22	198.8	R(0.05)	1.30
6247	D1078-automated	196.5		-0.41	197.3		-0.44	197.6		-0.29
6262		-----		-----	-----		-----	-----		-----
6336	D1078-automated	195.6	R(0.01)	-1.23	196.8	ex,C	-1.48	196.8	R(0.05)	-1.34
7006		197.4		0.41	-----		-----	198.4		0.77
7013	D1078-automated	197.5		0.50	197.9		0.81	-----		-----
9006		-----		-----	-----		-----	-----		-----
9008		-----		-----	-----		-----	-----		-----
9009		-----		-----	-----		-----	-----		-----

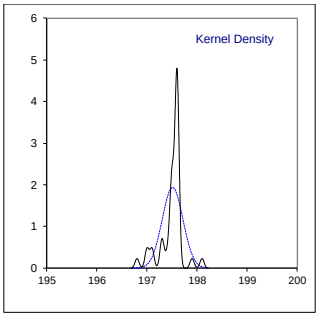
normality	suspect	not OK	OK
n	42	40	39
outliers	1	0 +1ex	3
mean (n)	196.95	197.51	197.82
st.dev. (n)	0.298	0.207	0.275
R(calc.)	0.83	0.58	0.77
st.dev.(D1078-A:11)	1.097	0.482	0.756
R(D1078-A:11)	3.07	1.35	2.12
Compare:			
R(D1078-M:11)	2.11	1.28	2.57

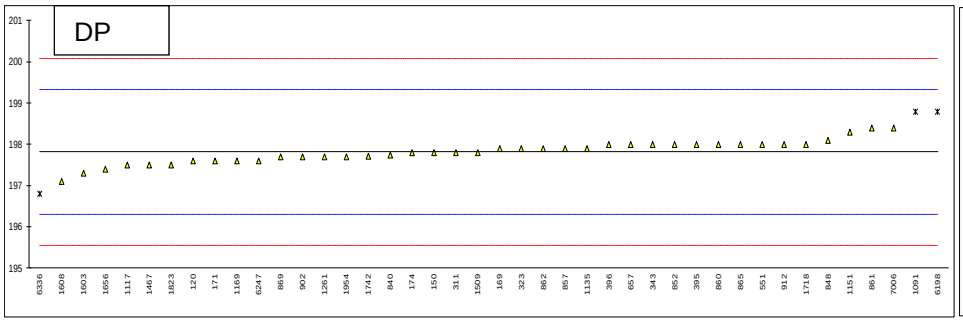
ex= test result excluded as two related reported test results are statistical outliers
lab 6336 first reported 196

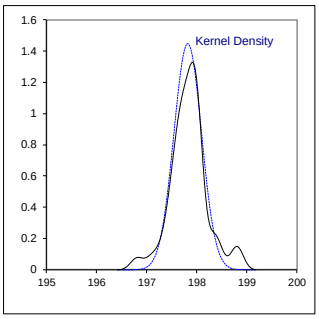








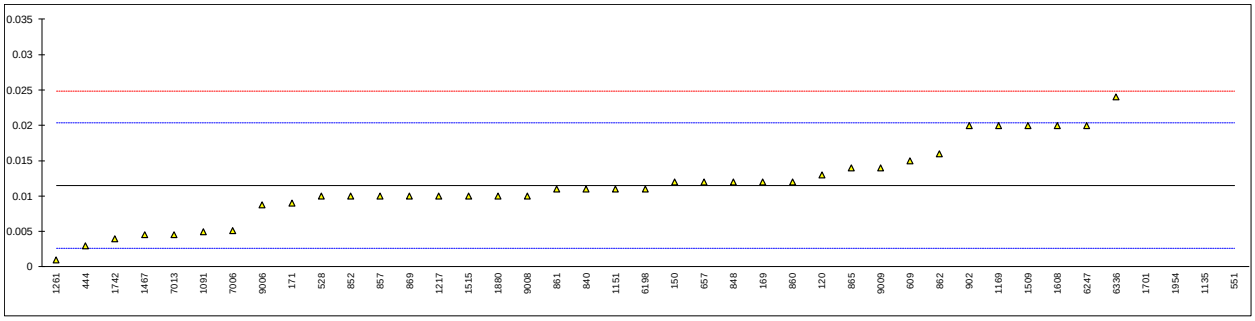


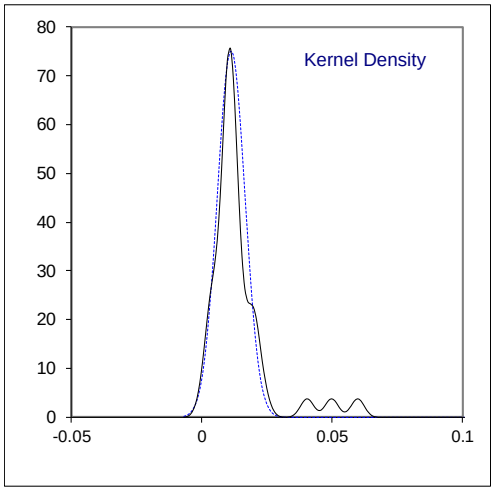


Determination of Iron as Fe on sample #20195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E1615	0.013		0.34	
150	E1615	0.012		0.11	
168		-----		-----	
169	E1615	0.012		0.11	
171	E1615	0.009		-0.56	
174	E1615	<0.01		-----	
311		-----		-----	
323		-----		-----	
343	E1615	<0,01		-----	
347		-----		-----	
370		-----		-----	
395		-----		-----	
396		-----		-----	
444	E1615	0.003		-1.91	
522		-----		-----	
528	E1615	0.010	C	-0.33	first reported 0.0337
551	E394	0.27	C,R(0.01)	58.11	first reported 0.04
557		-----		-----	
558		-----		-----	
609	E1615	0.015		0.79	
610		-----		-----	
621		-----		-----	
657	E1615	0.012		0.11	
840	E394	0.011		-0.11	
848	E394	0.012		0.11	
852	E394	0.01		-0.33	
857	E1615	0.010		-0.33	
860	E394	0.012		0.11	
861	E394	0.011		-0.11	
862	E1615	0.016		1.01	
865	E394	0.014		0.56	
869	E394	0.010		-0.33	
872		-----		-----	
886		-----		-----	
902	E1615	0.02		1.91	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E1615	0.005		-1.46	
1117	E394	< 0,01		-----	
1135	E394	0.06	R(0.01)	10.91	
1151	E394	0.011		-0.11	
1169	E394	0.02		1.91	
1217	E1615	0.01		-0.33	
1261	E394	0.001		-2.36	
1467	E394	0.0046		-1.55	
1509	E394	0.02		1.91	
1515	E394	0.01		-0.33	
1603	In house	N.N. < 0,01		-----	
1608	E394	0.02		1.91	
1656		-----		-----	
1701	E394	0.0406	R(0.01)	6.54	
1718	E394	<0.001		-----	
1742	In house	0.004		-1.68	
1823	E394	N.D.		-----	
1880	E1615	0.010		-0.33	
1954	E394	0.05	C,R(0.01)	8.66	first reported 0.07
2458		-----		-----	
6198	E394	0.011		-0.11	
6247	E394	0.02		1.91	
6262		-----		-----	
6336	E1615	0.024		2.81	
7006	E394	0.0051		-1.44	
7013	E1615	0.0046		-1.55	
9006	E1615	0.0088		-0.60	
9008	E1615	0.01		-0.33	
9009	E1615	0.014		0.56	

normality	OK
n	37
outliers	4
mean (n)	0.0115
st.dev. (n)	0.00531
R(calc.)	0.0149
st.dev.(E1615:16)	0.00445
R(E1615:16)	0.0125





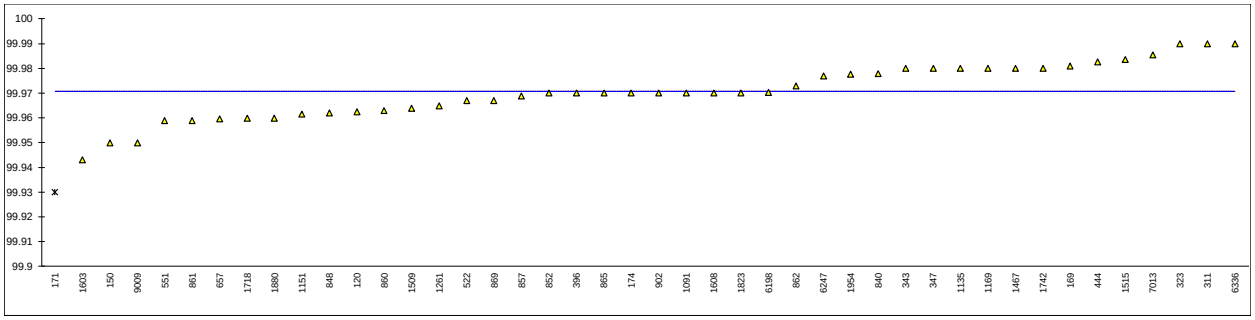
Determination of Miscibility with water (Hydrocarbons) on sample #20195;

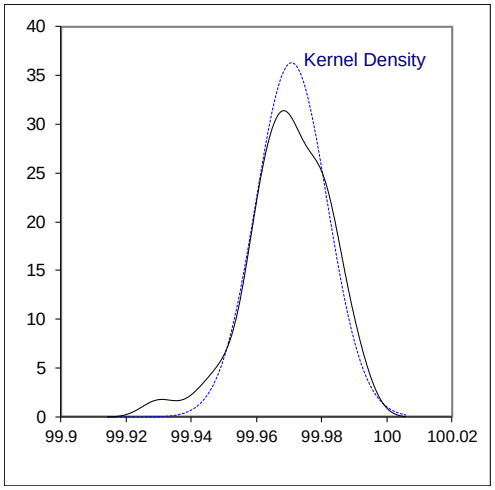
lab	method	value	mark	z(targ)	remarks
120	D1722	passes test		-----	
150	D1722	Pass		-----	
168		-----		-----	
169	D1722	Pass		-----	
171	D1722	Pass		-----	
174	D1722	Pass		-----	
311		-----		-----	
323	D1722	pass		-----	
343	D1722	pass		-----	
347		-----		-----	
370		-----		-----	
395	D1722	PASS		-----	
396	D1722	Passes Test		-----	
444	D1722	Pass		-----	
522		-----		-----	
528		-----		-----	
551	D1722	Passes Test		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657		-----		-----	
840	D1722	Passes test		-----	
848	D1722	pass		-----	
852	D1722	pass		-----	
857	D1722	Passes test		-----	
860	D1722	Pass test		-----	
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		-----		-----	
1217		-----		-----	
1261		-----		-----	
1467		-----		-----	
1509	D1722	Pass		-----	
1515	D1722	Pass		-----	
1603		-----		-----	
1608	D1722	Pass		-----	
1656		-----		-----	
1701		-----		-----	
1718	D1722	Pass		-----	
1742		-----		-----	
1823		-----		-----	
1880		-----		-----	
1954		-----		-----	
2458		-----		-----	
6198		-----		-----	
6247		-----		-----	
6262		-----		-----	
6336	D1722	pass		-----	
7006		-----		-----	
7013		-----		-----	
9006		-----		-----	
9008		-----		-----	
9009		-----		-----	
	n	27			
	mean (n)	Passes test			

Determination of Purity by GC as received on sample #20195; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	E2409	99.9626		-----	
150	E2409	99.95		-----	
168		-----		-----	
169	E2409	99.981		-----	
171	E2409	99.93	R(0.05)	-----	
174	E2409	99.97		-----	
311	In house	99.99		-----	
323	E2409	99.99		-----	
343	E2409	99.98		-----	
347	E202	99.98		-----	
370		-----		-----	
395		-----		-----	
396	E2409	99.97		-----	
444	E2409	99.9826		-----	
522	E2409	99.967		-----	
528		-----		-----	
551	E2409	99.959		-----	
557		-----		-----	
558		-----		-----	
609		-----		-----	
610		-----		-----	
621		-----		-----	
657	E2409	99.9596		-----	
840	E2409	99.978		-----	
848	E2409	99.962		-----	
852	E2409	99.97		-----	
857	E2409	99.969		-----	
860	E2409	99.963		-----	
861	E2409	99.959		-----	
862	E2409	99.973		-----	
865	E2409	99.970		-----	
869	E2409	99.967		-----	
872		-----		-----	
886		-----		-----	
902	E2409	99.97		-----	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	E2409	99.97		-----	
1117	E2409	> 99,9		-----	
1135	E2409	99.98		-----	
1151	E202	99.9615		-----	
1169	E2409	99.98		-----	
1217		-----		-----	
1261	E2409	99.965		-----	
1467	E2409	99.98		-----	
1509	E2409	99.964	C	-----	first reported 99.922
1515	E2409	99.9836		-----	
1603	In house	99.9430		-----	
1608	E2409	99.97		-----	
1656		-----		-----	
1701		-----		-----	
1718	E2409	99.960		-----	
1742	In house	99.98		-----	
1823	E2409	99.97		-----	
1880	E2409	99.96		-----	
1954	E2409	99.9778		-----	
2458		-----		-----	
6198	E2409	99.9703		-----	
6247	E2409	99.977		-----	
6262		-----		-----	
6336	E2409	99.99		-----	
7006		-----		-----	
7013	E2409	99.9854		-----	
9006		-----		-----	
9008		-----		-----	
9009	E2409	99.95		-----	

normality	OK
n	43
outliers	1
mean (n)	99.9707
st.dev. (n)	0.01098
R(calc.)	0.0307
st.dev.(lit.)	unknown
R(lit.)	unknown
Compare:	
R(iis19C14)	0.0383
R(iis18C09)	0.0546

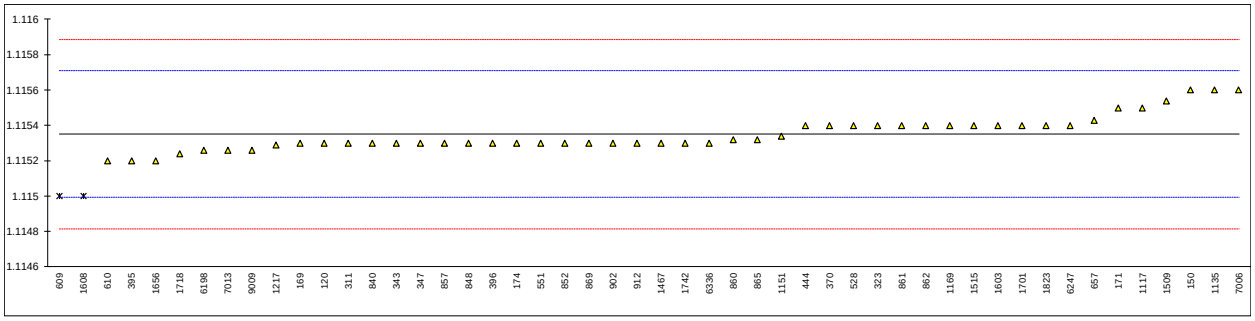


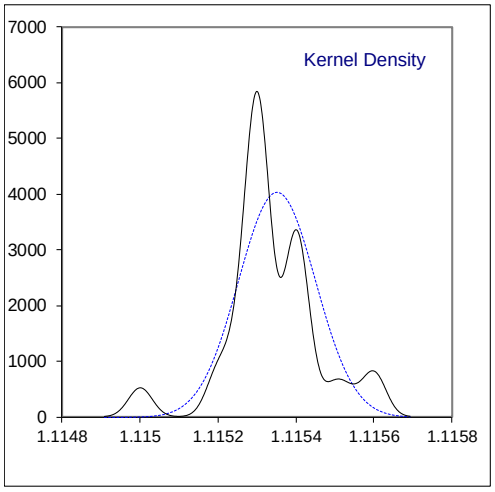


Determination of Specific Gravity 20/20°C on sample #20195;

lab	method	value	mark	z(targ)	remarks
120	D4052	1.11530		-0.28	
150	D4052	1.1156		1.40	
168		-----		-----	
169	D4052	1.1153		-0.28	
171	E202	1.1155		0.84	
174	D4052	1.1153		-0.28	
311	D4052	1.1153		-0.28	
323	E202	1.1154		0.28	
343	D4052	1.1153		-0.28	
347	D4052	1.1153		-0.28	
370	E202	1.1154		0.28	
395	D4052	1.1152		-0.84	
396	D4052	1.1153		-0.28	
444	D4052	1.1154		0.28	
522		-----		-----	
528	D4052	1.1154		0.28	
551	D4052	1.1153		-0.28	
557		-----		-----	
558		-----		-----	
609	D4052	1.1150	R(0.05)	-1.96	
610	D4052	1.1152		-0.84	
621		-----		-----	
657	D4052	1.11543		0.44	
840	D4052	1.1153		-0.28	
848	D4052	1.1153		-0.28	
852	D4052	1.1153		-0.28	
857	D4052	1.1153		-0.28	
860	D4052	1.11532		-0.17	
861	D4052	1.1154		0.28	
862	D4052	1.1154		0.28	
865	D4052	1.11532		-0.17	
869	D4052	1.1153		-0.28	
872		-----		-----	
886		-----		-----	
902	D4052	1.1153		-0.28	
912	D4052	1.1153		-0.28	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091		-----		-----	
1117	D4052	1.1155		0.84	
1135	D4052	1.1156		1.40	
1151	D4052	1.11534		-0.06	
1169	D4052	1.1154		0.28	
1217	E202	1.11529		-0.34	
1261		-----		-----	
1467	D4052	1.1153	C	-0.28	first reported 1.1148
1509	D4052	1.11554		1.06	
1515	D4052	1.1154		0.28	
1603	In house	1.11540		0.28	
1608	D4052	1.1150	R(0.05)	-1.96	
1656	D4052	1.1152		-0.84	
1701	D4052	1.1154		0.28	
1718	D4052	1.11524		-0.62	
1742	D4052	1.1153		-0.28	
1823	D4052	1.1154		0.28	
1880		-----		-----	
1954		-----		-----	
2458		-----		-----	
6198	D4052	1.11526		-0.51	
6247	D4052	1.1154		0.28	
6262		-----		-----	
6336	D4052	1.1153		-0.28	
7006	D4052	1.1156		1.40	
7013	D4052	1.11526		-0.51	
9006		-----		-----	
9008		-----		-----	
9009	D4052	1.11526		-0.51	

normality	suspect
n	48
outliers	2
mean (n)	1.11535
st.dev. (n)	0.000099
R(calc.)	0.00028
st.dev.(E202:18)	0.000179
R(E202:18)	0.0005

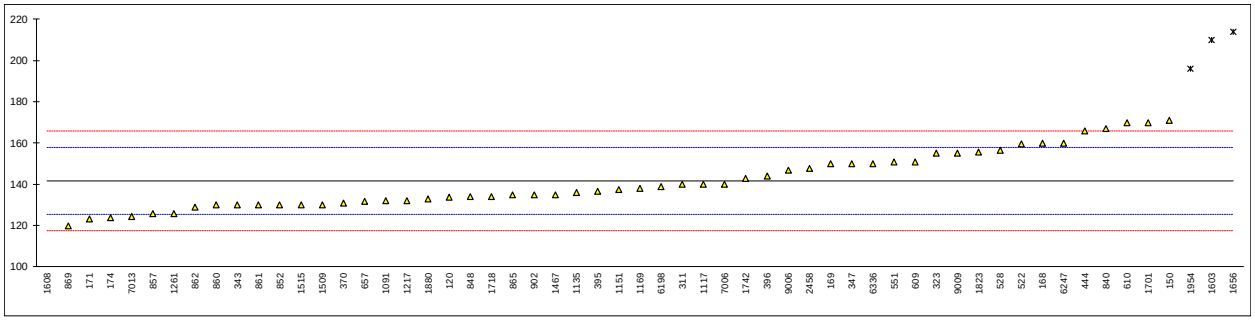


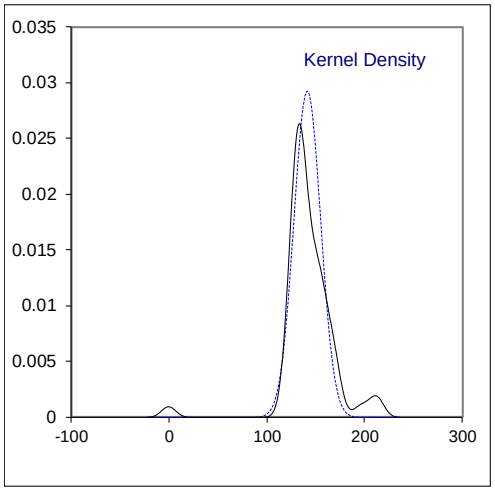


Determination of Water on sample #20195; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E1064	133.8		-0.97	
150	E1064	171		3.65	
168	E1064	160	C	2.28	first reported 178
169	E1064	150		1.04	
171	E1064	123.358		-2.27	
174	E1064	124		-2.19	
311	E203	140		-0.20	
323	D1364	155		1.66	
343	E1064	130		-1.45	
347	E1064	150		1.04	
370	E1064	131		-1.32	
395	E1064	136.7		-0.61	
396	E1064	144		0.30	
444	E1064	166	C	3.03	first reported 0.0166 mg/kg
522	E203	159.7		2.25	
528	E1064	156.6		1.86	
551	E1064	151		1.17	
557		-----		-----	
558		-----		-----	
609	E1064	151		1.17	
610	D6304	169.8		3.50	
621		-----		-----	
657	E1064	131.8		-1.22	
840	E1064	167		3.16	
848	E1064	134		-0.95	
852	E1064	130		-1.45	
857	E1064	126		-1.94	
860	E1064	130		-1.45	
861	E1064	130		-1.45	
862	E1064	129		-1.57	
865	E1064	135		-0.82	
869	E1064	120		-2.69	
872		-----		-----	
886		-----		-----	
902	E1064	135		-0.82	
912		-----		-----	
913		-----		-----	
962		-----		-----	
963		-----		-----	
1091	ISO12937	132		-1.20	
1117	E1064	140		-0.20	
1135	E1064	136		-0.70	
1151	E1064	137.39		-0.53	
1169	E1064	138		-0.45	
1217	E1064	132		-1.20	
1261	E1064	126		-1.94	
1467	E1064	135		-0.82	
1509	E1064	130.2	C	-1.42	first reported 302.6
1515	E1064	130		-1.45	
1603	In house	210	R(0.01)	8.50	
1608	E1064	0	R(0.01)	-17.61	
1656	E1064	214	C,R(0.01)	9.00	first reported 172
1701	E203	170		3.53	
1718	E1064	134		-0.95	
1742	ISO12937	143		0.17	
1823	E1064	155.6		1.74	
1880	E1064	133		-1.07	
1954	E1064	196	C,R(0.05)	6.76	first reported 192
2458	ISO12937	147.8		0.77	
6198	E1064	139		-0.33	
6247	E1064	160	C	2.28	first reported 200
6262		-----		-----	
6336	E203	150		1.04	
7006	E203	140		-0.20	
7013	E1064	124.34		-2.15	
9006	E1064	147		0.67	
9008		-----		-----	
9009	E1064	155		1.66	

normality	OK
n	53
outliers	4
mean (n)	141.62
st.dev. (n)	13.647
R(calc.)	38.21
st.dev.(E1064:16)	8.042
R(E1064:16)	22.52



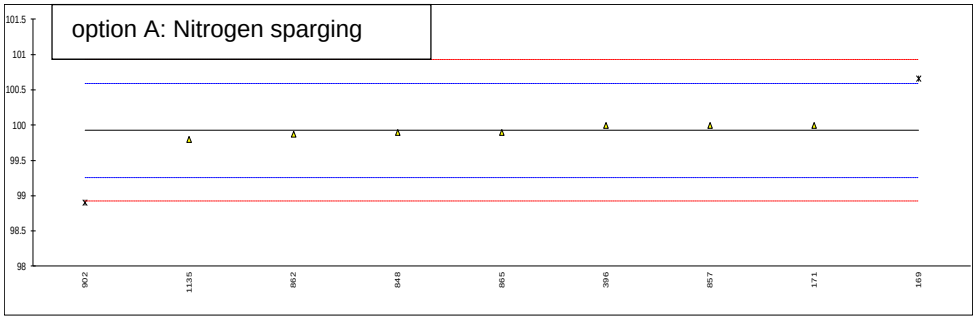


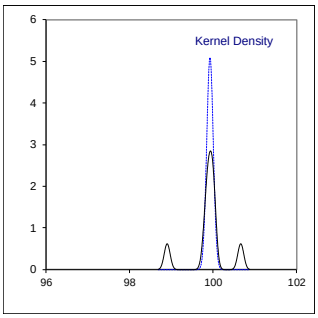
Determination of UV Transmittance at 350nm on sample #20196; results in %Transmittance

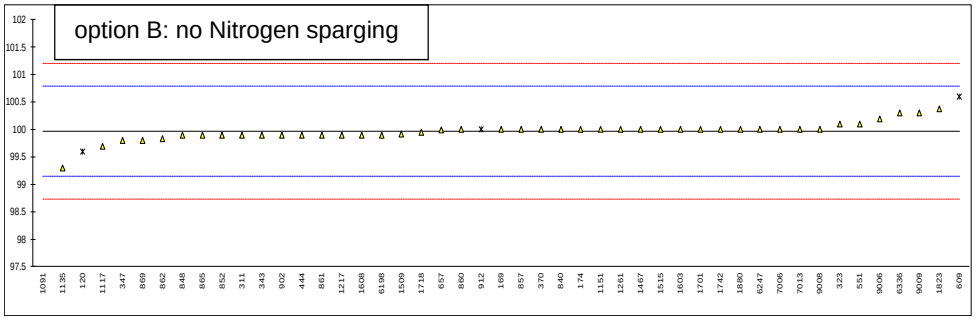
lab	method	cuvet	Option A	mark	z(targ)	method	cuvet	Option B	mark	z(targ)
120			-----		-----	E2193	50 mm	99.6	ex	-0.89
150			-----		-----	E2193	10 mm	>100.0		-----
168			-----		-----	E2193	10 mm	>100.0		-----
169	E2193	10 mm	100.66	D(0.01)	2.20	E2193	10 mm	100.0	C	0.08
171	E2193	10 mm	100.0		0.23			-----		-----
174			-----		-----	E2193	10 mm	100		0.08
311			-----		-----	E2193	10 mm	99.9		-0.16
323			-----		-----	E2193	10 mm	100.1		0.32
343			-----		-----	E2193	10 mm	99.9		-0.16
347			-----		-----	E2193	50 mm	99.8		-0.40
370			-----		-----	E2193	10 mm	100		0.08
395			-----		-----			-----		-----
396	E2193	10 mm	100.0		0.23			-----		-----
444			-----		-----	E2193	10 mm	99.9		-0.16
522			-----		-----			-----		-----
528			-----		-----			-----		-----
551			-----		-----	E2193	10 mm	100.1		0.32
557			-----		-----			-----		-----
558			-----		-----			-----		-----
609			-----		-----	E2193	10 mm	100.6	R(0.05)	1.54
610			-----		-----			-----		-----
621			-----		-----			-----		-----
657			-----		-----	E2193	10 mm	99.99		0.06
840			-----		-----	E2193	10 mm	100.00		0.08
848	E2193	50 mm	99.9		-0.07	E2193	50 mm	99.9		-0.16
852			-----		-----	E2193	10 mm	99.9		-0.16
857	E2193	10 mm	100.0		0.23	E2193	10 mm	100.0		0.08
860			-----		-----	E2193	10 mm	100.0		0.08
861			-----		-----	E2193	50 mm	99.9		-0.16
862	E2193	50 mm	99.87		-0.16	E2193	50 mm	99.83		-0.33
865	E2193	10 mm	99.9	C	-0.07	E2193	10 mm	99.9	C	-0.16
869			-----		-----	E2193	10 mm	99.8		-0.40
872			-----		-----			-----		-----
886			-----		-----			-----		-----
902	E2193	10 mm	98.9	D(0.01)	-3.06	E2193	10 mm	99.9		-0.16
912			-----		-----	E2193		100	ex	0.08
913			-----		-----			-----		-----
962			-----		-----			-----		-----
963			-----		-----			-----		-----
1091			-----		-----	E2193	10 mm	81.5	R(0.01)	-44.81
1117			-----		-----	E2193	50 mm	99.7		-0.65
1135	E2193	10 mm	99.8		-0.37	E2193	10 mm	99.3		-1.62
1151			-----		-----	E2193	10 mm	100.00		0.08
1169			-----		-----			-----		-----
1217			-----		-----	E2193	50 mm	99.9		-0.16
1261			-----		-----	In house	10 mm	100		0.08
1467			-----		-----	E2193	10 mm	100		0.08
1509			-----		-----	E2193	50 mm	99.92		-0.11
1515			-----		-----	E2193	50 mm	100.0		0.08
1603			-----		-----	In house	10 mm	100		0.08
1608			-----		-----	E2193	50 mm	99.9		-0.16
1656			-----		-----			-----		-----
1701			-----		-----	E2193	10 mm	100		0.08
1718			-----		-----	E2193	50 mm	99.95		-0.04
1742			-----		-----	E2193	10 mm	100.0		0.08
1823			-----		-----	E2193	50 mm	100.38		1.00
1880			-----		-----	E2193	10 mm	100.0		0.08
1954			-----		-----			-----		-----
2458			-----		-----			-----		-----
6198			-----		-----	E2193	10 mm	99.90		-0.16
6247			-----		-----	E2193	10 mm	100.0		0.08
6262			-----		-----			-----		-----
6336			-----		-----	E2193	10 mm	100.3		0.81
7006			-----		-----	E2193		100		0.08
7013			-----		-----	E2193	10 mm	100.0		0.08
9006			-----		-----	E2193	10 mm	100.2		0.57
9008			-----		-----	E2193	10 mm	100		0.08
9009			-----		-----	E2193	10 mm	100.305		0.82

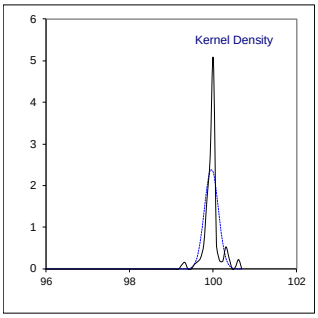
normality	OK	not OK
n	7	43
outliers	2	2 +2ex
mean (n)	99.924	99.967
st.dev. (n)	0.0783	0.1653
R(calc.)	0.219	0.463
st.dev.(E2193:16)	0.3343	0.4121
R(E2193:16)	0.936	1.154

Lab 120 test result excluded because of statistical outliers in related parameters
Lab 169 first reported 101.39
Lab 865 first reported 79.6 for option A and 93.20 for option B
Lab 912 test result excluded because of statistical outliers in related parameters







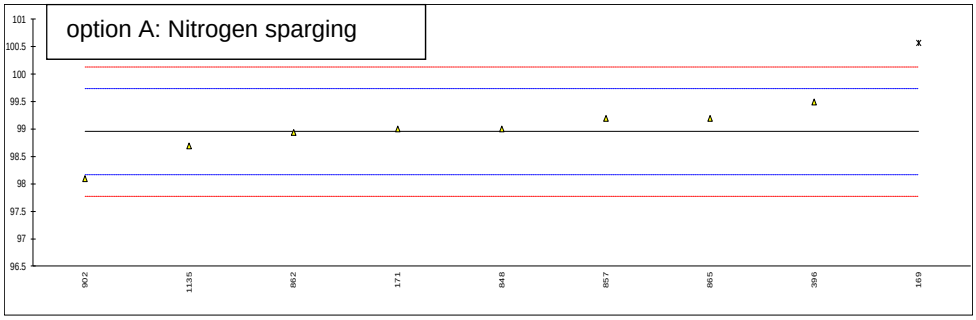


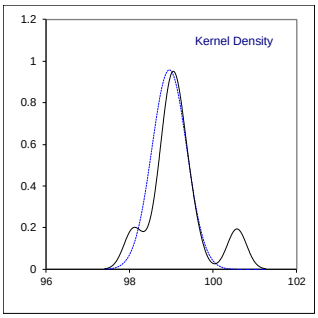
Determination of UV Transmittance at 275nm on sample #20196; results in %Transmittance

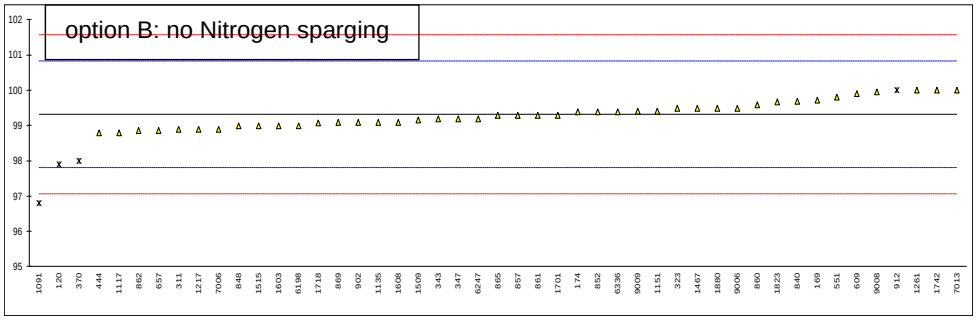
lab	method	cuvet	Option A	mark	z(targ)	method	cuvet	Option B	mark	z(targ)
120			-----		-----	E2193	50 mm	97.9	R(0.05)	-1.89
150			-----		-----	E2193	10 mm	>100.0		-----
168			-----		-----	E2193	10 mm	>100.0		-----
169	E2193	10 mm	100.57	D(0.05)	4.12	E2193	10 mm	99.73	C	0.54
171	E2193	10 mm	99.0		0.11			-----		-----
174			-----		-----	E2193	10 mm	99.4		0.10
311			-----		-----	E2193	10 mm	98.9		-0.56
323			-----		-----	E2193	10 mm	99.5		0.24
343			-----		-----	E2193	10 mm	99.2		-0.16
347			-----		-----	E2193	50 mm	99.2		-0.16
370			-----		-----	E2193	10 mm	98	R(0.05)	-1.76
395			-----		-----			-----		-----
396	E2193	10 mm	99.5		1.39			-----		-----
444			-----		-----	E2193	10 mm	98.8		-0.69
522			-----		-----			-----		-----
528			-----		-----			-----		-----
551			-----		-----	E2193	10 mm	99.8		0.64
557			-----		-----			-----		-----
558			-----		-----			-----		-----
609			-----		-----	E2193	10 mm	99.9		0.77
610			-----		-----			-----		-----
621			-----		-----			-----		-----
657			-----		-----	E2193	10 mm	98.86		-0.61
840			-----		-----	E2193	10 mm	99.69		0.49
848	E2193	50 mm	99.0		0.11	E2193	50 mm	99.0		-0.43
852			-----		-----	E2193	10 mm	99.4		0.10
857	E2193	10 mm	99.2		0.62	E2193	10 mm	99.3		-0.03
860			-----		-----	E2193	10 mm	99.6		0.37
861			-----		-----	E2193	50 mm	99.3		-0.03
862	E2193	50 mm	98.94		-0.04	E2193	50 mm	98.86		-0.61
865	E2193	10 mm	99.2	C	0.62	E2193	10 mm	99.3	C	-0.03
869			-----		-----	E2193	10 mm	99.1		-0.29
872			-----		-----			-----		-----
886			-----		-----			-----		-----
902	E2193	10 mm	98.1		-2.18	E2193	10 mm	99.1		-0.29
912			-----		-----	E2193		100	ex	0.90
913			-----		-----			-----		-----
962			-----		-----			-----		-----
963			-----		-----			-----		-----
1091			-----		-----	E2193	10 mm	96.8	R(0.01)	-3.35
1117			-----		-----	E2193	50 mm	98.8		-0.69
1135	E2193	10 mm	98.7		-0.65	E2193	10 mm	99.1	C	-0.29
1151			-----		-----	E2193	10 mm	99.41		0.12
1169			-----		-----			-----		-----
1217			-----		-----	E2193	50 mm	98.9		-0.56
1261			-----		-----	In house	10 mm	100		0.90
1467			-----		-----	E2193	10 mm	99.5		0.24
1509			-----		-----	E2193	50 mm	99.16		-0.21
1515			-----		-----	E2193	50 mm	99.0		-0.43
1603			-----		-----	In house	10 mm	99		-0.43
1608			-----		-----	E2193	50 mm	99.1		-0.29
1656			-----		-----			-----		-----
1701			-----		-----	E2193	10 mm	99.3		-0.03
1718			-----		-----	E2193	50 mm	99.08		-0.32
1742			-----		-----	E2193	10 mm	100.0		0.90
1823			-----		-----	E2193	50 mm	99.68		0.48
1880			-----		-----	E2193	10 mm	99.5		0.24
1954			-----		-----			-----		-----
2458			-----		-----			-----		-----
6198			-----		-----	E2193	10 mm	99.00		-0.43
6247			-----		-----	E2193	10 mm	99.2		-0.16
6262			-----		-----			-----		-----
6336			-----		-----	E2193	10 mm	99.4		0.10
7006			-----		-----	E2193		98.9		-0.56
7013			-----		-----	E2193	10 mm	100.0		0.90
9006			-----		-----	E2193	10 mm	99.5		0.24
9008			-----		-----	E2193	10 mm	99.95		0.84
9009			-----		-----	E2193	10 mm	99.409		0.12

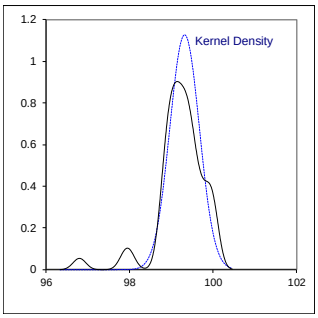
normality	not OK	OK
n	8	43
outliers	1	3 +1ex
mean (n)	98.955	99.322
st.dev. (n)	0.4170	0.3537
R(calc.)	1.168	0.990
st.dev.(E2193:16)	0.3921	0.7518
R(E2193:16)	1.098	2.105

Lab 169 first reported 101.12
Lab 865 first reported 96.3 for option A and 98.4 for option B
Lab 912 test result excluded because of statistical outliers in related parameters
Lab 1135 first reported 97.0







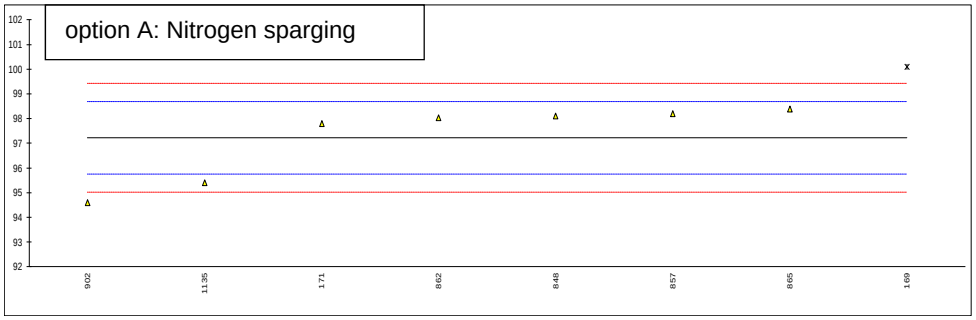


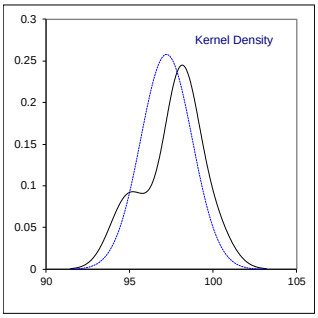
Determination of UV Transmittance at 250nm on sample #20196; results in %Transmittance

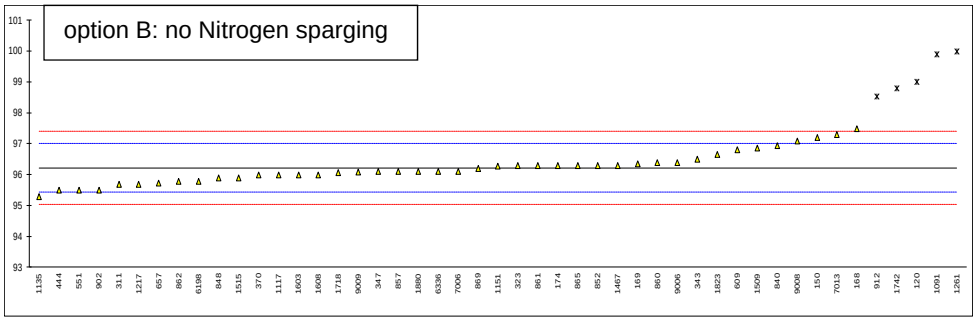
lab	method	cuvet	Option A	mark	z(targ)	method	cuvet	Option B	mark	z(targ)
120			-----		-----	E2193	50 mm	99.0	R(0.01)	7.06
150			-----		-----	E2193	10 mm	97.2		2.49
168			-----		-----	E2193	10 mm	97.5		3.25
169	E2193	10 mm	100.09	ex	3.89	E2193	10 mm	96.35	C	0.33
171	E2193	10 mm	97.8		0.79			-----		-----
174			-----		-----	E2193	10 mm	96.3		0.20
311			-----		-----	E2193	10 mm	95.7		-1.32
323			-----		-----	E2193	10 mm	96.3		0.20
343			-----		-----	E2193	10 mm	96.5		0.71
347			-----		-----	E2193	50 mm	96.1		-0.31
370			-----		-----	E2193	10 mm	96		-0.56
395			-----		-----			-----		-----
396			-----		-----			-----		-----
444			-----		-----	E2193	10 mm	95.5		-1.83
522			-----		-----			-----		-----
528			-----		-----			-----		-----
551			-----		-----	E2193	10 mm	95.5		-1.83
557			-----		-----			-----		-----
558			-----		-----			-----		-----
609			-----		-----	E2193	10 mm	96.8		1.47
610			-----		-----			-----		-----
621			-----		-----			-----		-----
657			-----		-----	E2193	10 mm	95.72		-1.27
840			-----		-----	E2193	10 mm	96.94		1.83
848	E2193	50 mm	98.1		1.19	E2193	50 mm	95.9		-0.81
852			-----		-----	E2193	10 mm	96.3		0.20
857	E2193	10 mm	98.2		1.33	E2193	10 mm	96.1		-0.31
860			-----		-----	E2193	10 mm	96.4		0.46
861			-----		-----	E2193	50 mm	96.3		0.20
862	E2193	50 mm	98.05		1.12	E2193	50 mm	95.79		-1.09
865	E2193	10 mm	98.4	C	1.60	E2193	10 mm	96.3	C	0.20
869			-----		-----	E2193	10 mm	96.2		-0.05
872			-----		-----			-----		-----
886			-----		-----			-----		-----
902	E2193	10 mm	94.6		-3.56	E2193	10 mm	95.5		-1.83
912			-----		-----	E2193		98.54	R(0.01)	5.89
913			-----		-----			-----		-----
962			-----		-----			-----		-----
963			-----		-----			-----		-----
1091			-----		-----	E2193	10 mm	99.9	R(0.01)	9.35
1117			-----		-----	E2193	50 mm	96.0		-0.56
1135	E2193	10 mm	95.4		-2.47	E2193	10 mm	95.3	C	-2.34
1151			-----		-----	E2193	10 mm	96.28		0.15
1169			-----		-----			-----		-----
1217			-----		-----	E2193	50 mm	95.7		-1.32
1261			-----		-----	In house	10 mm	100	R(0.01)	9.60
1467			-----		-----	E2193	10 mm	96.3	C	0.20
1509			-----		-----	E2193	50 mm	96.86		1.63
1515			-----		-----	E2193	50 mm	95.9		-0.81
1603			-----		-----	In house	10 mm	96		-0.56
1608			-----		-----	E2193	50 mm	96.0		-0.56
1656			-----		-----			-----		-----
1701			-----		-----			-----		-----
1718			-----		-----	E2193	50 mm	96.07		-0.38
1742			-----		-----	E2193	10 mm	98.8	R(0.01)	6.55
1823			-----		-----	E2193	50 mm	96.66		1.12
1880			-----		-----	E2193	10 mm	96.1		-0.31
1954			-----		-----			-----		-----
2458			-----		-----			-----		-----
6198			-----		-----	E2193	10 mm	95.79		-1.09
6247			-----		-----			-----		-----
6262			-----		-----			-----		-----
6336			-----		-----	E2193	10 mm	96.1		-0.31
7006			-----		-----	E2193		96.1		-0.31
7013			-----		-----	E2193	10 mm	97.3		2.74
9006			-----		-----	E2193	10 mm	96.4		0.46
9008			-----		-----	E2193	10 mm	97.10		2.24
9009			-----		-----	E2193	10 mm	96.095		-0.32

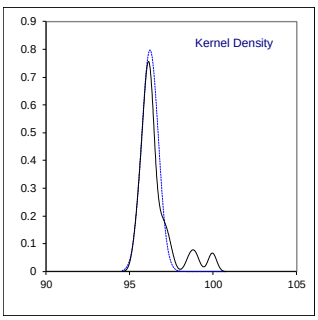
normality	unknown	OK
n	7	42
outliers	0 +1ex	5
mean (n)	97.221	96.220
st.dev. (n)	1.5454	0.5005
R(calc.)	4.327	1.401
st.dev.(E2193:16)	0.7368	0.3936
R(E2193:16)	2.063	1.102

Lab 169 test result excluded because of statistical outliers in related parameters
Lab 169 first reported 97.74 for option B
Lab 865 first reported 99.3 for option A and 99.2 for option B
Lab 1135 first reported 94.8
Lab 1467 first reported 97.79







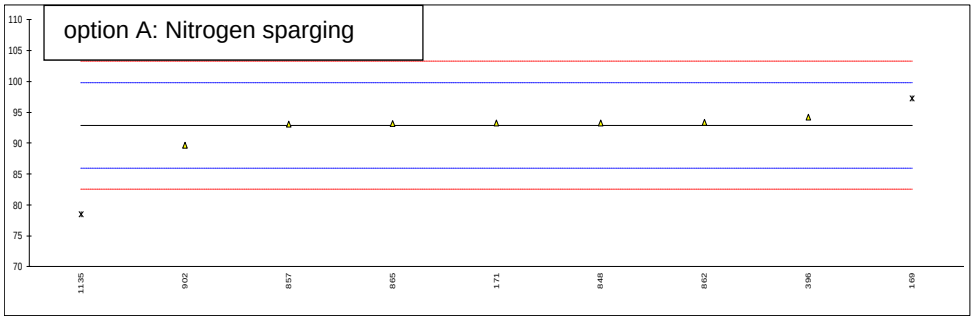


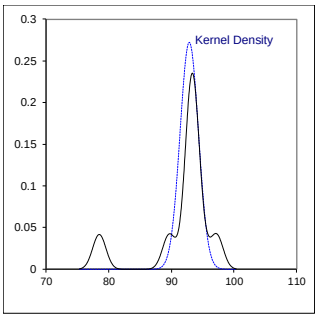
Determination of UV Transmittance at 220nm on sample #20196; results in %Transmittance

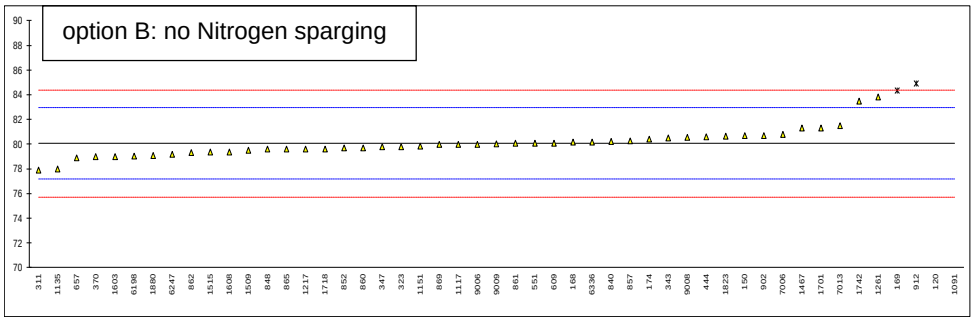
lab	method	cuvet	Option A	mark	z(targ)	method	cuvet	Option B	mark	z(targ)
120			-----		-----	E2193	50 mm	99.0	R(0.01)	13.11
150			-----		-----	E2193	10 mm	80.7		0.44
168			-----		-----	E2193	10 mm	80.2		0.10
169	E2193	10 mm	97.25	ex	1.26	E2193	10 mm	84.37	R(0.05)	2.98
171	E2193	10 mm	93.3		0.12			-----		-----
174			-----		-----	E2193	10 mm	80.4		0.24
311			-----		-----	E2193	10 mm	77.9		-1.49
323			-----		-----	E2193	10 mm	79.8		-0.18
343			-----		-----	E2193	10 mm	80.5		0.31
347			-----		-----	E2193	50 mm	79.8		-0.18
370			-----		-----	E2193	10 mm	79		-0.73
395			-----		-----			-----		-----
396	E2193	10 mm	94.3		0.40			-----		-----
444			-----		-----	E2193	10 mm	80.6		0.37
522			-----		-----			-----		-----
528			-----		-----			-----		-----
551			-----		-----	E2193	10 mm	80.1		0.03
557			-----		-----			-----		-----
558			-----		-----			-----		-----
609			-----		-----	E2193	10 mm	80.1		0.03
610			-----		-----			-----		-----
621			-----		-----			-----		-----
657			-----		-----	E2193	10 mm	78.89		-0.81
840			-----		-----	E2193	10 mm	80.24		0.13
848	E2193	50 mm	93.3		0.12	E2193	50 mm	79.6		-0.32
852			-----		-----	E2193	10 mm	79.7		-0.25
857	E2193	10 mm	93.1		0.06	E2193	10 mm	80.3		0.17
860			-----		-----	E2193	10 mm	79.7		-0.25
861			-----		-----	E2193	50 mm	80.1		0.03
862	E2193	50 mm	93.41		0.15	E2193	50 mm	79.32		-0.51
865	E2193	10 mm	93.2	C	0.09	E2193	10 mm	79.6	C	-0.32
869			-----		-----	E2193	10 mm	80.0		-0.04
872			-----		-----			-----		-----
886			-----		-----			-----		-----
902	E2193	10 mm	89.7		-0.93	E2193	10 mm	80.7		0.44
912			-----		-----	E2193		84.92	R(0.05)	3.36
913			-----		-----			-----		-----
962			-----		-----			-----		-----
963			-----		-----			-----		-----
1091			-----		-----	E2193	10 mm	100.3	R(0.01)	14.00
1117			-----		-----	E2193	50 mm	80.0		-0.04
1135	E2193	10 mm	78.5	C,D(0.01)	-4.16	E2193	10 mm	78.0		-1.42
1151			-----		-----	E2193	10 mm	79.84		-0.15
1169			-----		-----			-----		-----
1217			-----		-----	E2193	50 mm	79.6		-0.32
1261			-----		-----	In house	10 mm	83.836		2.61
1467			-----		-----	E2193	10 mm	81.30		0.86
1509			-----		-----	E2193	50 mm	79.51		-0.38
1515			-----		-----	E2193	50 mm	79.4		-0.46
1603			-----		-----	In house	10 mm	79		-0.73
1608			-----		-----	E2193	50 mm	79.4		-0.46
1656			-----		-----			-----		-----
1701			-----		-----	E2193	10 mm	81.3		0.86
1718			-----		-----	E2193	50 mm	79.60		-0.32
1742			-----		-----	E2193	10 mm	83.5		2.38
1823			-----		-----	E2193	50 mm	80.65		0.41
1880			-----		-----	E2193	10 mm	79.1		-0.66
1954			-----		-----			-----		-----
2458			-----		-----			-----		-----
6198			-----		-----	E2193	10 mm	79.04		-0.70
6247			-----		-----	E2193	10 mm	79.2		-0.59
6262			-----		-----			-----		-----
6336			-----		-----	E2193	10 mm	80.2		0.10
7006			-----		-----	E2193		80.8		0.51
7013			-----		-----	E2193	10 mm	81.5		1.00
9006			-----		-----	E2193	10 mm	80.0		-0.04
9008			-----		-----	E2193	10 mm	80.56		0.35
9009			-----		-----	E2193	10 mm	80.05		-0.01

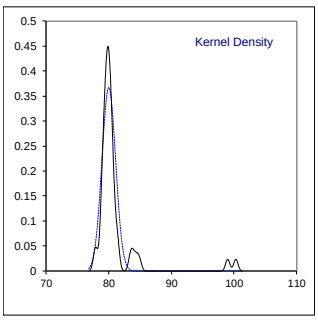
normality	not OK	not OK
n	7	45
outliers	1 +1ex	4
mean (n)	92.901	80.059
st.dev. (n)	1.4669	1.0891
R(calc.)	4.107	3.049
st.dev.(E2193:16)	3.4579	1.4454
R(E2193:16)	9.682	4.047

Lab 169 test result excluded because of statistical outliers in related parameters
Lab 865 first reported 99.9 for option A and 99.9 for option B
Lab 1135 first reported 77.7









APPENDIX 2

Number of participants per country

4 labs in	BELGIUM
3 labs in	BRAZIL
2 labs in	CANADA
10 labs in	CHINA, People's Republic
1 lab in	FINLAND
2 labs in	GERMANY
5 labs in	INDIA
1 lab in	INDONESIA
2 labs 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
2 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
2 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
4 ISO5725:86
5 ISO5725, parts 1-6, 1994
6 ISO13528:05
7 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
8 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
9 IP367:84
10 DIN38402 T41/42
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.
14 P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364 (2002)
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)